UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No. 7538P057
(maximum 12 characters)

First Named Inventor Philippe Kahn

Title: Method and System for Waking Up a Device Due to Motion

ADDRESS TO: **Commissioner for Patents**
P.O. Box 1450
Alexandria, Virginia 22313-1450

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. _____ **Fee Transmittal Form (e.g., PTO/SB/17)**
(Submit an original and a duplicate for fee processing)

2. _____ **Applicant Claims Small Entity Status. (37 CFR 1.27)**

3. X **Specification (Total Pages 24)**
(preferred arrangement set forth below)
- Descriptive Title of the Invention
- Cross Reference to Related Applications
- Statement Regarding Fed sponsored R & D
- Reference sequence listing, a table, or a computer program listing appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

4. X **Drawings(s) (35 USC 113) (Total Sheets 7)**

5. _____ **Oath or Declaration (Total Pages ____)**
   a. ____ Newly Executed (Original or Copy)
   b. ____ Copy from a Prior Application (37 CFR 1.63(d))
   (for Continuation/Divisional with Box 18 completed)
      i. ___ DELETIONS OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
   c. ____ Unsigned.

6. _____ **Application Data Sheet. (37 CFR 1.76)**

7. _____ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)

8. _____ Nucleotide and/or Amino Acid Sequence Submission
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   a. ____ Computer Readable Form (CRF)
   b. ____ Specification Sequence Listing on:
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ACCOMPANYING APPLICATION PARTS

9.	_____	**Assignment Papers (cover sheet & documents(s))**
10.	_____	a. Separate 37 CFR 3.73(b) Statement (where there is an assignee)
	_____	b. Power of Attorney
11.	_____	English Translation Document (if applicable)
12.	_____	a. Information Disclosure Statement (IDS)/PTO-1449 (or PTO/SB/08)
	_____	b. Copies of IDS Citations
13.	_____	**Preliminary Amendment**
14.	_____	**Return Receipt Postcard (MPEP 503) (Should be specifically itemized)**
15.	_____	Certified Copy of Priority Document(s) (if foreign priority is claimed)
16.	__X__	**Nonpublication Request under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.**
17A.	_____	Claim for Foreign Priority
17B.	_____	Other: ____________________

17C. __X__ **Pursuant to 37 C.F.R. 1.136(a)(3), applicant(s) hereby request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. 1.16 and 1.17, to Deposit Account No. 02-2666.**

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title (e.g., by way of preliminary amendment), or in an Application Data Sheet Under 37 C.F.R. 1.76:

____ **Continuation** ____ **Divisional** ____ **Continuation-in-part (CIP)**
Of Prior Application No.: ____________ **Examiner** ______________ **Group Art Unit** ______________
(which is a ___ continuation/ ___ divisional/ ___ CIP of prior application no. ______________,
which is a ___ continuation/ ___ divisional/ ___ CIP of prior application no. ______________) (List entire chain of priority)

Applicant(s): Also include a Preliminary Amendment to amend the specification to claim priority.
For CONTINUATION AND DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

19. Correspondence Address
__X__ **Customer Number or Bar Code Label** 08791
or **(Insert Customer No. or Attach Bar Code Label here)**
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CITY Sunnyvale **STATE** California **ZIP CODE** 94085
Country U.S.A. **TELEPHONE** (408) 720-8300 **FAX** (408) 720-8383

CERTIFICATE OF TRANSMISSION

I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.

Name (PRINT/TYPE): Judith A. Szepesi **Registration No.:** 39,393

Signature: /Judith Szepesi/ **Date:** October 8, 2008

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18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title (e.g., by way of preliminary amendment), or in an Application Data Sheet Under 37 C.F.R. 1.76:

____ Continuation ____ Divisional ____ Continuation-in-part (CIP)
Of Prior Application No.: ____________ Examiner ______________ Group Art Unit ______________
(which is a ___ continuation/ ___ divisional/ ___ CIP of prior application no. ______________,
which is a ___ continuation/ ___ divisional/ ___ CIP of prior application no. ______________) (List entire chain of priority)

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ADDRESS 1279 Oakmead Parkway

CITY Sunnyvale **STATE** California **ZIP CODE** 94085
Country U.S.A. **TELEPHONE** (408) 720-8300 **FAX** (408) 720-8383

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Name (PRINT/TYPE): Judith A. Szepesi **Registration No.:** 39,393

Signature: /Judith Szepesi/ **Date:** October 8, 2008

NONPUBLICATION REQUEST UNDER 35 U.S.C. 122(b)(2)(B)(i)

First Named Inventor Philippe Kahn
Title Method and System for Waking Up a Device Due to Motion

Attorney Docket No. 7538P057

I hereby certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing.

I hereby request that the attached application not be published under 35 U.S.C. 122(b).

October 8, 2008 Date	/Judith Szepesi/ Signature
(408) 720-8300 Telephone Number	Judith A. Szepesi Typed or Printed Name
	39,393 Registration No.

This request must be signed in compliance with 37 CFR 1.33(b) and submitted with the application **upon filing**.

Applicant may rescind this nonpublication request at any time. If applicant rescinds a request that an application not be published under 35 U.S.C. 122(b), the application will be scheduled for publication at eighteen months from the earliest claimed filing date for which a benefit is claimed.

If applicant subsequently files an application directed to the invention disclosed in the attached application in another country, or under a multilateral international agreement, that requires publication of applications eighteen months after filing, the applicant **must** notify the United States Patent and Trademark Office of such filing within forty-five (45) days after the date of the filing of such foreign or international application. **Failure to do so will result in abandonment of this application (35 U.S.C. 122(b)(2)(B)(iii)).**

Patent

UNITED STATES UTILITY PATENT APPLICATION

FOR

METHOD AND SYSTEM FOR WAKING UP A DEVICE DUE TO MOTION

INVENTORS:

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ATTORNEY'S DOCKET NO. 7538P057

METHOD AND SYSTEM FOR WAKING UP A DEVICE DUE TO MOTION

FIELD OF THE INVENTION

[001] This invention relates to a method and system for waking up a device from an idle state.

BACKGROUND

[002] Technological progress has led to the proliferation of commercial electronic devices such as portable computers, game controllers, GPS devices, digital cameras, cellular telephones, and personal media players. Continuous improvements have allowed the users to enjoy many features and possible uses from a single mobile device. However, generally, the more applications a mobile device has, the faster the battery of the mobile device depletes. Therefore, it can be difficult to maximize battery life and provide a great user experience at the same time.

SUMMARY OF THE INVENTION

[003] The present invention provides a method and system to wake up a device due to motion. The system determines a dominant axis of a device. The device is placed in an idle state, after a period of inactivity or lack of motion. A sensor, such as an accelerometer, registers a motion of the device. A computation logic analyzes the motion data to determine if the motion data indicates a real motion. If so, the device is woken up.

BRIEF DESCRIPTION OF THE DRAWINGS

[004] The present invention is illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings and in which like reference numerals refer to similar elements and in which:

[005] Figure 1 is an illustration of one embodiment of moving a device that may require waking up the device.

[006] Figures 2 is a block diagram of one embodiment of a system.

[007] Figure 3 is a flowchart of one embodiment of determining whether to wake up a device based on motion data.

[008] Figure 4 is a flowchart of one embodiment of a process to create a long average of accelerations.

[009] Figure 5 is a flowchart of one embodiment of a process for determining whether a device should be woken up from an idle state.

[0010] Figure 6 is a flowchart of one embodiment of a process to detect and correct glitches in motion data.

[0011] Figure 7 is a block diagram of one embodiment of a computer system that may be used with the present invention.

DETAILED DESCRIPTION

[0012] A method and system for waking up a device due to motion of the device is described. Embodiments of the present invention are designed to determine if a device should be woken up from an idle state based on the analysis of motion data. In one embodiment, motion data for the dominant axis is analyzed and the device is woken up from idle state if the motion data analysis points to the motion being "real" motion as opposed to a mere jostle or glitch.

[0013] The following detailed description of embodiments of the invention makes reference to the accompanying drawings in which like references indicate similar elements, showing by way of illustration specific embodiments of practicing the invention. Description of these embodiments is in sufficient detail to enable those skilled in the art to practice the invention. One skilled in the art understands that other embodiments may be utilized and that logical, mechanical, electrical, functional and other changes may be made without departing from the scope of the present invention. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the present invention is defined only by the appended claims.

[0014] Figure 1 is an illustration of one embodiment of moving an idle device that may result in waking up the device. The idle state is defined, in one embodiment, as a state in which the device is not moving, and there is no active application which includes user interaction/display. In one embodiment, there may be multiple levels of idle state, e.g. where various subsystems are placed in a power-reduced state or not. When the device is in the idle state, the device is placed in low-power mode. In this state, there is sufficient power maintained to monitor at least one sensor. However, other elements and applications are turned off to extend the battery life of the device.

In one embodiment, some applications may remain active. For example, the device may be in the idle state, but continue a download, utilizing a network and memory store. In one embodiment, if at least one subsystem is turned off due to lack of device motion, this may be considered an "idle state."

[0015] In one embodiment, after a device 110 is placed on a horizontal surface 115 such as a desk or chair, after a period of inactivity the device 110 goes to the idle state to conserve the battery. In one embodiment, the device is placed into the pocket, purse, bag, or any other non-moving location, the device enters the idle state.

[0016] The system, in one embodiment, is designed to ensure that when the device is picked up by a user, the device is moved from the idle state to an active state rapidly. By initiating the transition from the idle state to the active state without requiring user input, the user wait is reduced. For example, when a user 100 picks up the device 110 from its position on the horizontal surface 115, the device is designed to wake up. In one embodiment, the device 110 is woken up from idle state and the user is presented the last active state of the device. In one embodiment, this may be sufficiently rapid that by the time the device is being viewed by the user, the prior state has been restored. In contrast, if the table on which the device is resting is shaken, or the purse is jostled, the device should not wake up. This reduces power usage, because the device is not continuously being woken up from small motions which occur when someone walks near a table, sits down, or similarly causes small motions.

[0017] Figure 2 is a block diagram illustrating one embodiment of a system 200 of the present invention. In one embodiment, the system 200 is a portable electronic device. The system 200 in one embodiment comprises motion sensor logic 210, sample period logic 230, glitch correcting logic 235, long average logic 240, dominant axis logic 245, memory 250, computation logic 255, and configuration logic 260.

[0018] In one embodiment, the motion sensor logic 210 comprises an accelerometer 220. In one embodiment, the motion sensor logic 210 also includes one or more additional sensors, such as orientation sensor 215.

[0019] In one embodiment, accelerometer 220 may be used to determine orientation of the device. The orientation may be determined using long averages of accelerations. The sample period logic 230 determines how frequently the motion sensor logic 210 obtains data. In one embodiment, the sample period is preconfigured. In one embodiment, the sample period is adjusted based on the application(s) using the sensor data.

[0020] The accelerometer 220 periodically samples motion data. The long average logic 240 calculates an average of the acceleration data over the sample period. In one embodiment, the long average logic 240 calculates the average of the accelerations over a number of measurements, rather than over a time period. In one embodiment, the long average logic 240 calculates accelerations over 5 minutes. In one embodiment, the long average logic 240 calculates accelerations over 20 measurements.

[0021] In one embodiment, the acceleration data is sent to the glitch correcting logic 235, where the data is analyzed to determine if any it represents a glitch, i.e., data outside a pre-determined range of acceptable data. For example, it is extremely unlikely if not impossible for motion data to go from zero acceleration to 10m/s acceleration in one reading. In one embodiment, the pre-determined range of data is a predetermine change in acceleration from a current acceleration. For example, if the device is idle – e.g. not moving – the range of accelerations possible for the device is fairly limited. In one embodiment, glitch correcting logic 235 further may be used to discard non-human motions. For example, if the device is not being used but is in a moving vehicle, in one embodiment the vehicle's motion can be discarded as not fitting the signature of human motion.

[0022] In one embodiment, the glitch correcting logic 235 discards any abnormal accelerometer reading(s). In one embodiment, the non-glitch data is then passed on to the long average logic 240. In another embodiment, the glitch data is from the long average by glitch correcting logic 235. In one embodiment, if a certain number of glitch data points have been discarded, glitch notifier logic 237 notifies the user. In one embodiment, glitch notifier logic 237 may also notify the manufacturer. The glitches generally are indicative that the accelerometer or sensor is malfunctioning.

[0023] The long average logic 240 calculates one or more long averages of acceleration based on the received motion data. In one embodiment, the long average logic 240 utilizes a ring buffer memory 250, discarding older data as new data is added to the long average. In one embodiment, the long average logic 240 creates a long average of accelerations along a single axis. In one embodiment, the dominant axis – defined as the axis most impacted by gravity -- is used by the long average logic 240. In one embodiment, the axis corresponds to one of the axes of the accelerometer. In one embodiment, the axis is defined as the orientation experiencing the most pull from gravity. In one embodiment, the long average logic 240 creates long averages of accelerations along multiple axes.

[0024] Determining the orientation of an electronic device may include identifying a gravitational influence. The axis with the largest absolute long average may be the axis most influenced by gravity, which may change over time (e.g., as the electronic device is rotated). Therefore, a new dominant axis may be assigned when the orientation of the electronic device and/or the inertial sensor(s) attached to or embedded in the electronic device changes.

[0025] In one embodiment, the actual axis with the largest absolute long average over a sample period is assigned as the dominant axis. In alternative embodiment, the dominant axis does not correspond to one of the actual axes of the inertial sensor(s) in a current orientation, but rather to an axis that is defined as approximately aligned to gravity. In one embodiment, the dominant axis corresponds to a virtual axis that is a component of a virtual coordinate system. In one embodiment, a true gravity assessment, such as by doing trigonometric calculations on the actual axes based on the gravitational influence is performed to determine orientation.

[0026] In one embodiment, a long average of accelerations is computed by the long average logic 240 when the device goes into idle state after a period of inactivity. In one embodiment, the long average and the dominant axis for which it is computed are received by computation logic 255. The computation logic 255 also receives, based on a new sample of motion data, a current dominant axis and an updated current long average for the current dominant axis.

[0027] If the prior and current dominant axes are the same, the computation logic 255 determines if the long average has changed by more than a predetermined threshold. In one embodiment, when the change in the dominant axis is larger than the threshold value, the computation logic 255 communicates with the power logic 265 and the device state logic 270, to power up the device and restore the last active device state. If the change in the dominant axis is not larger than the threshold value, the device is maintained in the idle state.

[0028] In one embodiment, if the new dominant axis is different from the prior dominant axis, the computation logic 255 communicates with the power logic 265 and configuration logic 260 to restore the device to the last active device state.

[0029] Figure 3 is a flowchart of one embodiment of determining whether to wake up a device based on motion data. At block 305, the process starts. In one embodiment, the process runs continuously. In one embodiment, the user may initiate the auto-wake-up system, or set a preference to have the auto-wake-up system on.

[0030] At block 310, the process determines if it is time to sample motion data. In one embodiment, the motion data is sampled periodically. If it is time to sample motion data, the process continues to block 315. Otherwise, the process returns block 310.

[0031] At block 315, the process gets sample motion data. In one embodiment, based on the sample motion data, at least one current/updated long average of accelerations is calculated. In one embodiment, the long average is based on a preset number of measurements, or on a preset time. The process continues to block 320.

[0032] At block 320, the process determines whether the device is in idle state. In one embodiment, the device is placed in idle state after the device has been inactive for a period of time. Inactive, in one embodiment, means that the device is not moving and that there are no user-interactive applications active on the device. In one embodiment, when the device is placed in idle state, a long average is initialized. If the device is not in idle state, the process returns to block 310. If the process determines that the device is in idle state, the process continues to block 325.

[0033] At block 325, the process determines if the device has experienced any motion, e.g. there is a difference between the readings of the accelerometer that are larger than a minimum threshold. In one embodiment, this determination is made by using a filter to remove accelerometer motions below the minimum threshold. If the process determines that no motion has been detected, the process returns to block 310. If the process determines that the accelerometer data indicates a movement of the device, the process continues to block 330.

[0034] At block 330, the process determines if the movement is a “real” motion and not a mere jostle or bump. The device may move, for example, as a result of a little jostle of a desk or table on which the device is laying, a heavy step nearby, or something else that creates a very small motion, but which does not warrant waking up the device. In contrast, the device may move as a result of being picked up by a user intending to use the device. In this case, the movement is a “real” motion which warrants awakening the device.

[0035] If the motion is not a “real” motion, the process returns to block 310. If the movement is a “real” motion, the process continues to block 335. At block 335, the process wakes up the device. The process continues to block 340.

[0036] At block 340, the process in one embodiment configures the device to restore the last device state when the device was active. In one embodiment, the system allows the user to customize the wake-up restoration of the device. For example, the user may customize the system not to start the previously-active applications, but to present a home screen. The process then ends.

[0037] Figure 4 is a flowchart of one embodiment of a process to create a long average of accelerations. The process 400 starts at block 405. In one embodiment, this process is continuously running when the device is powered.

[0038] At block 410, the long average logic, in one embodiment, receives motion data from the accelerometer. In one embodiment, the long average logic receives the data from a glitch correcting logic which removes abnormal data from the motion data before the motion data is passed to the long average logic. The process continues to block 415.

[0039] At block 415, the long average logic adds the sampled motion data to the long average, to create an updated long average of accelerations. In one embodiment, the long average logic maintains a long average only for the dominant axis (e.g., the axis on which the gravitational effect is detected). In another embodiment, the long average logic maintains an average for one or more axes. The process continues to block 420.

[0040] At block 420, the long average logic, in one embodiment, optionally sends the long averages of accelerations for a plurality of axes to the dominant axis logic for determination of the dominant axis. In an alternative embodiment, the dominant axis logic retrieves the long averages of accelerations for a plurality of axes from memory to determine the dominant axis. The process then returns to block 410, to continue receiving motion data.

[0041] Figure 5 is a flowchart of one embodiment of a process 500 for determining whether a device should be woken up from an idle state. The process starts at block 505. In one embodiment, the process is activated when a preset period with no motion has been detected.

[0042] At block 510, the process places the device in idle state after the device has been inactive for a period of time. The process continues to block 515.

[0043] At block 515, the computation logic receives data for the dominant axis DA1 of the idle device and accelerations along DA1 over a sampling period, computed by the long average logic after the device becomes idle. The process continues to block 520.

[0044] At block 520, the computation logic assigns the long average of accelerations along DA1 over a period to Idle Sample (IS). In one embodiment, IS is saved to memory. The process continues to block 525.

[0045] At block 525, the process receives new dominant axis data DA2 and the new acceleration data along DA2. The process continues to block 530.

[0046] At block 530, the computation logic adds the new data to the long average of accelerations along DA2 to generate a Current Sample (CS). Also at block 530, in one embodiment, the computation logic saves CS to memory. The process continues to block 535.

[0047] At block 535, the computation logic compares the idle dominant axis DA1 with the current dominant axis DA2. If the current dominant axis DA2 is different from the idle dominant axis DA1, the process continues to block 545. In one embodiment, the comparison is within a range, e.g. a minimum change of one degree has to occur to identify DA2 as being different from DA1. In one embodiment, if the dominant axis has changed, then the orientation of the device has changed, and that warrants waking up the device. If DA2 is substantially the same as DA1, then the computation logic continues to block 540.

[0048] At block 540, the computation logic determines if the long average along the dominant axis has changed by more than a threshold value, i.e., if the difference between the Current Sample value and the Idle Sample value is larger than the threshold value. In one embodiment, the threshold value is set to 30, which is approximately a 10^{th} of a g. If the difference between IS and CS is less than the threshold value, the process returns to block 510, to continue monitoring the idle state. CS becomes IS, for the next calculation.

[0049] If the computation logic determines that the change in the long average of accelerations along the dominant axis is greater than the threshold, then the computation logic continues to block 545. At block 545, the computation logic communicates with the power logic of the configuration logic to start up the device. The process then ends.

[0050] Figure 6 is a flowchart of an embodiment of a process 600 to detect and correct glitches in motion data. In one embodiment, this process is always active. In one embodiment, this process is active when the device is in the idle state. In one embodiment, the glitch correction takes place before the motion data is added to the long average. The process starts at block 605.

[0051] At block 610, the glitch correcting logic receives motion data from an accelerometer.

[0052] At block 615, the glitch correcting logic determines if the received motion data contains a glitch. In one embodiment, a glitch is a datum that indicates a motion outside an acceptable range. For example, it is extremely unlikely that a device would go from idle (e.g., no motion) to moving at an acceleration of 64 feet per second squared (equivalent to 2 g). The correcting logic examines each datum against a range of acceptable data to determine if the datum falls within this range and, therefore, should be used in calculating the long average of accelerations. In one embodiment, the glitch correction logic utilizes the change in acceleration between two readings to determine whether there is a glitch.

[0053] If the glitch correcting logic determines that the motion data is not a glitch, the glitch correcting logic continues to block 625.

[0054] At block 625, the glitch correcting logic sends the motion data to the long average logic. The process then returns to block 610, to continue monitoring the acceleration data.

[0055] If at block 615, the glitch correcting logic determines that the motion data is outside the allowable range, the glitch correcting logic continues to block 635.

[0056] At block 635, the glitch correcting logic discards the unacceptable motion data. At block 640, the process determines whether there have been an excessive number of glitches. In one embodiment, the glitch correcting logic uses the motion data to detect a possible problem with the accelerometer. In one embodiment, an excessive number of glitches may indicate a problem with the accelerometer. If the process determines that there have been an excessive number of glitches, the process, at block 645, generates an alert regarding the problem. In one embodiment, the alert may be a message to alert the user of the device. In one embodiment, the alert may be a notification to one or more recipients via a network connection. For example, the system may notify a service provider, manufacturer, or other appropriate notification target.

[0057] The process then returns to block 610, to continue monitoring the acceleration data.

[0058] Figure 7 is a block diagram of one embodiment of a computer system that may be used with the present invention. It will be apparent to those of ordinary skill in the art, however that other alternative systems of various system architectures may also be used. The computer system may include a bus or other internal communication means 715 for communicating information, and a processor 710 coupled to the bus 715 for processing information. The system further comprises a random access memory (RAM) or other volatile storage device 750 (referred to as memory), coupled to bus 715 for storing information and instructions to be executed by processor 710. Main memory 750 also may be used for storing temporary variables or other intermediate information during execution of instructions by processor 710. In one embodiment, the system also comprises a read only memory (ROM) and/or static storage device 720 coupled to bus 715 for storing static information and instructions for processor 710, and a data storage device 725 such as a flash memory, magnetic disk, optical disk and its corresponding disk drive. Data storage device 725 is coupled to bus 715 for storing information and instructions.

[0059] The system may include various input/output devices, such as a screen, audio output, keyboard, button, mouse, etc. These I/O devices may also be coupled to bus 715 through bus 765 for communicating information and command selections to processor 710. Another device, which may optionally be coupled to computer system 700, is a communication device 790 for accessing other nodes of a distributed system via a network. The communication device 790 may include any of a number of commercially available networking peripheral devices such as those used for coupling to an Ethernet, token ring, Internet, or wide area network. The communication device 790 may further be a null-modem connection, a wireless connection mechanism, or any other mechanism that provides connectivity between the computer system 700 and the outside world. Note that any or all of the components of this system and associated hardware may be used in various embodiments of the present invention. It will be appreciated by those of ordinary skill in the art that any configuration of the system may be used for various purposes according to the particular implementation. The control logic or software implementing the present invention can be stored in main memory 750, mass storage device 725, or other storage medium locally or remotely accessible to processor 710.

[0060] It will be apparent to those of ordinary skill in the art that the system, method, and process described herein can be implemented as software stored in main memory 750 or read only memory 720 and executed by processor 710. This control logic or software may also be resident on an article of manufacture comprising a computer readable medium having computer readable program code embodied therein and being readable by the mass storage device 725 and for causing the processor 710 to operate in accordance with the methods and teachings herein.

[0061] The present invention may also be embodied in a handheld or portable device containing a subset of the computer hardware components described above. For example, the handheld device may be configured to contain only the bus 715, the processor 710, and memory 750 and/or 725. The present invention may also be embodied in a special purpose appliance including a subset of the computer hardware components described above. For example, the appliance may include a processor 710, a data storage device 725, a bus 715, and memory 750, and only rudimentary communications mechanisms, such as a small touch-screen that permits the user to communicate in a basic manner with the device. In general, the more special-purpose the device is, the fewer of the elements need be present for the device to function. In some devices, communications with the user may be through a touch-based screen, or similar mechanism.

[0062] It will be appreciated by those of ordinary skill in the art that any configuration of the system may be used for various purposes according to the particular implementation. The control logic or software implementing the present invention can be stored on any machine-readable medium locally or remotely accessible to processor 710. A machine-readable medium includes any mechanism for storing or transmitting information in a form readable by a machine (e.g., a computer). For example, a machine readable medium includes read-only memory (ROM), random access memory (RAM), magnetic disk storage media, optical storage media, flash memory devices. In one embodiment, the system may be embodied in a signal, such as an electrical, optical, acoustical or other forms of propagated signal (e.g., carrier waves, infrared signals, digital signals, etc.).

[0063] In the foregoing specification, the invention has been described with reference to specific exemplary embodiments thereof. It will, however, be evident that various modifications and changes may be made thereto without departing from the broader spirit and scope of the invention as set forth in the appended claims. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense.

CLAIMS

What is claimed is:

1. A method comprising:

determining an idle sample value for a dominant axis of a device;

registering a motion of the device; and

waking up the device when the motion of the device indicates a change in the dominant axis of the device.

2. The method of claim 1, wherein determining the idle sample value for the dominant axis comprises:

receiving motion data from a motion sensor;

processing the motion data to establish an idle sample value; and

processing the idle sample value to establish the dominant axis.

3. The method of claim 2, wherein the motion sensor comprises an accelerometer.

4. The method of claim 2, wherein the idle sample value comprises a long-average of accelerations over a sample period along the dominant axis recorded when the device goes to idle mode after a period of inactivity.

5. The method of claim 1, further comprising determining the idle sample value for each of the other axes of the device.

6. The method of claim 1, wherein registering the motion of the device comprises:

receiving motion data from a motion sensor; and

processing the motion data to determine a current sample value of the dominant axis of the device.

7. The method of claim 1, further comprising comparing a difference between a current sample value along the dominant axis determined based on the motion of the device and the idle sample value of the dominant axis against a threshold value.

8. The method of claim 1, wherein the change in the dominant axis comprises a change in acceleration along the dominant axis.

9. The method of claim 1, wherein waking up the device further comprises configuring the device to return to a last active device state.

10. The method of claim 6, wherein the current sample value is a long average of accelerations.

11. The method of claim 6, further comprising determining the current sample value for each of the other axes of the device.

12. The method of claim 6, wherein the motion sensor comprises an accelerometer.

13. The method of claim 6, wherein processing the motion data further comprises

verifying whether the motion data comprises one or more glitches; and

removing the one or more glitches in the motion data from the motion data before calculating the long average.

14. The method of claim 6, further comprising determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value.

15. The method of claim 8, further comprising:

determining a new dominant axis based on the motion data received from the motion sensor;

computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis determined when the device goes to idle mode after a period of inactivity; and

comparing the difference against a threshold value to establish whether to wake the device up.

16. A system comprising:

a long average logic to create one or more long averages of accelerations as measured by a motion sensor over a period of time;

a dominant axis logic to determine a dominant axis of a device based on motion data; and

a computation logic to determine if the long averages of accelerations indicate a true motion of the device.

17. The system of claim 16, further comprising a motion sensor logic to detect motion data.

18. The system of claim 17, wherein the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes.

19. The system of claim 16, further comprising a sample period logic to set the period over which motion data is collected to compute the one or more long averages of accelerations.

20. The system of claim 16, further comprising a power logic to activate the device when the motion data indicates the device should be woken up.

21. The system of claim 16, further comprising a device state logic to restore the device to a last active state.

22. The system of claim 21, wherein the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

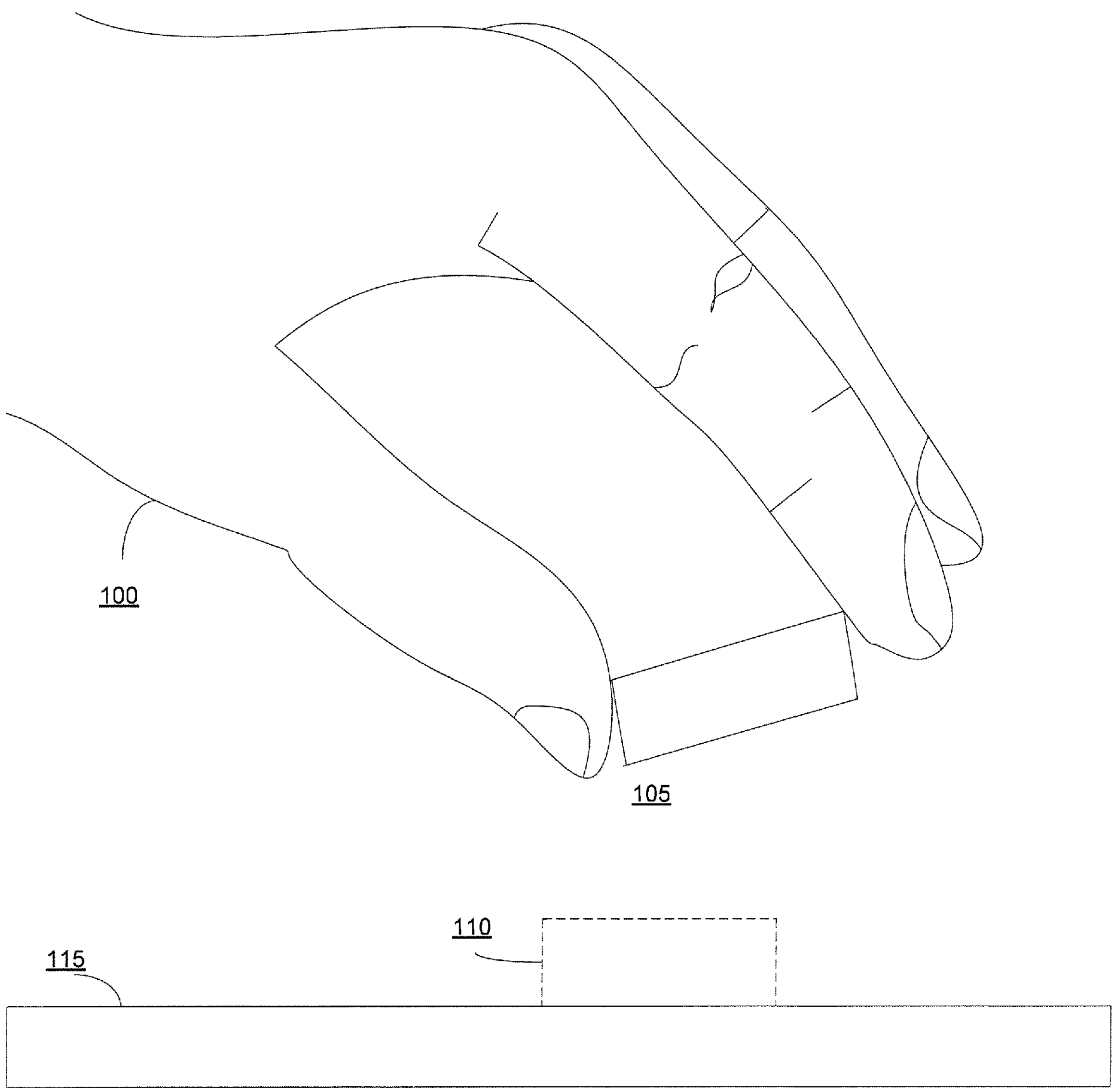
23. The system of claim 16, further comprising a glitch corrector logic to correct one or more glitches in the motion data.

24. The system of claim 23, wherein the glitch corrector removes the one or more glitches before the one or more long averages are calculated.

ABSTRACT

A method comprises determining an idle sample value for a dominant axis of a device in an idle state. The method further comprises registering a motion of the device, and evaluating the motion. The method further comprises waking up the device when the analysis of the motion indicates a change in the dominant axis of the device and/or a level of acceleration beyond a threshold.

Figure 1



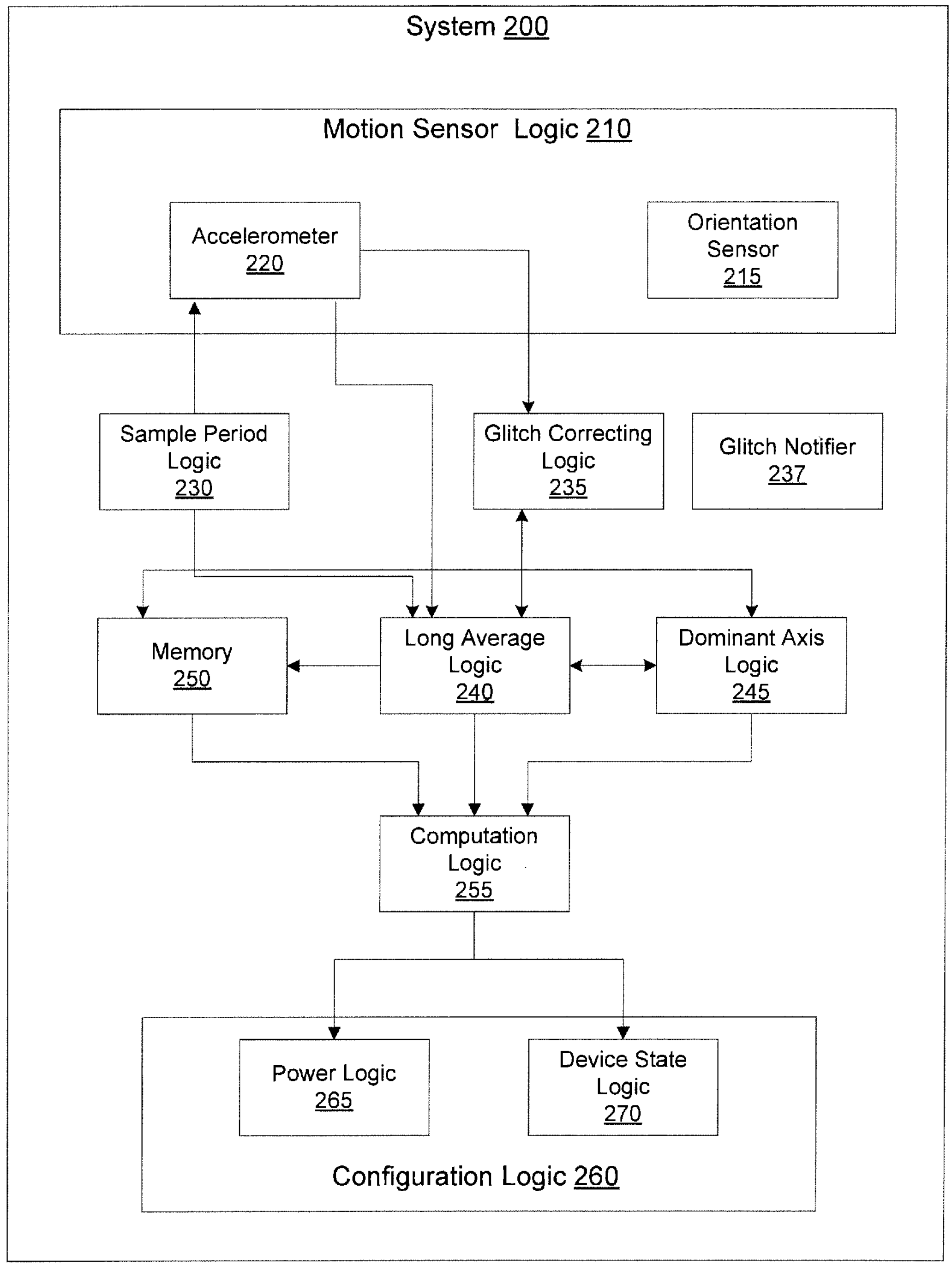

System 200
Motion Sensor Logic 210
Accelerometer 220
Orientation Sensor 215
Sample Period Logic 230
Glitch Correcting Logic 235
Glitch Notifier 237
Memory 250
Long Average Logic 240
Dominant Axis Logic 245
Computation Logic 255
Power Logic 265
Device State Logic 270
Configuration Logic 260

Figure 2

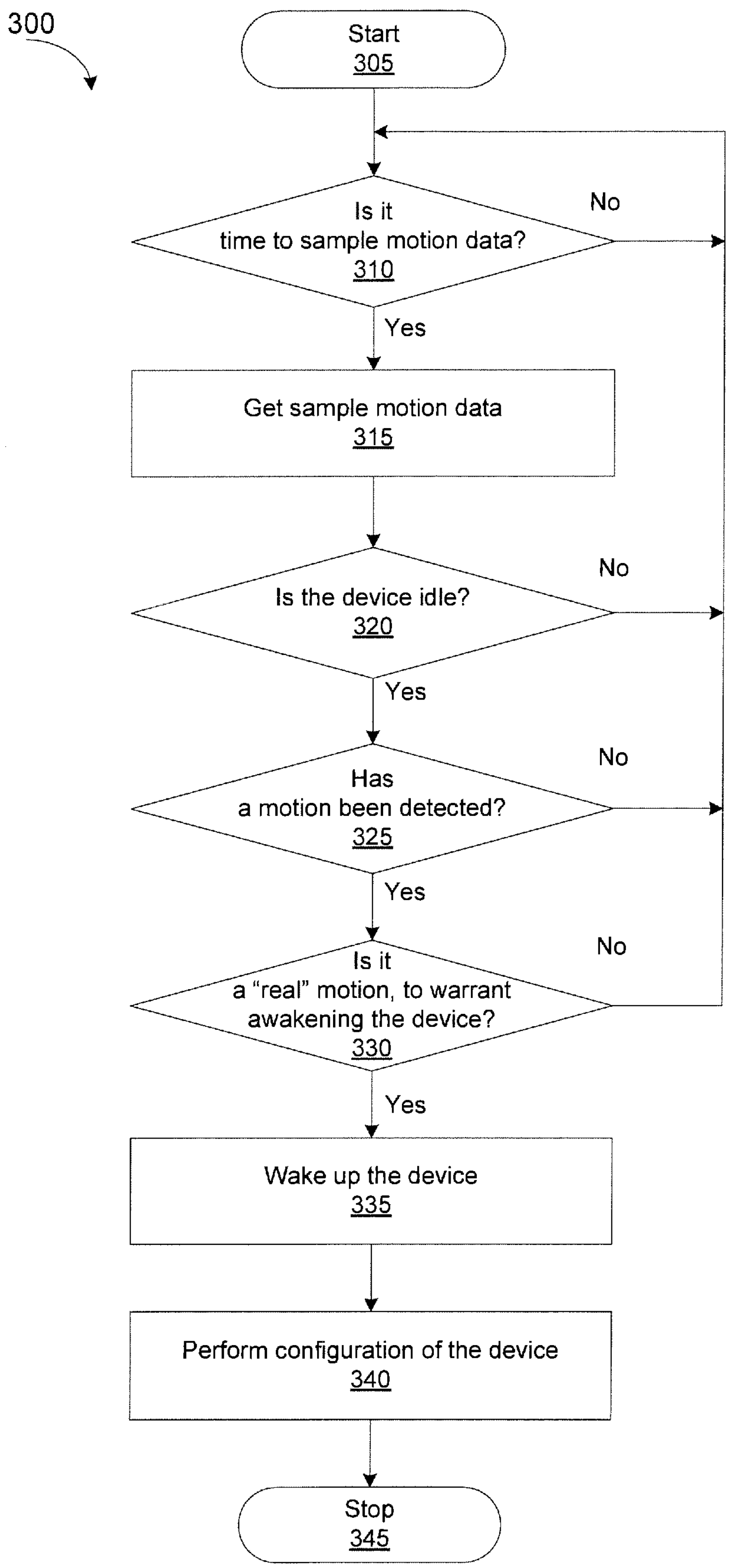

300
Start
305
Is it
time to sample motion data?
310
No
Yes
Get sample motion data
315
Is the device idle?
320
No
Yes
Has
a motion been detected?
325
No
Yes
Is it
a "real" motion, to warrant
awakening the device?
330
No
Yes
Wake up the device
335
Perform configuration of the device
340
Stop
345

Figure 3

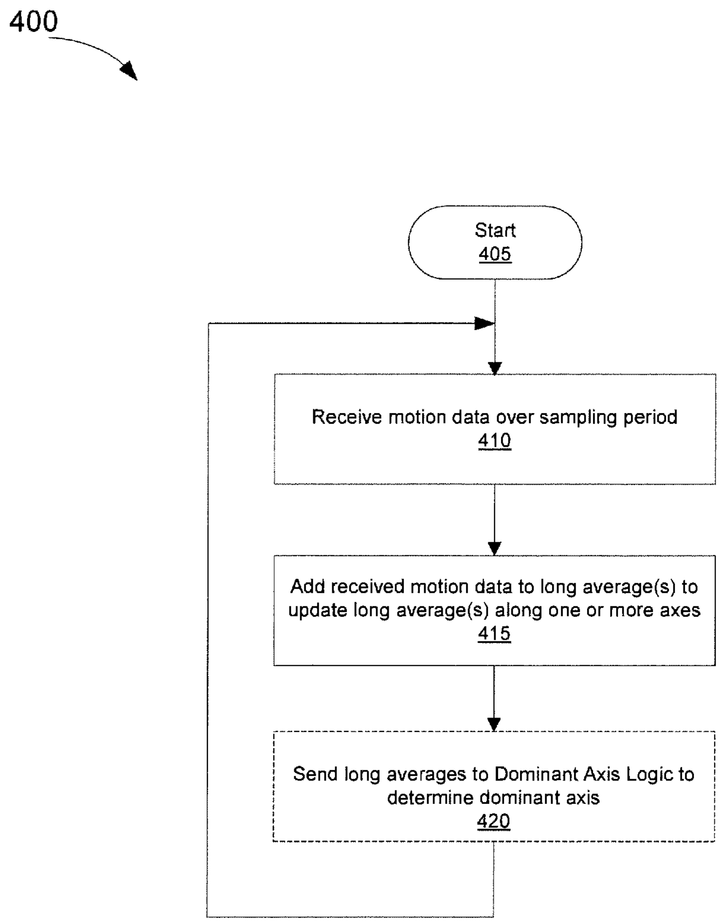

400
Start
405
Receive motion data over sampling period
410
Add received motion data to long average(s) to update long average(s) along one or more axes
415
Send long averages to Dominant Axis Logic to determine dominant axis
420

Figure 4

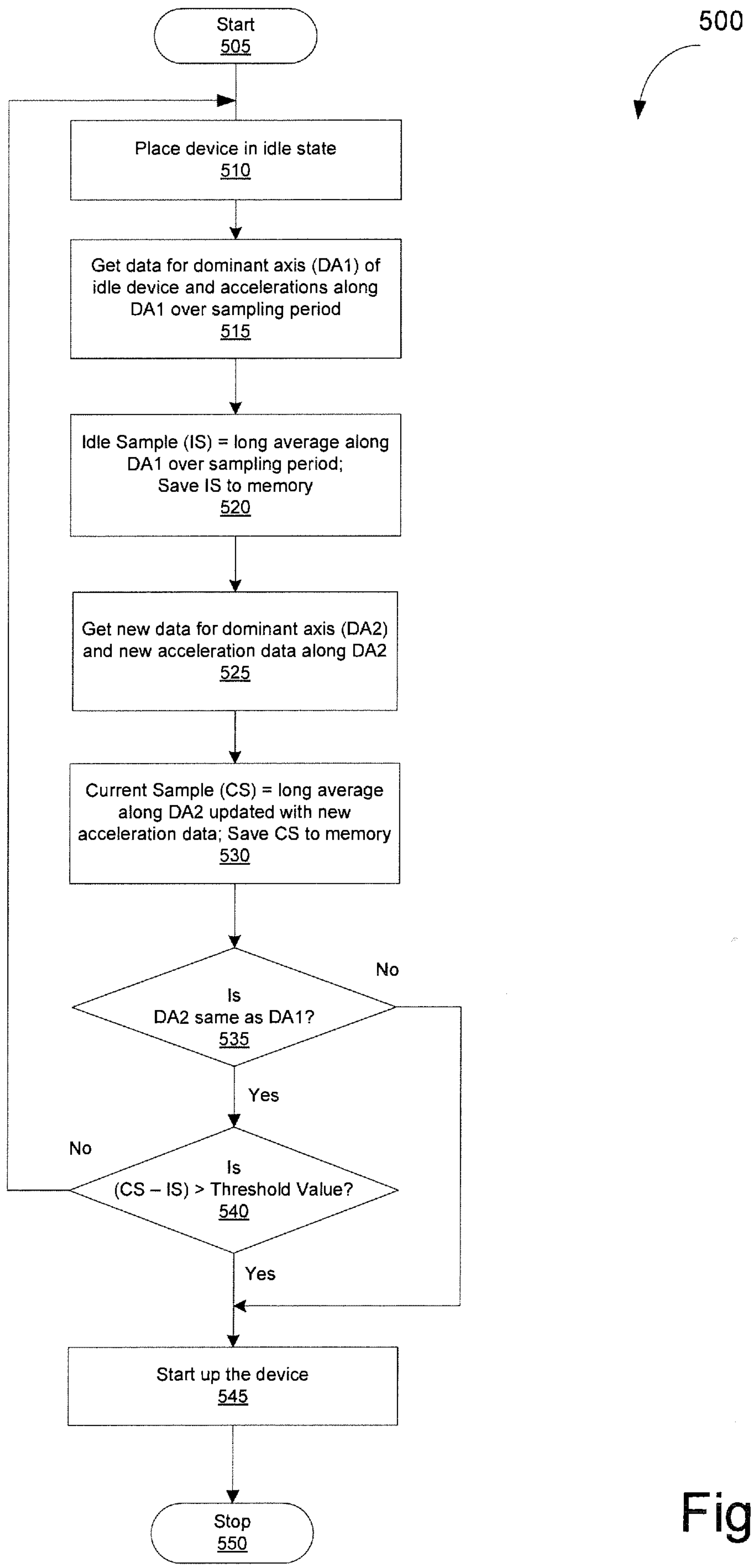

500
Start
505
Place device in idle state
510
Get data for dominant axis (DA1) of idle device and accelerations along DA1 over sampling period
515
Idle Sample (IS) = long average along DA1 over sampling period; Save IS to memory
520
Get new data for dominant axis (DA2) and new acceleration data along DA2
525
Current Sample (CS) = long average along DA2 updated with new acceleration data; Save CS to memory
530
Is DA2 same as DA1?
535
No
Yes
Is (CS – IS) > Threshold Value?
540
No
Yes
Start up the device
545
Stop
550

Figure 5

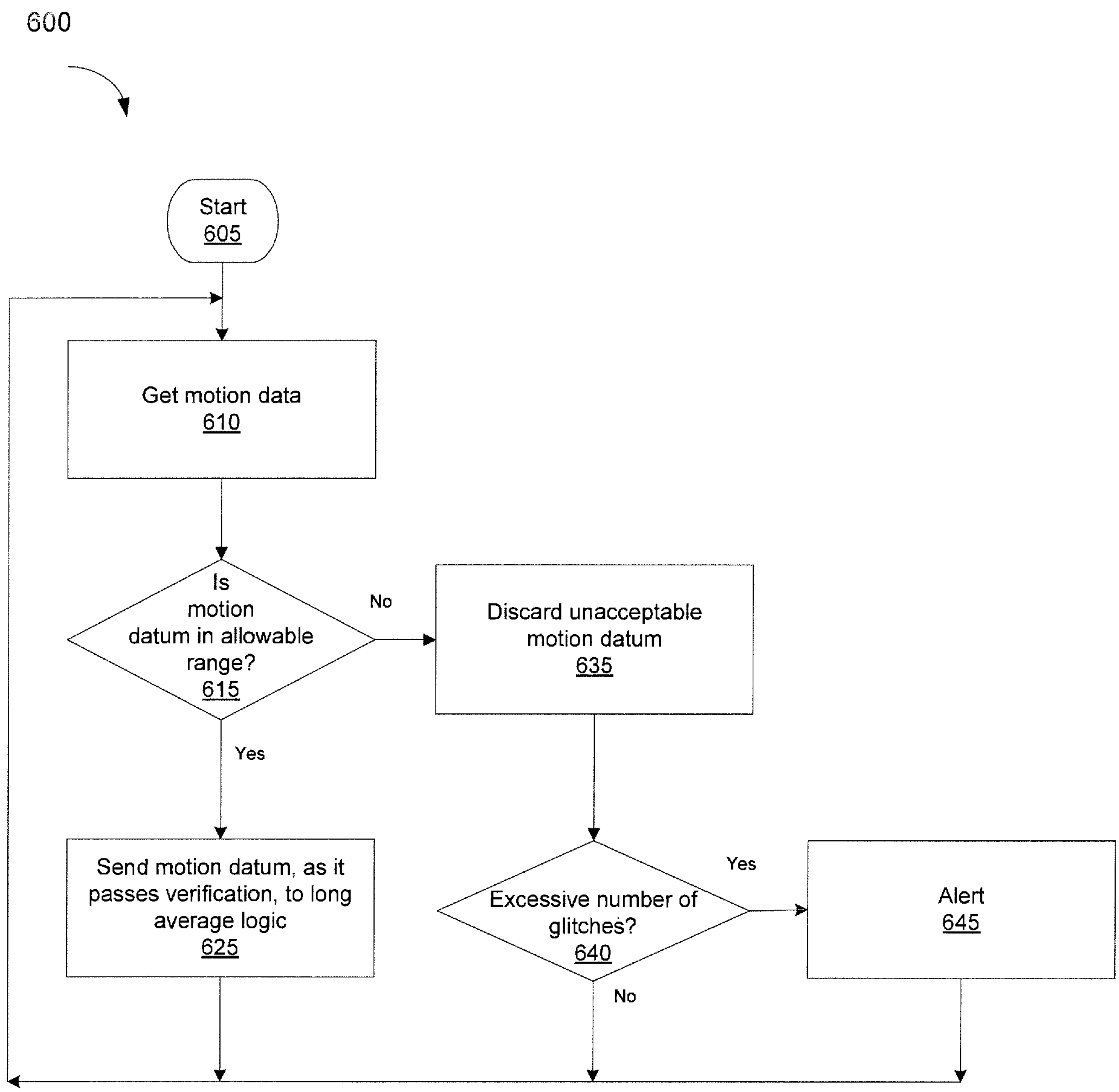

600
Start
605
Get motion data
610
Is
motion
datum in allowable
range?
615
No
Discard unacceptable
motion datum
635
Yes
Send motion datum, as it
passes verification, to long
average logic
625
Excessive number of
glitches?
640
Yes
Alert
645
No

Figure 6

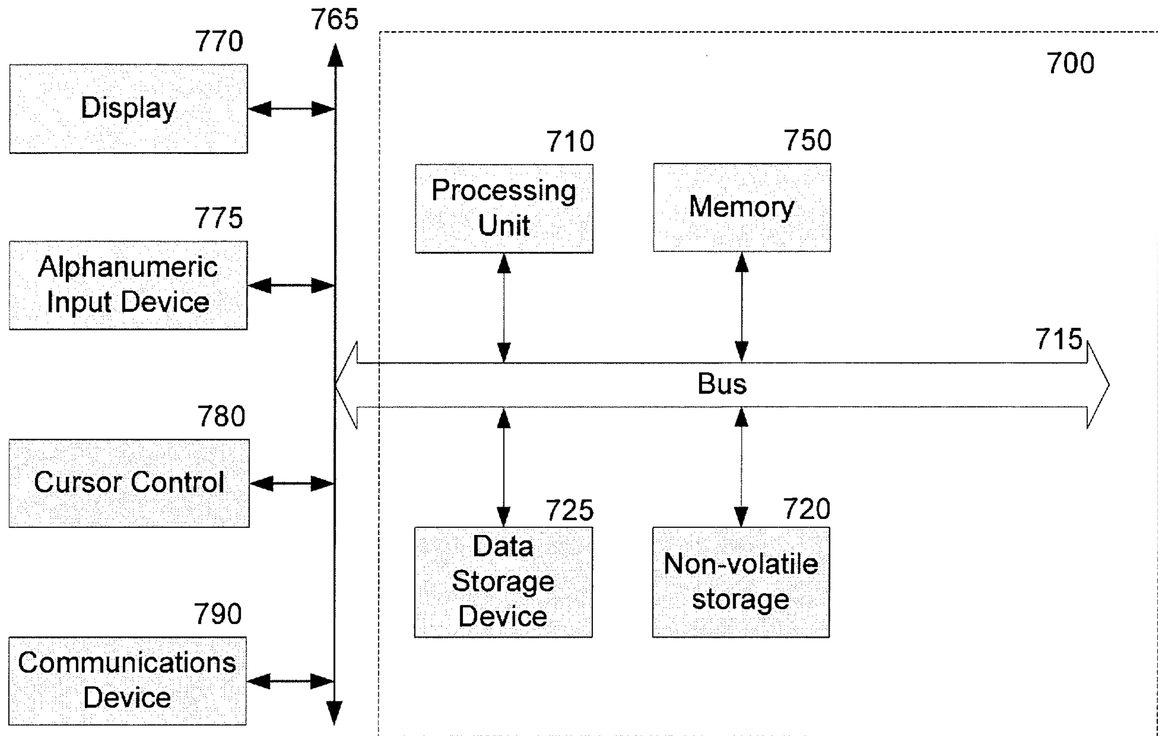

765
770
Display
700
710
Processing Unit
750
Memory
775
Alphanumeric Input Device
715
Bus
780
Cursor Control
725
Data Storage Device
720
Non-volatile storage
790
Communications Device

Figure 7

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Filer:	Judith A. Szepesi/Joan Abriam
Attorney Docket Number:	7538P057

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Claims in excess of 20	1202	4	52	208
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
	Total in USD ($)			**1298**

Electronic Acknowledgement Receipt

EFS ID:	4083563
Application Number:	12247950
International Application Number:	
Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Customer Number:	08791
Filer:	Judith A. Szepesi
Filer Authorized By:	
Attorney Docket Number:	7538P057
Receipt Date:	08-OCT-2008
Filing Date:	
Time Stamp:	19:57:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1298
RAM confirmation Number	4612
Deposit Account	022666
Authorized User	

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Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	7538P057_Transmittal.pdf	25268 31b63fc0b719f7c0c50928d348064b56f2e6ea75	no	2
Warnings:					
Information:					
2	Nonpublication request from applicant.	7538P057_Nonpublication_Request.pdf	14417 ec502810682ed5a1fe84674987db4809a75b012e	no	1
Warnings:					
Information:					
3		7538P057_Application.pdf	79893 10800538ad03ee5940616a8555331b03ab5bd0c8	yes	24

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	18
Claims	19	23
Abstract	24	24

Warnings:					
Information:					
4	Drawings-only black and white line drawings	7538P057_Formal_Figures.pdf	216458 58a073a318e93935ac0a7809ef5efc43e38c0bbb	no	7
Warnings:					
Information:					
5	Fee Worksheet (PTO-06)	fee-info.pdf	36448 009c27c199b84ccee43b8741cfc52f209bf805c8	no	2
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Total Files Size (in bytes):	372484

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National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
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PTO/SB/06 (12-04)

Filing Date: **10/08/08**

Approved for use through 7/31/2006. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: **12/247,950**

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	330
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	540
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	220
TOTAL CLAIMS (37 CFR 1.16(i))	24 minus 20 =	4	x$26		OR	x$52	208
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	x$110			x$220	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			195			390	
			TOTAL			TOTAL	1298

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR	X =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR	X =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
					TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR	X =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR	X =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
					TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/247,950	10/08/2008	3681	1298	7538P057	24	2

CONFIRMATION NO. 8961

FILING RECEIPT

8791
BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

OC000000032718204

Date Mailed: 10/23/2008

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Philippe Kahn, Residence Not Provided;

Power of Attorney: None

Domestic Priority data as claimed by applicant

Foreign Applications

If Required, Foreign Filing License Granted: 10/21/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/247,950**

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No

Title

Method and System for Waking Up a Device Due to Motion

Preliminary Class

192

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/247,950	10/08/2008	Philippe Kahn	7538P057

CONFIRMATION NO. 8961

8791
BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

FORMALITIES LETTER

OC000000032718205

Date Mailed: 10/23/2008

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The oath or declaration is missing.
  A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
  Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of $**130** for a non-small entity, must be submitted with the missing items identified in this notice.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is $**130** for a non-small entity
- $**130** Surcharge.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

/eggolla/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Attorney Docket No.: 8689P057 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Philippe Kahn, et al.	Examiner:	Not yet assigned
Appl. No.	: 12/247,950	Art Unit:	3681
Filed	: October 8, 2008	Confirmation No. 8961	
For	: Method and System for Waking Up a Device Due to Motion	**CERTIFICATE OF TRANSMISSION** I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.	
Customer No.	: 08791	/Judith Szepesi/ December 22, 2008 ***Judith A. Szepesi*** ***Date***	

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

RESPONSE TO NOTICE TO FILE MISSING PARTS OF APPLICATION
(FILING DATE GRANTED)

Sir:

In response to the Notice to File Missing parts of Application (Filing Date Granted) mailed October 23, 2008, please find enclosed:

(1) a duly executed Declaration and Power of Attorney with respect to the above-referenced patent application; and

(2) an authorization to charge $130.00 in payment of the surcharge of 37 C.F.R. § 1.16(e) to Deposit Account No. 02-2666.

If any additional fee is required, please charge Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: December 22, 2008

/Judith Szepesi/
Judith A. Szepesi
Reg. No. 39,393

1279 Oakmead Parkway
Sunnyvale, CA 94085
(408) 720-8300

Electronic Patent Application Fee Transmittal

Application Number:	12247950
Filing Date:	08-Oct-2008
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Filer:	Judith A. Szepesi/Joan Abriam
Attorney Docket Number:	8689P057

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Late filing fee for oath or declaration	1051	1	130	130
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**130**

Electronic Acknowledgement Receipt

EFS ID:	4487637
Application Number:	12247950
International Application Number:	
Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Customer Number:	08791
Filer:	Judith A. Szepesi
Filer Authorized By:	
Attorney Docket Number:	8689P057
Receipt Date:	22-DEC-2008
Filing Date:	08-OCT-2008
Time Stamp:	21:28:29
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$130
RAM confirmation Number	6426
Deposit Account	022666
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Oath or Declaration filed	8689P057_Declaration_and_POA.pdf	226742 8bbe343b7579bba7a80069844a5470c3091c38f7	no	4
Warnings:					
Information:					
2	Applicant Response to Pre-Exam Formalities Notice	8689P057_Response_to_Missing_Parts.pdf	14977 5fd927923d9a6af80054d2c1ad3814b8ca1773b4	no	1
Warnings:					
Information:					
3	Fee Worksheet (PTO-06)	fee-info.pdf	30163 5adaf131eddaf8f0343632ef310d8aaa06ef5542	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	271882		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION (37 CFR 1.63)	Attorney Docket Number	8689P057
☐ Declaration Submitted with Initial Filing **OR** ☒ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16(e)) required)	First Named Inventor	Philippe Kahn
	COMPLETE IF KNOWN	
	Application Number	12/247,950
	Filing Date	October 8, 2008
	Art Unit	3681
	Examiner Name	Not yet assigned

I hereby declare that: (1) Each inventor's residence, mailing address, and citizenship are as stated below next to their name; and (2) I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Method and System for Waking Up a Device Due to Motion

(Title of the Invention)

the specification of which

☐ is attached hereto.

OR

☒ was filed on (MM/DD/YYYY) **10/08/2008** as United States Application Number or

PCT International Application Number **12/247,950**

and was amended on (MM/DD/YYYY) ____________ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment specifically referred to above.

I do not know and do not believe that the claimed invention was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application. I do not know and do not believe that the claimed invention was in public use or on sale in the United States of America more than one year prior to this application, nor do I know or believe that the invention has been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months (for a utility patent application) or six months (for a design patent application) prior to this application.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

Authorization To Permit Access to Application by Participating Offices

☒ If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, or other intellectual property office in which a foreign application claiming priority to the above-identified application is filed to have access to the application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the application-as-filed with respect to: (1) the above-identified application, (2) any foreign application to which the above-identified application claims priority under 35 USC 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the above-identified US application, and (3) any U.S. application from which benefit is sought in the above-identified application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing the Authorization to Permit Access to Application by Participating Offices.

Claim of Foreign Priority Benefits

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s):

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?
			☐	☐ Yes ☐ No
			☐	☐ Yes ☐ No
			☐	☐ Yes ☐ No
			☐	☐ Yes ☐ No
			☐	☐ Yes ☐ No

Appointment of Practitioners:

I hereby appoint the practitioners associated with Customer Number: **08791** as my respective patent attorneys and patent agents, with full power of substitution and revocation, to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected herewith.

If this patent application is assigned, then the undersigned hereby authorizes the patent attorneys and patent agents named herein to accept and follow instructions from the assignee(s) as to any action to be taken in the United States Patent and Trademark Office regarding this application without direct communication between the patent attorneys and patent agents and the undersigned. In the event of a change in the persons from whom instructions may be taken, at least one patent attorney or patent agent named herein will be so notified by the undersigned.

Correspondence:

Direct all correspondence to Customer Number **08791**, WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioner/applicant should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available. Petitioner/applicant is advised that documents which form the record of a patent application (such as the PTO/SB/01) are placed into the Privacy Act system of records DEPARTMENT OF COMMERCE, COMMERCE-PAT-7, System name: *Patent Application Files.* Documents not retained in an application file (such as the PTO-2038) are placed into the Privacy Act system of COMMERCE/PAT-TM-10, System name: *Deposit Accounts and Electronic Funds Transfer Profiles.*

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR: ☐ A petition has been filed for this undersigned inventor

Full Name: **Philippe Kahn**

(First Middle [if any], Family Name (or Surname), and Suffix [if any])

Inventor's Signature ______ Date 12/17/08

Residence Aptos, California United States *(City, State, Country)* Citizenship United States *(Country)*

Mailing Address 777 Hudson Lane
Aptos, California 95003 United States

NAME OF SECOND INVENTOR: ☐ A petition has been filed for this undersigned inventor

Full Name: Arthur Kinsolving

(First, Middle [if any], Family Name (or Surname), and Suffix [if any])

Inventor's Signature *Arthur Kinsolving* Date 12/17/08

Residence Santa Cruz, California United States Citizenship United States

(City, State, Country) *(Country)*

Mailing Address 101 Soquel Ave. #403

Santa Cruz, California 95060 United States

NAME OF THIRD INVENTOR: ☐ A petition has been filed for this undersigned inventor

Full Name: David Vogel

(First, Middle [if any], Family Name (or Surname), and Suffix [if any])

Inventor's Signature *D Vogel* Date 12-17-08

Residence Santa Cruz, California United States Citizenship United States

(City, State, Country) *(Country)*

Mailing Address 600 Beel Drive

Santa Cruz, California 95060 United States

NAME OF FOURTH INVENTOR: ☐ A petition has been filed for this undersigned inventor

Full Name: Mark Andrew Christensen

(First, Middle [if any], Family Name (or Surname), and Suffix [if any])

Inventor's Signature *MA Christensen* Date 12-17-08

Residence Santa Cruz, California United States Citizenship New Zealand

(City, State, Country) *(Country)*

Mailing Address 107 Brookwood Drive

Santa Cruz, California 95065 United States

NAME OF FIFTH INVENTOR: ☐ A petition has been filed for this undersigned inventor

Full Name: __________

(First, Middle [if any], Family Name (or Surname), and Suffix [if any])

Inventor's Signature __________ Date __________

Residence __________ Citizenship __________

(City, State, Country) *(Country)*

Mailing Address __________

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/247,950	10/08/2008	3655	1428	8689P057	24	2

CONFIRMATION NO. 8961

8791
BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

UPDATED FILING RECEIPT

OC000000033893203

Date Mailed: 01/06/2009

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Philippe Kahn, Aptos, CA;
Arthur Kinsolving, Santa Cruz, CA;
David Vogel, Santa Cruz, CA;
Mark Andrew Christensen, Santa Cruz, CA;

Power of Attorney: The patent practitioners associated with Customer Number 08791

Domestic Priority data as claimed by applicant

Foreign Applications

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

If Required, Foreign Filing License Granted: 10/21/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/247,950**

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No

Title

Method and System for Waking Up a Device Due to Motion

Preliminary Class

192

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

Substitute for Form 1449/PTO				*Complete if Known*	
# INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	12/247,950
(use as many sheets as necessary)				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	3681
				Examiner Name	Not yet assigned
Sheet	1	**of**	1	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	6,013,007	1/11/2000	Root et al	
		US-	7,010,332	3/7/2006	Irvin et al	
		US-	2005/0232404	10/20/2005	Gaskill	
		US-	2007/0125852	6/7/2007	Rosenberg	
		US-				
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		US-				
		US-				

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] Number[4] Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6]Applicant is to place a check mark here if English language translation is attached.

Electronic Acknowledgement Receipt

EFS ID:	6206297
Application Number:	12247950
International Application Number:	
Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Customer Number:	08791
Filer:	Judith A. Szepesi
Filer Authorized By:	
Attorney Docket Number:	8689P057
Receipt Date:	05-OCT-2009
Filing Date:	08-OCT-2008
Time Stamp:	21:32:03
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		8689P057_IDS_and_SB08.pdf	63770 b8663c82ff54f6f80d5e28c565b0840a8cd9357e	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	2
	Information Disclosure Statement (IDS) Filed (SB/08)	3	3
Warnings:			
Information:			
	Total Files Size (in bytes):	63770	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
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National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
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Attorney Docket No.: 8689P057 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Philippe Kahn, et al.	Examiner:	Not yet assigned
Appl. No.	: 12/247,950	Art Unit:	3681
Filed	: October 8, 2008	Confirmation No. 8961	
For	: Method and System for Waking Up a Device Due to Motion	**CERTIFICATE OF TRANSMISSION** I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.	
Customer No.	: 08791	/Judith Szepesi/ October 5, 2009 ***Judith A. Szepesi*** ***Date***	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

INFORMATION DISCLOSURE STATEMENT

Sir:

Enclosed is a copy of Information Disclosure Citation Form PTO-1449 or PTO/SB/08 together with copies of the documents cited on that form, except for copies not required to be submitted (e.g., copies of U.S. patents and U.S. published patent applications need not be enclosed). It is respectfully requested that the cited documents be considered and that the enclosed copy of Information Disclosure Citation Form PTO-1449 or PTO/SB/08 be initialed by the Examiner to indicate such consideration and a copy thereof returned to applicant(s).

Pursuant to 37 C.F.R. § 1.97, the submission of this Information Disclosure Statement is not to be construed as a representation that a search has been made and is not to be construed as an admission that the information cited in this statement is material to patentability.

Pursuant to 37 C.F.R. § 1.97, this Information Disclosure Statement is being submitted under one of the following (as indicated by an "X" to the left of the appropriate paragraph):

__X__ 37 C.F.R. §1.97(b).

_______ 37 C.F.R. §1.97(c). If so, then enclosed with this Information Disclosure Statement is one of the following:

____ A statement pursuant to 37 C.F.R. §1.97(e) or

____ The Director is Authorized to charge in the amount of $180.00 for the fee under 37 C.F.R. § 1.17(p).

______ 37 C.F.R. §1.97(d). If so, then enclosed with this Information Disclosure Statement are the following:

(1) A statement pursuant to 37 C.F.R. §1.97(e); and

(2) A check for $180.00 for the fee under 37 C.F.R. §1.17(p) for submission of the Information Disclosure Statement.

If there are any additional charges, please charge Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: October 5, 2009

/Judith Szepesi/
Judith A. Szepesi
Reg. No. 39,393

1279 Oakmead Parkway
Sunnyvale, CA 94085
(408) 720-8300

RESCISSION OF PREVIOUS NONPUBLICATION REQUEST
(35 U.S.C. 122(b)(2)(B)(ii))
AND, IF APPLICABLE,
NOTICE OF FOREIGN FILING
(35 U.S.C. 122(b)(2)(B)(iii))

Send completed form to:
Mail Stop PG Pub
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
FAX: (703) 305-8568

Application Number 12/247,950
Filing Date 10/8/2008
First Named Inventor Philippe Kahn
Title METHOD AND SYSTEM FOR WAKING UP A DEVICE DUE TO MOTION
Attorney Docket No. 8689P057
Group Art Unit 3655
Examiner

A request that the above-identified application not be published under 35 U.S.C. 122(b) (nonpublication request) was included with the above-identified application on filing pursuant to 35 U.S.C. 122(b)(2)(B)(i). I hereby **rescind** the previous nonpublication request.

If a notice of foreign or international filing is or will be required by 35 U.S.C. 122(b)(2)(B) (iii) and 37 CFR 1.213(c), I hereby provide such notice. This notice is being provided no later than forty-five (**45**) days after the date of such foreign or international filing.

If a notice of subsequent foreign or international filing required by 35 U.S.C. 122(b)(2)(B)(iii) and 37 CFR 1.213(c) was not filed within forty-five (45) days after the date of filing of the foreign or international application, the application is ABANDONED, and a petition to revive under 37 CFR 1.137(b) is required. See 37 CFR 1.137(f).

10/7/2009 Date	Signature
(408) 720-8300 Telephone	Lester J. Vincent Typed or Printed Name
	31,460 Registration No.

This request must be signed in compliance with 37 CFR 1.33(b).

If information or assistance is needed in completing this form, please contact the Pre-Grant Publication Division at (703) 605-4283 or by e-mail at PGPub@USPTO.gov.

ELECTRONIC FILING STATEMENT

Date of Deposit: 10/7/2009

I hereby certify that this correspondence is being deposited with the United States Patent and Trademark Office via electronic filing through the United States Patent and Trademark Electronic Filing System on the date indicated above.

Name (Print/Type) Jing Xin

Signature: /Jing Xin/ Date Signed: 10/7/2009

Based on Form PTO/SB/36 (05-03) as modified by BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP on 05/09/03

Electronic Acknowledgement Receipt

EFS ID:	6219919
Application Number:	12247950
International Application Number:	
Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Customer Number:	08791
Filer:	Lester Vincent/Ashley Xin
Filer Authorized By:	Lester Vincent
Attorney Docket Number:	8689P057
Receipt Date:	07-OCT-2009
Filing Date:	08-OCT-2008
Time Stamp:	21:07:30
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	DPTech8689P057_RescindLetter.PDF	34427 46a24e201d13a0a335a24494b6e9b9e76796a9d5	no	1

Warnings:

Information:

2	Rescind Nonpublication Request for Pre Grant Pub	DPTech8689P057_RescindRequest.PDF	54405 9fa309557be65358e026e823592cb77b337940f0	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	88832		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

BLAKELY SOKOLOFF TAYLOR & ZAFMAN
A LIMITED LIABILITY PARTNERSHIP INCLUDING LAW CORPORATIONS

TELEPHONE (408) 720-8300
FACSIMILE (408) 720-8383
BSTZ_MAIL@BSTZ.COM
WWW.BSTZ.COM

INTELLECTUAL PROPERTY LAW

SILICON VALLEY

1279 OAKMEAD PARKWAY
SUNNYVALE, CALIFORNIA 94085-4040

OTHER OFFICES

LOS ANGELES, CA
ORANGE COUNTY/COSTA MESA, CA
SAN JOSE, CA
DENVER, CO
PORTLAND/BEAVERTON, OR
SEATTLE, WA

10/7/2009

MS PG Pub
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Via EFS

Re: USSN: 12/247,950 Filed: 10/8/2008
Assignee: DP Technologies, Inc.
Title: METHOD AND SYSTEM FOR WAKING UP A DEVICE DUE TO MOTION
Transmittal of Request to Rescind Previous Nonpublication Request Under 35 USC 122(b)(2)(B)(ii) and Notification of Foreign Filing Under 35 USC 122(b)(2)(B)(iii)
Our File No.: 8689P057

Dear Sirs:

We have foreign filed the above-identified application. A Request and Certification under 35 USC 122(b)(2)(B)(i) has been submitted for this invention. We herewith submit a Request to Rescind Previous Nonpublication Request under 35 USC 122(b)(2)(B)(ii) and a Notification of Foreign Filing under 35 USC 122(b)(2)(B)(iii).

Respectfully submitted,

Blakely, Sokoloff, Taylor & Zafman LLP

Lester J. Vincent
Reg. No. 31,460

LJV/SKW/ajx
Enclosure

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/247,950	10/08/2008	Philippe Kahn	8689P057

CONFIRMATION NO. 8961

8791
BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

NONPUBLICATION RESCISSION LETTER

OC000000038261147

Date Mailed: 10/16/2009

Communication Regarding Rescission Of Nonpublication Request and/or Notice of Foreign Filing

Applicant's rescission of the previously-filed nonpublication request and/or notice of foreign filing is acknowledged. The paper has been reflected in the Patent and Trademark Office's (USPTO's) computer records so that the earliest possible projected publication date can be assigned.

The projected publication date is 04/08/2010.

If applicant rescinded the nonpublication request before or on the date of "foreign filing,"[1] then no notice of foreign filing is required.

If applicant foreign filed the application after filing the above application and before filing the rescission, and the rescission did not also include a notice of foreign filing, then a notice of foreign filing (not merely a rescission) is required to be filed within 45 days of the date of foreign filing. See 35 U.S.C. § 122(b)(2)(B)(iii), and Clarification of the United States Patent and Trademark Office's Interpretation of the Provisions of 35 U.S.C. § 122(b)(2)(B)(ii)-(iv), 1272 Off. Gaz. Pat. Office 22 (July 1, 2003).

If a notice of foreign filing is required and is not filed within 45 days of the date of foreign filing, then the application becomes abandoned pursuant to 35 U.S.C. § 122(b)(2)(B)(iii). In this situation, applicant should either file a petition to revive or notify the Office that the application is abandoned. See 37 CFR 1.137(f). Any such petition to revive will be forwarded to the Office of Petitions for a decision. Note that the filing of the petition will not operate to stay any period of reply that may be running against the application.

Questions regarding petitions to revive should be directed to the Office of Petitions at (571) 272-3282.

[1] Note, for purpose of this notice, that "foreign filing" means "filing an application directed to the same invention in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing".

/hsarwari/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Not yet assigned
Sheet	1	**of**	1	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	2005/0210300	9/22/2005	Song et al	
		US-				
		US-				
		US-				
		US-				
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		US-				
		US-				

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] Number[4] Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6]Applicant is to place a check mark here if English language translation is attached.

Electronic Acknowledgement Receipt

EFS ID:	6905054
Application Number:	12247950
International Application Number:	
Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Customer Number:	08791
Filer:	Judith A. Szepesi
Filer Authorized By:	
Attorney Docket Number:	8689P057
Receipt Date:	28-JAN-2010
Filing Date:	08-OCT-2008
Time Stamp:	19:43:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		8689P057_IDS_and_SB08.pdf	63015 b9aacbe0238c7d0254b9a0f9dc87afe44cae04ab	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	2
	Information Disclosure Statement (IDS) Filed (SB/08)	3	3

Warnings:	
Information:	
Total Files Size (in bytes):	63015

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

ttorney's Docket No. 8689P057 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Philippe Kahn, et al	Examiner:	Not yet assigned
Appl. No.	: 12/247,950	Art Unit:	2612
Filed	: October 8, 2008	Confirmation No. 8961	
For	: Method and System for Waking Up a Device Due to Motion	**CERTIFICATE OF TRANSMISSION** I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.	
Customer No.	: 08791	/Judith Szepesi/ ***Judith A. Szepesi***	January 28, 2010 ***Date***

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

INFORMATION DISCLOSURE STATEMENT

Sir:

Enclosed is a copy of Information Disclosure Citation Form PTO-1449 or PTO/SB/08 together with copies of the documents cited on that form, except for copies not required to be submitted (e.g., copies of U.S. patents and U.S. published patent applications need not be enclosed). It is respectfully requested that the cited documents be considered and that the enclosed copy of Information Disclosure Citation Form PTO-1449 or PTO/SB/08 be initialed by the Examiner to indicate such consideration and a copy thereof returned to applicant(s).

Pursuant to 37 C.F.R. § 1.97, the submission of this Information Disclosure Statement is not to be construed as a representation that a search has been made and is not to be construed as an admission that the information cited in this statement is material to patentability.

Pursuant to 37 C.F.R. § 1.97, this Information Disclosure Statement is being submitted under one of the following (as indicated by an "X" to the left of the appropriate paragraph):

__X__ 37 C.F.R. §1.97(b).

________ 37 C.F.R. §1.97(c). If so, then enclosed with this Information Disclosure Statement is <u>one</u> of the following:

____ A statement pursuant to 37 C.F.R. §1.97(e) <u>or</u>

____ The Director is Authorized to charge in the amount of $<u>180.00</u> for the fee under 37 C.F.R. § 1.17(p).

______ 37 C.F.R. §1.97(d). If so, then enclosed with this Information Disclosure Statement are the following:

(1) A statement pursuant to 37 C.F.R. §1.97(e); and

(2) A check for $<u>180.00</u> for the fee under 37 C.F.R. §1.17(p) for submission of the Information Disclosure Statement.

If there are any additional charges, please charge Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: January 28, 2010

<u>/Judith Szepesi/</u>
Judith A. Szepesi
Reg. No. 39,393

1279 Oakmead Parkway
Sunnyvale, CA 94085
(408) 720-8300

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/247,950	10/08/2008	Philippe Kahn	8689P057

CONFIRMATION NO. 8961

PUBLICATION NOTICE

OC000000041023788

8791
BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

Title: Method and System for Waking Up a Device Due to Motion

Publication No.US-2010-0085203-A1
Publication Date:04/08/2010

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(use as many sheets as necessary)*				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Not yet assigned
Sheet	1	**of**	2	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	6,353,449	3/5/2002	Gregg et al	
		US-	6,771,250	8/3/2004	Oh	
		US-	2006/0161377	7/20/2006	Rakkola et al	
		US-	2007/0150136	6/28/2007	Doll et al	
		US-	2007/0259716	11/8/2007	Mattice et al	
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] Number[4] Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6]Applicant is to place a check mark here if English language translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SENT FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Not yet assigned
Sheet	2	**of**	2	Attorney Docket Number	8689P057

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
		The International Search Report and the Written Opinion, PCT/US2009/059900, mailing date 3/31/2010, 9 pages	

Examiner Signature		Date Considered	

*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1]Applicant's unique citation designation number (optional). [2]Applicant is to place a check mark here if English Translation is attached.
This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SENT FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To: LESTER VINCENT
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing (*day/month/year*)	31 MAR 2010
Applicant's or agent's file reference: 8689P057PCT	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No.: PCT/US2009/059900	International filing date (*day/month/year*): 07 October 2009
Applicant: DP TECHNOLOGIES, INC.	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:
   The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

   For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

   ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

   Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

   The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

   Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

   In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

   See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver Telephone No. 571-272-7774

Form PCT/ISA/220 (January 2004)

(See notes on accompanying sheet)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 8689P057PCT	**FOR FURTHER ACTION** see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/US2009/059900	International filing date *(day/month/year)* 07 October 2009	(Earliest) Priority Date *(day/month/year)* 08 October 2008
Applicant DP TECHNOLOGIES, INC.		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of:
      ☒ the international application in the language in which it was filed.
      ☐ a translation of the international application into ____________ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (see Box No. II).
3. ☐ **Unity of invention is lacking** (see Box No. III).
4. With regard to the **title**,
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:
5. With regard to the **abstract**,
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. With regard to the **drawings**,
   a. the figure of the **drawings** to be published with the abstract is Figure No. 2
      ☐ as suggested by the applicant.
      ☒ as selected by this Authority, because the applicant failed to suggest a figure.
      ☐ as selected by this Authority, because this figure better characterizes the invention.
   b. ☐ none of the figures is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/059900

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G01P 15/00 (2009.01)
USPC - 702/141
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - G01P 15/00 (2009.01)
USPC - 702/141

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase, MicroPatent

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US 2006/0161377 A1 (RAKKOLA et al) 20 July 2006 (20.07.2006) entire document	1, 5-7, 10-12, 14 -------- 2-4, 8, 9, 13, 15-24
Y	US 2007/0259716 A1 (MATTICE et al) 08 November 2007 (08.11.2007) entire document	2-4, 8, 15-24
Y	US 2007/0150136 A1 (DOLL et al) 28 June 2007 (28.06.2007) entire document	13
Y	US 6,353,449 B1 (GREGG et al) 05 March 2002 (05.03.2002) entire document	9, 21, 22
Y	US 6,771,250 B1 (OH) 03 August 2004 (03.08.2004) entire document	22

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 November 2009	31 MAR 2010
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: LESTER VINCENT
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing (*day/month/year*)	31 MAR 2010	
Applicant's or agent's file reference 8689P057PCT	**FOR FURTHER ACTION** See paragraph 2 below	
International application No. PCT/US2009/059900	International filing date (*day/month/year*) 07 October 2009	Priority date (*day/month/year*) 08 October 2008
International Patent Classification (IPC) or both national classification and IPC IPC(8) - G01P 15/00 (2009.01) USPC - 702/141		
Applicant DP TECHNOLOGIES, INC.		

1. This opinion contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/US	Date of completion of this opinion	Authorized officer:
Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	18 November 2009	Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/237 (cover sheet) (July 2009)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY	International application No. PCT/US2009/059900

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into ____________ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:

   a. (means)

   ☐ on paper

   ☐ in electronic form

   b. (time)

   ☐ in the international application as filed

   ☐ together with the international application in electronic form

   ☐ subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

Form PCT/ISA/237 (Box No. I) (July 2009)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY	International application No. PCT/US2009/059900

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	2-4, 8-9, 13, 15-24	YES
	Claims	1, 5-7, 10-12, 14	NO
Inventive step (IS)	Claims	None	YES
	Claims	1-24	NO
Industrial applicability (IA)	Claims	1-24	YES
	Claims	None	NO

2. Citations and explanations:

Claims 1, 5-7, 10-12, and 14 lack novelty under PCT Article 33(2) as being anticipated by Rakkola et al. (hereinafter, Rakkola).

Referring to Claim 1, Rakkola discloses a method comprising: determining an idle sample value for a dominant axis of a device (paragraph 0044, if no significant data is forthcoming from the accelerometer [e.g. because the accelerometer data is not changing significantly over time], then the motion detector shifts to an idle mode; paragraph 0033, acceleration on the x-axis causes an interrupt on the main processor, whereas the other two components [y-axis and z-axis] are not factors in this interrupt decision - it is interpreted that the x-axis is a dominant axis, and the accelerometer data that is not changing over time represent idle sample values); registering a motion of the device (paragraph 0006, a motion sensor detects acceleration of a device by analyzing the signal from the device's triaxial accelerometer); and waking up the device when the motion of the device indicates a change in the dominant axis of the device (paragraph 0015, higher level processing functions can be kept in an idle state until there is significant movement. The processor of the device housing the accelerometer can thus perform no tasks at all, until being interrupted by a signal generated by the motion detector when acceleration exceeds a predefined limit; paragraph 0017, once movement of the device is detected, the processor can be woken up).

Referring to Claim 5, Rakkola discloses determining the idle sample value for each of the other axes of the device (paragraph 0044, if no significant data is forthcoming from the accelerometer [e.g. because the accelerometer data is not changing significantly over time], then the motion detector shifts to an idle mode; paragraph 0042, accelerometer data for each of the three axes is averaged – accelerometer data is interpreted to include accelerometer values that are not changing over time [i.e., idle sample values]).

Referring to Claim 6, Rakkola discloses wherein registering the motion of the device comprises: receiving motion data from a motion sensor (paragraph 0039, motion detector 115 receives and analyzes the accelerometer output signal 110); and processing the motion data to determine a current sample value of the dominant axis of the device (paragraph 0001, processing of signals from an accelerometer; paragraph 0018, incoming acceleration data [i.e., current data] is summed into a single register per axis. When the number of samples has been summed, the output is divided by a shifting a bit vector in order to get an average value over a selected number of samples).

Referring to Claim 7, Rakkola discloses comparing a difference between a current sample value along the dominant axis determined based on the motion of the device and the idle sample value of the dominant axis against a threshold value (paragraph 0035, the motion detector can trigger an interrupt signal when thresholds are exceeded on selected axis/axes; paragraph 0042, a processor interrupt signal is provided if the average acceleration [i.e., current sample value] minus the reference level [i.e., idle value] exceeds a threshold).

Referring to Claim 10, Rakkola disclose wherein the current sample value is a long average of accelerations (paragraph 0018, incoming acceleration data [i.e., current data] is summed into a single register per axis. When the number of samples has been summed, the output is divided by a shifting a bit vector in order to get an average value over a selected number of samples).

Referring to Claim 11, Rakkola disclose determining the current sample value for each of the other axes of the device (paragraph 0042, accelerometer data for each of the three axes is averaged).

Referring to Claim 12, Rakkola discloses wherein the motion sensor comprises an accelerometer (paragraph 0014, the motion detector uses acceleration data that has been generated by an accelerometer).

Referring to Claim 14, Rakkola discloses determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value (paragraph 0035, the motion detector can trigger an interrupt signal when thresholds are exceeded on selected axis/axes; paragraph 0042, a processor interrupt signal is provided if the average acceleration [i.e., current sample value] minus the reference level [i.e., idle value] exceeds a threshold).

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US2009/059900

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Claim 13 lacks an inventive step under PCT Article 33(3) as being obvious over Rakkola in view of Doll et al. (hereinafter, Doll).

Referring to Claim 13, Rakkola discloses wherein processing the motion data further comprises removing the one or more glitches in the motion data from the motion data before calculating the long average (paragraph 0042, adjusting acceleration measurements to offset errors [i.e., glitches]. Then accelerometer data for each of the three axes is averaged 315, which is a simple and power-efficient way of deemphasizing measurement errors), but does not explicitly disclose verifying whether the motion data comprises one or more glitches. In disclosing a periodic test signal is injected into a motion sensor (Abstract), Doll teaches verifying whether the motion data comprises one or more glitches (paragraph 0007, verifying proper operation of a motion sensor includes injecting a test signal into the motion sensor and then measuring the output of the sensor. Upon determining that the output is either above or below the acceptable range of output values, a fault is declared and an error signal generated). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features in the invention of Rakkola as taught by Doll in order to make sure that the system is operating with valid information.

Claims 2-4, 8, 15-20 and 23-24 lack an inventive step under PCT Article 33(3) as being obvious over Rakkola in view of Mattice et al. (hereinafter, Mattice).

Referring to Claim 2, Rakkola discloses wherein determining the idle sample value for the dominant axis comprises: receiving motion data from a motion sensor (paragraph 0039, the motion detector receives and analyzes the accelerometer output signal); processing the motion data to establish an idle sample value; and processing the idle sample value (paragraph 0001, processing of signals from an accelerometer; paragraph 0044, if no significant data is forthcoming from the accelerometer [e.g. because the accelerometer data is not changing significantly over time], then the motion detector shifts to an idle mode - it is interpreted that the accelerometer data that us not changing over time represent idle sample values), but is silent on establishing the dominant axis. In disclosing techniques for controlling a wager-based game played at a gaming system (Abstract), Mattice teaches processing the idle sample value to establish the dominant axis (paragraph 0155, raw data corresponding to movement of a handheld device is received. The raw movement data is processed to yield an output indicating movement of the handheld device; paragraph 0156, determine a dominant axis of motion). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features in the invention of Rakkola as taught by Mattice in order to determine the axis with the greater amount of movement.

Referring to Claim 3, Rakkola discloses wherein the motion sensor comprises an accelerometer (paragraph 0014, the motion detector uses acceleration data that has been generated by an accelerometer).

Referring to Claim 4, Rakkola discloses wherein the idle sample value comprises a long-average of accelerations over a sample period along the dominant axis (paragraph 0018, incoming acceleration data [i.e., current data] is summed into a single register per axis. When the number of samples has been summed, the output is divided by a shifting a bit vector in order to get an average value over a selected number of samples; paragraph 0019, when the motion detector is enabled, a reference level [i.e., idle data] is calculated automatically. The reference levels are calculated for each of the three axes), but is silent on recording said accelerations when the device goes to idle mode after a period of inactivity. However, recording data during a specific period of time is known in the art and the specifics would be a matter of design choice. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features in the invention of Rakkola in order to continue collecting data when device is inactive.

Referring to Claim 8, Rakkola is silent wherein the change in the dominant axis comprises a change in acceleration along the dominant axis. Mattice teaches wherein the change in the dominant axis comprises a change in acceleration along the dominant axis (paragraphs 0053 and 0164, the handheld device may detect changes in acceleration with respect to one or more specified axes [x-axis, y-axis, and/or z-axis]). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features in the invention of Rakkola as taught by Mattice in order to determine whether the device is at rest or not.

Referring to Claim 15, Rakkola discloses computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis (paragraph 0042, a processor interrupt signal is provided if the average acceleration [i.e., current sample value] minus the reference level [i.e., idle value] exceeds a threshold); and comparing the difference against a threshold value to establish whether to wake the device up (paragraph 0035, the motion detector can trigger an interrupt signal when thresholds are exceeded on selected axis/axes), but does not explicitly disclose computing said difference when the device goes to idle mode after a period of inactivity; and determining a new dominant axis based on the motion data received from the motion sensor. However, calculating data during a specific period of time (i.e., period of inactivity) is known in the art and the specifics would be a matter of design choice. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features in the invention of Rakkola in order to continue collecting data when a device is inactive. Mattice teaches determining a new dominant axis based on the motion data received from the motion sensor (Fig. 2A, motion detection device 224; paragraph 0155, raw data [i.e., motion data] corresponding to movement of a handheld device is received; paragraph 0156, determine a dominant axis of motion; paragraph 00165, the handheld device may detect changes in acceleration with respect to one or more axes). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features in the invention of Rakkola modified as taught by Mattice in order to determine whether the device is at rest or not.

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No. PCT/US2009/059900

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Referring to Claim 16, Rakkola discloses a system comprising: a long average logic to create one or more long averages of accelerations as measured by a motion sensor over a period of time (paragraph 0018, incoming acceleration data is summed into a single register per axis. When the number of samples has been summed, the output is divided by a shifting a bit vector in order to get an average value over a selected number of samples); and a computation logic to determine if the long averages of accelerations indicate a true motion of the device (paragraph 0042, a processor interrupt signal is provided if the average acceleration minus the reference level exceeds a threshold, so that the processor can then monitor acceleration with the full accuracy and take actions in response to the detection of acceleration [i.e., motion of the device]), but is silent on a dominant axis logic to determine a dominant axis of a device based on motion data. Mattice teaches a dominant axis logic to determine a dominant axis of a device based on motion data (paragraph 0155, raw data corresponding to movement of a handheld device is received. The raw movement data is processed to yield an output indicating movement of the handheld device; paragraph 0156, determine a dominant axis of motion). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features in the invention of Rakkola as taught by Mattice in order to determine the axis with the greater amount of movement.

Referring to Claim 17, Rakkola discloses a motion sensor logic to detect motion data (paragraph 0006, a motion detector can detect acceleration [i.e., motion] of a device).

Referring to Claim 18, Rakkola discloses wherein the motion sensor logic comprises an accelerometer (Fig. 2, 205) to detect acceleration along one or more axes (paragraph 0006, a motion sensor detects acceleration of a device by analyzing the signal from the device's triaxial accelerometer; paragraph 0003, a triaxial accelerometer measures all three components of acceleration).

Referring to Claim 19, Rakkola discloses motion data is collected to compute the one or more long averages of accelerations (paragraph 0014, the motion detector uses acceleration data that has been generated by an accelerometer; paragraph 0018, incoming acceleration data is summed into a single register per axis. When the number of samples has been summed, the output is divided by a shifting a bit vector in order to get an average value over a selected number of samples), but is silent on a sample period logic to set the period over which motion data is collected. However, selecting the time during which to collect data is a common practice in the art, and the specifics would be a matter of design choice. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features in the invention of Rakkola in order to collect data during different periods of time.

Referring to Claim 20, Rakkola discloses a power logic (Fig. 2, 115) to activate the device when the motion data indicates the device should be woken up (paragraph 0017, once movement of the device is detected, the processor can be woken up for further analysis of movement; paragraph 0039, the low power motion detector 115 analyzes the accelerometer output signal 110, and if the motion detector determines that significant acceleration is or may be present, then the motion detector sends a processor interrupt signal 120 to a processor 125 which is either in an idle state or is performing other tasks. The processor determines actions that need to be taken in response to the accelerometer output data).

Referring to Claim 23, Rakkola discloses a glitch corrector logic to correct one or more glitches in the motion data (paragraph 0042, adjusting acceleration measurements to offset errors [i.e., glitches]).

Referring to Claim 24, Rakkola discloses wherein the glitch corrector removes the one or more glitches before the one or more long averages are calculated (paragraph 0042, adjusting acceleration measurements to offset errors [i.e., glitches]. Then accelerometer data for each of the three axes is averaged 315, which is a simple and power-efficient way of deemphasizing measurement errors).

Claim 9 lacks an inventive step under PCT Article 33(3) as being obvious over Rakkola in view of Gregg et al. (hereinafter, Gregg).

Referring to Claim 9, Rakkola is silent wherein waking up the device further comprises configuring the device to return to a last active device state. In disclosing a communicating screen saver (Title), Gregg teaches wherein waking up the device further comprises configuring the device to return to a last active device state (Col. 1 lines 23-30, the screensaver is invoked after a few minutes of keyboard or mouse inactivity. Once invoked, the screensaver can only be deactivated by an input interrupt such as a movement of a mouse or a keyboard input. When interrupted [i.e., woken up], the screen is restored to its last active state). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features in the invention of Rakkola as taught by Gregg in order to provide a means of viewing and executing applications that were being utilized when the user left the device.

Claim 21 lacks an inventive step under PCT Article 33(3) as being obvious over Rakkola in view of Mattice, and further in view of Gregg.

Referring to Claim 21, Rakkola is silent on a device state logic to restore the device to a last active state. Gregg teaches a device state logic to restore the device to a last active state (Col. 1 lines 23-30, the screensaver is invoked after a few minutes of keyboard or mouse inactivity. Once invoked, the screensaver can only be deactivated by an input interrupt such as a movement of a mouse or a keyboard input. When interrupted [i.e., woken up], the screen is restored to its last active state). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features in the invention of Rakkola as taught by Gregg in order to provide a means of viewing and executing applications that were being utilized when the user left the device.

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Claim 22 lacks an inventive step under PCT Article 33(3) as being obvious over Rakkola in view of Mattice and Gregg, and further in view of Oh.

Referring to Claim 22, Rakkola, Mattice, and Gregg are silent wherein the device state logic allows user interaction to customize applications to be displayed when the device is woken up. In disclosing a portable computer system having an application program launcher for low power consumption (Title), Oh teaches wherein the device state logic allows user interaction to customize applications to be displayed when the device is woken up (Abstract and Col. 3 lines 13-25, using the launcher, a user selects [i.e., customizes] and executes one of several application programs in a program selection menu. If a launching signal is generated when the hand-held computer is at a low power consumption mode [i.e., idle mode], the hand-held computer wakes up from a sleep mode. At this time, a program selection menu is displayed on a screen). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features in the invention of Rakkola modified as taught by Oh in order to provide a means of viewing and executing applications that were being utilized when the user left the device.

Claims 1-24 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

Electronic Acknowledgement Receipt

EFS ID:	7510789
Application Number:	12247950
International Application Number:	
Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Customer Number:	08791
Filer:	Judith A. Szepesi
Filer Authorized By:	
Attorney Docket Number:	8689P057
Receipt Date:	28-APR-2010
Filing Date:	08-OCT-2008
Time Stamp:	21:37:05
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		8689P057_IDS_and_SB08.pdf	72367 745dbca46816a9e4d337a0936dee44ebfa4ea930	yes	4

	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	2	
	Information Disclosure Statement (IDS) Filed (SB/08)		3	4	
Warnings:					
Information:					
2	NPL Documents	8689P057_NPL_ISRWO.PDF	757754 3ec36a570c7c95a0d5ee42e64951c206797650ff	no	9
Warnings:					
Information:					
		Total Files Size (in bytes):	830121		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Attorney's Docket No. 8689P057 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Philippe Kahn, et al	Examiner:	Not yet assigned
Appl. No.	: 12/247,950	Art Unit:	2612
Filed	: October 8, 2008	Confirmation No. 8961	
For	: Method and System for Waking Up a Device Due to Motion	**CERTIFICATE OF TRANSMISSION** I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.	
Customer No.	: 08791	/Judith Szepesi/ ***Judith A. Szepesi***	April 28, 2010 ***Date***

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

INFORMATION DISCLOSURE STATEMENT

Sir:

Enclosed is a copy of Information Disclosure Citation Form PTO-1449 or PTO/SB/08 together with copies of the documents cited on that form, except for copies not required to be submitted (e.g., copies of U.S. patents and U.S. published patent applications need not be enclosed). It is respectfully requested that the cited documents be considered and that the enclosed copy of Information Disclosure Citation Form PTO-1449 or PTO/SB/08 be initialed by the Examiner to indicate such consideration and a copy thereof returned to applicant(s).

Pursuant to 37 C.F.R. § 1.97, the submission of this Information Disclosure Statement is not to be construed as a representation that a search has been made and is not to be construed as an admission that the information cited in this statement is material to patentability.

Pursuant to 37 C.F.R. § 1.97, this Information Disclosure Statement is being submitted under one of the following (as indicated by an "X" to the left of the appropriate paragraph):

__X__ 37 C.F.R. §1.97(b).

____ 37 C.F.R. §1.97(c). If so, then enclosed with this Information Disclosure Statement is <u>one</u> of the following:

____ A statement pursuant to 37 C.F.R. §1.97(e) <u>or</u>

____ The Director is Authorized to charge in the amount of $<u>180.00</u> for the fee under 37 C.F.R. § 1.17(p).

____ 37 C.F.R. §1.97(d). If so, then enclosed with this Information Disclosure Statement are the following:

(1) A statement pursuant to 37 C.F.R. §1.97(e); and

(2) A check for $<u>180.00</u> for the fee under 37 C.F.R. §1.17(p) for submission of the Information Disclosure Statement.

If there are any additional charges, please charge Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: April 28, 2010

/Judith Szepesi/
Judith A. Szepesi
Reg. No. 39,393

1279 Oakmead Parkway
Sunnyvale, CA 94085
(408) 720-8300

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/247,950	10/08/2008	Philippe Kahn	8689P057	8961

8791 7590 02/17/2011

BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

EXAMINER	
LU, SHIRLEY	

ART UNIT	PAPER NUMBER
2612	

MAIL DATE	DELIVERY MODE
02/17/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No. 12/247,950	Applicant(s) KAHN ET AL.	
	Examiner SHIRLEY LU	Art Unit 2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *1* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-24* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-15, drawn to a method and determining an idle sample value, classified in class 713, subclass 323.

II. Claims 16-24, drawn to a system and long average logic, classified in class 702, subclass 127.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the combination as claimed does not require the particulars of the subcombination as claimed for patentability or the subcombination has utility by itself or in other combinations. The subcombination has separate utility such as a method of determining an idle sample value.

The examiner has required restriction between combination and subcombination inventions. Where applicant elects a subcombination, and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and/or examination burden if restriction were not required because at least one of the reason(s) apply.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

There is a search and/or examination burden for the patentably distinct species as set forth above because at least one of the above reason(s) applies.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or a grouping of patentably indistinct species to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected species or grouping of patentably indistinct species, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

The election may be made with or without traverse. To preserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the election of species requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected species or grouping of patentably indistinct species.

Should applicant traverse on the ground that the species, or groupings of patentably indistinct species from which election is required, are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing them to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the species unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other species.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shirley Lu whose telephone number is (571) 272-8546. The examiner can normally be reached on 8:30-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Wu can be reached on (571) 272-2964. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Shirley Lu/

Primary Examiner, Art Unit 2612

Attorney's Docket No. 8689P057 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Philippe Kahn, et al
Appl. No.	:	12/247,950
Filed	:	October 8, 2008
For	:	Method and System for Waking Up a Device Due to Motion
Customer No.	:	08791

Examiner: Lu, Shirley

Art Unit: 2612

Conf No: 8961

CERTIFICATE OF TRANSMISSION
I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.

/Judith Szepesi/ March 17, 2011
Judith A. Szepesi ***Date***

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

AMENDMENT

Sir:

In response to the election/restriction requirement set forth in the Office Action of February 17, 2011, applicants respectfully request the Examiner to enter the following amendments and consider the following remarks:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 6 of this paper.

IN THE CLAIMS:

1. (Original) A method comprising:

determining an idle sample value for a dominant axis of a device;

registering a motion of the device; and

waking up the device when the motion of the device indicates a change in the dominant axis of the device.

2. (Original) The method of claim 1, wherein determining the idle sample value for the dominant axis comprises:

receiving motion data from a motion sensor;

processing the motion data to establish an idle sample value; and

processing the idle sample value to establish the dominant axis.

3. (Original) The method of claim 2, wherein the motion sensor comprises an accelerometer.

4. (Original) The method of claim 2, wherein the idle sample value comprises a long-average of accelerations over a sample period along the dominant axis recorded when the device goes to idle mode after a period of inactivity.

5. (Original) The method of claim 1, further comprising determining the idle sample value for each of the other axes of the device.

6. (Original) The method of claim 1, wherein registering the motion of the device comprises:

receiving motion data from a motion sensor; and

processing the motion data to determine a current sample value of the dominant axis of the device.

7. (Original) The method of claim 1, further comprising comparing a difference between a current sample value along the dominant axis determined based

on the motion of the device and the idle sample value of the dominant axis against a threshold value.

8. (Original) The method of claim 1, wherein the change in the dominant axis comprises a change in acceleration along the dominant axis.

9. (Original) The method of claim 1, wherein waking up the device further comprises configuring the device to return to a last active device state.

10. (Original) The method of claim 6, wherein the current sample value is a long average of accelerations.

11. (Original) The method of claim 6, further comprising determining the current sample value for each of the other axes of the device.

12. (Original) The method of claim 6, wherein the motion sensor comprises an accelerometer.

13. (Original) The method of claim 6, wherein processing the motion data further comprises

verifying whether the motion data comprises one or more glitches; and

removing the one or more glitches in the motion data from the motion data before calculating the long average.

14. (Original) The method of claim 6, further comprising determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value.

15. (Original) The method of claim 8, further comprising:

determining a new dominant axis based on the motion data received from the motion sensor;

computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis determined when the device goes to idle mode after a period of inactivity; and

comparing the difference against a threshold value to establish whether to wake the device up.

Claims 16-24 (Canceled)

25. (New) A mobile device comprising:

a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data;

a motion sensor to register a motion of the mobile device; and

a power logic to activate the device when the motion indicates a change in the dominant axis of the device.

26. (New) The mobile device of claim 25, further comprising:

a long average logic to create one or more long averages of accelerations as measured by the motion sensor over a period of time, the long averages setting the idle sample value for the dominant axis.

27. (New) The mobile device of claim 26, further comprising a sample period logic to set the period over which motion data is collected to compute the one or more long averages of accelerations.

28. (New) The mobile device of claim 26, further comprising:

a computation logic to determine if the long averages of accelerations indicate a change in the dominant axis of the device.

29. (New) The mobile device of claim 26, further comprising a glitch corrector logic to correct one or more glitches in the motion data before the one or more long averages are calculated.

30. (New) The mobile device of claim 25, wherein the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes.

31. (New) The mobile device of claim 25, further comprising a device state logic to restore the device to a last active state.

32. (New) The mobile device of claim 31, wherein the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

33. (New) A system to wake up a mobile device comprising:

a dominant axis logic to determine a current dominant axis of the device; and

a power logic to move the device from an inactive state to an active state upon detection of a change in the dominant axis.

Remarks/Arguments

Reconsideration of the present application, as amended, is respectfully requested. Claims 16-24 have been cancelled. New claims 25-33 have been added. It is respectfully submitted that the amendment does not add new matter. Applicants reserve all rights with respect to the applicability of the Doctrine of Equivalents.

Examiner requires restriction to one of the following inventions under 35 U.S.C. 121:

I. Claims 1-15, classified in class 713, subclass 323; and

II. Claims 16-24, classified in class 702, subclass 127.

Applicant respectfully elects Group I to be examined, with traverse. Applicants respectfully submit that the long average logic recited in claims 16-24 is used in determining the idle sample value, as described in the Specification. Therefore, Applicant respectfully submits that the separate utility suggested by the Examiner is incorrect.

However, in order to expedite prosecution, applicants have canceled the claims of Group II, and added new claims drawn to the apparatus.

If a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact Judith Szepesi at (408) 720-8300.

If there are any additional charges/credits, please charge/credit our deposit account no. 02-2666.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: March 17, 2011

/Judith Szepesi/
Judith A. Szepesi
Reg. No. 39,393

Customer No. 08791
1279 Oakmead Parkway
Sunnyvale, CA 94085
(408) 720-8300

Electronic Acknowledgement Receipt

EFS ID:	9679952
Application Number:	12247950
International Application Number:	
Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Customer Number:	08791
Filer:	Judith A. Szepesi
Filer Authorized By:	
Attorney Docket Number:	8689P057
Receipt Date:	18-MAR-2011
Filing Date:	08-OCT-2008
Time Stamp:	02:39:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		8689P057_RestrictionResp_March2011.pdf	28982 e1f39cb24eb68b001c61019dc0b4b082d1259c52	yes	6

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response to Election / Restriction Filed	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	6
Warnings:			
Information:			
	Total Files Size (in bytes):	28982	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/247,950	Filing Date 10/08/2008	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	03/18/2011	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 24	Minus	** 24	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	**0**

AMENDMENT		(Column 1)		(Column 2)	(Column 3)					
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/PATRICIA WARNER/

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/247,950	10/08/2008	Philippe Kahn	8689P057	8961

8791 7590 05/12/2011

BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

EXAMINER	
LU, SHIRLEY	

ART UNIT	PAPER NUMBER
2612	

MAIL DATE	DELIVERY MODE
05/12/2011	PAPER

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PTOL-90A (Rev. 04/07)

Office Action Summary	Application No.	Applicant(s)	
	12/247,950	KAHN ET AL.	
	Examiner	Art Unit	
	SHIRLEY LU	2612	

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Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15 and 25-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15 and 25-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

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2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
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Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 26-29 is/are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 26 recites "the long averages setting the idle sample value for the dominant axis." Proper action is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim(s) 1-15, 25-33 is/are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "long average(s)" in claim(s) 4, 10, 13, 26-29 is a relative term which renders the claim indefinite. The term "long average(s)" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Though the claims are read in light of the specification, the limitations from the specification are not read into the claims, and the broadest reasonable interpretation has been given to the claims. Proper action is required.

Claim(s) 4, 10, 13, 26-29 recite(s) the limitation(s): long average(s). It is not clear what exactly is being claimed. The dependent claims are rejected under similar reasoning. Proper action is required.

The term "dominant axis" in claim(s) 1-2, 4, 6-8, 15, 25-33 is a relative term which renders the claim indefinite. The term "long average(s)" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Though the claims are read in light of the specification, the limitations from the specification are not read into the claims, and the broadest reasonable interpretation has been given to the claims. Proper action is required.

Claim(s) 1-2, 4, 6-8, 15, 25-33 recite(s) the limitation(s): dominant axis. It is not clear what exactly is being claimed. The dependent claims are rejected under similar reasoning. Proper action is required.

Claim(s) 26 recite(s) the limitation(s): the long averages setting the idle sample value for the dominant axis. It is not clear what exactly is being claimed. The dependent claims are rejected under similar reasoning. Though the claims are read in light of the specification, the limitations from the specification are not read into the claims, and the broadest reasonable interpretation has been given to the claims. Proper action is required.

Claim(s) 10 recite(s) the limitation(s): the current sample value. There is insufficient antecedent basis for this/these limitation in the claim(s). The dependent claims are rejected under similar reasoning. Proper action is required.

Claim(s) 10 recite(s) the limitation(s): the current sample value. It is not clear what exactly is being claimed. It is also unclear as to which current sample value the claim is referring to. The dependent claims are rejected under similar reasoning. Though the claims are read in light of the specification, the limitations from the specification are not read into the claims, and the broadest reasonable interpretation has been given to the claims. Proper action is required.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claim(s) 1, 5-7, 10-12, 14 is/are rejected under 35 U.S.C. 102(b) as being anticipated by Rakkola (20060161377).

As to claim(s) 1, Rakkola disclose(s):

A method comprising: determining an idle sample value for a dominant axis of a device; registering a motion of the device; and waking up the device when the motion of the device indicates a change in the dominant axis of the device ([0015-44]).

As to claim(s) 5, Rakkola disclose(s):

determining the idle sample value for each of the other axes of the device ([0015-44]).

As to claim(s) 6, Rakkola disclose(s):

registering the motion of the device comprises: receiving motion data from a motion sensor; and processing the motion data to determine a current sample value of the dominant axis of the device ([0015-44]).

As to claim(s) 7, Rakkola disclose(s):

comparing a difference between a current sample value along the dominant axis determined based on the motion of the device and the idle sample value of the dominant axis against a threshold value ([0015-44]).

As to claim(s) 10, Rakkola disclose(s):

the current sample value is a long average of accelerations ([0015-44]).

As to claim(s) 11, Rakkola disclose(s):

determining the current sample value for each of the other axes of the device ([0015-44]).

As to claim(s) 12, Rakkola disclose(s):

the motion sensor comprises an accelerometer ([0015-44]).

As to claim(s) 14, Rakkola disclose(s):

determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value ([0015-44]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim(s) 2-4, 8, 15, 25-30, 33 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716).

As to claim(s) 2,

Rakkola disclose(s):

wherein determining the idle sample value for the dominant axis comprises: receiving motion data from a motion sensor; processing the motion data; and processing the idle sample value ([0015-44]).

The above art/combination does not expressly disclose to establish the dominant axis; to establish an idle sample value.

Rakkola disclose(s): processing data to establish an idle sample value; observing the degree of activity by counting the number of times a threshold is exceeded, as measured using an accelerometer, in combination with the low power motion detector; adjusting the idle sample value to offset temperature, air pressure, humidity, and other factors([0015-44]).

Mattice discloses processing the idle sample value to establish the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 3, Rakkola disclose(s):

the motion sensor comprises an accelerometer ([0015-44]).

As to claim(s) 4,

Rakkola disclose(s):

the idle sample value comprises a long-average of accelerations over a sample period along the dominant axis; when the device goes to idle mode after a period of inactivity ([0015-44]).

The above art/combination does not expressly disclose recorded.

Mattice discloses recorded spatial signatures, spatial signatures may be tracked, recorded, and/or analyzed by one or more motion detector devices; recording motion data (fig. 2; [0053]; [0155-65]; [0210-54]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to continue collecting data when the device is inactive, to track, record, and/or analyze the data.

As to claim(s) 8,

The above art/combination does not expressly disclose the change in the dominant axis comprises a change in acceleration along the dominant axis.

Mattice discloses the change in the dominant axis comprises a change in acceleration along the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to determine whether the device is rest.

As to claim(s) 15,

Rakkola disclose(s): computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis; comparing the difference against a threshold value to establish whether to wake the device up ([0015-44]).

The above art/combination does not expressly disclose determining a new dominant axis based on the motion data received from the motion sensor; when the device goes to idle mode after a period of inactivity.

Rakkola disclose(s): updating values automatically and periodically, as a programmable parameter; computing when the device goes to idle mode after a period of inactivity ([0015-44]).

Mattice discloses determining a new dominant axis based on the motion data received from the motion sensor (fig. 2; [0053]; [0155-65]; [0210-54]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to continue collecting data when a device is inactive, to determine whether the device is at rest, and to update values automatically and/or periodically, as a programmable parameter.

As to claim(s) 25,

Rakkola disclose(s): A mobile device comprising: a motion sensor to register a motion of the mobile device; and a power logic to activate the device when the motion indicates a change in the dominant axis of the device ([0015-44]; see also claim 2).

The above art/combination does not expressly disclose a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data.

Mattice discloses a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim 2).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to determine the axis with the greater amount of movement (see also claim 2).

As to claim(s) 26,

Rakkola disclose(s): a long average logic to create one or more long averages of accelerations as measured by the motion sensor over a period of time ([0015-44]).

The above art/combination does not expressly disclose the long averages setting the idle sample value for the dominant axis.

Rakkola disclose(s): processing data to establish an idle sample value; observing the degree of activity by counting the number of times a threshold is exceeded, as measured using an accelerometer, in combination with the low power motion detector; adjusting the idle sample value to offset temperature, air pressure, humidity, and other factors([0015-44]).

Mattice discloses processing the idle sample value to establish the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 27,

Rakkola disclose(s): to compute the one or more long averages of accelerations ([0015-44]).

The above art/combination does not expressly disclose a sample period logic to set the period over which motion data is collected.

Rakkola discloses logic to set a period over which motion data is collected; the number of samples summed to compute the one or more long averages of accelerations is a programmable setting ([0015-44]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a programmable setting to choose the number of samples collected and processed.

As to claim(s) 28, Rakkola disclose(s):

a computation logic to determine if the long averages of accelerations indicate a change in the dominant axis of the device ([0015-44]).

As to claim(s) 29, Rakkola disclose(s):

a glitch corrector logic to correct one or more glitches in the motion data before the one or more long averages are calculated ([0015-44]; see also claim 13).

As to claim(s) 30, Rakkola disclose(s):

the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes ([0015-44]).

As to claim(s) 33,

A system to wake up a mobile device comprising: a dominant axis logic to determine a current dominant axis of the device; and a power logic to move the device from an inactive state to an active state upon detection of a change in the dominant axis (see claims 1, 25).

3. Claim(s) 9 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Gregg (6353449).

As to claim(s) 9,

The above art/combination does not expressly disclose waking up the device further comprises configuring the device to return to a last active device state.

Gregg discloses waking up the device further comprises configuring the device to return to a last active device state ([1, 23-30]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a means of viewing and executing applications that were being utilized when the user left the device.

4. Claim(s) 31 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Gregg (6353449).

As to claim(s) 31,

a device state logic to restore the device to a last active state (see claim(s) 9).

5. Claim(s) 13 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Doll (20070150136).

As to claim(s) 13,

Rakkola disclose(s): processing the motion data further comprises; and removing the one or more glitches in the motion data from the motion data before calculating the long average ([0015-44]).

The above art/combination does not expressly disclose verifying whether the motion data comprises one or more glitches.

Doll discloses verifying whether the motion data comprises one or more glitches ([0007]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to ensure that the system utilizes and processes valid information and data.

6. Claim(s) 32 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Gregg (6353449) in view of Oh (6771250).

As to claim(s) 32,

The above art/combination does not expressly disclose the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

Oh discloses the device state logic allows user interaction to customize applications to be displayed when the device is woken up ([3, 13-25]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a means of viewing and executing applications that were being utilized and/or as desired by a user.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shirley Lu whose telephone number is (571) 272-8546. The examiner can normally be reached on 8:30-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Wu can be reached on (571) 272-2964. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Shirley Lu/

Primary Examiner, Art Unit 2612

Notice of References Cited	Application/Control No. 12/247,950	Applicant(s)/Patent Under Reexamination KAHN ET AL.	
	Examiner SHIRLEY LU	Art Unit 2612	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2006/0161377	07-2006	Rakkola et al.	702/141
*	B	US-2007/0259716	11-2007	Mattice et al.	463/036
*	C	US-6,353,449	03-2002	Gregg et al.	715/762
*	D	US-2007/0150136	06-2007	Doll et al.	701/034
*	E	US-6,771,250	08-2004	Oh, Jae-Choeul	345/156
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	**Application/Control No.** 12/247,950	**Applicant(s)/Patent under Reexamination** KAHN ET AL.	
	Examiner SHIRLEY LU	**Art Unit** 2612	

SEARCHED			
Class	Subclass	Date	Examiner
340	669	4/25/2011	SL
702	141	4/25/2011	SL
345	325, 156	4/25/2011	SL

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
east, inventor search, Google	4/25/2011	SL

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CONFIRMATION NO. 8961

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/247,950	10/08/2008 RULE	340	2612	8689P057

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David Vogel, Santa Cruz, CA;
Mark Andrew Christensen, Santa Cruz, CA;

** **CONTINUING DATA** *************************

** **FOREIGN APPLICATIONS** *************************

** **IF REQUIRED, FOREIGN FILING LICENSE GRANTED** **
10/21/2008

Foreign Priority claimed ❑ Yes ☑ No 35 USC 119(a-d) conditions met ❑ Yes ☑ No Verified and Acknowledged /SHIRLEY LU/ Examiner's Signature	❑ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CA	7	24	2

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UNITED STATES

TITLE

Method and System for Waking Up a Device Due to Motion

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
1428	No.____________ to charge/credit DEPOSIT ACCOUNT No.____________ for following:	❑ All Fees ❑ 1.16 Fees (Filing) ❑ 1.17 Fees (Processing Ext. of time) ❑ 1.18 Fees (Issue) ❑ Other ________________ ❑ Credit

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	"20070259716".pn. and ("0053" "0155" "0165" "0210" "0254")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
L2	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
L3	2	"6353449".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:00
L4	2	"20070150136".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:03

L5	7354	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
L6	3525	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
L7	3	5 and L6	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
L8	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
L9	1	5 and L8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S2	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48

S3	7	S2 and remote$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48
S4	2	S3 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:49
S5	1	"20040095252".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:50
S6	3552061	"20030222775.pn.and" distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:14
S7	3552061	"20030222775.pn. and" distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:14
S8	0	"20030222775".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:14

S9	2	"20030098792".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:16
S10	0	"20030098792".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S11	0	"20030098792".pn. and temperature$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S12	1	"20030098792".pn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:43
S13	2	S2 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:46
S14	11	baby adj seat and distance same counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:13

S15	19	baby adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:17
S16	2	"20030122662".pn. and range	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:20
S17	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:22
S18	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:23
S19	133	car adj seat and distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S20	14	car adj seat and predetermined adj distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24

S21	0	"7797212".pn. and counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:26
S22	12	car adj seat and distance with signal$1 adj strength $1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:27
S23	0	"1318".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S24	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S25	3	"131848".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06
S26	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06

S27	12	lojack.as. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:12
S28	2	"7561102".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:14
S29	2	"7536169".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:15
S30	3940	counter with time with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52
S31	245	counter with measur$4 near5 (time with distance)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52
S32	25	S31 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:54

S33	11598	"327"/$.ccls. and rectifier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16
S34	616	"327"/$.ccls. and rectifier.ti.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16
S35	36	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:49
S36	21	S35 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:50
S37	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:53
S38	2	"20030034887".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12

S39	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S40	1	"20030034887".pn. and "10"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:18
S41	2	"20030034887".pn. and timer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:38
S42	0	"20030098792".pn. and "72"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S43	1	"20030098792".pn. and "27"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S44	0	"779712".apn. and low adj power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53

S45	0	"779712".apn. and motion adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S46	0	"779712".apn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S47	3	"779712".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S48	2	"6922147".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:06
S49	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S50	3	S49 and (conserv$4 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31

S51	3	S49 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S52	2	S49 and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 20:56
S53	0	mtion adj detector with sleep	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S54	52	motion adj detector with sleep adj mode	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S55	10	S54 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:06
S56	9857	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15

S57	5	S56 and S54	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15
S58	638	signal adj edge adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:18
S59	0	signal adj edge adj detector same reduce adj error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S60	33	signal adj edge adj detector same error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S61	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S62	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:21

S63	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:22
S64	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S65	34	signal adj edge adj detector and measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S66	5	signal adj edge adj detector same measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S67	3120	edge adj detect$4 with counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:24
S68	86	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:24

S69	23	S68 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:25
S70	45	edge adj detect$4 with reduc$4 near3 error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S71	7	S70 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S72	1	"247950".apn. and dominant adj axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:03
S73	18	(("20060161377") or ("200702597") or ("20070150136") or ("6353449") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:40
S74	0	("200700259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57

S75	2	("20070259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S76	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 17:37
S77	1	"247950".apn. and (long adj average$1 with idle)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S78	1	"247950".apn. and (long adj average$1 with set$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S79	1	"247950".apn. and (long adj average$1 with idle adj sample)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:14
S80	1	"247950".apn. and (long adj average$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:17

S81	3524	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:18
S82	3524	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:19
S83	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S84	2	S83 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S85	1	"247950".apn. and dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:34
S86	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:40

S87	1	"247950".apn. and new adj dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:43
S88	1	"20060161377".pn. and reference	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:47
S89	0	"20070259716".pn. and (idle sleep)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:54
S90	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:57
S91	1	"247950".apn. and idle with comput$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S92	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58

4/28/2011 2:20:47 PM
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Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Not yet assigned
Sheet	1	of	1	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	2005/0210300	9/22/2005	Song et al	
		US-				
		US-				
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] Number[4] Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature	/Shirley Lu/ (04/28/2011)	Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6]Applicant is to place a check mark here if English language translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SENT FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450**.

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /S.L./

Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(use as many sheets as necessary)*				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	3681
				Examiner Name	Not yet assigned
Sheet	1	**of**	1	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	6,013,007	1/11/2000	Root et al	
		US-	7,010,332	3/7/2006	Irvin et al	
		US-	2005/0232404	10/20/2005	Gaskill	
		US-	2007/0125852	6/7/2007	Rosenberg	
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] Number[4] Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature	/Shirley Lu/ (04/28/2011)	Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6]Applicant is to place a check mark here if English language translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SENT FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450**.

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /S.L./

Attorney's Docket No. 8689P057 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Philippe Kahn, et al	Examiner:	Lu, Shirley
Appl. No.	:	12/247,950	Art Unit:	2612
Filed	:	October 8, 2008	Conf No:	8961
For	:	Method and System for Waking Up a Device Due to Motion	**CERTIFICATE OF TRANSMISSION** I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.	
Customer No.	:	08791	/Judith Szepesi/ ***Judith A. Szepesi***	August 12, 2011 ***Date***

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

AMENDMENT

Sir:

In response to the Office Action of May 12, 2011, applicants respectfully request the Examiner to enter the following amendments and consider the following remarks:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 6 of this paper.

IN THE CLAIMS:

1. (Original) A method comprising:

determining an idle sample value for a dominant axis of a device;

registering a motion of the device; and

waking up the device when the motion of the device indicates a change in the dominant axis of the device.

2. (Original) The method of claim 1, wherein determining the idle sample value for the dominant axis comprises:

receiving motion data from a motion sensor;

processing the motion data to establish an idle sample value; and

processing the idle sample value to establish the dominant axis.

3. (Original) The method of claim 2, wherein the motion sensor comprises an accelerometer.

4. (Original) The method of claim 2, wherein the idle sample value comprises a long-average of accelerations over a sample period along the dominant axis recorded when the device goes to idle mode after a period of inactivity.

5. (Original) The method of claim 1, further comprising determining the idle sample value for each of the other axes of the device.

6. (Original) The method of claim 1, wherein registering the motion of the device comprises:

receiving motion data from a motion sensor; and

processing the motion data to determine a current sample value of the dominant axis of the device.

7. (Original) The method of claim 1, further comprising comparing a difference between a current sample value along the dominant axis determined based

on the motion of the device and the idle sample value of the dominant axis against a threshold value.

8. (Original) The method of claim 1, wherein the change in the dominant axis comprises a change in acceleration along the dominant axis.

9. (Original) The method of claim 1, wherein waking up the device further comprises configuring the device to return to a last active device state.

10. (Currently Amended) The method of claim 6, wherein the current sample value <u>of the dominant axis of the device</u> is a long average of accelerations.

11. (Original) The method of claim 6, further comprising determining the current sample value for each of the other axes of the device.

12. (Original) The method of claim 6, wherein the motion sensor comprises an accelerometer.

13. (Original) The method of claim 6, wherein processing the motion data further comprises

verifying whether the motion data comprises one or more glitches; and

removing the one or more glitches in the motion data from the motion data before calculating the long average.

14. (Original) The method of claim 6, further comprising determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value.

15. (Original) The method of claim 8, further comprising:

determining a new dominant axis based on the motion data received from the motion sensor;

computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis determined when the device goes to idle mode after a period of inactivity; and

comparing the difference against a threshold value to establish whether to wake the device up.

Claims 16-24 (Canceled)

25. (Previously Presented) A mobile device comprising:

a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data;

a motion sensor to register a motion of the mobile device; and

a power logic to activate the device when the motion indicates a change in the dominant axis of the device.

26. (Currently Amended) The mobile device of claim 25, further comprising:

a long average logic to create one or more long averages of accelerations as measured by the motion sensor over a period of time~~, the long averages setting the idle sample value for the dominant axis~~.

27. (Previously Presented) The mobile device of claim 26, further comprising a sample period logic to set the period over which motion data is collected to compute the one or more long averages of accelerations.

28. (Previously Presented) The mobile device of claim 26, further comprising:

a computation logic to determine if the long averages of accelerations indicate a change in the dominant axis of the device.

29. (Previously Presented) The mobile device of claim 26, further comprising a glitch corrector logic to correct one or more glitches in the motion data before the one or more long averages are calculated.

30. (Previously Presented) The mobile device of claim 25, wherein the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes.

31. (Previously Presented) The mobile device of claim 25, further comprising a device state logic to restore the device to a last active state.

32. (Previously Presented) The mobile device of claim 31, wherein the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

33. (Previously Presented) A system to wake up a mobile device comprising:

a dominant axis logic to determine a current dominant axis of the device; and

a power logic to move the device from an inactive state to an active state upon detection of a change in the dominant axis.

Remarks/Arguments

Applicants respectfully request consideration of the subject application as amended herein. This Amendment is submitted in response to the Office Action mailed May 12, 2011. Claims 1-15 and 25-33 are rejected.

In this Amendment, claims 10 and 26 have been amended. No claims have been canceled or added. It is respectfully submitted that the amendment does not add new matter.

Applicants reserve all rights with respect to the applicability of the Doctrine of Equivalents.

Claim Rejections under 35 U.S.C. §112, first paragraph

Claims 26-29 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The Examiner objected to claim 26 which recites "the long averages setting the idle sample value for the dominant axis." Applicants have amended claim 26 to remove that limitation. In light of the above, Applicants respectfully request the withdrawal of the rejections under 35 U.S.C. 112, first paragraph.

Claim Rejections under 35 U.S.C. §112, second paragraph

Claims 1-15 and25-33 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner objected to the term "long average(s)" as a relative term, which renders the claim indefinite. Applicants respectfully disagree. The term "long average" as defined in the Specification is "a long average of accelerations" which is an averaging of a plurality of acceleration measurements over the sample period. (See Specification as originally filed, paragraph 31, 43, 44). While the term "long average" is used, it is simply a term used to describe the averaging of samples, it is not contrasted with a short average or any other type of average. Therefore, while the term long is used, it is not used as a relative term, but rather the name of the calculation is "long average." As the Applicants are permitted to be their own lexicographer, Applicants respectfully submit that the term “long average” is well defined within the Specification, and not relative.

The Examiner objected to the term “dominant axis” as a relative term which renders the claim indefinite. Applicants respectfully disagree. The term “dominant axis” is defined as “the axis most impacted by gravity” (see Specification as originally filed, paragraph 23). This term is not relative, and is well defined in the Specification.

The Examiner noted that the term “current sample value” in claim 10 lacked antecedent basis. Applicants have amended claim 10.

In light of the above, Applicants respectfully request the withdrawal of the rejections under 35 U.S.C. 112, second paragraph.

Claim Rejections under 35 U.S.C. §102(b)

Claims 1, 5-7, 10-12, and 14 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Publication No. 2006/0161377 to Rakkola, et al (hereinafter “Rakkola”).

Rakkola discusses an energy efficient acceleration measurement system. However, Rakkola teaches away from the present invention. In particular, Rakkola states that:

Another important aspect of the described motion detector's embodiments is that, when the motion detector is enabled, a reference level is calculated automatically. The benefit of this function is that there is consequently no need to consider offsets on different channels when setting threshold levels, and threshold levels can also be set independently from device orientation and from the vector of gravitational force. An averaging procedure is used for this reference level calculation as well (see previous description of averaging process for incoming acceleration data). The reference levels are calculated in this way for each of the three axes, assuming that a triaxial accelerometer is used. (Rakkola, paragraph 19). Rakkola concludes “The reference levels are set without regard to device orientation of the direction of gravity, and so setting of these reference levels is greatly streamlined, with corresponding reduction of power requirements.” (Rakkola, paragraph 20). Therefore, Rakkola specifically teaches away from "determining an idle sample value for a dominant axis of a device," since no such calculation is needed.

Claim 1 recites:

A method comprising:

determining an idle sample value for a dominant axis of a device;

registering a motion of the device; and

waking up the device when the motion of the device indicates a change in the dominant axis of the device.

(Claim 1). As noted above, Rakkola teaches away from using gravitational force at all. Therefore, Rakkola does not teach or suggest waking up the device when the motion of the device indicates a change in the dominant axis of the device (e.g. as defined in the Specification the axis most impacted by gravity). Therefore, claim 1 is not anticipated by Rakkola.

Claim 24 recites:

> A mobile device comprising:
>
> a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data;
>
> a motion sensor to register a motion of the mobile device; and
>
> a power logic to activate the device when the motion indicates a change in the dominant axis of the device.

(Claim 24). As noted above, Rakkola specifically teaches away from using the change in the dominant axis, or any use of the dominant axis. Therefore, claim 24, and the claims which depend on it, are not anticipated by Rakkola.

Claim 33 recites:

A system to wake up a mobile device comprising:

a dominant axis logic to determine a current dominant axis of the device; and

a power logic to move the device from an inactive state to an active state upon detection of a change in the dominant axis.

(Claim 33). As noted above, Rakkola specifically teaches away from using the change in the dominant axis, or any use of the dominant axis. Therefore, claim 33 is not anticipated by Rakkola.

Claim Rejections under 35 U.S.C. §103(a)

Claims 2-4, 8, 15, 25-30, and 33 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of U.S. Publication No. 2007/0259716 to Mattice, et al (hereinafter "Mattice").

Applicants reserve the right to swear behind Mattice. Mattice discusses the control of wager-based game using gesture recognition. While Mattice uses the term "gravitational acceleration" Mattice does not teach or suggest determining a dominant axis (e.g. an axis most impacted by gravity) much less using any such axis to determine when a device should be woken up. While the term "dominant axis" is used, it appears to refer to the axis experiencing the most motion from user input (see Mattice, Figure 6, paragraph 155). As noted above, Rakkola also does not teach or suggest this feature. Therefore, Applicants respectfully submit that Mattice does not teach or suggest using a dominant axis (e.g. an axis most impacted by gravity) for waking up the device either, and thus does not remedy the shortcomings of Rakkola discussed above. Therefore, claims 2-4, 8, 15, 25-30, and 33 are not obvious over the combination of Rakkola and Mattice.

Claim 9 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of U.S. Patent No. 6,353,449 to Gregg, et al (hereinafter "Gregg"). Gregg discusses a screensaver that communicates data, including application indicial representative of work in progress. (Gregg, Abstract). Gregg does not teach or suggest the use of a dominant axis, much less the use of a dominant axis to determine when to wake up a device. As noted above, Rakkola also does not teach or suggest this feature. Therefore, Gregg does not remedy the shortcomings of Rakkola discussed above. Therefore, claim 9 is not obvious over the combination of Rakkola and Gregg.

Claim 31 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Mattice in view of Gregg. As noted above, none of Rakkola, Mattice, or Gregg teach or suggest the use of a dominant axis (defined as the axis most impacted by gravity), to determine when to wake up a device. Therefore, the combination of references does not make claim 31, which incorporates claim 24, obvious.

Claims 13 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of U.S. Publication No. 2007/0150136 to Doll, et al (hereinafter "Doll"). Applicants reserve the right to swear behind Doll.

Doll discusses a test signal, which is injected into a motion sensor, to test whether a motion sensor is functioning properly (Doll, Abstract). Doll does not teach or suggest the use of a dominant axis, much less the use of a dominant axis to determine when to wake a device. As noted above, Rakkola also does not teach or suggest this feature. Therefore, claim 13, which incorporates claim 1, is not obvious over the combination of Rakkola and Doll.

Claim 32 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Mattice in view of Gregg in view of U.S. Patent No. 6,771,250 to Oh. Oh discusses an application program launcher having a multi-point switch. Using the launcher, a user selects and executes one of several application programs registered in a program selection menu. (Oh, Abstract). Oh does not discuss a dominant axis at all, much less the use of a dominant axis to determine when to wake up a device. As noted above, none of Rakkola, Mattice, and Gregg teach or suggest this feature either. Therefore, claim 32, which incorporates claim 24, is not obvious over the combination of Rakkola, Mattice, Gregg, and Oh.

Conclusion

Applicant respectfully submits that in view of the amendments and discussion set forth herein, the applicable rejections have been overcome. Accordingly, the present and amended claims should be found to be in condition for allowance.

If a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact Judith A. Szepesi at (408) 720-8300.

If there are any additional charges/credits, please charge/credit our deposit account no. 02-2666.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: August 12, 2011

/Judith Szepesi/
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Electronic Acknowledgement Receipt

EFS ID:	10727048
Application Number:	12247950
International Application Number:	
Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Customer Number:	08791
Filer:	Judith A. Szepesi
Filer Authorized By:	
Attorney Docket Number:	8689P057
Receipt Date:	13-AUG-2011
Filing Date:	08-OCT-2008
Time Stamp:	02:45:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		8689P057_AmResp_Aug2011.pdf	115550 ccc1102df668b1cadb3610581708ae3f1b799ce5	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	11

Warnings:	
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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 12/247,950

Filing Date: 10/08/2008

☐ To be Mailed

APPLICATION AS FILED – PART I

FOR	NUMBER FILED (Column 1)	NUMBER EXTRA (Column 2)	SMALL ENTITY ☐ RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
			TOTAL			TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

AMENDMENT

08/13/2011	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 24	Minus	** 24	= 0	X $ =		OR	X $52=	0
Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $220=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	**0**

AMENDMENT

	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/CHERYL CLARK/

Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	1	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	4,285,041	8/18/1981	Smith	
		US-	4,578,769	3/25/1986	Frederick	
		US-	5,446,725	8/29/1995	Ishiwatari	
		US-	5,446,775	8/25/1995	Wright et al	
		US-	5,583,776	12/10/1996	Levi et al	
		US-	5,593,431	1/14/1997	Sheldon	
		US-	5,654,619	8/5/1997	Iwashita, Yasusuke	
		US-	5,778,882	7/14/1998	Raymond et al	
		US-	5,955,667	9/21/1999	Fyfe	
		US-	5,976,083	11/2/1999	Richardson, et al.	
		US-	6,122,595	9/19/2000	Varley et al	
		US-	6,135,951	10/24/2000	Richardson, et al.	
		US-	6,145,389	11/14/2000	Ebeling, et al.	
		US-	6,282,496	8/28/2001	Chowdhary	
		US-	6,369,794	4/9/2002	Sakurai et al	
		US-	6,428,490	8/6/2002	Kramer et al	
		US-	6,493,652	12/10/2002	Ohlenbusch et al	
		US-	6,496,695	12/17/2002	Kouji et al	
		US-	6,513,381	2/4/2003	Fyfe et al.	
		US-	6,522,266	2/18/2003	Soehren, et al.	
		US-	6,532,419	3/11/2003	Begin, et al.	
		US-	6,539,336	3/25/2003	Vock, et al.	
		US-	6,611,789	8/26/2003	Darley, Jesse	
		US-	6,700,499	3/2/2004	Kubo et al	
		US-	6,786,877	9/7/2004	Foxlin	
		US-	6,790,178	9/14/2004	Mault, et al.	
		US-	6,813,582	11/2/2004	Levi et al.	
		US-	6,823,036	11/23/2004	Chen	

Examiner Signature		Date Considered	

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Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	2	of	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	6,826,477	11/30/2004	Ladetto et al	
		US-	6,836,744	12/28/2004	Asphahani, et al.	
		US-	6,881,191	4/19/2005	Oakley, et al.	
		US-	6,885,971	4/26/2005	Vock, et al.	
		US-	6,898,550	5/24/2005	Blackadar, et al.	
		US-	6,928,382	8/9/2005	Hong et al	
		US-	6,941,239	9/6/2005	Unuma, et al.	
		US-	6,959,259	10/25/2005	Vock, et al.	
		US-	6,975,959	12/13/2005	Dietrich et al.	
		US-	7,054,784	5/30/2006	Flentov et al	
		US-	7,057,551	6/6/2006	Vogt, Mark J	
		US-	7,072,789	7/4/2006	Vock, et al.	
		US-	7,092,846	8/15/2006	Vock, et al.	
		US-	7,148,797	12/12/2006	Albert	
		US-	7,158,912	1/20/2007	Vock, et al.	
		US-	7,169,084	1/30/2007	Tsuji, Tomoharu	
		US-	7,171,331	1/30/2007	Vock, et al.	
		US-	7,177,684	2/13/2007	Kroll et al	
		US-	7,212,943	5/1/2007	Aoshima, et al.	
		US-	7,220,220	5/22/2007	Stubbs, et al.	
		US-	7,297,088	11/20/2007	Tsuji, Tomoharu	
		US-	7,334,472	2/26/2008	Seo et al	
		US-	7,353,112	4/1/2008	Choi et al	
		US-	7,382,611	2/12/2008	Klees, et al.	
		US-	7,387,611	6/17/2008	Inoue et al.	
		US-	7,451,056	11/11/2008	Flentov et al	
		US-	7,457,719	11/25/2008	Kahn et al	
		US-	7,467,060	12/16/2008	Kulach et al	

Examiner Signature		Date Considered	

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Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(use as many sheets as necessary)*				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	3	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	7,489,937	2/10/2009	Chung et al	
		US-	7,512,515	3/31/2009	Vock et al	
		US-	7,526,402	4/28/2009	Tenanhaus et al	
		US-	7,608,050	10/27/2009	Sugg, Christoper John	
		US-	7,640,804	1/5/2010	Daumer et al	
		US-	7,647,196	1/12/2010	Kahn et al.	
		US-	7,647,196	11/12/2010	Kahn et al	
		US-	7,653,508	1/26/2010	Kahn et al.	
		US-	7,752,011	7/6/2010	Niva et al	
		US-	7,753,861	7/13/2010	Kahn et al.	
		US-	7,774,156	8/10/2010	Niva et al	
		US-	7,857,772	12/28/2010	Bouvier et al	
		US-	2002/0023654	2/28/2002	Webb, James D	
		US-	2002/0089425	7/11/2002	Kubo et al	
		US-	2002/0109600	8/15/2002	Mault, James R.; et al.	
		US-	2002/0118121	8/29/2002	Lehrman et al	
		US-	2002/0151810	10/17/2002	Wong, Philip Lim-Kong; et al.	
		US-	2002/0193124	12/19/2002	Hamilton et al	
		US-	2003/0018430	1/23/2003	Ladetto et al	
		US-	2003/0048218	3/13/2003	Milnes et al	
		US-	2003/0083596	5/1/2003	Kramer et al	
		US-	2003/0109258	6/12/2003	Mantyjarvi et al	
		US-	2003/0139692	7/24/2003	Barrey et al.	
		US-	2004/0106421	6/3/2004	Tomiyoshi et al	
		US-	2004/0225467	11/11/2004	Vock, Curtis A.; et al.	
		US-	2004/0236500	11/25/2004	Choi et al	
		US-	2005/0033200	2/10/2005	Soehren, Wayne A.; et al.	
		US-	2005/0202934	9/15/2005	Olrik et al	

Examiner Signature		Date Considered	

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				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	4	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number: Number-Kind Code[2] (If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	2005/0222801	10/6/2005	Wulff et al	
		US-	2005/0232388	10/20/2005	Tsuji, Tomoharu	
		US-	2005/0238132	10/27/2005	Tsuji, Tomoharu	
		US-	2005/0240375	10/27/2005	Sugai, Yoshinori	
		US-	2005/0248718	11/10/2005	Howell, Thomas A., et al.	
		US-	2006/0020177	1/26/2006	Seo et al	
		US-	2006/0063980	3/23/2006	Hwang et al	
		US-	2006/0064276	3/23/2006	Ren et al	
		US-	2006/0100546	5/11/2006	Silk, Jeffrey E	
		US-	2006/0136173	6/22/2006	Charles Whipple Jr.; et al.	
		US-	2006/0167387	7/27/2006	Buchholz et al	
		US-	2006/0205406	9/14/2006	Pekonen et al	
		US-	2006/0206258	9/14/2006	Brooks, Amanda S.	
		US-	2006/0223547	10/5/2006	Chin et al	
		US-	2006/0259268	11/16/2006	Vock et al	
		US-	2006/0288781	12/28/2006	Daumer et al	
		US-	2007/0037610	2/15/2007	Logan, James D	
		US-	2007/0038364	2/15/2007	Lee et al	
		US-	2007/0061105	3/15/2007	Darley, Jesse; et al.	
		US-	2007/0063850	3/22/2007	Devaul; Richard W.; et al.	
		US-	2007/0067094	3/22/2007	Park et al	
		US-	2007/0073482	3/29/2007	Churchill et al	
		US-	2007/0082789	4/12/2007	Nissila et al	
		US-	2007/0130582	6/7/2007	Chang et al	
		US-	2007/0142715	6/21/2007	Banet et al.	
		US-	2007/0195784	8/23/2007	Allen et al	
		US-	2007/0208531	9/6/2007	Darley, Jesse; et al.	
		US-	2007/0213085	9/13/2007	Fedora, Neal R	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	5	of	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number: Number-Kind Code[2] (If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	2007/0213126	9/13/2007	Deutsch et al	
		US-	2007/0250261	10/25/2007	Soehren	
		US-	2007/0260418	11/8/2007	Ladetto et al	
		US-	2007/0260482	11/8/2007	Nurmela et al	
		US-	2008/0161072	7/3/2008	Lide et al	
		US-	2008/0171918	7/17/2008	Teller et al	
		US-	2009/0047645	2/19/2009	Dibenedetto et al	
		US-	2009/0098880	4/16/2009	Lindquist, Bjorn	
		US-	2009/0213002	8/27/2009	Rani et al	
		US-	2009/0234614	9/17/2009	Kahn et al.	
		US-	2009/0319221	12/24/2009	Kahn et al	
		US-	2010/0056872	3/4/2010	Kahn et al.	
		US-	2010/0057398	3/4/2010	Darley, Jesse; et al.	
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				Art Unit	2612
				Examiner Name	Lu, Shirley
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		ANDERSON, Ian, et al, “Shakra: Tracking and Sharing Daily Activity Levels with Unaugmented Mobile Phones," Mobile Netw Appl, 8/3/2007, pp 185-199	
		AYLWARD, Ryan, et al, "Sensemble: A Wireless, Compact, Multi-User Sensor System for Interactive Dance," International Conference on New Interfaces for Musical Expression (NIME06), June 4-8, 2006, pp 134-139	
		BACA, Arnold, et al, "Rapid Feedback Systems for Elite Sports Training," IEEE Pervasive Computing, October-December 2006, pp 70-76	
		BAKHRU, Kesh, "A Seamless Tracking Solution for Indoor and Outdoor Position Location," IEEE 16th International Symposium on Personal, Indoor, and Mobile Radio Communications, 2005, pp 2029-2033	
		BLILEY, Kara E, et al, "A Miniaturized Low Power Personal Motion Analysis Logger Utilizing MEMS Accelerometers and Low Power Microcontroller," IEEE EMBS Special Topic Conference on Microtechnologies in Medicine and Biology, May 12-15, 2005, pp 92-93	
		BOURZAC, Katherine, "Wearable Health Reports," Technology Review, February 28, 2006, <http://www.techreview.com/printer_friendly_article_aspx?id+16431>, accessed 3/22/2007, 3 pages	
		CHENG, Fangxiang, et al, "Periodic Human Motion Description for Sports Video Databases," Proceedings of the Pattern Recognition, 2004, 5 pages	
		DAO, Ricardo, “Inclination Sensing with Thermal Accelerometers”, MEMSIC, May 2002, 3 pages	
		FANG, Lei, et al, "Design of a Wireless Assisted Pedestrian Dead Reckoning System--The NavMote Experience," IEEE Transactions on Instrumentation and Measurement, Vol 54, No 6, December 2005, pp 2342-2358	
		HEALEY, Jennifer, et al, "Wearable Wellness Monitoring Using ECG and Accelerometer Data," IEEE Int. Symposium on Wearable Computers (ISWC'05), 2005, 2 pages	
		HEMMES, Jeffrey, et al, "Lessons Learned Building TeamTrak: An Urban/Outdoor Mobile Testbed," 2007 IEEE Int. Conf. on Wireless Algorithms, August 1-3, 2007, pp 219-224	

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				Filing Date	October 8, 2008
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				Art Unit	2612
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		JONES, L, et al, "Wireless Physiological Sensor System for Ambulatory Use," <http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?tp=&arnumber=1612917&isnumber=33861>, April 3-5, 2006	
		JOVANOV, Emil, et al, "A Wireless Body Area Network of Intelligent Motion Sensors for Computer Assisted Physical Rehabilitation," Journal of NeuroEngineering and Rehabilitation, March 2005, 10 pages	
		KALPAXIS, Alex, "Wireless Temporal-Spatial Human Mobility Analysis Using Real-Time Three Dimensional Acceleration Data," IEEE Intl. Multi-Conf. on Computing in Global IT (ICCGI'07), 2007, 7 pages	
		LEE, Seon-Woo, et al., “Recognition of Walking Behaviors for Pedestrian Navigation,” IEEE International Conference on Control Applications, September 5-7, 2001, pp 1152-1155	
		MARGARIA, Rodolfo, "Biomechanics and Energetics of Muscular Exercise", Chapter 3, Oxford: Clarendon Press, 1976, pages 105-125	
		MILENKOVIC, Milena, et al, "An Accelerometer-Based Physical Rehabilitation System," IEEE SouthEastern Symposium on System Theory, 2002, pp 57-60	
		MIZELL, David, “Using Gravity to Estimate Accelerometer Orientation”, Seventh IEEE International Symposium on Wearable Computers, 2003, 2 pages	
		ORMONEIT, D, et al, “Learning and Tracking Cyclic Human Motion,” 7 pages	
		OTTO, Chris, et al, "System Architecture of a Wireless Body Area Sensor Network for Ubiquitous Health Monitoring," Journal of Mobile Multimedia, Vol 1, No 4, 2006, pp 307-326	
		PARK, Chulsung, et al, "Eco: An Ultra-Compact Low-Power Wireless Sensor Node for Real-Time Motion Monitoring," IEEE Int. Symp. on Information Processing in Sensor Networks, 2005, pp 398-403	
		SHEN, Chien-Lung, et al, "Wearable Band Using a Fabric-Based Sensor for Exercise ECG Monitoring," IEEE Int. Symp. on Wearable Computers, 2006, 2 pages	

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				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	8	**of**	8	Attorney Docket Number	8689P057

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		"Sensor Fusion," <www.u-dynamics.com>, accessed 8/29/2008, 2 pages	
		TAPIA, Emmanuel Munguia, et al, "Real-Time Recognition of Physical Activities and Their Intensities Using Wireless Accelerometers and a Heart Rate Monitor," IEEE Cont. on Wearable Computers, October 2007, 4 pages	
		WANG, Shu, et al, "Location Based Services for Mobiles: Technologies and Standards, LG Electronics MobileComm," IEEE ICC 2008, Beijing, pages 1-66 (part 1 of 3)	
		WANG, Shu, et al, "Location Based Services for Mobiles: Technologies and Standards, LG Electronics MobileComm," IEEE ICC 2008, Beijing, pages 67-92 (part 2 of 3)	
		WANG, Shu, et al, "Location Based Services for Mobiles: Technologies and Standards, LG Electronics MobileComm," IEEE ICC 2008, Beijing, pages 93-123 (part 3 of 3)	
		WECKESSER, P, et al, "Multiple Sensorprocessing for High-Precision Navigation and Environmental Modeling with a Mobile Robot," IEEE, 1995, pp 453-458	
		WEINBERG, Harvey, "MEMS Motion Sensors Boost Handset Reliability," <http://www.mwrf.com/Articles/Print.cfm?ArticleID=12740>, June 2006, 3 pages	
		WIXTED, Andrew J, et al, "Measurement of Energy Expenditure in Elite Athletes Using MEMS-Based Triaxial Accelerometers," IEEE Sensors Journal, Vol 7, No 4, April 2007, pp 481-488	
		WU, Winston H, et al, "Context-Aware Sensing of Physiological Signals," IEEE Int. Conf. on Engineering for Medicine and Biology, August 23-26, 2007, pp 5271-5275	
		YOO, Chang-Sun, et al, "Low Cost GPS/INS Sensor Fusion System for UAV Navigation," IEEE Digital Avionics Systems Conference (DASC '03), 2003, 9 pages	

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Electronic Patent Application Fee Transmittal

Application Number:	12247950
Filing Date:	08-Oct-2008
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Filer:	Judith A. Szepesi/Joan Abriam
Attorney Docket Number:	8689P057

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

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Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

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EFS ID:	10776209
Application Number:	12247950
International Application Number:	
Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Customer Number:	08791
Filer:	Judith A. Szepesi
Filer Authorized By:	
Attorney Docket Number:	8689P057
Receipt Date:	19-AUG-2011
Filing Date:	08-OCT-2008
Time Stamp:	20:45:28
Application Type:	Utility under 35 USC 111(a)

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Applicant	: Philippe Kahn, et al	Examiner:	Lu, Shirley
Appl. No.	: 12/247,950	Art Unit:	2612
Filed	: October 8, 2008	Conf No:	8961
For	: Method and System for Waking Up a Device Due to Motion		
Customer No.	: 08791		

CERTIFICATE OF TRANSMISSION
I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.

/Judith Szepesi/ August 19, 2011
Judith A. Szepesi ***Date***

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

INFORMATION DISCLOSURE STATEMENT

Sir:

Enclosed is a copy of Information Disclosure Citation Form PTO-1449 or PTO/SB/08 together with copies of the documents cited on that form, except for copies not required to be submitted (e.g., copies of U.S. patents and U.S. published patent applications need not be enclosed). It is respectfully requested that the cited documents be considered and that the enclosed copy of Information Disclosure Citation Form PTO-1449 or PTO/SB/08 be initialed by the Examiner to indicate such consideration and a copy thereof returned to applicant(s).

Pursuant to 37 C.F.R. § 1.97, the submission of this Information Disclosure Statement is not to be construed as a representation that a search has been made and is not to be construed as an admission that the information cited in this statement is material to patentability.

Pursuant to 37 C.F.R. § 1.97, this Information Disclosure Statement is being submitted under one of the following (as indicated by an "X" to the left of the appropriate paragraph):

________ 37 C.F.R. §1.97(b).

__**X**__ 37 C.F.R. §1.97(c). If so, then enclosed with this Information Disclosure Statement is one of the following:

____ A statement pursuant to 37 C.F.R. §1.97(e) or

__**X**__ The Director is Authorized to charge in the amount of $180.00 for the fee under 37 C.F.R. § 1.17(p).

________ 37 C.F.R. §1.97(d). If so, then enclosed with this Information Disclosure Statement are the following:

(1) A statement pursuant to 37 C.F.R. §1.97(e); and

(2) A check for $180.00 for the fee under 37 C.F.R. §1.17(p) for submission of the Information Disclosure Statement.

If there are any additional charges, please charge Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: August 19, 2011

/Judith Szepesi/
Judith A. Szepesi
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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/247,950	10/08/2008	Philippe Kahn	8689P057	8961

8791 7590 10/20/2011
BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

EXAMINER	
LU, SHIRLEY	
ART UNIT	**PAPER NUMBER**
2612	

MAIL DATE	DELIVERY MODE
10/20/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No.	Applicant(s)	
	12/247,950	KAHN ET AL.	
	Examiner	**Art Unit**	
	SHIRLEY LU	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1-15 and 25-33* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-15, 25-33* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

a. Applicant argues starting on page(s) 6, that the terms “long average, dominant axis” is well defined in the specification.

In response, it is noted that these terms have been merely described in the specification in terms of exemplary embodiments. Thus, there are no explicit definitions in the specification. Furthermore, it is noted that although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

b. Applicant argues starting on page(s) 7, that the prior art teaches away from using gravitational force.

In response to applicant's argument that the references fail to show certain features of applicant’s invention, it is noted that the features upon which applicant relies (i.e., using gravitational force) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Though the claims are read in light of the specification, the limitations from the specification are not read into the claims, and the broadest reasonable interpretation has been given to the claims.

c. Applicant argues starting on page(s) 9, that the prior art does not teach an axis most impacted by gravity.

In response to applicant's argument that the references fail to show certain features of applicant’s invention, it is noted that the features upon which applicant relies (i.e., an axis most impacted by gravity) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Though the claims are read in light of the specification, the limitations from the specification are not read into the claims, and the broadest reasonable interpretation has been given to the claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim(s) 1-15, 25-33 is/are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "long average(s)" in claim(s) 4, 10, 13, 26-29 is a relative term which renders the claim indefinite. The term "long average(s)" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Though the claims are read in light of the specification, the limitations from the specification are not read into the claims, and the broadest reasonable interpretation has been given to the claims. Proper action is required.

Claim(s) 4, 10, 13, 26-29 recite(s) the limitation(s): long average(s). It is not clear what exactly is being claimed. The dependent claims are rejected under similar reasoning. Proper action is required.

The term "dominant axis" in claim(s) 1-2, 4, 6-8, 15, 25-33 is a relative term which renders the claim indefinite. The term "long average(s)" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Though the claims are read in light of the specification, the limitations from the specification are not read into the claims, and the broadest reasonable interpretation has been given to the claims. Proper action is required.

Claim(s) 1-2, 4, 6-8, 15, 25-33 recite(s) the limitation(s): dominant axis. It is not clear what exactly is being claimed. The dependent claims are rejected under similar reasoning. Proper action is required.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claim(s) 1, 5-7, 10-12, 14 is/are rejected under 35 U.S.C. 102(b) as being anticipated by Rakkola (20060161377).

As to claim(s) 1, Rakkola disclose(s):

A method comprising: determining an idle sample value for a dominant axis of a device; registering a motion of the device; and waking up the device when the motion of the device indicates a change in the dominant axis of the device ([0015-44]).

As to claim(s) 5, Rakkola disclose(s):

determining the idle sample value for each of the other axes of the device ([0015-44]).

As to claim(s) 6, Rakkola disclose(s):

registering the motion of the device comprises: receiving motion data from a motion sensor; and processing the motion data to determine a current sample value of the dominant axis of the device ([0015-44]).

As to claim(s) 7, Rakkola disclose(s):

comparing a difference between a current sample value along the dominant axis determined based on the motion of the device and the idle sample value of the dominant axis against a threshold value ([0015-44]).

As to claim(s) 10, Rakkola disclose(s):

the current sample value of the dominant axis of the device is a long average of accelerations ([0015-44]).

As to claim(s) 11, Rakkola disclose(s):

determining the current sample value for each of the other axes of the device ([0015-44]).

As to claim(s) 12, Rakkola disclose(s):

the motion sensor comprises an accelerometer ([0015-44]).

As to claim(s) 14, Rakkola disclose(s):

determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value ([0015-44]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim(s) 2-4, 8, 15, 25-30, 33 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716).

As to claim(s) 2,

Rakkola disclose(s):

wherein determining the idle sample value for the dominant axis comprises: receiving motion data from a motion sensor; processing the motion data; and processing the idle sample value ([0015-44]).

The above art/combination does not expressly disclose to establish the dominant axis; to establish an idle sample value.

Rakkola disclose(s): processing data to establish an idle sample value; observing the degree of activity by counting the number of times a threshold is exceeded, as measured using an accelerometer, in combination with the low power motion detector; adjusting the idle sample value to offset temperature, air pressure, humidity, and other factors([0015-44]).

Mattice discloses processing the idle sample value to establish the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 3, Rakkola disclose(s):

the motion sensor comprises an accelerometer ([0015-44]).

As to claim(s) 4,

Rakkola disclose(s):

the idle sample value comprises a long-average of accelerations over a sample period along the dominant axis; when the device goes to idle mode after a period of inactivity ([0015-44]).

The above art/combination does not expressly disclose recorded.

Mattice discloses recorded spatial signatures, spatial signatures may be tracked, recorded, and/or analyzed by one or more motion detector devices; recording motion data (fig. 2; [0053]; [0155-65]; [0210-54]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to continue collecting data when the device is inactive, to track, record, and/or analyze the data.

As to claim(s) 8,

The above art/combination does not expressly disclose the change in the dominant axis comprises a change in acceleration along the dominant axis.

Mattice discloses the change in the dominant axis comprises a change in acceleration along the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to determine whether the device is rest.

As to claim(s) 15,

Rakkola disclose(s): computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis; comparing the difference against a threshold value to establish whether to wake the device up ([0015-44]).

The above art/combination does not expressly disclose determining a new dominant axis based on the motion data received from the motion sensor; when the device goes to idle mode after a period of inactivity.

Rakkola disclose(s): updating values automatically and periodically, as a programmable parameter; computing when the device goes to idle mode after a period of inactivity ([0015-44]).

Mattice discloses determining a new dominant axis based on the motion data received from the motion sensor (fig. 2; [0053]; [0155-65]; [0210-54]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to continue collecting data when a device is inactive, to determine whether the device is at rest, and to update values automatically and/or periodically, as a programmable parameter.

As to claim(s) 25,

Rakkola disclose(s): A mobile device comprising: a motion sensor to register a motion of the mobile device; and a power logic to activate the device when the motion indicates a change in the dominant axis of the device ([0015-44]; see also claim 2).

The above art/combination does not expressly disclose a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data.

Mattice discloses a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim 2).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to determine the axis with the greater amount of movement (see also claim 2).

As to claim(s) 26,

Rakkola disclose(s): a long average logic to create one or more long averages of accelerations as measured by the motion sensor over a period of time ([0015-44]).

As to claim(s) 27,

Rakkola disclose(s): to compute the one or more long averages of accelerations ([0015-44]).

The above art/combination does not expressly disclose a sample period logic to set the period over which motion data is collected.

Rakkola discloses logic to set a period over which motion data is collected; the number of samples summed to compute the one or more long averages of accelerations is a programmable setting ([0015-44]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a programmable setting to choose the number of samples collected and processed.

As to claim(s) 28, Rakkola disclose(s):

a computation logic to determine if the long averages of accelerations indicate a change in the dominant axis of the device ([0015-44]).

As to claim(s) 29, Rakkola disclose(s):

a glitch corrector logic to correct one or more glitches in the motion data before the one or more long averages are calculated ([0015-44]; see also claim 13).

As to claim(s) 30, Rakkola disclose(s):

the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes ([0015-44]).

As to claim(s) 33,

A system to wake up a mobile device comprising: a dominant axis logic to determine a current dominant axis of the device; and a power logic to move the device from an inactive state to an active state upon detection of a change in the dominant axis (see claims 1, 25).

3. Claim(s) 9 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Gregg (6353449).

As to claim(s) 9,

The above art/combination does not expressly disclose waking up the device further comprises configuring the device to return to a last active device state.

Gregg discloses waking up the device further comprises configuring the device to return to a last active device state ([1, 23-30]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a means of viewing and executing applications that were being utilized when the user left the device.

4. Claim(s) 31 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Gregg (6353449).

As to claim(s) 31,

a device state logic to restore the device to a last active state (see claim(s) 9).

5. Claim(s) 13 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Doll (20070150136).

As to claim(s) 13,

Rakkola disclose(s): processing the motion data further comprises; and removing the one or more glitches in the motion data from the motion data before calculating the long average ([0015-44]).

The above art/combination does not expressly disclose verifying whether the motion data comprises one or more glitches.

Doll discloses verifying whether the motion data comprises one or more glitches ([0007]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to ensure that the system utilizes and processes valid information and data.

6. Claim(s) 32 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Gregg (6353449) in view of Oh (6771250).

As to claim(s) 32,

The above art/combination does not expressly disclose the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

Oh discloses the device state logic allows user interaction to customize applications to be displayed when the device is woken up ([3, 13-25]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a means of viewing and executing applications that were being utilized and/or as desired by a user.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shirley Lu whose telephone number is (571) 272-8546. The examiner can normally be reached on 8:30-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Wu can be reached on (571) 272-2964. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Shirley Lu/
Primary Examiner, Art Unit 2612

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S2	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48
S3	7	S2 and remote$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48
S4	2	S3 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:49
S5	1	"20040095252".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:50
S8	0	"20030222775".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:14
S9	2	"20030098792".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:16
S10	0	"20030098792".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S11	0	"20030098792".pn. and temperature$1	US-PGPUB;	OR	OFF	2010/05/03

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			10:40
S12	1	"20030098792".pn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:43
S13	2	S2 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:46
S14	11	baby adj seat and distance same counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:13
S15	19	baby adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:17
S16	2	"20030122662".pn. and range	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:20
S17	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:22
S18	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:23
S19	133	car adj seat and distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2010/05/03 11:24

			IBM_TDB			
S20	14	car adj seat and predetermined adj distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S21	0	"7797212".pn. and counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:26
S22	12	car adj seat and distance with signal$1 adj strength$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:27
S23	0	"1318".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S24	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S25	3	"131848".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06
S26	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06
S27	12	lojack.as. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:12
S28	2	"7561102".pn.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2010/05/13 20:14

			EPO; JPO; DERWENT; IBM_TDB				
S29	2	"7536169".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:15
S30	3940	counter with time with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52
S31	245	counter with measur$4 near5 (time with distance)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52
S32	25	S31 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:54
S33	11598	"327"/$.ccls. and rectifier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16
S34	616	"327"/$.ccls. and rectifier.ti.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16
S35	36	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:49
S36	21	S35 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:50
S37	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT;	OR	OFF	2011/04/26 17:53

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S38	2	"20030034887".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S39	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S40	1	"20030034887".pn. and "10"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:18
S41	2	"20030034887".pn. and timer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:38
S42	0	"20030098792".pn. and "72"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S43	1	"20030098792".pn. and "27"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S44	0	"779712".apn. and low adj power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S45	0	"779712".apn. and motion adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53

S46	0	"779712".apn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S47	3	"779712".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S48	2	"6922147".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:06
S49	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S50	3	S49 and (conserv$4 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S51	3	S49 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S52	2	S49 and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 20:56
S53	0	mtion adj detector with sleep	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S54	52	motion adj detector with sleep adj mode	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/04/26 21:05

			DERWENT; IBM_TDB			
S55	10	S54 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:06
S56	9857	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15
S57	5	S56 and S54	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15
S58	638	signal adj edge adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:18
S59	0	signal adj edge adj detector same reduce adj error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S60	33	signal adj edge adj detector same error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S61	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S62	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:21
S63	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/04/26 21:22

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S64	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S65	34	signal adj edge adj detector and measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S66	5	signal adj edge adj detector same measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S68	86	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:24
S69	23	S68 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:25
S70	45	edge adj detect$4 with reduc$4 near3 error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S71	7	S70 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S72	1	"247950".apn. and dominant adj axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:03
S73	18	(("20060161377") or ("200702597") or	US-PGPUB;	OR	OFF	2011/04/26

		("20070150136") or ("6353449") or ("6771250")).PN.	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			22:40
S74	0	("200700259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S75	2	("20070259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S76	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 17:37
S77	1	"247950".apn. and (long adj average$1 with idle)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S78	1	"247950".apn. and (long adj average$1 with set$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S79	1	"247950".apn. and (long adj average$1 with idle adj sample)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:14
S80	1	"247950".apn. and (long adj average$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:17
S81	3524	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2011/04/27 23:18

			IBM_TDB			
S82	3524	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:19
S83	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S84	2	S83 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S85	1	"247950".apn. and dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:34
S86	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:40
S87	1	"247950".apn. and new adj dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:43
S88	1	"20060161377".pn. and reference	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:47
S89	0	"20070259716".pn. and (idle sleep)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:54
S90	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2011/04/27 23:57

			EPO; JPO; DERWENT; IBM_TDB			
S91	1	"247950".apn. and idle with comput$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S92	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S93	0	"20070259716".pn. and ("0053" "0155" "0165" "0210" "0254")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
S94	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
S95	2	"6353449".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:00
S96	2	"20070150136".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:03
S97	7354	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S98	3525	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S99	3	S97 and S98	US-PGPUB; USPAT;	OR	OFF	2011/04/28 14:15

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB				
S100	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S101	1	S97 and S100	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S102	3668	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S103	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S104	38	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S105	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S106	2	S105 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S107	7852	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56

S108	3668	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S109	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S110	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S111	3	S110 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S112	23	S104 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57

10/ 14/ 2011 4:03:17 PM
C:\ Users\ slu\ Documents\ EAST\ Workspaces\ 12247950.wsp

Search Notes	**Application/Control No.** 12/247,950	**Applicant(s)/Patent under Reexamination** KAHN ET AL.	
	Examiner SHIRLEY LU	**Art Unit** 2612	

SEARCHED

Class	Subclass	Date	Examiner
340	669	10/6	SL
702	141		
345	325, 156		

INTERFERENCE SEARCHED

Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)

	DATE	EXMR
east, inventor search, Google	10/6	SL

REQUEST FOR CONTINUED EXAMINATION (RCE) TRANSMITTAL

Address to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450

Application No. 12/247,950
Filing Date October 8, 2008
First Named Inventor Philippe Kahn
Art Unit 2612
Examiner Name Lu, Shirley
Attorney Docket No. 8689P057

This is a Request for Continued Examination (RCE) under 37 C.F.R. § 1.114 of the above-identified application. Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See instruction sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. **Submission required under 37 C.F.R. § 1.114** – Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

   a. [ ] Previously submitted If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

      i. [ ] Consider the amendment(s)/reply under 37 C.F.R. § 1.116 previously filed on ______ (Any unentered amendment(s) referred to above will be entered. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

      ii. [ ] Consider the arguments in the Appeal Brief or Reply Brief previously filed on ______

      iii. [ ] Other ______

   b. [X] Enclosed
      i. [X] Amendment/Reply
      ii. [ ] Affidavit(s)/Declaration(s)
      iii. [X] Information Disclosure Statement (IDS)
      iv. [ ] Other: ______

2. **Miscellaneous**
   a. [ ] Suspension of action on the above-identified application is requested under 37 C.F.R. § 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months. **Fee under 37 C.F.R. § 1.17(i) required)**
   b. [ ] Other ______

3. **Fees** The RCE fee under 37 C.F.R. § 1.17(e) is required by C.F.R. § 1.114 when the RCE is filed.
   a. [X] The Director is hereby authorized to charge the following fees, or credit any overpayments, to Deposit Account No. 02-2666
      i. [X] RCE fee required under 37 C.F.R. § 1.17(e)
      ii. [ ] Extension of time fee (37 C.F.R. §§ 1.136 and 1.17)
      iii. [ ] Processing fee under 37 CFR § 1.17(i) for Limited Suspension of Action
      iv. [ ] Other ______

   b. [ ] Check in the amount of $______ enclosed
   c. [ ] Payment by credit card (Form PTO-2038 enclosed)
      WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Name (Print/Type) Judith A. Szepesi Registration No. (Attorney/Agent) 39,393

Signature /Judith Szepesi/ Date January 12, 2012

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.

Name (Print/Type) Judith A. Szepesi

Signature /Judith Szepesi/ Date January 12, 2012

Based on Form PTO/SB/30 (08-03) as modified by BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP on 09/10/03

Electronic Patent Application Fee Transmittal

Application Number:	12247950
Filing Date:	08-Oct-2008
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Filer:	Judith A. Szepesi/Joan Abriam
Attorney Docket Number:	8689P057

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	930	930
		Total in USD ($)		**930**

Electronic Acknowledgement Receipt

EFS ID:	11824142
Application Number:	12247950
International Application Number:	
Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Customer Number:	8791
Filer:	Judith A. Szepesi
Filer Authorized By:	
Attorney Docket Number:	8689P057
Receipt Date:	12-JAN-2012
Filing Date:	08-OCT-2008
Time Stamp:	17:01:06
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$930
RAM confirmation Number	4039
Deposit Account	022666
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1		8689P057_AmResp_Jan2012.pdf	49962 59b3195ab5fdf8bcb1c923ec0803e5567143c948	yes	11

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment Submitted/Entered with Filing of CPA/RCE	1	1
Claims	2	5
Applicant Arguments/Remarks Made in an Amendment	6	11

Warnings:

Information:

2		8689P057_Request_for_Examiner_Initials.pdf	134931 e0b88a15151988e847b2f050913000762d095b75	yes	9

Multipart Description/PDF files in .zip description

Document Description	Start	End
Transmittal Letter	1	1
Information Disclosure Statement (IDS) Form (SB08)	2	9

Warnings:

Information:

3	Request for Continued Examination (RCE)	8689P057_RCE_Transmittal.pdf	20093 b47ebafcd8b10353f49d4e9c7dd47e9f267029dc	no	1

Warnings:

This is not a USPTO supplied RCE SB30 form.

Information:

4	Fee Worksheet (SB06)	fee-info.pdf	30549 081073a22a0fdd89a3ee121c922b7127c00b59d8	no	2

Warnings:

Information:

Total Files Size (in bytes):	235535

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Philippe Kahn, et al	Examiner:	Lu, Shirley
Appl. No.	:	12/247,950	Art Unit:	2612
Filed	:	October 8, 2008	Conf No:	8961
For	:	Method and System for Waking Up a Device Due to Motion		
Customer No.	:	08791		

CERTIFICATE OF TRANSMISSION
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/Judith Szepesi/ January 12, 2012
Judith A. Szepesi ***Date***

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P.O. Box 1450
Alexandria, Virginia 22313-1450

AMENDMENT

Sir:

In response to the Office Action of October 20, 2011, which was made final, applicants respectfully request the Examiner to enter the following amendments and consider the following remarks:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 6 of this paper.

IN THE CLAIMS:

1. (Currently Amended) A method comprising:

receiving motion data from a motion sensor, the motion sensor sensing motion along three axes;

determining an idle sample value for a dominant axis of a device, the dominant axis defined as the axis with a largest effect from gravity among the three axes;

registering a motion of the device based on the motion data from the motion sensor; and

waking up the device when the motion of the device indicates a change in the dominant axis of the device.

2. (Currently Amended) The method of claim 1, wherein determining the idle sample value for the dominant axis comprises:

~~receiving motion data from a motion sensor;~~

processing the motion data to establish an idle sample value; and

processing the idle sample value to establish the dominant axis.

3. (Currently Amended) The method of claim 1 [[2]], wherein the motion sensor comprises an accelerometer.

4. (Currently Amended) The method of claim 2, wherein the idle sample value comprises an ~~long~~ average of accelerations over a sample period along the dominant axis recorded when the device goes to idle mode after a period of inactivity.

5. (Currently Amended) The method of claim 2 [[1]], further comprising determining the idle sample value for each of the other axes of the device.

6. (Currently Amended) The method of claim 1, wherein registering the motion of the device comprises:

~~receiving motion data from a motion sensor; and~~

processing the motion data to determine a current sample value [[of]] along the dominant axis of the device.

7. (Currently Amended) The method of claim 2 [[1]], further comprising comparing a difference between a current sample value along the dominant axis determined based on the motion of the device and the idle sample value of the dominant axis against a threshold value.

8. (Original) The method of claim 1, wherein the change in the dominant axis comprises a change in acceleration along the dominant axis.

9. (Original) The method of claim 1, wherein waking up the device further comprises configuring the device to return to a last active device state.

10. (Currently Amended) The method of claim 6, wherein the current sample value of the dominant axis of the device is an ~~long~~ average of accelerations over a sample period.

11. (Original) The method of claim 6, further comprising determining the current sample value for each of the other axes of the device.

12. (Canceled)

13. (Currently Amended) The method of claim 6, wherein processing the motion data further comprises:

verifying whether the motion data includes ~~comprises~~ one or more glitches; and

removing the one or more glitches in the motion data from the motion data before calculating the long average.

14. (Original) The method of claim 6, further comprising determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value.

15. (Original) The method of claim 8, further comprising:

determining a new dominant axis based on the motion data received from the motion sensor;

computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis determined when the device goes to idle mode after a period of inactivity; and

comparing the difference against a threshold value to establish whether to wake the device up.

Claims 16-24. (Canceled)

25. (Currently Amended) A mobile device comprising:

a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data, the dominant axis defined as an axis with a largest effect from gravity among three axes;

a motion sensor to register a motion of the mobile device; and

a power logic to activate the device when the motion indicates a change in the dominant axis of the device.

26. (Currently Amended) The mobile device of claim 25, further comprising:

a long average logic to create one or more ~~long~~ averages of accelerations over a sample period as measured by the motion sensor ~~over a period of time~~.

27. (Canceled)

28. (Currently Amended) The mobile device of claim 26, further comprising:

a computation logic to determine if the ~~long~~ averages of accelerations indicate a change in the dominant axis of the device.

29. (Previously Presented) The mobile device of claim 26, further comprising a glitch corrector logic to correct one or more glitches in the motion data before the one or more long averages are calculated.

30. (Previously Presented) The mobile device of claim 25, wherein the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes.

31. (Previously Presented) The mobile device of claim 25, further comprising a device state logic to restore the device to a last active state.

32. (Previously Presented) The mobile device of claim 31, wherein the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

33. (Currently Amended) A system to wake up a mobile device comprising:

a motion sensor to detect motion along three axes;

a dominant axis logic to compare an effect of gravity on the three axes, and to determine an ~~current dominant~~ axis of the device experiencing a largest effect of gravity; and

a power logic to move the device from an inactive state to an active state upon detection of a change in the ~~dominant~~ axis experiencing the largest effect of gravity.

34. (New) The system of claim 33, further comprising:

a long average logic to create an average of accelerations over a sample period along the dominant axis; and

a computation logic to determine if the average of accelerations indicates the change in the dominant axis of the device.

35. (New) The system of claim 33, further comprising:

a device state logic to restore the device to one of: a last active state, a preset customized state.

Remarks/Arguments

Applicants respectfully request consideration of the subject application as amended herein. This Amendment is submitted in response to the Office Action mailed October 20, 2011, which was made final. Claims 1-15 and 25-33 are rejected.
In this Amendment, claims 1-7, 10, 13, 25-26, 28, and 33 have been amended. Claims 12 and 27 have been canceled. New claims 34 and 35 have been added. Applicants reserve all rights with respect to the applicability of the Doctrine of Equivalents.

Therefore, claims 1-11, 13-15, 25, 26, and 28-35 are presented for examination. It is respectfully submitted that the amendment does not add new matter.

Claim Rejections under 35 U.S.C. §112, second paragraph

Claims 1-15 and 25-33 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner objected to the term "long average(s)" as a relative term, which renders the claim indefinite. Applicants have amended the claims to remove the term long average. This amendment of the claims does not add new matter.

The Examiner objected to the term "dominant axis" as a relative term that renders the claim indefinite. Applicants have amended the claims to include a specific definition of the term which is not relative. This addition of this language into the claims does not add new matter, as the definition comes from the Specification as filed.

In light of the above, Applicants respectfully request the withdrawal of the rejections under 35 U.S.C. 112, second paragraph.

Claim Rejections under 35 U.S.C. §102(b)

Claims 1, 5-7, 10-12, and 14 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Publication No. 2006/0161377 to Rakkola, et al (hereinafter "Rakkola").

Rakkola discusses an energy efficient acceleration measurement system. However, Rakkola teaches away from the present invention. In particular, Rakkola states that:

> Another important aspect of the described motion detector's embodiments is that, when the motion detector is enabled, a reference level is calculated automatically. The benefit of this function is that there is consequently no need to consider offsets on different channels when setting threshold levels, and threshold levels can also be set independently from device orientation and from the vector of gravitational force. An averaging procedure is used for this reference level calculation as well (see previous description of averaging process for incoming acceleration data). The reference levels are calculated in this way for each of the three axes, assuming that a triaxial accelerometer is used.

(Rakkola, paragraph 19). Rakkola concludes "The reference levels are set without regard to device orientation of the direction of gravity, and so setting of these reference levels is greatly streamlined, with corresponding reduction of power requirements." (Rakkola, paragraph 20). Therefore, Rakkola specifically teaches away from "determining an idle sample value for a dominant axis of a device," since no such calculation is needed.

Claim 1, as amended, recites:

> 1. A method comprising:
>
> receiving motion data from a motion sensor, the motion sensor sensing motion along three axes;
>
> determining an idle sample value for a dominant axis of a device, the dominant axis defined as the axis with a largest effect from gravity among the three axes;
>
> registering a motion of the device based on the motion data from the motion sensor; and
>
> waking up the device when the motion of the device indicates a change in the dominant axis of the device.

(Claim 1). As noted above, Rakkola teaches away from determining a dominant axis, defined as the axis with a largest effect from gravity, and teaches away from using gravitational force at all. Therefore, Rakkola does not teach or suggest waking up the device when the motion of the device indicates a change in the dominant axis, e.g. the axis most impacted by gravity. Therefore, claim 1 is not anticipated by Rakkola. Claims 5-7, 10-12, and 14 depend on claim 1, and incorporate its limitations, and therefore are also not anticipated by Rakkola.

Claim Rejections under 35 U.S.C. §103(a)

Claims 2-4, 8, 15, 25-30, and 33 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of U.S. Publication No. 2007/0259716 to Mattice, et al (hereinafter "Mattice"). Applicants reserve the right to swear behind Mattice.

As noted above, Rakkola discusses an energy efficient acceleration measurement system. However, Rakkola teaches away from using gravitation.

Mattice discusses the control of wager-based game using gesture recognition. While Mattice uses the term "gravitational acceleration" Mattice does not teach or suggest determining an axis most impacted by gravity, much less using any such axis to determine when a device should be woken up. While the term "dominant axis" is used, it appears to refer to the axis experiencing the most motion from user input (see Mattice, Figure 6, paragraph 155).

As noted above, Rakkola also does not teach or suggest the identification of an axis with a largest impact from gravity, and using that axis identification. Therefore, Applicants respectfully submit that Mattice does not teach or suggest using a dominant axis (e.g. an axis most impacted by gravity) for waking up the device either, and thus does not remedy the shortcomings of Rakkola discussed above.

Claim 1, as amended, recites:

> 1. A method comprising:
>
> receiving motion data from a motion sensor, the motion sensor sensing motion along three axes;
>
> determining an idle sample value for a dominant axis of a device, the dominant axis defined as the axis with a largest effect from gravity among the three axes;
>
> registering a motion of the device based on the motion data from the motion sensor; and
>
> waking up the device when the motion of the device indicates a change in the dominant axis of the device.

(Claim 1, as amended). As noted above, neither Rakkola nor Mattice teach or suggest determining an axis with a largest effect from gravity, and waking up the device when the motion of the device indicates a change in that axis. Claims 2-4, 8, and 15 depend on claim 1, and incorporate its limitations. Therefore, claims 2-4, 8, 15, are not obvious over the combination of Rakkola and Mattice.

(Claim 1, as amended). As noted above, neither Rakkola nor Mattice teach or suggest determining an axis with a largest effect from gravity, and waking up the device when the motion of the device indicates a change in that axis. Claims 2-4, 8, and 15 depend on claim 1, and incorporate its limitations. Therefore, claims 2-4, 8, 15, are not obvious over the combination of Rakkola and Mattice.

Claim 25, as amended, recites:

> A mobile device comprising:
> a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data, the dominant axis defined as an axis with a largest effect from gravity among three axes;
> a motion sensor to register a motion of the mobile device; and
> a power logic to activate the device when the motion indicates a change in the dominant axis of the device.

(Claim 25, as amended). As noted above, neither Rakkola nor Mattice teach or suggest a power logic to activate the device when the motion indicates a change in the dominant axis of the device. Claims 26-30 depend on claim 25, and incorporate its limitations. Therefore, claims 26-30 are not obvious over the combination of Rakkola and Mattice.

Claim 33, as amended, recites:

> A system to wake up a mobile device comprising:
> a motion sensor to detect motion along three axes;
> a dominant axis logic to compare an effect of gravity on the three axes, and to determine an axis of the device experiencing a largest effect of gravity; and
> a power logic to move the device from an inactive state to an active state upon detection of a change in the axis experiencing the largest effect of gravity.

(Claim 33, as amended). As noted above, neither Rakkola nor Mattice teach or suggest a power logic to move the device from an inactive state to an active state upon detection of a change in the axis experiencing the largest effect of gravity. Therefore, claim 33, and newly added claims 34-35 which depend on it, are not obvious over the combination of Rakkola and Mattice.

Claim 9 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of U.S. Patent No. 6,353,449 to Gregg, et al (hereinafter "Gregg"). Claim 9 depends on claim 1, and incorporates its limitations.

Gregg discusses a screensaver that communicates data, including application indicial representative of work in progress. (Gregg, Abstract). Gregg does not teach or suggest the identification of an axis having the largest impact from gravity, much less use such an axis to determine when to wake up a device. As noted above, Rakkola also does not teach or suggest this feature. Therefore, Gregg does not remedy the shortcomings of Rakkola discussed above. Therefore, claim 9 is not obvious over the combination of Rakkola and Gregg.

Claim 31 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Mattice in view of Gregg. Claim 31 depends on claim 25, and incorporates its limitations.

As noted above, none of Rakkola, Mattice, or Gregg teach or suggest a power logic which uses a change in a dominant axis of a device (defined as the axis most impacted by gravity), to wake up a device. Therefore, the combination of references does not make claim 31 obvious.

Claims 13 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of U.S. Publication No. 2007/0150136 to Doll, et al (hereinafter "Doll"). Applicants reserve the right to swear behind Doll. Claim 13 depends on claim 1, and incorporates its limitations.

Doll discusses a test signal, which is injected into a motion sensor, to test whether a motion sensor is functioning properly (Doll, Abstract). Doll does not teach or suggest the identification of an axis most impacted by gravity, much less the use such an axis to determine when to wake a device. As noted above, Rakkola also does not teach or suggest this feature. Therefore, claim 13 is not obvious over the combination of Rakkola and Doll.

Claim 32 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Mattice in view of Gregg in view of U.S. Patent No. 6,771,250 to Oh. Claim 32 depends on claim 25, and incorporates its limitations.

Oh discusses an application program launcher having a multi-point switch. Using the launcher, a user selects and executes one of several application programs registered in a program selection menu. (Oh, Abstract). Oh does not discuss identifying an axis most impacted by gravity at all, much less the use such an axis to determine when to wake up a device. As noted above, none of Rakkola, Mattice, and Gregg teach or suggest this feature either.

Therefore, claim 32 is not obvious over the combination of Rakkola, Mattice, Gregg, and Oh.

Conclusion

Applicant respectfully submits that in view of the amendments and discussion set forth herein, the applicable rejections have been overcome. Accordingly, the present and amended claims should be found to be in condition for allowance.

If a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact Judith A. Szepesi at (408) 720-8300.

If there are any additional charges/credits, please charge/credit our deposit account no. 02-2666.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: January 12, 2012

/Judith Szepesi/
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Attorney's Docket No. 8689P057 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Philippe Kahn, et al	Examiner:	Lu, Shirley
Appl. No.	: 12/247,950	Art Unit:	2612
Filed	: October 8, 2008	Conf No:	8961
For	: Method and System for Waking Up a Device Due to Motion		
Customer No.	: 08791		

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/Judith Szepesi/ January 12, 2012
Judith A. Szepesi ***Date***

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P.O. Box 1450
Alexandria, Virginia 22313-1450

REQUEST FOR EXAMINER INITIALS

Sir:

Applicants request that the Examiner initial the cited documents on Form PTO-1449 submitted with an Information Disclosure Statement filed 8/19/2011 in the present application and return a copy of that initialed Form PTO-1449 to applicants. Applicants request the Examiner's initials in order to show consideration of the cited references.

A copy of the previously-submitted Form PTO-1449 is included herewith without copies of the previously submitted references.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: January 12, 2012

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Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	1	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	4,285,041	8/18/1981	Smith	
		US-	4,578,769	3/25/1986	Frederick	
		US-	5,446,725	8/29/1995	Ishiwatari	
		US-	5,446,775	8/25/1995	Wright et al	
		US-	5,583,776	12/10/1996	Levi et al	
		US-	5,593,431	1/14/1997	Sheldon	
		US-	5,654,619	8/5/1997	Iwashita, Yasusuke	
		US-	5,778,882	7/14/1998	Raymond et al	
		US-	5,955,667	9/21/1999	Fyfe	
		US-	5,976,083	11/2/1999	Richardson, et al.	
		US-	6,122,595	9/19/2000	Varley et al	
		US-	6,135,951	10/24/2000	Richardson, et al.	
		US-	6,145,389	11/14/2000	Ebeling, et al.	
		US-	6,282,496	8/28/2001	Chowdhary	
		US-	6,369,794	4/9/2002	Sakurai et al	
		US-	6,428,490	8/6/2002	Kramer et al	
		US-	6,493,652	12/10/2002	Ohlenbusch et al	
		US-	6,496,695	12/17/2002	Kouji et al	
		US-	6,513,381	2/4/2003	Fyfe et al.	
		US-	6,522,266	2/18/2003	Soehren, et al.	
		US-	6,532,419	3/11/2003	Begin, et al.	
		US-	6,539,336	3/25/2003	Vock, et al.	
		US-	6,611,789	8/26/2003	Darley, Jesse	
		US-	6,700,499	3/2/2004	Kubo et al	
		US-	6,786,877	9/7/2004	Foxlin	
		US-	6,790,178	9/14/2004	Mault, et al.	
		US-	6,813,582	11/2/2004	Levi et al.	
		US-	6,823,036	11/23/2004	Chen	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6]Applicant is to place a check mark here if English language translation is attached.
This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SENT FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450**.
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	2	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	6,826,477	11/30/2004	Ladetto et al	
		US-	6,836,744	12/28/2004	Asphahani, et al.	
		US-	6,881,191	4/19/2005	Oakley, et al.	
		US-	6,885,971	4/26/2005	Vock, et al.	
		US-	6,898,550	5/24/2005	Blackadar, et al.	
		US-	6,928,382	8/9/2005	Hong et al	
		US-	6,941,239	9/6/2005	Unuma, et al.	
		US-	6,959,259	10/25/2005	Vock, et al.	
		US-	6,975,959	12/13/2005	Dietrich et al.	
		US-	7,054,784	5/30/2006	Flentov et al	
		US-	7,057,551	6/6/2006	Vogt, Mark J	
		US-	7,072,789	7/4/2006	Vock, et al.	
		US-	7,092,846	8/15/2006	Vock, et al.	
		US-	7,148,797	12/12/2006	Albert	
		US-	7,158,912	1/20/2007	Vock, et al.	
		US-	7,169,084	1/30/2007	Tsuji, Tomoharu	
		US-	7,171,331	1/30/2007	Vock, et al.	
		US-	7,177,684	2/13/2007	Kroll et al	
		US-	7,212,943	5/1/2007	Aoshima, et al.	
		US-	7,220,220	5/22/2007	Stubbs, et al.	
		US-	7,297,088	11/20/2007	Tsuji, Tomoharu	
		US-	7,334,472	2/26/2008	Seo et al	
		US-	7,353,112	4/1/2008	Choi et al	
		US-	7,382,611	2/12/2008	Klees, et al.	
		US-	7,387,611	6/17/2008	Inoue et al.	
		US-	7,451,056	11/11/2008	Flentov et al	
		US-	7,457,719	11/25/2008	Kahn et al	
		US-	7,467,060	12/16/2008	Kulach et al	

Examiner Signature		Date Considered	

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		US-	7,489,937	2/10/2009	Chung et al	
		US-	7,512,515	3/31/2009	Vock et al	
		US-	7,526,402	4/28/2009	Tenanhaus et al	
		US-	7,608,050	10/27/2009	Sugg, Christoper John	
		US-	7,640,804	1/5/2010	Daumer et al	
		US-	7,647,196	1/12/2010	Kahn et al.	
		US-	7,647,196	11/12/2010	Kahn et al	
		US-	7,653,508	1/26/2010	Kahn et al.	
		US-	7,752,011	7/6/2010	Niva et al	
		US-	7,753,861	7/13/2010	Kahn et al.	
		US-	7,774,156	8/10/2010	Niva et al	
		US-	7,857,772	12/28/2010	Bouvier et al	
		US-	2002/0023654	2/28/2002	Webb, James D	
		US-	2002/0089425	7/11/2002	Kubo et al	
		US-	2002/0109600	8/15/2002	Mault, James R.; et al.	
		US-	2002/0118121	8/29/2002	Lehrman et al	
		US-	2002/0151810	10/17/2002	Wong, Philip Lim-Kong; et al.	
		US-	2002/0193124	12/19/2002	Hamilton et al	
		US-	2003/0018430	1/23/2003	Ladetto et al	
		US-	2003/0048218	3/13/2003	Milnes et al	
		US-	2003/0083596	5/1/2003	Kramer et al	
		US-	2003/0109258	6/12/2003	Mantyjarvi et al	
		US-	2003/0139692	7/24/2003	Barrey et al.	
		US-	2004/0106421	6/3/2004	Tomiyoshi et al	
		US-	2004/0225467	11/11/2004	Vock, Curtis A.; et al.	
		US-	2004/0236500	11/25/2004	Choi et al	
		US-	2005/0033200	2/10/2005	Soehren, Wayne A.; et al.	
		US-	2005/0202934	9/15/2005	Olrik et al	

Examiner Signature		Date Considered	

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Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	4	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number: Number-Kind Code[2] (If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	2005/0222801	10/6/2005	Wulff et al	
		US-	2005/0232388	10/20/2005	Tsuji, Tomoharu	
		US-	2005/0238132	10/27/2005	Tsuji, Tomoharu	
		US-	2005/0240375	10/27/2005	Sugai, Yoshinori	
		US-	2005/0248718	11/10/2005	Howell, Thomas A., et al.	
		US-	2006/0020177	1/26/2006	Seo et al	
		US-	2006/0063980	3/23/2006	Hwang et al	
		US-	2006/0064276	3/23/2006	Ren et al	
		US-	2006/0100546	5/11/2006	Silk, Jeffrey E	
		US-	2006/0136173	6/22/2006	Charles Whipple Jr.; et al.	
		US-	2006/0167387	7/27/2006	Buchholz et al	
		US-	2006/0205406	9/14/2006	Pekonen et al	
		US-	2006/0206258	9/14/2006	Brooks, Amanda S.	
		US-	2006/0223547	10/5/2006	Chin et al	
		US-	2006/0259268	11/16/2006	Vock et al	
		US-	2006/0288781	12/28/2006	Daumer et al	
		US-	2007/0037610	2/15/2007	Logan, James D	
		US-	2007/0038364	2/15/2007	Lee et al	
		US-	2007/0061105	3/15/2007	Darley, Jesse; et al.	
		US-	2007/0063850	3/22/2007	Devaul; Richard W.; et al.	
		US-	2007/0067094	3/22/2007	Park et al	
		US-	2007/0073482	3/29/2007	Churchill et al	
		US-	2007/0082789	4/12/2007	Nissila et al	
		US-	2007/0130582	6/7/2007	Chang et al	
		US-	2007/0142715	6/21/2007	Banet et al.	
		US-	2007/0195784	8/23/2007	Allen et al	
		US-	2007/0208531	9/6/2007	Darley, Jesse; et al.	
		US-	2007/0213085	9/13/2007	Fedora, Neal R	

Examiner Signature		Date Considered	

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Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	5	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number: Number-Kind Code[2] (If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	2007/0213126	9/13/2007	Deutsch et al	
		US-	2007/0250261	10/25/2007	Soehren	
		US-	2007/0260418	11/8/2007	Ladetto et al	
		US-	2007/0260482	11/8/2007	Nurmela et al	
		US-	2008/0161072	7/3/2008	Lide et al	
		US-	2008/0171918	7/17/2008	Teller et al	
		US-	2009/0047645	2/19/2009	Dibenedetto et al	
		US-	2009/0098880	4/16/2009	Lindquist, Bjorn	
		US-	2009/0213002	8/27/2009	Rani et al	
		US-	2009/0234614	9/17/2009	Kahn et al.	
		US-	2009/0319221	12/24/2009	Kahn et al	
		US-	2010/0056872	3/4/2010	Kahn et al.	
		US-	2010/0057398	3/4/2010	Darley, Jesse; et al.	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)	Application Number	12/247,950
	Filing Date	October 8, 2008
	First Named Inventor:	Philippe Kahn
	Art Unit	2612
	Examiner Name	Lu, Shirley
Sheet 6 **of** 8	Attorney Docket Number	8689P057

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
		ANDERSON, Ian, et al, "Shakra: Tracking and Sharing Daily Activity Levels with Unaugmented Mobile Phones," Mobile Netw Appl, 8/3/2007, pp 185-199	
		AYLWARD, Ryan, et al, "Sensemble: A Wireless, Compact, Multi-User Sensor System for Interactive Dance," International Conference on New Interfaces for Musical Expression (NIME06), June 4-8, 2006, pp 134-139	
		BACA, Arnold, et al, "Rapid Feedback Systems for Elite Sports Training," IEEE Pervasive Computing, October-December 2006, pp 70-76	
		BAKHRU, Kesh, "A Seamless Tracking Solution for Indoor and Outdoor Position Location," IEEE 16th International Symposium on Personal, Indoor, and Mobile Radio Communications, 2005, pp 2029-2033	
		BLILEY, Kara E, et al, "A Miniaturized Low Power Personal Motion Analysis Logger Utilizing MEMS Accelerometers and Low Power Microcontroller," IEEE EMBS Special Topic Conference on Microtechnologies in Medicine and Biology, May 12-15, 2005, pp 92-93	
		BOURZAC, Katherine, "Wearable Health Reports," Technology Review, February 28, 2006, <http://www.techreview.com/printer_friendly_article_aspx?id+16431>, accessed 3/22/2007, 3 pages	
		CHENG, Fangxiang, et al, "Periodic Human Motion Description for Sports Video Databases," Proceedings of the Pattern Recognition, 2004, 5 pages	
		DAO, Ricardo, "Inclination Sensing with Thermal Accelerometers", MEMSIC, May 2002, 3 pages	
		FANG, Lei, et al, "Design of a Wireless Assisted Pedestrian Dead Reckoning System--The NavMote Experience," IEEE Transactions on Instrumentation and Measurement, Vol 54, No 6, December 2005, pp 2342-2358	
		HEALEY, Jennifer, et al, "Wearable Wellness Monitoring Using ECG and Accelerometer Data," IEEE Int. Symposium on Wearable Computers (ISWC'05), 2005, 2 pages	
		HEMMES, Jeffrey, et al, "Lessons Learned Building TeamTrak: An Urban/Outdoor Mobile Testbed," 2007 IEEE Int. Conf. on Wireless Algorithms, August 1-3, 2007, pp 219-224	

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Substitute for Form 1449/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Application Number	12/247,950
		Filing Date	October 8, 2008
		First Named Inventor:	Philippe Kahn
		Art Unit	2612
		Examiner Name	Lu, Shirley
Sheet 7	**of** 8	Attorney Docket Number	8689P057

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
		JONES, L, et al, "Wireless Physiological Sensor System for Ambulatory Use," <http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?tp=&arnumber=1612917&isnumber=33861>, April 3-5, 2006	
		JOVANOV, Emil, et al, "A Wireless Body Area Network of Intelligent Motion Sensors for Computer Assisted Physical Rehabilitation," Journal of NeuroEngineering and Rehabilitation, March 2005, 10 pages	
		KALPAXIS, Alex, "Wireless Temporal-Spatial Human Mobility Analysis Using Real-Time Three Dimensional Acceleration Data," IEEE Intl. Multi-Conf. on Computing in Global IT (ICCGI'07), 2007, 7 pages	
		LEE, Seon-Woo, et al., "Recognition of Walking Behaviors for Pedestrian Navigation," IEEE International Conference on Control Applications, September 5-7, 2001, pp 1152-1155	
		MARGARIA, Rodolfo, "Biomechanics and Energetics of Muscular Exercise", Chapter 3, Oxford: Clarendon Press, 1976, pages 105-125	
		MILENKOVIC, Milena, et al, "An Accelerometer-Based Physical Rehabilitation System," IEEE SouthEastern Symposium on System Theory, 2002, pp 57-60	
		MIZELL, David, "Using Gravity to Estimate Accelerometer Orientation", Seventh IEEE International Symposium on Wearable Computers, 2003, 2 pages	
		ORMONEIT, D, et al, "Learning and Tracking Cyclic Human Motion," 7 pages	
		OTTO, Chris, et al, "System Architecture of a Wireless Body Area Sensor Network for Ubiquitous Health Monitoring," Journal of Mobile Multimedia, Vol 1, No 4, 2006, pp 307-326	
		PARK, Chulsung, et al, "Eco: An Ultra-Compact Low-Power Wireless Sensor Node for Real-Time Motion Monitoring," IEEE Int. Symp. on Information Processing in Sensor Networks, 2005, pp 398-403	
		SHEN, Chien-Lung, et al, "Wearable Band Using a Fabric-Based Sensor for Exercise ECG Monitoring," IEEE Int. Symp. on Wearable Computers, 2006, 2 pages	

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		"Sensor Fusion," <www.u-dynamics.com>, accessed 8/29/2008, 2 pages	
		TAPIA, Emmanuel Munguia, et al, "Real-Time Recognition of Physical Activities and Their Intensities Using Wireless Accelerometers and a Heart Rate Monitor," IEEE Cont. on Wearable Computers, October 2007, 4 pages	
		WANG, Shu, et al, "Location Based Services for Mobiles: Technologies and Standards, LG Electronics MobileComm," IEEE ICC 2008, Beijing, pages 1-66 (part 1 of 3)	
		WANG, Shu, et al, "Location Based Services for Mobiles: Technologies and Standards, LG Electronics MobileComm," IEEE ICC 2008, Beijing, pages 67-92 (part 2 of 3)	
		WANG, Shu, et al, "Location Based Services for Mobiles: Technologies and Standards, LG Electronics MobileComm," IEEE ICC 2008, Beijing, pages 93-123 (part 3 of 3)	
		WECKESSER, P, et al, "Multiple Sensorprocessing for High-Precision Navigation and Environmental Modeling with a Mobile Robot," IEEE, 1995, pp 453-458	
		WEINBERG, Harvey, "MEMS Motion Sensors Boost Handset Reliability," <http://www.mwrf.com/Articles/Print.cfm?ArticleID=12740>, June 2006, 3 pages	
		WIXTED, Andrew J, et al, "Measurement of Energy Expenditure in Elite Athletes Using MEMS-Based Triaxial Accelerometers," IEEE Sensors Journal, Vol 7, No 4, April 2007, pp 481-488	
		WU, Winston H, et al, "Context-Aware Sensing of Physiological Signals," IEEE Int. Conf. on Engineering for Medicine and Biology, August 23-26, 2007, pp 5271-5275	
		YOO, Chang-Sun, et al, "Low Cost GPS/INS Sensor Fusion System for UAV Navigation," IEEE Digital Avionics Systems Conference (DASC '03), 2003, 9 pages	

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[1]Applicant's unique citation designation number (optional). [2]Applicant is to place a check mark here if English Translation is attached.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number	Filing Date	To be Mailed
12/247,950	10/08/2008	☐

APPLICATION AS FILED – PART I

FOR	NUMBER FILED (Column 1)	NUMBER EXTRA (Column 2)	SMALL ENTITY ☐ RATE ($)	FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
			TOTAL			TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

AMENDMENT	01/12/2012	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 24	Minus	** 24	= 0	X $ =		OR	X $60=	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $250=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	**0**

AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/TRACIE ROBERTSON/

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/247,950	10/08/2008	Philippe Kahn	8689P057	8961

8791 7590 01/26/2012

BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

EXAMINER	
LU, SHIRLEY	
ART UNIT	PAPER NUMBER
2612	

MAIL DATE	DELIVERY MODE
01/26/2012	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No.	Applicant(s)	
	12/247,950	KAHN ET AL.	
	Examiner	Art Unit	
	SHIRLEY LU	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 January 2012*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1-11,13-15,25,26 and 28-35* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-11,13-15,25,26 and 28-35* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

a. Applicant argues starting on page(s) 7, that the prior art does not specifically disclose the newly amended limitations.

In response, please see action below.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim(s) 13, 26, 29, 34 is/are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "long average(s)" in claim(s) 13, 26, 29, 34 is a relative term which renders the claim indefinite. The term "long average(s)" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Though the claims are read in light of the specification, the limitations from the specification are not read into the claims, and the broadest reasonable interpretation has been given to the claims. Any dependent claim(s) and/or similar limitation(s) is/are rejected for similar reason(s). Proper action is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claim(s) 1-8, 10-11, 14-15, 25-26, 28-30, 33-34 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Kahn (7987070) in view of Mattice (20070259716).

As to claim(s) 1, Rakkola disclose(s):

A method comprising: receiving motion data from a motion sensor, the motion sensor sensing motion along three axes; registering a motion of the device based on the motion data from the motion sensor; and waking up the device when the motion of the device indicates a change in the dominant axis of the device ([0015-44]).

The above art/combination does not expressly disclose determining an idle sample value for a dominant axis of a device, the dominant axis defined as the axis with a largest effect from gravity among the three axes.

Rakkola disclose(s): calculating reference levels for each of the three axes; programming threshold levels for each axis independently; collecting data for each of the three axes; idle states ([0015-44]).

Kahn disclose(s): identification of movement along 3 axes; determining dominant axis before or in conjunction with counting periodic motions; dominant axis, the axis most affected by gravity; comparing dominant axis to the other axes; determining movement from acceleration data of the axes; activating functions only when specified orientation detected ([7, 52 et seq.]).

Mattice discloses processing the idle sample value to establish the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 2,

Rakkola disclose(s):

wherein determining the idle sample value for the dominant axis comprises: processing the motion data; and processing the idle sample value ([0015-44]).

Rakkola disclose(s): processing data to establish an idle sample value; observing the degree of activity by counting the number of times a threshold is exceeded, as measured using an accelerometer, in combination with the low power motion detector; adjusting the idle sample value to offset temperature, air pressure, humidity, and other factors([0015-44]).

Mattice discloses processing the idle sample value to establish the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54] see also claim(s) 1 and above claims).

As to claim(s) 3, Rakkola disclose(s):

the motion sensor comprises an accelerometer ([0015-44]).

As to claim(s) 4,

Rakkola disclose(s):

the idle sample value comprises an average of accelerations over a sample period along the dominant axis; when the device goes to idle mode after a period of inactivity ([0015-44]).

The above art/combination does not expressly disclose recorded.

Mattice discloses recorded spatial signatures, spatial signatures may be tracked, recorded, and/or analyzed by one or more motion detector devices; recording motion data (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to continue collecting data when the device is inactive, to track, record, and/or analyze the data.

As to claim(s) 5, Rakkola disclose(s):

determining the idle sample value for each of the other axes of the device ([0015-44]).

As to claim(s) 6, Rakkola disclose(s):

registering the motion of the device comprises: processing the motion data to determine a current sample value along the dominant axis of the device ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 7, Rakkola disclose(s):

comparing a difference between a current sample value along the dominant axis determined based on the motion of the device and the idle sample value of the dominant axis against a threshold value ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 8,

The above art/combination does not expressly disclose the change in the dominant axis comprises a change in acceleration along the dominant axis.

Mattice discloses the change in the dominant axis comprises a change in acceleration along the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to determine whether the device is rest.

As to claim(s) 10, Rakkola disclose(s):

the current sample value of the dominant axis of the device is an average of accelerations over a sample period ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 11, Rakkola disclose(s):

determining the current sample value for each of the other axes of the device ([0015-44]).

As to claim(s) 14, Rakkola disclose(s):

determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value ([0015-44]).

As to claim(s) 15,

Rakkola disclose(s): computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis; comparing the difference against a threshold value to establish whether to wake the device up ([0015-44]).

The above art/combination does not expressly disclose determining a new dominant axis based on the motion data received from the motion sensor; when the device goes to idle mode after a period of inactivity.

Rakkola disclose(s): updating values automatically and periodically, as a programmable parameter; computing when the device goes to idle mode after a period of inactivity ([0015-44]).

Mattice discloses determining a new dominant axis based on the motion data received from the motion sensor (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to continue collecting data when a device is inactive, to determine whether the device is at rest, and to update values automatically and/or periodically, as a programmable parameter.

As to claim(s) 25,

Rakkola disclose(s): A mobile device comprising: a motion sensor to register a motion of the mobile device; and a power logic to activate the device when the motion indicates a change in the dominant axis of the device ([0015-44]; see also claim 2).

The above art/combination does not expressly disclose a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data, the dominant axis defined as an axis with a largest effect from gravity among three axes.

Mattice discloses a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim 2).

the dominant axis defined as an axis with a largest effect from gravity among three axes (see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account, and to determine the axis with the greater amount of movement (see also claim 1, 2).

As to claim(s) 26,

Rakkola disclose(s): a long average logic to create one or more averages of accelerations over a sample period as measured by the motion sensor; acceleration data along each of the axes ([0015-44]).

Rakkola disclose(s): to compute the one or more long averages of accelerations; logic to set a period over which motion data is collected; the number of samples summed to compute the one or more long averages of accelerations is a programmable setting ([0015-44]).

As to claim(s) 28, Rakkola disclose(s):

a computation logic to determine if the averages of accelerations indicate a change in the dominant axis of the device ([0015-44]; see also claim(s) 1, 25 and above claims).

As to claim(s) 29, Rakkola disclose(s):

a glitch corrector logic to correct one or more glitches in the motion data before the one or more long averages are calculated ([0015-44]; see also claim 13).

As to claim(s) 30, Rakkola disclose(s):

the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes ([0015-44]).

As to claim(s) 33,

A system to wake up a mobile device comprising: a motion sensor to detect motion along three axes; a dominant axis logic to compare an effect of gravity on the three axes, and to determine an axis of the device experiencing a largest effect of gravity; and a power logic to move the device from an inactive state to an active state upon detection of a change in the axis experiencing the largest effect of gravity (see claim(s) 1, 25 and above claims).

As to claim(s) 34,

A long average logic to create an average of accelerations over a sample period along the dominant axis; and a computation logic to determine of the average of accelerations indicates the change in the dominant axis of the device (see claim(s) 1, 26, 28 and above claims).

2. Claim(s) 9, 31, 35 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Kahn (7987070) in view of Mattice (20070259716) in view of Gregg (6353449).

As to claim(s) 9, 31, 35,

The above art/combination does not expressly disclose waking up the device further comprises configuring the device to return to a last active device state.

Gregg discloses waking up the device further comprises configuring the device to return to a last active device state ([1, 23-30]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a means of viewing and executing applications that were being utilized when the user left the device.

3. Claim(s) 13 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Kahn (7987070) in view of Mattice (20070259716) in view of Doll (20070150136).

As to claim(s) 13,

Rakkola disclose(s): processing the motion data further comprises; and removing the one or more glitches in the motion data from the motion data before calculating the long average ([0015-44]).

The above art/combination does not expressly disclose verifying whether the motion data includes one or more glitches.

Doll discloses verifying whether the motion data includes one or more glitches ([0007]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to ensure that the system utilizes and processes valid information and data.

4. Claim(s) 32 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Kahn (7987070) in view of Mattice (20070259716) in view of Gregg (6353449) in view of Oh (6771250).

As to claim(s) 32,

The above art/combination does not expressly disclose the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

Oh discloses the device state logic allows user interaction to customize applications to be displayed when the device is woken up ([3, 13-25]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a means of viewing and executing applications that were being utilized and/or as desired by a user.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shirley Lu whose telephone number is (571) 272-8546. The examiner can normally be reached on 8:30-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Wu can be reached on (571) 272-2964. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Shirley Lu/

Primary Examiner, Art Unit 2612

Notice of References Cited	Application/Control No. 12/247,950	Applicant(s)/Patent Under Reexamination KAHN ET AL.	
	Examiner SHIRLEY LU	Art Unit 2612	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-			
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S2	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48
S3	7	S2 and remote$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48
S4	2	S3 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:49
S5	1	"20040095252".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:50
S8	0	"20030222775".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:14
S9	2	"20030098792".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:16
S10	0	"20030098792".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S11	0	"20030098792".pn. and temperature$1	US-PGPUB;	OR	OFF	2010/05/03

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			10:40
S12	1	"20030098792".pn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:43
S13	2	S2 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:46
S14	11	baby adj seat and distance same counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:13
S15	19	baby adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:17
S16	2	"20030122662".pn. and range	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:20
S17	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:22
S18	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:23
S19	133	car adj seat and distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2010/05/03 11:24

			IBM_TDB			
S20	14	car adj seat and predetermined adj distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S21	0	"7797212".pn. and counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:26
S22	12	car adj seat and distance with signal$1 adj strength$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:27
S23	0	"1318".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S24	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S25	3	"131848".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06
S26	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06
S27	12	lojack.as. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:12
S28	2	"7561102".pn.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2010/05/13 20:14

			EPO; JPO; DERWENT; IBM_TDB			
S29	2	"7536169".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:15
S30	3940	counter with time with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52
S31	245	counter with measur$4 near5 (time with distance)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52
S32	25	S31 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:54
S33	11598	"327"/$.ccls. and rectifier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16
S34	616	"327"/$.ccls. and rectifier.ti.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16
S35	36	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:49
S36	21	S35 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:50
S37	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT;	OR	OFF	2011/04/26 17:53

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S38	2	"20030034887".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S39	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S40	1	"20030034887".pn. and "10"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:18
S41	2	"20030034887".pn. and timer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:38
S42	0	"20030098792".pn. and "72"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S43	1	"20030098792".pn. and "27"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S44	0	"779712".apn. and low adj power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S45	0	"779712".apn. and motion adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53

S46	0	"779712".apn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S47	3	"779712".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S48	2	"6922147".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:06
S49	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S50	3	S49 and (conserv$4 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S51	3	S49 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S52	2	S49 and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 20:56
S53	0	mtion adj detector with sleep	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S54	52	motion adj detector with sleep adj mode	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/04/26 21:05

			DERWENT; IBM_TDB			
S55	10	S54 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:06
S56	9857	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15
S57	5	S56 and S54	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15
S58	638	signal adj edge adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:18
S59	0	signal adj edge adj detector same reduce adj error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S60	33	signal adj edge adj detector same error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S61	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S62	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:21
S63	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/04/26 21:22

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S64	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S65	34	signal adj edge adj detector and measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S66	5	signal adj edge adj detector same measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S68	86	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:24
S69	23	S68 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:25
S70	45	edge adj detect$4 with reduc$4 near3 error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S71	7	S70 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S72	1	"247950".apn. and dominant adj axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:03
S73	18	(("20060161377") or ("200702597") or	US-PGPUB;	OR	OFF	2011/04/26

		("20070150136") or ("6353449") or ("6771250")).PN.	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			22:40
S74	0	("200700259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S75	2	("20070259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S76	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 17:37
S77	1	"247950".apn. and (long adj average$1 with idle)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S78	1	"247950".apn. and (long adj average$1 with set$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S79	1	"247950".apn. and (long adj average$1 with idle adj sample)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:14
S80	1	"247950".apn. and (long adj average$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:17
S81	3524	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2011/04/27 23:18

			IBM_TDB			
S82	3524	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:19
S83	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S84	2	S83 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S85	1	"247950".apn. and dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:34
S86	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:40
S87	1	"247950".apn. and new adj dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:43
S88	1	"20060161377".pn. and reference	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:47
S89	0	"20070259716".pn. and (idle sleep)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:54
S90	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2011/04/27 23:57

			EPO; JPO; DERWENT; IBM_TDB				
S91	1	"247950".apn. and idle with comput$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S92	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S93	0	"20070259716".pn. and ("0053" "0155" "0165" "0210" "0254")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
S94	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
S95	2	"6353449".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:00
S96	2	"20070150136".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:03
S97	7354	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S98	3525	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S99	3	S97 and S98	US-PGPUB; USPAT;	OR	OFF	2011/04/28 14:15

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S100	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S101	1	S97 and S100	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S102	3668	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S103	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S104	38	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S105	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S106	2	S105 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S107	7852	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56

S108	3668	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S109	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S110	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S111	3	S110 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S112	23	S104 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S113	1	tire with inches with sensor with (outside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S114	1	tire with sensor with (outside) same inches	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S115	20	tire with sensor with (outside) same size	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S116	3	"447841".apn. and ("18" "20")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/10/22 18:48

			DERWENT; IBM_TDB			
S117	3	"447841".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S118	3	"447841".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S119	1	S114 and ("18" "20")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S120	3	tire adj size with sensor with (outside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:50
S121	6	tire adj size same sensor with (outside inside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:50
S123	331	tire with sensor with (outside) with (pressure temperature)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:54
S124	86	S123 and @rlad < "20080604"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:55
S125	1	"20060161377".pn. and (axis axes)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/01/22 18:25
S126	1	"247950".apn. and dominant adj axis	US-PGPUB; USPAT; USOCR;	OR	OFF	2012/01/22 18:32

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S127	12	dominant adj axis with gravity	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/01/22 19:05
S128	5	S127 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/01/22 19:06
S129	12	dominant adj (axis axes)with gravity	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/01/22 19:07
S130	8125	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/01/22 19:17
S131	38	S130 and dominant adj (axis axes)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/01/22 19:17
S132	1	"20060161377".pn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/01/22 19:25

1/22/2012 8:30:15 PM
C:\Users\slu\Documents\EAST\Workspaces\12247950.wsp

Search Notes	**Application/Control No.** 12/247,950	**Applicant(s)/Patent under Reexamination** KAHN ET AL.	
	Examiner SHIRLEY LU	**Art Unit** 2612	

SEARCHED			
Class	Subclass	Date	Examiner
340	669	1/19/12	SL
702	141		
345	325, 156		

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
east, inventor search, Google	1/19	SL

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

Attorney's Docket No. 8689P057 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Philippe Kahn, et al
Appl. No.	:	12/247,950
Filed	:	October 8, 2008
For	:	Method and System for Waking Up a Device Due to Motion
Customer No.	:	08791

Examiner:	Lu, Shirley
Art Unit:	2612
Conf No:	8961

CERTIFICATE OF TRANSMISSION
I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.

/Judith Szepesi/ April 26, 2012
Judith A. Szepesi ***Date***

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

AMENDMENT

Sir:

In response to the Office Action of January 26, 2012, applicants respectfully request the Examiner to enter the following amendments and consider the following remarks:

Amendments to the Claims are reflected in the listing of claims, which begins on page 2 of this paper.

Remarks/Arguments begin on page 6 of this paper.

IN THE CLAIMS:

1. (Previously Presented) A method comprising:

receiving motion data from a motion sensor, the motion sensor sensing motion along three axes;

determining an idle sample value for a dominant axis of a device, the dominant axis defined as the axis with a largest effect from gravity among the three axes;

registering a motion of the device based on the motion data from the motion sensor; and

waking up the device when the motion of the device indicates a change in the dominant axis of the device.

2. (Previously Presented) The method of claim 1, wherein determining the idle sample value for the dominant axis comprises:

processing the motion data to establish an idle sample value; and

processing the idle sample value to establish the dominant axis.

3. (Previously Presented) The method of claim 1, wherein the motion sensor comprises an accelerometer.

4. (Previously Presented) The method of claim 2, wherein the idle sample value comprises an average of accelerations over a sample period along the dominant axis recorded when the device goes to idle mode after a period of inactivity.

5. (Previously Presented) The method of claim 2, further comprising determining the idle sample value for each of the other axes of the device.

6. (Previously Presented) The method of claim 1, wherein registering the motion of the device comprises:

processing the motion data to determine a current sample value along the dominant axis of the device.

7. (Previously Presented) The method of claim 2, further comprising comparing a difference between a current sample value along the dominant axis determined based on the motion of the device and the idle sample value of the dominant axis against a threshold value.

8. (Original) The method of claim 1, wherein the change in the dominant axis comprises a change in acceleration along the dominant axis.

9. (Original) The method of claim 1, wherein waking up the device further comprises configuring the device to return to a last active device state.

10. (Previously Presented) The method of claim 6, wherein the current sample value of the dominant axis of the device is an average of accelerations over a sample period.

11. (Original) The method of claim 6, further comprising determining the current sample value for each of the other axes of the device.

12. (Canceled)

13. (Currently Amended) The method of claim 6, wherein processing the motion data further comprises:

verifying whether the motion data includes one or more glitches; and

removing the one or more glitches in the motion data from the motion data before calculating the ~~long~~ average.

14. (Original) The method of claim 6, further comprising determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value.

15. (Original) The method of claim 8, further comprising:

determining a new dominant axis based on the motion data received from the motion sensor;

computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis determined when the device goes to idle mode after a period of inactivity; and

comparing the difference against a threshold value to establish whether to wake the device up.

Claims 16-24. (Canceled)

25. (Previously Presented) A mobile device comprising:

a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data, the dominant axis defined as an axis with a largest effect from gravity among three axes;

a motion sensor to register a motion of the mobile device; and

a power logic to activate the device when the motion indicates a change in the dominant axis of the device.

26. (Previously Presented) The mobile device of claim 25, further comprising:

a long average logic to create one or more averages of accelerations over a sample period as measured by the motion sensor.

27. (Canceled)

28. (Previously Presented) The mobile device of claim 26, further comprising:

a computation logic to determine if the averages of accelerations indicate a change in the dominant axis of the device.

29. (Previously Presented) The mobile device of claim 26, further comprising a glitch corrector logic to correct one or more glitches in the motion data before the one or more long averages are calculated.

30. (Previously Presented) The mobile device of claim 25, wherein the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes.

31. (Previously Presented) The mobile device of claim 25, further comprising a device state logic to restore the device to a last active state.

32. (Previously Presented) The mobile device of claim 31, wherein the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

33. (Previously Presented) A system to wake up a mobile device comprising:

a motion sensor to detect motion along three axes;

a dominant axis logic to compare an effect of gravity on the three axes, and to determine an axis of the device experiencing a largest effect of gravity; and

a power logic to move the device from an inactive state to an active state upon detection of a change in the axis experiencing the largest effect of gravity.

34. (Previously Presented) The system of claim 33, further comprising:

a long average logic to create an average of accelerations over a sample period along the dominant axis; and

a computation logic to determine if the average of accelerations indicates the change in the dominant axis of the device.

35. (Previously Presented) The system of claim 33, further comprising:

a device state logic to restore the device to one of: a last active state, a preset customized state.

Remarks/Arguments

Applicants respectfully request consideration of the subject application as amended herein. This Amendment is submitted in response to the Office Action mailed January 26, 2012. Claims 1-11, 13-15, 25, 26, and 28-35 are rejected. In this Amendment, claim 13 has been amended. No claims have been canceled. No new claims have been added. Applicants reserve all rights with respect to the applicability of the Doctrine of Equivalents.

Therefore, claims 1-11, 13-15, 25, 26, and 28-35 are presented for examination. It is respectfully submitted that the amendment does not add new matter.

Claim Rejections under 35 U.S.C. §112, second paragraph

Claims 13, 26, 29, and 34 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner objected to the use of the term "long average" as a relative term. Applicants have amended claim 13 to remove the term.

With respect to claims 26, 29, and 34, the phrase "long average logic" is used in as the name of an element. Applicants may be their own lexicographers, and may use terms, which are clearly defined in the Specification. Applicants respectfully submit that the term "long average logic" can be found in the original Specification and figures referencing the same element. Therefore, the phrase is well defined, and not a relative term, and one of skill in the would understand that "the long average logic" is a logic element in the system. Therefore, Applicants respectfully request withdrawal of this rejection.

If the Examiner maintains that this term is a relative term, the Examiner is respectfully requested to contact Judith Szepesi, at 408-720-8300 x3483, to resolve any such issue.

Claim Rejections under 35 U.S.C. §103(a)

Claims 1-8, 10-11, 14-15, 25-26, 28-30, and 33-34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Publication No. 2006/0161377 to Rakkola, et al (hereinafter "Rakkola") in view of U.S. Patent No. 7,987,070 to Kahn, et al (hereinafter “Kahn”) in view of of U.S. Publication No. 2007/0259716 to Mattice, et al (hereinafter “Mattice”).

Claims 9, 31, and 35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Kahn in view of Mattice in view of U.S. Patent No. 6,353,449 to Gregg, et al (hereinafter “Gregg”).

Claim 13 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Kahn in view of Mattice in view of U.S. Publication No. 2007/0150136 to Doll, et al (hereinafter “Doll”).

Claim 32 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Kahn in view of Mattice in view of Gregg in view of U.S. Patent No. 6,771,250 to Oh.

In each of these rejections, Kahn is utilized as a reference. Applicants respectfully submit that Kahn is prior art only under 35 U.S.C. 102(e). As noted in 35 U.S.C. 103(c)(1) “Subject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the claimed invention was made, owned by the same person or subject to an obligation of assignment to the same person.”

The present invention was invented by a subset of the inventors named in the Kahn patent. Furthermore, both applications are assigned to the same entity, and are assigned to and owned by the same entity. Therefore, Kahn cannot be used as prior art against the present invention.

Applicants therefore respectfully submit that the claims are not obvious over the combination of references, since Kahn cannot be used as a reference.

Conclusion

Applicant respectfully submits that in view of the amendments and discussion set forth herein, the applicable rejections have been overcome. Accordingly, the present and amended claims should be found to be in condition for allowance.

If a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact Judith A. Szepesi at (408) 720-8300.

If there are any additional charges/credits, please charge/credit our deposit account no. 02-2666.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: April 25, 2012

/Judith Szepesi/
Judith A. Szepesi
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1279 Oakmead Parkway
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Attorney's Docket No. 8689P057 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Philippe Kahn, et al	Examiner:	Lu, Shirley
Appl. No.	: 12/247,950	Art Unit:	2612
Filed	: October 8, 2008	Conf No:	8961
For	: Method and System for Waking Up a Device Due to Motion		
Customer No.	: 08791		

CERTIFICATE OF TRANSMISSION
I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.

/Judith Szepesi/ April 26, 2012
Judith A. Szepesi ***Date***

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

REQUEST FOR EXAMINER INITIALS

Sir:

Applicants request that the Examiner initial the cited documents on Form PTO-1449 submitted with an Information Disclosure Statement filed 8/19/2011 in the present application and return a copy of that initialed Form PTO-1449 to applicants. Applicants request the Examiner's initials in order to show consideration of the cited references.

A copy of the previously-submitted Form PTO-1449 is included herewith without copies of the previously submitted references.

No fees are included herewith. If there are any additional charges/credits, please charge/credit our deposit account no. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: April 26, 2012

/Judith Szepesi/
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(408) 720-8300

Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	1	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	4,285,041	8/18/1981	Smith	
		US-	4,578,769	3/25/1986	Frederick	
		US-	5,446,725	8/29/1995	Ishiwatari	
		US-	5,446,775	8/25/1995	Wright et al	
		US-	5,583,776	12/10/1996	Levi et al	
		US-	5,593,431	1/14/1997	Sheldon	
		US-	5,654,619	8/5/1997	Iwashita, Yasusuke	
		US-	5,778,882	7/14/1998	Raymond et al	
		US-	5,955,667	9/21/1999	Fyfe	
		US-	5,976,083	11/2/1999	Richardson, et al.	
		US-	6,122,595	9/19/2000	Varley et al	
		US-	6,135,951	10/24/2000	Richardson, et al.	
		US-	6,145,389	11/14/2000	Ebeling, et al.	
		US-	6,282,496	8/28/2001	Chowdhary	
		US-	6,369,794	4/9/2002	Sakurai et al	
		US-	6,428,490	8/6/2002	Kramer et al	
		US-	6,493,652	12/10/2002	Ohlenbusch et al	
		US-	6,496,695	12/17/2002	Kouji et al	
		US-	6,513,381	2/4/2003	Fyfe et al.	
		US-	6,522,266	2/18/2003	Soehren, et al.	
		US-	6,532,419	3/11/2003	Begin, et al.	
		US-	6,539,336	3/25/2003	Vock, et al.	
		US-	6,611,789	8/26/2003	Darley, Jesse	
		US-	6,700,499	3/2/2004	Kubo et al	
		US-	6,786,877	9/7/2004	Foxlin	
		US-	6,790,178	9/14/2004	Mault, et al.	
		US-	6,813,582	11/2/2004	Levi et al.	
		US-	6,823,036	11/23/2004	Chen	

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		US-	6,826,477	11/30/2004	Ladetto et al	
		US-	6,836,744	12/28/2004	Asphahani, et al.	
		US-	6,881,191	4/19/2005	Oakley, et al.	
		US-	6,885,971	4/26/2005	Vock, et al.	
		US-	6,898,550	5/24/2005	Blackadar, et al.	
		US-	6,928,382	8/9/2005	Hong et al	
		US-	6,941,239	9/6/2005	Unuma, et al.	
		US-	6,959,259	10/25/2005	Vock, et al.	
		US-	6,975,959	12/13/2005	Dietrich et al.	
		US-	7,054,784	5/30/2006	Flentov et al	
		US-	7,057,551	6/6/2006	Vogt, Mark J	
		US-	7,072,789	7/4/2006	Vock, et al.	
		US-	7,092,846	8/15/2006	Vock, et al.	
		US-	7,148,797	12/12/2006	Albert	
		US-	7,158,912	1/20/2007	Vock, et al.	
		US-	7,169,084	1/30/2007	Tsuji, Tomoharu	
		US-	7,171,331	1/30/2007	Vock, et al.	
		US-	7,177,684	2/13/2007	Kroll et al	
		US-	7,212,943	5/1/2007	Aoshima, et al.	
		US-	7,220,220	5/22/2007	Stubbs, et al.	
		US-	7,297,088	11/20/2007	Tsuji, Tomoharu	
		US-	7,334,472	2/26/2008	Seo et al	
		US-	7,353,112	4/1/2008	Choi et al	
		US-	7,382,611	2/12/2008	Klees, et al.	
		US-	7,387,611	6/17/2008	Inoue et al.	
		US-	7,451,056	11/11/2008	Flentov et al	
		US-	7,457,719	11/25/2008	Kahn et al	
		US-	7,467,060	12/16/2008	Kulach et al	

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				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	3	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number: Number-Kind Code[2] (If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	7,489,937	2/10/2009	Chung et al	
		US-	7,512,515	3/31/2009	Vock et al	
		US-	7,526,402	4/28/2009	Tenanhaus et al	
		US-	7,608,050	10/27/2009	Sugg, Christoper John	
		US-	7,640,804	1/5/2010	Daumer et al	
		US-	7,647,196	1/12/2010	Kahn et al.	
		US-	7,647,196	11/12/2010	Kahn et al	
		US-	7,653,508	1/26/2010	Kahn et al.	
		US-	7,752,011	7/6/2010	Niva et al	
		US-	7,753,861	7/13/2010	Kahn et al.	
		US-	7,774,156	8/10/2010	Niva et al	
		US-	7,857,772	12/28/2010	Bouvier et al	
		US-	2002/0023654	2/28/2002	Webb, James D	
		US-	2002/0089425	7/11/2002	Kubo et al	
		US-	2002/0109600	8/15/2002	Mault, James R.; et al.	
		US-	2002/0118121	8/29/2002	Lehrman et al	
		US-	2002/0151810	10/17/2002	Wong, Philip Lim-Kong; et al.	
		US-	2002/0193124	12/19/2002	Hamilton et al	
		US-	2003/0018430	1/23/2003	Ladetto et al	
		US-	2003/0048218	3/13/2003	Milnes et al	
		US-	2003/0083596	5/1/2003	Kramer et al	
		US-	2003/0109258	6/12/2003	Mantyjarvi et al	
		US-	2003/0139692	7/24/2003	Barrey et al.	
		US-	2004/0106421	6/3/2004	Tomiyoshi et al	
		US-	2004/0225467	11/11/2004	Vock, Curtis A.; et al.	
		US-	2004/0236500	11/25/2004	Choi et al	
		US-	2005/0033200	2/10/2005	Soehren, Wayne A.; et al.	
		US-	2005/0202934	9/15/2005	Olrik et al	

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This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SENT FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450**.

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Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	4	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	2005/0222801	10/6/2005	Wulff et al	
		US-	2005/0232388	10/20/2005	Tsuji, Tomoharu	
		US-	2005/0238132	10/27/2005	Tsuji, Tomoharu	
		US-	2005/0240375	10/27/2005	Sugai, Yoshinori	
		US-	2005/0248718	11/10/2005	Howell, Thomas A., et al.	
		US-	2006/0020177	1/26/2006	Seo et al	
		US-	2006/0063980	3/23/2006	Hwang et al	
		US-	2006/0064276	3/23/2006	Ren et al	
		US-	2006/0100546	5/11/2006	Silk, Jeffrey E	
		US-	2006/0136173	6/22/2006	Charles Whipple Jr.; et al.	
		US-	2006/0167387	7/27/2006	Buchholz et al	
		US-	2006/0205406	9/14/2006	Pekonen et al	
		US-	2006/0206258	9/14/2006	Brooks, Amanda S.	
		US-	2006/0223547	10/5/2006	Chin et al	
		US-	2006/0259268	11/16/2006	Vock et al	
		US-	2006/0288781	12/28/2006	Daumer et al	
		US-	2007/0037610	2/15/2007	Logan, James D	
		US-	2007/0038364	2/15/2007	Lee et al	
		US-	2007/0061105	3/15/2007	Darley, Jesse; et al.	
		US-	2007/0063850	3/22/2007	Devaul; Richard W.; et al.	
		US-	2007/0067094	3/22/2007	Park et al	
		US-	2007/0073482	3/29/2007	Churchill et al	
		US-	2007/0082789	4/12/2007	Nissila et al	
		US-	2007/0130582	6/7/2007	Chang et al	
		US-	2007/0142715	6/21/2007	Banet et al.	
		US-	2007/0195784	8/23/2007	Allen et al	
		US-	2007/0208531	9/6/2007	Darley, Jesse; et al.	
		US-	2007/0213085	9/13/2007	Fedora, Neal R	

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		US-	2007/0213126	9/13/2007	Deutsch et al	
		US-	2007/0250261	10/25/2007	Soehren	
		US-	2007/0260418	11/8/2007	Ladetto et al	
		US-	2007/0260482	11/8/2007	Nurmela et al	
		US-	2008/0161072	7/3/2008	Lide et al	
		US-	2008/0171918	7/17/2008	Teller et al	
		US-	2009/0047645	2/19/2009	Dibenedetto et al	
		US-	2009/0098880	4/16/2009	Lindquist, Bjorn	
		US-	2009/0213002	8/27/2009	Rani et al	
		US-	2009/0234614	9/17/2009	Kahn et al.	
		US-	2009/0319221	12/24/2009	Kahn et al	
		US-	2010/0056872	3/4/2010	Kahn et al.	
		US-	2010/0057398	3/4/2010	Darley, Jesse; et al.	
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				Examiner Name	Lu, Shirley
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NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
		ANDERSON, Ian, et al, "Shakra: Tracking and Sharing Daily Activity Levels with Unaugmented Mobile Phones," Mobile Netw Appl, 8/3/2007, pp 185-199	
		AYLWARD, Ryan, et al, "Sensemble: A Wireless, Compact, Multi-User Sensor System for Interactive Dance," International Conference on New Interfaces for Musical Expression (NIME06), June 4-8, 2006, pp 134-139	
		BACA, Arnold, et al, "Rapid Feedback Systems for Elite Sports Training," IEEE Pervasive Computing, October-December 2006, pp 70-76	
		BAKHRU, Kesh, "A Seamless Tracking Solution for Indoor and Outdoor Position Location," IEEE 16th International Symposium on Personal, Indoor, and Mobile Radio Communications, 2005, pp 2029-2033	
		BLILEY, Kara E, et al, "A Miniaturized Low Power Personal Motion Analysis Logger Utilizing MEMS Accelerometers and Low Power Microcontroller," IEEE EMBS Special Topic Conference on Microtechnologies in Medicine and Biology, May 12-15, 2005, pp 92-93	
		BOURZAC, Katherine, "Wearable Health Reports," Technology Review, February 28, 2006, <http://www.techreview.com/printer_friendly_article_aspx?id+16431>, accessed 3/22/2007, 3 pages	
		CHENG, Fangxiang, et al, "Periodic Human Motion Description for Sports Video Databases," Proceedings of the Pattern Recognition, 2004, 5 pages	
		DAO, Ricardo, "Inclination Sensing with Thermal Accelerometers", MEMSIC, May 2002, 3 pages	
		FANG, Lei, et al, "Design of a Wireless Assisted Pedestrian Dead Reckoning System--The NavMote Experience," IEEE Transactions on Instrumentation and Measurement, Vol 54, No 6, December 2005, pp 2342-2358	
		HEALEY, Jennifer, et al, "Wearable Wellness Monitoring Using ECG and Accelerometer Data," IEEE Int. Symposium on Wearable Computers (ISWC'05), 2005, 2 pages	
		HEMMES, Jeffrey, et al, "Lessons Learned Building TeamTrak: An Urban/Outdoor Mobile Testbed," 2007 IEEE Int. Conf. on Wireless Algorithms, August 1-3, 2007, pp 219-224	

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		JONES, L, et al, "Wireless Physiological Sensor System for Ambulatory Use," <http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?tp=&arnumber=1612917&isnumber=33861>, April 3-5, 2006	
		JOVANOV, Emil, et al, "A Wireless Body Area Network of Intelligent Motion Sensors for Computer Assisted Physical Rehabilitation," Journal of NeuroEngineering and Rehabilitation, March 2005, 10 pages	
		KALPAXIS, Alex, "Wireless Temporal-Spatial Human Mobility Analysis Using Real-Time Three Dimensional Acceleration Data," IEEE Intl. Multi-Conf. on Computing in Global IT (ICCGI'07), 2007, 7 pages	
		LEE, Seon-Woo, et al., "Recognition of Walking Behaviors for Pedestrian Navigation," IEEE International Conference on Control Applications, September 5-7, 2001, pp 1152-1155	
		MARGARIA, Rodolfo, "Biomechanics and Energetics of Muscular Exercise", Chapter 3, Oxford: Clarendon Press, 1976, pages 105-125	
		MILENKOVIC, Milena, et al, "An Accelerometer-Based Physical Rehabilitation System," IEEE SouthEastern Symposium on System Theory, 2002, pp 57-60	
		MIZELL, David, "Using Gravity to Estimate Accelerometer Orientation", Seventh IEEE International Symposium on Wearable Computers, 2003, 2 pages	
		ORMONEIT, D, et al, "Learning and Tracking Cyclic Human Motion," 7 pages	
		OTTO, Chris, et al, "System Architecture of a Wireless Body Area Sensor Network for Ubiquitous Health Monitoring," Journal of Mobile Multimedia, Vol 1, No 4, 2006, pp 307-326	
		PARK, Chulsung, et al, "Eco: An Ultra-Compact Low-Power Wireless Sensor Node for Real-Time Motion Monitoring," IEEE Int. Symp. on Information Processing in Sensor Networks, 2005, pp 398-403	
		SHEN, Chien-Lung, et al, "Wearable Band Using a Fabric-Based Sensor for Exercise ECG Monitoring," IEEE Int. Symp. on Wearable Computers, 2006, 2 pages	

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				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	8	**of**	8	Attorney Docket Number	8689P057

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		"Sensor Fusion," <www.u-dynamics.com>, accessed 8/29/2008, 2 pages	
		TAPIA, Emmanuel Munguia, et al, "Real-Time Recognition of Physical Activities and Their Intensities Using Wireless Accelerometers and a Heart Rate Monitor," IEEE Cont. on Wearable Computers, October 2007, 4 pages	
		WANG, Shu, et al, "Location Based Services for Mobiles: Technologies and Standards, LG Electronics MobileComm," IEEE ICC 2008, Beijing, pages 1-66 (part 1 of 3)	
		WANG, Shu, et al, "Location Based Services for Mobiles: Technologies and Standards, LG Electronics MobileComm," IEEE ICC 2008, Beijing, pages 67-92 (part 2 of 3)	
		WANG, Shu, et al, "Location Based Services for Mobiles: Technologies and Standards, LG Electronics MobileComm," IEEE ICC 2008, Beijing, pages 93-123 (part 3 of 3)	
		WECKESSER, P, et al, "Multiple Sensorprocessing for High-Precision Navigation and Environmental Modeling with a Mobile Robot," IEEE, 1995, pp 453-458	
		WEINBERG, Harvey, "MEMS Motion Sensors Boost Handset Reliability," <http://www.mwrf.com/Articles/Print.cfm?ArticleID=12740>, June 2006, 3 pages	
		WIXTED, Andrew J, et al, "Measurement of Energy Expenditure in Elite Athletes Using MEMS-Based Triaxial Accelerometers," IEEE Sensors Journal, Vol 7, No 4, April 2007, pp 481-488	
		WU, Winston H, et al, "Context-Aware Sensing of Physiological Signals," IEEE Int. Conf. on Engineering for Medicine and Biology, August 23-26, 2007, pp 5271-5275	
		YOO, Chang-Sun, et al, "Low Cost GPS/INS Sensor Fusion System for UAV Navigation," IEEE Digital Avionics Systems Conference (DASC '03), 2003, 9 pages	

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Electronic Acknowledgement Receipt

EFS ID:	12637049
Application Number:	12247950
International Application Number:	
Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Customer Number:	8791
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Filer Authorized By:	
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		8689P057_AmResp_April2012.pdf	36533 5eef3c9c70c9bf4ba8491ab05b1b9aaf90b689fe	yes	8

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	8

Warnings:

Information:

2		8689P057_Request_for_Examiner_Initials.pdf	135157 eec5db72721228bf9204eb87a809a1315223b6ae	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	1
	Information Disclosure Statement (IDS) Form (SB08)	2	9

Warnings:

Information:

Total Files Size (in bytes):	171690

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/247,950	Filing Date 10/08/2008	☐ To be Mailed

APPLICATION AS FILED – PART I

FOR	NUMBER FILED (Column 1)	NUMBER EXTRA (Column 2)	SMALL ENTITY ☐ RATE ($)	FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
			TOTAL			TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

AMENDMENT 04/26/2012	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 24	Minus	** 35	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	* 3	Minus	***3	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/DEANNA RORIE/

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/247,950	10/08/2008	Philippe Kahn	8689P057	8961

8791 7590 06/21/2012

BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
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EXAMINER	
LU, SHIRLEY	

ART UNIT	PAPER NUMBER
2612	

MAIL DATE	DELIVERY MODE
06/21/2012	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No.	Applicant(s)	
	12/247,950	KAHN ET AL.	
	Examiner	Art Unit	
	SHIRLEY LU	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 April 2012*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1-11,13-15,25,26 and 28-35* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-11,13-15,25,26 and 28-35* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

a. Applicant argues starting on page(s) 7, that the prior art does not specifically disclose the newly amended limitations.

In response, please see action below.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim(s) 1-11, 13-15, 25, 26, 28-35 is/are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1, 25, 33 recite “axis with a largest effect from gravity.” Any dependent claim(s) and/or similar limitation(s) is/are rejected for similar reason(s). Proper action is required.

Claim1-11, 13-15, 25, 26, 28-35 is/are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Limitation(s) critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Any dependent claim(s) and/or similar limitation(s) is/are rejected for similar reason(s). Proper action is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim(s) 26, 29, 34 is/are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "long average(s)" in claim(s) 13, 26, 29, 34 is a relative term which renders the claim indefinite. The term "long average(s)" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Though the claims are read in light of the specification, the limitations from the specification are not read into the claims, and the broadest reasonable interpretation has been given to the claims. Any dependent claim(s) and/or similar limitation(s) is/are rejected for similar reason(s). Proper action is required.

The term "axis with a largest effect from gravity" in claim(s) 1-11, 13-15, 25, 26, 28-35 is unclear which renders the claim indefinite. The term is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Though the claims are read in light of the specification, the limitations from the specification are not read into the claims, and the broadest reasonable interpretation has been given to the claims. Any dependent claim(s) and/or similar limitation(s) is/are rejected for similar reason(s). Proper action is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claim(s) 1-8, 10-11, 14-15, 25-26, 28-30, 33-34 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716).

As to claim(s) 1, Rakkola disclose(s):

A method comprising: receiving motion data from a motion sensor, the motion sensor sensing motion along three axes; registering a motion of the device based on the motion data from the motion sensor; and waking up the device when the motion of the device indicates a change in the dominant axis of the device ([0015-44]).

The above art/combination does not expressly disclose determining an idle sample value for a dominant axis of a device, the dominant axis defined as the axis with a largest effect from gravity among the three axes.

Rakkola disclose(s): calculating reference levels for each of the three axes; programming threshold levels for each axis independently; collecting data for each of the three axes; idle states ([0015-44]).

Rakkola disclose(s): wherein determining the idle sample value for the dominant axis comprises: processing the motion data; and processing the idle sample value; processing data to establish an idle sample value; observing the degree of activity by counting the number of times a threshold is exceeded, as measured using an accelerometer, in combination with the low power motion detector; adjusting the idle sample value to offset temperature, air pressure, humidity, and other factors([0015-44]).

Mattice discloses processing the idle sample value to establish the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 2,

Rakkola disclose(s):

wherein determining the idle sample value for the dominant axis comprises: processing the motion data; and processing the idle sample value ([0015-44]).

Rakkola disclose(s): processing data to establish an idle sample value; observing the degree of activity by counting the number of times a threshold is exceeded, as measured using an accelerometer, in combination with the low power motion detector; adjusting the idle sample value to offset temperature, air pressure, humidity, and other factors([0015-44]).

Mattice discloses processing the idle sample value to establish the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54] see also claim(s) 1 and above claims).

As to claim(s) 3, Rakkola disclose(s):

the motion sensor comprises an accelerometer ([0015-44]).

As to claim(s) 4,

Rakkola disclose(s):

the idle sample value comprises an average of accelerations over a sample period along the dominant axis; when the device goes to idle mode after a period of inactivity ([0015-44]).

The above art/combination does not expressly disclose recorded.

Mattice discloses recorded spatial signatures, spatial signatures may be tracked, recorded, and/or analyzed by one or more motion detector devices; recording motion data (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to continue collecting data when the device is inactive, to track, record, and/or analyze the data, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 5, Rakkola disclose(s):

determining the idle sample value for each of the other axes of the device ([0015-44]).

As to claim(s) 6, Rakkola disclose(s):

registering the motion of the device comprises: processing the motion data to determine a current sample value along the dominant axis of the device ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 7, Rakkola disclose(s):

comparing a difference between a current sample value along the dominant axis determined based on the motion of the device and the idle sample value of the dominant axis against a threshold value ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 8,

The above art/combination does not expressly disclose the change in the dominant axis comprises a change in acceleration along the dominant axis.

Mattice discloses the change in the dominant axis comprises a change in acceleration along the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to determine whether the device is rest, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 10, Rakkola disclose(s):

the current sample value of the dominant axis of the device is an average of accelerations over a sample period ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 11, Rakkola disclose(s):

determining the current sample value for each of the other axes of the device ([0015-44]).

As to claim(s) 14, Rakkola disclose(s):

determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value ([0015-44]).

As to claim(s) 15,

Rakkola disclose(s): computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis; comparing the difference against a threshold value to establish whether to wake the device up ([0015-44]).

The above art/combination does not expressly disclose determining a new dominant axis based on the motion data received from the motion sensor; when the device goes to idle mode after a period of inactivity.

Rakkola disclose(s): updating values automatically and periodically, as a programmable parameter; computing when the device goes to idle mode after a period of inactivity ([0015-44]).

Mattice discloses determining a new dominant axis based on the motion data received from the motion sensor (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to continue collecting data when a device is inactive, to determine whether the device is at rest, and to update values automatically and/or periodically, as a programmable parameter, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 25,

Rakkola disclose(s): A mobile device comprising: a motion sensor to register a motion of the mobile device; and a power logic to activate the device when the motion indicates a change in the dominant axis of the device ([0015-44]; see also claim 2).

The above art/combination does not expressly disclose a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data, the dominant axis defined as an axis with a largest effect from gravity among three axes.

Mattice discloses a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim 2).

the dominant axis defined as an axis with a largest effect from gravity among three axes (see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account, and to determine the axis with the greater amount of movement (see also claims 1, 2).

As to claim(s) 26,

Rakkola disclose(s): a long average logic to create one or more averages of accelerations over a sample period as measured by the motion sensor; acceleration data along each of the axes ([0015-44]).

Rakkola disclose(s): to compute the one or more long averages of accelerations; logic to set a period over which motion data is collected; the number of samples summed to compute the one or more long averages of accelerations is a programmable setting ([0015-44]).

As to claim(s) 28, Rakkola disclose(s):

a computation logic to determine if the averages of accelerations indicate a change in the dominant axis of the device ([0015-44]; see also claim(s) 1, 25; above claim(s)).

As to claim(s) 29, Rakkola disclose(s):

a glitch corrector logic to correct one or more glitches in the motion data before the one or more long averages are calculated ([0015-44]; see also claim 13; above claim(s)).

As to claim(s) 30, Rakkola disclose(s):

the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes ([0015-44]).

As to claim(s) 33,

A system to wake up a mobile device comprising: a motion sensor to detect motion along three axes; a dominant axis logic to compare an effect of gravity on the three axes, and to determine an axis of the device experiencing a largest effect of gravity; and a power logic to move the device from an inactive state to an active state upon detection of a change in the axis experiencing the largest effect of gravity (see claim(s) 1, 25; above claim(s)).

As to claim(s) 34,

A long average logic to create an average of accelerations over a sample period along the dominant axis; and a computation logic to determine of the average of accelerations indicates the change in the dominant axis of the device (see claim(s) 1, 26, 28; above claim(s)).

2. Claim(s) 9, 31, 35 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Gregg (6353449).

As to claim(s) 9, 31, 35,

The above art/combination does not expressly disclose waking up the device further comprises configuring the device to return to a last active device state.

Gregg discloses waking up the device further comprises configuring the device to return to a last active device state ([1, 23-30]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a means of viewing and executing applications that were being utilized when the user left the device, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

3. Claim(s) 13 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Doll (20070150136).

As to claim(s) 13,

Rakkola disclose(s): processing the motion data further comprises; and removing the one or more glitches in the motion data from the motion data before calculating the long average ([0015-44]).

The above art/combination does not expressly disclose verifying whether the motion data includes one or more glitches.

Doll discloses verifying whether the motion data includes one or more glitches ([0007]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to ensure that the system utilizes and processes valid information and data, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

4. Claim(s) 32 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Gregg (6353449) in view of Oh (6771250).

As to claim(s) 32,

The above art/combination does not expressly disclose the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

Oh discloses the device state logic allows user interaction to customize applications to be displayed when the device is woken up ([3, 13-25]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a means of viewing and executing applications that were being utilized and/or as desired by a user, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shirley Lu whose telephone number is (571) 272-8546. The examiner can normally be reached on 8:30-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Wu can be reached on (571) 272-2964. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Shirley Lu/

Primary Examiner, Art Unit 2612

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	(axis axes) with idle with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:40
L2	66	(axis axes) with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:41
L3	15	2 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:41
L4	0	(three) adj axes with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:44
L5	6	(three) adj axes with idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:44
L6	1	"247950".apn. and gravity	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:50
L7	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:57
L8	1	"247950".apn. and wak$4	US-PGPUB;	OR	OFF	2012/06/16

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			16:00
L9	10685	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
L10	3855	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
L11	88	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
S2	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48
S3	7	S2 and remote$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48
S4	2	S3 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:49
S5	1	"20040095252".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:50
S8	0	"20030222775".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2010/05/03 10:14

			IBM_TDB			
S9	2	"20030098792".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:16
S10	0	"20030098792".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S11	0	"20030098792".pn. and temperature$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S12	1	"20030098792".pn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:43
S13	2	S2 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:46
S14	11	baby adj seat and distance same counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:13
S15	19	baby adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:17
S16	2	"20030122662".pn. and range	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:20
S17	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2010/05/03 11:22

			EPO; JPO; DERWENT; IBM_TDB			
S18	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:23
S19	133	car adj seat and distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S20	14	car adj seat and predetermined adj distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S21	0	"7797212".pn. and counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:26
S22	12	car adj seat and distance with signal$1 adj strength$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:27
S23	0	"1318".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S24	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S25	3	"131848".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06
S26	1	"131848".apn. and automatic$4	US-PGPUB; USPAT;	OR	OFF	2010/05/13 20:06

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S27	12	lojack.as. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:12
S28	2	"7561102".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:14
S29	2	"7536169".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:15
S30	3940	counter with time with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52
S31	245	counter with measur$4 near5 (time with distance)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52
S32	25	S31 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:54
S33	11598	"327"/$.ccls. and rectifier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16
S34	616	"327"/$.ccls. and rectifier.ti.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16

S35	36	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:49
S36	21	S35 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:50
S37	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:53
S38	2	"20030034887".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S39	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S40	1	"20030034887".pn. and "10"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:18
S41	2	"20030034887".pn. and timer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:38
S42	0	"20030098792".pn. and "72"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S43	1	"20030098792".pn. and "27"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/04/26 18:46

			DERWENT; IBM_TDB			
S44	0	"779712".apn. and low adj power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S45	0	"779712".apn. and motion adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S46	0	"779712".apn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S47	3	"779712".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S48	2	"6922147".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:06
S49	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S50	3	S49 and (conserv$4 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S51	3	S49 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S52	2	S49 and motion	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/04/26 20:56

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S53	0	mtion adj detector with sleep	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S54	52	motion adj detector with sleep adj mode	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S55	10	S54 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:06
S56	9857	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15
S57	5	S56 and S54	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15
S58	638	signal adj edge adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:18
S59	0	signal adj edge adj detector same reduce adj error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S60	33	signal adj edge adj detector same error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S61	10	signal adj edge adj detector with error	US-PGPUB;	OR	OFF	2011/04/26

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			21:19
S62	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:21
S63	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:22
S64	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S65	34	signal adj edge adj detector and measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S66	5	signal adj edge adj detector same measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S68	86	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:24
S69	23	S68 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:25
S70	45	edge adj detect$4 with reduc$4 near3 error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2011/04/26 21:26

			IBM_TDB			
S71	7	S70 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S72	1	"247950".apn. and dominant adj axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:03
S73	18	(("20060161377") or ("200702597") or ("20070150136") or ("6353449") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:40
S74	0	("200700259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S75	2	("20070259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S76	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 17:37
S77	1	"247950".apn. and (long adj average$1 with idle)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S78	1	"247950".apn. and (long adj average$1 with set$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S79	1	"247950".apn. and (long adj average$1 with idle adj sample)	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2011/04/27 23:14

			EPO; JPO; DERWENT; IBM_TDB			
S80	1	"247950".apn. and (long adj average$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:17
S81	3524	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:18
S82	3524	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:19
S83	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S84	2	S83 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S85	1	"247950".apn. and dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:34
S86	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:40
S87	1	"247950".apn. and new adj dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:43
S88	1	"20060161377".pn. and reference	US-PGPUB; USPAT;	OR	OFF	2011/04/27 23:47

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S89	0	"20070259716".pn. and (idle sleep)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:54
S90	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:57
S91	1	"247950".apn. and idle with comput$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S92	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S93	0	"20070259716".pn. and ("0053" "0155" "0165" "0210" "0254")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
S94	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
S95	2	"6353449".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:00
S96	2	"20070150136".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:03

S97	7354	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S98	3525	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S99	3	S97 and S98	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S100	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S101	1	S97 and S100	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S102	3668	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S103	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S104	38	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S105	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/10/14 15:56

			DERWENT; IBM_TDB			
S106	2	S105 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S107	7852	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S108	3668	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S109	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S110	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S111	3	S110 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S112	23	S104 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S113	1	tire with inches with sensor with (outside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S114	1	tire with sensor with (outside) same inches	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/10/22 18:48

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S115	20	tire with sensor with (outside) same size	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S116	3	"447841".apn. and ("18" "20")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S117	3	"447841".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S118	3	"447841".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S119	1	S114 and ("18" "20")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S120	3	tire adj size with sensor with (outside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:50
S121	6	tire adj size same sensor with (outside inside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:50
S123	331	tire with sensor with (outside) with (pressure temperature)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:54
S124	86	S123 and @rlad < "20080604"	US-PGPUB;	OR	OFF	2011/10/22

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			18:55
S125	8488	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S126	347	tire with sensor with (outside) with (pressure temperature)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S127	3272	edge adj detect$4 with counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S128	39	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S129	23	S128 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S130	2	("7987070").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 19:00
S131	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:32
S132	208	(axis axes) with (idl$4 sleep$4) with accelerat$4	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:39
S133	20	S132 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:39

S134	9346	accelerometer with motion	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:41
S135	2	("20060161377").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 19:41

6/ 16/ 2012 4:06:34 PM
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Search Notes	Application/Control No. 12/247,950	Applicant(s)/Patent under Reexamination KAHN ET AL.	
	Examiner SHIRLEY LU	Art Unit 2612	

SEARCHED

Class	Subclass	Date	Examiner
340	457,573.1, 686.1,539. 1,522,667	6/15/12	SL

INTERFERENCE SEARCHED

Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)

	DATE	EXMR
east, inventor search, Google	6/15/12	SL

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Philippe Kahn, et al	Examiner:	Lu, Shirley
Appl. No.	:	12/247,950	Art Unit:	2612
Filed	:	October 8, 2008	Conf No:	8961
For	:	Method and System for Waking Up a Device Due to Motion	**CERTIFICATE OF TRANSMISSION** I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.	
Customer No.	:	08791	/Judith Szepesi/ ***Judith A. Szepesi***	September 21, 2012 ***Date***

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

AMENDMENT

Sir:

In response to the Office Action of June 21, 2012, applicants respectfully request the Examiner to enter the following amendments and consider the following remarks:

Amendments to the Claims are reflected in the listing of claims, which begins on page 2 of this paper.

Remarks/Arguments begin on page 6 of this paper.

IN THE CLAIMS:

1. (Currently Amended) A method comprising:

receiving motion data from a motion sensor in a device, the motion sensor sensing motion along three axes;

determining an idle sample value for a dominant axis of [[a]] the device, the dominant axis defined as the axis with a largest effect from gravity among the three axes;

registering a motion of the device based on the motion data from the motion sensor; and

waking up the device when the motion of the device indicates a change in the dominant axis of the device.

2. (Previously Presented) The method of claim 1, wherein determining the idle sample value for the dominant axis comprises:

processing the motion data to establish an idle sample value; and

processing the idle sample value to establish the dominant axis.

3. (Previously Presented) The method of claim 1, wherein the motion sensor comprises an accelerometer.

4. (Previously Presented) The method of claim 2, wherein the idle sample value comprises an average of accelerations over a sample period along the dominant axis recorded when the device goes to idle mode after a period of inactivity.

5. (Previously Presented) The method of claim 2, further comprising determining the idle sample value for each of the other axes of the device.

6. (Previously Presented) The method of claim 1, wherein registering the motion of the device comprises:

processing the motion data to determine a current sample value along the dominant axis of the device.

7. (Previously Presented) The method of claim 2, further comprising comparing a difference between a current sample value along the dominant axis determined based on the motion of the device and the idle sample value of the dominant axis against a threshold value.

8. (Original) The method of claim 1, wherein the change in the dominant axis comprises a change in acceleration along the dominant axis.

9. (Original) The method of claim 1, wherein waking up the device further comprises configuring the device to return to a last active device state.

10. (Previously Presented) The method of claim 6, wherein the current sample value of the dominant axis of the device is an average of accelerations over a sample period.

11. (Original) The method of claim 6, further comprising determining the current sample value for each of the other axes of the device.

12. (Canceled)

13. (Previously Presented) The method of claim 6, wherein processing the motion data further comprises:

verifying whether the motion data includes one or more glitches; and

removing the one or more glitches in the motion data from the motion data before calculating the average.

14. (Original) The method of claim 6, further comprising determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value.

15. (Original) The method of claim 8, further comprising:

determining a new dominant axis based on the motion data received from the motion sensor;

computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis determined when the device goes to idle mode after a period of inactivity; and

comparing the difference against a threshold value to establish whether to wake the device up.

Claims 16-24. (Canceled)

25. (Previously Presented) A mobile device comprising:

a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data, the dominant axis defined as an axis with a largest effect from gravity among three axes;

a motion sensor to register a motion of the mobile device; and

a power logic to activate the device when the motion indicates a change in the dominant axis of the device.

26. (Previously Presented) The mobile device of claim 25, further comprising:

a long average logic to create one or more averages of accelerations over a sample period as measured by the motion sensor.

27. (Canceled)

28. (Previously Presented) The mobile device of claim 26, further comprising:

a computation logic to determine if the averages of accelerations indicate a change in the dominant axis of the device.

29. (Previously Presented) The mobile device of claim 26, further comprising a glitch corrector logic to correct one or more glitches in the motion data before the one or more long averages are calculated.

30. (Previously Presented) The mobile device of claim 25, wherein the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes.

31. (Previously Presented) The mobile device of claim 25, further comprising a device state logic to restore the device to a last active state.

32. (Previously Presented) The mobile device of claim 31, wherein the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

33. (Previously Presented) A system to wake up a mobile device comprising:

a motion sensor to detect motion along three axes;

a dominant axis logic to compare an effect of gravity on the three axes, and to determine an axis of the device experiencing a largest effect of gravity; and

a power logic to move the device from an inactive state to an active state upon detection of a change in the axis experiencing the largest effect of gravity.

34. (Previously Presented) The system of claim 33, further comprising:

a long average logic to create an average of accelerations over a sample period along the dominant axis; and

a computation logic to determine if the average of accelerations indicates the change in the dominant axis of the device.

35. (Previously Presented) The system of claim 33, further comprising:

a device state logic to restore the device to one of: a last active state, a preset customized state.

Remarks/Arguments

Applicants respectfully request consideration of the subject application as amended herein. This Amendment is submitted in response to the Office Action mailed June 21, 2012. Claims 1-11, 13-15, 25, 26, and 28-35 are rejected. In this Amendment, claim 1 has been amended. No claims have been canceled. No new claims have been added. Applicants reserve all rights with respect to the applicability of the Doctrine of Equivalents.

Therefore, claims 1-11, 13-15, 25, 26, and 28-35 are presented for examination. It is respectfully submitted that the amendment does not add new matter.

Claim Rejections under 35 U.S.C. §112, first paragraph

Claims 1-11, 13-15, 25, 26, 28-35 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Claims 1-11, 13-15, 25, 26, 28-35 stand rejected under 35 U.S.C. §112, first paragraph, as based on a disclosure which is not enabling. The Examiner suggests that the Specification does not describe “axis with a largest effect from gravity.” Applicants respectfully disagree. The Specification as originally filed explains the determination of this axis in paragraphs 23-24, as follows:

> In one embodiment, the long average logic 240 creates a long average of accelerations along a single axis. In one embodiment, the dominant axis – defined as the axis most impacted by gravity -- is used by the long average logic 240. In one embodiment, the axis corresponds to one of the axes of the accelerometer. In one embodiment, the axis is defined as the orientation experiencing the most pull from gravity. In one embodiment, the long average logic 240 creates long averages of accelerations along multiple axes.
>
> Determining the orientation of an electronic device may include identifying a gravitational influence. The axis with the largest absolute long average may be the axis most influenced by gravity, which may change over time (e.g., as the electronic device is rotated). Therefore, a new dominant axis may be assigned when the orientation of the electronic device and/or the inertial sensor(s) attached to or embedded in the electronic device changes.

Thus, the Specification explains that the <u>axis most impacted by gravity</u>, is the one <u>experiencing the most pull from gravity</u>. The concept that gravity exerts a force is well known in the art. It is clear that gravity pulls downward, as is known. Therefore, the "axis most impacted by gravity" identifies the axis of the accelerometer which experiences the largest effect from the downward force of gravity. One of skill in the art would understand based on the definitions provided in the Specification, and the knowledge of gravity's pull on all objects on the Earth's surface, what the axis with a largest effect from gravity means.

Therefore, Applicants respectfully request withdrawal of this rejection.

Claim Rejections under 35 U.S.C. §112, second paragraph

Claims 26, 29, and 34 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicants respectfully not that the term "long average" is used only in the context of the name of an element, e.g. a "long average logic" which is defined in the Specification, in paragraph 23, as follows:

> The long average logic 240 calculates one or more long averages of acceleration based on the received motion data. In one embodiment, the long average logic 240 utilizes a ring buffer memory 250, discarding older data as new data is added to the long average. In one embodiment, the long average logic 240 creates a long average of accelerations along a single axis.

As noted in the MPEP 2111.01 IV, "An applicant is entitled to be his or her own lexicographer and may rebut the presumption that claim terms are to be given their ordinary and customary meaning by clearly setting forth a definition of the term that is different from its ordinary and customary meaning(s). See In re Paulsen, 30 F.3d 1475, 1480, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994)."

The term "long average logic" is clearly defined in the Specification and thus is not using the term "long" as a relative and thus indefinite term. Therefore, the phrase is well defined, and not a relative term, and one of skill in the art would understand that "the long average logic" is a logic element in the system which calculates averages of acceleration based on motion data. Therefore,

Applicants respectfully request withdrawal of this rejection.

The Examiner further rejected the term "axis with a largest effect from gravity" as indefinite. As noted above the term is clearly defined in the Specification. Applicants assume that the objection is to the term “largest effect.” The actual claim element is “the axis with a largest effect from gravity among the three axes.” Thus the term “largest” clearly references the effect on one axis being larger than the effect on the other two axis.

Furthermore, Applicants respectfully note that the MPEP 2173.05(b) notes that “Acceptability of the claim language depends on whether one of ordinary skill in the art would understand what is claimed, in light of the specification.” Applicants respectfully submit that given the knowledge of multiple axis, the determination of an axis having a largest effect from gravity clearly would be understood by one of skill in the art, as experiencing a larger effect than the other axes.

Applicants would further point to the “Training Examples, Supplementary Examination Guidelines for Determining Compliance with 35 U.S.C. § 112 and for Treatment of Related Issues in Patent Applications, 76 FR 7,162 (Feb. 9, 2011)” In particular, the case Seattle Box Co., Inc. v. Indus. Crating & Packing, Inc., 731 F.2d 818, 221 USPQ 568 (Fed. Cir. 1984) discussed therein, in which the term “substantially equal to or greater” was found not to be indefinite. In this case, having one axis having a “larger” effect than another would be understood by one of skill in the art.

Applicants therefore respectfully submit that the term “largest effect” is not indefinite, and requests the withdrawal of this rejection.

Claim Rejections under 35 U.S.C. §103(a)

Claims 1-8, 10-11, 14-15, 25-26, 28-30, and 33-34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Publication No. 2006/0161377 to Rakkola, et al (hereinafter “Rakkola”) in view of U.S. Publication No. 2007/0259716 to Mattice, et al (hereinafter “Mattice”).

Rakkola discusses an energy-efficient acceleration measurement system. Rakkola’s system includes an accelerometer, responsive to acceleration of the system, for providing an accelerometer output signal having a magnitude indicative of at least one component of the acceleration. A motion detector is responsive to the accelerometer output signal, and provides a processor interrupt signal, but only if the magnitude of acceleration reaches a threshold.

However, Rakkola specifically teaches away from using the axis with the largest effect from gravity by stating that "Another important aspect of the described motion detector's embodiments is that, when the motion detector is enabled, a reference level is calculated automatically. The benefit of this function is that there is consequently no need to consider offsets on different channels when setting threshold levels, and threshold levels can also be set independently from device orientation and from the vector of gravitational force. An averaging procedure is used for this reference level calculation as well (see previous description of averaging process for incoming acceleration data). The reference levels are calculated in this way for each of the three axes, assuming that a triaxial accelerometer is used." (Rakkola, paragraph 19). Thus it is an important aspect of Rakkola that the threshold levels are <u>independent of the vector of gravitational force</u>, and further that reference levels are calculated for each axis.

Therefore, it would substantially alter the functioning of Rakkola to utilize an axis most impacted by gravity.

Mattice discusses control of wager-based game using gesture recognition. Mattice simply notes that a tilt of a device may be detected by a change in gravitational acceleration. Although Mattice utilizes the term "dominant axis" Mattice references the "dominant axis of motion" which is the axis along which the user's motion is largest, and which is therefore augmented in analysis. (Mattice, paragraph 156).

Applicants respectfully submit that neither Rakkola nor Mattice teach or suggest "waking up the device when the motion of the device indicates a change in the dominant axis of the device," as recited in claim 1. Rakkola specifically teaches away from the use of a dominant axis, e.g. an axis having the largest gravitational effect from gravity. Mattice's dominant axis is only connected to the axis along which the largest motion is observed, and is used to augment the motions sensed. Therefore, the combination of Rakkola and Mattice does not make obvious claim 1, and the claims that depend on it.

Claim 25 recites in part "a power logic to activate the device when the motion indicates a change in the dominant axis of the device." As noted above, neither Rakkola nor Mattice alone or in combination teach or suggest activating the device when the motion indicates a change in the dominant axis of the device. Therefore, claim 25 and the claims that depend on it are not obvious over Rakkola and Mattice.

Claim 33 recites in part “a power logic to move the device from an inactive state to an active state upon detection of a change in the axis experiencing the largest effect of gravity.” As noted above, neither Rakkola nor Mattice alone or in combination teach or suggest activating the device when the motion indicates a change in the axis experiencing the largest effect of gravity. Therefore, claim 33 and the claims that depend on it are not obvious over Rakkola and Mattice.

Claims 9, 31, and 35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Mattice in view of U.S. Patent No. 6,353,449 to Gregg, et al (hereinafter “Gregg”).

Gregg discusses various screen savers for computing devices. Gregg does not discuss dominant axis or movements at all, and therefore Gregg cannot remedy the shortcomings of Rakkola and Mattice discussed above. Therefore, for at least the same reasons advanced above with respect to their respective parent claims, claims 9, 31, and 35 are not obvious over Rakkola in view of Mattice, in view of Gregg.

Claim 13 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Mattice in view of U.S. Publication No. 2007/0150136 to Doll, et al (hereinafter “Doll”).

Doll discusses a sensor self-test system for a motion sensor. However, Doll does not discuss waking up a device, much less waking up a device based on a change in a dominant axis. Therefore, for at least the same reasons advanced above with respect to claim 1, claim 13 is not obvious over Rakkola in view of Mattice, in view of Doll.

Claim 32 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Mattice in view of Gregg in view of U.S. Patent No. 6,771,250 to Oh.

Oh discusses an application program launcher, which may be used to launch applications from low power mode. While Oh discusses waking up a device, Oh does not discuss utilizing any motion data. Therefore, Oh cannot remedy the shortcomings of Rakkola, Mattice, and Gregg discussed above. Therefore, claim 32 is not obvious over the combination of Rakkola, Mattice, Greg, and Oh for at least the same reasons advanced above with respect to claim 25.

Conclusion

Applicant respectfully submits that in view of the amendments and discussion set forth herein, the applicable rejections have been overcome. Accordingly, the present and amended claims should be found to be in condition for allowance.

If a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact Judith A. Szepesi at (408) 720-8300.

If there are any additional charges/credits, please charge/credit our deposit account no. 02-2666.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: September 21, 2012

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Electronic Patent Application Fee Transmittal

Application Number:	12247950
Filing Date:	08-Oct-2008
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Filer:	Judith A. Szepesi
Attorney Docket Number:	8689P057

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt

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Application Number:	12247950
International Application Number:	
Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
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Filer:	Judith A. Szepesi
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Non Patent Literature	8689P057_NPL_ESSR.pdf	423896 71050923bd3fb3336ddbcb2a7c0baadd655baf98	no	10

Warnings:

Information:

2	Foreign Reference	8689P057_FOR_EP1271099A2.pdf	2173219 548324e6b11c0953efc232fafbf605878fcb95a6	no	21

Warnings:

Information:

3		8689P057_IDS_and_SB08.pdf	62794 dc6996e741c61d9d8b6860458863ffcf1e03b340	yes	3

Multipart Description/PDF files in .zip description

Document Description	Start	End
Transmittal Letter	1	2
Information Disclosure Statement (IDS) Form (SB08)	3	3

Warnings:

Information:

4		8689P057_Request_for_Examiner_Initials.pdf	135183 8aa501c9c8cafdaabb7a0f1178485ccebe2c0f4e	yes	9

Multipart Description/PDF files in .zip description

Document Description	Start	End
Transmittal Letter	1	1
Information Disclosure Statement (IDS) Form (SB08)	2	9

Warnings:

Information:

5		8689P057_AmResp_Sept2012.pdf	113616 6baf8562ec780684cc264777b77b8cf1f3d2a6ee	yes	11

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Claims	2	5

	Applicant Arguments/Remarks Made in an Amendment		6		11
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	30197 5d7eae0d54a86ea285ca227cc2ad50e0efd59715	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2938905		

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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(54) Method and arrangement for determining movement

(57) To determine the movement of a device, a three-dimensional measurement of the device's acceleration is provided in known directions with regard to the device, and average signals ($\bar{x}$, $\bar{y}$, $\bar{z}$) of acceleration signals (x, y, z) parallel to different axes are formed to allow tilt angles (θ, φ, γ) of the device with respect to gravity to be defined. Acceleration change signals (x_c, y_c, z_c) are formed by removing the average signals ($\bar{x}$, $\bar{y}$, $\bar{z}$) from their respective acceleration signals (x, y, z) parallel to the different axes. The acceleration change signals (x_c, y_c, z_c) and the tilt angles (θ, φ, γ) of the device are used for forming a component (Z_{ztot}) of the acceleration change of the device, which component is parallel to gravity and independent of the position of the device.

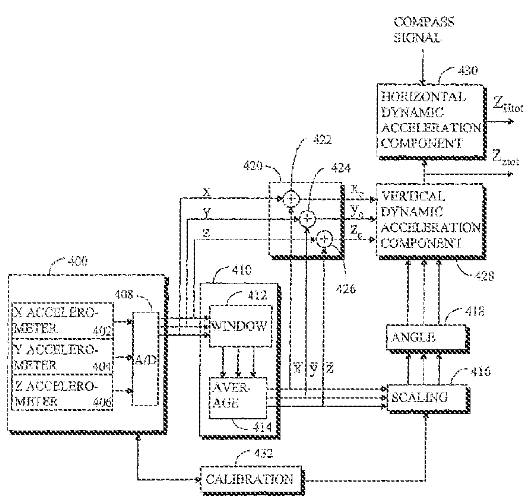

FIG. 4A

EP 1 271 099 A2

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Description

FIELD OF THE INVENTION

[0001] The invention relates to a solution for determining the movement of a device.

BACKGROUND OF THE INVENTION

[0002] Portable electronic devices are being used for increasingly diversified purposes. Typical examples of these devices are mobile phones and computers. The devices carry large amounts of data about the user, and they provide the user with access to various information channels. However, up to the present, the state associated with the movement of the device, or changes in the state, have not been utilized to any larger extent, although they would allow to recognize the user's activity context, which depends on the user's activities related to work or spare time, such as negotiations, travel or leisure activities.

[0003] One way of measuring the movement of a mobile device or to determine the user's activity context is to use one or more accelerometers to measure the accelerations of the device in one or more directions. Accelerations parallel to different dimensions vary according to activity context and they are characteristic of each activity context. In principle, it is therefore possible to identify activity contexts on the basis of the acceleration or movement data parallel to the different dimensions. For example, it is possible to try to identify whether the user is walking, running, walking up the stairs, etc. However, a problem involved in this is that the accelerometer signals change when the position of the device changes and therefore it is not possible to know the structural directions of the device to which the accelerations are really acting on. For example, it is not possible to measure the direction of gravity in relation to the axes parallel to the device's structures and, therefore, measurements cannot be used for determining whether the device is in an even approximately correct position, or upside down.

[0004] An attempt to solve this problem has been to attach the device always in the same position to the user. This does not, however, solve the problem, but complicates the use of the device. In addition, changes in the user's pose affect the position of the device and thereby change the directions of the accelerations, which makes it more difficult to recognise the direction of gravity in relation to the device.

SUMMARY OF THE INVENTION

[0005] It is an object of the invention to provide an improved method and an arrangement implementing the method to determine a dynamic acceleration component parallel with gravity and independent of the position of a device. This is achieved by a method for determining the movement of the device, in which method the acceleration of the device is measured at least in three different directions to provide a three-dimensional measurement. The method also comprises the steps of generating acceleration signals parallel to three orthogonal axes, which are in a known orientation to the device; generating average signals of the acceleration signals parallel to the different axes; defining tilt angles of the device in relation to the direction of gravity by means of the average signals; generating acceleration change signals by removing the average signals from their respective acceleration signals parallel to the different axes; forming a component of the acceleration change of the device by means of the acceleration change signals and the tilt angles of the device, which component is parallel to gravity and independent of the position of the device.

[0006] The invention also relates to an arrangement for determining the movement of a device, the arrangement being arranged to measure the acceleration of the device at least in three different directions to provide a three-dimensional measurement. The arrangement is arranged to measure acceleration signals in the direction of three orthogonal axes which are in a known orientation to the device; generate average signals of the acceleration signals parallel to the different axes; use the average signals for forming tilt angles of the device in relation to the direction of gravity; generate acceleration change signals by removing the average signals from their respective acceleration signals parallel to the different axes; form a component of the acceleration change of the device by means of the acceleration change signals and the tilt angles of the device, which component is parallel to gravity and independent of the position of the device.

[0007] The preferred embodiments of the invention are disclosed in the dependent claims.

[0008] The underlying idea of the invention is to measure device accelerations parallel to three dimensions and to use slowly changing accelerations for determining tilt angles of the device in relation to the direction of gravity. By removing slowly changing accelerations from total accelerations, rapidly changing accelerations are obtained. The device's rapidly changing accelerations and tilt angles are used for determining rapid acceleration changes parallel to gravity.

[0009] The method and arrangement of the invention provide several advantages. They allow acceleration parallel to gravity and changes in the acceleration to be determined irrespective of the position of the device, which is important when an activity context is to be identified.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] In the following, the invention will be described in greater detail in connection with preferred embodiments and with reference to the accompanying drawings, in which

Figure 1 illustrates the structure of a mobile phone system;
Figure 2 illustrates a cellular radio system;
Figure 3 is a block diagram illustrating a mobile phone;
Figure 4A is a block diagram of the described arrangement;
Figure 4B is a flow diagram of the described arrangement;
Figure 5A shows slowly changing and rapidly changing accelerations parallel to three different dimensions;
Figure 5B shows rapidly changing accelerations parallel to three different dimensions;
Figure 6A shows gravity acting in a direction towards the upper right-hand front corner of a space defined on the basis of the structural axes of the device;
Figure 6B shows gravity acting in a direction towards the upper left-hand rear corner of a space defined on the basis of the structural axes of the device;
Figure 6C shows gravity acting in a direction towards the upper left-hand front corner of a space defined on the basis of the structural axes of the device;
Figure 6D shows gravity acting in a direction towards the upper right-hand rear corner of a space defined on the basis of the structural axes of the device;
Figure 6E shows gravity acting in a direction towards the lower right-hand front corner of a space defined on the basis of the structural axes of the device;
Figure 6F shows gravity acting in a direction towards the lower left-hand rear corner of a space defined on the basis of the structural axes of the device;
Figure 6G shows gravity acting in a direction towards the lower left-hand front corner of a space defined on the basis of the structural axes of the device; and
Figure 6H shows gravity acting in a direction towards the lower right-hand rear corner of a space defined on the basis of the structural axes of the device.

DETAILED DESCRIPTION OF THE INVENTION

[0011] The described solution is applicable in, although not restricted to, portable electronic user devices, such as mobile phones and computers.

[0012] Let us first examine some aspects relating to the activity context of a portable user device. When carried by the user, the position of a portable device usually varies according to situation, time and place (a mobile phone may be upside down in the pocket, attached to the belt in a horizontal position, or slightly tilted when held in hand). Changes in the position of the device in turn cause changes in signals measured in the directions of the device's different dimensions, thus making the position of the device and its activity context very difficult to recognize. In fact, the most important prerequisite for activity context recognition is that the position of the device is determined at least in the vertical direction. Additionally, the position should be determined in horizontal directions as well.

[0013] Before going into the described solution in detail, let us examine an example of a radio system structure with reference to Figure 1, because one application of the described solution is to use it in portable devices connected to a radio system. The radio system may be for example a GSM or UMTS radio system and it comprises a terrestrial radio access network 2 and user equipment UE 4. The user equipment 4 comprises two parts: a functional unit which is mobile equipment ME 6, the radio terminal of which is used for setting up a radio link to the network 2, and a user-specific module, i.e. a subscriber identity module SIM 8, which is a smart card comprising user identity data and which typically executes identification algorithms and stores encryption parameters and subscriber data.

[0014] The network 2 is composed of radio network subsystems RNS 10 comprising base station controllers 12 and one or more base stations 14. Each base station controller 12 controls radio resources through the base stations connected to it.

[0015] Since the illustration in Figure 1 is fairly general, it is clarified by a more detailed example of a cellular radio system shown in Figure 2. Figure 2 only comprises the most essential blocks, but a person skilled in the art will find it apparent that a conventional cellular radio network also comprises other functions and structures, which need not be described in greater detail in this context. It should also be noted that the structure shown in Figure 2 provides only one example.

[0016] The cellular radio network thus typically comprises a fixed network infrastructure, i.e. a network part 200, and user equipment 202, such as fixedly mounted, vehicle-mounted or handheld terminals. The network part 200 comprises base stations 204. A plural number of base stations 204 are in turn centrally controlled by a radio network controller 206 communicating with the base stations. A base station 204 comprises transceivers 408 and a multiplexer 212.

[0017] The base station 204 further comprises a control unit 210 which controls the operation of the transceivers 208 and the multiplexer 212. The multiplexer is used for arranging the traffic and control channels used by a plural number of transceivers 208 on one transmission link 214.

[0018] From the transceivers 208 of the base station 204 there is a connection to an antenna unit 218 which provides a bi-directional radio link 216 to the user equipment 202. The structure of the frames transferred on the bi-directional radio link 216 is defined for each system separately. In the preferred embodiments of the invention, at least a part of a signal is transmitted using three or more transmit antennas or three or more beams provided by a plural number of transmit antennas.

[0019] The radio network controller 206 comprises a group switching field 220 and a control unit 222. The group switching field 220 is used for switching speech and data and for connecting signalling circuits. The radio network subsystem 224 formed of the base station 204 and the radio network controller 206 further comprises a transcoder 226. The transcoder 226 is usually located as close to a mobile services switching centre 228 as possible, because speech can then be transferred between the transcoder 226 and the radio network controller 206 in a cellular radio network form, which saves transmission capacity.

[0020] The transcoder 226 converts different digital speech coding formats used between the public switched telephone network and the radio telephone network to make them compatible, for example from a fixed network format to another format in the cellular network, and vice versa. The control unit 222 carries out call control, mobility management, collection of statistical data and signalling.

[0021] Figure 2 further illustrates the mobile services switching centre 228 and a gateway mobile services switching centre 230 which is responsible for the external connections of the mobile communications system, in this case for those to a public switched telephone network 232.

[0022] With reference to Figure 3, let us then examine an example of a portable user terminal in a GSM or UMTS radio system. The terminal comprises a processor 200 in which the software routines of the terminal are executed. The processor 200 is responsible for digital signal processing, for example, and it controls the operation of the other blocks. The terminal display and its keypad 202 serve as the user interface and they are used for displaying to the user visual information, such as text and images, processed by the processor 200, the user interface also allowing the user to produce such information. The processor 200 also carries out the checking of the SIM module 204. Information needed by the processor 200, such as the data needed for accelerometer calibration, is stored in a memory 206. An accelerometer block 208 comprises one or more accelerometers measuring acceleration in at least three orthogonal directions. Even in the case of only one accelerometer, it must be provided with elements that enable three-dimensional acceleration measurement. Acceleration signals provided by the accelerometers are supplied to the processor 200, which carries out the actual signal processing. A codec block 210 converts a signal coming from the processor 200 into a format suitable for a speaker 212 and the codec block 210 converts a signal coming from a microphone 214 to a format suitable for the processor 200. An RF block 216 in turn converts the digital signal to be transmitted which is received from the processor 200 to an analog radio frequency signal to allow it to be transmitted in the form of electromagnetic radiation over the antenna 218. Correspondingly, the radio frequency signal received by the antenna 218 is converted to lower frequency and digitized in the RF block 216 before the signal is supplied to the processor 200.

[0023] Acceleration is measured using one or more accelerometers which generate an electric signal corresponding to the acceleration to their output poles. The accelerometer may be electromechanical, for example. Its operation may be based on a piezoelectric crystal, for example, in which a change in the charge distribution is proportional to a force acting on the crystal.

[0024] Let us then examine the disclosed solution with reference to Figures 4A and 4B. Figure 4A is a block diagram illustrating the described solution, and Figure 4B is a flow diagram of the method. An accelerometer block 400 comprises at least three accelerometers 402, 404 and 406 which measure acceleration in the direction of three mutually orthogonal dimensions. The number of accelerometers may be more than three; what is essential is that the measurement signals of the accelerometers can be used for forming acceleration signals parallel with all the three dimensions as denoted in block 500. This structural solution is apparent to a person skilled in the art and therefore it will not be described in greater detail herein. The axes parallel to the measured dimensions are denoted with letters X, Y and Z, and they are preferably either identical with the structural directions X_d, Y_d and Z_d of the device, or at least in a known relation to them. In other words, the axes X, Y and Z represent the directions of the measurement axes, the directions X_d, Y_d and Z_d of the device's structural axes being parallel with the faces, or sides, of the device's cover or frame, or the like (the devices usually resemble a rectangular prism). The directions of the device's structural axes and the measurement directions are in a predetermined relation to each other, the dependencies between the measurement directions and the device's structural dimensions being expressed as $\theta = \theta_1 + \Delta\theta$, $\varphi = \varphi_1 + \Delta\varphi$ and $\gamma = \gamma_1 + \Delta\gamma$, where θ is the angle between the device's structural direction X_d and gravity direction g, φ is the angle between the device's structural direction Y_d and gravity direction g, γ is the angle between the device's structural direction Z_d and gravity direction g, and tilt angles θ, φ, γ are within $\theta, \varphi, \gamma \in [-\pi/2, \pi/2]$.

[0025] The directions to be measured are preferably selected to relate to the structural directions of the electronic device, for example such that when the electronic device is in a vertical position with the display towards the user (who sees the letters in their correct position), the Z_d axis points upward, the Y_d axis points horizontally from left to right, and the X_d axis points horizontally from front to back, directly to the user. The directions of the measured dimensions are thus preferably the same as the structural directions of the device, i.e. $X = X_d$, $Y = Y_d$ and $Z = Z_d$.

[0026] Analog measurement signals parallel to the different dimensions are digitized in an A/D converter 408. The filtering of the digital acceleration signals is shown in blocks 410 and 502. It is carried out on the time plane by multiplying a signal sample sequence of a finite length by a window 412 of a finite length and a suitable frequency content, such as a Hanning window, which is suitable for separating dynamic signals from static ones. In addition, the average of multiple windowed signals is calculated in block 414. Instead of calculating the actual average, the averaging can be carried out using mean value calculation, low-pass filtering or other known methods. On the basis of the average, a static acceleration signal is formed, which hardly ever changes or which only reacts to slow changes. How slow phenomena should be taken into account can be freely selected for example by means of the window used for calculating the average. The average is calculated using a desired time window which can be formed for example as a Hanning window, known per se, in block 412. The Hanning windows for accelerations parallel to the different dimensions take the following mathematical forms:

$$(1) \qquad \begin{aligned} x_i^w &= \frac{1}{2} x_i \left[1 - \cos\left(\frac{2\pi i}{n}\right) \right], \\ y_i^w &= \frac{1}{2} y_i \left[1 - \cos\left(\frac{2\pi i}{n}\right) \right] \text{and} \\ z_i^w &= \frac{1}{2} z_i \left[1 - \cos\left(\frac{2\pi i}{n}\right) \right], \end{aligned}$$

where x_i, y_i and z_i are acceleration samples parallel to the different dimensions; n is the number of samples in the window, x_i^w, y_i^w ja z_i^w are modified samples. Other possible windows known per se include the Hamming, Kaiser, Bessel and triangle windows. The average can be calculated in block 414 by applying for example formula (2):

$$(2) \qquad \bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i^w,\ \bar{y} = \frac{1}{n}\sum_{i=1}^{n} y_i^w \ \text{ja}\ \bar{z} = \frac{1}{n}\sum_{i=1}^{n} z_i^w,$$

where $\bar{x}$, $\bar{y}$ and $\bar{z}$ represent the averages. Figure 5A shows the different acceleration signals x, y and z, and the averaged acceleration signals $\bar{x}$, $\bar{y}$ and $\bar{z}$. As shown in Figure 5A, the averaged signals $\bar{x}$, $\bar{y}$ and $\bar{z}$ are in a way static DC signals of the measured acceleration signals. It is not necessary to form the averages $\bar{x}$, $\bar{y}$ and $\bar{z}$ from the windowed samples x_i^w, y_i^w ja z_i^w, but the averages $\bar{x}$, $\bar{y}$ and $\bar{z}$ can also be calculated directly from the samples x_i, y_i and Z_i.

[0027] The averaged signals propagate further to a scaling block 416 where the levels of the filtered signals are arranged to be proportional to each other such that they may be used as sine function arguments. Since the averaged signals are in some cases directly applicable as sine function arguments, the scaling block 416 is not absolutely necessary in the disclosed solution. Scaling is used for example for rectifying distortions, if any, in the accelerometer operation. Manufacturers usually include the operations to be carried out in the scaling block in the accelerometers they deliver. Scaling thus ensures that averaged acceleration cannot exceed gravity acceleration, at least not on a continuous basis, and therefore the ratio of the accelerations measured in the different dimensions to the gravity acceleration corresponds to the ratio of a sine function of a tilt angle to the direction of gravity, i.e. $\bar{x}/g = \sin(\theta_1)$, $\bar{y}/g = \sin(\varphi_1)$ and $\bar{z}/g = \sin(\gamma_1)$, where θ_1 corresponds to the angle between measured acceleration direction X and gravity direction g, φ_1 corresponds to the angle between measured acceleration direction Y and gravity direction g, and γ_1 corresponds to the angle between measured acceleration direction Z and gravity direction g. On the basis of angles θ_1, φ_1 and γ_1, tilt angles θ, φ and γ between the device's structural directions and gravity direction can be formed, because the directions of the structural axes of the device and the directions of the measurement are known to be proportional to each other.

[0028] In block 418 the accelerations parallel to the different dimensions and measured by the accelerometers are used to form tilt angles θ, φ and γ which illustrate the deviation of the different structural directions of the device from the gravity direction. This is also shown in block 504. If the structural directions of the device are the same as the directions of the measured accelerations, $\Delta\theta = \Delta\varphi = \Delta\gamma = 0$, and the angles can be formed as reverse sien functions $\theta_1 = \theta = \arcsin(\bar{x}/g)$, $\varphi_1 = \varphi = \arcsin(\bar{y}/g)$ and $\gamma_1 = \gamma = \arcsin(\bar{z}/g)$. Otherwise the deviation of the structural directions X_d, Y_d and Z_d from the measured directions X, Y and Z must be taken into account by calculating $\theta = \theta_1 + \Delta\theta$, $\varphi = \varphi_1 + \Delta\varphi$ and $\gamma = \gamma_1 + \Delta\gamma$.

[0029] In block 420, the averaged accelerations $\bar{x}$, $\bar{y}$ and $\bar{z}$ are subtracted from the measured accelerations x, y and z parallel to the different dimensions in sequences equal to the sample windows in length, whereby change signals x_c, y_c and z_c representing a continuous change in the accelerations are formed. This is shown in block 506. These acceleration change signals x_c, y_c and z_c represent rapid acceleration changes which are often regular as well, and which relate to the user's activity context, for example. Figure 5B shows the acceleration change signals x_c, y_c and z_c parallel to the different directions of the device's structural axes as a function of time on a freely selected scale. The state of movement of the device may vary quite considerably in the different directions of the axes. As is shown in Figures 5A and 5B, the acceleration change signals are in a way dynamic AC signals of the measured acceleration signals. The subtraction is carried out for each dimension separately in sum blocks 422, 424 and 426 in which negations $-\bar{x}$, $-\bar{y}$ and $-\bar{z}$ of the averaged accelerations are added to the accelerations x, y and z.

[0030] In accordance with block 508, the acceleration change signals and the tilt angles θ, φ and γ of the device can be used in block 428 for forming a component Z_{ztot} of the acceleration change of the device, the component being parallel to the earth's gravity acceleration and indicating continuously changing vertical accelerations parallel with gravity that act on the device. An essential aspect here is that in the vertical direction, the acceleration change component Z_{ztot} of the device can be determined irrespective of the device's position. Vertical acceleration change subcomponents of X_z, Y_z and Z_z are formed by multiplying the acceleration change signals x_c, y_c and z_c by sine functions of the device's tilt angles θ, φ and γ according to the following projections:

$$\text{(3)}\qquad \begin{aligned} &\text{when } \operatorname{sgn}(\theta) \geq 0,\ \operatorname{sgn}(\varphi) \geq 0 \text{ and } \operatorname{sgn}(\gamma) \geq 0\\ &X_z = -x_c\sin(\theta)\\ &Y_z = -y_c\sin(\varphi)\\ &Z_z = -z_c\sin(\gamma) \text{ and}\\ &\text{when } \operatorname{sgn}(\theta) < 0,\ \operatorname{sgn}(\varphi) < 0 \text{ and } \operatorname{sgn}(\gamma) < 0\\ &X_z = x_c\sin|\theta|\\ &Y_z = y_c\sin|\varphi|\\ &Z_z = z_c\sin|\gamma|, \end{aligned}$$

where sgn() denotes a sign function whether the angle is positive or negative), and |θ|, |φ| and |γ| denote the absolute value of the angles θ, φ and γ. The acceleration change component Z_{ztot} parallel to gravity is the sum of the subcomponents of acceleration change of the device: $Z_{ztot} = X_z + Y_z + Z_z$.

[0031] With reference to Figures 6A to 6H, let us now examine an alternative way of forming for the device an acceleration change component parallel to the earth's gravity. In this embodiment, the space depicted as a cube in Figures 6A to 6H is divided into eight parts relative to the corners of the cube. The direction of gravity with respect to each one of the three axes X, Y, Z may obtain two values $\pi/4 \pm \pi/4$ or $-(\pi/4 \pm \pi/4)$ and thus the number of parts is $2^3 = 8$. In this embodiment, the direction of a gravity vector is first determined on the basis of the signs of tilt angles θ, φ and γ. When the signs have been determined, the appropriate calculation formula is selected. This procedure is entirely equivalent with formulae (3).

[0032] In Figure 6A, gravity direction g is acting in the direction of the upper right-hand front corner of the cube, and for tilt angles θ and φ it is thus valid that $\operatorname{sgn}(\theta) < 0$, $\operatorname{sgn}(\varphi) < 0$. In addition, angle γ is defined as $\operatorname{sgn}(\gamma) \geq 0$. This provides the following calculation formulae 1/8 for the acceleration change components in the vertical direction:

$$X_z = x_c\sin|\theta|$$

$$Y_z = y_c\sin|\varphi|$$

$$Z_z = -z_c\sin(\gamma).$$

[0033] In Figure 6B, the gravity vector points to the upper left-hand rear corner of the cube, and for tilt angles θ, φ and γ it is thus valid that sgn(θ) ≥ 0, sgn(φ) ≥ 0 and sgn(γ) ≥ 0. This provides the following calculation formulae 2/8 for the acceleration change components in the vertical direction:

$$X_z = -x_c\sin(\theta)$$

$$Y_z = -y_c\sin(\varphi)$$

$$Z_z = -z_c\sin(\gamma).$$

[0034] In Figure 6C gravity direction g is acting in the direction of the upper left-hand front corner of the cube, and for tilt angles θ, φ and γ it is thus valid that sgn(θ) < 0, sgn(φ) ≥ 0 and sgn(γ) ≥ 0. This provides the following calculation formulae 3/8 for the acceleration change components in the vertical direction:

$$X_z = x_c\sin|\theta|$$

$$Y_z = -y_c\sin(\varphi)$$

$$Z_z = -z_c\sin(\gamma).$$

[0035] In Figure 6D gravity direction g is acting in the direction of the upper right-hand rear corner of the cube, and for tilt angles θ, φ and γ it is thus valid that sgn(θ) ≥ 0, sgn(φ) < 0 and sgn(γ) ≥ 0. This provides the following calculation formulae 4/8 for the acceleration change components in the vertical direction:

$$X_z = -x_c\sin(\theta)$$

$$Y_z = y_c\sin|\varphi|$$

$$Z_z = -z_c\sin(\gamma).$$

[0036] In Figure 6E gravity direction g is acting in the direction of the lower right-hand front corner of the cube, and for tilt angles θ, φ and γ it is thus valid that sgn(θ) < 0, sgn(φ) < 0 and sgn(γ) < 0. This provides the following calculation formulae 5/8 for the acceleration change components in the vertical direction:

$$X_z = x_c\sin|\theta|$$

$$Y_z = y_c\sin|\varphi|$$

$$Z_z = z_c\sin|\gamma|.$$

[0037] In Figure 6F gravity direction g is acting in the direction of the lower left-hand rear corner of the cube, and for tilt angles θ, φ and γ it is thus valid that sgn(θ) ≥ 0, sgn(φ) ≥ 0 and sgn(γ) < 0. This provides the following calculation formulae 6/8 for the acceleration change components in the vertical direction:

$$X_z = -x_c \sin(\theta)$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = z_c \sin|\gamma|.$$

[0038] In Figure 6G gravity direction g is acting in the direction of the lower left-hand front corner of the cube, and for tilt angles θ, φ and γ it is thus valid that $\mathrm{sgn}(\theta) \geq 0$, $\mathrm{sgn}(\varphi) < 0$ and $\mathrm{sgn}(\gamma) < 0$. This provides the following calculation formulae 7/8 for the acceleration change components in the vertical direction:

$$X_z = x_c \sin|\theta|$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = z_c \sin|\gamma|.$$

[0039] Finally, in Figure 6H gravity direction g is acting in the direction of the lower right-hand rear corner of the cube, and for tilt angles θ, φ and γ it is thus valid that $\mathrm{sgn}(\theta) < 0$, $\mathrm{sgn}(\varphi) < 0$ and $\mathrm{sgn}(\gamma) < 0$. This provides the following calculation formulae 8/8 for the acceleration change components in the vertical direction:

$$X_z = -x_c \sin(\theta)$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = z_c \sin|\gamma|.$$

Also in this case the acceleration change component Z_{ztot} parallel to gravity is the sum of the change components: $Z_{ztot} = X_z + Y_z + Z_z$.

[0040] In block 430 the vertical total acceleration Z_{ztot} is removed from the change signals x_c, y_c and z_c, whereby a horizontal acceleration change component Z_{htot} is formed which represents changing accelerations acting on the device in horizontal directions. The mathematical form in which this is carried out is subtraction: $Z_{Htot} = (x_c + y_c + z_c) - Z_{ztot}$. However, this calculation does not allow the direction of the horizontal acceleration change component to be determined in greater detail.

[0041] The described solution may also employ a compass, which may be an ordinary compass based on a magnetic needle, or a gyrocompass. The compass is used for arranging a horizontal direction in relation to two orthogonal axes. This allows the position of the device with respect to earth's magnetic field to be accurately defined at the same time as acceleration information. A preferred way to select the horizontal axes is one in which a first axis X_{ns} is in the north-south direction and a second axis Y_{ew} is in the east-west direction. These axes allow the horizontal acceleration change component Z_{htot} formed in block 430 to be determined by means of the horizontal sub-components Z_{ns} and Z_{ew} of change serving as projections of the axes.

[0042] In block 432 is stored accelerometer calibration values which are used for correcting non-linearities in the accelerometers. Examples of the calibration include crawling, temperature changes, the magnitude of gravity at the earth's different latitudes, and the like.

[0043] Although the invention is described above with reference to an example shown in the attached drawings, it is apparent that the invention is not restricted to it, but can vary in many ways within the inventive idea disclosed in the attached claims.

Claims

1. A method for determining the movement of a device, in which method the acceleration of the device is measured at least in three different directions to provide a three-dimensional measurement, **characterized by** comprising the steps of

   (500) generating acceleration signals (x, y, z) parallel to three orthogonal axes, which are in a known orientation to the device;

   (502) generating average signals ($\bar{x}, \bar{y}, \bar{z}$) of the acceleration signals parallel to the different axes;

   (504) defining tilt angles (θ, φ, γ) of the device in relation to the direction of gravity (g) by means of the average signals ($\bar{x}$, $\bar{y}$, $\bar{z}$);

   (506) generating acceleration change signals (x_c, y_c, z_c) by removing the average signals ($\bar{x}, \bar{y}, \bar{z}$) from their respective acceleration signals (x, y, z) parallel to the different axes;

   (508) forming a component (Z_{ztot}) of the acceleration change of the device by means of the acceleration change signals (x_c, y_c, z_c) and the tilt angles (θ, φ, γ) of the device, which component is parallel to gravity and independent of the position of the device.

2. A method according to claim 1,**characterized by** forming a horizontal acceleration change component (Z_{Htot}) by removing the acceleration change component parallel to gravity from the acceleration change signals.

3. A method according to claim 1, **characterized in that** the orthogonal axes are in known orientations in relation to the structural directions of the device, and that tilt angles of the structural directions of the device in relation to the direction of gravity are formed using the average signals.

4. A method according to claim 1, **characterized in that** the acceleration change components X_z, Y_z and Z_z are formed by multiplying the acceleration change signals x_c, y_c and z_c by the sine function of the device's tilt angles θ, φ and γ according to the following projections:

   if $sgn(\theta) \geq 0$, $sgn(\varphi) \geq 0$ and $sgn(\gamma) \geq 0$

$$X_z = -x_c \sin(\theta)$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = -z_c \sin(\gamma), \text{ or}$$

   if $sgn(\theta) < 0$, $sgn(\varphi) < 0$ and $sgn(\gamma) < 0$

$$X_z = x_c \sin|\theta|$$

$$Y_z = y_c \sin|\varphi|$$

$$Z_z = z_c \sin|\gamma|,$$

   where sgn() denotes a sign function, $|\theta|$, $|\varphi|$ and $|\gamma|$ denote the absolute values of angles θ, φ and γ, and that an acceleration change signal Z_{ztot} parallel to gravity is formed as the sum of the sub-components of acceleration change: $Z_{ztot} = X_z + Y_z + Z_z$.

5. A method according to claim 1, **characterized in that** the spatial directions defined by the axes are divided into portions, separate formulae being determined for forming a vertical acceleration change component for each portion;

   the portion in the direction of which gravity acts is determined using the tilt angles; and

   a vertical acceleration change component is formed according to the device portion in question.

6. A method according to claim 5, **characterized in that** the spatial directions defined by the axes are divided into eight portions such that the direction of gravity in relation to each one of the three measured axis directions obtains the values $(\pi/4 \pm \pi/4)$ or $-(\pi/4 \pm \pi/4)$, separate formulae being determined for forming sub-components of vertical acceleration change for each portion, and
if $sgn(\theta) < 0$, $sgn(\varphi) < 0$ and $sgn(\gamma) \geq 0$ are valid for tilt angles θ, φ and γ, the sub-components X_z, Y_z and Z_z of acceleration change are formed as follows:

$$X_z = x_c \sin|\theta|$$

$$Y_z = y_c \sin|\varphi|$$

$$Z_z = -z_c \sin(\gamma),$$

if $sgn(\theta) \geq 0$, $sgn(\varphi) \geq 0$ and $sgn(\gamma) \geq 0$ are valid for tilt angles θ, φ and γ, the sub-components X_z, Y_z and Z_z of acceleration change are formed as follows:

$$X_z = -x_c \sin(\theta)$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = -z_c \sin(\gamma),$$

if $sgn(\theta) < 0$, $sgn(\varphi) \geq 0$ and $sgn(\gamma) \geq 0$ are valid for tilt angles θ, φ and γ, the sub-components X_z, Y_z and Z_z of acceleration change are formed as follows:

$$X_z = x_c \sin|\theta|$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = -z_c \sin(\gamma),$$

if $sgn(\theta) \geq 0$, $sgn(\varphi) < 0$ and $sgn(\gamma) \geq 0$ are valid for tilt angles θ, φ and γ, the sub-components X_z, Y_z and Z_z of acceleration change are formed as follows:

$$X_z = -x_c \sin(\theta)$$

$$Y_z = y_c \sin|\varphi|$$

$$Z_z = -z_c \sin(\gamma),$$

if $sgn(\theta) < 0$, $sgn(\varphi) < 0$ and $sgn(\gamma) < 0$ are valid for tilt angles θ, φ and γ, the sub-components X_z, Y_z and Z_z of acceleration change are formed as follows:

$$X_z = x_c \sin|\theta|$$

$$Y_z = y_c \sin|\varphi|$$

$$Z_z = z_c \sin|\gamma|,$$

if $\mathrm{sgn}(\theta) \geq 0$, $\mathrm{sgn}(\varphi) \geq 0$ and $\mathrm{sgn}(\gamma) < 0$ are valid for tilt angles θ, φ and γ, the sub-components X_z, Y_z and Z_z of acceleration change are formed as follows:

$$X_z = -x_c \sin(\theta)$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = z_c \sin|\gamma|,$$

if $\mathrm{sgn}(\theta) \geq 0$, $\mathrm{sgn}(\varphi) < 0$ and $\mathrm{sgn}(\gamma) < 0$ are valid for tilt angles θ, φ and γ, the sub-components X_z, Y_z and Z_z of acceleration change are formed as follows:

$$X_z = x_c \sin|\theta|$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = z_c \sin|\gamma|,$$

and
if $\mathrm{sgn}(\theta) < 0$, $\mathrm{sgn}(\varphi) < 0$ and $\mathrm{sgn}(\gamma) < 0$ are valid for tilt angles θ, φ and γ, the sub-components X_z, Y_z and Z_z of acceleration change are formed as follows:

$$X_z = -x_c \sin(\theta)$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = z_c \sin|\gamma|;$$

and
the acceleration change component Z_{ztot} of the device is formed parallel to gravity as a sum of the change components: $Z_{ztot} = X_z + Y_z + Z_z$.

7. A method according to claim 1, **characterized by** further comprising the steps of forming a horizontal acceleration change component by removing the acceleration change component parallel to gravity from the acceleration change signals;
   determining two mutually orthogonal directions in the horizontal plane by means of a compass; and
   determining sub-components of acceleration change as projections of the horizontal acceleration change component parallel to the orthogonal axes.

8. A method according to claim 1, **characterized in that** before the average signals are formed, the acceleration signals are windowed using a desired windowing function.

9. An arrangement for determining the movement of a device, the arrangement being arranged to measure the ac-

celeration of the device at least in three different directions to provide a three-dimensional measurement, **characterized in that** the arrangement is arranged to

measure acceleration signals (x, y, z) parallel to three orthogonal axes, which are in a known orientation to the device;

generate average signals ($\bar{x}, \bar{y}, \bar{z}$) of the acceleration signals parallel to the different axes;

define tilt angles (θ, φ, γ) of the device in relation to the direction of gravity (g) by means of the average signals ($\bar{x}$, $\bar{y}$, $\bar{z}$);

generate acceleration change signals (x_c, y_c, z_c) by removing the average signals ($\bar{x}$, $\bar{y}$, $\bar{z}$) from their respective acceleration signals (x, y, z) parallel to the different axes;

form a component (Z_{ztot}) of the acceleration change of the device by means of the acceleration change signals (x_c, y_c, z_c) and the tilt angles (θ, φ, γ) of the device, which component is parallel to gravity and independent of the position of the device.

10. An arrangement according to claim 9, **characterized in that** the arrangement is arranged to form a horizontal acceleration change component by removing the acceleration change component parallel to gravity from the acceleration change signals.

11. An arrangement according to claim 9, **characterized in that** the orthogonal axes are in known orientations in relation to the structural directions of the device, and that the arrangement is arranged to form tilt angles of the structural directions of the device in relation to the direction of gravity by using the average signals.

12. An arrangement according to claim 9, **characterized in that** the arrangement is arranged to form the sub-components X_z, Y_z and Z_z of acceleration change by multiplying the acceleration change signals x_c, y_c and z_c by the sine function of the device's tilt angles θ, φ and γ according to the following projections:

if $\mathrm{sgn}(\theta) \geq 0$, $\mathrm{sgn}(\varphi) \geq 0$ and $\mathrm{sgn}(\gamma) \geq 0$

$$X_z = -x_c \sin(\theta)$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = -z_c \sin(\gamma), \text{ or}$$

if $\mathrm{sgn}(\theta) < 0$, $\mathrm{sgn}(\varphi) < 0$ and $\mathrm{sgn}(\gamma) < 0$

$$X_z = x_c \sin|\theta|$$

$$Y_z = y_c \sin|\varphi|$$

$$Z_z = z_c \sin|\gamma|,$$

where sgn() denotes a sign function, $|\theta|$, $|\varphi|$ and $|\gamma|$ denote the absolute values of angles θ, φ and γ, and that the arrangement is arranged to form the acceleration change component Z_{ztot} parallel to gravity as the sum of the sub-components of acceleration change: $Z_{ztot} = X_z + Y_z + Z_z$.

13. An arrangement according to claim 9, **characterized in that** the spatial directions defined by the axes are divided into portions, separate formulae being determined for forming a vertical acceleration change component for each portion;

the arrangement is arranged to determine the portion in the direction of which gravity acts by using the tilt angles; and

the arrangement is arranged to form the vertical acceleration change component according to the device portion in question.

14. An arrangement according to claim 13, **characterized in that** the spatial directions defined by the axes are divided into eight portions such that the direction of gravity in relation to each one of the three measured axis directions obtains the values ($\pi/4 \pm \pi/4$) or $-(\pi/4 \pm \pi/4)$, separate formulae being defined for each portion for forming sub-components of vertical acceleration change; and

if $\mathrm{sgn}(\theta) < 0$, $\mathrm{sgn}(\varphi) < 0$ and $\mathrm{sgn}(\gamma) \geq 0$ are valid for tilt angles 0, φ and γ, the arrangement is arranged to form the sub-components X_z, Y_z and Z_z of acceleration change as follows:

$$X_z = x_c \sin|\theta|$$

$$Y_z = y_c \sin|\varphi|$$

$$Z_z = -z_c \sin(\gamma),$$

if $\mathrm{sgn}(\theta) \geq 0$, $\mathrm{sgn}(\varphi) \geq 0$ and $\mathrm{sgn}(\gamma) \geq 0$ are valid for tilt angles θ, φ and γ, the arrangement is arranged to form the sub-components X_z, Y_z and Z_z of acceleration change as follows:

$$X_z = -x_c \sin(\theta)$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = -z_c \sin(\gamma),$$

if $\mathrm{sgn}(\theta) < 0$, $\mathrm{sgn}(\varphi) \geq 0$ and $\mathrm{sgn}(\gamma) \geq 0$ are valid for tilt angles θ, φ and γ, the arrangement is arranged to form sub-components X_z, Y_z and Z_z of acceleration change as follows:

$$X_z = x_c \sin|\theta|$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = -z_c \sin(\gamma),$$

if $\mathrm{sgn}(\theta) \geq 0$, $\mathrm{sgn}(\varphi) < 0$ and $\mathrm{sgn}(\gamma) \geq 0$ are valid for tilt angles θ, φ and γ, the arrangement is arranged to form the sub-components X_z, Y_z and Z_z of acceleration change as follows:

$$X_z = -x_c \sin(\theta)$$

$$Y_z = y_c \sin|\varphi|$$

$$Z_z = -z_c \sin(\gamma),$$

if $\mathrm{sgn}(\theta) < 0$, $\mathrm{sgn}(\varphi) < 0$ and $\mathrm{sgn}(\gamma) < 0$ are valid for tilt angles θ, φ and γ, the arrangement is arranged to form the sub-components X_z, Y_z and Z_z of acceleration change as follows:

$$X_z = x_c \sin|\theta|$$

$$Y_z = y_c \sin|\varphi|$$

$$Z_z = z_c \sin|\gamma|,$$

if $\mathrm{sgn}(\theta) \geq 0$, $\mathrm{sgn}(\varphi) \geq 0$ and $\mathrm{sgn}(\gamma) < 0$ are valid for tilt angles θ, φ and γ, the arrangement is arranged to form sub-components X_z, Y_z and Z_z of acceleration change as follows:

$$X_z = -x_c \sin(\theta)$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = z_c \sin|\gamma|,$$

if $\mathrm{sgn}(\theta) \geq 0$, $\mathrm{sgn}(\varphi) < 0$ and $\mathrm{sgn}(\gamma) < 0$ are valid for tilt angles θ, φ and γ, the arrangement is arranged to form the sub-components X_z, Y_z and Z_z of acceleration change as follows:

$$X_z = x_c \sin|\theta|$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = z_c \sin|\gamma|,$$

and
if $\mathrm{sgn}(\theta) < 0$, $\mathrm{sgn}(\varphi) < 0$ and $\mathrm{sgn}(\gamma) < 0$ are valid for tilt angles θ, φ and γ, the arrangement is arranged to form the sub-components X_z, Y_z and Z_z of acceleration change as follows:

$$X_z = -x_c \sin(\theta)$$

$$Y_z = -y_c \sin(\varphi)$$

$$Z_z = z_c \sin|\gamma|;$$

and
the arrangement is arranged to form the acceleration change component Z_{ztot} of the device parallel to gravity as the sum of the change components: $Z_{ztot} = X_z + Y_z + Z_z$.

15. An arrangement according to claim 9, **characterized in that** the arrangement is arranged to form a horizontal acceleration change component by removing the acceleration change component parallel to gravity from the acceleration change signals;
the arrangement is arranged to determine two mutually orthogonal directions in the horizontal plane by means of a compass; and
the arrangement is arranged to determine sub-components of acceleration change as projections of the horizontal acceleration change component parallel to the orthogonal axes.

16. An arrangement according to claim 9, **characterized in that** the arrangement is arranged to window the acceleration signals using a desired windowing function before the average signals are formed.

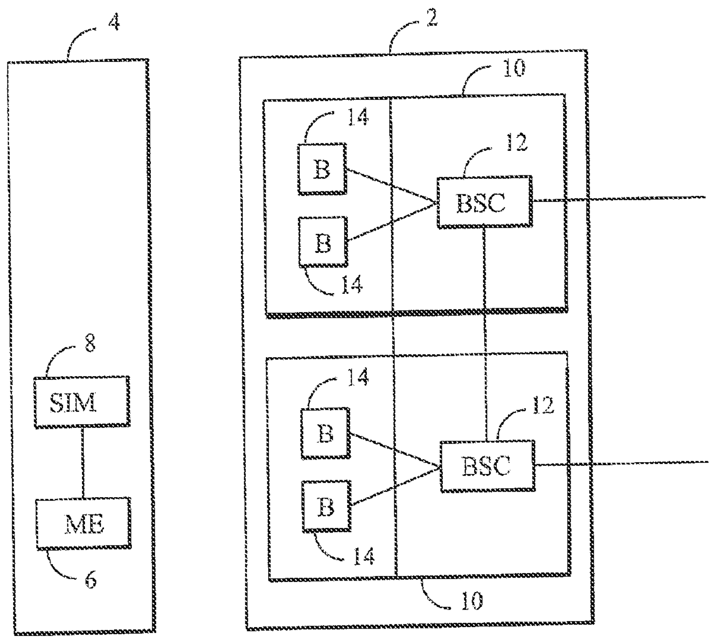

FIG. 1

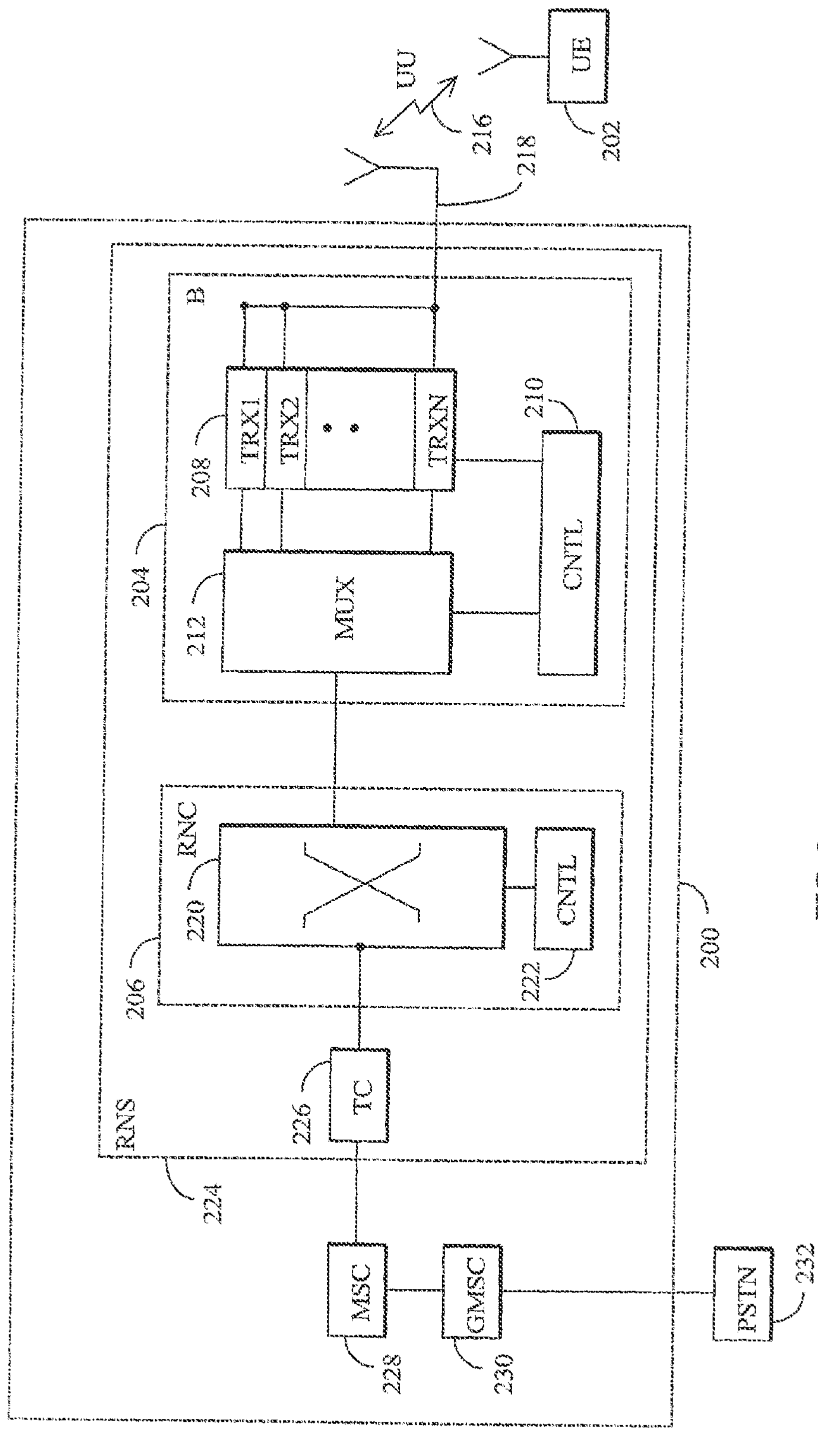
UE
202
UU
216
218
B
TRX1
TRX2
TRXN
208
210
204
MUX
212
CNTL
RNC
220
CNTL
222
206
200
RNS
TC
226
224
MSC
228
GMSC
230
PSTN
232

FIG. 2

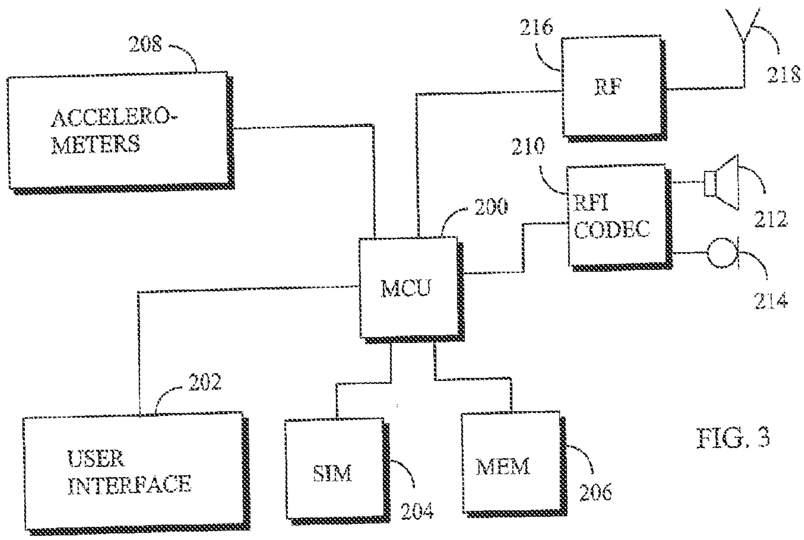
208
ACCELERO-
METERS
216
RF
218
210
RFI
CODEC
212
214
200
MCU
202
USER
INTERFACE
SIM
204
MEM
206

FIG. 3

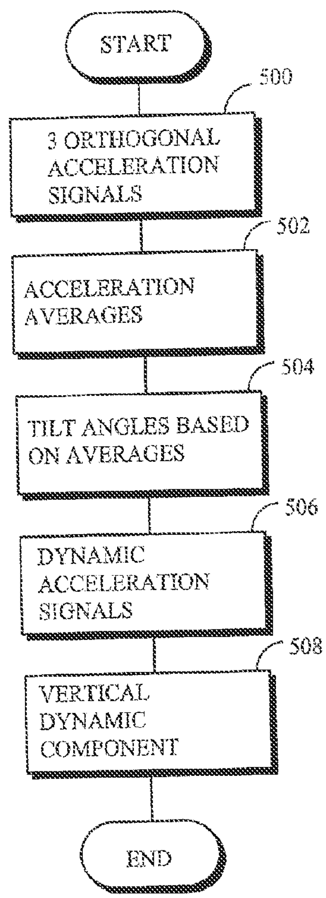
START
500
3 ORTHOGONAL
ACCELERATION
SIGNALS
502
ACCELERATION
AVERAGES
504
TILT ANGLES BASED
ON AVERAGES
506
DYNAMIC
ACCELERATION
SIGNALS
508
VERTICAL
DYNAMIC
COMPONENT
END

FIG. 4B

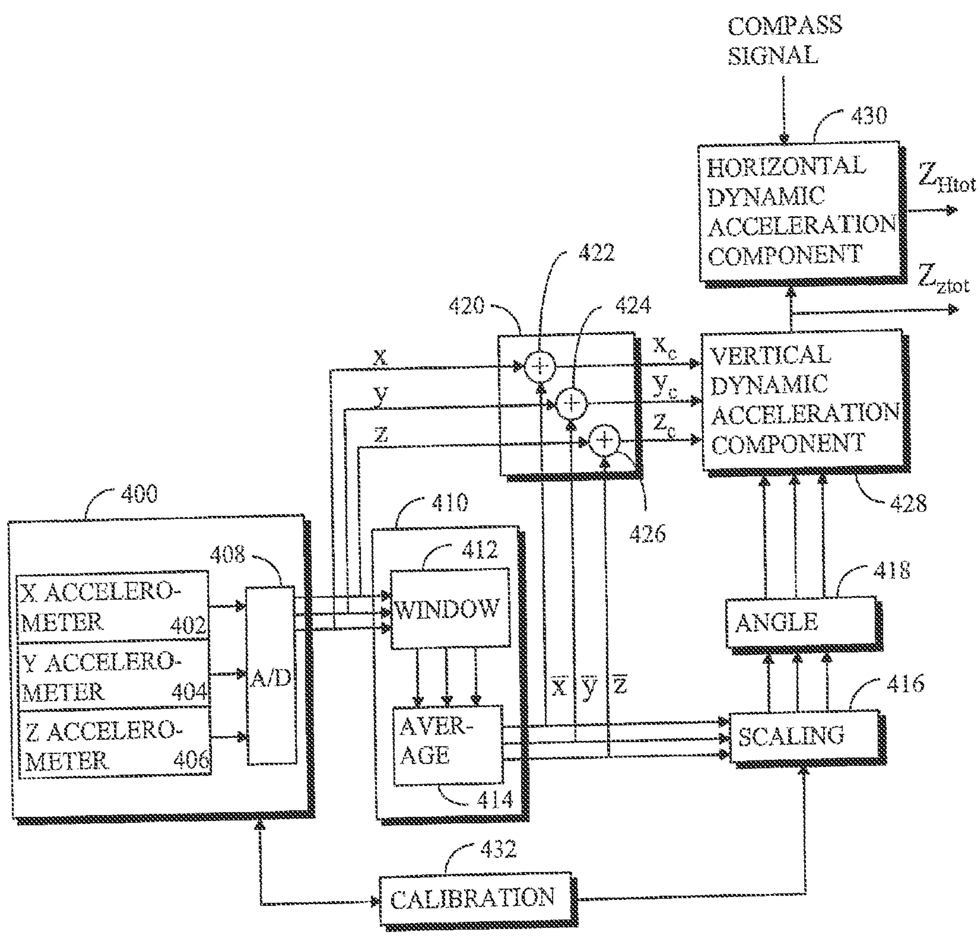
COMPASS SIGNAL
430
HORIZONTAL DYNAMIC ACCELERATION COMPONENT
Z_{Htot}
Z_{ztot}
422
420
424
x_c
y_c
z_c
x
y
z
VERTICAL DYNAMIC ACCELERATION COMPONENT
428
426
400
410
408
412
418
X ACCELERO-METER 402
Y ACCELERO-METER 404
Z ACCELERO-METER 406
A/D
WINDOW
ANGLE
$\overline{x}$ $\overline{y}$ $\overline{z}$
416
AVER-AGE
414
SCALING
432
CALIBRATION

FIG. 4A

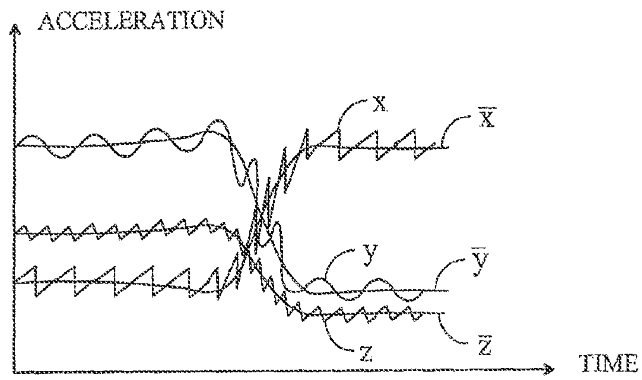
ACCELERATION
x
$\overline{x}$
y
$\overline{y}$
z
$\overline{z}$
TIME

FIG. 5A

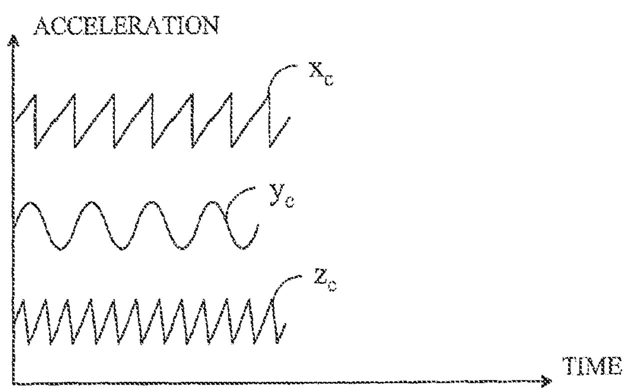
ACCELERATION
x_c
y_c
z_c
TIME

FIG. 5B

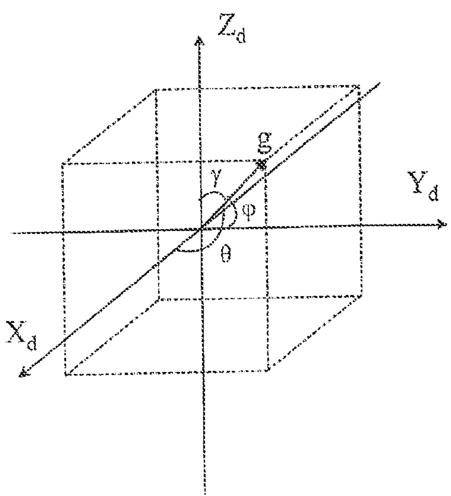

FIG. 6A

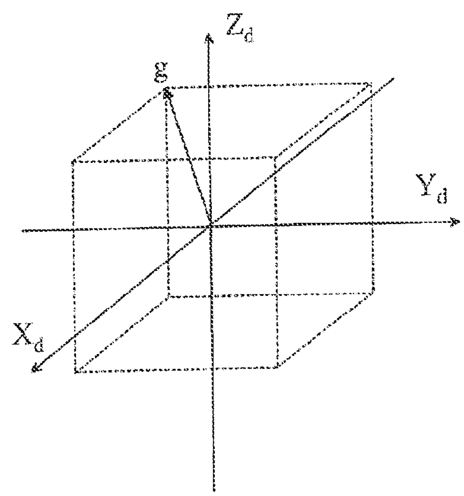

FIG. 6B

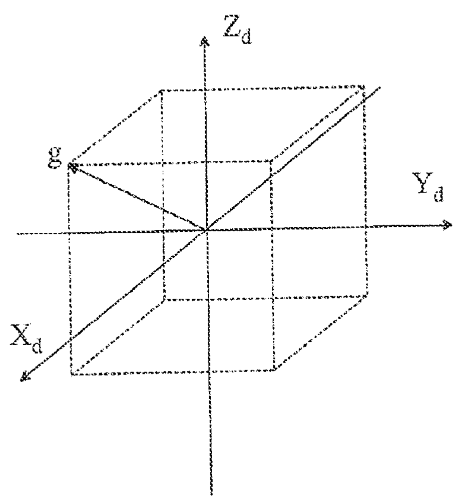

FIG. 6C

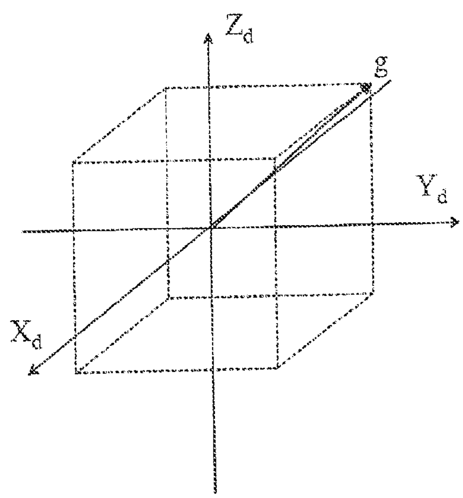

FIG. 6D

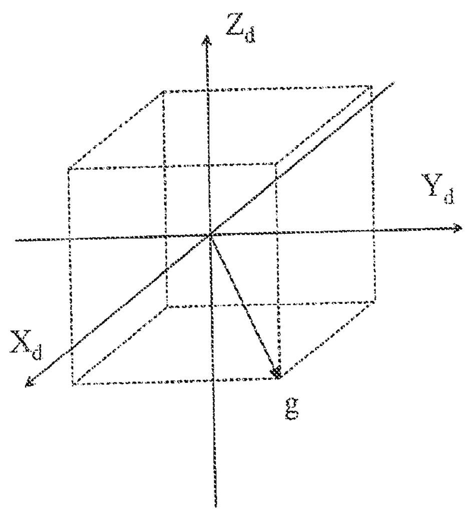

FIG. 6E

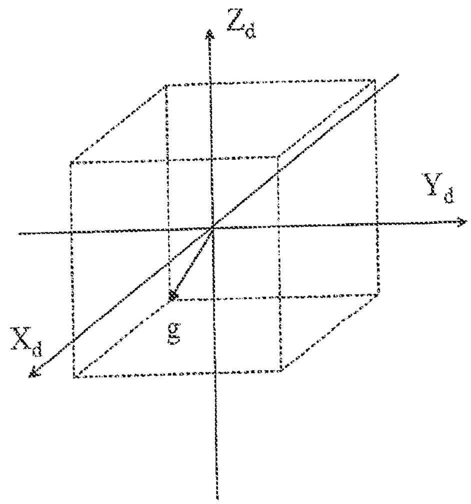

FIG. 6F

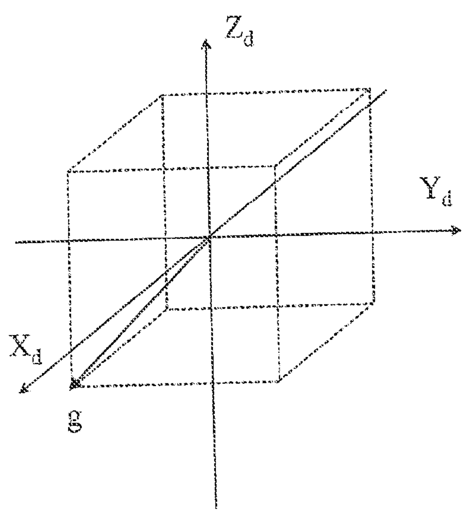

FIG. 6G

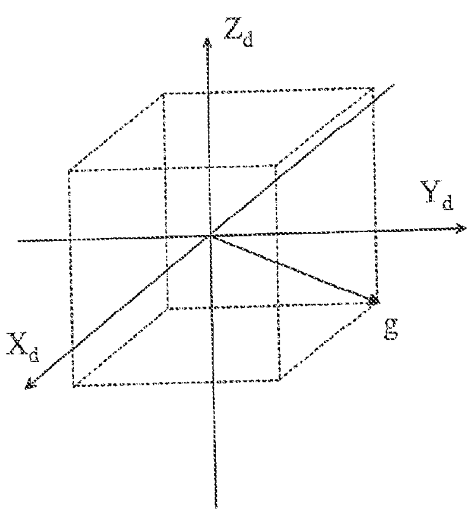

FIG. 6H

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Philippe Kahn, et al
Appl. No.	:	12/247,950
Filed	:	October 8, 2008
For	:	Method and System for Waking Up a Device Due to Motion
Customer No.	:	08791

Examiner: Lu, Shirley

Art Unit: 2612

Confirmation No. 8961

CERTIFICATE OF TRANSMISSION

I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.

/Judith Szepesi/ September 21, 2012
Judith A. Szepesi ***Date***

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

INFORMATION DISCLOSURE STATEMENT

Madam:

Enclosed is a copy of Information Disclosure Citation Form PTO-1449 or PTO/SB/08 together with copies of the documents cited on that form, except for copies not required to be submitted (e.g., copies of U.S. patents and U.S. published patent applications need not be enclosed). It is respectfully requested that the cited documents be considered and that the enclosed copy of Information Disclosure Citation Form PTO-1449 or PTO/SB/08 be initialed by the Examiner to indicate such consideration and a copy thereof returned to applicant(s).

Pursuant to 37 C.F.R. § 1.97, the submission of this Information Disclosure Statement is not to be construed as a representation that a search has been made and is not to be construed as an admission that the information cited in this statement is material to patentability.

Pursuant to 37 C.F.R. § 1.97, this Information Disclosure Statement is being submitted under one of the following (as indicated by an "X" to the left of the appropriate paragraph):

________ 37 C.F.R. §1.97(b).

___X___ 37 C.F.R. §1.97(c). If so, then enclosed with this Information Disclosure Statement is one of the following:

____ A statement pursuant to 37 C.F.R. §1.97(e) or

__X__ The Director is Authorized to charge in the amount of $180.00 for the fee under 37 C.F.R. § 1.17(p).

______ 37 C.F.R. §1.97(d). If so, then enclosed with this Information Disclosure Statement are the following:

(1) A statement pursuant to 37 C.F.R. §1.97(e); and

(2) A check for $180.00 for the fee under 37 C.F.R. §1.17(p) for submission of the Information Disclosure Statement.

If there are any additional charges, please charge Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: September 20, 2012

/Judith Szepesi/
Judith A. Szepesi
Reg. No. 39,393

1279 Oakmead Parkway
Sunnyvale, CA 94085
(408) 720-8300

Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(use as many sheets as necessary)*				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	1	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number: Number-Kind Code[2] (If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	4,285,041	8/18/1981	Smith	
		US-	4,578,769	3/25/1986	Frederick	
		US-	5,446,725	8/29/1995	Ishiwatari	
		US-	5,446,775	8/25/1995	Wright et al	
		US-	5,583,776	12/10/1996	Levi et al	
		US-	5,593,431	1/14/1997	Sheldon	
		US-	5,654,619	8/5/1997	Iwashita, Yasusuke	
		US-	5,778,882	7/14/1998	Raymond et al	
		US-	5,955,667	9/21/1999	Fyfe	
		US-	5,976,083	11/2/1999	Richardson, et al.	
		US-	6,122,595	9/19/2000	Varley et al	
		US-	6,135,951	10/24/2000	Richardson, et al.	
		US-	6,145,389	11/14/2000	Ebeling, et al.	
		US-	6,282,496	8/28/2001	Chowdhary	
		US-	6,369,794	4/9/2002	Sakurai et al	
		US-	6,428,490	8/6/2002	Kramer et al	
		US-	6,493,652	12/10/2002	Ohlenbusch et al	
		US-	6,496,695	12/17/2002	Kouji et al	
		US-	6,513,381	2/4/2003	Fyfe et al.	
		US-	6,522,266	2/18/2003	Soehren, et al.	
		US-	6,532,419	3/11/2003	Begin, et al.	
		US-	6,539,336	3/25/2003	Vock, et al.	
		US-	6,611,789	8/26/2003	Darley, Jesse	
		US-	6,700,499	3/2/2004	Kubo et al	
		US-	6,786,877	9/7/2004	Foxlin	
		US-	6,790,178	9/14/2004	Mault, et al.	
		US-	6,813,582	11/2/2004	Levi et al.	
		US-	6,823,036	11/23/2004	Chen	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6]Applicant is to place a check mark here if English language translation is attached.

Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	2	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	6,826,477	11/30/2004	Ladetto et al	
		US-	6,836,744	12/28/2004	Asphahani, et al.	
		US-	6,881,191	4/19/2005	Oakley, et al.	
		US-	6,885,971	4/26/2005	Vock, et al.	
		US-	6,898,550	5/24/2005	Blackadar, et al.	
		US-	6,928,382	8/9/2005	Hong et al	
		US-	6,941,239	9/6/2005	Unuma, et al.	
		US-	6,959,259	10/25/2005	Vock, et al.	
		US-	6,975,959	12/13/2005	Dietrich et al.	
		US-	7,054,784	5/30/2006	Flentov et al	
		US-	7,057,551	6/6/2006	Vogt, Mark J	
		US-	7,072,789	7/4/2006	Vock, et al.	
		US-	7,092,846	8/15/2006	Vock, et al.	
		US-	7,148,797	12/12/2006	Albert	
		US-	7,158,912	1/20/2007	Vock, et al.	
		US-	7,169,084	1/30/2007	Tsuji, Tomoharu	
		US-	7,171,331	1/30/2007	Vock, et al.	
		US-	7,177,684	2/13/2007	Kroll et al	
		US-	7,212,943	5/1/2007	Aoshima, et al.	
		US-	7,220,220	5/22/2007	Stubbs, et al.	
		US-	7,297,088	11/20/2007	Tsuji, Tomoharu	
		US-	7,334,472	2/26/2008	Seo et al	
		US-	7,353,112	4/1/2008	Choi et al	
		US-	7,382,611	2/12/2008	Klees, et al.	
		US-	7,387,611	6/17/2008	Inoue et al.	
		US-	7,451,056	11/11/2008	Flentov et al	
		US-	7,457,719	11/25/2008	Kahn et al	
		US-	7,467,060	12/16/2008	Kulach et al	

Examiner Signature		Date Considered	

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Substitute for Form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	3	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	7,489,937	2/10/2009	Chung et al	
		US-	7,512,515	3/31/2009	Vock et al	
		US-	7,526,402	4/28/2009	Tenanhaus et al	
		US-	7,608,050	10/27/2009	Sugg, Christoper John	
		US-	7,640,804	1/5/2010	Daumer et al	
		US-	7,647,196	1/12/2010	Kahn et al.	
		US-	7,647,196	11/12/2010	Kahn et al	
		US-	7,653,508	1/26/2010	Kahn et al.	
		US-	7,752,011	7/6/2010	Niva et al	
		US-	7,753,861	7/13/2010	Kahn et al.	
		US-	7,774,156	8/10/2010	Niva et al	
		US-	7,857,772	12/28/2010	Bouvier et al	
		US-	2002/0023654	2/28/2002	Webb, James D	
		US-	2002/0089425	7/11/2002	Kubo et al	
		US-	2002/0109600	8/15/2002	Mault, James R.; et al.	
		US-	2002/0118121	8/29/2002	Lehrman et al	
		US-	2002/0151810	10/17/2002	Wong, Philip Lim-Kong; et al.	
		US-	2002/0193124	12/19/2002	Hamilton et al	
		US-	2003/0018430	1/23/2003	Ladetto et al	
		US-	2003/0048218	3/13/2003	Milnes et al	
		US-	2003/0083596	5/1/2003	Kramer et al	
		US-	2003/0109258	6/12/2003	Mantyjarvi et al	
		US-	2003/0139692	7/24/2003	Barrey et al.	
		US-	2004/0106421	6/3/2004	Tomiyoshi et al	
		US-	2004/0225467	11/11/2004	Vock, Curtis A.; et al.	
		US-	2004/0236500	11/25/2004	Choi et al	
		US-	2005/0033200	2/10/2005	Soehren, Wayne A.; et al.	
		US-	2005/0202934	9/15/2005	Olrik et al	

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				Examiner Name	Lu, Shirley
Sheet	4	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number: Number-Kind Code[2](If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	2005/0222801	10/6/2005	Wulff et al	
		US-	2005/0232388	10/20/2005	Tsuji, Tomoharu	
		US-	2005/0238132	10/27/2005	Tsuji, Tomoharu	
		US-	2005/0240375	10/27/2005	Sugai, Yoshinori	
		US-	2005/0248718	11/10/2005	Howell, Thomas A., et al.	
		US-	2006/0020177	1/26/2006	Seo et al	
		US-	2006/0063980	3/23/2006	Hwang et al	
		US-	2006/0064276	3/23/2006	Ren et al	
		US-	2006/0100546	5/11/2006	Silk, Jeffrey E	
		US-	2006/0136173	6/22/2006	Charles Whipple Jr.; et al.	
		US-	2006/0167387	7/27/2006	Buchholz et al	
		US-	2006/0205406	9/14/2006	Pekonen et al	
		US-	2006/0206258	9/14/2006	Brooks, Amanda S.	
		US-	2006/0223547	10/5/2006	Chin et al	
		US-	2006/0259268	11/16/2006	Vock et al	
		US-	2006/0288781	12/28/2006	Daumer et al	
		US-	2007/0037610	2/15/2007	Logan, James D	
		US-	2007/0038364	2/15/2007	Lee et al	
		US-	2007/0061105	3/15/2007	Darley, Jesse; et al.	
		US-	2007/0063850	3/22/2007	Devaul; Richard W.; et al.	
		US-	2007/0067094	3/22/2007	Park et al	
		US-	2007/0073482	3/29/2007	Churchill et al	
		US-	2007/0082789	4/12/2007	Nissila et al	
		US-	2007/0130582	6/7/2007	Chang et al	
		US-	2007/0142715	6/21/2007	Banet et al.	
		US-	2007/0195784	8/23/2007	Allen et al	
		US-	2007/0208531	9/6/2007	Darley, Jesse; et al.	
		US-	2007/0213085	9/13/2007	Fedora, Neal R	

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This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SENT FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450**.

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Substitute for Form 1449/PTO				*Complete if Known*	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	5	**of**	8	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	2007/0213126	9/13/2007	Deutsch et al	
		US-	2007/0250261	10/25/2007	Soehren	
		US-	2007/0260418	11/8/2007	Ladetto et al	
		US-	2007/0260482	11/8/2007	Nurmela et al	
		US-	2008/0161072	7/3/2008	Lide et al	
		US-	2008/0171918	7/17/2008	Teller et al	
		US-	2009/0047645	2/19/2009	Dibenedetto et al	
		US-	2009/0098880	4/16/2009	Lindquist, Bjorn	
		US-	2009/0213002	8/27/2009	Rani et al	
		US-	2009/0234614	9/17/2009	Kahn et al.	
		US-	2009/0319221	12/24/2009	Kahn et al	
		US-	2010/0056872	3/4/2010	Kahn et al.	
		US-	2010/0057398	3/4/2010	Darley, Jesse; et al.	
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				Examiner Name	Lu, Shirley
Sheet	6	**of**	8	Attorney Docket Number	8689P057

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
		ANDERSON, Ian, et al, “Shakra: Tracking and Sharing Daily Activity Levels with Unaugmented Mobile Phones," Mobile Netw Appl, 8/3/2007, pp 185-199	
		AYLWARD, Ryan, et al, "Sensemble: A Wireless, Compact, Multi-User Sensor System for Interactive Dance," International Conference on New Interfaces for Musical Expression (NIME06), June 4-8, 2006, pp 134-139	
		BACA, Arnold, et al, "Rapid Feedback Systems for Elite Sports Training," IEEE Pervasive Computing, October-December 2006, pp 70-76	
		BAKHRU, Kesh, "A Seamless Tracking Solution for Indoor and Outdoor Position Location," IEEE 16th International Symposium on Personal, Indoor, and Mobile Radio Communications, 2005, pp 2029-2033	
		BLILEY, Kara E, et al, "A Miniaturized Low Power Personal Motion Analysis Logger Utilizing MEMS Accelerometers and Low Power Microcontroller," IEEE EMBS Special Topic Conference on Microtechnologies in Medicine and Biology, May 12-15, 2005, pp 92-93	
		BOURZAC, Katherine, "Wearable Health Reports," Technology Review, February 28, 2006, <http://www.techreview.com/printer_friendly_article_aspx?id+16431>, accessed 3/22/2007, 3 pages	
		CHENG, Fangxiang, et al, "Periodic Human Motion Description for Sports Video Databases," Proceedings of the Pattern Recognition, 2004, 5 pages	
		DAO, Ricardo, “Inclination Sensing with Thermal Accelerometers”, MEMSIC, May 2002, 3 pages	
		FANG, Lei, et al, "Design of a Wireless Assisted Pedestrian Dead Reckoning System--The NavMote Experience," IEEE Transactions on Instrumentation and Measurement, Vol 54, No 6, December 2005, pp 2342-2358	
		HEALEY, Jennifer, et al, "Wearable Wellness Monitoring Using ECG and Accelerometer Data," IEEE Int. Symposium on Wearable Computers (ISWC'05), 2005, 2 pages	
		HEMMES, Jeffrey, et al, "Lessons Learned Building TeamTrak: An Urban/Outdoor Mobile Testbed," 2007 IEEE Int. Conf. on Wireless Algorithms, August 1-3, 2007, pp 219-224	

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		JONES, L, et al, "Wireless Physiological Sensor System for Ambulatory Use," <http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?tp=&arnumber=1612917&isnumber=33861>, April 3-5, 2006	
		JOVANOV, Emil, et al, "A Wireless Body Area Network of Intelligent Motion Sensors for Computer Assisted Physical Rehabilitation," Journal of NeuroEngineering and Rehabilitation, March 2005, 10 pages	
		KALPAXIS, Alex, "Wireless Temporal-Spatial Human Mobility Analysis Using Real-Time Three Dimensional Acceleration Data," IEEE Intl. Multi-Conf. on Computing in Global IT (ICCGI'07), 2007, 7 pages	
		LEE, Seon-Woo, et al., “Recognition of Walking Behaviors for Pedestrian Navigation,” IEEE International Conference on Control Applications, September 5-7, 2001, pp 1152-1155	
		MARGARIA, Rodolfo, "Biomechanics and Energetics of Muscular Exercise", Chapter 3, Oxford: Clarendon Press, 1976, pages 105-125	
		MILENKOVIC, Milena, et al, "An Accelerometer-Based Physical Rehabilitation System," IEEE SouthEastern Symposium on System Theory, 2002, pp 57-60	
		MIZELL, David, “Using Gravity to Estimate Accelerometer Orientation”, Seventh IEEE International Symposium on Wearable Computers, 2003, 2 pages	
		ORMONEIT, D, et al, “Learning and Tracking Cyclic Human Motion,” 7 pages	
		OTTO, Chris, et al, "System Architecture of a Wireless Body Area Sensor Network for Ubiquitous Health Monitoring," Journal of Mobile Multimedia, Vol 1, No 4, 2006, pp 307-326	
		PARK, Chulsung, et al, "Eco: An Ultra-Compact Low-Power Wireless Sensor Node for Real-Time Motion Monitoring," IEEE Int. Symp. on Information Processing in Sensor Networks, 2005, pp 398-403	
		SHEN, Chien-Lung, et al, "Wearable Band Using a Fabric-Based Sensor for Exercise ECG Monitoring," IEEE Int. Symp. on Wearable Computers, 2006, 2 pages	

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		"Sensor Fusion," <www.u-dynamics.com>, accessed 8/29/2008, 2 pages	
		TAPIA, Emmanuel Munguia, et al, "Real-Time Recognition of Physical Activities and Their Intensities Using Wireless Accelerometers and a Heart Rate Monitor," IEEE Cont. on Wearable Computers, October 2007, 4 pages	
		WANG, Shu, et al, "Location Based Services for Mobiles: Technologies and Standards, LG Electronics MobileComm," IEEE ICC 2008, Beijing, pages 1-66 (part 1 of 3)	
		WANG, Shu, et al, "Location Based Services for Mobiles: Technologies and Standards, LG Electronics MobileComm," IEEE ICC 2008, Beijing, pages 67-92 (part 2 of 3)	
		WANG, Shu, et al, "Location Based Services for Mobiles: Technologies and Standards, LG Electronics MobileComm," IEEE ICC 2008, Beijing, pages 93-123 (part 3 of 3)	
		WECKESSER, P, et al, "Multiple Sensorprocessing for High-Precision Navigation and Environmental Modeling with a Mobile Robot," IEEE, 1995, pp 453-458	
		WEINBERG, Harvey, "MEMS Motion Sensors Boost Handset Reliability," <http://www.mwrf.com/Articles/Print.cfm?ArticleID=12740>, June 2006, 3 pages	
		WIXTED, Andrew J, et al, "Measurement of Energy Expenditure in Elite Athletes Using MEMS-Based Triaxial Accelerometers," IEEE Sensors Journal, Vol 7, No 4, April 2007, pp 481-488	
		WU, Winston H, et al, "Context-Aware Sensing of Physiological Signals," IEEE Int. Conf. on Engineering for Medicine and Biology, August 23-26, 2007, pp 5271-5275	
		YOO, Chang-Sun, et al, "Low Cost GPS/INS Sensor Fusion System for UAV Navigation," IEEE Digital Avionics Systems Conference (DASC '03), 2003, 9 pages	

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				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2612
				Examiner Name	Lu, Shirley
Sheet	1	**of**	1	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	7,987,070	7/26/2011	Kahn et al	
		US-	2007/0102525	5/10/2007	Orr, Kevin, et al	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] Number[4] Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
		EP 1271099 A2	1/2/2003	Nokia Corp		

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
		European Patent Application No. EP09819844.3, Supplementary European Search Report, Dated 05 June 2012, 10 pages	

Examiner Signature		Date Considered	

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Attorney's Docket No. 8689P057 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Philippe Kahn, et al	Examiner:	Lu, Shirley
Appl. No.	: 12/247,950	Art Unit:	2612
Filed	: October 8, 2008	Conf No:	8961
For	: Method and System for Waking Up a Device Due to Motion		
Customer No.	: 08791		

CERTIFICATE OF TRANSMISSION
I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.

/Judith Szepesi/ September 21, 2012
Judith A. Szepesi ***Date***

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

REQUEST FOR EXAMINER INITIALS

Applicants request that the Examiner initial the cited documents on Form PTO-1449 submitted with an Information Disclosure Statement filed 8/19/2011 in the present application and return a copy of that initialed Form PTO-1449 to applicants. Applicants request the Examiner's initials in order to show consideration of the cited references.

A copy of the previously-submitted Form PTO-1449 is included herewith without copies of the previously submitted references.

No fees are included herewith. If there are any additional charges/credits, please charge/credit our deposit account no. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: September 20, 2012 /Judith Szepesi/
Judith A. Szepesi
Reg. No. 39,393

1279 Oakmead Parkway
Sunnyvale, CA 94085
(408) 720-8300

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number	Filing Date	
12/247,950	10/08/2008	☐ To be Mailed

APPLICATION AS FILED – PART I

FOR	NUMBER FILED (Column 1)	NUMBER EXTRA (Column 2)	SMALL ENTITY ☐ RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
			TOTAL			TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

AMENDMENT	09/22/2012	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 24	Minus	** 35	= 0	X $ =		OR	X $60=	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $250=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/CAROL BARNES/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/247,950	10/08/2008	Philippe Kahn	8689P057	8961

8791 7590 11/06/2012

BLAKELY SOKOLOFF TAYLOR & ZAFMAN
1279 Oakmead Parkway
Sunnyvale, CA 94085-4040

EXAMINER	
LU, SHIRLEY	

ART UNIT	PAPER NUMBER
2681	

MAIL DATE	DELIVERY MODE
11/06/2012	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No.	Applicant(s)	
	12/247,950	KAHN ET AL.	
	Examiner	Art Unit	
	SHIRLEY LU	2681	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 September 2012*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1-11,13-15,25,26 and 28-35* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-11,13-15,25,26 and 28-35* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

a. Applicant argues starting on page(s) 9, that the prior art does not specifically disclose "waking up the device when the motion of the device indicates a change in the dominant axis of the device."

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., specific dimension) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Please also see action below.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to applicant's argument that the benefit of the function would be different, and that it would substantially alter the functioning, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim(s) 26, 29, 34 is/are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "long average(s)" in claim(s) 13, 26, 29, 34 is a relative term which renders the claim indefinite. The term "long average(s)" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Though the claims are read in light of the specification, the limitations from the specification are not read into the claims, and the broadest reasonable interpretation has been given to the claims. Any dependent claim(s) and/or similar limitation(s) is/are rejected for similar reason(s). Proper action is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claim(s) 1-8, 10-11, 14-15, 25-26, 28-30, 33-34 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716).

As to claim(s) 1, Rakkola disclose(s):

A method comprising: receiving motion data from a motion sensor in a device, the motion sensor sensing motion along three axes; registering a motion of the device based on the motion data from the motion sensor; and waking up the device when the motion of the device indicates a change in the dominant axis of the device ([0015-44]).

The above art/combination does not expressly disclose determining an idle sample value for a dominant axis of the device, the dominant axis defined as the axis with a largest effect from gravity among the three axes.

Rakkola disclose(s): calculating reference levels for each of the three axes; programming threshold levels for each axis independently; collecting data for each of the three axes; idle states ([0015-44]).

Rakkola disclose(s): wherein determining the idle sample value for the dominant axis comprises: processing the motion data; and processing the idle sample value; processing data to establish an idle sample value; observing the degree of activity by counting the number of times a threshold is exceeded, as measured using an accelerometer, in combination with the low power motion detector; adjusting the idle sample value to offset temperature, air pressure, humidity, and other factors([0015-44]).

Mattice discloses processing the idle sample value to establish the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 2,

Rakkola disclose(s):

wherein determining the idle sample value for the dominant axis comprises: processing the motion data; and processing the idle sample value ([0015-44]).

Rakkola disclose(s): processing data to establish an idle sample value; observing the degree of activity by counting the number of times a threshold is exceeded, as measured using an accelerometer, in combination with the low power motion detector; adjusting the idle sample value to offset temperature, air pressure, humidity, and other factors([0015-44]).

Mattice discloses processing the idle sample value to establish the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54] see also claim(s) 1 and above claims).

As to claim(s) 3, Rakkola disclose(s):

the motion sensor comprises an accelerometer ([0015-44]).

As to claim(s) 4,

Rakkola disclose(s):

the idle sample value comprises an average of accelerations over a sample period along the dominant axis; when the device goes to idle mode after a period of inactivity ([0015-44]).

The above art/combination does not expressly disclose recorded.

Mattice discloses recorded spatial signatures, spatial signatures may be tracked, recorded, and/or analyzed by one or more motion detector devices; recording motion data (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to continue collecting data when the device is inactive, to track, record, and/or analyze the data, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 5, Rakkola disclose(s):

determining the idle sample value for each of the other axes of the device ([0015-44]).

As to claim(s) 6, Rakkola disclose(s):

registering the motion of the device comprises: processing the motion data to determine a current sample value along the dominant axis of the device ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 7, Rakkola disclose(s):

comparing a difference between a current sample value along the dominant axis determined based on the motion of the device and the idle sample value of the dominant axis against a threshold value ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 8,

The above art/combination does not expressly disclose the change in the dominant axis comprises a change in acceleration along the dominant axis.

Mattice discloses the change in the dominant axis comprises a change in acceleration along the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to determine whether the device is rest, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 10, Rakkola disclose(s):

the current sample value of the dominant axis of the device is an average of accelerations over a sample period ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 11, Rakkola disclose(s):

determining the current sample value for each of the other axes of the device ([0015-44]).

As to claim(s) 14, Rakkola disclose(s):

determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value ([0015-44]).

As to claim(s) 15,

Rakkola disclose(s): computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis; comparing the difference against a threshold value to establish whether to wake the device up ([0015-44]).

The above art/combination does not expressly disclose determining a new dominant axis based on the motion data received from the motion sensor; when the device goes to idle mode after a period of inactivity.

Rakkola disclose(s): updating values automatically and periodically, as a programmable parameter; computing when the device goes to idle mode after a period of inactivity ([0015-44]).

Mattice discloses determining a new dominant axis based on the motion data received from the motion sensor (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to continue collecting data when a device is inactive, to determine whether the device is at rest, and to update values automatically and/or periodically, as a programmable parameter, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 25,

Rakkola disclose(s): A mobile device comprising: a motion sensor to register a motion of the mobile device; and a power logic to activate the device when the motion indicates a change in the dominant axis of the device ([0015-44]; see also claim 2).

The above art/combination does not expressly disclose a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data, the dominant axis defined as an axis with a largest effect from gravity among three axes.

Mattice discloses a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim 2).

the dominant axis defined as an axis with a largest effect from gravity among three axes (see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account, and to determine the axis with the greater amount of movement (see also claims 1, 2).

As to claim(s) 26,

Rakkola disclose(s): a long average logic to create one or more averages of accelerations over a sample period as measured by the motion sensor; acceleration data along each of the axes ([0015-44]).

Rakkola disclose(s): to compute the one or more long averages of accelerations; logic to set a period over which motion data is collected; the number of samples summed to compute the one or more long averages of accelerations is a programmable setting ([0015-44]).

As to claim(s) 28, Rakkola disclose(s):

a computation logic to determine if the averages of accelerations indicate a change in the dominant axis of the device ([0015-44]; see also claim(s) 1, 25; above claim(s)).

As to claim(s) 29, Rakkola disclose(s):

a glitch corrector logic to correct one or more glitches in the motion data before the one or more long averages are calculated ([0015-44]; see also claim 13; above claim(s)).

As to claim(s) 30, Rakkola disclose(s):

the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes ([0015-44]).

As to claim(s) 33,

A system to wake up a mobile device comprising: a motion sensor to detect motion along three axes; a dominant axis logic to compare an effect of gravity on the three axes, and to determine an axis of the device experiencing a largest effect of gravity; and a power logic to move the device from an inactive state to an active state upon detection of a change in the axis experiencing the largest effect of gravity (see claim(s) 1, 25; above claim(s)).

As to claim(s) 34,

A long average logic to create an average of accelerations over a sample period along the dominant axis; and a computation logic to determine of the average of accelerations indicates the change in the dominant axis of the device (see claim(s) 1, 26, 28; above claim(s)).

2. Claim(s) 9, 31, 35 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Gregg (6353449).

As to claim(s) 9, 31, 35,

The above art/combination does not expressly disclose waking up the device further comprises configuring the device to return to a last active device state.

Gregg discloses waking up the device further comprises configuring the device to return to a last active device state ([1, 23-30]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a means of viewing and executing applications that were being utilized when the user left the device, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

3. Claim(s) 13 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Doll (20070150136).

As to claim(s) 13,

Rakkola disclose(s): processing the motion data further comprises; and removing the one or more glitches in the motion data from the motion data before calculating the long average ([0015-44]).

The above art/combination does not expressly disclose verifying whether the motion data includes one or more glitches.

Doll discloses verifying whether the motion data includes one or more glitches ([0007]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to ensure that the system utilizes and processes valid information and data, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

4. Claim(s) 32 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola

(20060161377) in view of Mattice (20070259716) in view of Gregg (6353449) in view of Oh (6771250).

As to claim(s) 32,

The above art/combination does not expressly disclose the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

Oh discloses the device state logic allows user interaction to customize applications to be displayed when the device is woken up ([3, 13-25]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a means of viewing and executing applications that were being utilized and/or as desired by a user, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shirley Lu whose telephone number is (571) 272-8546. The examiner can normally be reached on 8:30-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Wu can be reached on (571) 272-2964. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Shirley Lu/
Primary Examiner, Art Unit 2681

Search Notes	Application/Control No. 12/247,950	Applicant(s)/Patent under Reexamination KAHN ET AL.	
	Examiner SHIRLEY LU	Art Unit 2681	

SEARCHED			
Class	Subclass	Date	Examiner
340	340/457,573.1,686.1,539.1,522,	10/31/12	SL

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
east, inventor search, Google	10/31/12	SL

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	10977	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/11/04 01:49
L2	3973	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/11/04 01:49
L3	73	(axis axes) with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/11/04 01:49
L4	17	L3 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/11/04 01:49
L5	17	L3 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/11/04 01:49
L6	10977	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/11/04 01:50
L7	73	(axis axes) with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/11/04 01:50
S2	28	("5793291" | "5949340" | "5966070" |	US-PGPUB;	OR	OFF	2010/05/03

		"6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			09:48
S3	7	S2 and remote$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48
S4	2	S3 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:49
S5	1	"20040095252".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:50
S8	0	"20030222775".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:14
S9	2	"20030098792".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:16
S10	0	"20030098792".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S11	0	"20030098792".pn. and temperature$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S12	1	"20030098792".pn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2010/05/03 10:43

			IBM_TDB			
S13	2	S2 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:46
S14	11	baby adj seat and distance same counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:13
S15	19	baby adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:17
S16	2	"20030122662".pn. and range	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:20
S17	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:22
S18	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:23
S19	133	car adj seat and distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S20	14	car adj seat and predetermined adj distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S21	0	"7797212".pn. and counter	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2010/05/03 11:26

			EPO; JPO; DERWENT; IBM_TDB			
S22	12	car adj seat and distance with signal$1 adj strength$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:27
S23	0	"1318".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S24	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S25	3	"131848".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06
S26	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06
S27	12	lojack.as. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:12
S28	2	"7561102".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:14
S29	2	"7536169".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:15
S30	3940	counter with time with distance	US-PGPUB; USPAT;	OR	OFF	2011/01/10 12:52

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S31	245	counter with measur$4 near5 (time with distance)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52
S32	25	S31 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:54
S33	11598	"327"/$.ccls. and rectifier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16
S34	616	"327"/$.ccls. and rectifier.ti.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16
S35	36	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:49
S36	21	S35 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:50
S37	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:53
S38	2	"20030034887".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12

S39	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S40	1	"20030034887".pn. and "10"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:18
S41	2	"20030034887".pn. and timer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:38
S42	0	"20030098792".pn. and "72"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S43	1	"20030098792".pn. and "27"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S44	0	"779712".apn. and low adj power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S45	0	"779712".apn. and motion adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S46	0	"779712".apn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S47	3	"779712".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/04/26 18:53

			DERWENT; IBM_TDB			
S48	2	"6922147".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:06
S49	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S50	3	S49 and (conserv$4 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S51	3	S49 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S52	2	S49 and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 20:56
S53	0	mtion adj detector with sleep	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S54	52	motion adj detector with sleep adj mode	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S55	10	S54 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:06
S56	9857	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/04/26 21:15

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S57	5	S56 and S54	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15
S58	638	signal adj edge adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:18
S59	0	signal adj edge adj detector same reduce adj error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S60	33	signal adj edge adj detector same error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S61	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S62	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:21
S63	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:22
S64	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S65	34	signal adj edge adj detector and measur$4	US-PGPUB;	OR	OFF	2011/04/26

		adj time	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			21:23
S66	5	signal adj edge adj detector same measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S68	86	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:24
S69	23	S68 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:25
S70	45	edge adj detect$4 with reduc$4 near3 error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S71	7	S70 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S72	1	"247950".apn. and dominant adj axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:03
S73	18	(("20060161377") or ("200702597") or ("20070150136") or ("6353449") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:40
S74	0	("200700259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2011/04/27 11:57

			IBM_TDB			
S75	2	("20070259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S76	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 17:37
S77	1	"247950".apn. and (long adj average$1 with idle)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S78	1	"247950".apn. and (long adj average$1 with set$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S79	1	"247950".apn. and (long adj average$1 with idle adj sample)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:14
S80	1	"247950".apn. and (long adj average$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:17
S81	3524	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:18
S82	3524	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:19
S83	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2011/04/27 23:26

			EPO; JPO; DERWENT; IBM_TDB			
S84	2	S83 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S85	1	"247950".apn. and dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:34
S86	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:40
S87	1	"247950".apn. and new adj dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:43
S88	1	"20060161377".pn. and reference	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:47
S89	0	"20070259716".pn. and (idle sleep)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:54
S90	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:57
S91	1	"247950".apn. and idle with comput$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S92	1	"247950".apn. and idle	US-PGPUB; USPAT;	OR	OFF	2011/04/27 23:58

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB				
S93	0	"20070259716".pn. and ("0053" "0155" "0165" "0210" "0254")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39	
S94	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39	
S95	2	"6353449".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:00	
S96	2	"20070150136".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:03	
S97	7354	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15	
S98	3525	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15	
S99	3	S97 and S98	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15	
S100	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15	

S101	1	S97 and S100	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S102	3668	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S103	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S104	38	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S105	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S106	2	S105 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S107	7852	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S108	3668	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S109	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/10/14 15:56

			DERWENT; IBM_TDB			
S110	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S111	3	S110 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S112	23	S104 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S113	1	tire with inches with sensor with (outside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S114	1	tire with sensor with (outside) same inches	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S115	20	tire with sensor with (outside) same size	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S116	3	"447841".apn. and ("18" "20")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S117	3	"447841".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S118	3	"447841".apn.	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/10/22 18:49

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S119	1	S114 and ("18" "20")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S120	3	tire adj size with sensor with (outside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:50
S121	6	tire adj size same sensor with (outside inside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:50
S123	331	tire with sensor with (outside) with (pressure temperature)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:54
S124	86	S123 and @rlad < "20080604"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:55
S125	8488	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S126	347	tire with sensor with (outside) with (pressure temperature)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S127	3272	edge adj detect$4 with counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S128	39	340/573.1 and return adj signal with	US-PGPUB;	OR	OFF	2012/05/19

		distance	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			18:59
S129	23	S128 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S130	2	("7987070").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 19:00
S131	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:32
S132	208	(axis axes) with (idl$4 sleep$4) with accelerat$4	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:39
S133	20	S132 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:39
S134	9346	accelerometer with motion	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:41
S135	2	("20060161377").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 19:41
S136	0	(axis axes) with idle with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:40
S137	66	(axis axes) with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:41
S138	15	S137 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR;	OR	OFF	2012/06/16 15:41

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S139	0	(three) adj axes with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:44
S140	6	(three) adj axes with idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:44
S141	1	"247950".apn. and gravity	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:50
S142	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:57
S143	1	"247950".apn. and wak$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:00
S144	10685	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
S145	3855	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
S146	88	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04

11/ 4/ 2012 1:51:56 AM
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REQUEST FOR CONTINUED EXAMINATION (RCE) TRANSMITTAL

Address to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450

Application No. 12/247,950
Filing Date October 8, 2008
First Named Inventor Philippe Kahn
Art Unit 2681
Examiner Name Lu, Shirley
Attorney Docket No. 8689P057

This is a Request for Continued Examination (RCE) under 37 C.F.R. § 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See instruction sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. **Submission required under 37 C.F.R. § 1.114** – Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

   a. [ ] Previously submitted If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

      i. [ ] Consider the amendment(s)/reply under 37 C.F.R. § 1.116 previously filed on ______ (Any unentered amendment(s) referred to above will be entered. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.
      ii. [ ] Consider the arguments in the Appeal Brief or Reply Brief previously filed on ______
      iii. [ ] Other ______

   b. [X] Enclosed
      i. [X] Amendment/Reply
      ii. [ ] Affidavit(s)/Declaration(s)
      iii. [ ] Information Disclosure Statement (IDS)
      iv. [ ] Other ______

2. **Miscellaneous**
   a. [ ] Suspension of action on the above-identified application is requested under 37 C.F.R. § 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months. **Fee under 37 C.F.R. § 1.17(i) required)**
   b. [ ] Other ______

3. **Fees** The RCE fee under 37 C.F.R. § 1.17(e) is required by C.F.R. § 1.114 when the RCE is filed.
   a. [X] The Director is hereby authorized to charge the following fees, or credit any overpayments, to Deposit Account No. 02-2666
      i. [X] RCE fee required under 37 C.F.R. § 1.17(e)
      ii. [ ] Extension of time fee (37 C.F.R. §§ 1.136 and 1.17)
      iii. [ ] Processing fee under 37 CFR § 1.17(i) for Limited Suspension of Action
      iv. [ ] Other ______

   b. [ ] Check in the amount of $______ enclosed
   c. [ ] Payment by credit card (Form PTO-2038 enclosed)
   WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Name (Print/Type) Judith A. Szepesi   Registration No. (Attorney/Agent) 39,393

Signature /Judith Szepesi/   Date February 6, 2013

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.

Name (Print/Type) Judith A. Szepesi

Signature /Judith Szepesi/   Date February 6, 2013

Based on Form PTO/SB/30 (08-03) as modified by BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP on 09/10/03

Attorney's Docket No. 8689P057 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Philippe Kahn, et al
Appl. No.	:	12/247,950
Filed	:	October 8, 2008
For	:	Method and System for Waking Up a Device Due to Motion
Customer No.	:	08791

Examiner:	Lu, Shirley
Art Unit:	2681
Conf No:	8961

CERTIFICATE OF TRANSMISSION
I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.

/Judith Szepesi/ February 6, 2013
Judith A. Szepesi ***Date***

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

AMENDMENT

Sir:

In response to the Office Action of November 6, 2012, which was made final, applicants respectfully request the Examiner to enter the following amendments and consider the following remarks:

Amendments to the Claims are reflected in the listing of claims, which begins on page 2 of this paper.

Remarks/Arguments begin on page 6 of this paper.

Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method comprising:

receiving motion data from a motion sensor in a device, the motion sensor sensing motion along three axes;

determining an idle sample value for a dominant axis of the device, the dominant axis defined as the axis with a largest effect from gravity among the three axes;

registering a motion of the device based on the motion data from the motion sensor; and

waking up the device when the motion of the device indicates a change in the dominant axis of the device, indicating a change in the axis with the largest effect from gravity among the three axes.

2. (Previously Presented) The method of claim 1, wherein determining the idle sample value for the dominant axis comprises:

processing the motion data to establish an idle sample value; and

processing the idle sample value to establish the dominant axis.

3. (Previously Presented) The method of claim 1, wherein the motion sensor comprises an accelerometer.

4. (Previously Presented) The method of claim 2, wherein the idle sample value comprises an average of accelerations over a sample period along the dominant axis recorded when the device goes to idle mode after a period of inactivity.

5. (Previously Presented) The method of claim 2, further comprising determining the idle sample value for each of the other axes of the device.

6. (Previously Presented) The method of claim 1, wherein registering the motion of the device comprises:

processing the motion data to determine a current sample value along the dominant axis of the device.

7. (Previously Presented) The method of claim 2, further comprising comparing a difference between a current sample value along the dominant axis determined based on the motion of the device and the idle sample value of the dominant axis against a threshold value.

8. (Original) The method of claim 1, wherein the change in the dominant axis comprises a change in acceleration along the dominant axis.

9. (Original) The method of claim 1, wherein waking up the device further comprises configuring the device to return to a last active device state.

10. (Previously Presented) The method of claim 6, wherein the current sample value of the dominant axis of the device is an average of accelerations over a sample period.

11. (Original) The method of claim 6, further comprising determining the current sample value for each of the other axes of the device.

12. (Canceled)

13. (Previously Presented) The method of claim 6, wherein processing the motion data further comprises:

verifying whether the motion data includes one or more glitches; and

removing the one or more glitches in the motion data from the motion data before calculating the average.

14. (Original) The method of claim 6, further comprising determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value.

15. (Original) The method of claim 8, further comprising:

determining a new dominant axis based on the motion data received from the motion sensor;

computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis determined when the device goes to idle mode after a period of inactivity; and

comparing the difference against a threshold value to establish whether to wake the device up.

Claims 16-24. (Canceled)

25. (Previously Presented) A mobile device comprising:

a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data, the dominant axis defined as an axis with a largest effect from gravity among three axes;

a motion sensor to register a motion of the mobile device; and

a power logic to activate the device when the motion indicates a change in the dominant axis of the device.

26. (Previously Presented) The mobile device of claim 25, further comprising:

a long average logic to create one or more averages of accelerations over a sample period as measured by the motion sensor.

27. (Canceled)

28. (Previously Presented) The mobile device of claim 26, further comprising:

a computation logic to determine if the averages of accelerations indicate a change in the dominant axis of the device.

29. (Previously Presented) The mobile device of claim 26, further comprising a glitch corrector logic to correct one or more glitches in the motion data before the one or more long averages are calculated.

30. (Previously Presented) The mobile device of claim 25, wherein the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes.

31. (Previously Presented) The mobile device of claim 25, further comprising a device state logic to restore the device to a last active state.

32. (Previously Presented) The mobile device of claim 31, wherein the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

33. (Previously Presented) A system to wake up a mobile device comprising:

a motion sensor to detect motion along three axes;

a dominant axis logic to compare an effect of gravity on the three axes, and to determine an axis of the device experiencing a largest effect of gravity; and

a power logic to move the device from an inactive state to an active state upon detection of a change in the axis experiencing the largest effect of gravity.

34. (Previously Presented) The system of claim 33, further comprising:

a long average logic to create an average of accelerations over a sample period along the dominant axis; and

a computation logic to determine if the average of accelerations indicates the change in the dominant axis of the device.

35. (Previously Presented) The system of claim 33, further comprising:

a device state logic to restore the device to one of: a last active state, a preset customized state.

<u>Remarks/Arguments</u>

Applicants respectfully request consideration of the subject application as amended herein. This Amendment is submitted in response to the Office Action mailed November 6, 2012, which was made final. Claims 1-11, 13-15, 25, 26, and 28-35 are rejected. In this Amendment, claim 1 has been amended. No claims have been canceled or added. Applicants reserve all rights with respect to the applicability of the Doctrine of Equivalents.

<u>Claim Rejections under 35 U.S.C. §112, second paragraph</u>

Claims 26, 29, and 34 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, in objecting to the use of the term "long average logic."

Applicants respectfully not that the term "long average" is used only in the context of <u>the name of a logical element</u>, e.g. a "long average logic" which is defined in the Specification, in paragraph 23, as follows:

> The long average logic 240 calculates one or more long averages of acceleration based on the received motion data. In one embodiment, the long average logic 240 utilizes a ring buffer memory 250, discarding older data as new data is added to the long average. In one embodiment, the long average logic 240 creates a long average of accelerations along a single axis.

As noted in the MPEP 2111.01 IV, "An applicant is entitled to be his or her own lexicographer and may rebut the presumption that claim terms are to be given their ordinary and customary meaning by clearly setting forth a definition of the term that is different from its ordinary and customary meaning(s). See In re Paulsen, 30 F.3d 1475, 1480, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994)."

Furthermore, Applicants respectfully note that the MPEP 2173.05(b) notes that "Acceptability of the claim language depends on whether one of ordinary skill in the art would understand what is claimed, in light of the specification." One of skill in the art reading these claims would see that "long average logic" is a name for a logic element, and the term "long" is not used as a relative term, but rather as portion of a name.

Thus, the phrase is well defined, and not a relative term, and one of skill in the art would understand that "the long average logic" is a logic element in the system which calculates averages of acceleration based on motion data. Therefore, Applicants respectfully request withdrawal of this rejection.

Claim Rejections under 35 U.S.C. §103(a)

Claims 1-8, 10-11, 14-15, 25-26, 28-30, and 33-34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Publication No. 2006/0161377 to Rakkola, et al (hereinafter "Rakkola") in view of U.S. Publication No. 2007/0259716 to Mattice, et al (hereinafter "Mattice").

Rakkola discusses an energy-efficient acceleration measurement system. Rakkola's system includes an accelerometer, responsive to acceleration of the system, for providing an accelerometer output signal having a magnitude indicative of at least one component of the acceleration. A motion detector is responsive to the accelerometer output signal, and provides a processor interrupt signal, but only if the magnitude of acceleration reaches a threshold.

However, Rakkola specifically teaches away from using the axis with the largest effect from gravity by stating that "Another important aspect of the described motion detector's embodiments is that, when the motion detector is enabled, a reference level is calculated automatically. The benefit of this function is that there is consequently no need to consider offsets on different channels when setting threshold levels, and threshold levels can also be set independently from device orientation and from the vector of gravitational force. An averaging procedure is used for this reference level calculation as well (see previous description of averaging process for incoming acceleration data). The reference levels are calculated in this way for each of the three axes, assuming that a triaxial accelerometer is used." (Rakkola, paragraph 19). Thus it is an important aspect of Rakkola that the threshold levels are independent of the vector of gravitational force, and further that reference levels are calculated for each axis.

Therefore, it would substantially alter the functioning of Rakkola to utilize an axis most impacted by gravity.

Mattice discusses control of wager-based game using gesture recognition. Mattice notes that a tilt of a device may be detected by a change in gravitational acceleration, but does not teach or suggest utilizing gravity in determining whether to wake up a device. Although Mattice utilizes the term “dominant axis” Mattice references the “dominant axis of motion” which is the axis along which the user’s motion is largest, and which is therefore augmented in analysis. (Mattice, paragraph 156).

Applicants respectfully note that the proposed combination of Rakkola and Mattice is inappropriate. In particular, MPEP § 2145(X)(D)(2): clarifies that

> **References Cannot Be Combined Where Reference Teaches Away from Their Combination**
> It is improper to combine references where the references teach away from their combination. In re Grasselli, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983) (The claimed catalyst which contained both iron and an alkali metal was not suggested by the combination of a reference which taught the interchangeability of antimony and alkali metal with the same beneficial result, combined with a reference expressly excluding antimony from, and adding iron to, a catalyst.).

Because Rakkola specifically teaches away from utilizing gravitational force, adding the use of gravitational force from Mattice to the Rakkola reference is not appropriate. Therefore, the examiner’s proposed combination is inapt, and the claims should be found patentable.

Furthermore, Applicants respectfully submit that even if the combination were considered, the combination of Rakkola and Mattice do not teach or suggest “waking up the device when the motion of the device indicates a change in the dominant axis of the device,” as recited in claim 1.

Rakkola specifically teaches away from the use of a dominant axis, e.g. an axis having the largest gravitational effect from gravity, for waking up a device. Mattice’s dominant axis is only connected to the axis along which the most motion is observed, and is used to augment the motions sensed. Mattice does not utilize gravity-based calculations for waking up the device.

In contrast, claim 1 recites that the ”change in the dominant axis of the device” is used as a tool to wake up the device. Even if the combination of Rakkola and Mattice were valid, the combination of references does not teach or suggest this limitation.

Therefore, the combination of Rakkola and Mattice does not make obvious claim 1, and the claims that depend on it.

Claim 25 recites in part “a power logic to activate the device when the motion indicates a change in the dominant axis of the device.” As noted above, Rakkola and Mattice should not be combined. Furthermore, the combination of Rakkola and Mattice does not teach or suggest activating the device when the motion indicates a change in the dominant axis of the device. Therefore, claim 25 and the claims that depend on it are not obvious over Rakkola and Mattice.

Claim 33 recites in part “a power logic to move the device from an inactive state to an active state upon detection of a change in the axis experiencing the largest effect of gravity.” As noted above, Rakkola and Mattice should not be combined. Furthermore, the combination of Rakkola and Mattice does not teach or suggest activating the device when the motion indicates a change in the axis experiencing the largest effect of gravity. Therefore, claim 33 and the claims that depend on it are not obvious over Rakkola and Mattice.

Claims 9, 31, and 35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Mattice in view of U.S. Patent No. 6,353,449 to Gregg, et al (hereinafter “Gregg”).

Gregg discusses various screen savers for computing devices. Gregg does not discuss dominant axis or movements at all. Therefore Gregg cannot remedy the shortcomings of Rakkola and Mattice discussed above. Therefore, for at least the same reasons advanced above with respect to their respective parent claims, claims 9, 31, and 35 are not obvious over Rakkola in view of Mattice, in view of Gregg.

Claim 13 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Mattice in view of U.S. Publication No. 2007/0150136 to Doll, et al (hereinafter “Doll”).

Doll discusses a sensor self-test system for a motion sensor. However, Doll does not discuss waking up a device, much less waking up a device based on a change in a dominant axis. Therefore, for at least the same reasons advanced above with respect to claim 1, claim 13 is not obvious over Rakkola in view of Mattice, in view of Doll.

Claim 32 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Mattice in view of Gregg in view of U.S. Patent No. 6,771,250 to Oh.

Oh discusses an application program launcher, which may be used to launch applications from low power mode. While Oh discusses waking up a device, Oh does not discuss utilizing any motion data, much less using a change in the dominant axis. Therefore, Oh cannot remedy the shortcomings of Rakkola, Mattice, and Gregg discussed above. Therefore, claim 32 is not obvious over the combination of Rakkola, Mattice, Greg, and Oh for at least the same reasons advanced above with respect to claim 25.

Conclusion

Applicant respectfully submits that in view of the amendments and discussion set forth herein, the applicable rejections have been overcome. Accordingly, the present and amended claims should be found to be in condition for allowance.

If a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact Judith A. Szepesi at (408) 720-8300.

If there are any additional charges/credits, please charge/credit our deposit account no. 02-2666.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: February 6, 2013

/Judith Szepesi/
Judith A. Szepesi
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(408) 720-8300

Electronic Patent Application Fee Transmittal

Application Number:	12247950
Filing Date:	08-Oct-2008
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Filer:	Judith A. Szepesi
Attorney Docket Number:	8689P057

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	930	930
		Total in USD ($)		**930**

Electronic Acknowledgement Receipt

EFS ID:	14896164
Application Number:	12247950
International Application Number:	
Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Customer Number:	8791
Filer:	Judith A. Szepesi
Filer Authorized By:	
Attorney Docket Number:	8689P057
Receipt Date:	07-FEB-2013
Filing Date:	08-OCT-2008
Time Stamp:	02:35:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$930
RAM confirmation Number	7603
Deposit Account	022666
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Request for Continued Examination (RCE)	8689P057_RCE_Transmittal.pdf	20095 236fefbe03c23941ff94b9b9fe244d5baae9b0f7	no	1
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
2		8689P057_AmResp_Jan2013.pdf	111659 e26d41571ed506a6c9efa429d1f562cf1904e85f	yes	10

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment Submitted/Entered with Filing of CPA/RCE	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	10

Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30420 5e57789e93ddf599c0dd5ffec6507807c94badec	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	162174	

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number: 12/247,950
Filing Date: 10/08/2008
☐ To be Mailed

APPLICATION AS FILED – PART I

FOR	NUMBER FILED (Column 1)	NUMBER EXTRA (Column 2)	SMALL ENTITY ☐ RATE ($)	FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
			TOTAL			TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

AMENDMENT 02/07/2013	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 24	Minus	** 35	= 0	X $ =		OR	X $62=	0
Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $250=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/ALLYSON PURNELL/

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/247,950	10/08/2008	Philippe Kahn	8689P057	8961

8791 7590 02/26/2013
BLAKELY SOKOLOFF TAYLOR & ZAFMAN
1279 Oakmead Parkway
Sunnyvale, CA 94085-4040

EXAMINER	
LU, SHIRLEY	

ART UNIT	PAPER NUMBER
2681	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Office Action Summary	**Application No.** 12/247,950	**Applicant(s)** KAHN ET AL.	
	Examiner SHIRLEY LU	**Art Unit** 2681	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 February 2013*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1-11,13-15,25,26 and 28-35* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-11,13-15,25,26 and 28-35* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

a. Applicant argues starting on page(s) 7, that the reference teaches away and would substantially alter the functioning of Rakkola.

In response to applicant's argument that there is no teaching, suggestion, or motivation to combine the references, the examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007). In this case, the motivation would have been to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, collect data for each of the three axes, activate functions when specified conditions are detected, determine the axis with the greater amount of movement, adjust values according to other factors that should be taken into account, perform specific actions as a response to movement.

In response to applicant's argument that the benefit of the function would be different, and that it would substantially alter the functioning, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

b. Applicant argues starting on page(s) 8, that the prior art does not specifically disclose the newly amended limitations.

In response, please see action below. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Please also see action below.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim(s) 26, 29, 34 is/are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "long average(s)" in claim(s) 26, 29, 34 is a relative term which renders the claim indefinite. The term "long average(s)" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Though the claims are read in light of the specification, the limitations from the specification are not read into the claims, and the broadest reasonable interpretation has been given to the claims. Any dependent claim(s) and/or similar limitation(s) is/are rejected for similar reason(s). Proper action is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

> such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claim(s) 1-8, 10-11, 14-15, 25-26, 28-30, 33-34 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716).

As to claim(s) 1, Rakkola disclose(s):

A method comprising: receiving motion data from a motion sensor in a device, the motion sensor sensing motion along three axes; registering a motion of the device based on the motion data from the motion sensor; and waking up the device when the motion of the device indicates a change in the dominant axis of the device ([0015-44]).

The above art/combination does not expressly disclose determining an idle sample value for a dominant axis of the device, the dominant axis defined as the axis with a largest effect from gravity among the three axes; indicating a change in the axis with the largest effect from gravity among the three axes.

Rakkola disclose(s): calculating reference levels for each of the three axes; programming threshold levels for each axis independently; collecting data for each of the three axes; idle states; wherein determining the idle sample value for the dominant axis comprises: processing the motion data; and processing the idle sample value; processing data to establish an idle sample value; observing the degree of activity by counting the number of times a threshold is exceeded, as measured using an accelerometer, in combination with the low power motion detector; adjusting the idle sample value to offset temperature, air pressure, humidity, and other factors; if motion detector receives significant data from accelerometer, activates an interrupt; movement detected, woken up, perform specific actions as a response to movement ([0015-44]).

Mattice discloses processing the idle sample value to establish the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, collect data for each of the three axes, activate functions when specified conditions are detected, determine the axis with the greater amount of movement, adjust values according to other factors that should be taken into account, perform specific actions as a response to movement.

As to claim(s) 2,

Rakkola disclose(s):

wherein determining the idle sample value for the dominant axis comprises: processing the motion data; and processing the idle sample value ([0015-44]).

Rakkola disclose(s): processing data to establish an idle sample value; observing the degree of activity by counting the number of times a threshold is exceeded, as measured using an accelerometer, in combination with the low power motion detector; adjusting the idle sample value to offset temperature, air pressure, humidity, and other factors([0015-44]).

Mattice discloses processing the idle sample value to establish the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54] see also claim(s) 1 and above claims).

As to claim(s) 3, Rakkola disclose(s):

the motion sensor comprises an accelerometer ([0015-44]).

As to claim(s) 4,

Rakkola disclose(s):

the idle sample value comprises an average of accelerations over a sample period along the dominant axis; when the device goes to idle mode after a period of inactivity ([0015-44]).

The above art/combination does not expressly disclose recorded.

Mattice discloses recorded spatial signatures, spatial signatures may be tracked, recorded, and/or analyzed by one or more motion detector devices; recording motion data (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to continue collecting data when the device is inactive, to track, record, and/or analyze the data, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 5, Rakkola disclose(s):

determining the idle sample value for each of the other axes of the device ([0015-44]).

As to claim(s) 6, Rakkola disclose(s):

registering the motion of the device comprises: processing the motion data to determine a current sample value along the dominant axis of the device ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 7, Rakkola disclose(s):

comparing a difference between a current sample value along the dominant axis determined based on the motion of the device and the idle sample value of the dominant axis against a threshold value ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 8,

The above art/combination does not expressly disclose the change in the dominant axis comprises a change in acceleration along the dominant axis.

Mattice discloses the change in the dominant axis comprises a change in acceleration along the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to determine whether the device is rest, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 10, Rakkola disclose(s):

the current sample value of the dominant axis of the device is an average of accelerations over a sample period ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 11, Rakkola disclose(s):

determining the current sample value for each of the other axes of the device ([0015-44]; see also claim(s) 1 and above claim(s)).

As to claim(s) 14, Rakkola disclose(s):

determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value ([0015-44]; see also claim(s) 1 and above claim(s)).

As to claim(s) 15,

Rakkola disclose(s): computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis; comparing the difference against a threshold value to establish whether to wake the device up ([0015-44]).

The above art/combination does not expressly disclose determining a new dominant axis based on the motion data received from the motion sensor; when the device goes to idle mode after a period of inactivity.

Rakkola disclose(s): updating values automatically and periodically, as a programmable parameter; computing when the device goes to idle mode after a period of inactivity ([0015-44]).

Mattice discloses determining a new dominant axis based on the motion data received from the motion sensor (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to continue collecting data when a device is inactive, to determine whether the device is at rest, and to update values automatically and/or periodically, as a programmable parameter, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 25,

Rakkola disclose(s): A mobile device comprising: a motion sensor to register a motion of the mobile device; and a power logic to activate the device when the motion indicates a change in the dominant axis of the device ([0015-44]; see also claim 2).

The above art/combination does not expressly disclose a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data, the dominant axis defined as an axis with a largest effect from gravity among three axes.

Mattice discloses a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim 2).

the dominant axis defined as an axis with a largest effect from gravity among three axes (see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account, and to determine the axis with the greater amount of movement (see also claims 1, 2).

As to claim(s) 26,

Rakkola disclose(s): a long average logic to create one or more averages of accelerations over a sample period as measured by the motion sensor; acceleration data along each of the axes ([0015-44]).

Rakkola disclose(s): to compute the one or more long averages of accelerations; logic to set a period over which motion data is collected; the number of samples summed to compute the one or more long averages of accelerations is a programmable setting ([0015-44]; see also claim(s) 1 and above claim(s)).

As to claim(s) 28, Rakkola disclose(s):

a computation logic to determine if the averages of accelerations indicate a change in the dominant axis of the device ([0015-44]; see also claim(s) 1, 25; above claim(s)).

As to claim(s) 29, Rakkola disclose(s):

a glitch corrector logic to correct one or more glitches in the motion data before the one or more long averages are calculated ([0015-44]; see also claim 13; above claim(s)).

As to claim(s) 30, Rakkola disclose(s):

the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes ([0015-44]; see also claim(s) 1 and above claim(s)).

As to claim(s) 33,

A system to wake up a mobile device comprising: a motion sensor to detect motion along three axes; a dominant axis logic to compare an effect of gravity on the three axes, and to determine an axis of the device experiencing a largest effect of gravity; and a power logic to move the device from an inactive state to an active state upon detection of a change in the axis experiencing the largest effect of gravity (see claim(s) 1, 25; above claim(s)).

As to claim(s) 34,

A long average logic to create an average of accelerations over a sample period along the dominant axis; and a computation logic to determine of the average of accelerations indicates the change in the dominant axis of the device (see claim(s) 1, 26, 28; above claim(s)).

2. Claim(s) 9, 31, 35 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Gregg (6353449).

As to claim(s) 9, 31, 35,

The above art/combination does not expressly disclose waking up the device further comprises configuring the device to return to a last active device state.

Gregg discloses waking up the device further comprises configuring the device to return to a last active device state ([1, 23-30]; see also claim(s) 1 and above claim(s)).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a means of viewing and executing applications that were being utilized when the user left the device, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

3. Claim(s) 13 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Doll (20070150136).

As to claim(s) 13,

Rakkola disclose(s): processing the motion data further comprises; and removing the one or more glitches in the motion data from the motion data before calculating the long average ([0015-44]).

The above art/combination does not expressly disclose verifying whether the motion data includes one or more glitches.

Doll discloses verifying whether the motion data includes one or more glitches ([0007]; see also claim(s) 1 and above claim(s)).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to ensure that the system utilizes and processes valid information and data, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

4. Claim(s) 32 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Gregg (6353449) in view of Oh (6771250).

As to claim(s) 32,

The above art/combination does not expressly disclose the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

Oh discloses the device state logic allows user interaction to customize applications to be displayed when the device is woken up ([3, 13-25]; see also claim(s) 1 and above claim(s)).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a means of viewing and executing applications that were being utilized and/or as desired by a user, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shirley Lu whose telephone number is (571) 272-8546. The examiner can normally be reached on 8:30-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Wu can be reached on (571) 272-2964. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Shirley Lu/

Primary Examiner, Art Unit 2681

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	10977	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/11/04 01:49
L2	3973	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/11/04 01:49
L3	73	(axis axes) with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/11/04 01:49
L4	17	L3 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/11/04 01:49
L5	17	L3 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/11/04 01:49
L6	10977	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/11/04 01:50
L7	73	(axis axes) with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/11/04 01:50
S2	28	("5793291" | "5949340" | "5966070" |	US-PGPUB;	OR	OFF	2010/05/03

		"6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			09:48
S3	7	S2 and remote$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48
S4	2	S3 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:49
S5	1	"20040095252".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:50
S8	0	"20030222775".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:14
S9	2	"20030098792".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:16
S10	0	"20030098792".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S11	0	"20030098792".pn. and temperature$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S12	1	"20030098792".pn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2010/05/03 10:43

			IBM_TDB			
S13	2	S2 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:46
S14	11	baby adj seat and distance same counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:13
S15	19	baby adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:17
S16	2	"20030122662".pn. and range	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:20
S17	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:22
S18	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:23
S19	133	car adj seat and distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S20	14	car adj seat and predetermined adj distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S21	0	"7797212".pn. and counter	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2010/05/03 11:26

			EPO; JPO; DERWENT; IBM_TDB			
S22	12	car adj seat and distance with signal$1 adj strength$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:27
S23	0	"1318".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S24	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S25	3	"131848".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06
S26	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06
S27	12	lojack.as. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:12
S28	2	"7561102".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:14
S29	2	"7536169".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:15
S30	3940	counter with time with distance	US-PGPUB; USPAT;	OR	OFF	2011/01/10 12:52

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S31	245	counter with measur$4 near5 (time with distance)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52
S32	25	S31 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:54
S33	11598	"327"/$.ccls. and rectifier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16
S34	616	"327"/$.ccls. and rectifier.ti.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16
S35	36	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:49
S36	21	S35 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:50
S37	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:53
S38	2	"20030034887".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12

S39	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S40	1	"20030034887".pn. and "10"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:18
S41	2	"20030034887".pn. and timer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:38
S42	0	"20030098792".pn. and "72"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S43	1	"20030098792".pn. and "27"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S44	0	"779712".apn. and low adj power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S45	0	"779712".apn. and motion adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S46	0	"779712".apn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S47	3	"779712".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/04/26 18:53

			DERWENT; IBM_TDB			
S48	2	"6922147".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:06
S49	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S50	3	S49 and (conserv$4 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S51	3	S49 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S52	2	S49 and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 20:56
S53	0	mtion adj detector with sleep	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S54	52	motion adj detector with sleep adj mode	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S55	10	S54 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:06
S56	9857	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/04/26 21:15

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S57	5	S56 and S54	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15
S58	638	signal adj edge adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:18
S59	0	signal adj edge adj detector same reduce adj error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S60	33	signal adj edge adj detector same error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S61	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S62	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:21
S63	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:22
S64	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S65	34	signal adj edge adj detector and measur$4	US-PGPUB;	OR	OFF	2011/04/26

		adj time	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			21:23
S66	5	signal adj edge adj detector same measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S68	86	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:24
S69	23	S68 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:25
S70	45	edge adj detect$4 with reduc$4 near3 error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S71	7	S70 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S72	1	"247950".apn. and dominant adj axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:03
S73	18	(("20060161377") or ("200702597") or ("20070150136") or ("6353449") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:40
S74	0	("200700259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2011/04/27 11:57

			IBM_TDB			
S75	2	("20070259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S76	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 17:37
S77	1	"247950".apn. and (long adj average$1 with idle)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S78	1	"247950".apn. and (long adj average$1 with set$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S79	1	"247950".apn. and (long adj average$1 with idle adj sample)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:14
S80	1	"247950".apn. and (long adj average$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:17
S81	3524	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:18
S82	3524	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:19
S83	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2011/04/27 23:26

			EPO; JPO; DERWENT; IBM_TDB			
S84	2	S83 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S85	1	"247950".apn. and dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:34
S86	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:40
S87	1	"247950".apn. and new adj dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:43
S88	1	"20060161377".pn. and reference	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:47
S89	0	"20070259716".pn. and (idle sleep)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:54
S90	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:57
S91	1	"247950".apn. and idle with comput$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S92	1	"247950".apn. and idle	US-PGPUB; USPAT;	OR	OFF	2011/04/27 23:58

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S93	0	"20070259716".pn. and ("0053" "0155" "0165" "0210" "0254")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
S94	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
S95	2	"6353449".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:00
S96	2	"20070150136".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:03
S97	7354	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S98	3525	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S99	3	S97 and S98	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S100	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15

S101	1	S97 and S100	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S102	3668	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S103	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S104	38	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S105	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S106	2	S105 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S107	7852	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S108	3668	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S109	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/10/14 15:56

			DERWENT; IBM_TDB			
S110	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S111	3	S110 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S112	23	S104 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S113	1	tire with inches with sensor with (outside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S114	1	tire with sensor with (outside) same inches	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S115	20	tire with sensor with (outside) same size	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S116	3	"447841".apn. and ("18" "20")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S117	3	"447841".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S118	3	"447841".apn.	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/10/22 18:49

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S119	1	S114 and ("18" "20")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S120	3	tire adj size with sensor with (outside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:50
S121	6	tire adj size same sensor with (outside inside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:50
S123	331	tire with sensor with (outside) with (pressure temperature)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:54
S124	86	S123 and @rlad < "20080604"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:55
S125	8488	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S126	347	tire with sensor with (outside) with (pressure temperature)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S127	3272	edge adj detect$4 with counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S128	39	340/573.1 and return adj signal with	US-PGPUB;	OR	OFF	2012/05/19

		distance	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			18:59
S129	23	S128 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S130	2	("7987070").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 19:00
S131	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:32
S132	208	(axis axes) with (idl$4 sleep$4) with accelerat$4	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:39
S133	20	S132 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:39
S134	9346	accelerometer with motion	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:41
S135	2	("20060161377").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 19:41
S136	0	(axis axes) with idle with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:40
S137	66	(axis axes) with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:41
S138	15	S137 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR;	OR	OFF	2012/06/16 15:41

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S139	0	(three) adj axes with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:44
S140	6	(three) adj axes with idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:44
S141	1	"247950".apn. and gravity	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:50
S142	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:57
S143	1	"247950".apn. and wak$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:00
S144	10685	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
S145	3855	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
S146	88	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	(axis axes) with idle with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:40
L2	66	(axis axes) with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:41
L3	15	2 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:41
L4	0	(three) adj axes with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:44
L5	6	(three) adj axes with idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:44
L6	1	"247950".apn. and gravity	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:50
L7	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:57
L8	1	"247950".apn. and wak$4	US-PGPUB;	OR	OFF	2012/06/16

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			16:00
L9	10685	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
L10	3855	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
L11	88	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
S2	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48
S3	7	S2 and remote$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48
S4	2	S3 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:49
S5	1	"20040095252".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:50
S8	0	"20030222775".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2010/05/03 10:14

			IBM_TDB			
S9	2	"20030098792".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:16
S10	0	"20030098792".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S11	0	"20030098792".pn. and temperature$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S12	1	"20030098792".pn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:43
S13	2	S2 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:46
S14	11	baby adj seat and distance same counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:13
S15	19	baby adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:17
S16	2	"20030122662".pn. and range	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:20
S17	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2010/05/03 11:22

			EPO; JPO; DERWENT; IBM_TDB			
S18	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:23
S19	133	car adj seat and distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S20	14	car adj seat and predetermined adj distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S21	0	"7797212".pn. and counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:26
S22	12	car adj seat and distance with signal$1 adj strength$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:27
S23	0	"1318".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S24	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S25	3	"131848".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06
S26	1	"131848".apn. and automatic$4	US-PGPUB; USPAT;	OR	OFF	2010/05/13 20:06

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB				
S27	12	lojack.as. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:12	
S28	2	"7561102".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:14	
S29	2	"7536169".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:15	
S30	3940	counter with time with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52	
S31	245	counter with measur$4 near5 (time with distance)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52	
S32	25	S31 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:54	
S33	11598	"327"/$.ccls. and rectifier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16	
S34	616	"327"/$.ccls. and rectifier.ti.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16	

S35	36	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:49
S36	21	S35 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:50
S37	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:53
S38	2	"20030034887".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S39	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S40	1	"20030034887".pn. and "10"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:18
S41	2	"20030034887".pn. and timer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:38
S42	0	"20030098792".pn. and "72"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S43	1	"20030098792".pn. and "27"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/04/26 18:46

			DERWENT; IBM_TDB			
S44	0	"779712".apn. and low adj power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S45	0	"779712".apn. and motion adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S46	0	"779712".apn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S47	3	"779712".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S48	2	"6922147".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:06
S49	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S50	3	S49 and (conserv$4 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S51	3	S49 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S52	2	S49 and motion	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/04/26 20:56

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S53	0	mtion adj detector with sleep	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S54	52	motion adj detector with sleep adj mode	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S55	10	S54 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:06
S56	9857	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15
S57	5	S56 and S54	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15
S58	638	signal adj edge adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:18
S59	0	signal adj edge adj detector same reduce adj error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S60	33	signal adj edge adj detector same error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S61	10	signal adj edge adj detector with error	US-PGPUB;	OR	OFF	2011/04/26

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			21:19
S62	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:21
S63	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:22
S64	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S65	34	signal adj edge adj detector and measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S66	5	signal adj edge adj detector same measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S68	86	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:24
S69	23	S68 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:25
S70	45	edge adj detect$4 with reduc$4 near3 error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2011/04/26 21:26

			IBM_TDB			
S71	7	S70 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S72	1	"247950".apn. and dominant adj axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:03
S73	18	(("20060161377") or ("200702597") or ("20070150136") or ("6353449") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:40
S74	0	("200700259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S75	2	("20070259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S76	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 17:37
S77	1	"247950".apn. and (long adj average$1 with idle)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S78	1	"247950".apn. and (long adj average$1 with set$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S79	1	"247950".apn. and (long adj average$1 with idle adj sample)	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2011/04/27 23:14

			EPO; JPO; DERWENT; IBM_TDB			
S80	1	"247950".apn. and (long adj average$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:17
S81	3524	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:18
S82	3524	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:19
S83	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S84	2	S83 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S85	1	"247950".apn. and dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:34
S86	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:40
S87	1	"247950".apn. and new adj dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:43
S88	1	"20060161377".pn. and reference	US-PGPUB; USPAT;	OR	OFF	2011/04/27 23:47

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S89	0	"20070259716".pn. and (idle sleep)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:54
S90	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:57
S91	1	"247950".apn. and idle with comput$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S92	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S93	0	"20070259716".pn. and ("0053" "0155" "0165" "0210" "0254")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
S94	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
S95	2	"6353449".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:00
S96	2	"20070150136".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:03

S97	7354	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S98	3525	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S99	3	S97 and S98	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S100	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S101	1	S97 and S100	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S102	3668	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S103	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S104	38	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S105	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/10/14 15:56

			DERWENT; IBM_TDB			
S106	2	S105 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S107	7852	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S108	3668	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S109	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S110	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S111	3	S110 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S112	23	S104 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S113	1	tire with inches with sensor with (outside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S114	1	tire with sensor with (outside) same inches	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/10/22 18:48

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S115	20	tire with sensor with (outside) same size	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S116	3	"447841".apn. and ("18" "20")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S117	3	"447841".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S118	3	"447841".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S119	1	S114 and ("18" "20")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S120	3	tire adj size with sensor with (outside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:50
S121	6	tire adj size same sensor with (outside inside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:50
S123	331	tire with sensor with (outside) with (pressure temperature)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:54
S124	86	S123 and @rlad < "20080604"	US-PGPUB;	OR	OFF	2011/10/22

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			18:55
S125	8488	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S126	347	tire with sensor with (outside) with (pressure temperature)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S127	3272	edge adj detect$4 with counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S128	39	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S129	23	S128 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S130	2	("7987070").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 19:00
S131	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:32
S132	208	(axis axes) with (idl$4 sleep$4) with accelerat$4	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:39
S133	20	S132 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:39

S134	9346	accelerometer with motion	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:41
S135	2	("20060161377").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 19:41

6/ 16/ 2012 4:07:00 PM
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Search Notes	Application/Control No. 12/247,950	Applicant(s)/Patent under Reexamination KAHN ET AL.	
	Examiner SHIRLEY LU	Art Unit 2681	

SEARCHED

Class	Subclass	Date	Examiner
340	457,573.1, 686.1,539. 1,522,667	2/15/13	SL

SEARCH NOTES (INCLUDING SEARCH STRATEGY)

	DATE	EXMR
east, inventor search, Google	2/15/13	SL

INTERFERENCE SEARCHED

Class	Subclass	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	89	(axis axes) with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/02/21 17:36
L2	19	L1 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/02/21 17:36
L3	19	L1 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/02/21 17:36
S2	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48
S3	7	S2 and remote$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48
S4	2	S3 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:49
S5	1	"20040095252".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:50
S8	0	"20030222775".pn. and distance$1	US-PGPUB;	OR	OFF	2010/05/03

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			10:14
S9	2	"20030098792".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:16
S10	0	"20030098792".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S11	0	"20030098792".pn. and temperature$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S12	1	"20030098792".pn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:43
S13	2	S2 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:46
S14	11	baby adj seat and distance same counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:13
S15	19	baby adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:17
S16	2	"20030122662".pn. and range	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2010/05/03 11:20

			IBM_TDB			
S17	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:22
S18	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:23
S19	133	car adj seat and distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S20	14	car adj seat and predetermined adj distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S21	0	"7797212".pn. and counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:26
S22	12	car adj seat and distance with signal$1 adj strength$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:27
S23	0	"1318".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S24	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S25	3	"131848".apn.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2010/05/13 20:06

			EPO; JPO; DERWENT; IBM_TDB			
S26	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06
S27	12	lojack.as. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:12
S28	2	"7561102".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:14
S29	2	"7536169".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:15
S30	3940	counter with time with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52
S31	245	counter with measur$4 near5 (time with distance)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52
S32	25	S31 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:54
S33	11598	"327"/$.ccls. and rectifier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16
S34	616	"327"/$.ccls. and rectifier.ti.	US-PGPUB; USPAT;	OR	OFF	2011/01/11 22:16

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S35	36	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:49
S36	21	S35 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:50
S37	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:53
S38	2	"20030034887".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S39	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S40	1	"20030034887".pn. and "10"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:18
S41	2	"20030034887".pn. and timer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:38
S42	0	"20030098792".pn. and "72"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46

S43	1	"20030098792".pn. and "27"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S44	0	"779712".apn. and low adj power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S45	0	"779712".apn. and motion adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S46	0	"779712".apn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S47	3	"779712".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S48	2	"6922147".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:06
S49	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S50	3	S49 and (conserv$4 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S51	3	S49 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/04/26 19:31

			DERWENT; IBM_TDB			
S52	2	S49 and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 20:56
S53	0	mtion adj detector with sleep	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S54	52	motion adj detector with sleep adj mode	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S55	10	S54 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:06
S56	9857	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15
S57	5	S56 and S54	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15
S58	638	signal adj edge adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:18
S59	0	signal adj edge adj detector same reduce adj error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S60	33	signal adj edge adj detector same error	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/04/26 21:19

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S61	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S62	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:21
S63	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:22
S64	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S65	34	signal adj edge adj detector and measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S66	5	signal adj edge adj detector same measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S68	86	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:24
S69	23	S68 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:25
S70	45	edge adj detect$4 with reduc$4 near3	US-PGPUB;	OR	OFF	2011/04/26

		error$1	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			21:26
S71	7	S70 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S72	1	"247950".apn. and dominant adj axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:03
S73	18	(("20060161377") or ("200702597") or ("20070150136") or ("6353449") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:40
S74	0	("200700259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S75	2	("20070259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S76	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 17:37
S77	1	"247950".apn. and (long adj average$1 with idle)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S78	1	"247950".apn. and (long adj average$1 with set$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2011/04/27 23:11

			IBM_TDB			
S79	1	"247950".apn. and (long adj average$1 with idle adj sample)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:14
S80	1	"247950".apn. and (long adj average$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:17
S81	3524	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:18
S82	3524	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:19
S83	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S84	2	S83 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S85	1	"247950".apn. and dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:34
S86	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:40
S87	1	"247950".apn. and new adj dominant	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2011/04/27 23:43

			EPO; JPO; DERWENT; IBM_TDB				
S88	1	"20060161377".pn. and reference	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:47
S89	0	"20070259716".pn. and (idle sleep)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:54
S90	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:57
S91	1	"247950".apn. and idle with comput$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S92	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S93	0	"20070259716".pn. and ("0053" "0155" "0165" "0210" "0254")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
S94	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
S95	2	"6353449".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:00
S96	2	"20070150136".pn.	US-PGPUB; USPAT;	OR	OFF	2011/04/28 14:03

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S97	7354	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S98	3525	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S99	3	S97 and S98	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S100	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S101	1	S97 and S100	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S102	3668	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S103	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S104	38	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56

S105	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S106	2	S105 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S107	7852	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S108	3668	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S109	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S110	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S111	3	S110 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S112	23	S104 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S113	1	tire with inches with sensor with (outside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/10/22 18:48

			DERWENT; IBM_TDB			
S114	1	tire with sensor with (outside) same inches	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S115	20	tire with sensor with (outside) same size	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S116	3	"447841".apn. and ("18" "20")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S117	3	"447841".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S118	3	"447841".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S119	1	S114 and ("18" "20")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S120	3	tire adj size with sensor with (outside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:50
S121	6	tire adj size same sensor with (outside inside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:50
S123	331	tire with sensor with (outside) with (pressure temperature)	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/10/22 18:54

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S124	86	S123 and @rlad < "20080604"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:55
S125	8488	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S126	347	tire with sensor with (outside) with (pressure temperature)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S127	3272	edge adj detect$4 with counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S128	39	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S129	23	S128 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S130	2	("7987070").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 19:00
S131	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:32
S132	208	(axis axes) with (idl$4 sleep$4) with accelerat$4	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:39

S133	20	S132 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:39
S134	9346	accelerometer with motion	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:41
S135	2	("20060161377").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 19:41
S136	0	(axis axes) with idle with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:40
S137	66	(axis axes) with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:41
S138	15	S137 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:41
S139	0	(three) adj axes with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:44
S140	6	(three) adj axes with idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:44
S141	1	"247950".apn. and gravity	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:50
S142	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2012/06/16 15:57

			EPO; JPO; DERWENT; IBM_TDB			
S143	1	"247950".apn. and wak$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:00
S144	10685	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
S145	3855	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
S146	88	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
S147	11201	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/02/21 16:13
S148	91	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/02/21 16:13
S149	4082	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/02/21 16:13

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Attorney's Docket No. 8689P057 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Philippe Kahn, et al
Appl. No.	:	12/247,950
Filed	:	October 8, 2008
For	:	Method and System for Waking Up a Device Due to Motion
Customer No.	:	08791

Examiner:	Lu, Shirley
Art Unit:	2681
Conf No:	8961

CERTIFICATE OF TRANSMISSION
I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.

/Judith Szepesi/ May 28, 2013
Judith A. Szepesi ***Date***

E-Filed via EFS Web
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

AMENDMENT

Sir:

In response to the Office Action of February 26, 2013, applicants respectfully request the Examiner to enter the following amendments and consider the following remarks:

Amendments to the Claims are reflected in the listing of claims, which begins on page 2 of this paper.

Remarks/Arguments begin on page 6 of this paper.

Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A method comprising:

receiving motion data from a motion sensor in a device, the motion sensor sensing motion along three axes;

determining an idle sample value for a dominant axis of the device, the dominant axis defined as the axis with a largest effect from gravity among the three axes;

registering a motion of the device based on the motion data from the motion sensor; and

waking up the device when the motion of the device indicates a change in the dominant axis of the device, the dominant axis being ~~indicating a change in~~ the axis with the largest effect from gravity among the three axes.

2. (Previously Presented) The method of claim 1, wherein determining the idle sample value for the dominant axis comprises:

processing the motion data to establish an idle sample value; and

processing the idle sample value to establish the dominant axis.

3. (Previously Presented) The method of claim 1, wherein the motion sensor comprises an accelerometer.

4. (Previously Presented) The method of claim 2, wherein the idle sample value comprises an average of accelerations over a sample period along the dominant axis recorded when the device goes to idle mode after a period of inactivity.

5. (Previously Presented) The method of claim 2, further comprising determining the idle sample value for each of the other axes of the device.

6. (Previously Presented) The method of claim 1, wherein registering the motion of the device comprises:

processing the motion data to determine a current sample value along the dominant axis of the device.

7. (Previously Presented) The method of claim 2, further comprising comparing a difference between a current sample value along the dominant axis determined based on the motion of the device and the idle sample value of the dominant axis against a threshold value.

8. (Original) The method of claim 1, wherein the change in the dominant axis comprises a change in acceleration along the dominant axis.

9. (Original) The method of claim 1, wherein waking up the device further comprises configuring the device to return to a last active device state.

10. (Previously Presented) The method of claim 6, wherein the current sample value of the dominant axis of the device is an average of accelerations over a sample period.

11. (Original) The method of claim 6, further comprising determining the current sample value for each of the other axes of the device.

12. (Canceled)

13. (Previously Presented) The method of claim 6, wherein processing the motion data further comprises:

verifying whether the motion data includes one or more glitches; and

removing the one or more glitches in the motion data from the motion data before calculating the average.

14. (Original) The method of claim 6, further comprising determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value.

15. (Original) The method of claim 8, further comprising:

determining a new dominant axis based on the motion data received from the motion sensor;

computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis determined when the device goes to idle mode after a period of inactivity; and

comparing the difference against a threshold value to establish whether to wake the device up.

Claims 16-24. (Canceled)

25. (Previously Presented) A mobile device comprising:

a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data, the dominant axis defined as an axis with a largest effect from gravity among three axes;

a motion sensor to register a motion of the mobile device; and

a power logic to activate the device when the motion indicates a change in the dominant axis of the device.

26. (Currently Amended) The mobile device of claim 25, further comprising:

a long average logic to calculate an ~~create one or more~~ average[s] of accelerations over a sample period ~~as measured by the motion sensor~~.

27. (Canceled)

28. (Previously Presented) The mobile device of claim 26, further comprising:

a computation logic to determine if the averages of accelerations indicate a change in the dominant axis of the device.

29. (Currently Amended) The mobile device of claim 26, further comprising a glitch corrector logic to correct one or more glitches in the motion data before the one or more ~~long~~ averages are calculated.

30. (Previously Presented) The mobile device of claim 25, wherein the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes.

31. (Previously Presented) The mobile device of claim 25, further comprising a device state logic to restore the device to a last active state.

32. (Previously Presented) The mobile device of claim 31, wherein the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

33. (Previously Presented) A system to wake up a mobile device comprising:

a motion sensor to detect motion along three axes;

a dominant axis logic to compare an effect of gravity on the three axes, and to determine an axis of the device experiencing a largest effect of gravity; and

a power logic to move the device from an inactive state to an active state upon detection of a change in the axis experiencing the largest effect of gravity.

34. (Currently Amended) The system of claim 33, further comprising:

a long average logic to calculate ~~create~~ an average of accelerations over a sample period, for accelerations along the dominant axis; and

a computation logic to determine if the average of accelerations indicates the change in the dominant axis of the device.

35. (Previously Presented) The system of claim 33, further comprising:

a device state logic to restore the device to one of: a last active state, a preset customized state.

Remarks/Arguments

Applicants respectfully request consideration of the subject application as amended herein. This Amendment is submitted in response to the Office Action mailed February 26, 2013. Claims 1-11, 13-15, 25, 26, and 28-35 are rejected. In this Amendment, claims 1, 26, 29, and 34 have been amended. No claims have been canceled or added. Applicants reserve all rights with respect to the applicability of the Doctrine of Equivalents.

Examiner Interview

Applicants wish to thank the Examiner for her time in discussing the rejections. The Examiner suggested that if the term long average logic were defined identically to the language used in the Specification, the rejection under 35 USC 112, second paragraph, could be overcome. Applicants have amended the claims accordingly. The Examiner also noted that definitions from the Specification are not read into the claims, and thus suggested that Applicants should add definitions into the claim language, to overcome the references. No specific agreements on allowability were reached. If the Examiner has any specific suggestions on how the Applicants can clarify the scope of the claims and move this case to allowance, the Examiner is invited to call Judith Szepesi, at 408-720-8300.

Claim Rejections under 35 U.S.C. §112, second paragraph

Claims 26, 29, and 34 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicants have amended claims 26 and 34 to specifically reference the element definition from the Specification, in particular the Specification at paragraph 20 states that "The long average logic 240 calculates an average of the acceleration data over the sample period." Claims 26 and 34 have been amended accordingly, to further clarify that long average logic is an element name, as defined in the Specification, and not a relative term.

Claim 29 has been amended to remove the term "long."

Accordingly, Applicants respectfully request the withdrawal of the rejection under 35 U.S.C. §112, second paragraph.

Claim Rejections under 35 U.S.C. §103(a)

Claims 1-8, 10-11, 14-15, 25-26, 28-30, and 33-34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Publication No. 2006/0161377 to Rakkola, et al (hereinafter "Rakkola") in view of U.S. Publication No. 2007/0259716 to Mattice, et al (hereinafter "Mattice").

Rakkola discusses an energy-efficient acceleration measurement system. Rakkola's system includes an accelerometer, responsive to acceleration of the system, for providing an accelerometer output signal having a magnitude indicative of at least one component of the acceleration. A motion detector is responsive to the accelerometer output signal, and provides a processor interrupt signal, but only if the magnitude of acceleration reaches a threshold.

Rakkola notes that in the system described there is "no need to consider offsets on different channels when setting threshold levels, and threshold levels can also be set independently from device orientation and from the vector of gravitational force." (Rakkola, paragraph 19). Thus it is an important aspect of Rakkola that the threshold levels are independent of the vector of gravitational force, and further that reference levels are calculated for each axis.

Mattice discusses control of wager-based game using gesture recognition. Mattice notes that a tilt of a device may be detected by a change in gravitational acceleration, but does not teach or suggest utilizing gravity in determining whether to wake up a device. Although Mattice utilizes the term "dominant axis" Mattice references the "dominant axis of motion" which is the axis along which the user's motion is largest, and which is therefore augmented in analysis. (Mattice, paragraph 156).

Firstly, the combination of Rakkola and Mattice is inappropriate, because Rakkola specifically teaches away from utilizing gravitational force, adding the use of gravitational force from Mattice to the Rakkola reference is not appropriate.

The Examiner suggests that the motivation would be to suit the needs based on the characteristics of the system. However, this is incorrect. The system of Rakkola relies on the data from all three axes. Removing this aspect, which is called out by

Rakkola as being the advantage of the system would substantially alter the system. There is no motivation, either within the prior art cited or the knowledge in the art cited to make this modification to Rakkola, and thus render it less useful than as originally designed. Furthermore, the present invention is not an other advantage following naturally from the suggestion of the prior art, but is rather a substantial change to the prior art, which the prior art teaches away from. The MPEP 2143.01 notes that "the proposed modification §cannot render the prior art unsatisfactory for its intended purpose or change the principle of operation of a reference." Applicants respectfully submit that the suggested alteration of selecting a particular axis, and calculating averages only for that axis would substantially change the principle of operation of Rakkola. Therefore, Applicants respectfully submit that the Examiner's suggested combination is incorrect.

Furthermore, even if the combination were considered, the references in combination do not render the claims of the present invention obvious. The Examiner appears to suggest that a modification is based on other factors or criteria as desired by the user. Applicants respectfully submit that there is no such suggestion either in the prior art, or in knowledge in the art stated by the Examiner. Therefore, Applicants rely on the text of the references, and logical teaching and suggestion from those references. If the Examiner is asserting an alleged knowledge in the art, for relying a change in an identified dominant axis, for waking a device, Applicants respectfully request a source for this feature.

Claim 1 recites in part ""waking up the device when the motion of the device indicates a change in the dominant axis of the device, the dominant axis being the axis with the largest effect from gravity among the three axes." Applicants respectfully submit that the combination of Rakkola and Mattice does not teach or suggest this feature.

Rakkola does not utilize a dominant axis calculation at all, and therefore cannot utilize the change in the dominant axis for any action. Mattice discusses the use of a "dominant axis" but utilizes that term to refer to the "dominant axis of motion" along which the user's motion occurs. Mattice also does not teach or suggest utilizing a change in the dominant axis to wake the device, where the dominant axis is defined as the axis with the largest effect from gravity among the three axes. Therefore, since neither reference teaches or suggests utilizing the dominant axis, experiencing the largest effect from gravity, to wake the device, the combination of references cannot teach or suggest this limitation. Therefore, claim 1, as amended, and the claims that depend on it, are not obvious over the combination of references.

Claim 25 recites:

> A mobile device comprising:
>
> a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data, the dominant axis defined as an axis with a largest effect from gravity among three axes;
>
> a motion sensor to register a motion of the mobile device; and
>
> a power logic to activate the device when the motion indicates a change in the dominant axis of the device.

As noted above, Rakkola does not identify a dominant axis, defined as the axis with the largest effect from gravity among the three axes. Mattice does not identify such an axis either, as it uses the term “dominant axis” to mean the axis experiencing the largest user motion. Therefore, the combination of references does not teach or suggest a power logic to activate the device when the motion indicates a change in the dominant axis of the device. Therefore, claim 25, and the claims that depend on it, are not obvious over the combination of Rakkola and Mattice.

Claim 33 recites:

> A system to wake up a mobile device comprising:
>
> a motion sensor to detect motion along three axes;
>
> a dominant axis logic to compare an effect of gravity on the three axes, and to determine an axis of the device experiencing a largest effect of gravity; and
>
> a power logic to move the device from an inactive state to an active state upon detection of a change in the axis experiencing the largest effect of gravity.

As noted above, neither Rakkola nor Mattice use an axis experiencing the largest effect of gravity, in making any decisions. Rather, Rakkola uses data from all axes, and Mattice uses the axis experiencing the largest user movement. Therefore, neither Rakkola nor Mattice, alone or in combination teach or suggest a power logic to move the device from an inactive state to the active state upon detection of a change in the axis experiencing the largest effect of gravity. Therefore, claim 33 and the claims that depend on it are not obvious over Rakkola and Mattice.

Claims 9, 31, and 35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Mattice in view of U.S. Patent No. 6,353,449 to Gregg, et al (hereinafter "Gregg").

Gregg discusses various screen savers for computing devices. Gregg does not discuss utilizing an axis experiencing a greatest gravitational effect, or movements at all. Therefore, Gregg cannot remedy the shortcomings of Rakkola and Mattice discussed above. Therefore, for at least the same reasons advanced above with respect to their respective parent claims, claims 9, 31, and 35 are not obvious over Rakkola in view of Mattice, in view of Gregg.

Claim 13 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Mattice in view of U.S. Publication No. 2007/0150136 to Doll, et al (hereinafter "Doll").

Doll discusses a sensor self-test system for a motion sensor. However, Doll does not discuss waking up a device, much less waking up a device based on a change in a dominant axis. Therefore, Doll cannot remedy the shortcomings of Rakkola and Mattice discussed above.

Furthermore, the Examiner suggests that the self-test system of Doll teaches verifying whether the motion data includes identifying glitches and removing the glitches in the motion data before calculating the average. Applicants respectfully disagree. Doll's system is designed to verify proper operation of a motion sensor by injecting a test signal, and measuring the output of the sensor. Doll then sends an error message, if a fault is detected. (Doll, paragraph 7). However, firstly, the measurement of a test signal is not equivalent to a glitch. A glitch is an erroneous measurement in data, which does not reflect actual movement. Furthermore, there is no suggestion in Doll to remove erroneous data. Because Doll measures a test signal, there is no purpose in Doll in removing the one or more glitches in the motion data.

Claim 13 recites:

> The method of claim 6, wherein processing the motion data further comprises:
>
> verifying whether the motion data includes one or more glitches; and
>
> removing the one or more glitches in the motion data from the motion data before calculating the average.

There is no teaching or suggestion in Rakkola, Mattice, or Doll to determine whether the motion data includes one or more glitches, and to remove those glitches prior to calculating the average. Therefore, claim 13 is not obvious over the combination of Rakkola, Mattice, and Doll. Furthermore, Applicants respectfully submit that claim 13 is not obvious over the combination of Rakkola, Mattice, and Doll for at least the same reasons as advanced above with respect to claim 1.

Claim 32 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Rakkola in view of Mattice in view of Gregg in view of U.S. Patent No. 6,771,250 to Oh.

Oh discusses an application program launcher, which may be used to launch applications from low power mode. While Oh discusses waking up a device, Oh does not discuss utilizing any motion data, much less using a change in the dominant axis. Therefore, Oh cannot remedy the shortcomings of Rakkola, Mattice, and Gregg discussed above.

Furthermore, the Examiner suggests that Oh discusses a device state logic enabling the user to customize applications to be displayed when the device is woken up. Applicants respectfully disagree. Oh discusses a launcher, that enables using the launcher, a user can select one of application programs registered in a menu list of a launcher program, and immediately execute it. (Oh, column 3, lines 21-25). However, Oh teaches away from customizing a launch screen by noting that “When hand-held computer 10 is in a power-off state or a sleep mode, the microcomputer wakes up hand-held computer 10 to display menu list 100 only when the launching signal is inputted from launcher switch 40.” (Oh, column 4, line 57-60). There is no suggestion in Oh to allow user interaction to customize applications to be displayed when the device is woken up.

Claim 32 recites in part “the device state logic allows user interaction to customize applications to be displayed when the device is woken up.”

Applicants respectfully submit that there is no teaching in Rakkola, Mattice, Gregg, or Oh, alone or in combination of a device state logic that allows user interaction to customize applications to be displayed when the device is woken up. Therefore, claim 32 is not obvious over the references.

Furthermore, claim 32 is not obvious over the combination of Rakkola, Mattice, Gregg, and Oh for at least the same reasons advanced above with respect to claim 25.

Conclusion

Applicant respectfully submits that in view of the amendments and discussion set forth herein, the applicable rejections have been overcome. Accordingly, the present and amended claims should be found to be in condition for allowance.

If a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact Judith A. Szepesi at (408) 720-8300.

If there are any additional charges/credits, please charge/credit our deposit account no. 02-2666.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: May 28, 2013

/Judith Szepesi/
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Electronic Acknowledgement Receipt

EFS ID:	15888912
Application Number:	12247950
International Application Number:	
Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Customer Number:	8791
Filer:	Judith A. Szepesi
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1		8689P057_AmResp_May2013.pdf	119586 a3a00a7601faabe2bf11e647097de46bed8067cc	yes	12

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	12

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/247,950	Filing Date 10/08/2008	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	NUMBER FILED (Column 1)	NUMBER EXTRA (Column 2)	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT

05/29/2013	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 24	Minus	** 24	= 0	x $80 =	0
Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	x $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	**0**

AMENDMENT

	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/DAWN BREWER/

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/247,950	10/08/2008	Philippe Kahn	8689P057	8961

8791 7590 06/05/2013

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EXAMINER	
LU, SHIRLEY	

ART UNIT	PAPER NUMBER
2681	

MAIL DATE	DELIVERY MODE
06/05/2013	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No. 12/247,950	Applicant(s) KAHN ET AL.	
	Examiner SHIRLEY LU	Art Unit 2681	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 May 2013*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1-11,13-15,25-26 and 28-35* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-11,13-15,25,26 and 28-35* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some * c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Interim copies:

a)☐ All b)☐ Some c)☐ None of the: Interim copies of the priority documents have been received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

a. Applicant argues starting on page(s) 7, that the reference teaches away from utilizing gravitational force.

In response to applicant's argument that there is no teaching, suggestion, or motivation to combine the references, the examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007). In this case, the motivation would have been to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, collect data for each of the three axes, activate functions when specified conditions are detected, determine the axis with the greater amount of movement, adjust values according to other factors that should be taken into account, perform specific actions as a response to movement. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Please also see action below. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Please also see action below. In response to applicant's argument that the benefit of the function would be different, and that it would substantially alter the functioning, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

b. Applicant argues starting on page(s) 10, that the prior art does not specifically disclose claim(s) 13.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., remove erroneous data) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Please also see action below.

c. Applicant argues starting on page(s) 11, that the prior art does not specifically disclose customizing a launch screen.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., customizing a launch screen) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Please also see action below.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim(s) 29 is/are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim(s) 29 recite(s) the limitation "the one or more averages". There is insufficient antecedent basis for this limitation in the claim. Any dependent claims are rejected under similar reasons. Proper action is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claim(s) 1-8, 10-11, 14-15, 25-26, 28-30, 33-34 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716).

As to claim(s) 1, Rakkola disclose(s):

A method comprising: receiving motion data from a motion sensor in a device, the motion sensor sensing motion along three axes; registering a motion of the device based on the motion data from the motion sensor; and waking up the device when the motion of the device indicates a change in the dominant axis of the device ([0015-44]).

The above art/combination does not expressly disclose determining an idle sample value for a dominant axis of the device, the dominant axis defined as the axis with a largest effect from gravity among the three axes; the dominant axis being the axis with the largest effect from gravity among the three axes.

Rakkola disclose(s): calculating reference levels for each of the three axes; programming threshold levels for each axis independently; collecting data for each of the three axes; idle states; wherein determining the idle sample value for the dominant axis comprises: processing the motion data; and processing the idle sample value; processing data to establish an idle sample value; observing the degree of activity by counting the number of times a threshold is exceeded, as measured using an accelerometer, in combination with the low power motion detector; adjusting the idle sample value to offset temperature, air pressure, humidity, and other factors; if motion detector receives significant data from accelerometer, activates an interrupt; movement detected, woken up, perform specific actions as a response to movement ([0015-44]).

Mattice discloses processing the idle sample value to establish the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, collect data for each of the three axes, activate functions when specified conditions are detected, determine the axis with the greater amount of movement, adjust values according to other factors that should be taken into account, perform specific actions as a response to movement.

As to claim(s) 2,

Rakkola disclose(s):

wherein determining the idle sample value for the dominant axis comprises: processing the motion data; and processing the idle sample value ([0015-44]).

Rakkola disclose(s): processing data to establish an idle sample value; observing the degree of activity by counting the number of times a threshold is exceeded, as measured using an accelerometer, in combination with the low power motion detector; adjusting the idle sample value to offset temperature, air pressure, humidity, and other factors([0015-44]).

Mattice discloses processing the idle sample value to establish the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54] see also claim(s) 1 and above claims).

As to claim(s) 3, Rakkola disclose(s):

the motion sensor comprises an accelerometer ([0015-44]).

As to claim(s) 4,

Rakkola disclose(s):

the idle sample value comprises an average of accelerations over a sample period along the dominant axis; when the device goes to idle mode after a period of inactivity ([0015-44]).

The above art/combination does not expressly disclose recorded.

Mattice discloses recorded spatial signatures, spatial signatures may be tracked, recorded, and/or analyzed by one or more motion detector devices; recording motion data (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to continue collecting data when the device is inactive, to track, record, and/or analyze the data, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 5, Rakkola disclose(s):

determining the idle sample value for each of the other axes of the device ([0015-44]).

As to claim(s) 6, Rakkola disclose(s):

registering the motion of the device comprises: processing the motion data to determine a current sample value along the dominant axis of the device ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 7, Rakkola disclose(s):

comparing a difference between a current sample value along the dominant axis determined based on the motion of the device and the idle sample value of the dominant axis against a threshold value ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 8,

The above art/combination does not expressly disclose the change in the dominant axis comprises a change in acceleration along the dominant axis.

Mattice discloses the change in the dominant axis comprises a change in acceleration along the dominant axis (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to determine whether the device is rest, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 10, Rakkola disclose(s):

the current sample value of the dominant axis of the device is an average of accelerations over a sample period ([0015-44]; see also claim(s) 1 and above claims).

As to claim(s) 11, Rakkola disclose(s):

determining the current sample value for each of the other axes of the device ([0015-44]; see also claim(s) 1 and above claim(s)).

As to claim(s) 14, Rakkola disclose(s):

determining that the device is to be woken up based on the difference between the current sample value and the idle sample value being greater than a threshold value ([0015-44]; see also claim(s) 1 and above claim(s)).

As to claim(s) 15,

Rakkola disclose(s): computing a difference between the current sample value along the new dominant axis and an idle sample value along the new dominant axis; comparing the difference against a threshold value to establish whether to wake the device up ([0015-44]).

The above art/combination does not expressly disclose determining a new dominant axis based on the motion data received from the motion sensor; when the device goes to idle mode after a period of inactivity.

Rakkola disclose(s): updating values automatically and periodically, as a programmable parameter; computing when the device goes to idle mode after a period of inactivity ([0015-44]).

Mattice discloses determining a new dominant axis based on the motion data received from the motion sensor (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to continue collecting data when a device is inactive, to determine whether the device is at rest, and to update values automatically and/or periodically, as a programmable parameter, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

As to claim(s) 25,

Rakkola disclose(s): A mobile device comprising: a motion sensor to register a motion of the mobile device; and a power logic to activate the device when the motion indicates a change in the dominant axis of the device ([0015-44]; see also claim 2).

The above art/combination does not expressly disclose a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data, the dominant axis defined as an axis with a largest effect from gravity among three axes.

Mattice discloses a dominant axis logic to determine an idle sample value for a dominant axis of the mobile device based on motion data (fig. 2; [0053]; [0155-65]; [0210-54]; see also claim 2).

the dominant axis defined as an axis with a largest effect from gravity among three axes (see also claim(s) 1 and above claims).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account, and to determine the axis with the greater amount of movement (see also claims 1, 2).

As to claim(s) 26,

Rakkola disclose(s): a long average logic to calculate an average of accelerations over a sample period; acceleration data along each of the axes ([0015-44]).

Rakkola disclose(s): to compute the one or more long averages of accelerations; logic to set a period over which motion data is collected; the number of samples summed to compute the one or more averages of accelerations is a programmable setting ([0015-44]; see also claim(s) 1 and above claim(s)).

As to claim(s) 28, Rakkola disclose(s):

a computation logic to determine if the averages of accelerations indicate a change in the dominant axis of the device ([0015-44]; see also claim(s) 1, 25; above claim(s)).

As to claim(s) 29, Rakkola disclose(s):

a glitch corrector logic to correct one or more glitches in the motion data before the one or more averages are calculated ([0015-44]; see also claim 13; above claim(s)).

As to claim(s) 30, Rakkola disclose(s):

the motion sensor logic comprises an accelerometer to detect acceleration along one or more axes ([0015-44]; see also claim(s) 1 and above claim(s)).

As to claim(s) 33,

A system to wake up a mobile device comprising: a motion sensor to detect motion along three axes; a dominant axis logic to compare an effect of gravity on the three axes, and to determine an axis of the device experiencing a largest effect of gravity; and a power logic to move the device from an inactive state to an active state upon detection of a change in the axis experiencing the largest effect of gravity (see claim(s) 1, 25; above claim(s)).

As to claim(s) 34,

A long average logic to calculate an average of accelerations over a sample period, for accelerations along the dominant axis; and a computation logic to determine of the average of accelerations indicates the change in the dominant axis of the device (see claim(s) 1, 26, 28; above claim(s)).

2. Claim(s) 9, 31, 35 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Gregg (6353449).

As to claim(s) 9, 31, 35,

The above art/combination does not expressly disclose waking up the device further comprises configuring the device to return to a last active device state.

Gregg discloses waking up the device further comprises configuring the device to return to a last active device state ([1, 23-30]; see also claim(s) 1 and above claim(s)).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a means of viewing and executing applications that were being utilized when the user left the device, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

3. Claim(s) 13 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Doll (20070150136).

As to claim(s) 13,

Rakkola disclose(s): processing the motion data further comprises; and removing the one or more glitches in the motion data from the motion data before calculating the long average ([0015-44]).

The above art/combination does not expressly disclose verifying whether the motion data includes one or more glitches.

Doll discloses verifying whether the motion data includes one or more glitches ([0007]; see also claim(s) 1 and above claim(s)).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to ensure that the system utilizes and processes valid information and data, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

4. Claim(s) 32 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Rakkola (20060161377) in view of Mattice (20070259716) in view of Gregg (6353449) in view of Oh (6771250).

As to claim(s) 32,

The above art/combination does not expressly disclose the device state logic allows user interaction to customize applications to be displayed when the device is woken up.

Oh discloses the device state logic allows user interaction to customize applications to be displayed when the device is woken up ([3, 13-25]; see also claim(s) 1 and above claim(s)).

It would have been obvious to one of ordinary skill in the art to modify the above art/combination to teach the claimed limitations, to suit the needs of a based on the characteristics of the system, such that the system is based on criteria desired by the user, and to utilize a means of viewing and executing applications that were being utilized and/or as desired by a user, to collect data for each of the three axes, and to activate functions when specified conditions are detected, to determine the axis with the greater amount of movement, and to adjust the values according to other factors that should be taken into account.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shirley Lu whose telephone number is (571) 272-8546. The examiner can normally be reached on 8:30-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Wu can be reached on (571) 272-2964. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Shirley Lu/
Primary Examiner, Art Unit 2681

Search Notes	Application/Control No. 12/247,950	Applicant(s)/Patent under Reexamination KAHN ET AL.	
	Examiner SHIRLEY LU	**Art Unit** 2681	

SEARCHED			
Class	Subclass	Date	Examiner
340	457,573.1, 686.1,539. 1,522,667	5/30/13	SL

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
east, inventor search, Google	5/30/13	SL

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	11423	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/02 02:08
L2	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/02 02:08
L3	95	(axis axes) with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/02 02:08
L4	226	(axis axes) with (idl$4 sleep$4) with accelerat$4	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2013/06/02 02:08
L5	95	(axis axes) with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/02 02:08
L6	21	L3 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/02 02:08
S2	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:48
S3	7	S2 and remote$4	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2010/05/03 09:48

			EPO; JPO; DERWENT; IBM_TDB			
S4	2	S3 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:49
S5	1	"20040095252".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 09:50
S8	0	"20030222775".pn. and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:14
S9	2	"20030098792".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:16
S10	0	"20030098792".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S11	0	"20030098792".pn. and temperature$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:40
S12	1	"20030098792".pn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:43
S13	2	S2 and distance$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 10:46
S14	11	baby adj seat and distance same counter	US-PGPUB; USPAT;	OR	OFF	2010/05/03 11:13

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S15	19	baby adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:17
S16	2	"20030122662".pn. and range	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:20
S17	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:22
S18	167	car adj seat and predetermined adj distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:23
S19	133	car adj seat and distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S20	14	car adj seat and predetermined adj distance with signal$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:24
S21	0	"7797212".pn. and counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:26
S22	12	car adj seat and distance with signal$1 adj strength$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/03 11:27

S23	0	"1318".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S24	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:05
S25	3	"131848".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06
S26	1	"131848".apn. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:06
S27	12	lojack.as. and automatic$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:12
S28	2	"7561102".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:14
S29	2	"7536169".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/05/13 20:15
S30	3940	counter with time with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:52
S31	245	counter with measur$4 near5 (time with distance)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/01/10 12:52

			DERWENT; IBM_TDB			
S32	25	S31 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/10 12:54
S33	11598	"327"/$.ccls. and rectifier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16
S34	616	"327"/$.ccls. and rectifier.ti.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 22:16
S35	36	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:49
S36	21	S35 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:50
S37	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 17:53
S38	2	"20030034887".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S39	2	"20030034887".pn. and return adj signal	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:12
S40	1	"20030034887".pn. and "10"	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/04/26 18:18

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S41	2	"20030034887".pn. and timer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:38
S42	0	"20030098792".pn. and "72"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S43	1	"20030098792".pn. and "27"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:46
S44	0	"779712".apn. and low adj power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S45	0	"779712".apn. and motion adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S46	0	"779712".apn. and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S47	3	"779712".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 18:53
S48	2	"6922147".pn. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:06
S49	6	(("20030098792") or ("20030034887") or	US-PGPUB;	OR	OFF	2011/04/26

		("6922147")).PN.	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			19:31
S50	3	S49 and (conserv$4 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S51	3	S49 and (conserv$6 sav$4 power reduc$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 19:31
S52	2	S49 and motion	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 20:56
S53	0	mtion adj detector with sleep	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S54	52	motion adj detector with sleep adj mode	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:05
S55	10	S54 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:06
S56	9857	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:15
S57	5	S56 and S54	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2011/04/26 21:15

			IBM_TDB			
S58	638	signal adj edge adj detector	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:18
S59	0	signal adj edge adj detector same reduce adj error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S60	33	signal adj edge adj detector same error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S61	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:19
S62	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:21
S63	3	signal adj edge adj detector with error with count$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:22
S64	10	signal adj edge adj detector with error	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S65	34	signal adj edge adj detector and measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:23
S66	5	signal adj edge adj detector same measur$4 adj time	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2011/04/26 21:23

			EPO; JPO; DERWENT; IBM_TDB			
S68	86	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:24
S69	23	S68 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:25
S70	45	edge adj detect$4 with reduc$4 near3 error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S71	7	S70 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 21:26
S72	1	"247950".apn. and dominant adj axis	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:03
S73	18	(("20060161377") or ("200702597") or ("20070150136") or ("6353449") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/26 22:40
S74	0	("200700259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S75	2	("20070259716").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 11:57
S76	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT;	OR	OFF	2011/04/27 17:37

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S77	1	"247950".apn. and (long adj average$1 with idle)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S78	1	"247950".apn. and (long adj average$1 with set$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:11
S79	1	"247950".apn. and (long adj average$1 with idle adj sample)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:14
S80	1	"247950".apn. and (long adj average$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:17
S81	3524	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:18
S82	3524	"long average"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:19
S83	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26
S84	2	S83 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:26

S85	1	"247950".apn. and dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:34
S86	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:40
S87	1	"247950".apn. and new adj dominant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:43
S88	1	"20060161377".pn. and reference	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:47
S89	0	"20070259716".pn. and (idle sleep)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:54
S90	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:57
S91	1	"247950".apn. and idle with comput$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S92	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/27 23:58
S93	0	"20070259716".pn. and ("0053" "0155" "0165" "0210" "0254")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2011/04/28 13:39

			DERWENT; IBM_TDB			
S94	2	"20070259716".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 13:39
S95	2	"6353449".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:00
S96	2	"20070150136".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:03
S97	7354	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S98	3525	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S99	3	S97 and S98	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S100	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S101	1	S97 and S100	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/28 14:15
S102	3668	"long average"	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/10/14 15:56

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S103	28	("5793291" | "5949340" | "5966070" | "6104293" | "6535137" | "6714132" | "6812844" | "6909365" | "6922154" | "6924742" | "6930614" | "6998988").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S104	38	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S105	10	(("20060161377") or ("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S106	2	S105 and record$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S107	7852	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S108	3668	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S109	8	(("20070259716") or ("6353449") or ("20070150136") or ("6771250")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:56
S110	6	(("20030098792") or ("20030034887") or ("6922147")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S111	3	S110 and (conserv$6 sav$4 power	US-PGPUB;	OR	OFF	2011/10/14

		reduc$4)	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			15:57
S112	23	S104 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/14 15:57
S113	1	tire with inches with sensor with (outside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S114	1	tire with sensor with (outside) same inches	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S115	20	tire with sensor with (outside) same size	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S116	3	"447841".apn. and ("18" "20")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:48
S117	3	"447841".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S118	3	"447841".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:49
S119	1	S114 and ("18" "20")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2011/10/22 18:49

			IBM_TDB			
S120	3	tire adj size with sensor with (outside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:50
S121	6	tire adj size same sensor with (outside inside)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:50
S123	331	tire with sensor with (outside) with (pressure temperature)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:54
S124	86	S123 and @rlad < "20080604"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/10/22 18:55
S125	8488	((340/669) or (702/141) or (345/325,156)).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S126	347	tire with sensor with (outside) with (pressure temperature)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S127	3272	edge adj detect$4 with counter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S128	39	340/573.1 and return adj signal with distance	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 18:59
S129	23	S128 and @rlad < "20060718"	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2012/05/19 18:59

			EPO; JPO; DERWENT; IBM_TDB			
S130	2	("7987070").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 19:00
S131	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:32
S132	208	(axis axes) with (idl$4 sleep$4) with accelerat$4	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:39
S133	20	S132 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:39
S134	9346	accelerometer with motion	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2012/05/19 19:41
S135	2	("20060161377").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/19 19:41
S136	0	(axis axes) with idle with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:40
S137	66	(axis axes) with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:41
S138	15	S137 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:41
S139	0	(three) adj axes with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2012/06/16 15:44

			IBM_TDB			
S140	6	(three) adj axes with idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:44
S141	1	"247950".apn. and gravity	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:50
S142	1	"247950".apn. and idle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 15:57
S143	1	"247950".apn. and wak$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:00
S144	10685	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
S145	3855	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
S146	88	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/16 16:04
S147	11201	(340/457,573.1,686.1,539.1,522,667).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/02/21 16:13
S148	91	edge adj detect$4 with counter with error$1	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2013/02/21 16:13

			EPO; JPO; DERWENT; IBM_TDB			
S149	4082	long adj average	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/02/21 16:13
S150	89	(axis axes) with wak$4 adj up	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/02/21 17:36
S151	19	S150 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/02/21 17:36
S152	19	S150 and @rlad < "20081008"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/02/21 17:36
S153	1	"20040090333".pn. and exit$4	US-PGPUB; USPAT; USOCR; FPRS	OR	OFF	2013/02/21 18:15

6/2/2013 2:11:05 AM
C:\Users\slu\Documents\EAST\Workspaces\12247950.wsp

Substitute for Form 1449/PTO				*Complete if Known*	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	12/247,950
(use as many sheets as necessary)				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2681
				Examiner Name	Lu, Shirley
Sheet	1	**of**	9	Attorney Docket Number	8689P057

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] Number[4] Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
		EP 0 833 537	7/31/2002	Matsushita Electric Industrial Co.		
		EP 1 104 143	5/30/2001	Kaartinen		
		JP 2003-014459	1/15/2003	Sony Corp		√
		JP 2005-309691 A	11/4/2005	Tsuji, Tomoharuna		√
		JP 2006-118909	5/11/2006	Matsushita Electric Works Ltd		√
		JP 2007-093433	4/12/2007	Hitachi Ltd		√
		JP 7020547 A	1/24/1995	Ricoh KK		√
		WO 00/63874	10/26/2000	Stringer, John		
		WO 02/088926	11/7/2002	The Commonwealth of Australia		
		WO 2001/088477 A2	11/22/2001	Soehren et al		
		WO 99/22338	5/6/1999	British Telecommunicaitons		

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
		ANG, Wei Tech, et al, "Zero Phase Filtering for Active Compensation of Periodic Physiological Motion," Proc 1st IEEE / RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics, February 20-22, 2006, pp 182-187	
		LEE, Hyunseok, et al, "A Dual Processor Solution for the MAC Layer of a Software Defined Radio Terminal, Advanced Computer Architecture Laboratory, University of Michigan, 25 pages	
		WEINBERG, Harvey, "Minimizing Power Consumption of iMEMS® Accelerometers," Analog Devices, <http://www.analog.com/static/imported-files/application_notes/5935151853362884599AN601.pdf>, 2002, 5 pages	
		Zypad WL 1100 Wearable Computer, <http://www.eurotech.fi/products/manuals/Zypad%20WL%201100_sf.pdf>, 1/16/2008, 2 pgs	

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		US-	4,571,680	2/18/1986	Wu, Chyuan-Jong	
		US-	4,776,323	10/11/1998	Spector, Donald	
		US-	5,386,210	1/31/1995	Lee, Wade	
		US-	5,430,480	7/4/1995	Allen et al	
		US-	5,454,114	9/26/1995	Yach et al	
		US-	5,485,402	1/16/1996	Smith et al	
		US-	5,506,987	4/9/1996	Abramson et al	
		US-	5,737,439	4/7/1998	Lapsley et al	
		US-	5,771,001	6/23/1998	Cobb, Marion	
		US-	5,911,065	6/8/1999	Williams et al	
		US-	5,960,085	9/28/1999	de la Huerga	
		US-	6,061,456	9/5/2000	Andrea et al	
		US-	6,246,321	6/12/2001	Rechsteiner et al.	
		US-	6,396,883	5/28/2002	Yang, et al.	
		US-	6,408,330	6/18/2002	de la Huerga	
		US-	6,470,147	10/22/2002	Imada	
		US-	6,478,736	11/12/2002	Mault, James R	
		US-	6,529,144	3/4/2003	Nilsen et al	
		US-	6,595,929	7/22/2003	Stivoric et al	
		US-	6,607,493	8/19/2003	Song, O Shik	
		US-	6,628,898	9/30/2003	Endo, Takayuki	
		US-	6,634,992	10/21/2003	Ogawa, Kyotaka	
		US-	6,665,802	12/16/2003	Ober	
		US-	6,672,991	1/6/2004	O'Malley, Sean M	
		US-	6,685,480	2/3/2004	Nishimoto et al	
		US-	6,731,958	5/4/2004	Shirai	
		US-	6,788,980	9/7/2004	Johnson	
		US-	6,895,425	5/17/2005	Kadyk et al	
		US-	7,020,487	3/28/2006	Kimata	
		US-	7,027,087	4/11/2006	Nozaki et al	
		US-	7,028,547	4/18/2006	Shiratori et al	
		US-	7,042,509	5/9/2009	Onuki, Ichiro	

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		US-	7,096,619	8/29/2006	Jackson et al	
		US-	7,149,964	12/12/2006	Cottrille et al	
		US-	7,155,507	12/26/2006	Hirano et al	
		US-	7,171,222	1/30/2007	Fotstick, Gideon	
		US-	7,173,604	2/6/2007	Marvit et al	
		US-	7,176,886	2/13/2007	Marvit et al	
		US-	7,176,887	2/13/2007	Marvit et al	
		US-	7,176,888	2/13/2007	Marvit et al	
		US-	7,180,500	2/20/2007	Marvit et al	
		US-	7,180,501	2/202007	Marvit et al	
		US-	7,180,502	2/202007	Marvit et al	
		US-	7,212,230	5/1/2007	Stavely, Donald J.	
		US-	7,254,516	8/7/2007	Case et al	
		US-	7,280,096	10/9/2007	Marvit et al	
		US-	7,301,526	11/27/2007	Marvit et al	
		US-	7,301,527	11/27/2007	Marvit et al	
		US-	7,301,528	11/27/2007	Marvit et al	
		US-	7,301,529	11/27/2007	Marvit et al	
		US-	7,305,323	12/4/2007	Skvortsov et al	
		US-	7,365,735	4/29/2008	Reinhardt et al	
		US-	7,365,736	4/29/2008	Marvit et al	
		US-	7,365,737	4/29/2008	Marvit et al	
		US-	7,379,999	5/27/2008	Zhou et al	
		US-	7,397,357	7/8/2008	Krumm et al	
		US-	7,428,471	9/23/2008	Darley et al	
		US-	7,457,872	11/25/2008	Aton et al	
		US-	7,463,997	12/9/2008	Pasolini et al	
		US-	7,617,071	11/10/2009	Darley et al	
		US-	7,640,134	12/29/2009	Park et al	
		US-	7,664,657	2/16/2010	Letzt et al	
		US-	7,689,107	3/30/2010	Enomoto, Shigeo	
		US-	7,705,884	4/27/2010	Pinto, et al.	

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		US-	7,765,553	7/27/2010	Douceur et al	
		US-	7,788,059	8/31/2010	Kahn et al	
		US-	7,881,902	2/1/2011	Kahn et al	
		US-	7,889,085	2/15/2011	Downey et al	
		US-	7,892,080	2/22/2011	Dahl, Fredrik Andreas	
		US-	7,962,312	6/14/2011	Darley et al	
		US-	8,187,182	5/29/2012	Kahn et al	
		US-	2001/0047488	11/29/2001	Verplaetse et al	
		US-	2002/0006284	1/17/2002	Kim, Sung Bong	
		US-	2002/0027164	3/7/2002	Mault et al	
		US-	2002/0042830	4/11/2002	Bose et al	
		US-	2002/0044634	4/18/2002	Rooke et al	
		US-	2002/0054214	5/9/2002	Yoshikawa, Toshikazu	
		US-	2002/0122543	9/5/2002	Rowen, Chris E	
		US-	2002/0138017	9/26/2002	Bui et al	
		US-	2002/0142887	10/3/2002	O'Malley, Sean M	
		US-	2002/0150302	10/17/2002	McCarthy, et al	
		US-	2002/0173295	11/21/2002	Nykanen et al	
		US-	2002/0190947	12/19/2002	Feinstein	
		US-	2003/0033411	2/13/2003	Kavoori et al	
		US-	2003/0093187	5/15/2003	Walker et al	
		US-	2003/0101260	5/29/2003	Dacier et al	
		US-	2003/0139908	7/24/2003	Wegerich et al.	
		US-	2003/0149526	8/7/2003	Zhou et al.	
		US-	2003/0151672	8/14/2003	Robins et al	
		US-	2003/0187683	10/2/2003	Kirchhoff et al	
		US-	2003/0208110	11/6/2003	Mault et al	
		US-	2003/0208113	11/6/2003	Mault et al	
		US-	2003/0227487	12/11/2003	Hugh, Harlan M.	
		US-	2003/0236625	12/25/2003	Brown et al	
		US-	2004/0017300	1/29/2004	Kotzin et al	
		US-	2004/0024846	2/5/2004	Randall et al	

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		US-	2004/0043760	3/4/2004	Rosenfeld et al	
		US-	2004/0044493	5/4/2001	Coulthard	
		US-	2004/0047498	3/11/2004	Mulet-Parada, et al	
		US-	2004/0078219	4/22/2004	Kaylor et al	
		US-	2004/0078220	4/22/2004	Jackson	
		US-	2004/0081441	4/29/2004	Sato, Tatsuya , et al.	
		US-	2004/0106958	6/3/2004	Mathis, et al	
		US-	2004/0122294	6/24/2004	Hatlestad et al	
		US-	2004/0122295	6/24/2004	Hatlestad et al	
		US-	2004/0122296	6/24/2004	Hatlestad et al	
		US-	2004/0122297	6/24/2004	Stahmann et al	
		US-	2004/0122333	6/24/2004	Nissila, Seppo	
		US-	2004/0122484	6/24/2004	Hatlestad et al	
		US-	2004/0122485	6/24/2004	Stahmann et al	
		US-	2004/0122486	6/24/2004	Stahmann et al	
		US-	2004/0122487	6/24/2004	Hatlestad et al	
		US-	2004/0125073	7/1/2004	Potter et al	
		US-	2004/0130628	7/8/2004	Stavely, Donald J	
		US-	2004/0135898	7/15/2004	Zador	
		US-	2004/0146048	7/29/2004	Cotte	
		US-	2004/0148340	7/29/2004	Cotte	
		US-	2004/0148341	7/29/2004	Cotte	
		US-	2004/0148342	7/29/2004	Cotte	
		US-	2004/0148351	7/29/2004	Cotte	
		US-	2004/0176067	9/9/2004	Lakhani et al	
		US-	2004/0185821	9/23/2004	Yuasa, Tomokazu	
		US-	2004/0219910	11/4/2004	Beckers, Fabien	
		US-	2004/0242202	12/2/2004	Torvinen, Marko	
		US-	2004/0247030	12/9/2004	Wiethoff, Andre	
		US-	2004/0259494	12/23/2004	Mazar, Scott T.	
		US-	2005/0015768	1/20/2005	Moore, Mark Justin	
		US-	2005/0027567	2/3/2006	Taha	

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		US-	2005/0038691	2/17/2005	Babu, Suresh	
		US-	2005/0048945	3/3/2005	Porter, Robert	
		US-	2005/0048955	3/3/2005	Ring, Steffen	
		US-	2005/0078197	4/14/2005	Gonzales, Patrick F	
		US-	2005/0079873	4/14/2005	Caspi et al.	
		US-	2005/0101841	5/12/2005	Kaylor et al	
		US-	2005/0102167	5/12/2005	Kapoor, Ashok K	
		US-	2005/0107944	5/19/2005	Hovestadt et al	
		US-	2005/0113649	5/26/2005	Bergantino, Paul V	
		US-	2005/0113650	5/26/2005	Pacione et al	
		US-	2005/0131736	6/16/2005	Nelson et al	
		US-	2005/0141522	6/30/2005	Kadar et al	
		US-	2005/0143106	6/30/2005	Chan et al	
		US-	2005/0146431	7/7/2005	Hastings et al	
		US-	2005/0157181	7/21/2005	Kawahara et al	
		US-	2005/0165719	7/28/2005	Greenspan et al	
		US-	2005/0168587	8/4/2005	Sato, et al.	
		US-	2005/0182824	8/18/2005	Cotte	
		US-	2005/0183086	8/18/2005	Abe et al	
		US-	2005/0203430	9/15/2005	Williams, Lyndsay , et al.	
		US-	2005/0212751	9/29/2005	Marvit et al	
		US-	2005/0212752	9/29/2005	Marvit et al	
		US-	2005/0212753	9/29/2005	Marvit et al	
		US-	2005/0212760	9/29/2005	Marvit et al	
		US-	2005/0216403	9/29/2005	Tam et al	
		US-	2005/0234676	10/20/2005	Shibayama, Hiroaki	
		US-	2005/0235058	10/20/2005	Rackus et al.	
		US-	2005/0243178	11/3/2005	McConica	
		US-	2005/0245988	11/3/2005	Miesel, Keith A.	
		US-	2005/0256414	11/17/2005	Kettunen et al	
		US-	2005/0258938	11/24/2005	Moulson, John L	
		US-	2005/0262237	11/24/2005	Fulton et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT *(use as many sheets as necessary)*				Application Number	12/247,950
				Filing Date	October 8, 2008
				First Named Inventor:	Philippe Kahn
				Art Unit	2681
				Examiner Name	Lu, Shirley
Sheet	7	**of**	9	Attorney Docket Number	8689P057

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2](If known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-	2005/0281289	12/22/2005	Huang et al	
		US-	2006/0009243	1/12/2006	Dahan et al	
		US-	2006/0017692	1/26/2006	Wehrenberg et al.	
		US-	2006/0029284	2/9/2006	Stewart	
		US-	2006/0080551	4/13/2009	Mantyjarvi et al	
		US-	2006/0090088	4/27/2006	Choi et al	
		US-	2006/0098097	5/11/2006	Wach et al	
		US-	2006/0149516	7/6/2006	Bond et al	
		US-	2006/0154642	7/13/2006	Scannell, Robert F. Jr.	
		US-	2006/0161459	7/20/2006	Rosenfeld et al	
		US-	2006/0167647	7/27/2006	Krumm et al.	
		US-	2006/0167943	7/27/2006	Rosenberg	
		US-	2006/0172706	8/3/2006	Griffin et al	
		US-	2006/0174685	8/10/2006	Skvortsov et al	
		US-	2006/0204214	9/14/2006	Shah et al	
		US-	2006/0249683	11/3/2006	Goldberg et al	
		US-	2006/0256082	11/16/2006	Cho et al	
		US-	2006/0257042	11/16/2006	Ofek, et al.	
		US-	2006/0289819	12/28/2006	Parsons, et al.	
		US-	2007/0004451	1/4/2007	C Anderson, Eric	
		US-	2007/0005988	1/4/2007	Zhengyou et al	
		US-	2007/0017136	1/25/2007	Mosher et al	
		US-	2007/0024441	2/1/2007	Kahn et al.	
		US-	2007/0037605	2/15/2007	Logan et al	
		US-	2007/0040892	2/22/2007	Aoki et al	
		US-	2007/0050157	3/1/2007	Kahn et al.	
		US-	2007/0075127	4/5/2007	Rosenberg, Louis B.	
		US-	2007/0075965	4/5/2007	Huppi et al	
		US-	2007/0106991	5/10/2007	Yoo, Jun-Hyun	
		US-	2007/0143068	6/21/2007	Pasolini et al	
		US-	2007/0145680	6/28/2007	Rosenberg, Louis B	
		US-	2007/0156364	7/5/2007	Rothkopf, Fletcher R	

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U.S. PATENT DOCUMENTS

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		US-	2007/0161410	7/12/2007	Huang, et al.	
		US-	2007/0165790	7/19/2007	Taori, Rakesh	
		US-	2007/0169126	7/19/2007	Todoroki et al	
		US-	2007/0176898	8/2/2007	Suh, Hyuk-Jeen	
		US-	2007/0192483	8/16/2007	Rezvani et al	
		US-	2007/0239399	10/11/2007	Shyenblat et al	
		US-	2007/0259685	11/8/2007	Engblom et al.	
		US-	2007/0259717	11/8/2007	Mattice et al	
		US-	2007/0263995	11/15/2007	Park, Kyong H., et al.	
		US-	2008/0005738	1/3/2008	Imai et al	
		US-	2008/0030586	2/7/2008	Helbing et al	
		US-	2008/0046888	2/21/2008	Appaji, Anuradha K	
		US-	2008/0052716	2/28/2008	Theurer, Andrew Matthew	
		US-	2008/0072014	3/20/2008	Krishnan et al	
		US-	2008/0113689	5/15/2008	Bailey, William P	
		US-	2008/0140338	6/12/2008	No et al	
		US-	2008/0153671	6/26/2008	Ogg et al	
		US-	2008/0165022	7/10/2008	Herz et al.	
		US-	2008/0168361	7/10/2008	Forstall, et al.	
		US-	2008/0214358	9/4/2008	Ogg et al	
		US-	2008/0231713	9/25/2008	Florea, Corneliu , et al.	
		US-	2008/0231714	9/25/2008	Estevez et al	
		US-	2008/0232604	9/25/2008	Dufresne et al	
		US-	2008/0243432	10/2/2008	Kato et al	
		US-	2008/0303681	12/11/2008	Herz et al	
		US-	2008/0311929	12/18/2008	Carro et al	
		US-	2009/0017880	1/15/2009	Moore et al	
		US-	2009/0031319	1/29/2009	Fecioru, Mihai-Daniel	
		US-	2009/0043531	2/12/2009	Kahn et al	
		US-	2009/0067826	3/12/2009	Shinohara, Junichi , et al.	
		US-	2009/0082994	3/26/2009	Schuler et al	
		US-	2009/0088204	4/2/2009	Culbert et al	

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		US-	2009/0099668	4/16/2009	Lehman et al	
		US-	2009/0124348	5/14/2009	Yoseloff et al	
		US-	2009/0128448	5/21/2009	Riechel, Patrick	
		US-	2009/0174782	7/9/2009	Kahn, et al	
		US-	2009/0215502	8/27/2009	Griffin Jr, Paul P	
		US-	2009/0274317	11/5/2009	Kahn et al	
		US-	2009/0296951	12/3/2009	De Haan, Indo	
		US-				
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Application Number:	12247950
Filing Date:	08-Oct-2008
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Filer:	Judith A. Szepesi/Joan Abriam
Attorney Docket Number:	8689P057

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Claims:				
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Submission- Information Disclosure Stmt	1806	1	180	180
	Total in USD ($)			**180**

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Application Number:	12247950
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Confirmation Number:	8961
Title of Invention:	Method and System for Waking Up a Device Due to Motion
First Named Inventor/Applicant Name:	Philippe Kahn
Customer Number:	8791
Filer:	Judith A. Szepesi
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Payment information:

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Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	7877
Deposit Account	022666
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1	Foreign Reference	FOR_EP0833537.pdf	122519 e36afa2b57ddd8d09a6fa8341d9d6ab80f1fd50b	no	9
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3	Foreign Reference	FOR_JP2003014459.pdf	6163465 69639c7d19b948612db0838f15446801ad5b5b2d	no	14
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Information:					
4	Foreign Reference	FOR_JP02005309691.pdf	1829707 304c51af46e89bb94fce03c656335e8074a947ae	no	10
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Warnings:					
Information:					
6	Foreign Reference	FOR_JP2007093433.pdf	1430974 ab5a7ecf5c809525d5d3929dff8ad9642a44b539	no	17
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Information:					
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Information:					
8	Foreign Reference	FOR_WO0063874.pdf	1581721 ba972226b8a454ef1eebaf9d45ab3de1557361a7	no	40
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9	Foreign Reference	FOR_WO02088926.pdf	7678649 264615a1b9fe0432401659cb1f272216f171b4b6	no	194
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Information:					

10	Foreign Reference	FOR_WO0188477.pdf	1685465 6ba0f84135093e15945e8a36406cf6d9d1e46234	no	39
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Information:					
11	Foreign Reference	FOR_WO9922338.pdf	1460103 4b8c6e3f50306b40a768fef286b002d5bf40b88e	no	40
Warnings:					
Information:					
12	Non Patent Literature	NPL_Ang.pdf	256838 b27e476be8919621685a13b5dccb445ed6c72996	no	6
Warnings:					
Information:					
13	Non Patent Literature	NPL_Lee_DualProcessor.pdf	2720103 d80843c1d88e268ca4451761adec9cd8fb889a4e	no	25
Warnings:					
Information:					
14	Non Patent Literature	NPL_Weinberg_Minimizing.pdf	138258 f30f36becd5d78a0eb2472a87b57a0ab0fea0fe7	no	5
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15	Non Patent Literature	NPL_Zypad.pdf	1427300 d05d5ce56bfaae771a5954b43cf058c901f01aff	no	2
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(22) Date of filing: **25.09.1997**

(54) **A mobile telephone apparatus with power saving**

Energiesparendes mobiles Telefongerät

Téléphone mobile avec économie d'énergie

(84) Designated Contracting States:
DE FR GB

(30) Priority: **27.09.1996 JP 25610496**

(43) Date of publication of application:
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(56) References cited:
US-A- 4 903 319

- **PATENT ABSTRACTS OF JAPAN vol. 095, no. 003, 28 April 1995 & JP 06 351058 A (SHARP CORP), 22 December 1994**

EP 0 833 537 B1

Printed by Jouve, 75001 PARIS (FR)

Description

[0001] This invention relates to a mobile telephone apparatus with power saving.

[0002] A mobile telephone apparatus with power saving is known. Such a mobile telephone apparatus effects intermittent receiving outside a service area to save a power consumption, because there is a possibility that the mobile telephone apparatus moves to inside of the service area.

[0003] Japanese patent application provisional publication No. 06311079 A discloses a prior art mobile telephone set with automatic power-off function. In this prior art mobile telephone set, there is a function which interrupts power of a power supply automatically when the mobile telephone set comes outside of a zone of the service network.

[0004] Further, document US-4 903 319 discloses a battery-powered portable radio telephone for use in a mobile telephone network which receives signals from the network and judges from the received signal whether the radio telephone is inside or outside of the service area of the network. A battery saver is provided to periodically interrupt the battery power of the telephone when the latter is judged as being outside of the service area.

[0005] Moreover, document JP-06 351 058 discloses a mobile communication device in which a measuring means measures the electric field level of the presently used base station and another measuring means measures the electric field level of each base station so that the base station providing the strongest signals can be determined. Further, there is a moving control part for the detection of a movement of the mobile communication device so that the power consumed by the location registration is saved if the device does not move.

[0006] The aim of the present invention is to provide an improved mobile telephone apparatus with power saving.

[0007] According to the present invention, a mobile telephone apparatus is provided, which comprises: a radio communication circuit having an antenna for receiving a radio wave signal and outputting a reception signal; a judging circuit responsive to the reception signal for judging whether the mobile telephone apparatus is inside or outside a service area of the radio wave signal; a detection circuit for detecting whether the mobile telephone apparatus is in a moving condition or a static condition; a power supply for supplying a power to the radio communication circuit; and a control circuit responsive to the judging circuit and the detection circuit for stopping supplying the power to the radio communication circuit when the mobile telephone apparatus is outside the service area and the mobile telephone apparatus is in the static condition.

[0008] The mobile telephone apparatus mentioned above, may further comprise: a clock circuit for measuring a first interval of stopping supplying the power to the radio communication circuit, a second interval in the moving condition and displaying circuit for displaying the first interval and the second interval.

[0009] In the mobile telephone apparatus, the detection circuit comprises an accelerometer for detecting acceleration of the mobile telephone apparatus.

[0010] In the mobile telephone apparatus, the detection circuit comprises a vibration sensor for detecting a vibration of the mobile telephone apparatus.

[0011] In the mobile telephone apparatus, the detection circuit comprises a receiving circuit for receiving a vehicle speed signal indicative of a vehicle on which the mobile telephone apparatus is mounted.

[0012] The mobile telephone apparatus may further comprise: a clock circuit for measuring a first interval of stopping supplying the power to the radio communication circuit, a second interval in the moving condition and a displaying circuit for displaying the first interval and the second interval, wherein the detection circuit comprises a receiving circuit for receiving a vehicle speed signal indicative of a vehicle on which the mobile telephone apparatus is mounted.

[0013] The object and features of the present invention will become more readily apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a block diagram of a mobile telephone apparatus of a first embodiment;
Fig. 2 depicts a flow chart of the control program stored in the microprocessor 8; and
Fig. 3 is a partial block diagram of a modification; and
Fig. 4 is a block diagram of a mobile telephone apparatus of a second embodiment.

[0014] The same or corresponding elements or parts are designated with like references throughout the drawings.

<FIRST EMBODIMENT>

[0015] Fig. 1 is a block diagram of a mobile telephone apparatus of a first embodiment.

[0016] The mobile telephone apparatus of the first embodiment comprises a radio communication circuit 2 including an antenna for receiving a radio wave signal from a base station (not shown) and for transmitting a transmission signal, a service area judging circuit 6 for judging whether the mobile telephone apparatus is inside or outside the service area from the reception signal 24, an acceleration sensor (accelerometer) 7 for detecting acceleration of the mobile telephone apparatus, a clock circuit (timer) 9 for generating a present time signal and a timer signal, a key pad 10 for generating an operation signal, a control circuit 8 (microprocessor) for controlling respective circuits of the mobile telephone apparatus in response to outputs of the radio communication circuit 2, the service area judging circuit 6, the acceleration sensor 7, the clock circuit 9, and the operation signal, a display circuit 3 for displaying information from the control circuit 8, and a power supply for supplying first to third power PWR1 to PWR3 from a battery power from a battery 5 under control by the control circuit 8.

[0017] The first power PWR1 is supplied to the radio communication circuit 2 and the service area judging circuit 6.

[0018] An operation will be described.

[0019] The radio communication circuit 2 receives the radio wave signal from a base station through the antenna 1 and transmits the transmission signal. The service area judging circuit 6 judges whether the mobile telephone apparatus is inside or outside the service area from the reception signal 24. That is, if a control signal in the radio wave signal can be received correctly, the service area judging circuit 6 judges that the mobile telephone apparatus is inside the service area and if the control signal in the radio wave signal cannot be received correctly, the service area judging circuit 6 judges that the mobile telephone apparatus is outside the service area. The acceleration sensor 7 detects acceleration of the mobile telephone apparatus. When the acceleration sensor 7 shows an intermediate voltage in its dynamic range, the control circuit judges that the mobile telephone apparatus is in the static condition. When the voltage of the acceleration sensor 7 shows other voltages in its dynamic range, the control circuit judges that the mobile telephone apparatus is in the moving condition. The clock circuit 9 generates the present time signal and the timer signal for measuring an event in response to the control circuit 8. The key pad 10 generates the operation signal such as a dial signal and includes an ON/OFF switch (not shown) and a HOOK switch (not shown). The control circuit 8 controls respective circuits in accordance with a control program mentioned later. The display circuit 3 displays information from the control circuit 8. The power supply supplies first to third power PWR1 to PWR3 from a battery power from a battery 5 in a power-on condition. In a power save mode, the power supplying circuit 4 stops supplying the power PWR1 to the radio communication circuit 2 and to the service area judging circuit 6.

[0020] Fig. 2 depicts a flow chart of the control program stored in the microprocessor (mpu) 8.

[0021] The microprocessor 8 judges whether the ON/OFF switch is in the OFF or the ON condition in step s1. If the ON/OFF switch is in the ON condition, the microprocessor 8 judges whether the mobile telephone apparatus is inside or outside the service area from the reception signal in step s2. If the mobile telephone apparatus is inside the service area, the microprocessor 8 operates the power supply circuit 4 to supply all of powers PWR1 to PWR3 in step s3. In the following step s4, the microprocessor 8 effects controlling of a standby operation (intermittent receiving) or a communication condition. In the following step s11, the microprocessor 8 displays a moving condition interval from the timer signal which is derived from step s10 mentioned later. Then, the microprocessor 8 judges whether the ON/OFF switch is in the OFF or the ON condition. If the ON/OFF switch is in the ON condition, processing returns to step s2. If the ON/OFF switch is in the OFF condition, processing returns to step s1

[0022] In step s2, if the mobile telephone apparatus is outside the service area, the microprocessor 8 judges whether the mobile telephone apparatus is in the moving condition or the static condition in step s6. If the mobile telephone apparatus is in the moving condition processing proceeds to step s10 where the microprocessor 8 operates the clock circuit 9 to generate the timer signal indicative of the moving condition. Then, processing proceeds to step s3 to perform the standby or communication operation and the moving condition interval is displayed in step s11 as mentioned.

[0023] If the mobile telephone apparatus is in the static condition, the microprocessor 8 stops supplying the power PWR1 to the radio communication circuit 2 and to the service area judging circuit in step s7, calculates a total moving condition interval, and starts the timer to measure the power saving mode interval. In the following step s8, the microprocessor 8 makes the microprocessor 8 itself and the acceleration sensor 7 in a sleep mode to reduce the power consumption, starts the timer in the clock circuit for generating the timer signal, and displays the total moving condition interval. The acceleration sensor 7 consumes a power less than 1 mA in the sleep mode.

[0024] In the following step s9, the microprocessor 8 displays an interval of stopping supplying power PWR1 from the timer signal and displays the present time from the clock circuit 9. Then, processing returns to step s6.

[0025] Fig. 3 is a partial block diagram of a modification. In this modification, a vibration sensor 7' is used instead the acceleration sensor 7. The displaying in the sleep mode may be only effected in response to a command from the key pad 10 to further reduce the power consumption.

<SECOND EMBODIMENT>

[0026] Fig. 4 is a block diagram of a mobile telephone apparatus of a second embodiment.

[0027] The mobile telephone apparatus of the second embodiment is substantially the same as that of the first embodiment. The difference is that a vehicle speed sensor 11 replaces the acceleration sensor 7 and an interface circuit 13 for interfacing the vehicle speed sensor with the control circuit 8 is further provided. The vehicle speed sensor 11 detects a speed of a vehicle to which the mobile telephone apparatus is provided and supplies the vehicle speed signal to the control circuit 8 through the interface circuit 13. The interface circuit 13 comprises two sets of contacts, namely, one set for the vehicle speed sensor 11 and another for the ground line and effects interfacing when the mobile telephone apparatus is placed on a holder (not shown) provided to the vehicle. The holder has the contacts. Moreover, an infrared coupling using photo-diodes or a magnetic coupling can be used for the interfacing.

[0028] A mobile telephone apparatus is disclosed which comprises: a radio communication circuit having an antenna for receiving a radio wave signal and outputting a reception signal; a judging circuit responsive to the reception signal for judging whether the mobile telephone apparatus is inside or outside a service area; a detection circuit for detecting whether the mobile telephone apparatus is in a moving condition or a static condition; a power supply for supplying a power to the radio communication circuit; and a control circuit responsive to the judging circuit and the detection circuit for stopping supplying the power to the radio communication circuit when the mobile telephone apparatus is outside the service area and the mobile telephone apparatus is in the static condition. The detection circuit may comprise an acceleration sensor, a vibration sensor or a vehicle speed meter. The power consumption is further reduced by making the microprocessor and the acceleration sensor in a sleep mode. Intervals of the power saving mode can be displayed.

Claims

1. A mobile telephone apparatus comprising:

radio communication means (2) having an antenna for receiving a radio wave signal and outputting a reception signal;
judging means (6) responsive to said reception signal for judging whether said mobile telephone apparatus is inside or outside a service area of said radio wave signal;
a power supply (4) for supplying a power to said radio communication means;
characterized by
detection means (7) for detecting whether said mobile telephone apparatus is in a moving condition or a static condition; and
control means (8) responsive to said judging means and said detection means for stopping supplying said power to said radio communication means
when said mobile telephone apparatus is outside said service area and said mobile telephone apparatus is in said static condition.

2. The mobile telephone apparatus as claimed in claim 1, further comprising: a clock circuit (9) for measuring a first interval of stopping supplying said power to said radio communication means, a second interval in said moving condition and displaying means (3) for displaying said first interval and said second interval.

3. The mobile telephone apparatus as claimed in claim 1, wherein said detection means (7) comprises an accelerometer for detecting acceleration of said mobile telephone apparatus.

4. The mobile telephone apparatus as claimed in claim 1, wherein said detection means (7) comprises a vibration sensor for detecting a vibration of said mobile telephone apparatus.

5. The mobile telephone apparatus as claimed in claim 1, wherein said detection means (7) comprises receiving means (11) for receiving a vehicle speed signal indicative of a vehicle on which said mobile telephone apparatus is mounted, said detection means (7) detecting whether said mobile telephone apparatus is in said moving condition or said static condition from said vehicle speed signal.

6. The mobile telephone apparatus as claimed in claim 1, further comprising: a clock circuit (9) for measuring a first interval of stopping supplying said power to said radio communication means, a second Interval in said moving condition and displaying means (3) for displaying said first interval and said second interval, wherein said detection means (7) comprises receiving means (11) for receiving a vehicle speed signal indicative of a vehicle on which said mobile telephone apparatus is mounted.

Patentansprüche

1. Mobiles Telefongerät, umfassend:

eine Funkkommunikationseinrichtung (2) mit einer Antenne zum Empfangen eines Funkwellensignals und Ausgeben eines Empfangssignals;
eine auf das Empfangssignal ansprechende Beurteilungseinrichtung (6) zum Beurteilen, ob sich das mobile Telefongerät innerhalb oder außerhalb eines Dienstbereichs des Funkwellensignals befindet; und
eine Leistungsversorgung (4) zum Zuführen von Leistung zu der Funkkommunikationseinrichtung,
gekennzeichnet durch
eine Erfassungseinrichtung (7) zum Erfassen, ob sich das mobile Telefongerät in einem Bewegungszustand oder in einem statischen Zustand befindet; und
eine Steuereinrichtung (8), die auf die Beurteilungseinrichtung und die Erfassungseinrichtung anspricht, um die Zufuhr der Leistung zu

der Funkkommunikationseinrichtung zu beenden, wenn sich das mobile Telefongerät außerhalb des Dienstbereichs befindet und sich das mobile Telefongerät in dem statischen Zustand befindet.

2. Mobiles Telefongerät nach Anspruch 1, ferner umfassend:

eine Zeitmesserschaltung (9) zum Messen eines ersten Intervalls des Beendens der Leistungszufuhr zu der Funkkommunikationseinrichtung, eines zweiten Intervalls in dem Bewegungszustand, und eine Anzeigeeinrichtung (3) zum Anzeigen des ersten Intervalls und des zweiten Intervalls.

3. Mobiles Telefongerät nach Anspruch 1, bei dem die Erfassungseinrichtung (7) einen Beschleunigungsmesser zum Erfassen einer Beschleunigung des mobilen Telefongeräts umfaßt.

4. Mobiles Telefongerät nach Anspruch 1, bei dem die Erfassungseinrichtung (7) einen Vibrationssensor zum Erfassen einer Vibration des mobilen Telefongeräts umfaßt.

5. Mobiles Telefongerät nach Anspruch 1, bei dem die Erfassungseinrichtung (7) eine Empfangseinrichtung (11) zum Empfangen eines Fahrzeuggeschwindigkeitssignals umfaßt, das ein Fahrzeug anzeigt, in welchem das mobile Telefongerät eingebaut ist, wobei die Erfassungseinrichtung (7) aus dem Fahrzeuggeschwindigkeitssignal erfaßt, ob sich das mobile Telefongerät in dem Bewegungszustand oder in dem statischen Zustand befindet.

6. Mobiles Telefongerät nach Anspruch 1, ferner umfassend:

eine Zeitmesserschaltung (9) zum Messen eines ersten Intervalls des Beendens der Leistungszufuhr zu der Funkkommunikationseinrichtung, eines zweiten Intervalls in dem Bewegungszustand, und eine Anzeigeeinrichtung (3) zum Anzeigen des ersten Intervalls und des zweiten Intervalls, wobei die Erfassungseinrichtung (7) eine Empfangseinrichtung (11) zum Empfangen eines Fahrzeuggeschwindigkeitssignals umfaßt, das ein Fahrzeug anzeigt, in welchem das mobile Telefongerät eingebaut ist.

Revendications

1. Dispositif de téléphone mobile comprenant :

un moyen de communication radio (2) comportant une antenne destinée à recevoir un signal d'onde radio et à fournir en sortie un signal de réception,
un moyen d'évaluation (6) sensible audit signal de réception afin d'évaluer si ledit dispositif de téléphone mobile est à l'intérieur ou à l'extérieur d'une zone de service dudit signal d'onde radio,
une alimentation (4) destinée à fournir de l'alimentation audit moyen de communication radio,

caractérisé par

un moyen de détection (7) destiné à détecter si ledit dispositif de téléphone mobile est dans un état de déplacement ou un état statique, et
un moyen de commande (8) sensible audit moyen d'évaluation et audit moyen de détection pour arrêter de fournir ladite alimentation audit moyen de communication radio lorsque ledit dispositif de téléphone mobile est à l'extérieur de ladite zone de service et que ledit dispositif de téléphone mobile est dans ledit état statique.

2. Dispositif de téléphone mobile selon la revendication 1, comprenant en outre : un circuit d'horloge (9) destiné à mesurer un premier intervalle d'arrêt de la fourniture de ladite alimentation audit moyen de communication radio, un second intervalle dans ledit état de déplacement et un moyen d'affichage (3) destiné à afficher ledit premier intervalle et ledit second intervalle.

3. Dispositif de téléphone mobile selon la revendication 1, dans lequel ledit moyen de détection (7) comprend un accéléromètre destiné à détecter une accélération dudit dispositif de téléphone mobile.

4. Dispositif de téléphone mobile selon la revendication 1, dans lequel ledit moyen de détection (7) comprend un capteur de vibration destiné à détecter une vibration dudit dispositif de téléphone mobile.

5. Dispositif de téléphone mobile selon la revendication 1, dans lequel ledit moyen de détection (7) comprend un moyen de réception (11) destiné à recevoir un signal de vitesse de véhicule indicatif d'un véhicule sur lequel ledit dispositif de téléphone mobile est monté, ledit moyen de détection (7) détectant si ledit dispositif de téléphone mobile est dans ledit état de déplacement ou dans ledit état statique d'après ledit signal de vitesse du véhicule.

6. Dispositif de téléphone mobile selon la revendication 1, comprenant en outre : un circuit d'horloge (9) destiné à mesurer un premier intervalle d'arrêt de la fourniture de ladite alimentation audit moyen de

communication radio, un second intervalle dans ledit état de déplacement et un moyen d'affichage (3) destiné à afficher ledit premier intervalle et ledit second intervalle, dans lequel ledit moyen de détection (7) comprend un moyen de réception (11) destiné à recevoir un signal de vitesse de véhicule indicatif d'un véhicule sur lequel ledit dispositif de téléphone mobile est monté.

FIG. 1

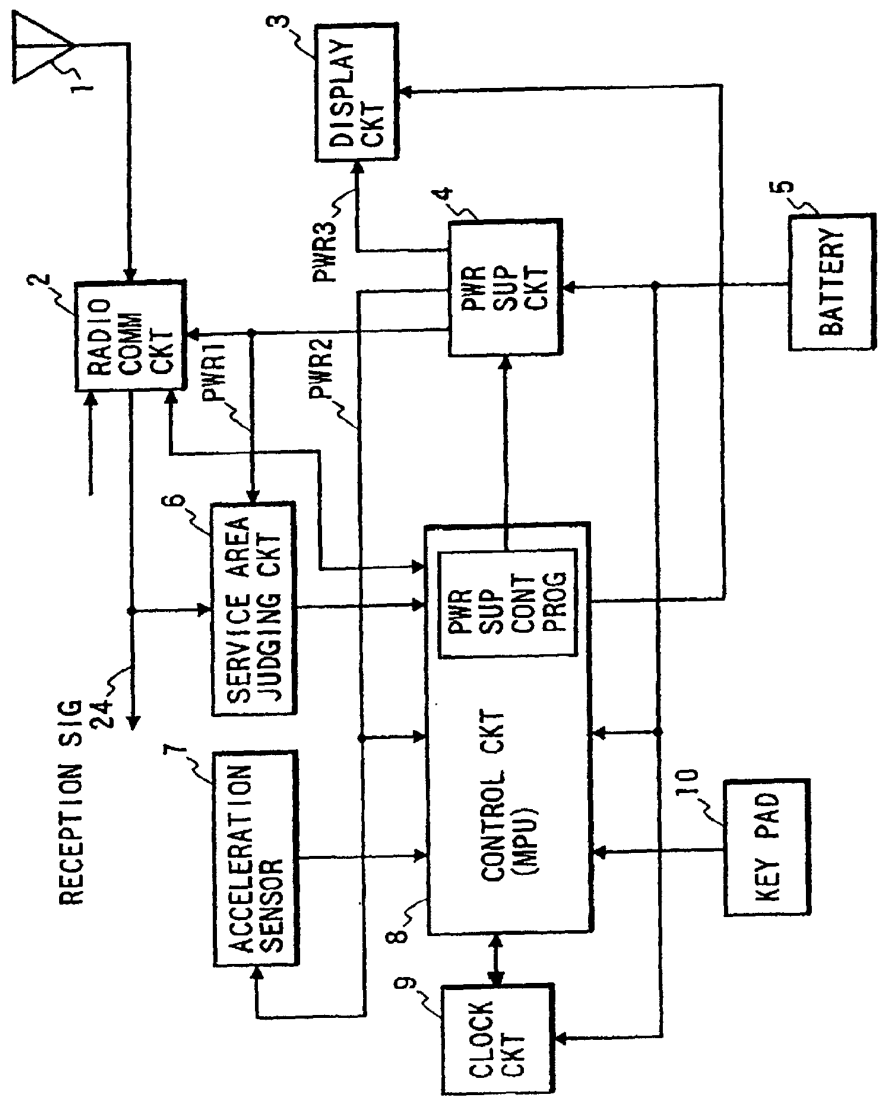

RADIO COMM CKT
DISPLAY CKT
PWR SUP CKT
BATTERY
SERVICE AREA JUDGING CKT
ACCELERATION SENSOR
CONTROL CKT (MPU)
PWR SUP CONT PROG
CLOCK CKT
KEY PAD
RECEPTION SIG
PWR1
PWR2
PWR3
1
2
3
4
5
6
7
8
9
10
24

FIG. 2

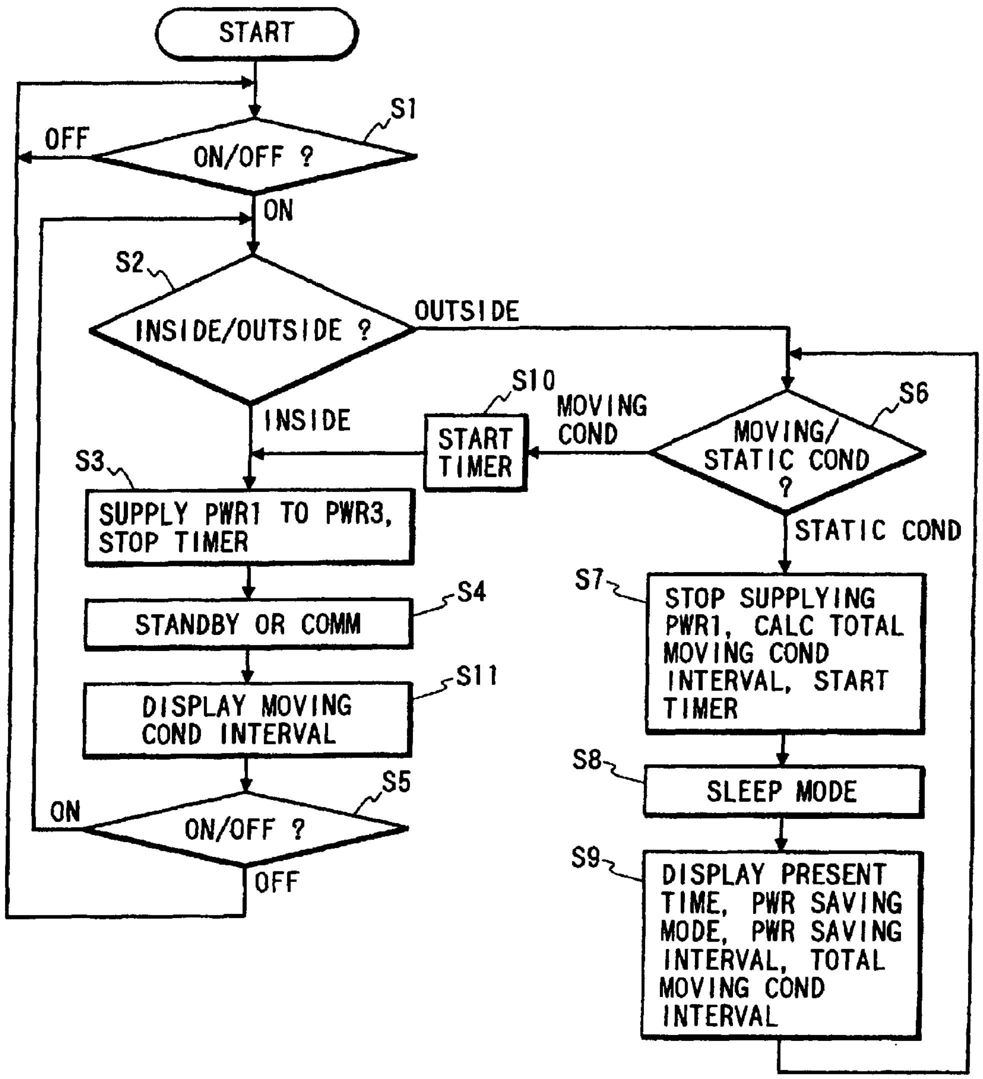

START
S1
ON/OFF ?
OFF
ON
S2
INSIDE/OUTSIDE ?
OUTSIDE
INSIDE
S10
START TIMER
MOVING COND
S6
MOVING/ STATIC COND ?
STATIC COND
S3
SUPPLY PWR1 TO PWR3, STOP TIMER
S4
STANDBY OR COMM
S11
DISPLAY MOVING COND INTERVAL
S5
ON/OFF ?
ON
OFF
S7
STOP SUPPLYING PWR1, CALC TOTAL MOVING COND INTERVAL, START TIMER
S8
SLEEP MODE
S9
DISPLAY PRESENT TIME, PWR SAVING MODE, PWR SAVING INTERVAL, TOTAL MOVING COND INTERVAL

FIG. 3

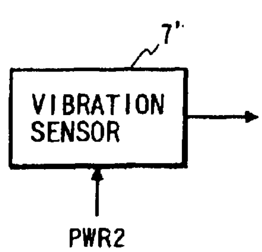
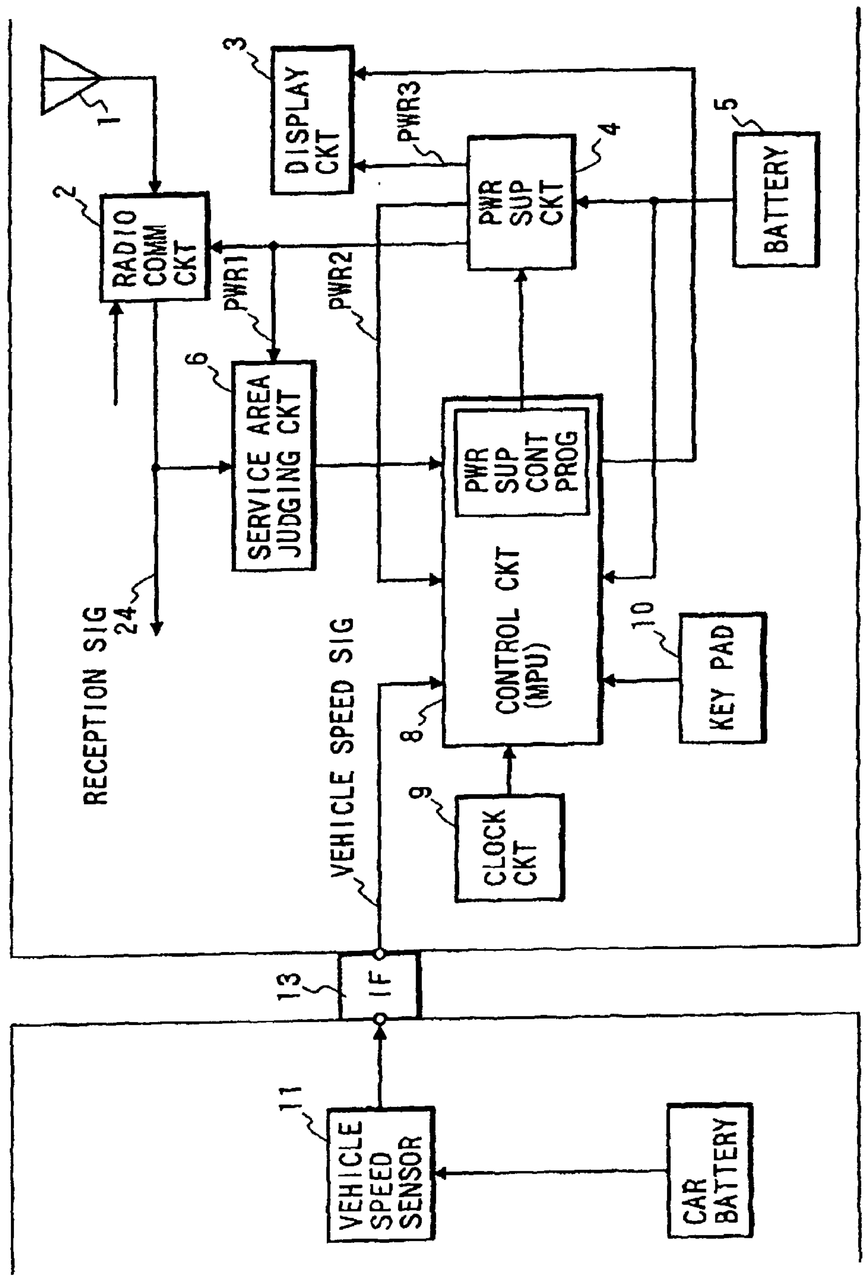

7'
VIBRATION SENSOR
PWR2

FIG. 4


1
2
RADIO COMM CKT
3
DISPLAY CKT
PWR3
4
PWR SUP CKT
5
BATTERY
PWR1
PWR2
6
SERVICE AREA JUDGING CKT
PWR SUP CONT PROG
CONTROL CKT (MPU)
8
RECEPTION SIG
24
VEHICLE SPEED SIG
10
KEY PAD
9
CLOCK CKT
13
IF
11
VEHICLE SPEED SENSOR
CAR BATTERY

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(54) **Handheld devices**

(57) A mobile communications device comprising: means for determining the orientation of said device; and trained signal processing means for processing an output of the determining means.

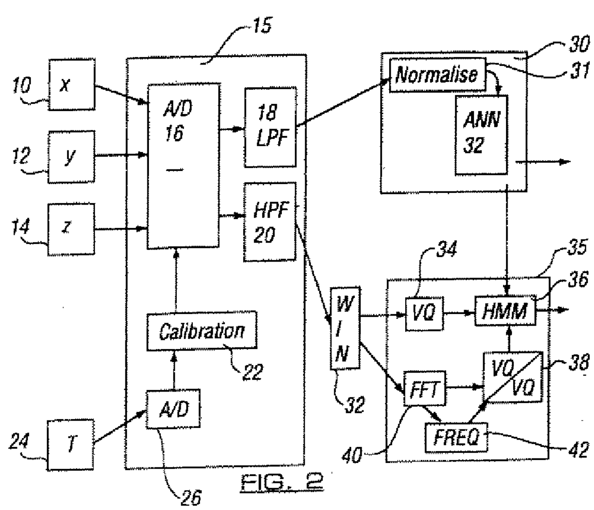

FIG. 2

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Description

Field of the Invention

[0001] The present invention relates to handheld devices and in particular, but not exclusively, to handheld devices such as mobile telephones or the like.

Background to the Invention

[0002] Wireless cellular telecommunication networks are known. The area covered by a telecommunications network is divided up into a number of cells. Each cell has a base transceiver station associated with it. The base transceiver station is arranged to send signals to and receive signals from mobile stations in the same cell as the respective base station. The signals sent between the mobile stations and the base station permit voice and/or data communications to take place.

[0003] In order to prevent the unauthorised use of mobile stations by other people, password protection is used. In order to activate the keyboard and/or allow the user of a mobile phone to make a call, the user has to enter a password. That password consists of a number.

[0004] One problem with the use of numbers is that it can be difficult for the user to remember the password. This is both inconvenient and annoying to the user.

[0005] Alternative methods of preventing unauthorised use of a mobile phone have been proposed which rely on finger print recognition. The phone can be set up so that it can only be activated if it correctly identifies the user's fingerprint. However, if fingerprint data is stolen, for example, from a central store, it is not possible for the user to alter his fingerprint. Accordingly, the unauthorised use of the mobile phone may not be preventable.

[0006] One further problem is that the password used by the user may be simple for an unauthorised person to guess and once the correct password has been guessed, the mobile telephone can be used without the consent of its owner. People often use their birthdays or the name of a pet.

[0007] The optimal settings for a mobile telephone, such as its volume level and the like may depend on whether the mobile telephone is stationery, the user is walking, cycling or in a car. Currently, in order to achieve the optimal settings, the user has to change the settings as the environmental changes. This is inconvenient and often the user forgets to do this. The user may forget to change the settings before the user receives a call and the user then has to either alter the settings during the call or conduct the call with the less than optimal settings.

Summary of the Invention

[0008] It is an aim of embodiments of the present invention to address one or more of these problems.

[0009] According to one aspect of the present invention, there is provided a mobile communications device comprising means for determining the orientation of said device; and trained signal processing means for processing an output of the determining means.

[0010] According to a second aspect of the present invention, there is provided a mobile communications device comprising means for detecting movement of the device and trained signal processing means for processing an output of the detecting means.

According to a third aspect of the present invention, there is provided a hand held device comprising means for determining at least one of orientation and movement of the device; and processing means for recognising at least one predetermined orientation and/or movement of said device.

[0011] The following preferred features of embodiments of the present invention can be used in conjunction with one or more of the above aspects.

[0012] Preferably, the trained signal processing means are arranged to recognise at least one predetermined movement. The trained signal processing means may be arranged to determine the orientation of the device. The trained signal processing means may be arranged to recognise at least one predetermined position.

[0013] The processing means may be arranged to recognise a sequence of movements. The trained signal processing means may be arranged to determine the current mode of operation of the device. For example, depending on the orientation and/or movement of the device, it is possible to determine if the device is in a meeting mode, a games mode or the like.

[0014] Preferably, control means are provided to control the device to provide an associated function when a predetermined orientation and/or movement is recognised. For example, the device may be usable only if a predetermined orientation and/or movement is recognised. In other words, passwords can be implemented using a predetermined orientation and/or movement. The associated function may be a function of the user interface of the device. For example, where the device is a mobile telephone, a predetermined orientation and/or movement may be used to answer a call, close connection, switch off an alarm or the like.

[0015] The means for detecting the movement of the device may comprise at least one accelerometer. The means for determining the orientation of the device may comprise at least one accelerometer. In preferred embodiments of the present invention, at least one accelerometer is arranged to provide movement and orientation information. Preferably, three accelerometers are provided which are arranged to provide information in respect of three orthogonal directions.

[0016] The trained signal processing means may comprise at least one neural network. The at least one neural network may be used for recognising the orientation of the device. The at least one neural network may use a self organising mapping technique.

[0017] The trained signal processing means may comprise at least one pattern recognition system, for example a hidden Markov model.

[0018] The predetermined orientation and/or movement of the device may be pre-programmed or alternatively may be programmed into the device by the user or selected by the user.

[0019] Preferably, the device is a mobile telephone. It should be appreciated that in alternative embodiments of the invention, the device can be any other suitable device, such as a control device for a game or the like.

[0020] According to a fourth aspect of the present invention, there is provided a method for controlling a device comprising the steps of determining the orientation and/or movement of the device; using a trained signal processing method to process the result of the determining step; and controlling the device in response to the determined orientation and/or movement of the device.

Brief Description of the Drawings

[0021] For a better understanding of the present invention and as to how the same may be carried into effect, reference will now be made by way of example to the accompanying drawings in which:-

Figure 1 shows a cellular telecommunications network with which embodiments of the present invention can be used;
Figure 2 shows a block diagram of a mobile telephone embodying the present invention;
Figure 3 shows a schematic view of an accelerometer used in the arrangement of Figure 2;
Figure 4 shows an example of signals which are output by the accelerometer in Figure 3; and
Figure 5 illustrates the function provided by the windowing circuitry of Figure 2.

Detailed Description of Embodiments of the Invention

[0022] Reference will first be made to Figure 1 which shows a wireless cellular telecommunications network 2. The area covered by the network 2 is divided up into a plurality of cells 4. Each of the cells 4 has associated with it a base transceiver station 6. Each base transceiver station 6 is arranged to communicate with mobile stations 8 in the cell associated with that base transceiver station 6.

[0023] The network shown in Figure 1 may use any suitable method of communication for communicating with the mobile stations. In particular, one or more of the following methods may be used: Time Division Multiple Access, Frequency Division Multiple Access, Spread Spectrum Methods such as Code Division Multiple Access or other suitable methods. In some embodiments of the present invention, hybrids of two or more of these access methods may be used.

[0024] Reference will now be made to Figure 2 which shows an embodiment of the present invention, arranged to be incorporated in a mobile telephone. The elements shown in Figure 2 are arranged to provide information as to the orientation of the mobile telephone and its movement.

[0025] The arrangement shown in Figure 2 comprises three accelerometers 10, 12 and 14. The first accelerometer 10 is arranged to detect motion in the X direction. The second accelerometer 12 is arranged to detect motion in the Y direction. The third accelerometer 14 is arranged to detect motion in the Z direction. In other words, the three accelerometers 10, 12 and 14 are each arranged to detect motion in mutually perpendicular directions.

[0026] Reference is made to Figure 3, which shows a schematic example of one accelerometer which can be used with embodiments of the invention. The accelerometer comprises a mass 100. The accelerometer shown in Figure 3 is arranged to detect motion in the directions of arrow A. When there is no motion in the directions of arrow A and there are no external forces on the mass in the directions of arrow A, the mass will be in its rest position shown in Figure 3. However, when there is movement in the direction of arrow A, the mass will move about the rest position indicated by dotted line B. It should be appreciated that if gravity provides a force in one of the directions of arrow A, the rest position will be above or below line B, depending on the orientation of the sensor.

[0027] Reference is made to Figure 4 which shows an output of the accelerometer shown in Figure 3. The sensor is initially oriented in such a way that there is a force on the mass 100 in one of the directions of arrow A due to gravity.

The part of the graph 102 represents the condition where the sensor is in one orientation such that it is affected by gravity in one of the directions of arrow A and there is movement in at least one of the directions of arrow A. The part of the graph referenced 104 shows the output of the accelerometer when the sensor is in the opposite orientation so that gravity still affects the sensor but in the other direction of arrow A. This can be because the phone has been turned upside down. There is also movement in at least one of the directions of arrow A. Thus, graph 102 can be said to be when gravity acts in the direction of arrow C whilst part of the graph referenced 104 is where gravity acts in the direction of arrow D.

[0028] As can be seen in Figure 4, the part of the graph referenced 102 provides a signal based about a centre point represented by line E whilst the part of the graph referenced 104 provides the signal centred about the line F. Lines E and F provide information about the position of the phone whilst the signals themselves provide information about the amount of movement. It should be appreciated that depending on the orientation of the phone, the signals can be centred about different lines which will be between lines E and F. This is because lines E and F represent the two extreme positions.

[0029] Each of the sensors shown in Figure 2 provides a signal of the type shown in Figure 4 but for the three orthogonal directions X, Y and Z. The signals thus provide information about the position of the phone in the X, Y and Z directions as well as information about movement of the phone in the X, Y and Z directions.

[0030] In preferred embodiments of the present invention, accelerometers such as the ADXL 202 made by Analog devices may be used. Any other type of accelerometer can be used which may use different techniques in order to sense gravity to provide position information and acceleration to provide movement information.

[0031] The output of the accelerometers 10 to 14 are input to an analog to digital converter 16 which converts the analog outputs of the accelerometers into digital signals. It should be appreciated that in alternative embodiments of the present invention, the accelerometers may provide digital outputs, in which case the analogue to digital converter can be omitted. In still further embodiments of the present invention, it may be possible to process the analog outputs of the accelerometer in their analog form and thus the need for the analog to digital converter can be avoided.

[0032] The operation of the accelerometers 10 to 12 will depend on the temperature of the environment in which the mobile telephone is located. The temperature sensor 24 thus measures the temperature inside the mobile station. The temperature sensor 24 may take any suitable format. The output of the temperature sensor 24 is connected to an analog to digital converter 26. The output of the temperature sensor 24 is an analog signal which is converted by the analog to digital converter 26 to a digital signal.

[0033] The digital signal representing the temperature of the mobile phone is input to a calibration arrangement 22. This calibration unit 22 provides a correction output which is used to correct the digital signals representing the output of the accelerometers 10 to 14. In this way, the influence of temperature on the accelerometers can be disregarded so that a more accurate evaluation of the movement and position of the mobile telephone can be made.

[0034] The calibration unit 22 can take any suitable format. For example, the calibration unit can take the form of a look up table, with the digital output of the analog to digital converter 26 providing an address to the look up table. Alternatively, the calibration unit may perform an algorithm which calculates the compensation required based on the output of the analog to digital converter 26. The calibration unit 22 can of course use a combination of an algorithm and a look up table.

[0035] The analog to digital converter 16 connected to the accelerometers 10 to 14 provides two identical outputs. Each output contains a digital representation of each of the three outputs of the three accelerometers 10 to 14.

[0036] One of the outputs is connected to a low pass filtering arrangement 18. The low pass filter is arranged to remove frequency components above a given cut of frequency. For example, with the signal shown in Figure 4, the low pass filter 18 will remove the part of the signal above line E for the part of the signal referenced 102 and will remove the part of the signal above line F for the part of the signal referenced 104. The function of the low pass filter 18 is effectively to allow the middle positions of each portion of the output from each sensor to be determined as this provides information as to the position of the mobile telephone. Alternatively, a DC estimator can be used to provide orientation information.

[0037] In the example shown in Figure 4, lines E and F are straight lines. However, it should be appreciated that depending on the motion of the mobile telephone, the line about which the signals are centred may be curved or any other possible shape.

[0038] The output of the low pass filter 18 is input to a position recognition system 30 in a post processing layer 28. The position recognition system 30 includes an artificial neural network 32. The neural network 32 is trained to identify the position of the mobile telephone based on the filtered outputs which it receives from the low pass filter 18 for each of the three sensors. For example, one combination of values from the three accelerometers 10 to 14 will be provided when the mobile phone is lying flat on a table with its display uppermost. A different combination of outputs from the three accelerometers will be provided when the mobile phone is in a vertical position and so on.

[0039] Any suitable type of artificial neural network ANN or pattern recognition unit can be used. By way of example, the artificial neural network 32 that can be used is the self organising map proposed by Kohonen. Another example of an ANN is a multi layer perception neural network. This ANN is used for pattern recognition and feature extraction. In embodiments of the present invention, this ANN is able to extract information relating to the position of the mobile phone.

[0040] A self organising map SOM is a neural network which forms spatially organised feature maps from an N dimensional input signal in an unsupervised manner. In the embodiment of the present invention, N is equal to 3 with information being provided by each of the three sensors. The method used by the self organising map is similar to human sensory input mapping in the brain, which is then organised topographically. During training, weight sectors $w_{ji}(n)$ of the network are shifted closer to the input sectors X by

$$w_{ji}(n+1)=w_{ji}(n)+k(n)n_{j\cdot 1(x)}(n)(x-w_{ji}(n)).$$

where $w_{ji}(n+1)$ is the updated weight vector, k(n) the learning rate and $n_{j\cdot 1(x)}(n)$ the neighbourhood function. The learning rate and the neighbourhood function are changed as the training proceeds. After self-organization the hand labelled training data presented to the SOM again and labels are suggested for the winning neurons with their immediate neighbours. All suggestions are collected for each neuron, after which majority voting is performed for final labelling.

[0041] The three dimensional sensor data is normalized prior to the ANN, that is the mean and variance are calculated and used for computing the normalization. A normalization block 31 can be implemented into the position recognition system 30. The normalisation block 31 receives the output of the low pass filter 18 and the output of the normalisation block is input to the ANN.

[0042] The artificial neural network unit 32 is arranged to provide two functions, feature extraction and classification. Feature extraction allows the neural network to process the information which it has received. The output is then classified so that it can be determined what has occurred. In one embodiment of the present invention, the neural network 32 is trained to identify the following positions:

the mobile phone is in an orientation with the display upwards,
the mobile phone is in an orientation with the display downwards,
the mobile telephone has a typical in the pocket orientation,
the mobile phone is being held to the user's left ear,
the mobile phone is being held to the user's right ear,
the mobile phone is in an orientation on its left side,
the mobile phone is in an orientation on its right side,
the mobile phone is standing, and
the mobile phone is upside down.

[0043] It should of course be appreciated that embodiments of the present invention may be used to identify a larger range of orientations of the mobile station or indeed any orientation of the mobile station.

[0044] In one embodiment of the present invention, the self organising map used is a two dimensional hexagonal grid arranged to be seven neurons by seven neurons. The parameters of the self organisation map are shown in table 1 below.

Table 1

Parameter	Value/Argument
Map lattice	Hexagonal
Initialization type	Linear
Size of the map	7x7
Initial and final learning radiuses	[3 1]
Initial learning rate	0.03
Learning rate	Linear
Neighbourhood function	epanechnikov

The signals from the accelerometers are sampled. In one embodiment they are sampled with a frequency of 90Hz. The input to the low pass filter 18 starts a sequence of vectors of the following form:

$$P_n = [x_n y_n z_n]^T,$$

where X_n, Y_n and Z_n are acceleration signals in X, Y and Z directions at a discrete time N. In the low pass filter 18, each vector component is filtered and normalised separately. A low pass filtering is carried out using, in one embodiment of the present invention, a fourth order Butterworth filter of the type IIR. A 3-dB cut off frequency of 2.5Hz was used in one preferred embodiment of the present invention. The variance of each component is normalised to 1 and the mean to zero. The processed components of each vector are recombined to a sequence of 3 dimensional feature vectors P'_n.

[0045] The feature vector P'_n at time N is input to a 2 dimensional feature map of the artificial neural network 32. This produces an index I_n representing the training data cluster in question. The resulting sequences of self organising map indices I_n is interpreted by the classifier which assigns a label to each index according to the training data. Each label suggests a specific gesture or position of the mobile telephone, for example display up etc. Finally, a majority voting is formed among the label sequence to recognise the gesture.

[0046] The position recognition system 30 provides two outputs. The first output provides position information on the phone which can be used as required. The second output is to a dynamic acceleration recognition system 35 which will be discussed in more detail hereinafter.

[0047] One example of an artificial neural network is a multi layer perception network **(MLP)**. This has three input layer neurons, ten hidden layer neurons and six output layer neurons. The network can produce position data as number sequences of six numbers. Each number can represent a different one of the positions. For example:

- Display up: 001000
- Display down: 100000
- Device standing: 000100
- Bottom up: 010000
- Sideways to the left: 000001
- Sideways to the right: 000010

[0048] The output of the analog to digital converter 16 connected to the outputs of the accelerometers 10 to 14 is also connected to a high pass filter or AC estimator 20. The high pass filter is arranged to remove the effects of, for example, gravity from the signal. In the case of the signal shown in Figure 4, the high pass filter 20 is arranged so that the first part of the signal 102 and the second part of the signal 104 are centred about a common line having a zero or similar value. If the signal is such that the centre line curves, again, the signal will be filtered such that the signal is centred about a straight horizontal line at the same zero or other reference point. This is because the signals are being used to identify information relating to the movement of the mobile telephone and not its position.

[0049] The output of the high pass filter 20 is input to a windowing unit 32. The windowing unit 32 receives three signals, an example of which is shown in Figure 5. One signal represents the output of the X accelerometer 10, the second input represents the output of the Y accelerometer 12 and the third input represents the output of the Z accelerometer 14. Each of the signals is centred about a zero level. The windowing unit 32 defines a window. The signals within a window are processed together in order to obtain the required information. As can be seen from Figure 5, the first window shown, window A overlaps slightly with the next window, window B. It should be appreciated that all of the signals output by the high pass filter will be divided into windows for processing. The filtering may use any form of DSP filters.

[0050] The output of the windowing unit 32 is connected to the dynamic acceleration recognition system 35. One output of the windowing unit 32 is input to a first vector quantization unit 34. The vector quantization unit 34 quantizes the signals received in a given window into a plurality of vectors each having an X, an Y and an Z value. The values are derived from the respective X, Y and Z signals. The quantized signals are output to a second pattern recognition system 36. This system is, in preferred embodiments of the present invention, a hidden Markov Model (HMM).

[0051] The windowing unit 32 also provides an output to a fast Fourier transform unit 40. This unit converts the received signals from the time to the frequency domain. The output of the fast Fourier transform unit 40 is input to a frequency peak estimate unit 42. The frequency peak estimate unit 42 identifies, for each of the X, Y and Z signals the highest frequency. The identified highest frequency for each of the X, Y and Z signals is output to a second vector quantization unit 38. This quantizes the output of the frequency peak estimate unit 42 and outputs it to the HMM 36.

[0052] The fast Fourier transform unit 40 also outputs the X, Y and Z signals in the frequency domain to the second vector quantization unit 38 which also quantizes the three X, Y and Z signals and outputs them to the neural network 36.

[0053] Based on the information which the neural network receives from the first and second vector quantization units 38 and from the position recognition system 30, the neural network 36 is able to identify how the mobile station is moving.

[0054] The hidden Markov model 36 is a stochastic process with an underlying process of transitions between hidden states of the system and a process of emitting observable outputs. When the outputs are discrete symbols, this is referred to as discrete HMM. The state transitions form a first order discrete Markov process with a transition probability distribution A and in an initial state distribution π. The observable process of emitting symbols can be presented as an observation symbol distribution B. Thus each HMM λ can be represented as a triplet-λ=(A, B, π). In the embodiment of the present invention, Baum-Welch and Viterbi algorithms have been used for the training and recognition tasks. The loq-Viterbi form of the Viterbi algorithm has been used as this is economic with computational processing. Before training, the initialisation of the HMM parameters were carried out as follows:

1. The initial state probability for the first state was set to 1.
2. The transition probability distribution for each state was set uniformerly distributed; and
3. Any topologically allowable state transition from individual states was given probabilities of the form 1/(amount of allowable state - transitions from state).

[0055] A HMM with a left right topology is used for modelling time series whose properties change sequentially over time. This model was used in one embodiment of the present invention. In one implementation, left-right HMM models with 7 states were used. It has been found that the number of states was not particularly critical and that there was little difference between choosing five or four states on the recognition ability of the system. Any other type of HMM may be used in alternative embodiments of the invention.

[0056] A collection of the three dimensional acceleration data is performed with a 100Hz sampling rate. As described previously, each signal from the X, Y and Z accelerometers 12 to 14 are separately filtered with the high pass filter 20. In particular, a fourth order low pass Butterworth filter with a 3dB cut off frequency of 4Hz is used. The signal was decimated at 1/6 times the original rate.

[0057] The HMM 36 detects the usable signal, this is also referred to as gesture segmentation. For individual gestures, normalisation of each component to a zero mean and unit variants is performed.

[0058] The vector quantization units 34 effectively act as a code book. Discrete code book indices correspond to the observable symbols and are input to the HMM both in the training and test phase. The indices are computed by vector quantization in the first vector quantization unit 34 of the 3D input vectors of the acceleration signals from the accelerometers. The code book used by the vector quantization units is constructed by uniformerly quantizing the 3D feature space. The uniform quantization is advantageous because the acceleration trajectory in the feature space can pass through any point with equal probability within the region defined by the application. The maximum values of each acceleration component was searched in the measured training data in order to define the parallelogram of activity in the feature space. In one preferred embodiment of the present invention, the code book was of 512 3 dimensional code words. The larger the size of the code book, the more accurate the recognition capability of the recognition system. Accordingly, the degree of recognition which is required will determine the size of the code book.

[0059] The vector quantization carried out by both of the vector quantization units is performed in a conventional way by selecting the code book entry containing the closest code word to the input vector in the Euclidean sense.

[0060] The HMM 36 can thus be trained to recognise certain gestures or movements of the phone. This will rely on a combination of information relating to the position of the mobile telephone and the movement of the mobile phone. For example, using information on the position and/or movement of the mobile station, it is possible to identify the following:

1. The user is holding the phone in front of him and watching the display. This can be while the user is moving or stationary.
2. The phone is lying on the table with its display downwards.
3. The phone is against the ear of a user with the user either stationary or moving.
4. The phone is in a pocket of a user with the user moving.
5. A ringing phone, which is in a right hand side of a belt box with the display turned towards the user is taken into the right hand and the number of the caller is checked by looking at the display. After this, the phone is returned to the belt holder.
6. A ringing phone, which is in a right hand side belt with display towards the user is taken into the right hand and the number of the caller is checked by the user viewing the display. After this, the user opens the line by pressing the corresponding button on the user interface and brings the phone up to his right ear.
7. The phone call ends, the phone is taken from the ear and the line is shut down by activating a button on the interface. Finally, the phone is put back into the belt box.
8. A ringing phone, which is on the desk with its display facing up is taken into the right hand and the number of the caller is checked by watching. After this, the phone is put back on the desk in the same position.
9. A ringing phone, which is on the desk with its display facing upwards is taken into the right hand and the number of the caller is checked by watching. After this, the user opens the line by pressing the corresponding button on

the interface and moves the phone to the right ear.

10. The phone call ends, the phone is taken from the ear and the line is shut down by activating a button on the display. Finally, the phone is put back on the desk with its display up.

[0061] These are just some of the examples of different movements of the phone which can be identified by the ANN 32 and/or the HMM 36.

[0062] The information provided by the post processing layer 28 including the neural network and HMM can be used in a number of different ways. For example, information as to the movement of the user can be ascertained. For example, it is possible to identify whether the user is moving or stationary. If the user is moving, it is possible to identify the type of movement and thus to identify if the user is walking, running, cycling, or in a car or the like. It is then possible to automatically select the settings of the user so as to optimise the quality with which the user is able to make and receive calls. For example, if the user is moving, it may be harder for the user to hear the ringing tone of the phone. Accordingly, the volume of the ringing tone may be automatically increased.

[0063] In one embodiment of the invention, information on the type of movement of the user may be sent to the base station which uses that information for determining the base station with which the mobile station is to communicate, when handoff should occur or the like.

[0064] In one embodiment of the present invention, the neural networks can be trained to recognise certain gestures and to control the phone accordingly. For example, instead of a number which is input to the user interface to provide password protection, a gesture can be used. For example, the gesture may consist of the user signing his name in the air or against a surface with the mobile phone. Alternatively, the gesture may comprise a set of movements.

[0065] Using the position and movement neural networks, the HMM is able to identify when the user performs the password gesture and to allow the phone to be used when that gesture has been detected.

[0066] It should be appreciated that the neural network is able to identify the gesture from the movement of the phone and the position of the phone over a period of time. Typically, but not always, the gesture will span several windows.

[0067] Gestures can also be used to achieve certain functions. For example, a series of gestures may be used to automatically answer the phone, for example, a phone could be shaken in a particular way for a predetermined number of times.

[0068] It is in fact possible to allow the user to control virtually any aspect of the operation of the phone which can be usually controlled via the user interface using an associated gesture. The user can select his own gestures. He will need to train the neural network to recognise the gesture by repeating the gesture a number of times. The neural network will then learn to recognise that gesture and when that gesture is recognised causes the associated function to occur.

[0069] Gesture based passwords can be used by a group of users to share some data. In this case, information to train the neural network to recognise the gesture may be transmitted to the mobile station or mobile stations from base stations.

[0070] In an alternative application of this, the gesture password may be used to generate a game. For example, a user may transmit a ciphered file to the mobile phone of friend along with associated gesture password information. The friend may then try to get the right gesture in order to access the ciphered file. The mobile station can be programmed to provide audio or visual indicators as to whether or not there is a match and how similar the gestures are. The mobile station can also be arranged to give the friend hints or the like.

[0071] It should be appreciated that the gestures can be in two or three dimensions. The gestures can be in the air or against a surface. For example, the antenna of a phone could be used as a pen like member.

[0072] In one embodiment of the present invention, the user may move the phone, for example as a pen to write messages in the air or against the surface. The information which is drawn or written by the user may be displayed on the display. In more sophisticated embodiments of the present invention, the letters which are written are recognised. In this way, a simple way to generate text messages is provided without having to use the keyboard which can be time consuming given that there are usually only a limited number of keys.

[0073] The neural network can be trained so as to take into account the speed at which a gesture is formed and only to recognise that gesture if the timing is similar to that which has been prestored. However, in alternative embodiments of the present invention, the neural network can be trained so as to ignore differences in timing.

[0074] The password can be arranged to protect any suitable resource, such as access to the mobile telephone itself, access to the SIM card or access to a file.

[0075] Embodiments of the present invention are applicable not only to mobile telephones but any other suitable hand held device. These hand held devices may be provided with accelerometers such as discussed hereinbefore.

[0076] One example of an alternative device is one which includes an integrated alarm clock. That might be switched off by a shaking type of gesture. It should be appreciated that some mobile telephones may incorporate an alarm clock.

[0077] Embodiments of the invention may be used with devices such as Tamogochi toys where the users has to provide a feedback in response to certain stimuli. The gestures can provide the feedback with different gestures being used for different feedback responses.

[0078] Gestures can be carried out in order to permit data to be logged in an automatic diary, reminder system or context aware applications.

[0079] It should be appreciated that in certain embodiments of the present invention, the gestures used by the user can be changed either for variety or for security purposes.

[0080] It should be appreciated that the neural networks provide a degree of tolerance for the matching of the performed gesture and the known gesture. In some embodiments of the present invention, the degree of tolerance which is allowable can be adjusted by the user.

[0081] In preferred embodiments of the present invention, the mobile telephone or similar device will be sold with at least part trained neural networks. However, in alternative embodiments, the user may do some or all of the training. The training can be done at the device itself. The training can also be done as follows:

- The device logs the sensor data during a gesture.
- The data is sent to a network server which carries out the required training.
- The server sends the ANN source code to the device. In this way, a new gesture can be recognised. This can be quicker than training in device itself.

[0082] Gesture recognition can be used in order to control dialling functions of a mobile phone. It is also possible to use gesture recognition in order to play games with mobile telephones or any other such devices. The information from the accelerometers can be used to control the interface of the mobile phone in a number of ways. Games can be played by tilting the mobile station and detecting that movement and position. Dialling can be achieved by for example shaking. Certain positions of the phone can cause certain modes to incur and so on.

[0083] In the embodiment described hereinbefore, discrete HMM is used. If continuous HMM is used, effective quantization would not be required.

[0084] Embodiments of the present invention can be used to provide an automatic antitheft alarm system. For example, if the device is used with the incorrect gesture or is moved when it should be stationary, an alarm can be set.

[0085] In another embodiment of the present invention, the device is a hand held device which acts as a control device, for example for a game or the like. The control device may be wired or wireless. The device can therefore act as a joystick or the like.

[0086] It should be appreciated that any alternative neural network to the artificial neural network or HMM network described in the embodiment of the present invention can be used in embodiments of the present invention. Multiple parallel recognition systems (ANNs and/or HMMs) can be used depending on the operating state of the device.

[0087] In an alternative embodiment of the invention, the device or mobile telephone may have different modes. Those modes may for example be meeting mode, games mode or any other different modes. The gestures, orientations or movements which are detected in the different modes may result in different functions in different modes. Of course some gestures, movements or positions may have no significance in some modes. The neural networks may be trained to determine the mode from the position and/or movement of the device. For example, in a meeting mode, the mobile telephone may be stationary and lying on a horizontal surface with its display mode upwards.

Claims

1. A mobile communications device comprising: means for determining the orientation of said device; and trained signal processing means for processing an output of the determining means.

2. A mobile communications device comprising: means for detecting movement of the device and trained signal processing means for processing an output of the detecting means.

3. A device as claimed in claim 2, wherein said trained signal processing means are arranged to recognise at least one predetermined movement.

4. A device as claimed in claim 2, wherein said trained signal processing means are arranged to determine the orientation of the device.

5. A device as claimed in claim 1, wherein said trained signal processing means are arranged to recognise at least one predetermined position.

6. A hand held device comprising:

means for determining at least one of orientation and movement of the device; and
processing means for recognising at least one predetermined orientation and/or movement of said device.

7. A device as claimed in claim 6, wherein said processing means comprises trained signal processing means.

8. A device as claimed in claim 2, wherein said processing means are arranged to recognise a sequence of movements.

9. A device as claimed in claim 1, wherein said trained signal processing means is arranged to determine the current mode of operation of said device.

10. A device as claimed in claim 3, wherein control means are provided to control the device to provide an associated function when a predetermined orientation and/or movement is recognised.

11. A device as claimed in claim 10, wherein said device is usable only if a predetermined orientation and/or movement is recognised.

12. A device as claimed in claim 10, wherein said associated function is a function of a user interface of said device.

13. A device as claimed in claim 2, wherein said means for detecting the movement of the device comprises at least one accelerometer.

14. A device as claimed in claim 1, wherein said means for determining the orientation of the device comprises at least one accelerometer.

15. A device as claimed in claim 13, wherein three accelerometers are provided which are arranged to provide information in respect of three orthogonal directions.

16. A device as claimed in claim 1, wherein said trained signal processing means comprises at least one neural network.

17. A device as claimed in claim 16, wherein said trained signal processing means comprises at least one neural network is provided for recognising the orientation of said device.

18. A device as claimed in claim 17, wherein the at least one neural network uses a self organising mapping technique.

19. A device as claimed in claim 3, wherein said trained signal processing means comprises at least one pattern recognition system.

20. A device as claimed in claim 19, wherein the at least one pattern recognition system uses a hidden Markov model.

21. A device as claimed in claim 1, wherein the device is a mobile telephone.

22. A device as claimed in claim 3, wherein the predetermined orientation and/or movement of the device is preprogrammed.

23. A device as claimed in claim 3, wherein the device is arranged to recognise the predetermined orientation and/or movement of the device which is selected by the user.

24. A method for controlling a device comprising the steps of:

determining the orientation and/or movement of the device;
using a trained signal processing method to process the result of the determining step; and
controlling the device in response to the determined orientation and/or movement of the device.

25. A method as claimed in claim 24, wherein in the processing step, at least one predetermined orientation and/or movement of the device is recognised.

26. A method as claimed in claim 25, wherein in the control step, an associated function is provided when a predetermined orientation and/or movement is recognised.

27. A method as claimed in claim 24, wherein said trained signal processing method uses at least one neural network.

28. A method as claimed in claim 24, wherein said trained signal processing method uses at least one pattern recognition system.

29. A mobile communications device comprising means for determining the orientation of the device.

30. A mobile communications device comprising means for detecting movement of the device.

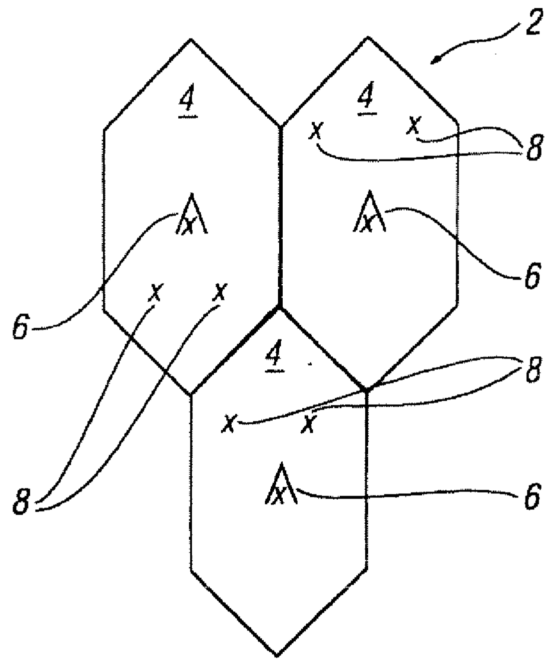


FIG. 1

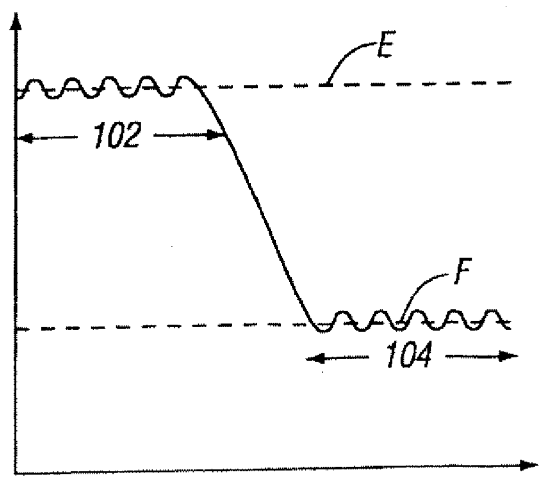
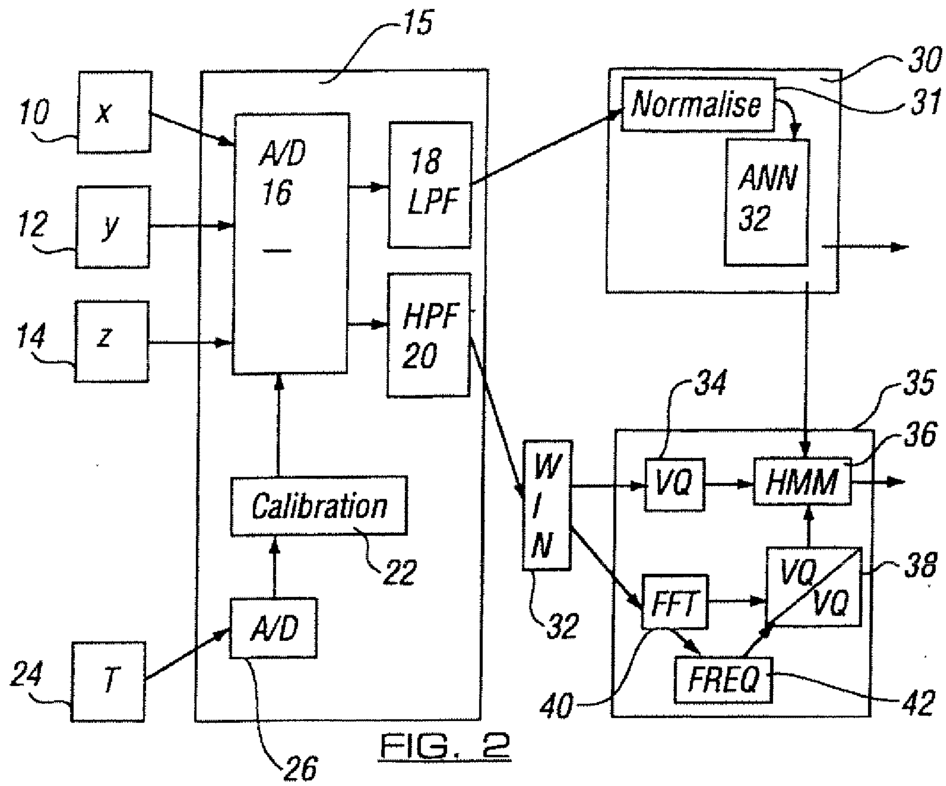


FIG. 4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18
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Calibration
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30
Normalise
31
ANN
32
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HMM
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FFT
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38
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FREQ
42

FIG. 2

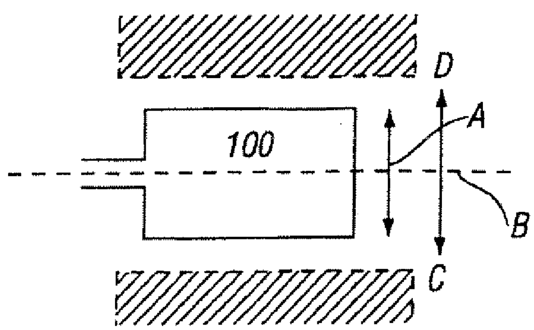
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FIG. 3

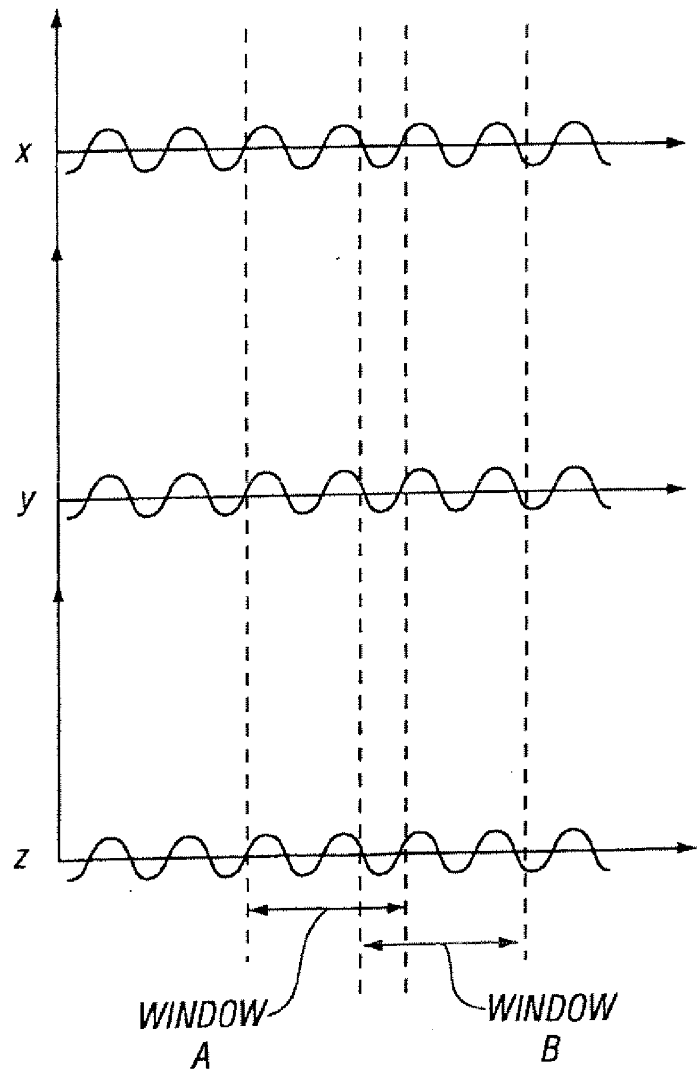

FIG. 5

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(54) **Handheld devices**

(57) A mobile communications device comprising: means for determining the orientation of said device; and trained signal processing means for processing an output of the determining means.

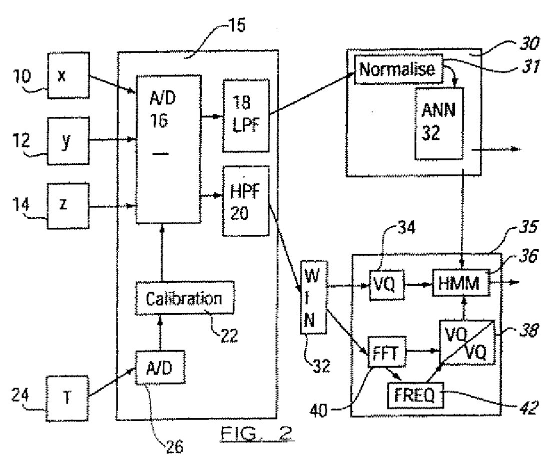

FIG. 2

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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 30 9610

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	WO 99/22338 A (WILLIAMS HILARY LYNDSAY ; BRITISH TELECOMM (GB)) 6 May 1999 (1999-05-06) * page 6, line 1 - page 7, line 2 * * page 9, line 1 - page 18, line 27; figures 1-16 * -----	1-15, 21-27, 29,30	H04M1/00 G01C21/20
X,P	WO 00/63874 A (STRINGER JOHN WARREN) 26 October 2000 (2000-10-26) * page 3, line 13 - page 6, line 15; figures 1-14 * * page 9, line 25 - page 21, line 1 * -----	1-15, 21-27, 29,30	
E	EP 1 104 143 A (NOKIA MOBILE PHONES LTD) 30 May 2001 (2001-05-30) * the whole document * -----	1-30	
A	EP 0 833 537 A (MATSUSHITA ELECTRIC IND CO LTD) 1 April 1998 (1998-04-01) * the whole document * -----	1-30	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)
G01C
H04M

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	9 July 2004	Fourrichon, P

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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O : non-written disclosure
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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09-07-2004

Patent document cited in search report		Publication date	Patent family member(s)			Publication date
WO 9922338	A	06-05-1999	AU	770921	B2	11-03-2004
			AU	9358598	A	17-05-1999
			CA	2307780	A1	06-05-1999
			CN	1278348	T	27-12-2000
			DE	69824311	D1	08-07-2004
			EP	1032919	A1	06-09-2000
			WO	9922338	A1	06-05-1999
WO 0063874	A	26-10-2000	AU	4473000	A	02-11-2000
			EP	1250698	A2	23-10-2002
			WO	0063874	A1	26-10-2000
EP 1104143	A	30-05-2001	GB	2358108	A	11-07-2001
			EP	1104143	A2	30-05-2001
EP 0833537	A	01-04-1998	JP	3111909	B2	27-11-2000
			JP	10107718	A	24-04-1998
			CN	1179073	A ,B	15-04-1998
			DE	69714367	D1	05-09-2002
			DE	69714367	T2	27-03-2003
			EP	0833537	A2	01-04-1998
			US	5953677	A	14-09-1999

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Bibliographic data: JP2003014459 (A) — 2003-01-15

AZIMUTH DETECTOR, AZIMUTH DETECTING METHOD AND WALKING DETECTOR

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- **international:** ***G01C17/04; G01C17/30; G01C17/32; G01C22/00;*** (IPC1-7): G01C17/04; G01C17/30; G01C17/32; G01C22/00
- **cooperative:**

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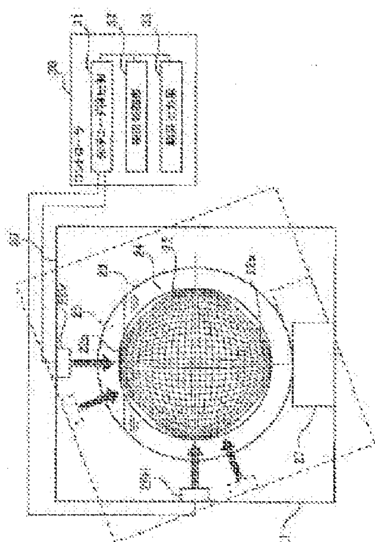
Abstract of JP2003014459 (A)

PROBLEM TO BE SOLVED: To provide an azimuth detector, an azimuth detecting method and the like capable of performing a precise azimuth detection with a simple structure. SOLUTION: In an azimuth detection sensor 10, coordinate information showing an azimuth or inclination by an optical code shown by a two-dimensional barcode, a mark or a pit is written on the surface of a sphere 22 to be influenced by geomagnetism, and it is read by optical code reading parts 26H and 26V, whereby the azimuth of a walker is detected. Further, such an azimuth detection sensor 10 can be provided on a walking detector, and this walking detector collects components of low frequency band transmitted within the body in walking by a microphone and performs a detection of walking on the basis of this to estimate the length of step of the walker, and it further detects the change of direction of the walker by detecting the azimuth by the azimuth detection sensor 10.



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（P2003－14459A）

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審査請求　未請求　請求項の数７　ＯＬ　（全 12 頁）

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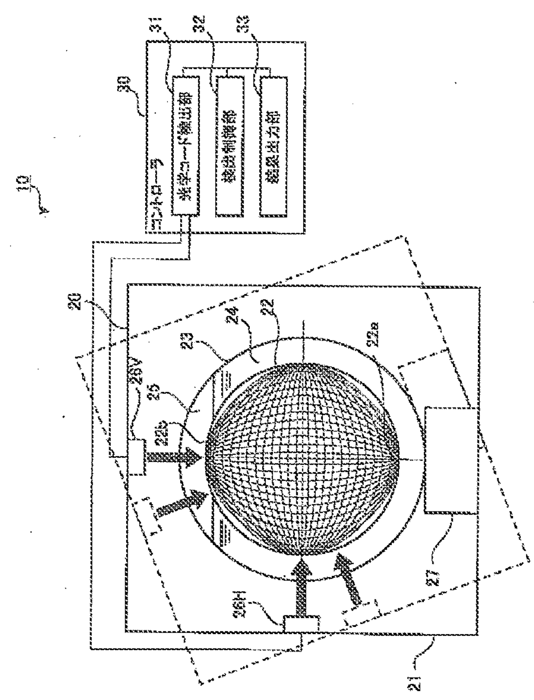
Ｆターム(参考)　2F024 BA01 BA09 BA15 BA17

(54)【発明の名称】　方位検出装置、方位検出方法、歩行検出装置

(57)【要約】
【課題】　簡易な構成で、高精度の方位検出を行なうことのできる方位検出装置、方位検出方法等を提供することを目的とする。
【解決手段】　方位検出センサ１０では、地磁気の影響を受ける球体２２の表面に、２次元バーコードや記号、ピット等によって示される光学コードによって、方位や傾斜角を示す座標情報を記し、これを光学コード読取り部２６Ｈ、２６Ｖで読み取ることによって歩行者の方位を検出する構成とした。さらに、このような方位検出センサ１０を歩行検出装置に備えることができ、この歩行検出装置は、マイクロフォンで歩行時に体内を伝わってくる低周波帯域の成分を採集し、これに基づいて歩行の検出を行なって歩行者の歩幅を推定するとともに、方位検出センサ１０で方位を検出することによって歩行者の方向転換を検出する。



【特許請求の範囲】

【請求項１】　地磁気に対して指向性を有し、その表面に座標情報を示す光学コードが記された方位磁石と、
前記方位磁石を回転自在に保持するケーシングと、
前記方位磁石に記された光学コードを読み取る光学コード読取り部と、
読み取った前記光学コードに基づき、前記方位磁石が示す方位を検出する方位検出部と、を備えることを特徴とする方位検出装置。

【請求項２】　前記光学コード読取り部で読み取った前記光学コードに基づき、前記方位検出装置の傾きを検出する傾き検出部をさらに備えることを特徴とする請求項１記載の方位検出装置。

【請求項３】　前記ケーシングと前記方位磁石の間に介在する当該方位磁石よりも比重が大きな液体と、
前記ケーシングに対して振動を加える加振部と、
をさらに備えることを特徴とする請求項１記載の方位検出装置。

【請求項４】　前記方位検出装置の装着者が歩行するときに発する振動を採集して電気信号に変換するマイクロフォンと、
前記マイクロフォンから転送された電気信号に基づき、所定の周波数以下に対応した信号の変化を解析して装着者の歩行を検出し、装着者の歩行移動量を検出する検出部と、
前記検出部で検出した歩行移動量、および前記方位検出部で装着者の方位を連続的に検出することによって得られる方位の変化に基づき、装着者の位置を検出する位置検出部と、をさらに備えることを特徴とする請求項１記載の方位検出装置。

【請求項５】　地磁気に対して指向性を有する方位磁石を回転自在に保持した方位検出装置における方位検出方法であって、
前記方位磁石の表面に記された座標情報を示す光学コードを読み取るステップと、
読み取った前記光学コードに基づき、前記座標情報に予め対応付けられた方位を検出するステップと、を有することを特徴とする方位検出方法。

【請求項６】　前記光学コードを読み取るステップを連続的に複数回行ない、読み取った前記光学コードから得られる座標情報の変化に基づいて振動を検出するステップをさらに有することを特徴とする請求項５記載の方位検出方法。

【請求項７】　歩行者が歩行するときに発する振動を採集して電気信号に変換する変換手段と、
前記変換手段から転送された電気信号に基づき、所定の周波数以下に対応した信号の変化を解析して歩行者の歩行を検出し、当該歩行者の移動量を推定する移動量推定手段と、
地磁気に対して指向性を有する方位磁石を回転自在に保持した方位検出手段と、
前記方位磁石の表面に記された方位を示す光学コードを読み取るコード読取り手段と、
読み取った前記光学コードに基づき、当該光学コードに予め対応付けられた方位を検出することによって、歩行者の移動方位の変化を検出する方位変化検出手段と、
前記移動量および前記移動方位の変化に基づき、歩行者の位置を検出する位置検出手段と、を備えることを特徴とする歩行検出装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、方位検出装置、方位検出方法、ならびにそれらを用いた方向検出装置に関する。

【０００２】

【従来の技術】方位を検出するには、地磁気を利用しているのは周知の通りであり、高精度な方位の検出には、従来より磁気センサーが用いられている。すなわち、磁気センサーによって地磁気の磁力線を検出するのである。ところで、このような方位の検出を行なうことによって、人や車両等の移動体の向きの変更を検出することもできる。つまり、磁気センサー等を装着した人や車両の向きの変更を、磁気センサー等によって検出される方位の変位に基づいて検出するのである。

【０００３】

【発明が解決しようとする課題】しかしながら、上述したような磁気センサーで方位の検出を行なう場合、磁気センサーを地平面に対して水平を保ち、地磁気の軸に対する角度を正確に設定する必要があった。これは、磁気センサーに傾きがあると、地磁気による方位とセンサーの傾きからなる合成角によって、検出される方位に誤差が生じてしまうからである。このため磁気センサー等を用い、特に、車両等に較べて姿勢変化の大きな人の向きの変更を検出しようとした場合には、精度の高い検出が事実上困難になっている。このような問題を解決するには、ジャイロセンサー等を用い、磁気センサーの傾きを検出することによって補正を図ることが考えられるが、これでは、方位を検出するために磁気センサーだけでなく、さらにジャイロセンサーや補正回路等が必要となって機構が複雑になってしまう。本発明は、このような技術的課題に基づいてなされたもので、簡易な構成で、高精度の方位検出を行なうことのできる方位検出装置、方位検出方法等を提供することを主たる目的とする。

【０００４】

【課題を解決するための手段】かかる目的のもと、本発明の方位検出装置は、方位磁石の表面に座標情報を示す光学コードが記され、この光学コードを光学コード読取り部で読み取ることによって、方位磁石が示す方位を検出することを特徴とする。光学コードとしては、２次元バーコードや、文字列や数字列等からなる記号等があ

り、これらの光学コードによって示される座標情報を、方位磁石が指し示す方位に対応付けておくことによって、光学コードを読み取れば方位情報を直接的に得ることができる。また、光学コードに、方位検出装置を傾けたときの方位磁石とケーシングの相対変位から得られる傾きの情報を含んでおくことによって、方位検出装置の傾きを検出することもできる。また、ケーシングと方位磁石の間に方位磁石よりも比重が大きな液体を介在させることによって方位磁石を液体に浮かべた状態で保持しておき、加振部によって振動、例えば超音波振動をケーシングに加えることもできる。これにより、液体と方位磁石との間の摩擦が低減される。

【０００５】本発明は、方位磁石の表面に記された座標情報を示す光学コードを読み取るステップと、読み取った光学コードに基づき、座標情報に予め対応付けられた方位を検出するステップと、を有することを特徴とする方位検出方法として捉えることもできる。また、光学コードを読み取るステップを連続的に複数回行ない、読み取った光学コードから得られる座標情報の変化に基づいて振動を検出することも可能である。さらには検出した振動に基づき加速度を検出することもできる。

【０００６】ところで、本出願人が、上記のような方位検出装置、方位検出方法に想到するに至ったのは、歩行者の歩行を検出するための歩行検出装置の開発を行なっている過程であった。従来より、歩行者の歩行を検出する方式としては、振動子を内蔵し、歩行時におけるこの振動子の振動を検出する、いわゆる万歩計（登録商標）方式のものがある。しかし、振動子を内蔵したメカニカルな方式では、歩行時以外であっても、振動子が動作するだけの振動が入力されれば、歩数がカウントされることになるため、計測精度が低い。これに対し、振動子に代えて加速度センサやジャイロセンサを内蔵し、これらのセンサで検出される加速度から、振動(運動)を検出し、これによって歩行を検出するものもあった。ところが、このような方式で検出精度を高めるには、センサを歩行者の腰等、特定の箇所に確実に取り付けなければならなかった。さらに、加速度センサやジャイロセンサを用いる方式の場合、センサの向きによって検出結果が異なるため、歩行者にセットしてからセンサの軸方向の検出を行なわなければならず、検出に手間がかかったり、プログラムや回路の構成が複雑になる。さらに、歩行に際する歩行者の複雑な動きを高精度で検出するには、多軸の加速度センサが必要となり、構成の複雑化および高コスト化を招いていた。

【０００７】上記したような方式で検出した歩行者の歩行は、万歩計のように単なる歩数のカウントに用いられる他、例えば、検出した歩行から歩行者の移動量を推測するものがある。これは、ＧＰＳ(Global Positioning System：全地球測位システム)を利用したナビゲーション装置において、ＧＰＳ衛星から得られる電波に基づいて測位した位置を歩行者の移動量に基づいて補正する、いわゆる自律航法を行なう場合等に用いられる。従来、このような場合には、歩行者の歩行周波数(単位時間あたりの歩数)と身長の２つのパラメータが歩幅に相関することを利用し、歩幅の推測を行なっている。

【０００８】さらに、検出した歩行に基づき、歩行検出対象を識別する技術も提案されている。このような場合、上記したような方式の他、足音を検出することによって歩行を検出するものがある。例えば馬が歩行する際に蹄が地面に接する時の音をマイクロフォンで採集し、この音から得られる歩行態様から個体を識別するのである(特開２０００－１９３５２０号公報)。

【０００９】このようにマイクロフォンで採集する音から歩行を検出する場合、検出される波形を処理することによって、１歩１歩の歩行を検出する。この場合、歩行の際に発生する波形のピークを単純にカウントするものもあれば、波形の時系列的な変化をフーリエ変換やウェーブレット変換することによって、周波数の強度スペクトルパターンに変換し、そのパターンを解析することによって歩行を検出するものもある。しかし、歩行を実際に検出する環境には、例えば歩行者が車両に搭乗している場合に車両側で発生するノイズ等、歩行者以外の外部から混入するノイズが存在する。このため、いずれの方式で歩行の検出を行なうにしても、これらのノイズがその検出精度(解析精度)に大きく影響する。

【００１０】また、歩行者の歩行から移動量を推測する場合、歩行者の歩調と身長から歩幅の推測を行なうが、従来の方式では、上記したように歩行の検出精度自体が十分に高いとは言えないのが現状であり、さらに、歩行者が通常歩行以外のパターン、例えば歩幅を広くして大また歩きをした場合や、駆け足、階段の上り下り等を行なった場合等の識別も当然のことながら困難であるため、歩幅の正確な検出、つまり正確な移動量の推測を行なうことも難しかった。

【００１１】このような従来からの問題を解決することのできる歩行検出装置として、本出願人は、歩行者が歩行するときに発する振動を採集して電気信号に変換し、この電気信号に基づき、所定の周波数以下に対応した信号の変化を解析して歩行者の歩行を検出することによって、この歩行者の移動量を推定する構成を提案する。そして、このような構成の歩行検出装置において、方位磁石の表面に記された方位を示す光学コードを読み取り、この光学コードに予め対応付けられた方位を検出することによって、歩行者の移動方位の変化を検出し、さらに、検出した移動量および移動方位の変化に基づいて、歩行者の位置を検出する構成を備えるのである。

【００１２】

【発明の実施の形態】以下、添付図面に示す実施の形態に基づいてこの発明を詳細に説明する。図１は、本実施の形態における方位検出装置の構成を示すための図であ

る。この図１に示すように、方位検出センサ(方位検出装置、方位検出手段)１０は、センサ本体２０と、コントローラ３０とから構成される。センサ本体２０は、筐体２１の内部に、球体２２と、この球体２２を回転自在な状態で収めるケーシング２３を備えている。

【００１３】球体２２は、球状で着磁されることによって地磁気に対して指向性を有する方位磁石を内蔵しており、その表面全域にわたり、回転したときの球体２２の座標情報を示す光学コードが多数記されている。ここで、球体２２の表面に記される光学コードとしては、図２(ａ)に示すような２次元バーコードや、図２(ｂ)に示すような文字列や数字列等の記号、これ以外にも、光ディスクに用いられているピットと同様の方式の記録方式等が考えられ、これらの光学コードによって示される座標情報は、予め設定されたテーブル情報に基づき、方位検出センサ１０で指し示される方位および傾斜角の情報に直接変換できるようになっている。この球体２２は、底部２２ａに図示しない錘が内蔵される等して、球体２２の他の部分よりも比重が高くなるように形成されている。

【００１４】ケーシング２３は、透明な材料によって形成され、その内径が、球体２２の外径よりも一定寸法以上大きく設定されている。そして、このケーシング２３と球体２２の隙間には、液体２４が注入されている。ここで、液体２４は、ケーシング２３内の上部に気室２５が形成されるような量が注入されており、またその比重は球体２２よりも大きなものが選定されている。これによって、球体２２は、液体２４の液面から、その頂部２２ｂを突出させた状態でケーシング２３と接触することなく浮かび、内蔵した方位磁石が地磁気の影響を受けることによって指向性を有し、筐体２１側の動き(向き)に関わらず常に所定の方角を向くようになっている。

【００１５】筐体２１の内周面には、レーザ光等を用いた光学コード読取り部(コード読取り手段)２６Ｈ、２６Ｖが備えられている。これら光学コード読取り部２６Ｈ、２６Ｖは、レーザ光等を、透明なケーシング２３を通して球体２２の表面に照射し、その反射光を検出することによって、球体２２の表面に記されている光学コードを読み取る。これら光学コード読取り部２６Ｈ、２６Ｖは、筐体２１を水平状態としたときに、球体２２に対し、水平方向、鉛直方向からレーザ光等を照射するようになっている。ここで、一方の光学コード読取り部２６Ｈは、球体２２の表面に記されている光学コードから方位を得るために座標情報を読み取り、他方の光学コード読取り部２６Ｖでは、球体２２の表面に記されている光学コードから傾斜角を得るために座標情報を読み取る。

【００１６】ところで、ケーシング２３は、筐体２１に対し、超音波振動子(加振部)２７を介して筐体２１に支持されている。超音波振動子２７は、ケーシング２３に対して所定周波数の超音波振動を加えるもので、これによって、ケーシング２３内の液体２４と球体２２の間に作用する静止摩擦を低減し、球体２２の動きを良くすることを目的としている。

【００１７】一方、コントローラ３０は、光学コード検出部３１、検出制御部(方位検出部、傾き検出部、方位変化検出手段)３２、結果出力部３３を備えている。図３に示すように、光学コード検出部３１は、光学コード読取り部２６Ｈ、２６Ｖで読み取った光学コードを検出する(ステップＳ１０１)。検出制御部３２は、予め格納されているテーブル情報等に基づいて、読み取った光学コードによって示される座標情報から、これに対応する方位・傾斜角の情報を取得する(ステップＳ１０２)。そして、結果出力部３３は、検出制御部３２で変換した方位・傾斜角の情報を、外部、例えば後述する歩行検出装置３６等に対して出力するのである(ステップＳ１０３)。

【００１８】このような構成のセンサ本体２０は、光学コード読取り部２６Ｈ、２６Ｖを一体に備えたケーシング２３の向きが変化しても、球体２２は、地磁気によって底部２２ａと頂部２２ｂを結ぶ軸を常に鉛直状態として所定の方位を向いた状態を維持し、これによって光学コード読取り部２６Ｈ、２６Ｖと球体２２との間に相対変位が生じることになる。そして、光学コード読取り部２６Ｈ、２６Ｖでは、球体２２との間に相対変位が生じた状態で、球体２２の表面に記された光学コードを読み取ることによって、コントローラ３０において、センサ本体２０の方位・傾斜角の情報を得るのである。

【００１９】さて、本実施の形態では、図４に示すような歩行検出装置３６に、上記方位検出センサ１０を備える構成とする。図４は、本実施の形態における歩行検出装置３６の基本的な構成を説明するための図である。この図４に示すように、歩行検出装置３６は、周囲の音を採集して電気信号に変換するマイクロフォン(変換手段)４０と、決められた周波数以下の信号のみを通過させるローパスフィルタ４１と、マイクロフォン４０で集音され、ローパスフィルタ４１を通過した音をＡ／Ｄ変換してデジタル波形に変換する変換器４２と、後述の如く、変換器４２で変換した波形を解析することによって歩行を検出する解析部(検出部)４３と、解析部４３での解析に用いるデータを格納したデータベース４４と、解析部４３での検出結果のデータを図４に示した検出制御部３２に出力する出力部４５と、上記方位検出センサ１０と、を備えている。

【００２０】マイクロフォン４０では、当該マイクロフォン４０で採集可能な全周波数帯域の振動(音を含む)を採集する。ここでは、マイクロフォン４０で周囲の音を採集することにより、歩行時に発生して歩行者（装着者）の体を伝わる振動や、空気中を伝わる音を採集するのである。通常、携帯型電話端末のマイクロフォン等においては、可聴領域外(例えば２０Ｈｚ以下と２０００

０Ｈｚ以上)の周波数帯域の信号をバンドパスフィルタによってカットしているが、本実施の形態では、マイクロフォン４０から出力される信号は、ローパスフィルタ４１によって、決められた周波数、例えば２００Ｈｚ以下の信号のみを通過させ、２００Ｈｚよりも高い周波数帯域の成分、いわゆる音声信号と分離する。そして、解析部４３では、決められた周波数以下の成分の信号について解析を行なう。

【００２１】解析部４３は、変換器４２で変換された信号に基づき、スペクトログラムを生成するスペクトログラム処理部５１と、歩行者の歩行を検出する歩行検出部５２と、歩幅を推定する歩幅推定部５３と、歩幅推定部５３で得られた歩幅および方位検出センサ１０によって検出される方位に基づいて歩行者の位置を推定する位置推定部(位置検出部、移動量推定手段、位置検出手段)５４と、歩行者の歩行態様を検出する歩行態様検出部５５と、歩行態様検出部５５での検出結果に基づき歩行者の歩行態様を判定する歩行態様判定部５６と、を備えている。

【００２２】次に、解析部４３で、マイクロフォン４０で採集した音に基づいた解析を行なうに際しての基本的な概念を説明する。すなわち、歩行者が歩行して左足と右足を交互に着地させたときの振動(音)をマイクロフォン４０で採集し、この振動を変換器４２でＡ／Ｄ変換してデジタル信号にした後、この信号(電圧)をウェーブレット変換すると、図５に示すような、周波数の強度スペクトルパターンであるスペクトログラムが得られる。

【００２３】ここで、図５に示すものは、同一の歩行者が通常に歩行した場合のスペクトログラムである。なお、ここで言う「通常」とは、平坦地を歩行者が早足でもなく遅足でもなく、特にペースを意識することなく歩行した場合である。この図５に示すように、人間の歩行時には、足の着地や足の対地運動時に由来する衝撃、腰・股関節・膝関節・踝・足趾等の足部各関節や骨格、筋肉への伝導や運動により、可聴領域(約２０～２００００Ｈｚ)の下限に近い１００Ｈｚ程度以下、より詳しくは例えば３０～４０Ｈｚ以下の低周波帯域近辺に、特徴的な時間・周波数・強度のパターンが発生する。本実施の形態では、この低周波帯域成分のパターンを解析することにより、歩行検出を行なうのである。

【００２４】人間の歩行動作は、踵が着地(Heel-Strike)からつま先が離れる(Toe-Off)までの対地運動と、Toe-Offから踵の着地までの蹴り出し運動の２つのフェーズに分けることができる。そして、対地運動時における足底面の着地は、踵から始まり、足の外側部(外縦足弓部)を経由し、小指の付け根(第５指中足骨底)から方向を変えて親指の付け根(第１指中足骨底)まで順次行なわれる。この対地運動に伴う接地衝撃は、各関節や筋肉、脂肪層で吸収されるが、低周波成分の一部がこれらと共振し、人体を伝導して、図５のスペクトログラムで表されるような、複雑な時間・周波数・強度パターンを有した低周波帯域の振動を発するのである。

【００２５】図５に示す歩行者の例を用いて、歩行時に発生する低周波帯域の成分を詳細に検討してみる。図５において、(ア)の部分には明確なピークが出現しており、各ピークが歩行の一歩一歩に対応している。図５に示したスペクトログラムをさらに詳細に検討すると、横軸方向の(イ)で示す範囲が右足の対地運動時間、(ウ)で示す範囲が左足の対地運動時間、(エ)で示す範囲が、接地する足が右足から左足に変わるときのギャップ時間、(オ)で示す範囲が、接地する足が左足から右足に変わるときのギャップ時間である。これら(イ)、(ウ)、(エ)、(オ)の時間の長さからなる時間的特性により、歩行者の歩行態様を特徴付けることができる。ここで、スペクトログラムで、色の濃い部分ほど周波数強度が高く、色の薄い部分ほど周波数強度が低い。

【００２６】また、図６は、同一の歩行者が、様々な歩行態様で歩行したときのスペクトログラムである。図６の(ａ)は、その場で足踏みしたとき、(ｂ)は遅歩き、(ｃ)は通常歩行、(ｄ)は早歩き、(ｅ)はジョギング、(ｆ)は階段上り、(ｇ)は階段下りのときに検出されるスペクトログラムである。これらの歩行態様のスペクトログラムを比較してみると、歩行周期が異なる図６の(ｂ)、(ｃ)、(ｄ)では、(イ)、(ウ)の対地運動時間が異なっている(速く歩けば歩くほど短くなる)。また、図６(ｅ)のジョギングでは、他に比較し、周波数強度の強い範囲が周波数の高い領域にまで及んでおり、また信号のピーク周波数(ア)も高くなっている。図６(ｆ)の階段上りでは、足を接地したときの周波数強度(カ)、(キ)が弱くなっている。これは、足を持ち上げて階段面に接地するため、接地時の衝撃が平坦面での歩行時よりも弱くなるからである。加えて、階段を上るときには、つま先の接地が主であり、特に(カ)の踵の接地時の周波数強度が弱くなっている。また、図６(ｆ)と(ｇ)の階段の上りと下りを比較すれば、特に階段の下りの場合に、有意に高い周波数帯域までバンドが伸びている。これは、足の受ける衝撃に応じて高い周波数帯域にもエネルギースペクトルが発生していることを意味する。一方、図６(ｇ)の階段下り時には、つま先が踵よりも先行して接地するため、(キ)のつま先の接地時の周波数強度が強くなっている。

【００２７】ところで、図５のスペクトログラムからわかるように、前記した一連の対地運動に伴い、通常歩行では可聴領域外の低周波から可聴領域に及ぶ広帯域にわたるバンド状のパターンが、１歩あたり約１秒程度継続する。また、このバンド状の時間・周波数・強度パターンの中に、足底各部の対地運動に対応したそれぞれ異なる周波数域の強度スペクトルが見られる。

【００２８】図７は、歩行検出部５２における処理を示すもので、この処理では、このスペクトログラムにおけ

る時間・周波数・強度から得られる足底部の一歩一歩の対地運動継続時間(図５の(イ)、(ウ))から、単位時間あたりの歩数を求める。またこのとき、図５に示したように、周波数強度が一定以上の時間、左右の足底面の着地時間に応じて継続することと、時間・周波数・強度のスペクトログラムが歩行特有のパターンを描く(これらのデータはデータベース４４に予め格納されている)ことを利用して、単位時間あたりの歩数や歩行周期を検出するとともに、これらの時間・周波数・強度の特性から、例えば歩行者の手が体にぶつかる等の歩行以外の衝撃や、車両等に起因する外来のノイズを歩行による音と区別する。

【００２９】これにはまず、マイクロフォン４０からの信号を変換器４２でＡ／Ｄ変換して得られた信号ｗ(ｔ)から、ローパスフィルタ４１によって所定周波数以上の信号、つまり通常の音声信号を除去し、信号ｗ'(ｔ)を得る(ステップＳ２０１)。そして、解析部４３にて、この信号ｗ'(ｔ)を、時間と周波数の強度の関数式ｐ(ｔ、ｆ)に変換する(ステップＳ２０２)。続いて関数式ｐ(ｔ、ｆ)を予め設定した周波数帯域Ｂに対して積分し、周波数強度αに対する関係から歩行者のステータスを決定する。ここで積分値L_B(ｔ)が周波数強度αより大きければ、歩行者のステータス：ｓｔａｔｕｓ(ｔ)を「着地状態」とし、積分値L_B(ｔ)が周波数強度α以下であれば、歩行者のステータスを「通常状態」、つまり「着地状態」ではない状態とする(ステップＳ２０３)。

【００３０】この後、新たな信号が微小時間毎に入力される度に、続くステップＳ２０４を実行する。このステップＳ２０４では、その時点での時刻ｔにおける信号が、歩行に起因しない信号、つまり図５に示したような歩行特有の特徴点(パターン、強度分布)を有した信号でなく、かつステップＳ２０３で「着地状態」と判定されているか否かを判断する(ステップＳ２０４)。その結果、この条件を満たす場合には、誤判定であるとして、歩行者のステータスと「着地状態」に変更する(ステップＳ２０５)。一方、ステップＳ２０４の条件を満たさない場合、歩行者のステータスを変更しない。このようにして、信号が入力される度にその時点での歩行者のステータスｓｔａｔｕｓ(ｔ)を判定し、直前のステータスｓｔａｔｕｓ(ｔ－１)に対し、「通常状態」から「着地状態」に変化した場合には、着地回数を１回カウントする(ステップＳ２０６)。この着地回数のカウント値から、単位時間あたりの着地回数を算出すれば、単位時間あたりの歩数ｓを得ることができ、さらに、単位時間を歩数ｓで除算すれば、歩行周期を得ることができる(ステップＳ２０７)。

【００３１】次に、歩行態様検出部５５において、図６に示したような様々な歩行態様の特徴に基づき、マイクロフォン４０で採集した音から歩行者の歩行態様を認識する処理を示す。この場合、データベース４４に、予め、様々な歩行態様の特徴点のデータを格納しておく。図８に示すように、解析部４３では、図７のステップＳ２０１～Ｓ２０２と同様にして得た時間と周波数の強度の関数式ｐ(ｔ、ｆ)から、検出した歩行の特徴パターンＷを得る(ステップＳ３０１)。そして、得られた特徴パターンＷについて、データベース４４を参照し、このデータベース４４に格納されている様々な特徴パターンW_k、例えば遅歩きの特徴パターンW_1、普通歩きの特徴パターンW_2、早歩きの特徴パターンW_3、…等とのパターン認識処理を行なう。これには、例えば特徴パターンW_kと、データベース４４に格納された各特徴パターンW_kとのマハラノビス距離の演算等を行なって、特徴パターンＷとの差分d_kを求める(ステップＳ３０２)。そして、各特徴パターンW_kとの差分d_kのうち、最小のものを検索し(ステップＳ３０３)、差分d_kが最小の特徴パターンW_kから、歩行者の歩行態様を推定する(ステップＳ３０４)。

【００３２】さて、歩幅推定部５３で歩幅を推定するには、歩行検出部５２と歩行態様検出部５５での検出結果に基づいた処理を行なう。ここでの処理の一つの手法としては、歩行検出部５２で歩行周波数を検出し、この歩行周波数と歩行者の身長とから歩幅を推定するものがある。一般に、図９に示すように、歩行周波数(歩調)と歩行者の身長が、歩幅と相関することは知られている。この図９は、多数の被験者を対象に、歩行周波数と身長、歩幅の関係をプロットしたもので、全体として、これらが相関関係を有しているのは明らかである。

【００３３】この場合、データベース４４には、図９に示したような相関関係から得られる歩行周波数・歩行者の身長・歩幅の関係式(の係数)のデータを格納しておく。そして、歩行の検出に先立ち、設定メモリ５７に歩行者の身長(さらには性別)を入力しておく。歩幅を推定するには、図１０のステップＳ４０１に示すように、歩行検出部５２で検出された歩行周期と、設定メモリ５７に設定された歩行者の身長に基づき、歩行モデルＭを用いて歩幅ｌを予測する。この歩行モデルＭは、例えば以下に示すような関係式によって表される。

歩幅ｌ(ｃｍ)＝ｘ１×歩行周期(歩/分)＋ｘ２×身長(ｃｍ)＋Ｃ

なお、上記関係式において、ｘ１、ｘ２、Ｃは、予めデータベース４４に格納され、歩行態様毎に設定された係数および初期値である。

【００３４】そして、位置推定部５４にて、このようにして得られた歩幅ｌと、歩行検出部５２で検出された単位時間あたりの歩数ｓとを積算することにより、単位時間あたりの移動距離を推定することができる(ステップＳ４０２)。このとき、方位検出センサ１０において、方位を連続的に検出することにより、歩行者の歩行時における方位変化を検出することができる。そして、推定した移動距離および検出した方位変化に基づき、位置推

定部５４では、歩行者の移動経路を推定することができる。つまり、歩行検出装置３６における検出開始時の歩行者の位置が既知であれば、歩行中の歩行者の位置を推定することが可能となるのである。

【００３５】さらに、上記ステップＳ４０１にて、歩行モデルＭの関係式の一例を挙げたがこれに限るものではない。例えば、踵が着地するときのエネルギーと、つま先を蹴り出すときのエネルギーの比に基づいて歩行モデルＭの関係式を決めることもできる。図１１に示すものは、歩行時のエネルギー変化を表すもので、ここで、つま先を蹴り出すときのエネルギーである蹴り出しエネルギーE_1は、歩行信号のピーク値である。また、踵を着地するときの踵着地エネルギーE_2は、前記蹴り出しエネルギーE_1に対応したピーク値の直前の極大値である。そして、踵着地エネルギーE_2を蹴り出しエネルギーE_1で除算したものが、着地・蹴り出しエネルギー比となる。このようにして得た着地・蹴り出しエネルギー比と、歩行検出部５２で検出された歩行周期と、設定メモリ５７に設定された歩行者の身長に基づき、歩行モデルＭ’を用いて歩幅ｌを予測することができる。この歩行モデルＭ’は、例えば以下に示すような関係式によって表される。

歩幅ｌ（ｃｍ）＝ｘ１×歩行周期（歩/分）＋ｘ２×身長（ｃｍ）＋ｘ３×着地・蹴り出しエネルギー比

なお、上記関係式において、ｘ１、ｘ２、ｘ３は、予めデータベース４４に格納された歩行態様毎の係数である。

【００３６】また、歩幅推定部５３で歩幅を推定する他の方法としては、踵やつま先部が着地する際の衝撃に由来する周波数強度の変化を利用するものがある。人間の歩行態様では、早足で歩くと歩行周波数・歩幅ともに増加するが、意識して大股で歩くと、歩幅が変化するのみで歩行周波数そのものには変化が生じない。また、長距離移動時には、歩幅は身長と歩調によって決まるほぼ一定の定常値となるが、移動距離が短いときや、そのときの気分等によっては、歩幅は容易に変化する。このような影響を回避するため、図５に示したように、予め通常歩行時における周波数強度を基準値としてデータベース４４に記憶させておき、この基準値との比較により、踵やつま先部が着地する際の衝撃量の増減を検出し、歩幅の補正を行なう。

【００３７】図１２は、上記のような処理の具体的な流れを示すものであり、まず、図１０のステップＳ４０１と同様、歩行検出部５２で検出された歩行周期と、設定メモリ５７に設定された歩行者の身長に基づき、歩行モデルＭまたはＭ’を用いて歩幅ｌを予測する（ステップＳ５０１）。次いで　図７のステップＳ２０１～Ｓ２０２と同様にして得た時間と周波数の強度の関係式ｐ（ｔ、ｆ）を、着地の衝撃を特徴的に抽出できる周波数帯域Ｂ’に対して積分し、着地の衝撃L_B’を得る（ステップＳ５０２）。ここで、関係式ｐ（ｔ、ｆ）を積分して得られるものは、周波数帯域Ｂ’におけるスペクトログラムの信号の占有率（面積）である。予めデータベース４４に格納されたテーブルあるいは関係式に基づき、この衝撃L_B’から、歩幅の補正値Δｌを算出する（ステップＳ５０３）。そして、この歩幅の補正値Δｌを用い、移動距離（ｌ×ｓ＋Δｌ）を得る（ステップＳ５０４）。このようにして、スペクトログラムの周波数強度から歩幅の補正を行なうこともできるのである。

【００３８】さらに、歩幅推定部５３で歩幅を推定する他の方法としては、つま先部の蹴り出し時とつま先の着地時の周波数強度を利用するものがある。すなわち、同一の歩調で歩いていても、つま先の蹴り出し強度によって歩幅は異なってくる。このため、つま先の着地と蹴り出しに応じて発生する例えば１０～１６Ｈｚ前後の周波数帯域の強度に応じ、予めデータベース４４に記憶しておいた歩行者の周波数強度の基準値や、今までの歩行履歴データの比較により、歩幅の補正を行なう。

【００３９】図１３は、このような処理の流れを示すもので、図１２のステップＳ５０１からＳ５０３と同様、歩行検出部５２で検出された歩行周期と、設定メモリ５７に設定された歩行者の身長に基づき、歩行モデルＭまたはＭ’を用いて歩幅ｌを予測した後（ステップＳ６０１）、時間と周波数の強度の関係式ｐ（ｔ、ｆ）を、着地の衝撃を特徴的に抽出できる周波数帯域Ｂ’に対して積分し、着地の衝撃L_B’を得る（ステップＳ６０２）。さらに、予めデータベース４４に格納されたテーブルあるいは関係式に基づき、この衝撃L_B’から、歩幅の補正値Δｌを算出する（ステップＳ６０３）。この後、解析部４３にて、予め決められた低周波数帯域ｆ（例えば０～４０Ｈｚ）について、関係式ｐ（ｔ、ｆ）の特徴を抽出する（ステップＳ６０４）そして、データベース４４に格納された、周波数強度の特徴パターンデータと、歩行者の基準値、歩行履歴データから、歩幅の補正値ｈを取得する（ステップＳ６０５）。しかる後は、この補正値ｈを用い、移動距離（ｌ×ｓ＋Δｌ＋ｈ）を得ることができる（ステップＳ６０６）。

【００４０】このような歩行検出装置３６によれば、マイクロフォン４０で歩行時に体内を伝わってくる低周波帯域の成分を採集し、これに基づいて歩行の検出を行なうことにより、歩行者の歩幅を推定するとともに、方位検出センサ１０で方位を検出することによって歩行者の方向転換を検出することができる。これにより、歩行者の（スタート地点等、検出開始位置からの）歩行経路を検出し、歩行者の位置を推定することができるのである。

【００４１】このとき、方位検出センサ１０では、地磁気の影響を受ける球体２２の表面に、２次元バーコードや記号、ピット等によって示される光学コードによって、方位や傾斜角を示す座標情報を記す構成としたので、これを読み取ることによって、歩行者の方位を直接

的に検出することができ、また傾きによる影響も容易に排除することが可能となっている。しかも、このような方位検出センサ１０は、筐体２１に対する球体２２の相対変位を光学コード読取り部２６Ｈ、２６Ｖで読み取ることによって、方位と傾斜角を同時に検出することができ、構造を非常に簡易なものとすることができ、小型化を図ることも容易である。さらに、方位検出センサ１０に超音波振動子２７を備え、超音波振動を加えることによって、球体２２の動きを良くすることができるので、球体２２自体を小径化することが可能となり、方位検出センサ１０自体の小型化にも貢献することができる。

【００４２】なお、上記実施の形態では、方位検出センサ１０において、光学コード読取り部２６Ｈ、２６Ｖを備える構成としたが、光学コードによって示される座標情報に予め傾きを考慮した方位の情報を対応付けておくようにすれば、光学コード読取り部２６Ｖを省略する構成とすることが可能である。また、上記実施の形態では、ケーシング２３内で球体２２を浮いた状態で保持するため、液体２４を上部に気室２５を形成するようケーシング２３に注入する構成とした。このときには、液体２４と球体２２の比重、および気室２５の容積の設定により、球体２２がケーシング２３に接触しないようにすることが重要である。また、このような構成に代えて、図１４に示すように、ケーシング２３内に、比重が互いに異なり、かつ互いに混ざり合わないあるいは混和しない２種類の液体２４Ａ、２４Ｂを充填するようにしても良い。このとき、液体２４Ａの比重を球体２２よりも大きくし、液体２４Ｂの比重を球体２２よりも小さくすることによって、球体２２を浮いた状態で保持できる。

【００４３】ところで上記実施の形態では、方位検出センサ１０で検出する方位に基づき、歩行者の方向転換、さらには移動を検出する構成としたが、これに限るものではなく他の用途にも適用することができる。例えば、光学コード読取り部２６Ｈ、２６Ｖにおいて方位および傾斜角の経時変化を検出することによって、方位検出センサ１０において振動を検出することが可能となる。すなわち、図１５に示すように、光学コード読取り部２６Ｈ、２６Ｖで光学コードの読み取りを連続的に行ない、コントローラ３０の光学コード検出部３１において、読み取ったそれぞれの光学コードを検出する（ステップＳ７０１）。検出制御部３２では、予め格納されているテーブル情報等に基づいて、光学コード読取り部２６Ｈで読み取った光学コードをこれに対応する方位・傾斜角の情報に変換する。そして、複数回検出した光学コードから、水平方向成分（Ｘ、Ｙ方向）の変位を検出する。同様に、光学コード読取り部２６Ｖで読み取った光学コードをこれに対応する方位・傾斜角の情報に変換する。そして、複数回検出した光学コードから、垂直方向成分（Ｙ、Ｚ方向）の変位を検出する（ステップＳ７０２～Ｓ７０３）。そして、これら水平方向成分・垂直方向成分の変位から、方位検出センサ１０において、Ｘ・Ｙ・Ｚ三方向の振動を検出し、これを外部に出力するのである（ステップＳ７０４）

【００４４】さらに、方位検出センサ１０において、加速度を検出することもできる。すなわち、上記実施の形態で示したような構成の方位検出センサ１０においては、加速度が加わると球体２２が傾くので、これを検出するのである。これには、図１６に示すように、光学コード読取り部２６Ｈ、２６Ｖで光学コードの読み取りを連続的に行ない、コントローラ３０の光学コード検出部３１において、読み取ったそれぞれの光学コードを検出する（ステップＳ８０１）。検出制御部３２では、予め格納されているテーブル情報等に基づいて、光学コード読取り部２６Ｈで読み取った光学コードをこれに対応する方位・傾斜角の情報に変換する。そして、複数回検出した光学コードから、水平方向成分（Ｘ、Ｙ方向）の変位を検出する。同様に、光学コード読取り部２６Ｖで読み取った光学コードをこれに対応する方位・傾斜角の情報に変換する。そして、複数回検出した光学コードから、垂直方向成分（Ｙ、Ｚ方向）の変位を検出する（ステップＳ８０２～Ｓ８０３）。続いて、これら水平方向成分・垂直方向成分の変位から、方位検出センサ１０において、Ｘ・Ｙ・Ｚ三方向の振動を検出する（ステップＳ８０４）。さらに、これら水平方向成分・垂直方向成分の変位のうち、瞬間的な外乱であると判断できる高周波成分を除去するため、所定の閾値以下の変位をローパスフィルタ（図示無し）等によってフィルタリングする（ステップＳ８０５）。しかる後、これら水平方向成分・垂直方向成分の変位と経過時間とから加速度を算出し、これを外部に出力するのである（ステップＳ８０６）。これ以外にも、本発明の主旨を逸脱しない限り、上記実施の形態で挙げた構成を取捨選択したり、他の構成に適宜変更することが可能である。

【００４５】

【発明の効果】以上説明したように、本発明に係る方位検出装置、方位検出方法によれば、簡易な構成で、高精度の方位検出を行なうことが可能となる。

【図面の簡単な説明】

【図１】　本実施の形態における方位検出センサの構成を示す図である。

【図２】　球体の表面に記された光学コードの例を示す図である。

【図３】　光学コードを読み取ることによって方位・傾斜角を検出する流れを示す図である。

【図４】　歩行検出装置の構成を示す図である。

【図５】　歩行者が歩行したときに連続的に得られる信号から得たスペクトログラムの例である。

【図６】　同一の歩行者の様々な歩行態様におけるスペクトログラムを示す図である。

【図７】　歩数を検出するときの処理の流れを示す図で

ある。

【図８】　歩行態様を推定するときの処理の流れを示す図である。

【図９】　歩行周波数・歩幅・身長の相関関係を示すデータ分布図である。

【図１０】　移動距離を推定するときの処理の流れを示す図である。

【図１１】　歩行時のエネルギー変化を表す図である。

【図１２】　移動距離を推定するときの他の処理の流れを示す図である。

【図１３】　移動距離を推定するときのさらに他の処理の流れを示す図である。

【図１４】　方位検出センサの他の例を示す図である。

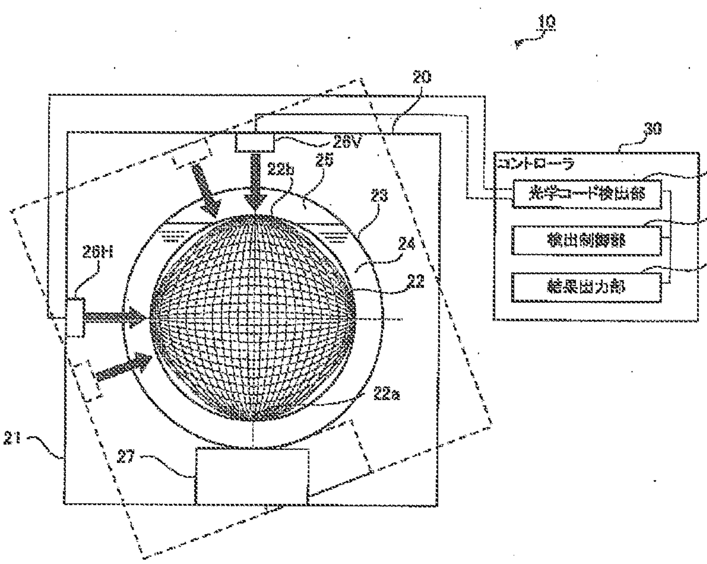
【図１５】　振動を検出するときの流れを示す図であ＊る。

【図１６】　加速度を検出するときの流れを示す図である。

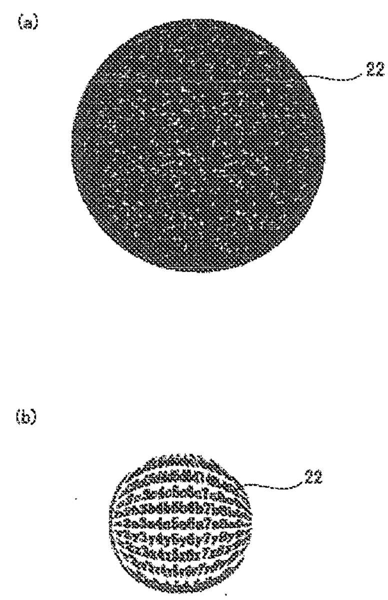
【符号の説明】

１０…方位検出センサ(方位検出装置、方位検出手段)、２０…センサ本体、２２…球体(方位磁石)、２３…ケーシング、２４、２４A…液体、２６H、２６V…光学コード読取り部(コード読取り手段)、２７…超音波振動子(加振部)、３０…コントローラ、３２…検出制御部(方位検出部、傾き検出部、方位変化検出手段)、３６…歩行検出装置、４０…マイクロフォン(変換手段)、４１…ローパスフィルタ、４３…解析部(検出部)、５３…歩幅推定部、５４…位置推定部(位置検出部、移動量推定手段、位置検出手段)

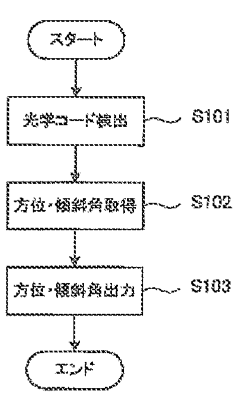
【図１】



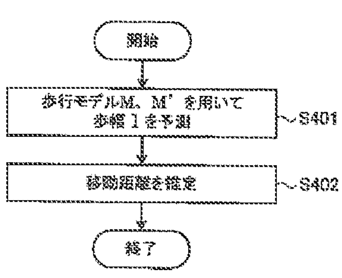
【図２】



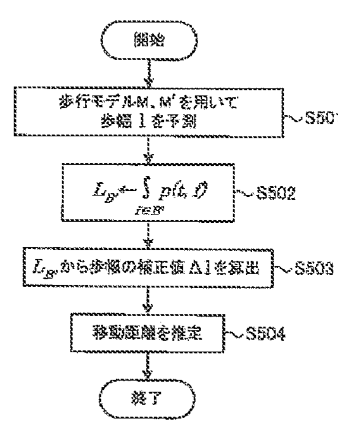
【図３】



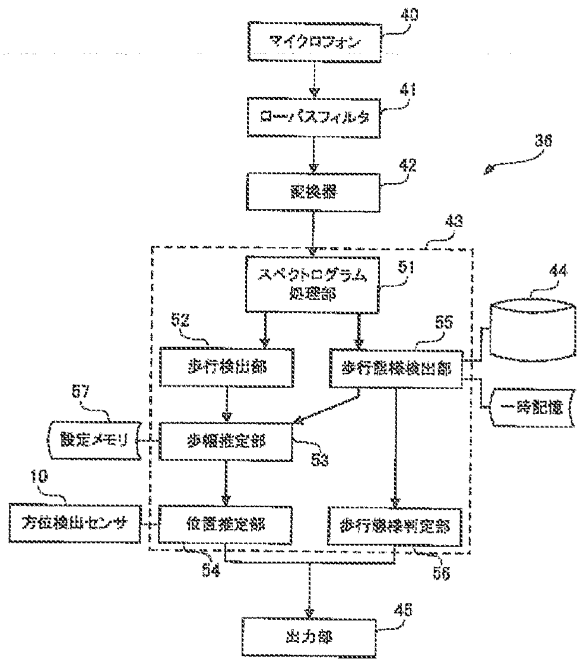
【図１０】



【図１２】



【図4】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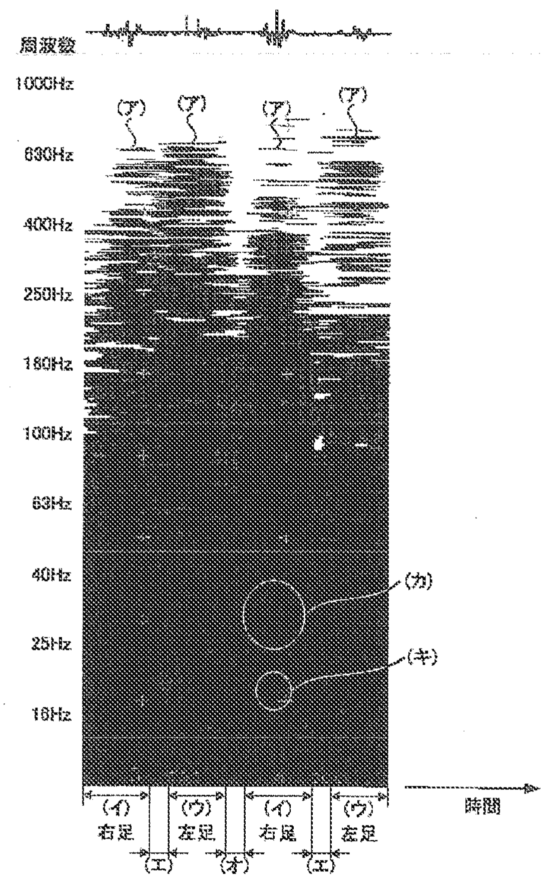
ローパスフィルタ
41
変換器
42
36
43
スペクトログラム処理部
51
44
52
55
歩行検出部
歩行態様検出部
一時記憶
57
設定メモリ
歩幅推定部
53
10
方位検出センサ
位置推定部
歩行態様判定部
54
56
出力部
45

【図5】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(ア)
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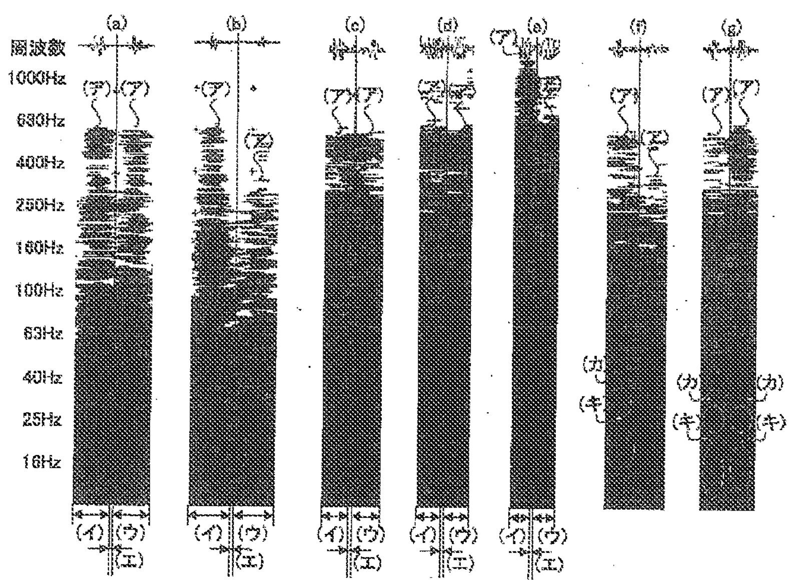
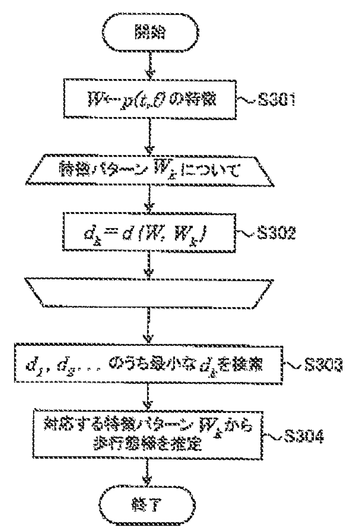
(ア)
(カ)
(キ)
時間
(イ) 右足
(ウ) 左足
(イ) 右足
(ウ) 左足
(エ)
(オ)
(エ)

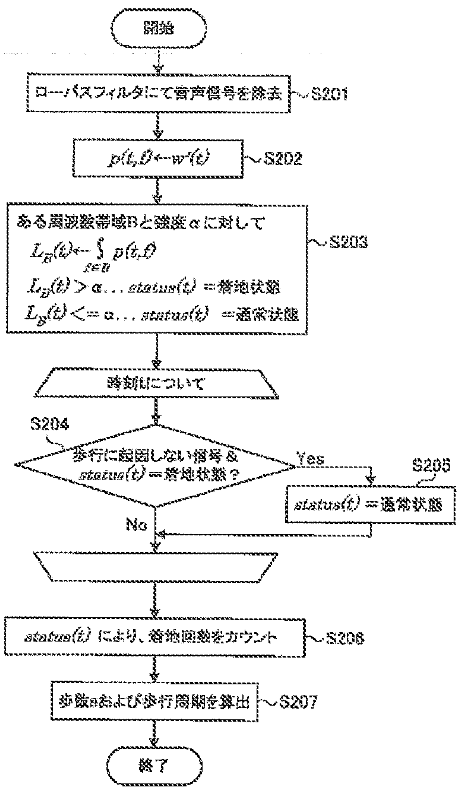
【図6】


(a)
(b)
(c)
(d)
(e)
(f)
(g)
周波数
1000Hz
630Hz
400Hz
250Hz
160Hz
100Hz
63Hz
40Hz
25Hz
16Hz
(ア)
(カ)
(キ)
(イ)
(ウ)
(エ)

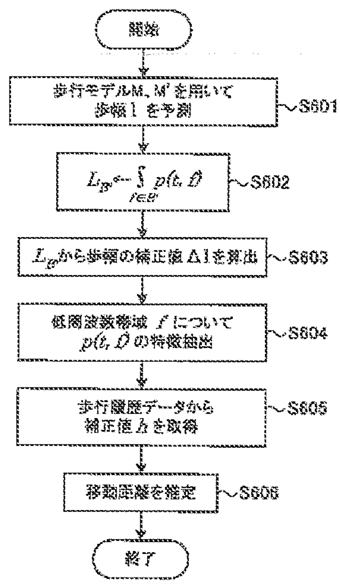
【図8】


開始
W←p(t,θ)の特徴
S301
特徴パターンW_kについて
d_k=d(W, W_k)
S302
d_1, d_2, . . . のうち最小なd_kを検索
S303
対応する特徴パターンW_kから歩行態様を推定
S304
終了

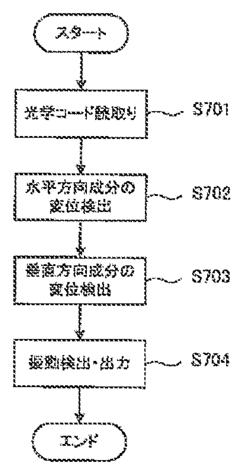
【図７】


開始
ローパスフィルタにて音声信号を除去
S201
p(t,f)←w'(t)
S202
ある周波数帯域Bと強度αに対して
S203
L_B(t)>α... status(t)＝着地状態
L_B(t)<＝α... status(t)＝通常状態
時刻tについて
S204
歩行に起因しない信号＆ status(t)＝着地状態？
Yes
S205
status(t)＝通常状態
No
status(t)により、着地回数をカウント
S206
歩数nおよび歩行周期を算出
S207
終了

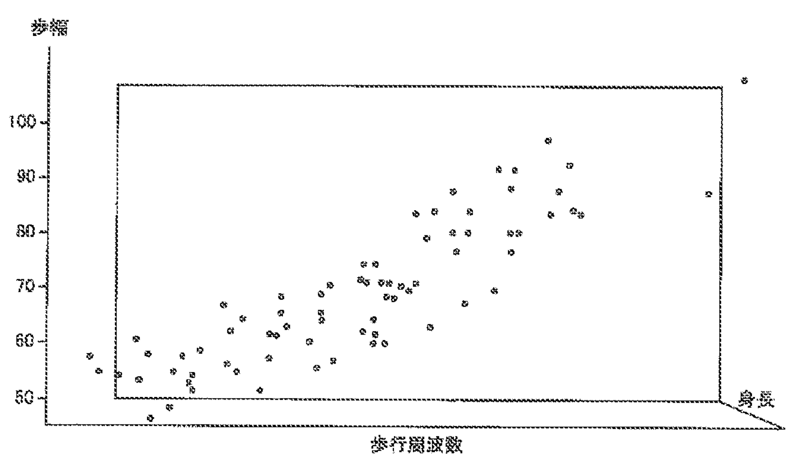
【図１３】


開始
歩行モデルM、M'を用いて 歩幅l を予測
S601
S602
L_Bから歩幅の補正値Δlを算出
S603
低周波数帯域 f について p(t, f)の特徴抽出
S604
歩行履歴データから 補正値hを取得
S605
移動距離を推定
S606
終了

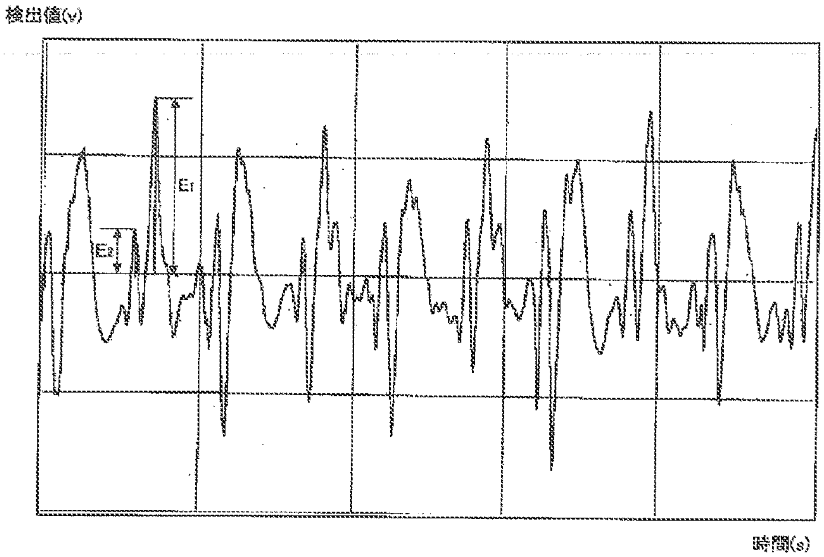
【図１５】


スタート
光学コード読取り
S701
水平方向成分の 変位検出
S702
垂直方向成分の 変位検出
S703
振動検出・出力
S704
エンド

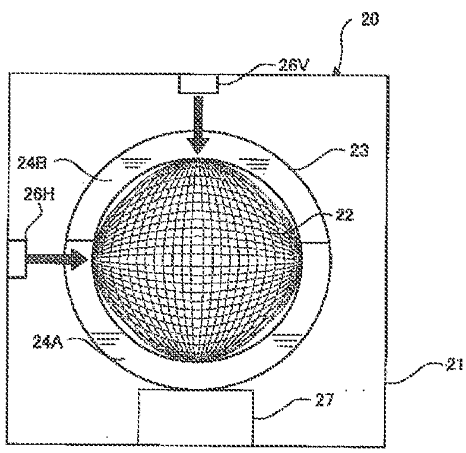
【図９】


歩幅
100
90
80
70
60
50
身長
歩行周波数

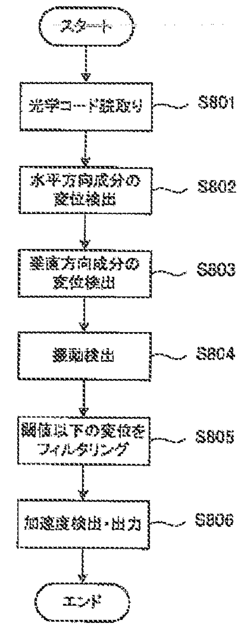
【図１１】


検出値(v)
E1
E2
時間(s)

【図１４】


20
26V
23
24B
26H
22
24A
21
27

【図１６】


スタート
光学コード読取り
S801
水平方向成分の変位検出
S802
垂直方向成分の変位検出
S803
揺動検出
S804
閾値以下の変位をフィルタリング
S805
加速度検出・出力
S806
エンド

Current Open Docket

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Client & Matter No.: 8689P044JP
Serial Number: 2010-520316
Patent Number:
Status: Pending

Docket Attorney(s):
Attorney_Supervisory: JAS (SV)

Deadline	Activity Name	Docket Description	Activity Comments
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4/9/13	Amendment and Response to Final Office Action	Final Office Action Response Due in 1 wk	Deadline to file response to the Final OA is 4/17/13, extendable (rml)
4/16/13	Amendment and Response to Final Office Action	Final Office Action Response Due	Deadline to file response to the Final OA is 4/17/13, extendable (rml)
4/17/13	Amendment and Response to Final Office Action	Final Office Action Response Due	Deadline to file response to the Final OA is 4/17/13, extendable (rml)

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DOCUMENT-IDENTIFIER: JP 2005-309691 A
TITLE: ELECTRONIC PEDOMETER
PUBN-DATE: November 4, 2005
INVENTOR-INFORMATION:

NAME	COUNTRY
TSUJI, TOMOHARU	N/A

INT-CL (IPC): G06M007/00, G01C022/00

ABSTRACT:

PROBLEM TO BE SOLVED: To perform much more accurate measurement of the number of steps even when any walking signal enough for detection is not obtained.

SOLUTION: A signal detected by an acceleration detecting part 101 having an acceleration sensor 100 is compared with a moving average value calculated by a walking cycle calculating part 108 by a walking cycle comparing part 106 after a fixed noise is removed by a filter part 105 of a counting part 102, and each signal in a predetermined cyclic range is counted by a number of step count part 107 as the number of steps for one step. A signal in a range similar to the n times of a predetermined cycle among signals beyond a predetermined cyclic range is judged as the number of steps for n steps by a beyond-specification number of step processing part 109, and counted as the number of steps for n steps by a number of step count part 107. The number of steps counted by the number of step count part 107 is displayed at a display part 103.

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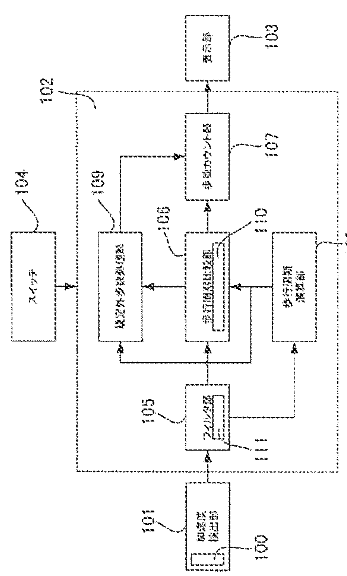
Fターム(参考) 2F024 BA07

(54)【発明の名称】電子歩数計

(57)【要約】
【課題】　検出するのに十分な歩行信号が得られない場合でも、より正確な歩数計測を行えるようにすること。
【解決手段】　加速度センサ１００を有する加速度検出部１０１で検出した信号は、計数部１０２のフィルタ部１０５で一定のノイズが除去された後、歩行周期比較部１０６により、歩行周期演算部１０８で算出した移動平均値と比較されて、所定周期範囲内の各信号は１歩分の歩数として歩数カウント部１０７で計数される。前記所定周期範囲外の信号のうちの所定周期のｎ倍に類似する範囲の信号は、規定外歩数処理部１０９によってｎ歩分の歩数と判断され、歩数カウント部１０７はｎ歩分の歩数として計数する。歩数カウント部１０７で計数された歩数は表示部１０３で表示される。
【選択図】　図１



【特許請求の範囲】
【請求項１】
歩行センサを有し該歩行センサで検出した使用者の歩行に対応する歩行信号を出力する歩行検出手段と、前記歩行検出手段からの歩行信号に基づいて歩数を計数する計数手段とを有し、少なくとも前記歩行センサは使用者の身体に装着して使用される電子歩数計において、
　前記計数手段は、前記歩行検出手段からの信号のうちの第１の基準周期範囲内の各信号を１歩分として計数すると共に、前記第１の周期範囲外の信号のうち、第２の基準周期範囲のｎ（正の整数）倍を基準とする所定範囲内にある信号をｎ歩分として計数することを特徴とする電子歩数計。
【請求項２】
前記計数手段は、前記歩行検出手段からの信号が前記第１の基準周期範囲内の信号か否かを判断する第１の周期判断手段と、前記歩行検出手段からの信号のうち、前記第１の周期判断手段が前記第１の基準周期範囲外と判断した信号が、前記第２の基準周期範囲のｎ倍を基準とする所定周期範囲内の信号か否かを判断する第２の周期判断手段と、前記歩行検出手段からの信号のうち、前記第１の基準周期判断手段が前記第１の基準周期範囲内の信号と判断した各信号を１歩分として計数すると共に、前記第２の基準周期判断手段が前記第２の基準周期範囲のｎ倍を基準とする所定周期範囲内の信号と判断した信号をｎ歩分として計数する歩数計数手段とを備えて成ることを特徴とする請求項１記載の電子歩数計。
【請求項３】
前記計数手段は前記歩行検出手段からの所定数の信号周期の移動平均をとる基準周期算出手段を有し、前記周期判断手段は、前記基準周期算出手段で算出した移動平均を基準とする所定範囲を前記第１の基準周期範囲として使用して、前記歩行検出手段からの信号が前記第１の基準周期範囲内の信号か否かを判断することを特徴とする請求項２記載の電子歩数計。
【請求項４】
前記第１の基準周期範囲を記憶する基準値記憶手段を備え、前記周期判断手段は、前記基準値記憶手段に記憶した第１の基準周期範囲を使用して、前記歩行検出手段からの信号が前記第１の基準周期範囲内の信号か否かを判断することを特徴とする請求項２記載の電子歩数計。
【請求項５】
前記基準値記憶手段に前記第１の基準周期範囲を記憶するための操作手段を備えて成ることを特徴とする請求項４記載の電子歩数計。
【請求項６】
前記第１の基準周期範囲と前記第２の基準周期範囲は同一であることを特徴とする請求項１乃至５のいずれか一に記載の電子歩数計。
【請求項７】
前記歩行センサは使用者の腕に装着して使用されることを特徴とする請求項１乃至６のいずれか一に記載の電子歩数計。
【発明の詳細な説明】
【技術分野】
【０００１】
　本発明は、人体に装着して使用され、該装着した人の歩数を電子的に計数する電子歩数計に関する。
【背景技術】
【０００２】
　従来から、人体に装着して使用され、電子的な処理を施すことによって使用者の歩数を計数する電子歩数計が開発されている。
【０００３】
　歩数の計数は、歩行中の人体の上下運動による加速度を検出し、その回数を歩数として

計数するのが一般的である。

【０００４】

しかし、実際には歩行以外の生活動作による様々なノイズを拾ってしまい、歩数を正確に測定することが出来ないという問題点が以前から指摘されている。

【０００５】

これを解決するために、フィルタリング処理として一旦加速度を検出した後に所定の不感帯期間を設けノイズによる誤検出を回避する方法（例えば、特許文献１参照）、検出した所定回数連続して検出信号が出力したことを検出して、はじめてこれを歩数として計数する方法（例えば、特許文献２、特許文献３参照）、歩行の周期を検出し、その周期と歩行時間から歩数を演算する方法（例えば、特許文献４参照）等が提案されている。

【０００６】

図３は、前記特許文献１に記載された歩数計のブロック図である。歩数計は、使用者の身体に装着して使用されると共に使用者の歩行によって生じる加速度を検出して歩行に対応する信号（歩行信号）を出力する加速度検出部３０１、加速度検出部３０１の出力信号から歩行周期に対応する所定周期の信号を出力するフィルタ部３０２、フィルタ部３０２から出力された信号のうちの所定数の信号を平均することによって基準となる歩行周期を算出する歩行周期演算部３０６、フィルタ部３０２から出力された信号の周期と歩行周期演算部３０７で算出された基準となる歩行周期とを比較して、フィルタ部３０２から出力された信号のうち、前記基準となる歩行周期に類似する周期の信号を出力する歩行周期比較部３０３と、歩行周期比較部３０３からの信号を計数する歩数カウント部３０４、歩数カウント部３０４で計数した計数値を表示する表示部３０５を備えている。尚、フィルタ部３０２、歩行周期比較部３０３、歩数カウント部３０４、歩行周期演算部３０６は、中央処理装置（ＣＰＵ）と該ＣＰＵが実行するプログラムを格納した記憶部とによって構成することができる。

【０００７】

加速度検出部３０１は、歩行者の歩行によって生じる加速度を検出して歩行に対応する信号を出力する。フィルタ部３０２は、加速度検出部３０１の出力信号から歩行周期に対応する所定周期の信号を出力する。歩行周期演算部３０６は、フィルタ部３０２から出力された信号のうちの所定数の信号を平均することによって基準となる歩行周期を算出する。歩行周期比較部３０３は、フィルタ部３０２から出力された信号の周期と歩行周期演算部３０６で算出された基準となる歩行周期とを比較して、フィルタ部３０２から出力された信号のうち、前記基準となる歩行周期に類似する周期の信号を出力する。歩数カウント部３０４は、歩行周期比較部３０３からの信号を歩行に対応する信号として計数する。表示部３０５は、歩数カウント部３０４で計数した計数値である歩数を表示する。

【０００８】

このように、歩行周期比較部３０３が基準となる歩行周期に類似する周期で発生する信号を出力するように構成することによって、歩行周期に類似する期間以外で発生する信号は検出しないように、所定の不感帯期間を設けている。これにより、ノイズを歩行による信号と誤って検出することを回避することが可能になる。

【０００９】

図４は、前記従来の電子歩数計にける信号検出動作を説明するための信号波形図であり、加速度センサを使用者の腕に装着して歩数計測する方式の電子歩数計の例である。図４において、横軸は時間、縦軸は加速度検出部３０１で検出される加速度である。加速度信号波形と基準レベルＸとの交点位置（時間軸に示した矢印位置）が、検出された歩行を表している。加速度信号波形の周期はＴであり、加速度センサを腕に装着する方式であるため、１周期Ｔ当たり２歩検出される。

【００１０】

実際には歩行における上下運動の加速度だけを検出することは非常に困難であり、日常生活における歩行以外の動作や、歩行中の腕の振り方等の付帯動作の影響を受けるため、検出される加速度信号はこれらの合算となる。このため、検出レベルの揺らぎが生じて、

本来ならば検出されるべき歩行信号が検出されずに抜けてしまうという問題がある。即ち、図４において、本来ならば谷４０１～４０３は基準レベルＸの下方まで突出して基準レベルＸと交差し、交差点位置が歩数として計数されるはずであるが、検出レベルの揺らぎが生じて、検出されるべき歩行信号に抜けが発生しているため、計数漏れが生じてしまうという問題がある。

【特許文献１】特開昭５６－８６３０９号公報（第１頁～第２頁、図２～図４）

【特許文献２】特開昭６３－２６２７８４号公報（第２頁～第４頁、図４、図５）

【特許文献３】特許第３０１７５２９号公報（第２頁、図１～図４）

【特許文献４】特許第２６９７９１１号公報（第２頁、図１～図５）

【発明の開示】

【発明が解決しようとする課題】

【００１１】

本発明は、検出するのに十分な歩行信号が得られない場合でも、より正確な歩数計測を行えるようにすることを課題としている。

【課題を解決するための手段】

【００１２】

本発明によれば、歩行センサを有し該歩行センサで検出した使用者の歩行に対応する歩行信号を出力する歩行検出手段と、前記歩行検出手段からの歩行信号に基づいて歩数を計数する計数手段とを有し、少なくとも前記歩行センサは使用者の身体に装着して使用される電子歩数計において、前記計数手段は、前記歩行検出手段からの信号のうちの第１の基準周期範囲内の各信号を１歩分として計数すると共に、前記第１の周期範囲外の信号のうち、第２の基準周期範囲のｎ（正の整数）倍を基準とする所定範囲内にある信号をｎ歩分として計数することを特徴とする電子歩数計が提供される。

【００１３】

歩行検出手段は、使用者の歩行を検出して該歩行に対応する歩行信号を出力する。計数手段は、歩行検出手段からの信号のうちの第１の基準周期範囲内の各信号を１歩分として計数すると共に、前記第１の周期範囲外の信号のうち、第２の基準周期範囲のｎ（正の整数）倍を基準とする所定範囲内にある信号をｎ歩分として計数する。

【００１４】

ここで、前記計数手段は、前記歩行検出手段からの信号が前記第１の基準周期範囲内の信号か否かを判断する第１の周期判断手段と、前記歩行検出手段からの信号のうち、前記第１の周期判断手段が前記第１の基準周期範囲外と判断した信号が、前記第２の基準周期範囲のｎ倍を基準とする所定周期範囲内の信号か否かを判断する第２の周期判断手段と、前記歩行検出手段からの信号のうち、前記第１の基準周期判断手段が前記第１の基準周期範囲内の信号と判断した各信号を１歩分として計数すると共に、前記第２の基準周期判断手段が前記第２の基準周期範囲のｎ倍を基準とする所定周期範囲内の信号と判断した信号をｎ歩分として計数する歩数計数手段とを備えて成るように構成してもよい。

【００１５】

また、前記計数手段は前記歩行検出手段からの所定数の信号周期の移動平均をとる基準周期算出手段を有し、前記周期判断手段は、前記基準周期算出手段で算出した移動平均を基準とする所定範囲を前記第１の基準周期範囲として使用して、前記歩行検出手段からの信号が前記第１の基準周期範囲内の信号か否かを判断するように構成してもよい。

【００１６】

また、前記第１の基準周期範囲を記憶する基準値記憶手段を備え、前記周期判断手段は、前記基準値記憶手段に記憶した第１の基準周期範囲を使用して、前記歩行検出手段からの信号が前記第１の基準周期範囲内の信号か否かを判断するように構成してもよい。

【００１７】

また、前記基準値記憶手段に前記第１の基準周期範囲を記憶するための操作手段を備えて成るように構成してもよい。

【００１８】

また、前記第１の基準周期範囲と前記第２の基準周期範囲は同一であるように構成してもよい。
【００１９】
また、前記歩行センサは使用者の腕に装着して使用されるように構成してもよい。
【発明の効果】
【００２０】
本発明によれば、検出するのに十分な歩行信号が得られない場合でも、より正確な歩数計測を行うことが可能になる。
【発明を実施するための最良の形態】
【００２１】
以下、本発明の実施の形態に係る電子歩数計について図面を用いて説明する。
【００２２】
図１は、本発明の実施の形態に係る電子歩数計のブロック図である。
【００２３】
図１において、電子歩数計は、加速度センサによって構成された歩行センサ１００を有すると共に歩行センサ１００によって使用者の歩行（走行を含む。）を検出して該歩行に対応する信号（歩行信号）を出力する加速度検出部１０１、加速度検出部１０１からの歩行信号に基づいて使用者の歩数を計数する計数部１０２、液晶表示装置によって構成され計数部１０２で計数した歩数を表示する表示部１０３、計数部１０２の計数開始操作や終了操作、計数データのリセット操作、基準周期範囲の設定操作等の操作を行うための操作手段としてのスイッチ１０４を備えている。
【００２４】
計数部１０２は、中央処理装置（ＣＰＵ）と該ＣＰＵが実行するプログラムを格納した記憶部とによって構成することができる。
【００２５】
図１では、計数部１０２を機能的に表した機能ブロック図で示しており、計数部１０２は、加速度検出部１０１の出力信号中の歩行周期に対応する所定周期の信号を出力するフィルタ部１０５、フィルタ部１０５からの信号のうちの最新の所定数の信号周期の移動平均Ｔａをとることによって基準歩行周期を算出する歩行周期演算部１０８、前記基準歩行周期に基づく第１の基準周期範囲（本実施の形態では、Ｔａ±１０％）とフィルタ部１０５からの信号の周期とを比較して、フィルタ部１０５から出力された信号のうち、前記第１の基準周期範囲内の周期の信号を１歩分の歩数として歩数カウント部１０７に出力すると共に、フィルタ部１０５からの信号のうち、前記第１の基準周期範囲外の信号を規定外歩数処理部１０９に出力する歩行周期比較部１０６、前記基準歩行周期に基づく第２の基準周期範囲（本実施の形態では、ｎＴａ±１０％（ｎは正の整数））と歩行周期比較部１０６からの信号の周期とを比較して、歩行周期比較部１０６からの信号のうち、前記第２の基準周期範囲内の周期の信号をｎ歩分の歩数として歩数カウント部１０７に出力すると共に、前記第２の基準周期範囲外の周期の信号の場合にはノイズとして排除する規定外歩数処理部１０９、歩行周期比較部１０６及び規定外歩数処理部１０９から得られた歩数を現在の歩数に加算することによって歩数を計数する歩数カウント部１０７を備えている。
【００２６】
歩行周期比較部１０６は第２の基準周期記憶部１１１とともに基準周期記憶手段を構成する第１の基準記憶部１１０を有するように構成し、第１の基準周期記憶部１１０に予め前記第１の基準周期範囲を設定するようにすれば、歩行周期演算部１０８を省略することができる。この場合、前記第１の基準周期範囲は予め固定した一の値に固定されることになる。また、基準周期記憶部１１０に対する前記第１の基準周期範囲の設定は、スイッチ１０４によって行う。
【００２７】
フィルタ部１０５は基準周期記憶手段を構成する第２の基準周期記憶部１１１を有しており、基準周期記憶部１１１には、使用者が通常歩行する時の周期の変動範囲（第３の基

準周期範囲）が予め記憶されている。本実施の形態では、前記第３の基準周期範囲は、３３３ｍｓｅｃ（１８０ｒｐｍ）～１０００ｍｓｅｃの範囲に設定している。また、第２の基準周期記憶部１１１に対する前記第３の基準周期範囲の設定は、スイッチ１０４によって行う。

【００２８】

尚、加速度検出部１０１は歩行検出手段を、計数部１０２は計数手段を、表示部１０３は表示手段を、スイッチ１０４は操作手段を、歩行周期比較部１０６は第１の周期判断手段を、歩数カウント部１０７は歩数計数手段を、歩行周期演算部１０８は基準周期算出手段を、規定外歩数処理部１０９は第２の周期判断手段を各々構成している。

【００２９】

図２は、計数部１０２の処理を示すフローチャートである。

【００３０】

以下、図１、図２及び必要に応じて図４を参照して、本実施の形態に係る電子歩数計の動作を説明する。

【００３１】

先ず、使用者は歩数計測を行う準備として、電子歩数計を身体に装着する。このとき、加速度検出部１０１に含まれる加速度センサは腕に装着する。この状態で、使用者はスイッチ１０４を操作することによって電子歩数計に歩数計測動作を開始させると共に歩行を開始する。

【００３２】

加速度検出部１０１は使用者の歩行（走行を含む。）を検出して該歩行に対応する信号（歩行信号）を出力する。フィルタ部１０５は、加速度検出部１０１の出力信号の周期Ｔが、予め定めた歩行の基準周期範囲（前記第３の基準周期範囲）内の値か否かを判断する（ステップＳ２０１）。即ち、フィルタ部１０５は、加速度検出部１０１の出力信号の周期Ｔが、基準記憶部１１１に予め記憶した前記第３の基準周期範囲内に入るか否かを判断する。本実施の形態では、フィルタ部１０５は出力信号の周期Ｔが、３３３ｍｓｅｃ（１８０ｒｐｍ）＜Ｔ＜１０００ｍｓｅｃを満足するか否かを判断する。

【００３３】

フィルタ部１０５は、ステップＳ２０１において、前記周期Ｔが前記第３の基準周期範囲内でない場合には、ノイズと判断して、信号は出力しない（ステップ２０６）。フィルタ部１０５は、ステップＳ２０１において、前記周期Ｔが前記第３の基準周期範囲内である場合には、加速度検出部１０１からの信号が歩行信号であると判断して該信号を出力する。

【００３４】

次に、歩行周期比較部１０６は、フィルタ部１０５からの信号と、歩行周期演算部１０８によって算出された基準歩行周期に基づく前記第１の基準周期範囲とを比較することにより、フィルタ部１０５からの信号が前記基準歩行周期に類似するか否かを判断する（ステップＳ２０２）。

【００３５】

ここで、前記類似するか否かの判断基準としては、ノイズによる計数誤差を生じることが少なく且つ歩行信号を漏れが少なく計数可能な基準である。本実施の形態では、前記第１の基準周期範囲としてＴａ±１０％（Ｔａは、フィルタ部１０５から出力される最新の所定数の歩行の周期の移動平均値）としており、フィルタ部１０５からの信号が前記第１の基準周期範囲内のときは、前記基準歩行周期に類似すると判断するようにしている。

【００３６】

歩行周期比較部１０６は、ステップＳ２０２においてフィルタ部１０５からの信号が前記第１の基準周期範囲内と判断した場合には、歩行信号と判断して、歩数カウント部１０７に歩行信号を１歩分出力する。歩数カウント部１０７は、歩行周期比較部１０６からの歩行信号を計数して、今までの歩数計数値に１カウント加算し、表示部１０３に出力する（ステップＳ２０３）。表示部１０３には、今まで表示していた計数値に１カウント加算

した計数値が累積の歩数として表示される。

【００３７】

一方、歩行周期比較部１０６は、ステップＳ２０２においてフィルタ部１０５からの信号が前記第１の基準周期範囲外と判断した場合は、フィルタ部１０５からの信号を規定外歩数処理部１０９に出力する。

【００３８】

規定外歩数処理部１０９は、フィルタ部１０５からの信号と、歩行周期演算部１０８によって算出された基準歩行周期に基づく第２の基準周期範囲とを比較することにより、フィルタ部１０５からの信号が前記基準歩行周期のｎ倍（ｎは正の整数）に類似するか否かを判断する（ステップＳ２０４）。

【００３９】

ここで、前記類似するか否かの判断基準としては、ノイズによる計数誤差を生じることが少なく且つ歩行信号を漏れが少なく計数可能な基準である。本実施の形態では、前記第２の基準周期範囲として、前記移動平均Ｔａのｎ倍（ｎＴａ）±１０％としており、フィルタ部１０５からの信号が前記第２の基準周期範囲内のときは、前記基準歩行周期のｎ倍に類似すると判断するようにしている。

【００４０】

規定外歩数処理部１０９は、ステップＳ２０４においてフィルタ部１０５からの信号が前記基準歩行周期のｎ倍に類似すると判断した場合、即ち、フィルタ部１０５からの信号が前記第２の基準周期内と判断した場合には、フィルタ部１０５からの信号がｎ個の歩行信号であると判断して、歩数カウント部１０７に歩行信号をｎ歩分出力する。歩数カウント部１０７は、規定外歩数処理部１０９からのｎ歩分の歩行信号を計数して、今までの歩数計数値にｎカウント加算し、表示部１０３に出力する（ステップＳ２０５）。表示部１０３には、今まで表示していた計数値にｎカウント加算した計数値が累積の歩数として表示される。

【００４１】

規定外歩数処理部１０９は、ステップＳ２０４においてフィルタ部１０５からの信号が前記基準歩行周期のｎ倍に類似しないと判断した場合、即ち、フィルタ部１０５からの信号が前第２の基準範囲内にないと判断した場合には、フィルタ部１０５からの信号が歩行信号ではなくノイズであると判断して、歩数カウント部１０７には信号は出力しない（ステップ２０６）。

【００４２】

前記動作を繰り返すことにより、計数部１０２は、加速度検出部で検出した歩行信号に基づいて歩数の計数処理を行い、累積した歩数が表示部１０３に随時表示される。

【００４３】

使用者は歩数計測を終了する場合には、スイッチ１０４を操作することにより、計数部１０２の計数動作を停止させることができる。また、表示部１０３の表示をリセットする場合にもスイッチ１０４を操作することによって行うことができる。

【００４４】

以上のように、本実施の形態に係る電子歩数計は、歩行センサを有し該歩行センサで検出した使用者の歩行に対応する歩行信号を出力する加速度検出部１０１と、加速度検出部１０１からの歩行信号に基づいて歩数を計数する計数部１０２を有し、少なくとも前記歩行センサは使用者の腕等の身体に装着して使用される電子歩数計において、前記計数部１０２は、加速度検出部１０１からの信号のうちの第１の基準周期範囲内の各信号を１歩分として計数すると共に、前記第１の周期範囲外の信号のうち、第２の基準周期範囲のｎ（正の整数）倍を基準とする所定範囲内にある信号をｎ歩分として計数することを特徴としている。

【００４５】

したがって、図４の谷４０１～４０３のように検出するのに十分な歩行信号が得られない場合でも、加速度検出部１０１からの信号が第２の基準周期のｎ倍を基準とする所定範

囲（例えば、ｎＴａ±１０％の範囲）内にあれば、外乱等でその間の信号が検出されなかったとしても、ｎ歩分の歩数として計数するため、より正確な歩数計測を行うことが可能になる。

【００４６】

尚、前記実施の形態では、歩行センサとして加速度センサを使用したが、靴底に設けた圧力センサ等を使用してもよい。

【産業上の利用可能性】

【００４７】

歩数計の構成要素全てを使用者に装着して使用するように構成した電子歩数計や、一部の構成要素（少なくともセンサ）を使用者に装着すると共に他の構成要素を前記一部の構成要素と無線で信号の送受信を行うように構成し、前記他の構成要素は使用者から離れた場所に設けるようにした電子歩数計等にも適用可能である。また、歩行センサを腕以外の身体に装着するようにした電子歩数計にも適用可能である。

【図面の簡単な説明】

【００４８】

【図１】本発明の実施の形態に係る電子歩数計のブロック図である。

【図２】本発明の実施の形態の処理を説明するためのフローチャートである。

【図３】従来の電子歩数計のブロック図である。

【図４】従来の電子歩数計の動作を説明するための信号波形図である。

【符号の説明】

【００４９】

１００・・・歩行センサ

１０１・・・歩行検出手段としての加速度検出部

１０２・・・計数手段としての計数部

１０３・・・表示手段としての表示部

１０４・・・操作手段としてのスイッチ

１０５・・・フィルタ部

１０６・・・第１の周期判断手段としての歩行周期比較部

１０７・・・歩数計数手段としての歩数カウント部

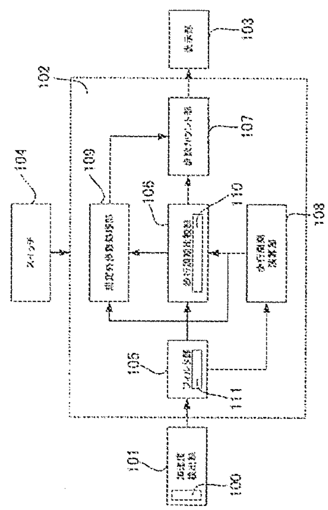
１０８・・・基準周期算出手段としての歩行周期演算部

１０９・・・第２の周期判断手段としての規定外歩数処理部

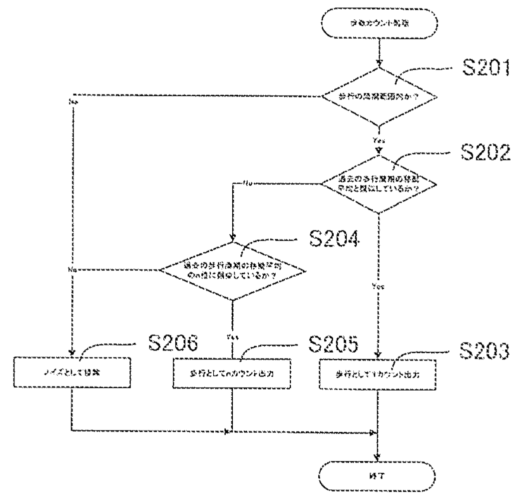
１１０・・・基準値記憶手段としての基準値記憶部

１１１・・・基準周期記憶部

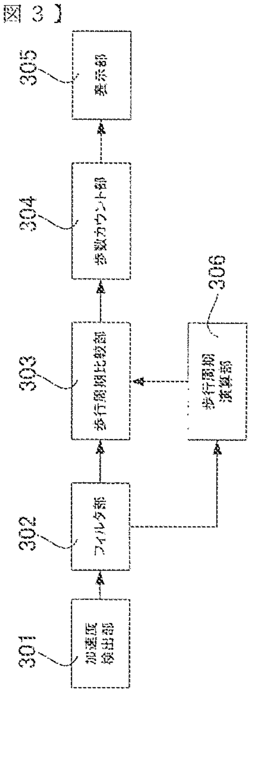
【図１】


103
102
104
109
106
110
107
108
105
111
101
100

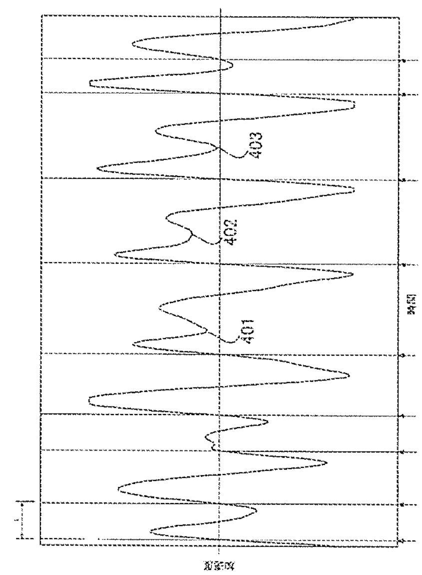
【図２】


S201
S202
S204
S206
S205
S203

【図３】


305
表示部
304
歩数カウント部
303
歩行周期比較部
306
歩行周期
演算部
302
フィルタ部
301
加速度
検出部

【図４】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401

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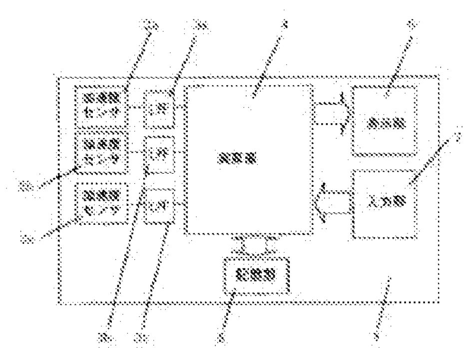
(54) **WALKING METER**

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a walking meter capable of calculating an accurate walking distance and walking speed, and capable of detecting walking.
SOLUTION: This walking meter has an acceleration sensor for detecting an acceleration of a pedestrian, a computing part for computing an acceleration data output from the acceleration sensor to output a computed result, a storage part for storing the acceleration data and the computed result, and a display part for displaying the computed result, and calculates a walking pitch, a length of step, and the walking speed of the pedestrian by the computing part, using a period and an amplitude drawn form the acceleration data, to be displayed on the display part.



CLAIMS

[Claim(s)]

[Claim 1]

It has an acceleration sensor which detects a pedestrian's acceleration, operation part which calculates acceleration data outputted from the aforementioned acceleration sensor, and outputs the result of an operation, a storage part which memorizes acceleration data and the result of an operation, and a display part which displays the result of an operation,

A walk meter characterized by what a walk pitch, and a pedestrian's step and walking speed are computed in operation part, and is displayed on a display part using a cycle and amplitude which were drawn from the aforementioned acceleration data.

[Claim 2]

The walk meter according to claim 1, wherein the aforementioned acceleration sensor detects acceleration more than a 2-way, computes a cycle from large data of variation of acceleration and computes amplitude in operation part from data of an absolute value of acceleration.

[Claim 3]

It has a database section which stores relation between a cycle and amplitude, and a step as a database,

The walk meter according to claim 1 or 2 computing a step from a cycle and amplitude which were computed in operation part, and a database.

[Claim 4]

The walk meter according to any one of claims 1 to 3 which has the communications department which considers data communications as a walking machine when creating the aforementioned database using a walking machine which measures a step previously when a pedestrian walks in imitation, and is characterized by things.

[Claim 5]

The walk meter according to any one of claims 1 to 4 which a cut off frequency is provided with not less than 10-Hz the low pass filter which is 100 Hz or less between the aforementioned acceleration sensor and the aforementioned operation part, and is characterized by things.

[Claim 6]

The walk meter according to any one of claims 1 to 5 computing a cycle by carrying out discrete Fourier series conversion for acceleration data for every predetermined time in operation part.

[Claim 7]

The walk meter according to any one of claims 1 to 5 computing a cycle and amplitude by calculating a moving average of acceleration data in operation part.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[0032]
[Drawing 1]It is the block which shows the composition of the walk meter of Embodiment 1.
[Drawing 2]It is an output wave of an acceleration sensor same as the above.
[Drawing 3]It is the block which shows the composition of the walk meter of Embodiment 2.
[Drawing 4]It is a perspective view showing a measurement state same as the above.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[Field of the Invention]
[0001]
The present invention is attached to a pedestrian and relates to the walk meter which measures and displays a walk pitch, and a step and walking speed.
[Background of the Invention]
[0002]
By detecting vibration in case a pedestrian walks from the former, the number of steps is measured and the walk meter which computes walking distance and walking speed is used by multiplying by the step previously input into this. However, in this kind of walk meter, since the number of steps may have counted by vibration other than a walk and the still more nearly actual step was not measured, exact walking distance or walking speed were not necessarily able to be computed.
[0003]
As a walking detecting method which improved this, the detection **** thing is disclosed by JP,2002-197437,A with the microphone in vibration which a pedestrian emits. The walk meter which detects the vibration at the time of a walk is disclosed by JP,H9-152355,A with the acceleration sensor.
[Patent document 1] JP,2002-197437,A
[Patent document 2] JP,H9-152355,A
[Description of the Invention]
[Problem to be solved by the invention]
[0004]
However, in the walking detecting method of a Patent document 1, since the microphone is used, there is a possibility that it may be affected by the influence of an external sound. In the walking detecting method of the Patent document 2, it is asking for the step with the correspondence table from the measured acceleration. For this reason, the case where he walked slowly with a quick case and long step could not necessarily be distinguished with a short step, and exact walking distance or walking speed might be unable to be obtained depending on the walking condition.
[0005]
There is the present invention in providing the walk meter which can compute and display exact walking distance and walking speed in real time, even if it was made in view of the aforementioned point and change and the walk pitch of a step change.
[Means for solving problem]
[0006]
In order to attain the above-mentioned purpose, the walk meter of the present invention, The acceleration sensor which detects a pedestrian's acceleration, and the operation part which calculates the acceleration data outputted from the aforementioned acceleration sensor, and outputs the result of an operation, It is characterized by what it has a storage part which memorizes acceleration data and the result of an

operation, and a display part which displays the result of an operation, and a walk pitch, and a pedestrian's step and walking speed are computed in operation part using the cycle and amplitude which were drawn from the aforementioned acceleration data, and is displayed on a display part.
[Effect of the Invention]
[0007]
Since the walk meter of the present invention is computing a walk pitch, and a pedestrian's step and walking speed in operation part using the cycle and amplitude which were drawn from acceleration data, it can compute exact walking distance and walking speed, without being influenced by the walking condition.
[Best Mode of Carrying Out the Invention]
[0008]
(Embodiment 1)
The composition and operation of Embodiment 1 of the present invention of a walk meter are described based on Fig.1 and Fig.2.As shown in the block diagram of this walk a total of one Fig.1, the three acceleration sensors 2a, 2b, and 2c, The low pass filters 3a, 3b, and 3c (LPF:Low Pass Filter) from which the noise component of the output of each acceleration sensor is removed, The operation part 4 which calculates the acceleration sensor 2a, 2b, and the acceleration data from 2c, the storage part 5 which memorizes data required for an operation etc., the display part 6 which displays the result of an operation, and the input part 7 which inputs a pedestrian's basic information are provided.
[0009]
First, the acceleration sensor 2a, 2b, and 2c arrange the direction which detects acceleration so that it may become an axis (X, Y, Z-axis) which intersects perpendicularly, respectively. The low pass filters 3a, 3b, and 3c which remove a noise have the respectively same characteristic, and a cut off frequency sets to 10 Hz - 100 Hz, removes the noise component by the shock by intense motion of a human body, etc. from acceleration data, and they are transmitting it to the operation part 4. Next, in the operation part 4, the acceleration data measured to the fixed time (every [for example,] 50 ms) of the level which can analyze the locus of a walk of people is sampled, and this is memorized to the storage part 5. And a step and a walk pitch are calculated by the operation part 4 based on the memorized acceleration data.
[0010]
An example of an acceleration data output wave is shown in Fig.2. Vertical axes are the acceleration sensor 2a, 2b, and output voltage (unit: V) outputted from 2c, and a horizontal axis is time. Here, also while the human body is walking, various motions are carried out during one-step operation of one step. While the human body is walking, in order that the acceleration sensor 2a, 2b, and 2c may incline in the various directions or may move, output voltage changes to various values. However, there is periodicity in the method of this change. Therefore, as shown in Fig.2, by the whole motion of one step, the motion is repeated periodically one step. That is, the periodicity of the acceleration sensor 2a, 2b, and the output voltage outputted from 2c corresponds to one step of a motion on a human body, and the cycle of the output voltage of an acceleration sensor expresses the walk pitch (number of steps for 1 second) of the human body. The amplitude of the output voltage of an acceleration sensor is equivalent to the size of a motion of a human body. Therefore, when a pedestrian's walking condition changes from a certain state (walking condition A) to other states (walking condition B), the cycle of output voltage changes from the cycle A to the cycle B, and amplitude changes from the amplitude A to the amplitude B. Thus, while asking for a walk pitch from the cycle of the acceleration sensor 2a, 2b, and the output voltage outputted from 2c, it can ask for a step from amplitude. And the speed of a walk is computed by multiplying by the walk pitch and a step.
[0011]
Below, the procedure of the operation of a specific walk pitch is described. First, the walk pitch fp (unit: Hz) is computed from the cycle of change of the acceleration sensor 2a, 2b, and the output voltage of 2c. Here, in order to make influence of a noise small, the moving average of the measured output voltage is computed by the operation part 4. the data number which computes an average takes a part for half [about] minute [of the fastest walk pitch assumed] time, by computing a moving average, removes the

influence of a noise and improves the accuracy of frequency measurement. For example, it samples, and when the fastest walk pitch assumed every 50 ms is 300 ms, the average of the data for 150 ms of the half, i.e., 150ms/50ms=3 piece data, is taken for every time, respectively, and the storage part 5 is made to memorize the data. Next, this output voltage is converted to frequency by carrying out discrete Fourier series conversion for every fixed time by choosing the output voltage outputted from the acceleration sensor with the largest (it is got blocked and amplitude is large) variation among the acceleration sensor 2a, 2b, and the output voltage outputted from 2c. And it asks for the walk pitch fp by asking for the frequency of the peak in this frequency conversion.
[0012]
Next, it describes about the procedure of calculation of a step. It cannot ask for a step directly from acceleration data. Then, the database showing the relation between acceleration data and a step is built as a database section inside the storage part 5, and a step is computed using this database. Table 1 is a data table showing the relation between a pedestrian's height and sex, and the average step Wa corresponding to this, Table 2 is a data table showing a pedestrian's age and a relation with the age factor A, and Table 3 is an example of the data table showing the relation between a pedestrian's attachment part and part factor B. The data table showing the relation between the data table showing a pedestrian's attachment part and a relation with the walk pitch factor P other than the data table of Tables 1-3 and the operation value Vs (after-mentioned) of a pedestrian's mean amplitude Va and the amplitude of the measured output voltage is needed. These data tables are memorized inside the storage part 5 as a database section.
[0013]
[Table 1]

身長(cm)		150	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182
平均歩幅	男	43.5	44	44.5	45	45.5	46	46.5	47	47.5	48	48.5	49	49.5	50	50.5	51	51.5
Wa (cm)	女	39	39.5	40	40.5	41	41.5	42	42.5	43	43.5	44	44.5	45	45.5	46	46.5	47

[0014]
[Table 2]

年齢	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
年齢ﾌｧｸﾀA	1	1	1	1	1	0.95	0.95	0.9	0.9	0.9	0.85	0.8	0.75	0.7	0.65

[0015]
[Table 3]

取り付け部位	腰前	腰横	手首	足首
部位ﾌｧｸﾀ B	0.9	1	3	4

[0016]
First, before measurement, the information on the attachment part of a pedestrian's height, sex, age, and a walk meter is input from the input part 7, and a basic step is set up.
[0017]
Wb = WaxAxBxP
There is an average step data table for every height for every sex in the storage part 5, and it asks for a standard step (WaxA) by applying the age factor A which shows change of the average step by age to the step Wa.
[0018]
Next, it describes about amplitude data. a ratio with the operation value Vs of the amplitude of the acceleration data which there is an average amplitude data table for every height for every sex in a database section, and was measured with the mean amplitude Va -- Vs/Va is computed. this ratio -- it asks for the step W by attaching with Vs/Va and multiplying by the factor P and standard step by factor B and a walk pitch by a part. The step W is computed by the following formulas.
[0019]
W=WbxVs/Va =WaxAxBxPxVs/Va
It attaches here, and since amplitude changes a lot the side of the waist, before the waist, or, for example by places, such as an arm, part factor B is the part to which walk 1 [a total of] is attached, and a thing which corrects this. In order [into which a motion of the body roughly divides the walk pitch factor P by the time of a walk and a run] to change, amplitude changes a lot. In order to correct this change, it considers that it will run if a pitch becomes early to some extent, and P is made small and corrected.
[0020]
Below, it describes about the arithmetic method of the operation value Vs of the amplitude of the output voltage of an acceleration sensor. The operation of amplitude takes the moving average of each acceleration sensor, in order to remove the influence of a noise like measurement of a walk pitch. In order to ask for the vector sum of acceleration furthermore, when what squared the amplitude of output voltage, respectively, and took the sum, and also took the square root is set to Vs, Vs is denoted by the following formulas. Vx, Vy, and Vz show here the amplitude value which took the moving average of each acceleration sensor output.
[0021]
[Mathematical formula 1]

$$Vs = \sqrt{Vx^2 + Vy^2 + Vz^2}$$

[0022]
by multiplying the step W by the walk pitch fp which carried out such and was boiled and for which it asked, the speed V is found (V=Wxfp) and this result is displayed on the display part 6.
[0023]
The operation part which the walk meter of the present invention calculates the acceleration sensor which detects a pedestrian's acceleration, and the acceleration data outputted from the aforementioned acceleration sensor, and outputs the result of an operation, The storage part which memorizes acceleration data and the result of an operation, and the display part which displays the result of an operation, Since it ****, a walk pitch, and a pedestrian's step and walking speed are computed in operation part using the cycle and amplitude which were drawn from the aforementioned acceleration data and it displays on a display part, even if change and the walk pitch of a step change, walking distance and a travel speed can be displayed on real time.
[0024]

Since the aforementioned acceleration sensor detects the acceleration more than a 2-way, and computes a cycle from the large data of the variation of acceleration and amplitude is computed in operation part from the data of the absolute value of acceleration, Even when it has influence of a noise on the sensor of one direction, right acceleration data can be measured and the accuracy of measurement can be improved.
[0025]
Since a step is computed from the cycle and amplitude which have a database section which stores the relation between a cycle and amplitude, and a step as a database, and were computed in operation part, and a database, Even when a walk meter and its attachment part change, it becomes possible to correct this and to ask for a step with sufficient accuracy.
[0026]
In addition, a cut off frequency is provided with not less than 10-Hz the low pass filter which is 100 Hz or less between the aforementioned acceleration sensor and the aforementioned operation part, and since, the influence of the noise produced by vibration at the time of a walk is removable.
[0027]
In addition, since a cycle and amplitude are computed by carrying out discrete Fourier series conversion for acceleration data for every predetermined time in operation part, a cycle and amplitude are computable with sufficient accuracy from acceleration data.
[0028]
Since a cycle and amplitude are computed by uniting and calculating the moving average of acceleration data in operation part, it can ask for walking distance or a travel speed with sufficient accuracy from acceleration data.
[0029]
(Embodiment 2)
The composition and operation of Embodiment 2 of the present invention of a walk meter are described based on Fig.3 and Fig.4.Fig.3 is walk a total of one block diagram of this embodiment, and the communications department 9 and the correction part 8 are added to the walk meter of Embodiment 1. As shown in the perspective view of Fig.4, the walking machine 11 has composition which the pedestrian 10 walks with this predetermined speed, when it has the belt part 12 in which the pedestrian 10 appears and this belt part 12 moves at a predetermined speed. The walking machine 11 has a communication function between [a total of one] walks, and can change the speed of the belt part 12 now by the instructions from walk 1 [a total of]. It has walk a total of one correction mode, and goes into correction mode by the instructions from the input part 7. And this information lets the communications department 9 pass from the correction part 8, and is transmited to the walking machine 11. In this case, the walking machine 11 can be moved at various speed fixed time, and can calculate a step and the walk pitch factor B from the operation value Vs of the amplitude of a walk pitch and output voltage.
[0030]
For example, if it goes into correction mode, the correction part 8 will perform control which increases the movement speed of the belt part 12 of the walking machine 11 at a time by 1 km/h from 3 km/h to 10 km/h. And the operation value Vs of the amplitude of the walk pitch corresponding to each speed and output voltage is calculated. It counts backward and asks for a step by the first 3-km/h walk, and after that, it counts backward and asks for the walk pitch factor B in each walk pitch at the rate of others, and the database section of the storage part 5 memorizes these results.
[0031]
When creating the aforementioned database using the walking machine which measures a step previously when a pedestrian walks in imitation, have the communications department which considers data communications as a walking machine, and since, Since the step for every pedestrian is surveyed in various walk pitches, speed can be found still more precisely.
[Brief Description of the Drawings]
[0032]
[Drawing 1]He is Brock who shows the composition of the walk meter of Embodiment 1.

[Drawing 2]It is an output wave of an acceleration sensor same as the above.
[Drawing 3]It is the block which shows the composition of the walk meter of Embodiment 2.
[Drawing 4]It is a perspective view showing a measurement state same as the above.
[Explanations of letters or numerals]
[0033]
1 Walk meter
2 a-c acceleration sensor
3 a-c LPF (low pass filter)
4 Operation part
5 Storage part
6 Display part
7 Input part
8 Correction part
9 Communications department
10 Pedestrian
11 Walking machine
11 Belt part

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention]
[0007]
Since the walk meter of the present invention is computing a walk pitch, and a pedestrian's step and walking speed in operation part using the cycle and amplitude which were drawn from acceleration data, it can compute exact walking distance and walking speed, without being influenced by the walking condition.

[Translation done.]

MEANS

[Means for solving problem]
[0006]
In order to attain the above-mentioned purpose, the walk meter of the present invention, The acceleration sensor which detects a pedestrian's acceleration, and the operation part which calculates the acceleration data outputted from the aforementioned acceleration sensor, and outputs the result of an operation, It is characterized by what it has a storage part which memorizes acceleration data and the result of an operation, and a display part which displays the result of an operation, and a walk pitch, and a pedestrian's step and walking speed are computed in operation part using the cycle and amplitude which were drawn from the aforementioned acceleration data, and is displayed on a display part.

[Translation done.]

PRIOR ART

[Background of the Invention]
[0002]
By detecting vibration in case a pedestrian walks from the former, the number of steps is measured and the walk meter which computes walking distance and walking speed is used by multiplying by the step previously input into this. However, in this kind of walk meter, since the number of steps may have counted by vibration other than a walk and the still more nearly actual step was not measured, exact walking distance or walking speed were not necessarily able to be computed.
[0003]
As a walking detecting method which improved this, the detection **** thing is disclosed by JP,2002-197437,A with the microphone in vibration which a pedestrian emits. The walk meter which detects the vibration at the time of a walk is disclosed by JP,H9-152355,A with the acceleration sensor.
[Patent document 1] JP,2002-197437,A
[Patent document 2] JP,H9-152355,A

[Translation done.]

TECHNICAL FIELD

[Field of the Invention]
[0001]
The present invention is attached to a pedestrian and relates to the walk meter which measures and displays a walk pitch, and a step and walking speed.

[Translation done.]

TECHNICAL PROBLEM

[Problem to be solved by the invention]
[0004]
However, in the walking detecting method of a Patent document 1, since the microphone is used, there is a possibility that it may be affected by the influence of an external sound. In the walking detecting method of the Patent document 2, it is asking for the step with the correspondence table from the measured acceleration. For this reason, the case where he walked slowly with a quick case and long step could not necessarily be distinguished with a short step, and exact walking distance or walking speed might be unable to be obtained depending on the walking condition.
[0005]
There is the present invention in providing the walk meter which can compute and display exact walking distance and walking speed in real time, even if it was made in view of the aforementioned point and change and the walk pitch of a step change.

[Translation done.]

* NOTICES *

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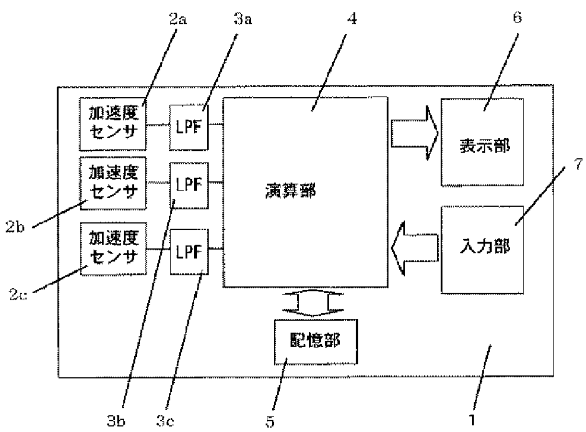
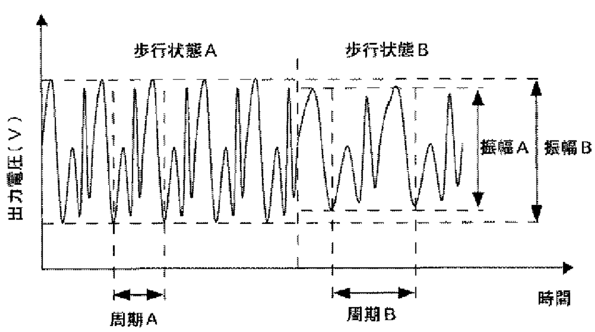
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

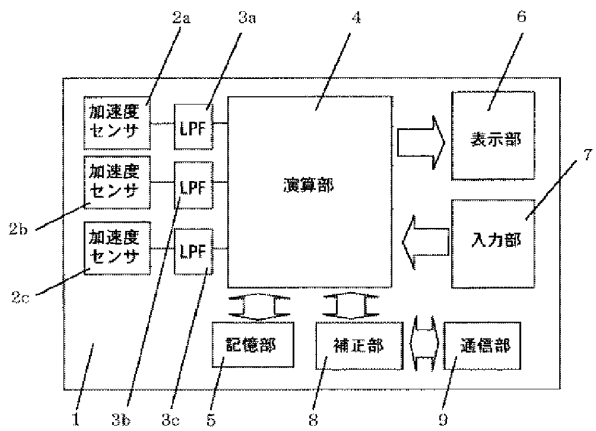
[Drawing 1]



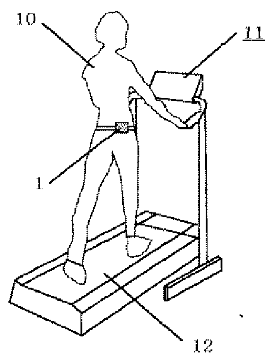
[Drawing 2]



[Drawing 3]



[Drawing 4]



[Translation done.]

Espacenet

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DETECTOR FOR MOTION OF PEDESTRIAN

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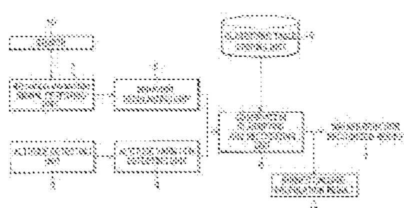
Abstract of JP2007093433 (A)

FIG. 1



PROBLEM TO BE SOLVED: To solve the following problems: there are no devices capable of correctly recognizing walking motion accompanying vertical motion; moreover though in the walking motion accompanying vertical motion, walking is performed with a stride different from that in walking on a level, there are no devices for detecting that. ; SOLUTION: A sensor for detecting a change in height and a device for detecting walking motion on a level are combined, to detect walking motion taking its vertical movement into consideration. By the use of this device, recognition of walking motion accompanying vertical movement becomes possible. Moreover, accurate stride detection becomes possible, and higher-accuracy position detection becomes possible. Moreover, where on the geography a pedestrian is can be estimated by comparing the walking motion with geographical information. ; COPYRIGHT: (C)2007,JPO&INPIT

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最終頁に続く

(54)【発明の名称】歩行者の動態検知装置

(57)【要約】

【課題】

上下移動を伴う歩行動態を正確に認識できる装置がなかった。また、上下移動を伴う歩行動態では、平面歩行とは異なる歩幅で歩く事になるがそれを検知する装置がなかった。

【解決手段】

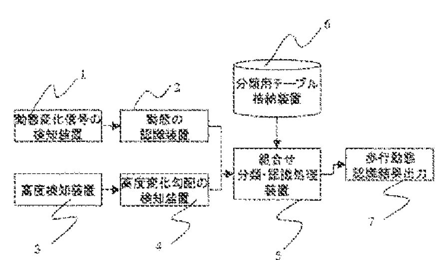
高度変化を検知するセンサと平面での歩行動態を検知する装置を組合せ上下移動を考慮した歩行動態を検知する。

【効果】

本発明によれば、上下移動を伴うような歩行動態が認識できるようになる。さらに、歩幅を正確に検知できるようになり精度の高い位置検知が可能になる。また、歩行動態と地理情報を比較して地理上のどこにいるかを推定できるようになる。

【選択図】図１

図１



【特許請求の範囲】
【請求項1】
歩行動態の検知装置において、平面での歩行動態の認識装置と高度変化を検知する手段を用い、平面での歩行動態と高度変化の組み合わせにより、上下移動も加味した歩行動態を検知する事を特徴とする、歩行者の動態検知装置。
【請求項2】
請求項１において、歩行動態の認識装置の特徴量を検知する手段として加速度変化や電界強度の変動・ジャイロセンサを使う事を特徴とする歩行者の動態検知装置。
【請求項3】
請求項１において、高度変化を検知する手段として気圧計やＧＰＳによる高度・RFIDから求めた高度を利用することを特徴とする歩行者の動態検知装置。
【請求項4】
請求項１において、歩行者の動態に応じた運動消費カロリーのテーブルを設け、歩行者の動態検知結果から上記テーブルを参照して、歩行者の動態に応じた運動消費カロリーを出力することを特徴とする歩行者の動態検知装置。
【請求項5】
請求項１において、歩行者の動態検知結果から上下移動に伴う歩行区間における気圧変動のみを積分し高度変化を検知することを特徴とする歩行者の動態検知装置。
【請求項6】
請求項１において、平面歩行時の歩幅推定装置を有し、平面歩行時には平面歩行時の歩幅推定装置を用い、上下移動を伴う歩行動態の場合には、対応する歩行動態に応じた歩幅補正を行い歩行者の移動速度や移動距離を検知することを特徴とする歩行者の動態検知装置。
【請求項7】
歩行動態の検知装置と検知した歩行動態に対応する地理情報を有し、検知した歩行動態情報をもとに対応する地理情報を探索し位置情報と進行方向情報を検知することを特徴とする歩行者の動態検知装置。
【請求項8】
請求項７において、検知した歩行者の位置情報及び進行方向を慣性航法の補正情報として利用する事を特徴とする歩行者の動態検知装置。
【請求項9】
請求項１，２，３，４，５，６，７，８のいずれか１項において、歩行者用ナビゲーション装置を実現する事を特徴とする歩行者の動態検知装置。
【請求項10】
上記請求項１，２，３，４，５，６，７，８のいずれか１項において、作業員の遠隔位置及び動態検知を実現する事を特徴とする歩行者の動態検知装置。

【発明の詳細な説明】
【技術分野】
【0001】
本発明は、歩行者の動態検知装置に関する。
【背景技術】
【0002】
平地での歩行者の動態検知技術に関しては、従来、歩行に伴う歩行者の上下の振動を加速度センサを用いて観測しスペクトル解析を用いて歩行状態を認識している（例えば、特許文献１参照）。また、従来は、認識した歩行状態と地理データ（建物内部の通路データや道路データなど）を比較し、認識された歩行状態に対応する位置を推定している。
【0003】
さらに、認識された歩行状態から歩幅を推定して移動距離を算出している（例えば、特許文献２及び非特許文献１参照）。
【0004】

【特許文献1】特開平１０－１１３３４３号公報
【特許文献2】特開２００４－０８５５１１号公報
【非特許文献1】電子情報通信学会論文誌A，Vol.Ｊ８７－Ａ，No.１，ｐｐ.７８－８６，２００４年1月
【発明の開示】
【発明が解決しようとする課題】
【0005】
従来技術では、歩行者の動きにより生じる物理的な力（加速度・角速度など）を観測し歩行状態を認識する。加速度・角速度のみでも階段歩行時に観測される波形から階段歩行を認識できるが、階段歩行に近い平地での走行運動と誤認識する可能性が高くなる。また、動作認識結果と地理情報を比較し位置の補正を行う場合、誤認識により間違った位置と判断する可能性が高くなる。さらに、この従来技術の位置の特定方法では、歩行者の進行方向に関しては考慮されていない。
【0006】
また、従来技術では、歩幅を推定して移動距離を算出しているが、階段の上り下り時の移動距離までは考慮されていない。
【0007】
本発明は、上下移動を伴うような歩行動態においても、正確な歩行状態を認識することができる歩行者の動態検知装置を提供する。
【課題を解決するための手段】
【0008】
上記目的を達成するため、本発明では、平地での歩行動作の認識装置と上下移動を検知できる手段を併用し、平地での歩行動作の認識装置から出力される認識結果との組合わせにより認識精度が向上できる。
【発明の効果】
【0009】
本発明によれば、上下移動を伴うような歩行動態が認識できるようになる。
【発明を実施するための最良の形態】
【0010】
図１は、本発明の一実施例である、歩行者の動態検知装置を示す。動態変化検知装置１は動態変化信号を検知する。動態変化信号とは、歩行者の移動に伴う加速度変化を検知する装置から出力される信号や、歩行者の角速度，関節の変位，歩行者の位置や移動に伴い基準局から送信される電界強度の変化等を検知する装置から出力される信号である。動態認識装置２は、「歩く」「走る」等の歩行者の動態や動態の変化を認識する。例えば、動態変化検知装置１として、歩行者の動態に伴う上下の加速度変化を検知する加速度センサを用い、動態認識装置２は、動態変化信号を周波数解析しその特徴量から「歩く」「走る」等の歩行者の動態変化を認識する。また、動態変化検知装置１として、基準局から送信されている電波を歩行者が所持している端末で受信するする受信装置を用いても良く、動態認識装置２は、歩行者の移動に伴い観測される電波の電界強度波形変化の特徴量を用いて歩行者の動態や動態の変化を認識しても良い。高度検知装置３は歩行者の高度を検知する。高度検知装置３としては、例えば、気圧変化を観測する気圧センサが用いられる。また、高度検知装置は、ＧＰＳ等の衛星測位装置から得られる高度情報を利用して高度を検知したり、ＲＦＩＤや無線ビーコンなどのＩＤ情報と、事前に計測しておいた高度情報との対応を示すテーブルを参照し高度を検知したりしても良い。高度変化勾配検知装置４は、歩行者の高度の変化勾配すなわち単位時間あたりの高度変化を検知する。例えば、気圧センサを用いて観測した気圧データを単位時間で微分して高度変化勾配が検知される。組合せ分類・認識装置５は、動態認識装置２及び高度変化勾配検知装置４から出力される結果を、分類用テーブル記憶装置６に記憶されている分類テーブルを用いて分類し、歩行者の動態認識結果として出力する。

【0011】
次に処理の流れを図２を用いて説明する。なお、図１では動態検知信号１や高度検知装置３として様々な装置がある旨を述べたが説明の簡素化のために以後、動態検知信号として加速度，高度検知装置として気圧センサを用いた場合を例にとり説明を行う。
【0012】
２１で加速度センサの値を入力する。例えば、加速度センサから出力されるアナログ信号をＡ／Ｄコンバータを持ちいて信号の取り込みを行う。取り込んだ加速度センサの出力は２２でＦＦＴ等を用いて周波数領域に変換される。２３で周波数領域に変換されたデータから歩行者の歩調を表すスペクトルの周波数とそのスペクトルの強さを抽出する。２４このスペクトルの強さをメンバーシップ関数をもちいて分類し歩行者の動態（「静止」「歩く」「走る」など）を認識する。（特開平１０−１１３３４３の認識装置と同様の認識処理）これにより、歩行者が平面上を移動したと仮定した場合の歩行者の動態が認識される。
【0013】
加速度センサと並行して２４において気圧センサの値をＡ／Ｄコンバータなどを用いて入力する。入力された気圧センサの値を２５で単位時間あたりで微分し気圧の変化量に変換する。
【0014】
歩行動態の認識判定結果２４及び気圧勾配の算出２５の結果を元に分類処理２７では２種類の判定結果を複合して歩行動態を認識する。この２７では以下のような処理を行う。
【0015】
例として歩行者が上下方向に移動する可能性として、階段，エレベータがある場合を例にとる。また、分類のテーブル（６）の一例として分類テーブルの内容を図３に示す。
【0016】
歩行者が平面上を移動する場合、上下移動に伴う気圧変動がないため観測される気圧変動はその時点における海面気圧に連動した気圧変動となる。この気圧変動は、低気圧や台風の通過により急激に変化する場合があるが数ｈＰａ以下である。例えば、２００５年の台風１１号通過時の横浜の最大気圧変動は２６日ＡＭ３時からＡＭ４時の１時間で５．１ｈＰａとなっている。この気圧変動を高度の変動に変換すると約４３ｍとなり、１時間の時間で約４３ｍ、１分で約７０cmの高度変化を行ったのと同じ気圧変動が観測される。これに比べ、歩行者が階段を登る場合、通常１フロアー４ｍ程度を１０〜１５秒程度で移動する。従って、１分では約１６ｍ移動することになり、台風接近時に比べ約２０倍程度気圧勾配が異なってる。従って、この気圧勾配を利用してある気圧勾配を閾値として大きな気圧勾配の場合、上下移動のある移動と判断でき、気圧勾配がある閾値よりも小さい場合、平面上での移動と判断できる。図３では、横軸が歩行動態の種類，縦軸が気圧変動の有無を表している。気圧勾配の閾値は３８のラインである。３８を境に気圧変動が小さい場合が平面移動３６、大きな場合が上下移動あり３７と判定される。気圧勾配だけでは歩行動態に関してまでは判定できない。そこで、歩行動態の判定２４で行った判定結果を組み合わせて歩行動態を判定する。図３の横軸が２４で判定した結果である。３３が静止状態、３４が歩行状態、３５が走行状態になっている。
【0017】
気圧勾配で平面と判定（３６）され、２４で静止と判定された場合、平面移動との交点である平地で静止３０１が判定結果として出力される。同様に、歩行（３４）の場合には、平地を歩行（３０２）が、走行（３５）の場合には平地を走行（３０３）が認識結果となる。
【0018】
気圧勾配で上下移動あり（３７）と判定され、２４で静止と判断された場合には、歩行者の動きが静止であるのに気圧変動があるのでエレベータで移動（３０４）と判断される。同様に、気圧勾配が３７の領域であり歩行（３４）と認識された場合には階段を歩いて移動（３０５）、走行（３５）と判定された場合には階段を走って移動（３０６）と判断

される。認識結果は２８として出力される。
【0019】
図４は本発明で判定した実際の例である。横軸は経過時間である。波形４０は気圧データであり左側の軸がＡＤ変換した値、右側が高度に変換した値になっている。波形４２は２３で抽出した歩調スペクトルの強度である。左側の軸にスペクトル強度の量が表記されている。スペクトル強度が０．０５を超えると歩行状態と判定され０．４を超えると走行状態と判定される。この例では０．４　を超えるスペクトル強度が存在しないので、この区間では静止及び歩行のみを行っている。波形４１が判定結果である。判定された結果は右の軸に記載されており、４１の引き出し線付近は静止状態と判定されている。先ず区間４３を見てみる。この区間では気圧の変動がなく、歩調スペクトルの強さが０．０５～０．１程度の値（歩行状態）を示している。従って、気圧勾配がなく歩行状態であるので歩行（平地での歩行）と判定されている。区間４４では気圧勾配があり、動態は静止状態である。従って、エレベータと判断されている。このとき気圧勾配の傾きの符号を利用し、この例のように符号が正であるのでエレベータ上りと判定することも可能である。区間４５では気圧勾配が正の傾きを持ち、歩調スペクトルの強さから歩行状態を表している。従って、階段を上っていると判定されている。区間４６では、気圧勾配の傾きが負、動態が歩行状態であるので階段を下っていると判定されている。
【0020】
このように平面と仮定した歩行動態認識装置と気圧勾配による認識を組み合わせることにより上下運動を伴った歩行動態を認識できるようになる。
【0021】
図５は高度勾配の閾値を図３によりも多くし、気圧勾配の閾値を歩行動作の激しさ（歩行に比べて走行の方が激しい）に応じ気圧勾配閾値に傾きを設け、更に多くの歩行動態を認識するようにした実施形態である。上下移動の認識対象は、階段の他に坂道，エスカレータを追加している。歩行者が静止状態における気圧勾配の閾値は、静止してエスカレータに乗っていると認識する閾値５０１とエレベータ移動と認識する５０２からなる。閾値５０１や閾値５０２は、エスカレータやエレベータの上昇速度をもとに決定される。歩行動作が伴っている場合、歩行による高度上昇変化を加える必要があるいため、エスカレータの高度上昇変化に加え、歩行の激しさ（速度）を加味した気圧勾配の閾値が必要になってくる。図５において気圧勾配の閾値直線５０４及び５０５が走行動作になるにつれて大きな閾値にしているのはそのためである。歩行動態の認識の振り分けは図３で行った装置と同様に、２４で認識した結果と気圧勾配の閾値の関係より図５のテーブルにより行う。また同様に２８から認識結果を出力する。
【0022】
このように本実施形態では気圧勾配の閾値を上下移動方法に応じて複数設けることにより上下運動を伴った歩行動態の認識の種類を拡張できるようになる。
【0023】
なお、上記実施形態では歩行動態の認識にとどまっているが、歩行動態より運動の消費カロリーも計算可能である。例えば、平面歩行の場合の消費カロリー、階段歩行での消費カロリーなど、歩行動態の違いにより消費する消費カロリーは異なっている。従って、前以て各歩行動態に対応する消費カロリーのテーブルを作成しておいて検知した歩行動態よりこのテーブルを参照することにより歩行動態に伴う運動消費カロリーを算出することができるようになる。
【0024】
このように本実施形態では、歩行動態に応じた運動消費カロリーを検知することが出来るようになる。
【0025】
次に、歩行動態の検知装置を利用し気圧センサなどで検知した高度を補正する実施形態について図９を用いて説明する。図４の波形４０が高度検知装置（気圧センサ）で検知した出力である。このデータは実験の最初の時刻（時間０）と最後の時刻（時間２４０）で

は、同じ位置（同じ高度）で観測した場合の例である。従って、最初と最後では同じ高度を示すはずであるが、最初の高度（矢印４８）と最後の高度（矢印４９）を比べると最後の高度が若干上昇している。これは、先に台風の例で説明したように時間の経過と伴い低気圧の接近などにより気圧が変動したためである。こような気圧変動があると気圧計で求めた高度に誤差が生じることになる。そこで、図９に示すような処理フローを用い誤差を補正する。先ず、９０で初期高度をセットする。これは、利用者が手動でセットしても良いし、ＧＰＳから出力される高度情報などを利用しても構わない。次に、上下移動を伴う歩行者の動態検知が可能である検知装置９１（図１で説明した装置など）を用い、上下の移動を伴った動態か否かを９２を用いて判定する。上下移動を伴う動態の場合、検知している高度勾配（４）は上下の移動に伴う気圧変動であるので９３の１計算サイクル前の高度に高度変化を加える処理を行い９４で高度を出力する。９２で上下移動を伴う歩行動態でないと判断された場合、ここで観測された気圧勾配の値は、上下移動に伴う高度変化ではないので９３の処理を行わないで１計算サイクル前の値と同じ高度として現在の高度を出力する（９４）。以後、同じ処理を繰り返して高度を検知する。処理の結果が、図４の波形４７である。４８，４９で生じていた高度差が補正され正しい高度を示していることがわかる。なお、本実施形態では、上下移動中の気圧変動（海面気圧）に関しては考慮していない。これは、通常平地歩行を行っている時間に比べ、上下移動を行っている時間は短く、上下移動中の海面気圧変動を考慮しないでも大きな誤差とならないためである。

【0026】

本実施形態によれば、上下移動を伴う歩行動態の区間だけ気圧変の量を考慮することにより、海面気圧変動の影響を補正する湖とが可能になる。

【0027】

次に、上記発明で認識した歩行動態を利用し上下移動を伴う歩行においても正確な歩幅を推定し位置検知技術に応用する装置について図６及び図７を用いて説明する。図７が歩幅推定及び位置検知を行うための構成図、図６は歩幅推定を行うための説明図である。平面歩行における歩行者の移動速度（移動距離）の推定は従来技術で述べられているが、大まかに下記のような処理を行う。

（１）上下の加速度変化波形を周波数解析し歩調を表す周波数とそのスペクトル強度を抽出する。

（２）これより歩幅は

　　歩幅＝歩調スペクトルの強度×動作毎の係数

（動作毎の係数は歩行と走行では歩行形態が異なり歩幅に変換する係数が異なる値を利用する）

（３）歩幅から移動速度は

　　移動速度＝歩幅×歩調

（４）移動距離

　　移動距離＝移動速度の時間積分

で求めている。水平面を移動する場合、歩行動態の違いによる歩幅の変動を考慮しているため、歩いた場合でも走った場合でも正確な移動速度を求めることが出来る。処が、階段を移動する場合、上り方向と下り方向では異なった強さのスペクトル強度を示してしまい（図４の区間４５及び区間４６）、上りと下りで異なった移動距離となってしまう。これは、上り階段に比べ下り階段では着地時に受ける加速度が大きいためである。また、階段の踏面の寸法は一定であるので歩行動態の違いにより歩幅が変化することはない（段飛ばしは除く）。

【0028】

そこで、図７の７０の上下移動を考慮した歩幅推定装置を用いて推定を行う。７０には動態の認識装置（２）で得られる歩調スペクトルの周波数と歩調スペクトルの強さ及び歩行の動態認識結果出力（７）が入力データして利用される。７０の処理内容を図６を用いて説明する。６０及び６１は加速度センサ単独で認識した歩行の状態を表している。６０が歩行、６１が走行である。動態認識結果出力（７）で平地移動（６３）と認識された場

合には、平地移動での歩幅推定計算（従来技術の歩幅推定方法）６５及び６６を行う。階段移動（６４）と認識された場合には歩行動態に依存せず６７のように固定歩幅×歩調の計算を行い移動速度を算出する。この固定歩幅の値は、標準的な踏面の長さ約３０cm程度にしてもよいし、精度を上げるために階段の踏面の長さを地理情報の中に入れておき、歩行者が通過している階段の踏面の長さを利用してもかまわない（歩行者がどこの階段を通過しているかを判断する装置については後述する）。このようにして歩幅（移動速度）を推定した後は、７１の進行方向の検知装置で歩行者の移動方向を検知し、７２の移動軌跡の算出方法で、移動速度と移動方向を積分し移動軌跡を求め、移動軌跡を出力（７３）できるようになる。

【0029】

本実施形態では、階段などの上下移動を伴うような歩行形態でも正確な歩幅推定を行う事ができるようになり、またこの歩幅より移動軌跡を推定できるようにもなる。

【0030】

次に、認識した歩行者の動態と周囲の地理情報を比較し認識した歩行状態に対応する位置を推定する実施形態について、図８，図１０を用いて説明する。図８は階段移動の説明図である。図１０は本実施形態を実現するための構成図である。図１０の１０１は歩行動態の認識装置でありこれまで説明してきた、上下方向の移動を含む歩行動態を認識する装置である。１０２は歩行者の位置検知装置である。例えば、図７で説明した歩幅推定による移動軌跡の検知装置でもかまわないしＧＰＳや無線ＬＡＮによる位置検知装置でもかまわない。この実施形態で説明する位置検知装置は、１０２による位置検知装置により検知された位置情報よりも更に高精度な位置を検知することが目的である。１０３は地理情報であり、建物の位置や階段・エレベータ等の建物内部の構造や位置情報、更に外の道路や地形情報が格納されている。１０４は歩行動態による地理情報の検索方法である。ここでは、１０２で検知した歩行動態に対応する地理情報の位置を大まかな位置情報１０２を用い１０３のデータベースから探索する処理を行う。ここで、歩行動態に対応する地理情報とは、階段歩行＝「階段の地理情報」，エレベータ移動＝「エレベータの地理情報」，エスカレータ移動＝「エスカレータの地理情報」等を示している。従って、階段歩行を認識している場合歩行者は階段の場所にいることになるので階段の地理情報を参照することにより階段の位置情報などが取得できるようになる。階段が複数ある場合を想定し、１０２で検知した歩行者の大まかな位置情報を元に１０３の地理情報データベースから一番近くにある対応する地理情報を探索する。これにより歩行者動態検知結果とおおまかな現在位置から対応する地理情報を探索するかとが出来、地理情報の中の位置情報から位置を推定できるようになる。(ここまでは、特開平１０－１１３３４３号公報と同様の処理である)更に、１０８の歩行動態の変化を利用した地理情報変化点の検知と進行方向検知処理を用いて検知精度の向上と進行方向の検知を行う。処理の方法を図８及び図９を用いて説明する。８０は階段を表している１０４の処理で歩行者がこの階段の中にいると判定されているとする。この階段は８７に示すように上り方向が北、下り方向が南側を向いている。歩行者が区間８１（階段）から区間８２（平地）へ向かった場合を考える。この場合、歩行者の動態認識結果は区間８１を移動中には「上り階段」、区間８２を移動中は「平面歩行」と認識される。従って、動態認識結果が「上り階段」から「平面歩行」へ変化する８５の地点は上り階段の終点となる。階段の形状と位置データは地理情報データベースの中に格納されているのでこの情報を元に８５の位置を割り出す事が出来る。このように、歩行動態の変化点を参照することにより１０４で検索した結果よりも更に詳細な位置情報を求めることが出来る。更に、この階段は上り方向は北に向かっているので階段を上っている歩行者は北を向いて歩行していることになる。従って、歩行者の進行方向も検知できるようになる。下りの場合も同様である。区間８３では「下り階段」区間８４では「平面歩行」と認識されその変化点が下り階段の終点である８６の位置となる。進行方向は下り階段を歩行してきたので南方向に移動していると判定される。

【0031】

このように、本実施形態では歩行動態の認識結果と地理情報を比較し歩行者がいる場所

を推定する事が可能になり、歩行者の現在位置と進行方向を検知することができるようになる。

【0032】

次に、前述の歩行動態の検知装置を利用した位置及び進行方向の検知装置を利用し、単位時間あたりの速度と進行方向を積分して位置を検知する装置（自立的位置検知装置あるいは慣性航法）の位置補正として利用する実施形態について図１１，図１２，図１３を用いて説明する。図１１は本実施形態の処理フロー、図１２及び図１３は検知した移動軌跡の例である。

【0033】

図１２は、図７を用いて説明した装置で求めた移動軌跡の例である。１２５は出発位置、１２０及び１２１は階段である。図１２の例で実際に歩行した経路は、１２５を出発点として階段１２０を３フロアー分上り３フロアー上の階層を階段１２１の階段の方向に移動し１２１の階段を３フロアー分下がり再度１２５の地点に戻るように行った。実際に図７の装置で検知した移動軌跡は１２４である。１２５の出発地点から１２０の階段までは正確な移動軌跡を示している。処が、１２０の階段を上っている間に、ジャイロなどの方向検知センサのドリフトのために方位に誤差が蓄積してしまい階段１２１に到達していると考えられる点線で囲んだ領域１２３になっても移動軌跡１２４は階段の１２１の位置に達していない。本実施形態ではこのような状況に陥っても正確な位置に補正する装置を提供する。先ず、図１１の１１０で歩行者の初期位置をセットする。歩行者が自分の位置を地図から確認して位置座標や進行方向を入力しても良いし、ＧＰＳなど絶対位置の検知できる装置が使える領域であればこの装置で検知した絶対位置及び進行方向を入力データとしてもかまわない、或はＲＦＩＤなどを利用して位置に対応するＩＤ情報を発信するタグなどを敷設し、このＩＤ情報を読み取る事により位置情報を検知し検知した位置情報を入力データとしてもかまわない。１１１で歩行動態の検知及び地理情報を利用した位置及び進行方向の推定方法の処理を行う。この処理は例えば図１０で説明した装置を用いる。ここでは（１）位置及び進行方向の推定が可能か否かの判断、（２）可能な場合の位置及び進行方向の算出を行う。位置及び進行方向の推定が可能な場合分岐１１２により１１３の推定した位置及び進行方向を用い現在位置及び進行方向の再セットを行う。位置及び進行方向の推定が可能な場合とは、階段の上り下りなどを認識し該当する位置が推定できた場合である。例えば、図１２，図１３の例では、階段１２０及び１２１を歩行者が通過した場合にこの状検知なり、階段の位置及び進行方向が再セットされる。その後１１４の単位時間ごとの速度と進行方向検知装置で速度と進行方向を検知し（例えば図７で説明した装置）、１１５において時間積分を行い移動軌跡を算出し１１６で現在の位置と進行方向が出力される。分岐１１２で位置及び進行方向が推定できない場合（階段以外の場所を歩行中など）は１１３の再セット処理を行わず、１１４，１１５の処理を行い１１６で現在の位置と進行方向が出力される。以後、再度１１１の処理に戻り処理を繰り返して連続的に位置と進行方向情報を出力する。図１３は、図１２と同じデータを用い本実施形態の効果を示したものである。１３２から出発した移動軌跡は階段の領域１３４に入ると１２０の階段の位置と進行方向に合致するように補正されていいる（途中移動軌跡が切れている場所が補正処理が行われた場所）。更に、１２１の階段の領域１３１へ進むと、同様に階段１２１の位置と進行方向が合致するように補正されている。最終的に終点１３３に到達するが出発点１３２とほぼ同じ位置となっており図１２の終点１２６に比べ位置検知精度が向上していることがわかる。

【0034】

なお、上記実施形態では、ＧＰＳによる位置補正は、初期位置のセット（１１０）のみに利用しているが、分岐１１２において動態検知による位置補正に加え、ＧＰＳの精度が信頼できるか否かの判断を行い精度が信頼できる値の場合、１１３の補正値をＧＰＳの値を用いて行ってもかまわない。精度が信頼できるか否かの判定はＤＯＰなどの情報をりようしてもかまわない。また、動態検知による位置補正及びＧＳＰによる位置検知両方が位置検知可能と判断された場合には、精度が高い動態検知による位置補正を選択してもかま

わない。
【0035】
本実施形態によれば、自律位置検知装置の補正装置として利用する事ができ、誤差が時間と共に増加する、自律位置検知装置の位置補正手段として利用できる。
【0036】
次に、本発明を利用した歩行者ナビゲーション端末に関して図１４を用いて説明する。１４４は加速度センサ、１４２は気圧センサ、１４７は方向センサ（磁気方位やジャイロセンサ）である。１４３はＧＰＳ装置である。１４６は地理情報のデータベース、１４１が演算処理用ＣＰＵ、１４５が表示装置となっている。これらの装置が一体化され１４０が歩行者ナビゲーション端末となっている。
【0037】
１４４は図1の動態変化信号の検知装置（１）に１４２は高度検知装置（３）に対応するセンサである。１４１演算処理用ＣＰＵでは、１４４及び１４２の情報をもとに図1を用いて説明した歩行者の動態検知、１４７のセンサを追加して利用し図7を用いて説明した歩行者の移動軌跡の検知装置、図１０を用いて説明した歩行動態による位置及び方向の検知装置などが処理される。また、１４３のＧＰＳはＧＰＳ衛星の電波が良好に受信できる屋外などでは、ＧＰＳから取得した位置情報を自分の位置としてそのまま利用したり、受信状態が悪くなる直前の値を図１１で説明した装置の１１０の初期位置のリセット情報として利用する。１４６は地理情報であり、歩行動態の検知結果から対応する地理情報（階段の位置など）を探索したり、図１１で説明した移動軌跡の検知装置で求めた移動軌跡と、周囲の地理情報（建物や階段，道などの情報）を描画するためのデータが格納されている。１４６及び１４１で処理した結果が１４５の表示装置を用いて描画される。描画される情報としては、図1により求めた歩行動態の検知結果や運動消費カロリー、図7や図１０，図１１により求めた歩行者の現在の移動軌跡とそれと重ねて表示した地理情報などである。これにより端末１４０を持った歩行者は、自分が今どこにいるかを表示画面１４５を見ることにより確認できるようになり自分がどこにいるかを把握できるようになる。なお、本実施形態では、自分の現在位置と移動軌跡の検知方法について述べているが、これらの情報をもとにカーナビゲーション（以下カーナビ）で一般的に行われている、経路探索情報をもとにした経路案内を行っても構わない。カーナビと本実施例の違いは、（１）ＧＰＳが使える領域ではカーナビと同様、（２）ＧＰＳが使えない場合、カーナビでは移動距離を車速パルスなどを利用するが本実施形態では歩幅推定技術を利用、（３）位置検知誤差が生じる場合、カーナビでは道路に沿って位置を補正（マップマッチング）するが、本実施形態では歩行動態に対応した地理情報（階段やエレベータ，エスカレータなど）で補正する違いがある。
【0038】
本実施形態によれば歩行者用のナビゲーションが可能になる。
【0039】
次に、表示画面（表示用端末）１５１を分離した例を図１５に示す。図１４との違いは、表示画面を分離しただけで処理内容は同様である。これは、歩行者の動態検知や歩幅推定を行うためには、１４４の加速度センサや１４７の方向センサを人間の重心位置である腰の位置に置くのが望ましい。処が、図１４の例の場合、通常腰の位置に取りつけて検知処理を行ったとしても、現在位置を確認するために画面を見る必要があり、結果的に腰から外し画面を見る動作により検知結果に誤認識や位置検知誤差が生じてしまう可能性が出てくる。従って、図１５の例では、センサ部分を搭載した１５２のくしに装着する装置と、利用者が手に持って画面などを確認できる利用者が見る表示端末１５３に分離して、通信回線１５０を用い画面情報等の情報をやり取りしながら表示する構成にしている。通信回線１５０は有線でも良いし無線を用いても構わない。これにより、画面と歩行者の動態検知を行うセンサを分離する事が可能になるので歩行動態の誤認識や位置検知誤差が生じにくくなる。なお、端末分離の目的は、歩行者の動態検知を行うセンサを一番条件の良い場所に配置するのが目的である。図１５の構成では演算用ＣＰＵや地理情報１４６を腰に

装着する端末側に配置しているが、位置精度に影響を与える１４４や１４７だけを腰に装着する端末１５２側に配置しその他のセンサや処理回路を１５３の利用者が見る表示端末側に配置しても構わない。

【0040】

本実施形態によれば、歩行動態の検知精度や移動軌跡の検知精度に影響を与えるセンサ群を条件の良い場所に分離して配置できるといった効果がある。

【0041】

次に、作業員の状態検知用システムに利用する場合の実施形態を図１６の構成図を用いて説明する。１６０の作業員が取り付ける作業員端末１６０と作業員から離れた場所に配置する作業員監視用装置１６７から構成される。作業員用の端末（１６０）は図１４で説明した構成図に通信装置１６１が追加されている。作業員用端末１６０では、図１４で説明した処理機能が搭載されており、歩行者（作業員）の動態や位置検知・移動軌跡検知を行う事ができる。これらの情報は、図１４で説明したのと同様に作業員が表示装置１４５を用いて見ることが出来るが、通信装置１６１を用いて遠隔地に置かれた作業員監視用装置１６７へ転送することが可能になっている。１６２は通信回線(無線通信など)、１６３は通信装置、１６４は地理情報データベース、１６５は処理用ＰＣ，１６６表示装置になっている。１６２を介して送られて来た作業員用の端末１６０で検知した情報は、１６３の通信装置で受信され処理用ＰＣ１６５へ送られる。処理用ＰＣ１６５では送られて来た情報の描画処理などを行う。例えば、歩行者（作業員）の動態検知結果が送られて来た場合、その動態（「歩く」「走る」「階段を上る」など）の結果を画像情報に変換して表示装置１６６へ送って描画する。移動軌跡や位置・進行方向情報が送られて来た場合には、地理情報１６４の情報と重ね合わせて、歩行者（作業員）が地図上のどこにいるかを描画することが出来る。従って、作業員監視用装置１６７を用いることにより遠隔地から作業員の動態や位置を検知する事が可能になる。なお、図１６では作業員端末は１つ書かれているが、複数の端末と接続し、複数の作業員の動態情報や位置情報を描画することも可能である。また、１６０は画面とセンサ群が一体型の端末であるが図１５で説明したようにセンサ群と表示画面を分離してもかまわない。

【0042】

本実施形態によれば、作業員の位置及び動態を遠隔地から検知可能になる。

【0043】

上記、実施例によれば、つぎのような作用・効果を生じる。

【0044】

平面と仮定した歩行動態認識装置と気圧勾配による認識を組み合わせることにより上下運動を伴った歩行動態を認識できるようになる。

【0045】

歩行動態に応じた運動消費カロリーを検知することが出来るようになる。

【0046】

上下移動を伴う歩行動態の区間だけ気圧変の量を考慮することにより、海面気圧変動の影響を補正することが可能になる。

【0047】

階段などの上下移動を伴うような歩行形態でも正確な歩幅推定を行う事ができるようになり、またこの歩幅より移動軌跡を推定できるようにもなる。

【0048】

歩行動態の認識結果と地理情報を比較し歩行者がいる場所を推定する事が可能になり、歩行者の現在位置と進行方向を検知することができるようになる。

【0049】

自律位置検知装置の補正装置として利用する事ができ、誤差が時間と共に増加する、自律位置検知装置の位置補正手段として利用できる。

【0050】

歩行者用のナビゲーションが可能になる。また、作業員の位置及び動態を遠隔地から検

知可能になる。

【図面の簡単な説明】

【0051】

【図1】上下移動を伴う歩行動態検知装置の構成図。
【図2】上下移動を伴う歩行動態検知装置の処理フロー。
【図3】分類テーブル。
【図4】実際の判定例。
【図5】認識項目を多くした場合の分類テーブル。
【図6】歩幅推定の説明図。
【図7】歩幅推定及び位置検知を行うための構成図。
【図8】階段の例。
【図9】高度補正のフローチャート。
【図10】歩行動態を利用した位置及び進行方向検知装置の構成。
【図11】自律航法の初期値に利用した場合の処理フロー。
【図12】移動軌跡の例（補正なし）。
【図13】移動軌跡の例（補正あり）。
【図14】歩行者ナビゲーション端末の構成図。
【図15】歩行者ナビゲーション端末の構成図（画面分離型）。
【図16】作業員の遠隔検知システムの構成図。

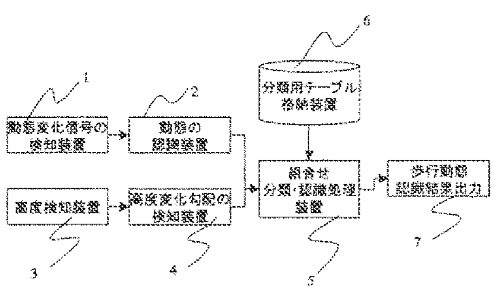
【符号の説明】

【0052】

１…動態検知信号の検知装置、２…動態の認識装置、３…高度検知装置、４…高度変化勾配の検知装置、５…組合せ分類・認識処理、６…分類用テーブル。

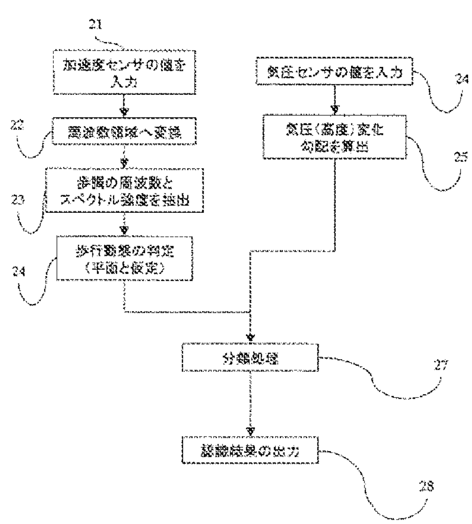
【図1】

図　1



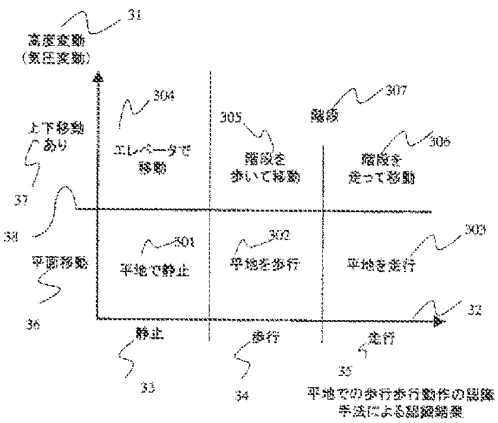
【図2】

図　2



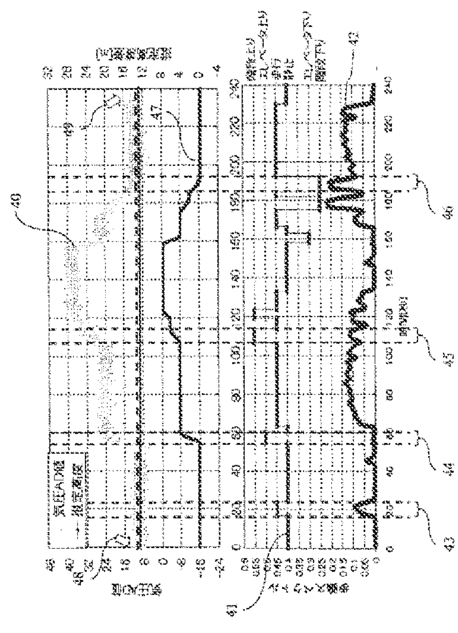
【図3】

図　3



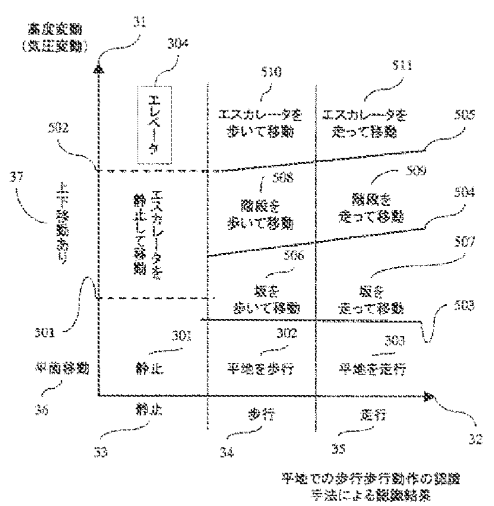
【図4】

図　4



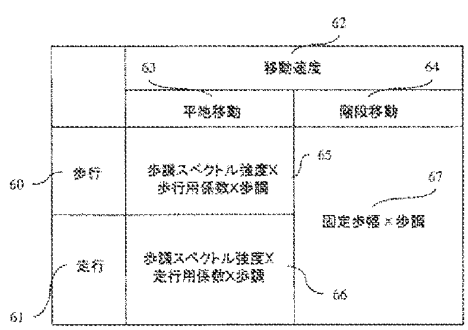
【図5】

図　5



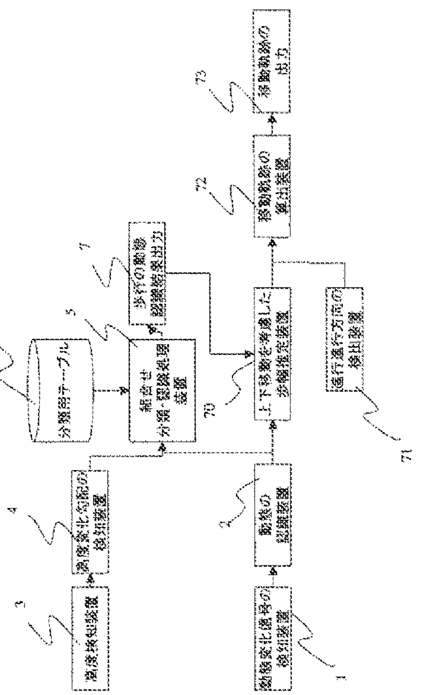
【図6】

図　6



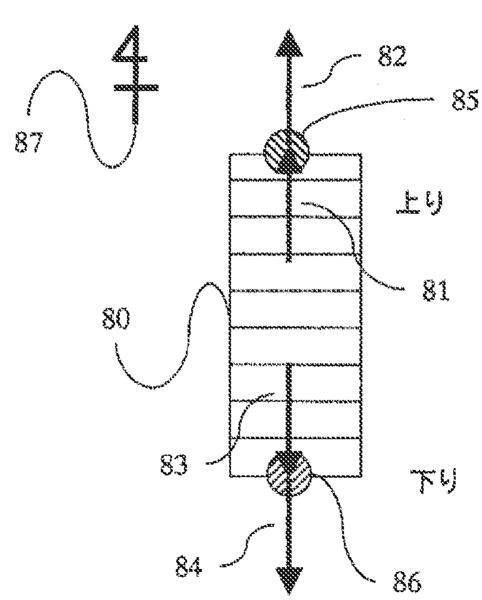
【図7】

図 7



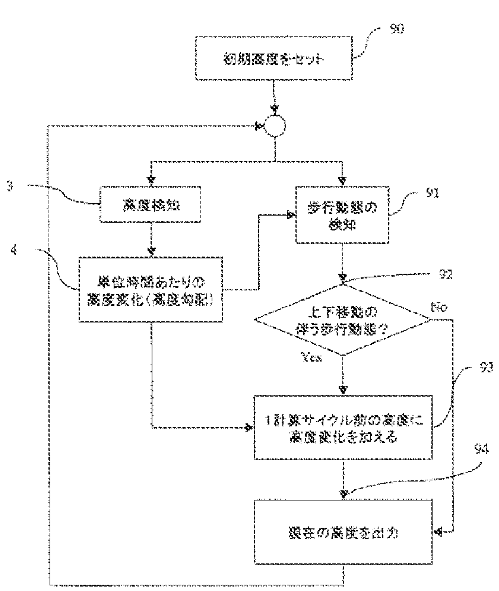
【図8】

図 8



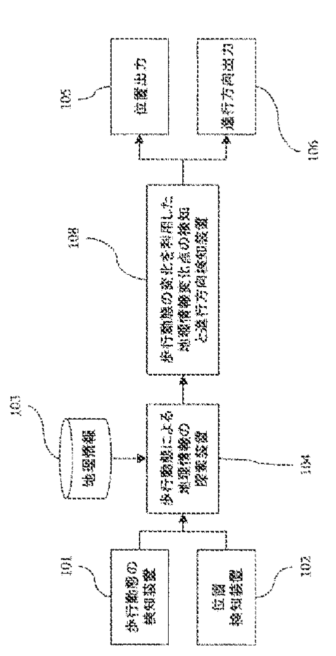
【図9】

図 9



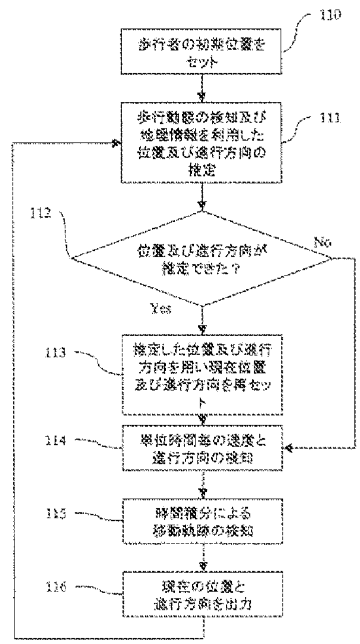
【図10】

図 10



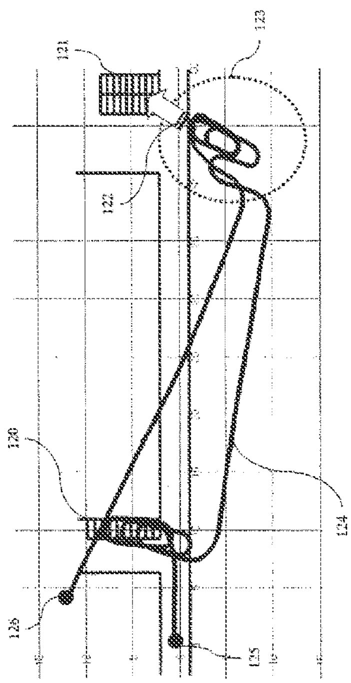
【図11】

図　11



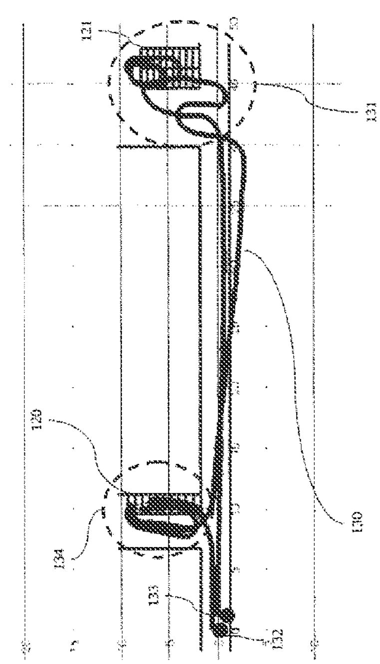
【図12】

図　12



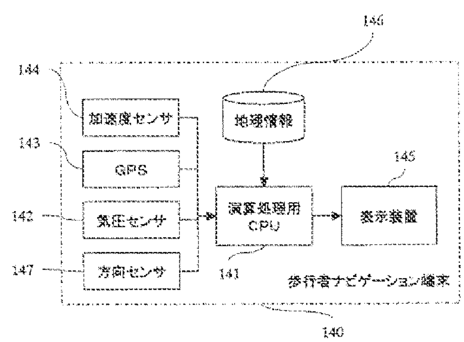
【図13】

図　13



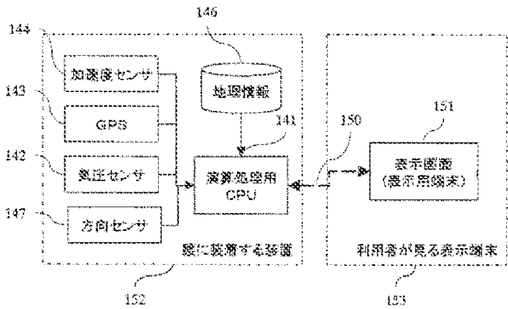
【図14】

図　14



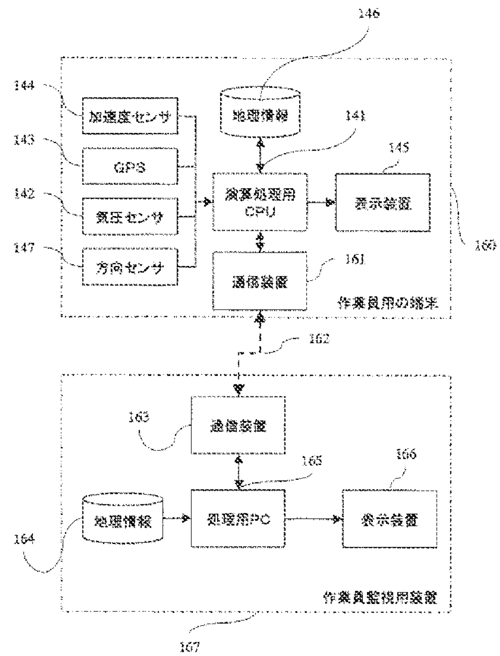
【図15】

図 15



【図16】

図 16



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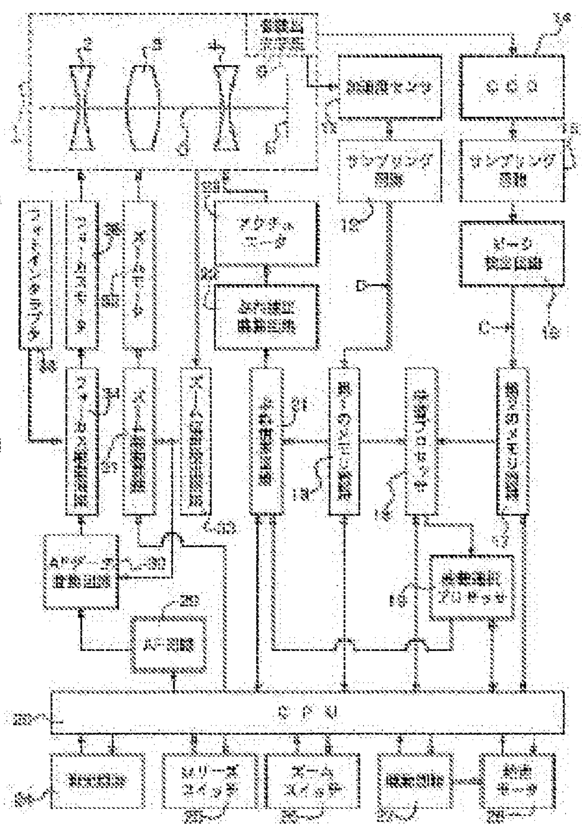
CAMERA-SHAKE CORRECTING DEVICE

Publication date:	1995-01-24	
Inventor(s):	NISHIDA TORU +	
Applicant(s):	RICOH KK +	
Classification:	**- international:**	***G01H17/00; G01P15/00; G01P7/00; G02B27/64; G03B17/00; G03B5/00;*** (IPC1-7): G01H17/00; G01P15/00; G01P7/00; G02B27/64; G03B17/00; G03B5/00
	- european:	
Application number:	JP19930183499 19930630	
Priority number (s):	JP19930183499 19930630	

Abstract of JP 7020547 (A)

PURPOSE:To attain camera-shake correction suitable for the camera-shaking properties of a wide area such as ones by photographer's own and ones different by the weight balance of a camera. CONSTITUTION:A learning processor 18 receives camera-shake data from an acceleration sensor 11a detecting acceleration and the movement of an image which cause camera-shaking and a CCD 14, via a first memory circuit 13 and a second memory circuit 17 and computes a coefficient satisfying prescribed relation. A variable selecting processor 19 selects arm input variable that the component of the difference between both camera-shake data is minimized, based on the coefficient. Camera-shake correction data for negating the camera- shaking on a film surface 5 is computed by a camera-shake arithmetic circuit 21 and a camera-shake correction arithmetic circuit 22, based on the input variable and the data stored in the first memory circuit 13. All actuator 23 drives a camera-shake correcting lens 4 so as to negate the camera-shaking, based on the camera-shake correction data.



Last updated: 26.04.2011 Worldwide Database 5.7.22; 93p

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特開平7－20547

(43)公開日　平成７年(1995)１月24日

(51)Int.Cl.⁶		識別記号	庁内整理番号	ＦＩ	技術表示箇所
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Ｇ０１Ｈ	17/00	Ｚ	8117－2G		
Ｇ０１Ｐ	7/00				
	15/00				
Ｇ０２Ｂ	27/64		9120－2K		

審査請求　未請求　請求項の数６　ＦＤ　（全 25 頁）　最終頁に続く

(21)出願番号　特願平5－183499

(22)出願日　平成５年(1993)６月30日

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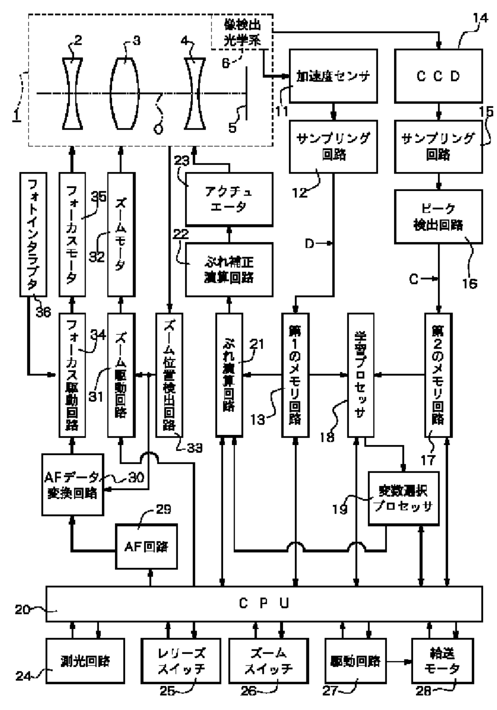
(74)代理人　弁理士　真田　修治

(54)【発明の名称】　カメラの手ぶれ補正装置

(57)【要約】

【目的】　撮影者個有のぶれ特性、カメラの重量バランスによって異なるぶれ特性など広範囲のぶれ振動の態様に適応した手ぶれ補正を実現する。

【構成】　学習プロセッサ１８は、手ぶれに起因する加速度および像移動を検出する加速度センサ１１ａおよびＣＣＤ１４からのぶれデータを、第１のメモリ回路１３および第２のメモリ回路１７を介して受けて所定の関係を満たす係数を演算する。変数選択プロセッサ１９は、上記係数を基に上記両ぶれデータ間の誤差成分が最小になる入力変数を選択する。この入力変数と第１のメモリ回路１３に記憶されたデータを基にして、ぶれ演算回路２１、ぶれ補正演算回路２２によりフィルム面５上のぶれを打ち消すぶれ補正データを演算する。アクチュエータ２３は、このぶれ補正データに基き、手ぶれを打ち消すようにぶれ補正レンズ４を駆動する。



【特許請求の範囲】

【請求項１】　少なくとも撮影者の手ぶれに起因する加速度または角速度を検知するぶれセンサと、
被写体像または被写体像に相応する像を受けて画像情報信号に変換して少なくとも撮影者の手ぶれに起因する像移動を検出して像データを得る光センサと、
上記ぶれセンサの出力をサンプリングして得たぶれデータを時系列的に記憶する第１の記憶手段と、
上記光センサの出力をサンプリングして得た像データを時系列的に記憶する第２の記憶手段と、
上記第１の記憶手段に記憶された時系列ぶれデータと上記第２の記憶手段に記憶された時系列データとからこれらの関係を満たす係数を複数時点で演算する学習手段と、
この学習手段で得られる複数の係数を演算して複数の入力変数を求め、求められた複数の入力変数のうちの、上記第１の記憶手段に記憶された時系列ぶれデータと上記第２の記憶手段に記憶された時系列データとの誤差成分が最小になるものを選択する変数選択手段と、
上記第１の記憶手段に記憶されたデータと上記変数選択手段で選択された入力変数に基づいてぶれ速度データまたはぶれ量データを演算するぶれ演算手段と、
このぶれ演算手段で求められたぶれ速度データまたはぶれ量データをフィルム面上のぶれを打ち消すように補正するぶれ補正データに変換するぶれ補正演算手段と、
このぶれ補正演算手段で得られたぶれ補正データに基づいてぶれ補正部材を駆動するぶれ補正駆動手段と、
を具備することを特徴とするカメラの手ぶれ補正装置。

【請求項２】　少なくとも撮影者の手ぶれに起因する加速度または角速度を検知するぶれセンサと、
被写体像または被写体像に相応する像を受けて画像情報信号に変換して少なくとも撮影者の手ぶれに起因する像移動を検出する光センサと、
上記ぶれセンサの出力を時系列的に記憶する記憶手段と、
この記憶手段に記憶された時系列データと上記光センサの出力データからこれらの関係を満たす結合係数を複数時点で演算する学習手段と、
上記記憶手段に記憶されたデータと上記学習手段で求められた結合係数に基づいてぶれ速度データまたはぶれ量データを演算するぶれ演算手段と、
このぶれ演算手段で求められたぶれ速度データまたはぶれ量データをフィルム面上のぶれを打ち消すように補正するぶれ補正データに変換するぶれ補正演算手段と、
上記ぶれ補正演算手段で得られたぶれ補正データに基づいてぶれ補正部材を駆動するぶれ補正駆動手段と、
を具備することを特徴とするカメラの手ぶれ補正装置。

【請求項３】　少なくとも撮影者の手ぶれに起因する加速度または角速度を検知するぶれセンサと、
被写体像または被写体像に相応する像を受けて画像情報信号に変換して少なくとも撮影者の手ぶれに起因する像移動を検出する光センサと、
上記ぶれセンサの出力を時系列的に記憶する記憶手段と、
この記憶手段に記憶されたデータと上記光センサの出力データからこれらの関係を満たす結合係数を複数時点で演算しこの演算により得られた結合係数を略対数的に変換した学習データとする学習手段と、
上記記憶手段に記憶されたデータと上記学習手段で求められた学習データに基づいてぶれ速度データまたはぶれ量データを演算するぶれ演算手段と、
このぶれ演算手段で求められたぶれ速度データまたはぶれ量データをフィルム面上のぶれを打ち消すように補正するぶれ補正データに変換するぶれ補正演算手段と、
このぶれ補正演算手段で得られたぶれ補正データに基づいてぶれ補正部材を駆動するぶれ補正駆動手段と、
を具備することを特徴とするカメラの手ぶれ補正装置。

【請求項４】　少なくとも撮影者の手ぶれに起因する加速度または角速度を検知するぶれセンサと、
被写体像または被写体像に相応する像を受けて画像情報信号に変換して少なくとも撮影者の手ぶれに起因する像移動を検出して像データを得る光センサと、
上記ぶれセンサのぶれデータを時系列的に記憶する第１の記憶手段と、
上記光センサの像データを時系列的に記憶する第２の記憶手段と、
上記第１の記憶手段に記憶された時系列ぶれデータと上記第２の記憶手段に記憶された時系列データとからこれらの関係を満たす係数を複数時点で演算する学習手段と、
この学習手段で得られる複数の係数を演算して複数の入力変数を求め、求められた複数の入力変数のうちの、上記第１の記憶手段に記憶された時系列ぶれデータと上記第２の記憶手段に記憶された時系列データとの誤差成分が最小になるものを選択する変数選択手段と、
上記第１の記憶手段に記憶されたデータと上記変数選択手段で選択された入力変数に基づいてぶれ速度データまたはぶれ量データを演算するぶれ演算手段と、
上記ぶれ演算手段で求められたぶれ速度データまたはぶれ量データを撮影レンズ光学系の焦点距離データに応じてフィルム面上のぶれを打ち消すように補正するぶれ補正データに変換するぶれ補正演算手段と、
上記ぶれ補正演算手段で得られたぶれ補正データに基づいてぶれ補正部材を駆動するぶれ補正駆動手段と、
を具備することを特徴とするカメラの手ぶれ補正装置。

【請求項５】　少なくとも撮影者の手ぶれに起因する加速度または角速度を検知するぶれセンサと、
被写体像または被写体像に相応する像を受けて画像情報信号に変換して少なくとも撮影者の手ぶれに起因する像移動を検出する光センサと、

上記ぶれセンサの出力を時系列的に記憶する記憶手段と、
この記憶手段に記憶された時系列データと上記光センサの出力データとから両データの結合係数を複数時点で演算する学習手段と、
上記記憶手段に記憶されたデータと上記学習手段で求められた結合係数に基づいてぶれ速度データまたはぶれ量データを演算するぶれ演算手段と、
このぶれ演算手段で求められたぶれ速度データまたはぶれ量データを撮影レンズ光学系の焦点距離データ応じてフィルム面上のぶれを打ち消すように補正するぶれ補正データに変換するぶれ補正演算手段と、
上記ぶれ補正演算手段で得られたぶれ補正データに基づいてぶれ補正部材を駆動するぶれ補正駆動手段と、
を具備することを特徴とするカメラの手ぶれ補正装置。
【請求項６】　少なくとも撮影者の手ぶれに起因する加速度または角速度を検知するぶれセンサと、
被写体像または被写体像に相応する像を受けて画像情報信号に変換して少なくとも撮影者の手ぶれに起因する像移動を検出する光センサと、
上記ぶれセンサの出力を時系列的に記憶する記憶手段と、
この記憶手段に記憶されたデータと上記光センサの出力データとから両データの結合係数を複数時点で演算して得られる結合係数を略対数的に変換した学習データとする学習手段と、
上記記憶手段に記憶されたデータと上記学習手段で求められた学習データに基づいてぶれ速度データまたはぶれ量データを演算するぶれ演算手段と、
このぶれ演算手段で求められたぶれ速度データまたはぶれ量データを撮影レンズ光学系の焦点距離データに応じてフィルム面上のぶれを打ち消すように補正するためのぶれ補正データに変換して演算するぶれ補正演算手段と、
このぶれ補正演算手段で得られたぶれ補正データに基づいてぶれ補正部材を駆動するぶれ補正駆動手段と、
を具備することを特徴とするカメラの手ぶれ補正装置。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】本発明は、カメラの手ぶれ補正装置に関し、より詳細には、撮影者が撮影を行う際に、カメラ本体に生じる手ぶれを検出し、この手ぶれを打ち消すように制御できるカメラの手ぶれ補正装置に関するものである。
【０００２】
【従来の技術】近年、カメラの自動化が著しく進み、撮影行うに際して基本的なことは、その殆どが自動化されるような趨勢であり、露出の自動化は勿論のことピント合わせを自動化することも広く行われている。
【０００３】また、その一環としてカメラ本体に生じる手ぶれを検出し、この手ぶれを打ち消すように制御することも提案されている。この一例として、特開平３－３７６３３号公報に開示されているカメラの手ぶれ補正装置がある。
【０００４】即ち、この手ぶれ補正装置は、カメラ本体に角速度計を設け、この角速度計によって手ぶれ振動を検出し、この検出結果に基づいてフィルム面上での像位置の移動量を演算し、この演算結果に基づいて手ぶれを打ち消すための駆動を行うものであるが、この手ぶれの打消の駆動量を、撮影レンズ光学系の鏡筒をボイスコイルモータで駆動することによって行っている。これによって、撮影者の手ぶれに起因する像ぶれを打ち消した撮影を行うようにしている。
【０００５】しかしながら、この従来技術は、通常の撮影で生じる手ぶれ成分の１Ｈｚないし１２Ｈｚの周波数の成分を重点的に抽出しているので、この帯域の手ぶれについては有効に抑制できるものの、いわゆるリアルタイム的な制御であるので時間平均的な制御に対応させることが難しい。
【０００６】そこで、特開昭６３－８６２８号公報に開示されているカメラ振動検出装置においては、時間平均的な制御で得られる速度信号を所定時間に亘る移動時間平均値として連続的に算出する移動平均算出手段を設け、この移動平均算出手段の出力を用いてカメラの手ぶれ補正を行なうようにしている。
【０００７】これによって、実際のカメラに生じている手ぶれ振動状態あるいはその他の取扱いに由来した状態に対応させて、高精度制御のために必要とされる、検出回路全体の有するフィルタ特性上の位相誤差の難の解消や対象外信号の除去を都合よく調整することができる。
【０００８】
【発明が解決しようとする課題】従来のカメラの手ぶれ補正装置においては、カメラ本体に生じる手ぶれを、カメラ本体に取りつけられた加速度センサにより検出し、これによって得られるデータに基づいて像ぶれ補正量を演算によって求め、この像ぶれ補正量だけぶれ補正部材（補正プリズム等）を駆動して像ぶれの生じない鮮明な写真を得るようにしているので、一応の手ぶれ補正が行えるものの、手ぶれの検出を行う態様としては現実的でない面がある。
【０００９】即ち、手ぶれ補正のための従来の手ぶれ検出は、撮影者によって異なるカメラ保持の態様、撮影者によって異なる手ぶれ振動の振動数及び振幅、あるいは、カメラ本体に装着される交換レンズの重量バランスについては何ら考慮されておらず、特別の前提条件の無い状態で行われているのが現状である。従って、手ぶれ補正の対象とする条件がかなり広い範囲に亘っているので、正確な手ぶれ補正が行えないという問題がある。
【００１０】また、この問題は、近年特に著しく発達しているズームレンズの高倍率化のために手ぶれ補正の精

度向上が要求されていることに応じ得ないという問題につながっている。

【００１１】本発明は、上述の事情に鑑みてなされたもので、その目的とするところは、実際の手ぶれ振動の特性、即ち、撮影者の癖やカメラ本体に装着された交換レンズの重量バランス等に対応した広い範囲の手ぶれ振動の態様に適応できるカメラの手ぶれ補正装置を提供することにある。

【００１２】

【課題を解決する手段】本発明の請求項１に係るカメラの手ぶれ補正装置は、上述の目的を達成するために、少なくとも撮影者の手ぶれに起因する加速度または角速度を検知するぶれセンサと、被写体像または被写体像に相応する像を受けて画像情報信号に変換して少なくとも撮影者の手ぶれに起因する像移動を検出して像データを得る光センサと、上記ぶれセンサの出力をサンプリングして得たぶれデータを時系列的に記憶する第１の記憶手段と、上記光センサの出力をサンプリングして得た像データを時系列的に記憶する第２の記憶手段と、上記第１の記憶手段に記憶された時系列ぶれデータと上記第２の記憶手段に記憶された時系列データとからこれらの関係を満たす係数を複数時点で演算する学習手段と、この学習手段で得られる複数の係数を演算して複数の入力変数を求め、求められた複数の入力変数のうちの、上記第１の記憶手段に記憶された時系列ぶれデータと上記第２の記憶手段に記憶された時系列データとの誤差成分が最小になるものを選択する変数選択手段と、上記第１の記憶手段に記憶されたデータと上記変数選択手段で選択された入力変数に基づいてぶれ速度データまたはぶれ量データを演算するぶれ演算手段と、このぶれ演算手段で求められたぶれ速度データまたはぶれ量データをフィルム面上のぶれを打ち消すように補正するぶれ補正データに変換するぶれ補正演算手段と、このぶれ補正演算手段で得られたぶれ補正データに基づいてぶれ補正部材を駆動するぶれ補正駆動手段と、を具備することを特徴とするものである。

【００１３】また、上記の目的を達成するために、本発明の請求項２に係るカメラの手ぶれ補正装置は、請求項１におけるぶれセンサと光センサとぶれ補正演算手段とぶれ補正駆動手段とを具備すると共に、少なくとも撮影者の手ぶれに起因する加速度または角速度を検知するぶれセンサと、被写体像または被写体像に相応する像を受けて画像情報信号に変換して少なくとも撮影者の手ぶれに起因する像移動を検出する光センサと、上記ぶれセンサの出力を時系列的に記憶する記憶手段と、この記憶手段に記憶された時系列データと上記光センサの出力データからこれらの関係を満たす結合係数を複数時点で演算する学習手段と、上記記憶手段に記憶されたデータと上記学習手段で求められた結合係数に基づいてぶれ速度データまたはぶれ量データを演算するぶれ演算手段と、このぶれ演算手段で求められたぶれ速度データまたはぶれ量データをフィルム面上のぶれを打ち消すように補正するぶれ補正データに変換するぶれ補正演算手段と、上記ぶれ補正演算手段で得られたぶれ補正データに基づいてぶれ補正部材を駆動するぶれ補正駆動手段と、を具備することを特徴とするものである。

【００１４】さらに、上記の目的を達成するために、本発明の請求項３に係るカメラの手ぶれ補正装置は、請求項１におけるぶれセンサと光センサとぶれ補正演算手段とぶれ補正駆動手段と記憶手段とを具備すると共に、少なくとも撮影者の手ぶれに起因する加速度または角速度を検知するぶれセンサと、被写体像または被写体像に相応する像を受けて画像情報信号に変換して少なくとも撮影者の手ぶれに起因する像移動を検出する光センサと、上記ぶれセンサの出力を時系列的に記憶する記憶手段と、この記憶手段に記憶されたデータと上記光センサの出力データからこれらの関係を満たす結合係数を複数時点で演算しこの演算により得られた結合係数を略対数的に変換した学習データとする学習手段と、上記記憶手段に記憶されたデータと上記学習手段で求められた学習データに基づいてぶれ速度データまたはぶれ量データを演算するぶれ演算手段と、このぶれ演算手段で求められたぶれ速度データまたはぶれ量データをフィルム面上のぶれを打ち消すように補正するぶれ補正データに変換するぶれ補正演算手段と、このぶれ補正演算手段で得られたぶれ補正データに基づいてぶれ補正部材を駆動するぶれ補正駆動手段と、を具備することを特徴とするものである。

【００１５】また、本発明の請求項４、５、６のそれぞれにおけるカメラの手ぶれ補正装置は、請求項１、２、３のそれぞれにおける構成のうちのぶれ補正演算回路を上記ぶれ演算手段で求められたぶれ速度データまたはぶれ量データを撮影レンズ光学系の焦点距離データに応じてフィルム面上のぶれを打ち消すように補正するぶれ補正データに変換するぶれ補正演算手段とするように構成したことを特徴とするものである。

【００１６】

【作用】上記のように構成されたカメラの手ぶれ補正装置は、少なくとも撮影者の手ぶれに起因する加速度または角速度をぶれセンサで検知し、被写体像または被写体像に相応する像を受けて画像情報信号に変換して少なくとも撮影者の手ぶれに起因する像移動を光センサで検出して像データを求める。

【００１７】上記ぶれセンサで得られたぶれデータを第１の記憶手段に時系列的に記憶し、上記光センサで得られた像データを第２の記憶手段に時系列的に記憶し、上記第１の記憶手段に記憶された時系列ぶれデータと上記第２の記憶手段に記憶された時系列データとからこれらの関係を満たす係数を複数時点で学習手段で演算する。

【００１８】この学習手段で得られる複数の係数を演算

して複数の入力変数を求め、求められた複数の入力変数のうちの、上記第１の記憶手段に記憶された時系列ぶれデータと上記第２の記憶手段に記憶された時系列データとの誤差成分が最小になるものを選択手段で選択する。

【００１９】上記第１の記憶手段に記憶されたデータと上記選択手段で選択された入力変数に基づいてぶれ速度データまたはぶれ量データをぶれ演算手段で演算し、上記ぶれ演算手段で求められたぶれ速度データまたはぶれ量データをフィルム面上のぶれを打ち消すように補正するためのぶれ補正データへの変換をぶれ補正演算手段で演算する。

【００２０】このぶれ補正演算手段で得られたぶれ補正データに基づいてぶれ補正駆動手段がぶれ補正部材を駆動することによって、撮影者の癖やカメラ本体に装着される交換レンズの重量等に対応した広い範囲の手ぶれ振動の態様に適応できる手ぶれ補正をすることができる。

【００２１】また、上記請求項２のように構成されたカメラの手ぶれ補正装置は、ぶれセンサと光センサとぶれ補正演算手段とぶれ補正駆動手段とを有し、上記ぶれセンサの出力を時系列的に記憶手段で記憶し、上記記憶手段に記憶された時系列データと上記光センサの出力データとから両データの結合係数を複数時点で学習手段で演算する。

【００２２】上記記憶手段に記憶されたデータと上記学習手段で求められた結合係数に基づいてぶれ速度データまたはぶれ量データをぶれ演算手段で演算することによって、撮影者の癖やカメラ本体に装着される交換レンズの重量等に対応した広い範囲の手ぶれ振動の態様に適応できる手ぶれ補正を実現している。

【００２３】さらに、本発明の請求項３に係るカメラの手ぶれ補正装置は、請求項１のように構成されたぶれセンサと光センサとぶれ補正演算手段とぶれ補正駆動手段と記憶手段とを有し、上記記憶手段に記憶されたデータと上記光センサの出力データとから両データの結合係数を複数時点で演算する。得られた結合係数を略対数的に変換した学習データを学習手段で求め、上記記憶手段に記憶されたデータと上記学習手段で求められた学習データに基づいてぶれ速度データまたはぶれ量データをぶれ演算手段で演算することによって、撮影者の癖やカメラ本体に装着される交換レンズの重量等に対応した広い範囲の手ぶれ振動の態様に適応できる手ぶれ補正を実現している。

【００２４】

【実施例】以下、本発明の実施例について詳細に説明する。先ず、第１実施例を図１ないし図１２を用いて説明する。この実施例は、撮影光学系を構成する撮影レンズに、自動合焦機能を有するズームレンズを用いたカメラに、請求項１の発明を適用したものである。

【００２５】全体構成の概略を示す図１において、撮影光学系１は、フォーカスレンズ２とズームレンズ３とぶれ補正レンズ４で構成され、その光軸Ｏ上にフィルム５が位置されている。

【００２６】また、フォーカスレンズ２を光軸Ｏの方向に駆動することによって合焦状態にすることができ、ズームレンズ３を光軸Ｏの方向に駆動することによって焦点距離が変更でき、ぶれ補正レンズ４を光軸Ｏに直交した方向もしくは光軸Ｏに対して傾斜する方向に駆動することによってフィルム５の面に生じる手ぶれを打ち消すことができるようになっている。

【００２７】このような撮影光学系１には、像検出光学系６が設けられ、この像検出光学系６は、被写体像または被写体像に相応する像を受けて画像情報信号に変換して少なくとも撮影者の手ぶれに起因する像移動を検出する光センサ（後述するＣＣＤ１４）に像を導くものである。

【００２８】この具体例としては、フォーカスレンズ２、ズームレンズ３、ぶれ補正レンズ４で形成される撮影光学系の光束の一部をハーフミラー等で分岐して光センサへの導入光学系を構成したり、撮影光学系とは全くの別個に光センサへの導入光学系を構成したり、ファインダ光学系の光束の一部をハーフミラー等で分岐して光センサへの導入光学系を構成することができる。

【００２９】撮影光学系１が設けられたカメラ本体には加速度センサ１１が固定され、カメラ本体に生じる手ぶれに起因する加速度を検知することができるようになっている。

【００３０】この加速度センサ１１には、サンプリング回路１２が接続され、その出力端には第１の記憶手段としての第１のメモリ回路１３が接続されている。この第１のメモリ回路１３は、上記加速度センサのぶれデータを時系列的に記憶するための第１の記憶手段である。一方、像検出光学系６によって形成される導入光は、ＣＣＤ１４に導かれるように構成されている。

【００３１】このＣＣＤ１４の出力端は、サンプリング回路１５とピーク検出回路１６を順次に介して第２のメモリ回路１７に接続されている。この第２のメモリ回路１７は、ＣＣＤ１４で得られる像データを時系列的に記憶するための第２の記憶手段である。

【００３２】この第１のメモリ回路１３と第２のメモリ回路１７のそれぞれから時系列的に得られるデータは、学習プロセッサ１８に供給されるようになっている。この学習プロセッサ１８は、第１のメモリ回路１３に記憶された時系列ぶれデータと第２のメモリ回路１７に記憶された時系列データとから、これらの関係を満たす係数（詳細は後述する）を複数時点で演算する学習手段である。

【００３３】この学習プロセッサ１８には、自身で得られる複数の係数を演算して複数の入力変数を求め、求められた複数の入力変数のうちの最適なものを選択する変数選択手段としての変数選択プロセッサ１９が接続され

ている。

【００３４】以上の第１のメモリ回路１３、第２のメモリ回路１７、学習プロセッサ１８、変数選択プロセッサ１９等や後述するぶれ演算回路２１のそれぞれは、ＣＰＵ２０によって総合的に制御され、所定の演算プログラムが実行できるようにされている。

【００３５】第１のメモリ回路１３から時系列的に出力されるデータは、上述の変数選択プロセッサ１９で選択された入力変数のデータと共にぶれ演算回路２１に供給されるように構成されている。このぶれ演算回路２１は、第１のメモリ回路１３に記憶されたデータと変数選択プロセッサ１９で選択された入力変数に基づいてぶれ速度データまたはぶれ量データを演算するぶれ演算手段である。

【００３６】このぶれ演算回路２１の次段には、ぶれ補正演算回路２２が接続されている。このぶれ補正演算回路２２は、ぶれ演算回路２１で求められたぶれ速度データまたはぶれ量データを撮影レンズ光学系の焦点距離データに応じてフィルム面5上のぶれを打ち消すように補正するぶれ補正データに変換して演算するものである。このぶれ補正演算回路２２の出力端には、ぶれ補正レンズ4を駆動してフィルム面上の像ぶれを打ち消すように駆動するアクチュエータ２３が接続されている。

【００３７】さて、ＣＰＵ２０には、自身の制御の基に適正露光を与えることが出来るようにされた周知の測光回路２４が接続されている。また、ＣＰＵ２０には、レリーズスイッチ２５が接続されている。

【００３８】このレリーズスイッチ２５は、シャックレリーズ釦の押込みに連動して半押しでオンされる第１レリーズスイッチと、さらに釦を押込むことによってオンされる第２レリーズスイッチとの２つのスイッチで構成されている。

【００３９】さらに、ＣＰＵ２０には、ズームスイッチ２６が接続されている。このズームスイッチ２６は、撮影光学系１ゐ形成するズームレンズ3の焦点距離を広角側に駆動させるための広角スイッチと望遠側に駆動させるための望遠スイッチとの２つのスイッチで構成されている。

【００４０】また、ＣＰＵ２０には、駆動回路２７を介して給送モータ２８が接続され、フィルムを給送出来るように構成されている。さらに、ＣＰＵ２０には、周知のＡＦ回路２９が接続され、その出力端に被写体距離データが得られるように構成され、この被写体距離データは、ＡＦ回路２９の次段に接続されたＡＦデータ変換回路３０によって合焦駆動量データに変換されるように構成されている。

【００４１】上述のズームスイッチ２６によって指定されるズーミングの方向がＣＰＵ２０によって識別されて出力される駆動データは、ズーム駆動回路３１を介してズームモータ３２に供給され、このズームモータ３２でズームレンズ3を所定の方向に駆動できるように構成されている。

【００４２】このときにズームレンズ3の焦点距離データは、ズーム位置検出回路３３によって検出されてズーム駆動回路３１に入力されると共にＡＦデータ変換回路３０にも入力されるように接続されている。

【００４３】上述のＡＦデータ変換回路３０で得られる合焦駆動量データは、次段のフォーカス駆動回路３４を介してフォーカスモータ３５に供給され、フォーカスモータ３５によって撮影光学系１を形成するフォーカスレンズ2が合焦駆動されるように構成されている。

【００４４】このときにフォーカス駆動された量を検出するフォトインタラプタ３６が設けられていて、このフォトインタラプタ３６のデータがフォーカス駆動回路３４に出力されるようになっている。

【００４５】上述の第１のメモリ回路１３と第２のメモリ回路１７の内部は、図2に示されるように構成されている。即ち、第１のメモリ回路１３は、メモリ１、メモリ２、……メモリＮでなる複数（Ｎ個）のメモリを直列的に形成して構成され、最初のメモリ１にサンプリング回路１２からの出力であるぶれデータＤが供給され、所定の周期でもって順々に次段のメモリにシフトとされ、第１のメモリ回路１３全体を見た場合には、第１のメモリ回路１３から時系列的なデータが学習プロセッサ１８とぶれ演算回路２１の両方にデータ出力されることになる。

【００４６】また、第２のメモリ回路１７も、メモリ１、メモリ２、……メモリＮでなる複数（Ｎ個）のメモリを直列的に形成して構成され、最初のメモリ１にピーク検出回路１６からの出力である光データＣが供給され、所定の周期でもって順々に次段のメモリにシフトとされ、第２のメモリ回路１７全体を見た場合には、第２のメモリ回路１７から時系列的なデータが学習プロセッサ１８にデータ入力されることになる。

【００４７】以上のように構成されたカメラの手ぶれ補正装置における動作を図3ないし図１２を用いて説明する。図3に示すステップ＃１（以下、「ステップ＃」を「＃」と省略して記載する）でメインスイッチがオンされると回路各部に電源供給がなされ、初期設定が行われて待機状態にされる。

【００４８】そして、＃２においてレリーズスイッチ２５を形成する２つのスイッチのうちの第１レリーズスイッチがオンされたか否か、即ちカメラ本体に設けられたレリーズ釦が半押しされたか否かがＣＰＵ２０で判断され、ＮＯの場合には待機状態がそのまま継続し、ＹＥＳの場合には＃３に移行して測光回路２４による測光とＡＦ回路２９による測距が開始される。

【００４９】この測光と測距の動作は、周知の手段でもって行われ、本発明の要旨には直接に関係しないのでその詳細を省略するが、その概要は、次の通りである。即

ち、＃３で行われた測光と測距の適正露光データと合焦駆動データが記憶され、後述する＃２１でレリーズスイッチ２５を形成する２つのスイッチのうちの第2レリーズスイッチがオンされたときに露光動作が開始されると共に合焦駆動が開始され、しかる後に適正露光が与えられると共に合焦状態にされることになるのである。

【００５０】さて、＃３で測光と測距が上述のように実行されると共に、撮影光学系１を形成するズームレンズ３における焦点距離データＺｐがズーム位置検出回路３３で検出されて格納され、この焦点距離データＺｐがＡＦデータ変換回路３０に入力されると共にズーム駆動回路３１にも入力される。

【００５１】そして、このような＃３が実行された後に移行する＃４は、ｊを０に初期セットし、次の＃５でｉをｎに初期セットするものである。このｎは、第１のメモリ回路１３における複数のメモリの数Ｎに対応したアドレスを意味し、この実施例ではＮとなっている。

【００５２】また、ｊは、第１のメモリ回路１３における複数のメモリの数ｎのそれぞれの出力データのうちの２つのデータを組み合わせたもののペア数になっている。次の＃４で上述のｊが０にセットされ＃５でｉがｎ（この例ではｎ＝１２）にセットされ＃６に移行する。

【００５３】この＃６から＃９は、ぶれデータＤと光データＣを時系列的に並べ変えるステップであり、＃１１から＃１５は、加速度センサ１１で検出されたぶれデータをサンプリング回路１２でサンプリングしたぶれデータＤと、ＣＣＤ１４に生じる光出力をサンプリング回路１５でサンプリングした出力をピーク検出回路１６でピーク検出した光データＣとを時系列的に並べ変えるステップである。

【００５４】ピーク検出回路１６におけるピーク検出は、図5に示すように光データＣの出力が、例えば時点t_0において実線で示すようになり、時点t_1において破線で示すようになり、時点t_2において一点鎖線で示すようになった場合に、それぞれのピーク値P_0、P_1、P_2が検出されることになる。

【００５５】このピーク値P_0、P_1、P_2は、手ぶれに相応して変化することになり、経過時間的に見た場合には、図6に示すように手ぶれ振動に相応した変化をすることになる。即ち、基準点0を境にしてプラスピーク（＋Ｐ）とマイナスピーク（－Ｐ）に分布することになる。一方、サンプリング回路１２より得られるぶれデータDは、その一例を図7に示すように手ぶれの方向（±方向）と絶対量に追従したものとなり、その変位は、図８に一例を示すようになる。さて、このようにして得られるぶれデータＤと光データＣの処理は、図３に戻り＃１６で、学習プロセッサ１８における処理手順の階層Ｌが1にセットされ、次段の＃１７で第１階層の学習手法が実行され、次の＃１８で階層Ｌが１ステップ歩進されて２にセットされ、次の＃１９で「Ｌ≦２？」の判定がなされ、ＹＥＳの場合（階層Ｌが１または２の場合）に第２階層の学習手法が実行され、＃１９がＮＯとなって＃２０に移行されるのである。

【００５６】次にこれらの学習手法の詳細について説明する。即ち、学習手法は、基本的には、下記のような関数を基礎関数として変数を自然発生的に増やして行く手法である。即ち、基礎関数を

$$Y_k = a_0 + (a_1 \cdot x_i) + (a_2 \cdot x_j) + (a_3 \cdot x_i^2) + (a_4 \cdot x_j^2) + (a_5 \cdot x_i \cdot x_j) \qquad \cdots\cdots\cdots\cdots 式1$$

とし、x_iとx_jのそれぞれを入力変数とし、出力変数をY_kとし、係数をa_0～a_5とする。

【００５７】そして、Ｎ個の入力変数x_i（$i=1, 2, 3 \cdots N$）と出力変数Ｃ（ｔ）との間には、

$$C(t) = f(x_1, x_2 \cdots x_{preN}) \qquad \cdots\cdots\cdots\cdots 式2$$

という非線形の関係がある。

【００５８】この実施例の場合には、入力変数x_iが、加速度センサ１１から出力されるぶれデータＤに置き換えられ、出力変数Ｃ（ｔ）は、ＣＣＤ１４への入射像の面の移動量（フィルム５における像面の移動量に等価なもの）データである光データＣに置き換えられる。

【００５９】また、入力変数x_iの個数ｐreNは、一定の学習期間ｔLを定めたときにその中に含まれる個数である。そして、Ｎ個の入力変数x_i（$i=1, 2, 3 \cdots N$）から２つのデータをx_i，x_jのように組み合わせて上述の式１を用いて時間ｔにおけるx_i，x_jを代入しておく。上述の式１におけるx_iとx_jに、時間ｔにおける第１のメモリ回路１３から出力データを代入するのである。

【００６０】一方、時間ｔにおける出力変数Ｃ（ｔ）と出力変数Y_kの２乗誤差εは、次の式3により求められる。

$$\begin{aligned} \varepsilon &= \{C(t) - Y_k\}^2 \\ &= [C(t) - \{a_0 + (a_1 \cdot x_i) + (a_2 \cdot x_j) + (a_3 \cdot x_i^2) + (a_4 \cdot x_j^2) + (a_5 \cdot x_i \cdot x_j)\}]^2 \end{aligned} \qquad \cdots\cdots\cdots\cdots 式3$$

この式３より学習期間の時点０からｔL までの間の２乗誤差εは、次の式４により求められる。

【００６１】

【数１】

$$\varepsilon = \sum_{t=0}^{t_{LEARN}} \left[\{ C(t) - \{ a_0 + (a_1 \cdot x_i) + (a_2 \cdot x_j) + (a_3 \cdot x_i^2) + (a_4 \cdot x_j^2) + (a_5 \cdot x_i \cdot x_j) \} \right]^2 \quad \cdots\cdots\cdots\cdots \text{式4}$$

ここで、学習期間t_L は、１回当たりの学習時間より充分に長いものにする。

【００６２】この式４においては、出力変数Ｃ（ｔ）と入力変数x_i ，x_j が既知となっていて、係数a_0 ，a_1 ，a_2 ，a_3 ，a_4 ，a_5 と２乗誤差εが未知数であり、最終的には係数a_0 ～a_5 を求めるのであるから、式４を誤差εを０として係数a_0 ～a_5 で偏微分すると、次の式５ないし式１０のような６つの式が得られる。

【００６３】

$$\partial \varepsilon_k / \partial a_0 = 2 \cdot \Sigma [C(t) - \{ a_0 + (a_1 \cdot x_i) + (a_2 \cdot x_j) + (a_3 \cdot x_i^2) + (a_4 \cdot x_j^2) + (a_5 \cdot x_i \cdot x_j) \}] = 0 \quad \cdots\cdots\cdots\cdots \text{式5}$$

$$\partial \varepsilon_k / \partial a_1 = 2 \cdot \Sigma [C(t) - \{ a_0 + (a_1 \cdot x_i) + (a_2 \cdot x_j) + (a_3 \cdot x_i^2) + (a_4 \cdot x_j^2) + (a_5 \cdot x_i \cdot x_j) \}] x_i = 0 \quad \cdots\cdots\cdots\cdots \text{式6}$$

$$\partial \varepsilon_k / \partial a_2 = 2 \cdot \Sigma [C(t) - \{ a_0 + (a_1 \cdot x_i) + (a_2 \cdot x_j) + (a_3 \cdot x_i^2) + (a_4 \cdot x_j^2) + (a_5 \cdot x_i \cdot x_j) \}] x_j = 0 \quad \cdots\cdots\cdots\cdots \text{式7}$$

$$\partial \varepsilon_k / \partial a_3 = 2 \cdot \Sigma [C(t) - \{ a_0 + (a_1 \cdot x_i) + (a_2 \cdot x_j) + (a_3 \cdot x_i^2) + (a_4 \cdot x_j^2) + (a_5 \cdot x_i \cdot x_j) \}] x_i^2 = 0 \quad \cdots\cdots\cdots\cdots \text{式8}$$

$$\partial \varepsilon_k / \partial a_4 = 2 \cdot \Sigma [C(t) - \{ a_0 + (a_1 \cdot x_i) + (a_2 \cdot x_j) + (a_3 \cdot x_i^2) + (a_4 \cdot x_j^2) + (a_5 \cdot x_i \cdot x_j) \}] x_j^2 = 0 \quad \cdots\cdots\cdots\cdots \text{式9}$$

$$\partial \varepsilon_k / \partial a_5 = 2 \cdot \Sigma [C(t) - \{ a_0 + (a_1 \cdot x_i) + (a_2 \cdot x_j) + (a_3 \cdot x_i^2) + (a_4 \cdot x_j^2) + (a_5 \cdot x_i \cdot x_j) \}] x_i \cdot x_j = 0 \quad \cdots\cdots\cdots\cdots \text{式10}$$

この式５ないし式１０は、連立１次方程式となっているので、周知のガウス・ヨルダン法等を用いて解くことにより係数a_0 ～a_5 を求めることができる。これにより、学習期間０～t_{LEARN} における最適な係数a_0 ～a_5 を求めることになる。これは次の式１１のような構造式になる。

【００６４】

【数２】

$$\hat{y} = a_0 + (a_1 \cdot x_i) + (a_2 \cdot x_j) + (a_3 \cdot x_i^2) + (a_4 \cdot x_j^2) + (a_5 \cdot x_i \cdot x_j) \quad \cdots\cdots \text{式11}$$

この式１１において係数a_0 ～a_5 は、既知であるので入力変数x_i ，x_jとしてぶれデータＤと光データＣを代入することによって２乗誤差εを求めることが出来るのである。

【００６５】このようにして各入力変数x_i ，x_j ごとに求められた２乗誤差εは、ＣＰＵ２０の制御の基に格納されて学習演算が完了して、次の＃２０に移行する。

【００６６】このようなモデル化された構造式にぶれデータＤと光データＣを代入して変位Ｚｙと$\hat{Zy}$をグラフ化した一例を、図９に示す。

＃２０は、第１のメモリ回路１３に記憶された時系列ぶれデータと第２のメモリ回路１７に記憶された時系列データとの誤差成分が最小になるものを選択するものであり、具体的には、＃１９以前のステップで行われた学習演算によって既に求められている複数の２乗誤差εにおいて、複数の入力変数x_i ，x_j に対して最も誤差が小さくなる組み合わせを必要な数だけ選択するのである。

【００６７】例えば、上述のNが４とした場合には、入力変数x_iと入力変数x_jの組み合わせは、（x_1，x_2）（x_1，x_3）（x_1，x_4）（x_2，x_3）（x_2，x_4）（x_3，x_4）のように６通りの組み合わせとなる。

【００６８】なお、一般には、入力変数がN個あると、その組み合わせは

Ｎ（Ｎ－１）／２個

の組み合わせとなる。このようにして、学習期間中の誤差を小さくするような入力変数の組み合わせと係数から所定の構造式を得たときに次の＃２１に移行する。

【００６９】＃２１で第２レリーズスイッチがオンされたか否かが判定され、ＮＯの場合には、前述の＃５まで戻され、＃５から＃２０までが再度に亘って実行され学習が行われて最適な係数が選択されるという一連のルーチンが実行される。

【００７０】この一連のルーチンは、＃２１がＹＥＳになるまで繰り返し行われる。言い換えれば、最初に演算される構造式から上述の式１を得た後に、それ以降の式を得るという演算を繰り返す。これを必要な回数だけ繰り返して最も最適な構造式を得るのである。

【００７１】さて、第２レリーズスイッチがオンされると＃２１をＹＥＳに分岐し、次の＃２２で予測ぶれ量B_{pre}が演算される。この予測演算の関数は、ルーチン＃２１まで繰り返されて得た最適な構造式を利用するものである。

【００７２】この場合、最適な構造式は、複数の入力変数x_i、x_jに対して最も誤差が小さくなる組み合せから成立するものである。ゆえに複数の入力変数に実際の値（この場合加速度、角速度）を代入することにより、将来のぶれ量を予測することができる。

【００７３】この予測演算式は、

$$B_{pre}=a_{20}+a_{21}\cdot Z_i+a_{22}\cdot Z_j+a_{23}\cdot Z_i^2+a_{24}\cdot Z_j^2+a_{25}\cdot Z_i\cdot Z_j$$

ここで

$$Z_i=a_{110}+a_{111}\cdot X_i+a_{112}\cdot X_j+a_{113}\cdot X_i^2+a_{114}\cdot X_j^2+a_{115}\cdot X_i\cdot X_j$$

$$Z_j=a_{120}+a_{121}\cdot X_h+a_{122}\cdot X_l+a_{123}\cdot X_h^2+a_{124}\cdot X_l^2+a_{125}\cdot X_h\cdot X_l$$

となる。

【００７４】以下簡略的に、

$$B_{pre}=f\{D(x_i,\cdots\cdot,x_h)\}$$

と表現する。

【００７５】このＤ（x_i，‥‥，x_h）は、変数選択プロセッサにより選択された最適な変数であり、x_i～x_hまでの最適な変数に相当する第１メモリの情報から得られたデータである。

【００７６】この＃２２で予測ぶれ量B_{pre}が演算されると＃２３でアクチュエータ２３によってぶれ補正レンズ４が駆動開始され、次の＃２４でシャッタが開き始められる。

【００７７】このようにぶれ補正レンズ４の駆動の予測は、その一例を図１０に示すようにぶれデータＤに基づく出力が変動した場合に図１１に示すようにその変位Ｚｙが図１１に示すようになる。また、この予測に基づいて、実際に駆動されるぶれ補正レンズ４の変位ＺｙとＺｙをグラフ化した一例を図１２に示す。

【００７８】上述の＃２４の次は、図面作成上で生じた中継点を介して図４に示す＃２５に移行する。この＃２５は、測光回路２４で得られた適正なシャッタ秒時S_sから、所定の時間Ｉｔだけ減算するもので、この時間Ｉｔは、サンプリング回路１２とサンプリング回路１５等の処理時間に基づいて定められている。

【００７９】そして、＃２６でシャッタ秒時$S_s<0$の判定がなされ、ＮＯである場合には、次の＃２７から＃３２までが上述と同様に行なわれ、ぶれデータＤを時系列的に並べ変えて第１のメモリ回路１３に時系列的なデータとして格納するステップが実行される。

【００８０】この＃３２の次に＃３３が実行され、ぶれ量の予測が上述の２２と同様にして行われ、その演算結果に基づいて＃３４でアクチュエータ２３によってぶれ補正レンズ４が駆動開始され、＃２５に戻され、＃２５でシャッタ秒時S_sの減算が行なわれ、＃２６がＮＯの場合には再度＃２７から＃３４が実行される。言い換えれば、シャッタが開いている間には常に手ぶれ補正の予測駆動が行なわれるということである。

【００８１】そして、＃２６でＹＥＳの場合、即ち、シャッタ開時間が適正なシャッタ秒時S_sの時間を経過したときには、＃３５に移行してシャッタ閉の確認がされた後に、＃３６でぶれ補正レンズ４を所定の初期位置まで戻すようにアクチュエータ２３が逆駆動され、＃３７でアクチュエータ２３が停止され、＃３８でフィルム給送が行なわれ、一連の手ぶれ補正制御が完了して次回の撮影に備えられることになる。

【００８２】したがって、本実施例においては、学習プロセッサ１８によって、ぶれデータＤと光データＣとからこれらの関係を満たす係数を複数時点で演算し、この学習プロセッサ１８で得られた複数の係数を演算して複数の入力変数を求め、求められた複数の入力変数のうちの、ぶれデータＤと光データＣの時系列データの誤差成分が最小になるものを変数選択プロセッサ１９で選択しているので、撮影者の癖やカメラ本体に装着される交換レンズの重量等に対応した広い範囲の手ぶれ振動の態様に適応できる手ぶれ補正装置を提供することができる。しかも、手ぶれ補正は、シャッタが開いている間にも繰り返し行なわれているので、急激な手ぶれに対しても充分に対応できる利点もある。

【００８３】次に本発明の第２実施例を図１３ないし図１９を用いて説明する。この実施例は、撮影光学系を構成する撮影レンズに、自動合焦機能を有するズームレン

ズを用いたカメラに、請求項２の発明を適用したものである。

【００８４】全体構成の概略を示す図１３は、前述説明した第１実施例の全体構成（図１参照）とかなりの部分が同様であるために、説明の重複化を避けるために図１３中の構成部材のうち、図１と同様のものには図１に付した符号と同一符号を付すにとどめ、異なる部分のみについて説明する。

【００８５】この加速度センサ１１の後段に接続されたサンプリング回路１２の出力端には、メモリ回路４１が接続されている。このメモリ回路４１は、加速度センサ１１の出力を時系列的に記憶する記憶手段であり、このメモリ回路４１からの時系列的な出力は、学習プロセッサ４３に供給されると共にぶれ演算回路４２にも供給されるようになっている。

【００８６】この学習プロセッサ４３は、メモリ回路４１に記憶されたぶれデータＤとしての時系列データとＣＣＤ１４からの光データＣとから両データの結合係数を複数時点で演算する学習手段となっている。

【００８７】また、ぶれ演算回路４２は、メモリ回路４１に記憶されたデータと学習プロセッサ４３で求められた結合係数に基づいてぶれ速度データまたはぶれ量データを演算するぶれ演算手段である。

【００８８】上述のメモリ回路４１の内部は、図１４に示されるように構成されている。即ち、メモリ回路４１は、１，２，……１２でなる複数のメモリを直列的に形成して構成され、最初のメモリ１にサンプリング回路１２からの出力であるぶれデータＤが供給され、所定の周期でもって順々に次段のメモリにシフトされ、メモリ回路４１全体を見た場合には、メモリ回路４１から時系列的なデータが学習プロセッサ４３とぶれ演算回路４２の両方にデータ出力されることになる。

【００８９】以上のように構成されたカメラの手ぶれ補正装置における動作を図１３ないし図１９を用いて説明する。図１５に示すステップ＃４１でメインスイッチがオンされると回路各部に電源供給がなされ、初期設定が行われて待機状態にされる。

【００９０】そして、＃４２においてレリーズスイッチ２５を形成する２つのスイッチのうちの第１レリーズスイッチがオンされたか否か、即ちカメラ本体に設けられたレリーズ釦が半押しされたか否かがＣＰＵ２０で判断され、ＮＯの場合には、待機状態がそのまま継続し、ＹＥＳの場合には、＃４３に移行して測光回路２４による測光とＡＦ回路２９による測距が開始される。

【００９１】＃４３で測光と測距が実行されると共に、撮影光学系１を形成するズームレンズ３における焦点距離データＺｐがズーム位置検出回路３３で検出されて格納され、この焦点距離データＺｐがＡＦデータ変換回路３０に入力されると共にズーム駆動回路３１にも入力される。

【００９２】そして、次の＃４４で適正シャッタ秒時S_sの演算とレンズの繰出しが行われる。尚、このような測光と測距の動作は、前述実施例と同様にして周知の手段でもって行われることになる。

【００９３】そして、このような＃４４が実行された後に移行する＃４５は、ｊを０に初期セットし、次の＃４６でｊをｎに初期セットするものである。このｎは、メモリ回路４１における複数のメモリの数の１２に対応したアドレスを意味している。また、ｊは、メモリ回路４１における複数のメモリの数ｎのそれぞれの出力データのうちの２つのデータを組み合わせたもののペア数になっている。

【００９４】従って、＃４５で上述のｊが０にセットされ、＃４６でｉがｎ（ｎ＝１２）にセットされ、次の＃４７に移行することになる。この＃４７から＃５３は、ぶれデータＤを時系列的に並べ変えるステップであり、＃５４から＃５５は、ＣＣＤ１４に生じる光出力をサンプリング回路１５でサンプリングした出力をピーク検出回路１６でピーク検出した光データＣを時系列的に並べ変えるステップである。

【００９５】さて、このようにして得られるぶれデータＤと光データＣの処理は、＃５６でレリーズスイッチ２５の第２レリーズスイッチがＯＮされたか否かが判定され、ＮＯの場合には＃４６に戻されて＃４６から＃５５が再度実行され、これらは＃５６がＹＥＳとなるまで行われることになる。＃５６がＹＥＳになったときには、次の＃５７に移行して学習演算が行なわれる。

【００９６】この学習演算は、基本的な原理としては、ニューラルネットワークの理論を用いたものである。次に、ニューラルネットワークを入力層と中間層と出力層の３つの階層で形成されたモデルを用いて説明する。

【００９７】図１７に示すようにニューロンユニット１１，１２，１３の３つのユニットで入力層が構成され、それぞれの入力には、入力x_1とx_2とx_3の１系統づつが入力されている。

【００９８】また、ニューロンユニット２１，２２の２つユニットで中間層が構成され、このニューロンユニット２１の入力には、３つのニューロンユニット１１，１２，１３のそれぞれの出力がシナプス２１１，２１２，２１３を介して入力され、ニューロンユニット２２の入力には、３つのニューロンユニット１１，１２，１３のそれぞれの出力がシナプス２２１，２２２，２２３を介して入力されている。

【００９９】さらに、ニューロンユニット３１で出力層が構成され、このニューロンユニット３１の入力には、２つのニューロンユニット２１，２２のそれぞれの出力がシナプス３１１，３１２を介して入力されている。

【０１００】そして、６つのニューロンユニット１１，１２，２１，２２，３１のそれぞれの出力y_{11}，y_{12}，y_{13}，y_{21}，y_{22}，y_{31}は、一般式で表すと式１２のよ

うになる。

【0101】

【数3】

$$y_{ij}=f\left[\sum_{j=1}^{n}\{W_{ij}\cdot y_{(i-1)k}\}\right] \quad \cdots\cdots\cdots\cdots \text{式12}$$

ここで、W_{ij}は、シナプスの結合係数であり、f［　］は、シグモイド関数であり、6つのニューロンユニット11，12，13，21，22，31の出力関数である。

【0102】また、このf［　］は、通常のニューラルネットワークにおいては、

$$f(x)=1/(1+e^{-x}) \quad \cdots\cdots\cdots\cdots \text{式13}$$

で表される。上述の入力x_1，x_2，x_3と出力y_{11}，y_{12}，y_{13}，y_{21}，y_{22}，y_{31}の関係を次に示す。

【0103】入力層（第1層）

$$x_1=y_{11} \quad \cdots\cdots\cdots\cdots \text{式14}$$

$$x_2=y_{12} \quad \cdots\cdots\cdots\cdots \text{式15}$$

$$x_3=y_{13} \quad \cdots\cdots\cdots\cdots \text{式16}$$

【0104】中間層（第2層）

$$u_{21}=(W_{211}\cdot y_{11})+(W_{212}\cdot y_{12})+(W_{213}\cdot y_{13}) \quad \cdots\cdots \text{式17}$$

【0105】

【数4】

$$\begin{aligned} y_{21}&=f(u_{21})\\ &=1/(1+e^{-u21}) \end{aligned} \quad \cdots\cdots \text{式18}$$

$$u_{22}=(W_{221}\cdot y_{11})+(W_{222}\cdot y_{12})+(W_{223}\cdot y_{13}) \quad \cdots\cdots \text{式19}$$

【0106】

【数5】

$$\begin{aligned} y_{22}&=f(u_{22})\\ &=1/(1+e^{-u22}) \end{aligned} \quad \cdots\cdots \text{式20}$$

出力層（第3層）

$$u_{31}=(W_{311}\cdot y_{21})+(W_{312}\cdot y_{22}) \quad \cdots\cdots \text{式21}$$

【0107】

【数6】

$$\begin{aligned} y_{31}&=f(u_{31})\\ &=1/(1+e^{-u31}) \end{aligned} \quad \cdots\cdots \text{式22}$$

ここで、ニューラルネットワークは、学習演算を複数回に亘って繰り返し行い、最終的には最も誤差が小さくなる、理想的には誤差が0となるような結合係数に収束されるように学習演算を行うものであり、バックプロパゲーション法によって算出でき、この具体的な算出方法について説明する。

【0108】

通常、入力データとなる変数x_1，x_2，x_3から演算されるデータ$\widehat{y_{31}}$

は、実際の出力値であるy_{31}とは異なるものになってしまう。これは、加速度センサ11の出力データとCCD14の出力データというように、基データの形態が異なるということに起因している。そこで、これらの異なっている量、即ち誤差Iは、

【0109】

【数7】

$$I=\sum_{i}(y_{31}-\widehat{y_{31}})^2 \quad \cdots\cdots\cdots\cdots \text{式23}$$

となり、この誤差Iが0になるようにすれば良い。このために結合係数を学習の度毎に修正して行き誤差Iをできるだけ小さくする方法がバックプロパゲーション法である。ここで、先ず、

【0110】

【数8】

$$\begin{aligned} \widehat{y_{31}}&=f[\widehat{u_{31}}]\\ &=f[W_{311}\cdot\widehat{y_{21}}+W_{312}\cdot\widehat{y_{22}}] \end{aligned} \quad \cdots\cdots\cdots\cdots \text{式24}$$

【0111】

【数9】

$$\widehat{y_{21}} = f\ [\widehat{u_{21}}]$$
$$= f\ [W_{211} \cdot x_1 + W_{212} \cdot x_2 + W_{213} \cdot x_3] \quad \cdots\cdots\cdots\cdots 式25$$

【0112】

【数10】

$$\widehat{y_{22}} = f\ [\widehat{u_{22}}]$$
$$= f\ [W_{221} \cdot x_1 + W_{222} \cdot x_2 + W_{223} \cdot x_3] \quad \cdots\cdots\cdots\cdots 式26$$

となる。ここで、ｆ［…］は、シグモイド関数である。そして、これらの式２３～式２６の誤差Ｉを、各結合係数で偏微分すると、次のようになる。

【0113】

【数11】

$$\frac{\partial I}{\partial W_{311}} = \frac{\partial}{\partial W_{311}} (y_{31} - \widehat{y_{31}})^2$$
$$= 2\ \{y_{31} - f\ (W_{311} \cdot \widehat{y_{21}} + W_{312} \cdot \widehat{y_{22}})\}$$
$$\cdot\ \{-\frac{\partial}{\partial W_{311}} f\ (W_{311} \cdot \widehat{y_{21}} + W_{312} \cdot \widehat{y_{22}})\} \cdot \widehat{y_{21}}$$
$$= -\alpha\ \{y_{31} - f\ (W_{311} \cdot \widehat{y_{21}} + W_{312} \cdot \widehat{y_{22}})\}$$
$$\cdot\ \{-\frac{\partial}{\partial W_{311}} f\ (W_{311} \cdot \widehat{y_{21}} + W_{312} \cdot \widehat{y_{22}})\} \cdot \widehat{y_{21}}$$
$$= -\alpha\ (y_{31} - \widehat{y_{31}}) \cdot -\frac{\partial}{\partial W_{312}} \cdot \widehat{y_{31}} \cdot \widehat{y_{21}} \cdots\cdots\cdots 式27$$

αは、係数

【0114】

【数12】

$$\frac{\partial I}{\partial W_{312}} = -\alpha\ (y_{31} - \widehat{y_{31}}) \cdot \frac{\partial}{\partial W_{312}} \cdot \widehat{y_{31}} \cdot \widehat{y_{22}} \quad \cdots\cdots\cdots\cdots 式28$$

【0115】

【数13】

$$\frac{\partial I}{\partial W_{211}}=\frac{\partial}{\partial W_{211}}(y_{31}-\widehat{y_{31}})^2$$

$$=2\cdot(y_{31}-\widehat{y_{31}})\cdot\frac{\partial}{\partial W_{211}}\{-f(W_{311}\cdot\widehat{y_{21}}+W_{312}\cdot\widehat{y_{22}})\}$$

$$=2\cdot(y31-\widehat{y31})\cdot\frac{\partial}{\partial W_{211}}\{-f[W_{311}\cdot f(W_{211}\cdot x_1+W_{212}\cdot x_2+W_{213}\cdot x_3)+W_{312}\cdot\widehat{y_{22}}]\}$$

ここで、y＝f（u），u＝g（x）のとき

$$\frac{\partial y}{\partial x}=\frac{\partial y}{\partial u}\cdot\frac{\partial u}{\partial x}$$ である。

$$\frac{\partial I}{\partial W_{211}}=-\alpha(y_{31}-\widehat{y_{31}})\cdot\frac{\partial}{\partial\widehat{y_{21}}}\{f(W_{311}\cdot\widehat{y_{21}}+W_{312}\cdot\widehat{y22})\}\cdot\frac{\partial}{\partial W_{211}}\widehat{y_{21}}$$

$$=-\alpha(y_{31}-\widehat{y_{31}})\cdot\frac{\partial}{\partial\widehat{y_{21}}}\widehat{y_{31}}\cdot\frac{\partial}{\partial W_{211}}\widehat{y_{21}}\cdot x_1$$

…………式29

【0116】

【数14】

$$\frac{\partial I}{\partial W_{212}}=-\alpha(y_{31}-\widehat{y_{31}})\cdot\frac{\partial}{\partial\widehat{y_{21}}}\widehat{y_{31}}\cdot\frac{\partial}{\partial W_{212}}\widehat{y_{21}}\cdot x_2$$

…………式30

【0117】

【数15】

$$\frac{\partial I}{\partial W_{213}}=-\alpha(y_{31}-\widehat{y_{31}})\cdot\frac{\partial}{\partial\widehat{y_{21}}}\widehat{y_{31}}\cdot\frac{\partial}{\partial W_{213}}\widehat{y_{21}}\cdot x_3$$

…………式31

【0118】

【数16】

$$\frac{\partial I}{\partial W_{221}}=-\alpha(y_{31}-\widehat{y_{31}})\cdot\frac{\partial}{\partial\widehat{y_{22}}}\widehat{y_{31}}\cdot\frac{\partial}{\partial W_{221}}\widehat{y_{22}}\cdot x_1$$

…………式32

【0119】　【数17】

$$\frac{\partial I}{\partial W_{222}} = -\alpha\,(y_{31}-\widehat{y_{31}})\cdot\frac{\partial}{\partial\widehat{y_{22}}}\widehat{y_{31}}\cdot\frac{\partial}{\partial W_{222}}\widehat{y_{22}}\cdot x_2 \quad \cdots\cdots\cdots\cdots 式33$$

【0120】　【数18】

$$\frac{\partial I}{\partial W_{223}} = -\alpha\,(y_{31}-\widehat{y_{31}})\cdot\frac{\partial}{\partial\widehat{y_{22}}}\widehat{y_{31}}\cdot\frac{\partial}{\partial W_{223}}\widehat{y_{22}}\cdot x_3 \quad \cdots\cdots\cdots\cdots 式34$$

ここで、
【0121】　【数19】

$$\widehat{y} = f\,(\widehat{u}) \quad \cdots\cdots\cdots\cdots 式35$$

ｆは、シグモイド関数であり、以下のようになる。
【0122】　【数20】

$$\widehat{y} = f\,(\widehat{u}) = \frac{1}{1+e^{-\widehat{u}}} \quad \cdots\cdots\cdots\cdots 式36$$

【0123】　【数21】

$$\frac{\partial \widehat{y}}{\partial \widehat{u}} = \frac{e^{-\widehat{u}}}{(1+e^{-\widehat{u}})^2} \quad \cdots\cdots\cdots\cdots 式37$$

以上のように誤差Ｉを各結合係数で偏微分して行き、この偏微分した値を更新して行くことにより正しい結合係数へ近づけて行くことができる。結合係数が正しい値であれば誤差Ｉが０となり結合係数の更新はなされない。このようにして学習演算が完了するとつぎの＃５８に移行し、ぶれ量の予測演算が行われる。

【０１２４】この学習が完了したということは、結合係数が最適となり、入力層の入力x_iと出力層の出力y_3が最適化されたことになる。つまり、入力x_iと出力y_3は、ニューラルネットワークにより線形化され、複数の入力x_iに実際の値（この場合加速度または角速度）を代入することにより将来のぶれ量を予測することができる。この予測演算は、ぶれ量B_{pre}は、（式１２）、（式１３）で示されるようになる。

【０１２５】これを簡略的に記述すると、

$$B_{pre} = f\,\{D\,(x_1,\ x_2,\ \cdots\cdots,\ x_n)\} \quad \cdots\cdots\cdots\cdots 式38$$

として行なわれる。このＤ（x_1，x_2，・・・・，x_n）は、ニューラルネットワーク第１層目の入力変数となるものであり、ぶれ演算する時に第１のメモリに格納されている情報を読み込んで、ぶれ演算をするものである。なお、Ｄ（x_1，x_2 ・・・・x_n）は、時系列的に与えられるデータである。

【０１２６】この＃５８で予測ぶれ量B_{pre}が演算されると＃５９でアクチュエータ２３によってぶれ補正レンズ４が駆動開始され、次の＃６０でシャッタが開き始められる。この＃６０の次は、図面作成上で生じた中継点を介して図１６に示す＃６１に移行する。

【０１２７】この＃６１は、＃４４で求められた適正なシャッタ秒時S_sから、所定の時間Ｉｔだけ減算するもので、この時間Ｉｔは、サンプリング回路１２とサンプリング回路１５等の処理時間に基づいて定められている。

【０１２８】そして、＃６２でシャッタ秒時$S_s < 0$の判定がなされ、ＮＯである場合には、次の＃６３から＃６８までが上述と同様に行なわれ、ぶれデータＤを時系列的に並べ変えてメモリ回路４１内部の各メモリに時系列的なデータとして格納するステップが実行される。この＃６８の次に＃６９が実行され光データＣのサンプリングと＃７０でそのピーク検出が行なわれる。

【０１２９】そして、つぎの＃７１で上述同様にして学習演算が再び行なわれ、その結果に基づいて、上述同様にして＃７２でぶれ量の予測が行なわれる。その演算結果に基づいて＃７３でアクチュエータ２３によってぶれ補正レンズ４が駆動開始され、＃６１に戻され、＃６１

でシャッタ秒時S_sの減算が行なわれ、＃６２がＮＯの場合には再度＃６３から＃７３が実行される。言い換えれば、シャッタが開いている間には、常に手ぶれ補正の予測駆動が行なわれるということである。

【０１３０】そして、＃６２でＹＥＳの場合、即ち、シャッタ開時間が適正なシャッタ秒時S_sの時間を経過したときには、＃７４に移行してシャッタ閉の確認がされた後に、＃７５でぶれ補正レンズ４が所定の初期位置まで戻されるようにアクチュエータ２３が逆駆動され、＃７６でアクチュエータ２３が停止され＃７７でフィルム給送が行なわれ、一連の手ぶれ補正制御が完了して次回の撮影に備えられることになる。

【０１３１】従って、本実施例においては、学習プロセッサ４３として、ニューラルネットワークを用いているので、学習演算を複数回に亘って繰り返し行い、最終的には最も誤差が小さくなる、理想的には誤差が０となるような結合係数に収束されるように学習演算が行なわれるので極めて精度の高いぶれ補正制御を行なうことが出来る。しかも、手ぶれ補正は、シャッタが開いている間にも繰り返し行なわれているので急激な手ぶれに対しても充分に対応できる利点もある。

【０１３２】なお、本発明は、上述の２つの実施例に限定されることなく、本発明の要旨を逸脱しない範囲内で種々の変形実施をすることが出来ることは勿論である。例えば、本発明におけるぶれデータＤの取り出し周期は、図１８に示すように、等間隔の時間スケールごとにデータとして取り出したり、図２０に示すように、対数的な時間スケールごとにデータとして取り出したりしてもよい。対数的なスケールにした場合には、所要の演算に要する時間を短縮させることが出来る。

【０１３３】また、第２実施例における学習演算におけるニューラルネットワークは、学習演算を複数回に亘って繰り返し行い、最終的には最も誤差が小さくなる、理想的には誤差が０となるような結合係数に収束されるように学習演算を行うものであり、３入力型のものであったが、本発明は、これには限定されず図１９に示すように、ｎ入力型のものにすればより精度の高いぶれ補正を行なうことができる。この入力数を幾つにするかの選択は、電気回路の規模の制限や撮影レンズの焦点距離やカメラ本体の全体重量等の諸々の条件に応じて自由に選択することが出来る。

【０１３４】さらに、加速度センサ１１の出力電圧は、通常はミリＶ単位で出力されるので、この出力電圧範囲のフルスケールを１２ビットもしくは２４ビット等の規格化をしても良い。また、光データＣの出力も同様にして１２ビットもしくは２４ビット等の規格化をしても良い。

【０１３５】加速度センサ１１の形態は、半導体型のものであってもその他の形式のものであっても良く、その大きさや消費電力等の条件によって自由に選択することができることは勿論である。

【０１３６】また、第１のメモリ回路１３，第２のメモリ回路１７，メモリ回路４１を構成するメモリの数は実施例のような１２のみならず全くの任意に選択できることも勿論である。

【０１３７】さらに、ぶれ補正レンズ４の具体例は、ガラスプリズムを揺動させたり、液体プリズムの屈折を局部的に変化させたりしたり、液に浸したミラーの光軸を局部的に変化させる等のいずれであっても、もしくは他の形式の光学部材であっても良いことは勿論である。

【０１３８】

【発明の効果】以上の説明で明らかなように本発明によれば、手ぶれ補正を行なうに際して、手ぶれ検出したデータを学習機能を有する演算手段でもって学習演算した結果に基づいて、手ぶれ補正の駆動を行なっているので、カメラ本体を扱う撮影者の癖やカメラ本体に装着される交換レンズの重量等に対応させることができ、極めて広い範囲の手ぶれ振動の態様に適応し得るカメラの手ぶれ補正装置を提供することができるのである。

【図面の簡単な説明】

【図１】本発明の第１実施例の回路構成を示すブロック図である。

【図２】図１中に示される第１および第２のメモリ回路の詳細を示すブロック図である。

【図３】本発明の第１実施例の動作を示すフローチャートである。

【図４】本発明の第１実施例の動作を示すフローチャートである。

【図５】光データの変化状態の一例を示す特性図である。

【図６】光データの基準点からの移動状態の一例を示す特性図である。

【図７】ぶれデータ出力の具体例を示す実測図である。

【図８】ぶれデータ出力に基づく変位の具体例を示す実測図である。

【図９】学習演算を行なったぶれデータ出力に基づく変位の具体例を示す実測図である。

【図１０】ぶれデータ予測出力の具体例を示す実測図である。

【図１１】学習演算を行なったぶれデータ予測出力に基づく変位の具体例を示す実測図である。

【図１２】学習演算を行なったぶれデータ予測出力に基づく変位の具体例を示す実測図である。

【図１３】本発明の第２実施例の回路構成を示すブロック図である。

【図１４】図１３中に示されるメモリ回路の詳細を示すブロック図である。

【図１５】本発明の第２実施例の動作を示すフローチャートである。

【図１６】本発明の第２実施例の動作を示すフローチャ

ートである。

【図１７】ニューラルネットワークの原理を説明するための原理図である。

【図１８】ぶれデータの取り出し周期の一例を示す線図である。

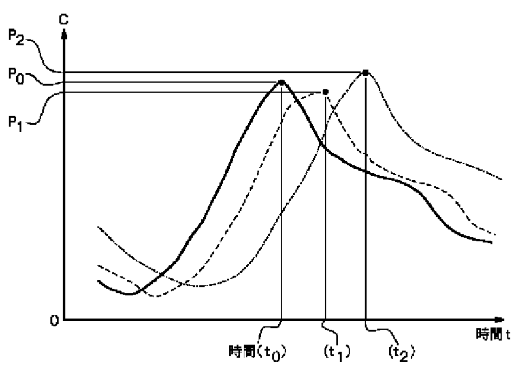
【図１９】ニューラルネットワークの具体例を説明するための原理図である。

【図２０】ぶれデータの取り出し周期の他の例を示す線図である。

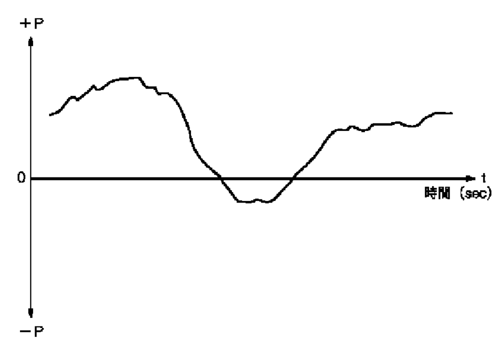
【符号の説明】

１　撮影光学系
２　フォーカスレンズ
３　ズームレンズ
４　ぶれ補正レンズ
５　フィルム
６　像検出光学系
１１　加速度センサ（ぶれセンサ）
１２　サンプリング回路
１３　第１のメモリ回路（第１の記憶手段）
１４　ＣＣＤ（光センサ）
１５　サンプリング回路
１６　ピーク検出回路
１７　第２のメモリ回路（第２の記憶手段）
１８　学習プロセッサ（学習手段）
１９　変数選択プロセッサ
２０　ＣＰＵ
２１　ぶれ演算回路
２２　ぶれ補正演算回路（ぶれ補正演算手段）
２３　アクチュエータ
２４　測光回路
２５　レリーズスイッチ
２６　ズームスイッチ
２７　駆動回路
２８　給送回路
２９　ＡＦ回路
３０　ＡＦデータ変換回路
３１　ズーム駆動回路
３２　ズームモータ
３３　ズーム位置検出回路
３４　フォーカス駆動回路
３５　フォーカスモータ
３６　フォトインタラプタ
４１　メモリ回路（記憶手段）
４２　ぶれ演算回路
４３　学習プロセッサ

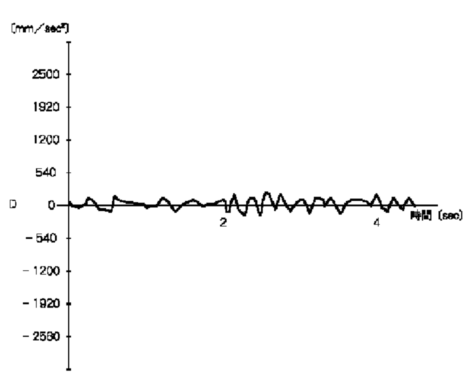
【図５】



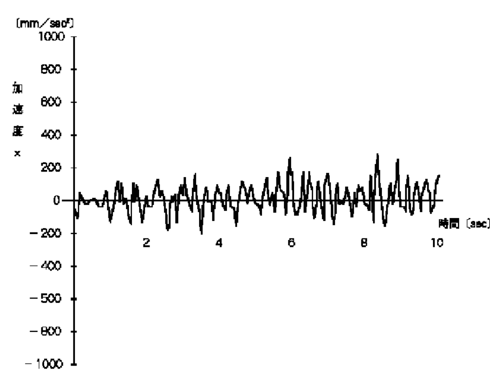
【図６】



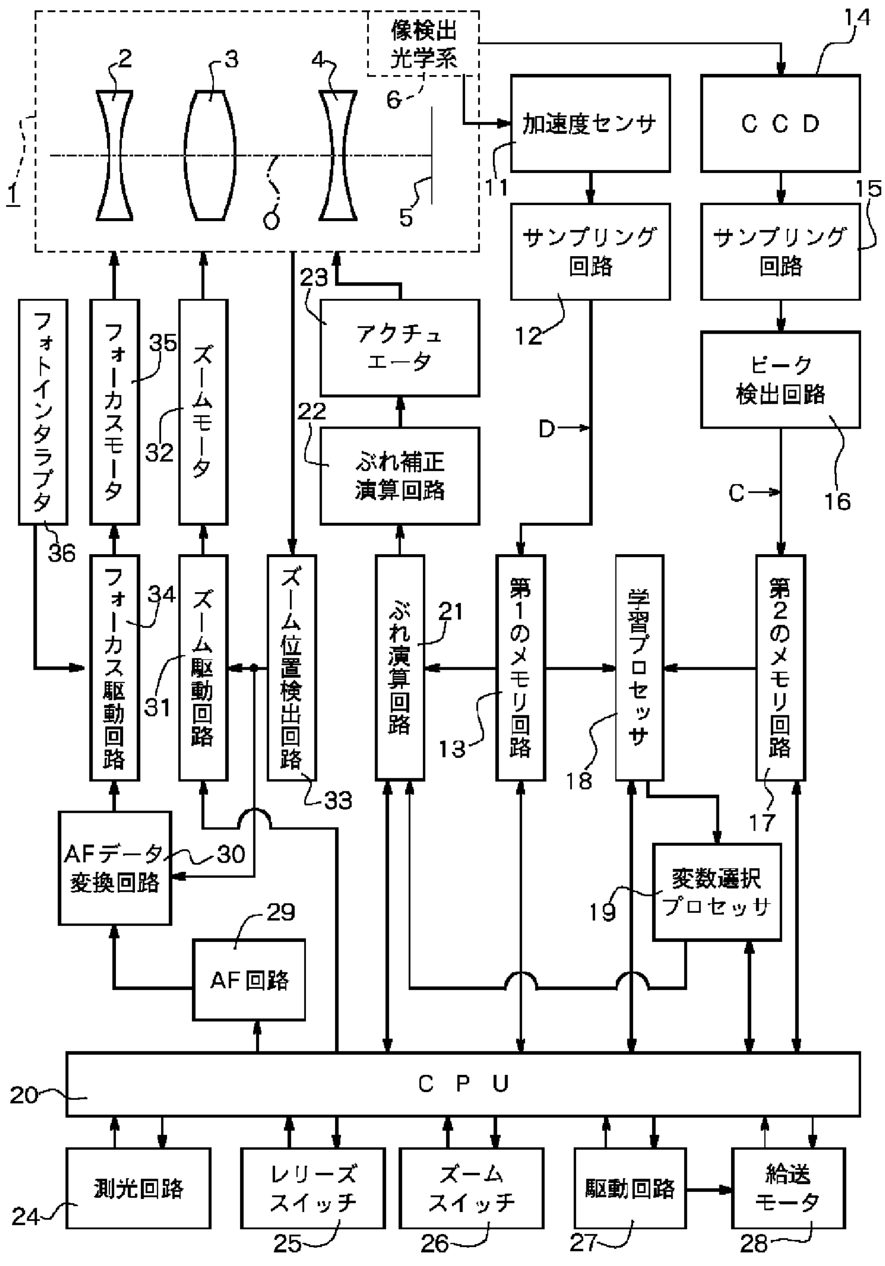
【図１０】



【図７】



【図1】



像検出光学系
加速度センサ
ＣＣＤ
サンプリング回路
サンプリング回路
ピーク検出回路
アクチュエータ
ぶれ補正演算回路
フォトインタラプタ
フォーカスモータ
ズームモータ
フォーカス駆動回路
ズーム駆動回路
ズーム位置検出回路
ぶれ演算回路
第1のメモリ回路
学習プロセッサ
第2のメモリ回路
変数選択プロセッサ
AFデータ変換回路
AF回路
ＣＰＵ
測光回路
レリーズスイッチ
ズームスイッチ
駆動回路
給送モータ
D
C
1
2
3
4
5
6
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
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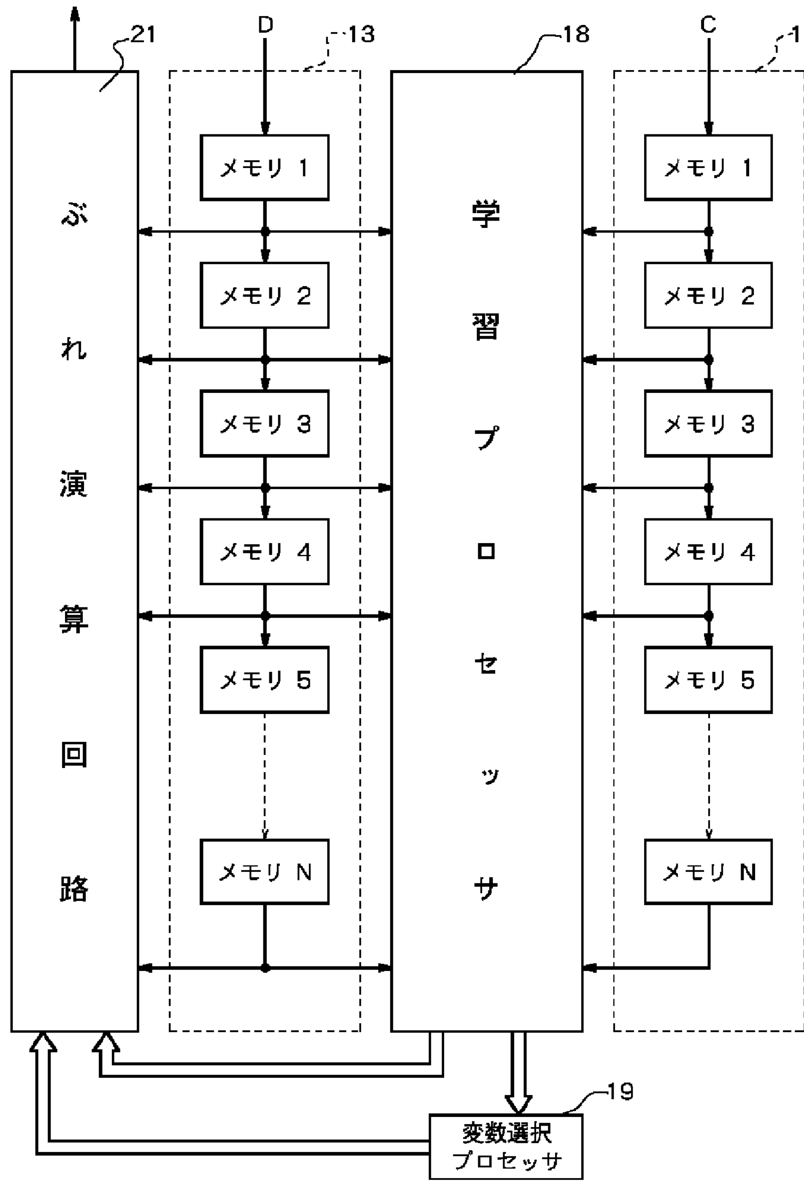
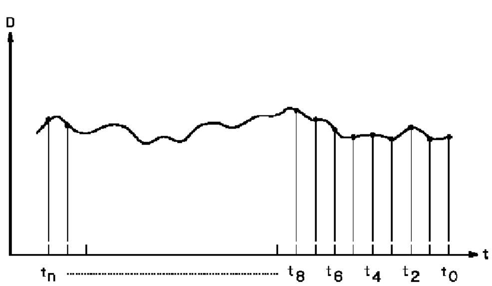
32
33
34
35
36

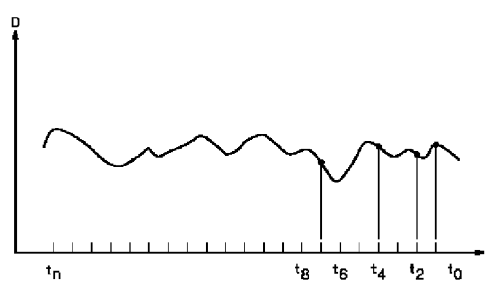
【図2】


21
D
13
18
C
17
ぶれ演算回路
メモリ 1
メモリ 2
メモリ 3
メモリ 4
メモリ 5
メモリ N
学習プロセッサ
メモリ 1
メモリ 2
メモリ 3
メモリ 4
メモリ 5
メモリ N
19
変数選択
プロセッサ

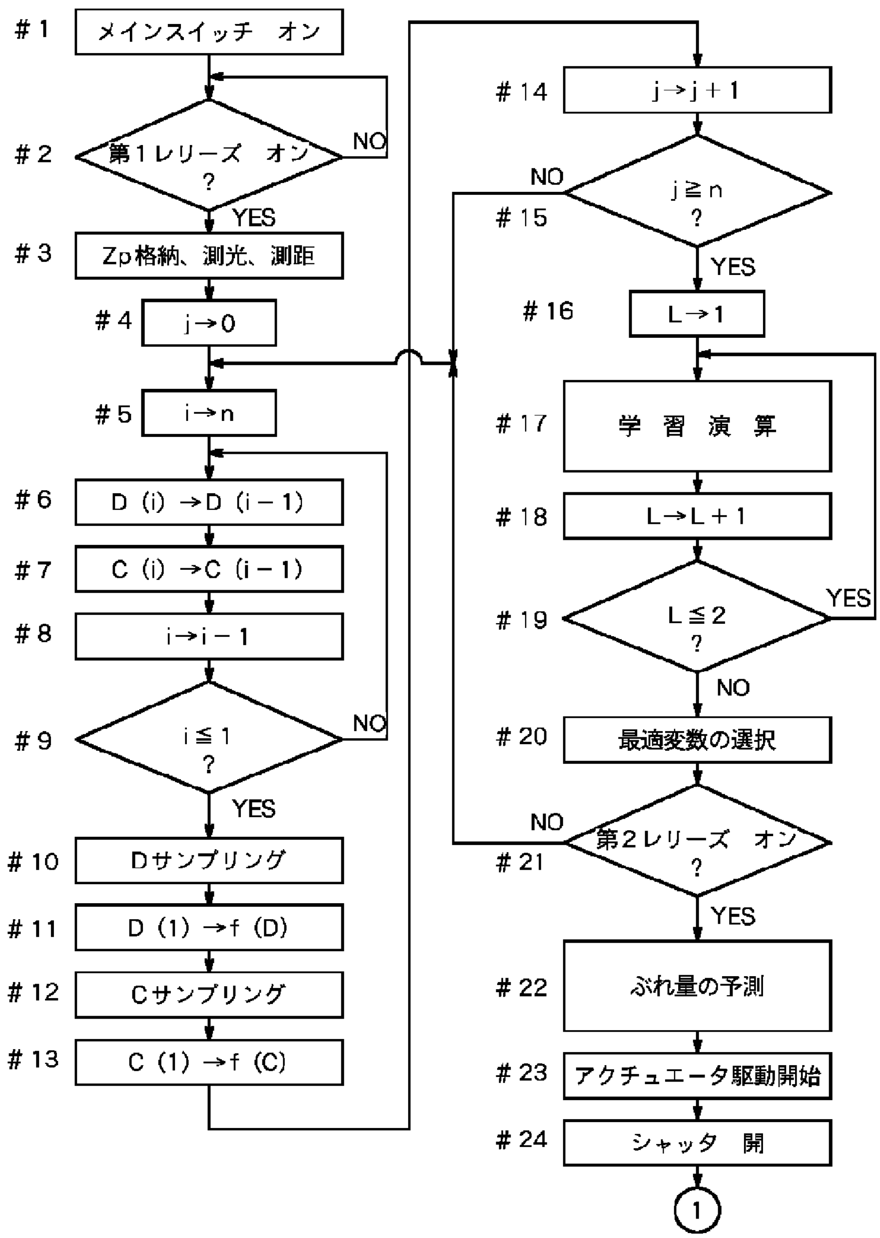
【図18】


D
t
t_n
t_8
t_6
t_4
t_2
t_0

【図20】

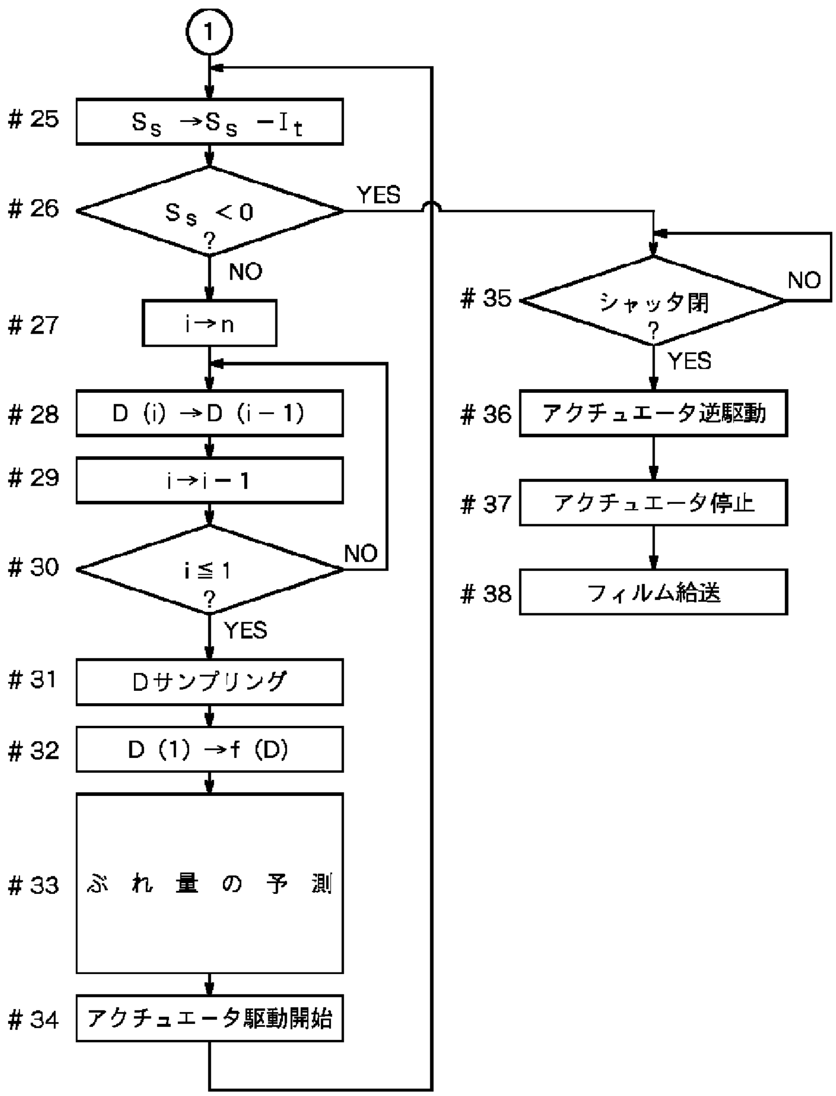

D
t
t_n
t_8
t_6
t_4
t_2
t_0

【図3】



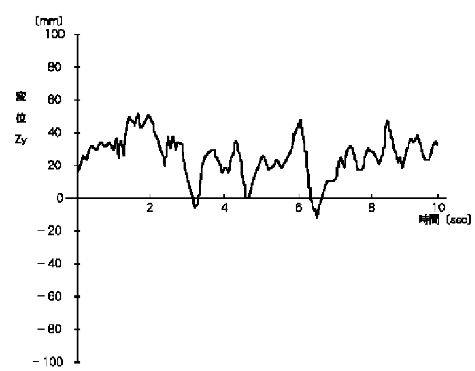
#1 メインスイッチ　オン
#2 第1レリーズ　オン ?
NO
YES
#3 Zp格納、測光、測距
#4 j→0
#5 i→n
#6 D (i) →D (i－1)
#7 C (i) →C (i－1)
#8 i→i－1
#9 i≦1 ?
NO
YES
#10 Dサンプリング
#11 D (1) →f (D)
#12 Cサンプリング
#13 C (1) →f (C)
#14 j→j＋1
#15 j≧n ?
NO
YES
#16 L→1
#17 学 習 演 算
#18 L→L＋1
#19 L≦2 ?
YES
NO
#20 最適変数の選択
#21 第2レリーズ　オン ?
NO
YES
#22 ぶれ量の予測
#23 アクチュエータ駆動開始
#24 シャッタ　開
1

【図4】



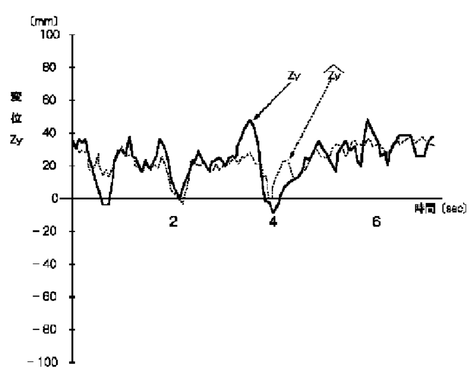
1
#25
$S_S \rightarrow S_S - I_t$
#26
$S_S < 0$?
YES
NO
#27
i→n
#28
D (i) →D (i－1)
#29
i→i－1
#30
i≦1 ?
NO
YES
#31
Dサンプリング
#32
D (1) →f (D)
#33
ぶれ量の予測
#34
アクチュエータ駆動開始
#35
シャッタ閉 ?
NO
YES
#36
アクチュエータ逆駆動
#37
アクチュエータ停止
#38
フィルム給送

【図8】



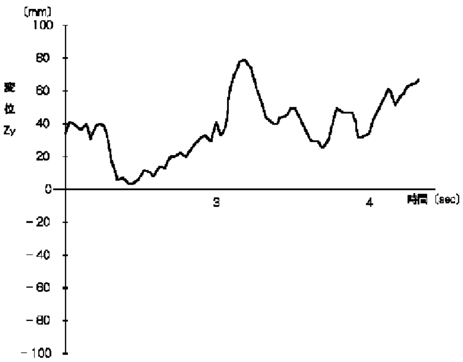
(mm)
100
80
60
40
20
0
－20
－40
－60
－80
－100
変位 Zy
2
4
6
8
10
時間 (sec)

【図9】

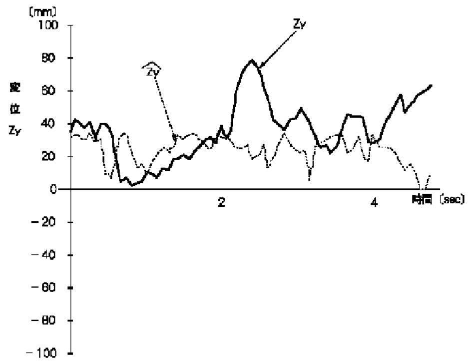


(mm)
100
80
60
40
20
0
－20
－40
－60
－80
－100
変位 Zy
Zy
2
4
6
時間 (sec)

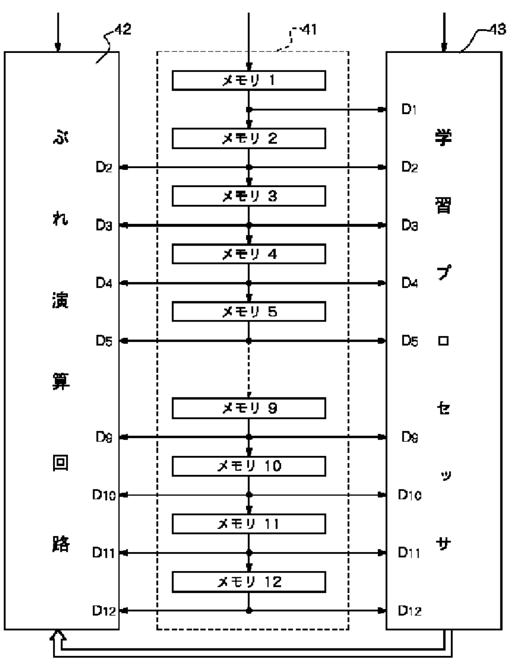
【図11】



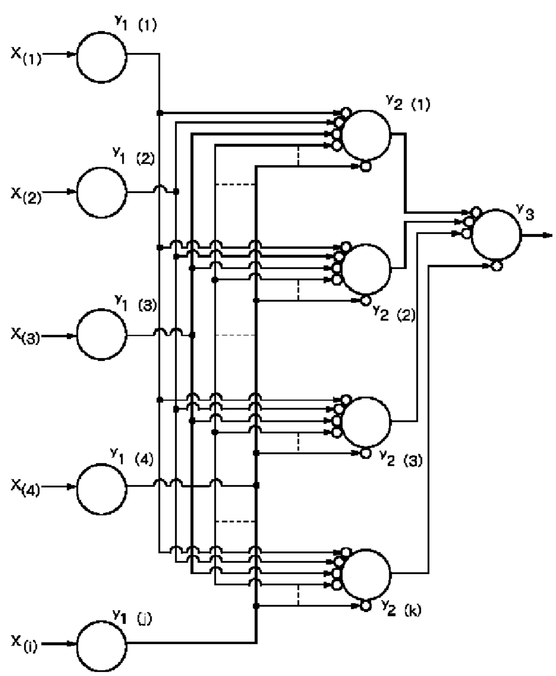
【図12】



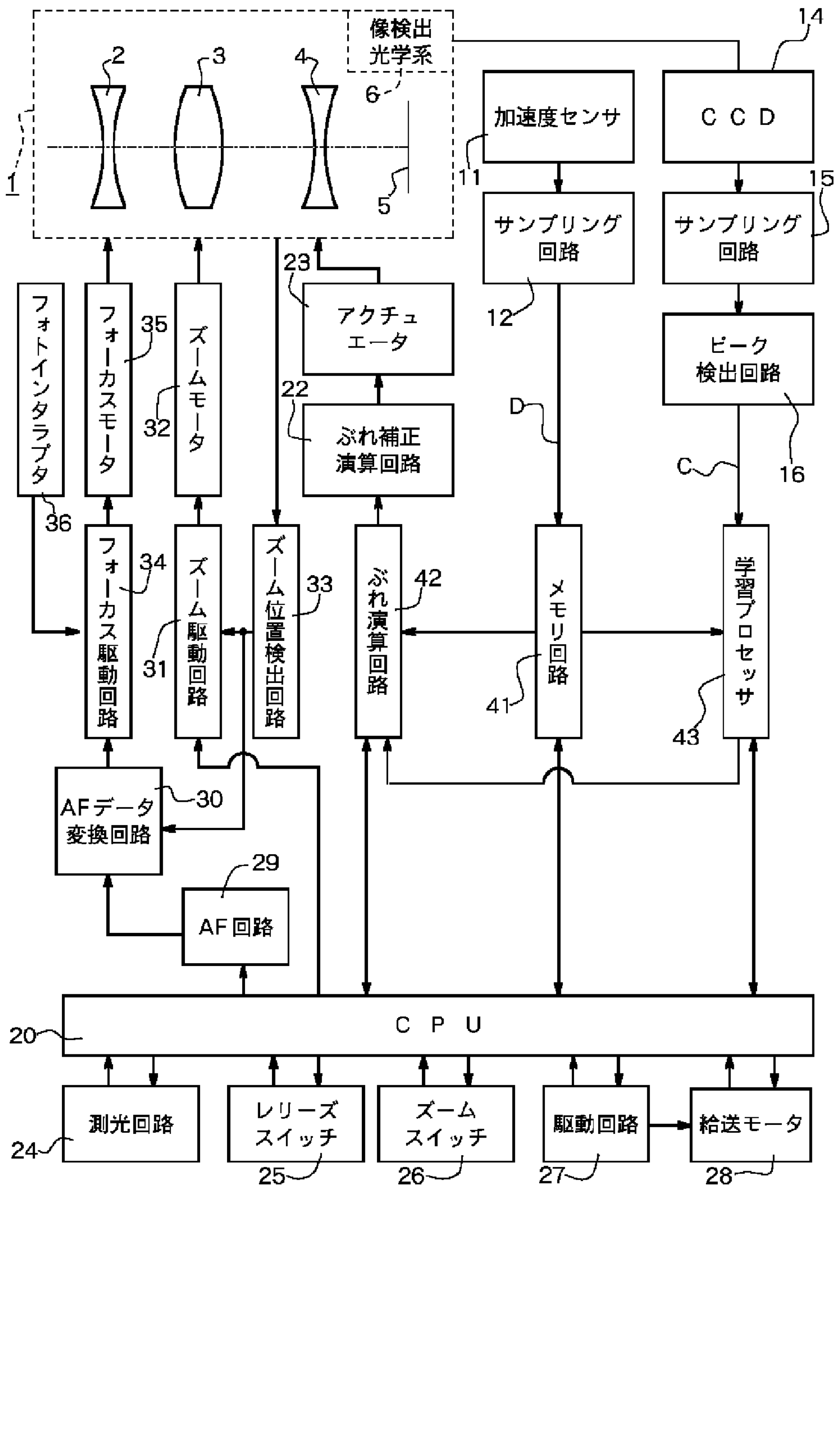
【図14】



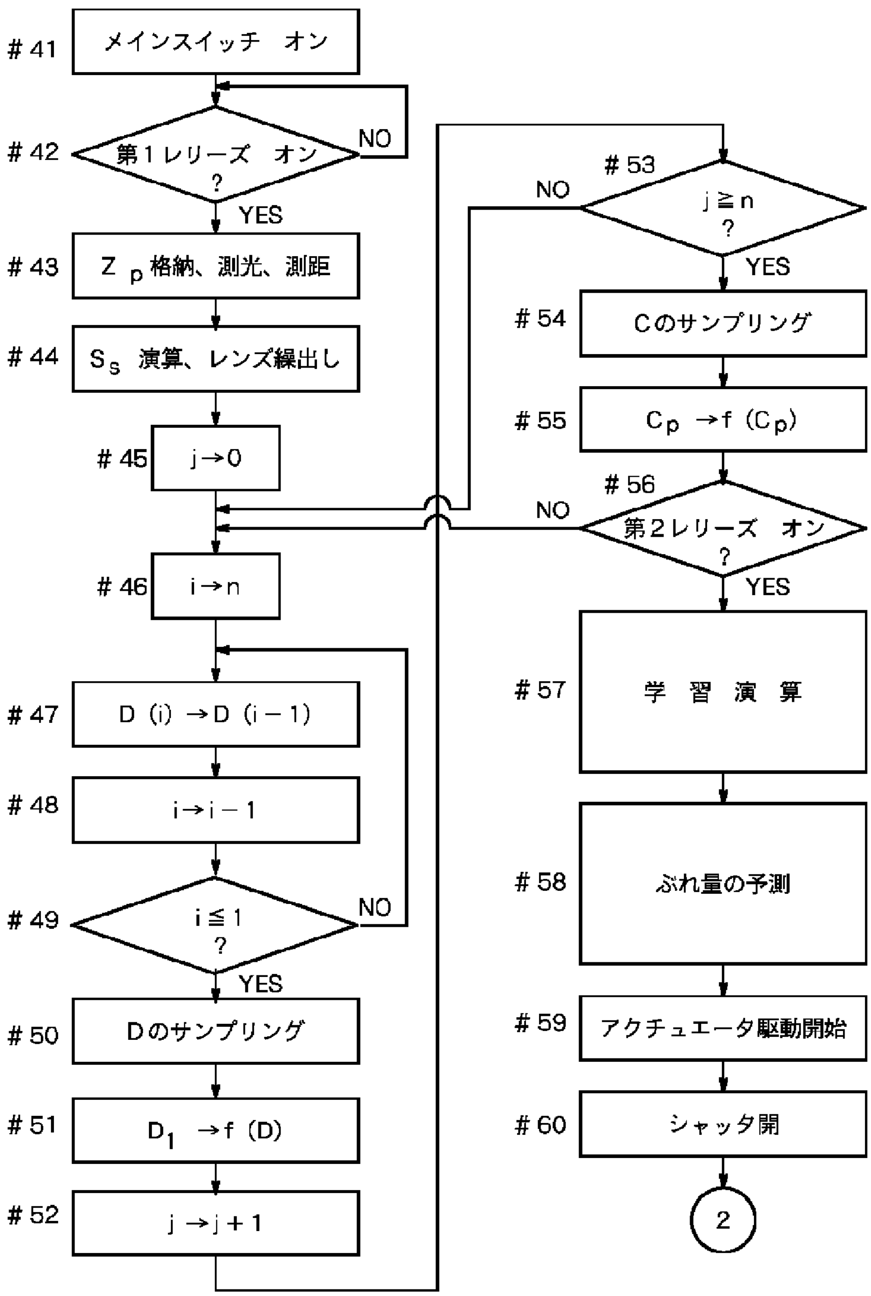
【図19】



【図13】

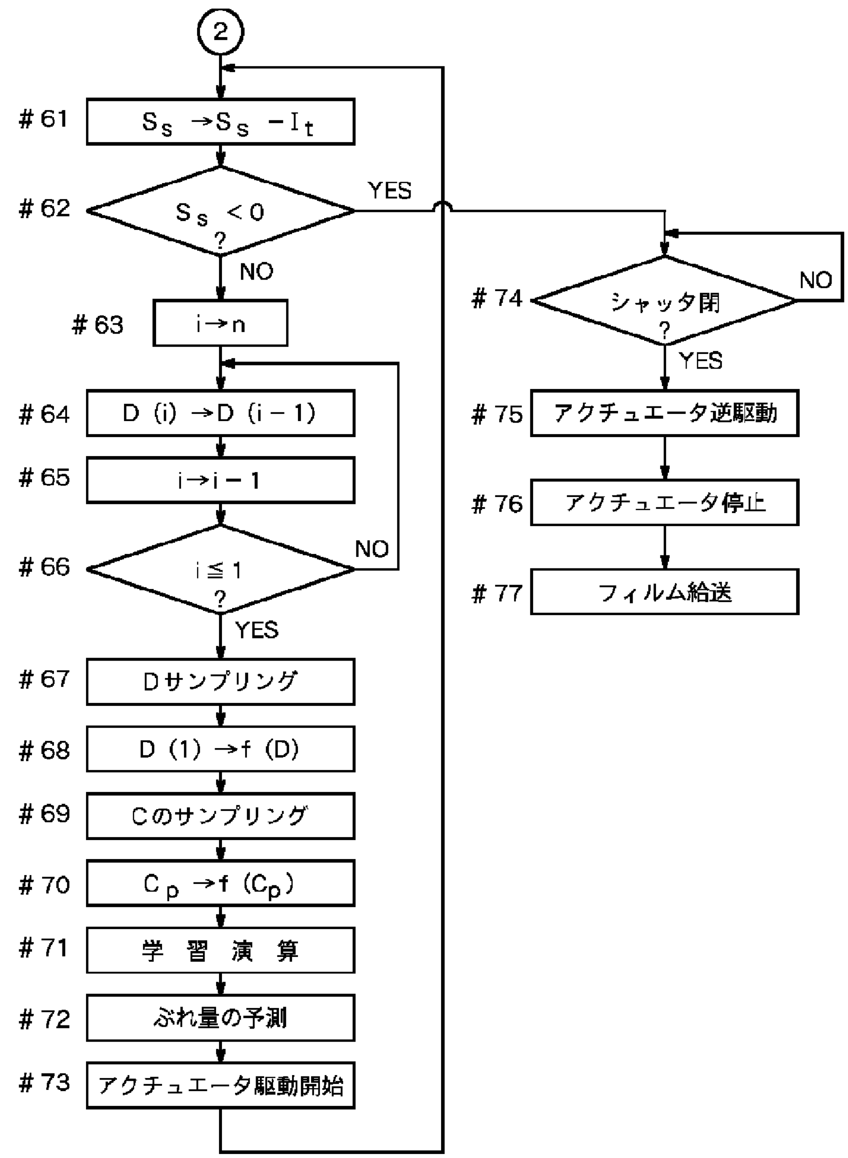

像検出光学系
1
2
3
4
5
6
加速度センサ
11
CCD
14
サンプリング回路
12
サンプリング回路
15
ピーク検出回路
16
D
C
アクチュエータ
23
ぶれ補正演算回路
22
フォトインタラプタ
36
フォーカスモータ
35
ズームモータ
32
フォーカス駆動回路
34
ズーム駆動回路
31
ズーム位置検出回路
33
ぶれ演算回路
42
メモリ回路
41
学習プロセッサ
43
AFデータ変換回路
30
AF回路
29
CPU
20
測光回路
24
レリーズスイッチ
25
ズームスイッチ
26
駆動回路
27
給送モータ
28

【図15】

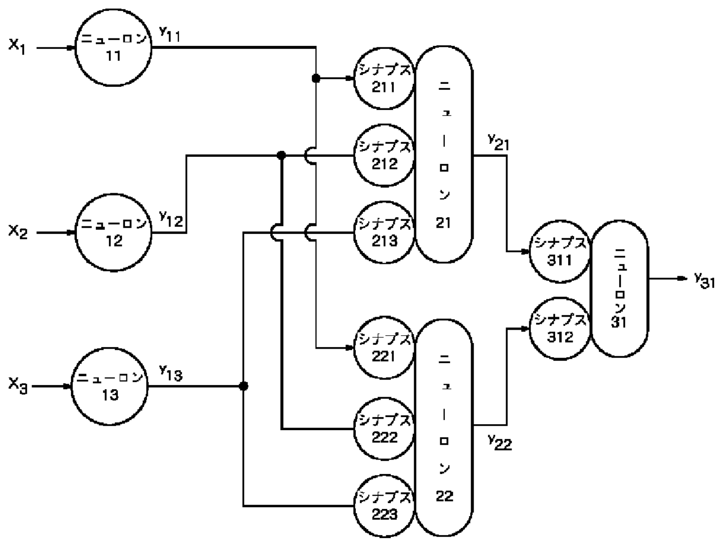


#41 メインスイッチ　オン
#42 第1レリーズ　オン ?
NO
YES
#43 Z p 格納、測光、測距
#44 Ss 演算、レンズ繰出し
#45 j→0
#46 i→n
#47 D（i）→D（i－1）
#48 i→i－1
#49 i≦1 ?
#50 Dのサンプリング
#51 D1 →f（D）
#52 j→j＋1
#53 j≧n ?
#54 Cのサンプリング
#55 Cp →f（Cp）
#56 第2レリーズ　オン ?
#57 学　習　演　算
#58 ぶれ量の予測
#59 アクチュエータ駆動開始
#60 シャッタ開
2

【図16】


2
#61
$S_s \rightarrow S_s - I_t$
#62
$S_s < 0$?
YES
NO
#63
i→n
#64
D (i) →D (i－1)
#65
i→i－1
#66
i≦1 ?
NO
YES
#67
Dサンプリング
#68
D (1) →f (D)
#69
Cのサンプリング
#70
$C_p \rightarrow f(C_p)$
#71
学 習 演 算
#72
ぶれ量の予測
#73
アクチュエータ駆動開始
#74
シャッタ閉 ?
NO
YES
#75
アクチュエータ逆駆動
#76
アクチュエータ停止
#77
フィルム給送

【図17】



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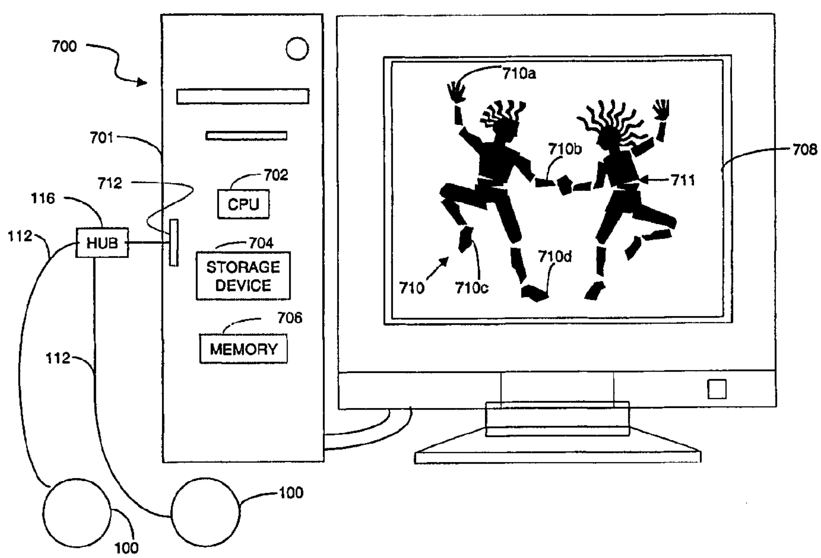

(57) Abstract

A hand–held computer input pointing device (100) has at least one motion detector (314), the at least one motion detector being capable of detecting motion in at least three dimensions. At least one pressure sensor (316) is capable of sensing pressure quantitatively. The input device is operable within a hand of a user to transmit signals from the motion detector and the pressure sensor, without contacting a base, work surface or pad. The pointing device may, for example, be used to control a computer (701) executing a program to display a movable virtual puppet (710).

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HUMAN GESTURAL INPUT DEVICE WITH MOTION AND PRESSURE

FIELD OF THE INVENTION

The present invention relates the field of input devices for computers.

DESCRIPTION OF THE RELATED ART

Computer input pointing devices are well known. A typical computer input pointing device contains at least two sensors for sensing motion in at least two directions, such as x and y (forward-backward and left-right). The pointing device also has at least one actuator for causing the pointing device to transmit a command signal (typically referred to as a "click") to a computer."

The most common pointing device for a desktop computer or workstation is a mouse. The mouse may have a ball on its underside. Motion of the ball causes rotation of one or more of a plurality of rotation sensors adjacent to the ball. The number of rotations determine the magnitude of the motion in the x or y direction. The most common mouse type includes two buttons for sending commands known as "left-click" and "right-click. Other types of mice include optical sensors that count markings on a specially marked mouse pad to determine an amount of movement.

Another common pointing device used primarily for computer games is a joystick. The joystick has a lever that is tilted in a forward-backward or left-right direction, each of which is sensed independently. A button is typically provided on the end of the lever for transmitting a command signal. Some joysticks also allow rotation of the lever, which is also sensed.

A variety of alternative pointing devices have been developed. Alternative pointing devices are typically used on laptop computers. An early pointing device used on laptop computers is the track ball. The track ball functions like an upside-down mouse. Instead of moving the device, the ball is rotated directly.

Many laptop computers include a miniature joystick that is positioned on the home row of the keyboard. Another common pointing device in laptop computers is a touch pad. The touch pad is a rectangular device that is sensitive to touch. Left and right sliding motion of a finger on the touch pad is detected. The touch pad also senses when it is struck, and produces a "click" signal.

Although conventional pointing devices are suitable for locating a point on an x-y grid, and transmitting a simple single-valued command signal, conventional pointing devices leave much to be desired for controlling application programs that require more complex inputs.

SUMMARY OF THE INVENTION

One aspect of the present invention is a hand-held computer input pointing device, comprising at least one motion detector. The at least one motion detector is capable of detecting motion in at least three dimensions. At least one pressure sensor is capable of sensing pressure quantitatively. The input device is operable within a hand of a user to transmit signals from the motion detector and the pressure sensor, without contacting a base, work surface or pad.

Another aspect of the invention is a method for operating a computer having an output device, comprising the steps of: receiving a plurality of signals from a computer input pointing device, the signals representing quantifiable pressure and motion in at least three dimensions; and outputting a video, audio or tactile output signal to the output device, the output signal having at least two characteristics that are capable of being varied separately from each other.

Still another aspect of the invention is a method for operating a computer input pointing device, comprising the steps of: moving the pointing device; transmitting at least three motion signals from the pointing device to a computer, the motion signals including signals representing translations in one or more dimension, or rotations in one or more dimensions, or a combination of translations and rotations; squeezing at least one portion of the pointing device; and transmitting quantifiable pressure signals from the pointing device to the computer.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of an exemplary squeezable pointing device according to the present invention.

FIG. 2 is an exploded view of the pointing device of FIG. 1.

FIG. 3A is an enlarged view of the origami sensor of FIG. 2.

FIG. 3B is a plan view of the sensor of FIG. 3A, prior to folding.

FIG. 4A is a plan view of a tetrahedral origami sensor in a flattened state.

FIG. 4B is an isometric view of the sensor of FIG. 4A, folded.

FIG. 5A is a plan view of an alternative cubic origami sensor in a flattened state.

FIG. 5B is an isometric view of the sensor of FIG. 5A, folded.

FIG. 6 is an isometric view of a tetrahedral edge sensor.

FIG. 7 is an elevation view of a computer system including the pointing device of FIG. 1.

FIG. 8 is a diagram of a range of motion tree for an application program executed on the computer shown in FIG. 7.

FIG. 9 shows the software layers for the application executed on the computer shown in FIG. 7.

FIG. 10 is a flow chart of a method for operating the virtual puppet of FIG. 7.

FIGS. 11-13 are block diagrams of the software layer structure shown in FIG. 9.

FIG. 14 is a flow chart of a method for operating the pointing device of FIG. 2.

DETAILED DESCRIPTION

FIG. 1 shows an exemplary computer input pointing device 100 according to the present invention. Pointing device 100 is capable of detecting motion and providing a quantifiable measure of squeeze pressure. The input device 100 is operable in a hand of a user, without contacting a base, work surface, or pad. Thus, the input device 100 is "free floating," in that it may be operated in any position without regard to the presence of a base, work surface, or pad. Pointing device 100 has a squeezable, deformable elastomeric cover 102. Inside the cover 102, the pointing device 100 has an internal motion detector that may measure acceleration in x, y and z planes, or measure pitch, yaw and roll. Squeezing the package increases pressure that translates into a pressure signal that is sent by the pointing device 100 to the computer (shown in FIG. 7) along with the motion data.

FIG. 2 is an exploded view of the computer input pointing device 100, with the squeezable elastomeric covering 102 partially removed. The squeezable covering 102 may be formed from natural or synthetic rubber or a variety of polymeric materials, which may be cut or injection molded. Cover 102 has an internal cavity 104 for containing sensors. An optional sensor enclosure 106 may be provided inside of cover 102. The sensor enclosure 106 may be sealed to protect the sensors from dust and moisture, allowing use of an unsealed cover 102. The deformable cover 102, with or without the sensor enclosure 106, allows the sensor to move freely, and compresses internal sensor. In one embodiment, the squeezable cover is made from a "SQEESH™" ball by the Toysmith Company of Kent, WA USA. "SQEESH™" balls are available in a variety of shapes and surface types, including smooth spherical, spherical with craters, and star shaped. A variety of shapes may be used to provide users with the grip of their choice or hints as to what object that the device controls.

Pointing device 100 has at least one motion detector 108, which is capable of detecting motion in at least three dimensions. Pointing device 100 also includes at least one pressure sensor capable of sensing pressure quantitatively. In the example, the pressure sensing capability is also provided by the sensor 108, which is described in greater detail below. The at least one motion detector may, for example, include an accelerometer or a piezoelectric device.

As best seen in FIG. 3A, the exemplary piezoelectric device 108 includes at least three piezoelectric strips 301-303 or flaps oriented in three orthogonal directions. More specifically, the exemplary device 108 is a single film sensor having three strips 301-303 folded origami style, as shown in FIG. 3A, to form a piezo thin film with six sensors.

FIG. 3B is a view of the device 108 with six sensors 314, 316. The device is formed on a substrate 300 and is shown laid flat before the origami folds along dashed lines 312. Optional weight W1-W3 may be attached to the end or center of each flap 301-303, respectively. Preferably, each of the three piezoelectric strips 301-303 has at least two sections, including a weighted section 314 and an unweighted section 316; so as to discriminate motion load from pressure load.

The piezo film substrate 300 is plastic and allows two strips of piezo material to measure bend of the substrate by the relative tension between two strips. One piezo sensor 316 is provided for pressure discrimination. The pressure on the deformable covering 102 bends the material of the piezo pressure sensor 316, producing a measurable voltage. Another piezo sensor 314 for motion discrimination has a weight W1-W3 placed at the middle or end of the sensor. If each of the three piezoelectric strips 314 has a respective weight; moving the pointing device 100 induces an inertial force. The weight W1-W3 moves against the material of the motion sensor 314, causing it to bend at a different rate than pressure sensor 316.

Cuts 318 on the exemplary piezo film substrate 300 allow each sensor flap 314, 316 to bend separately. The dotted lines 312 show folds where the flat sensor strip 300 is origami folded in 90 degree bends. The folded origami flaps 301-303 are affixed to a support assembly 320 (shown in FIG. 3A). The support assembly 320 holds the origami flaps 301-303 in place. The leads L from thin film sensor are connected to optional internal multiplexing circuitry 110 that connects the sensor circuitry to an external lead 112.

Referring again to FIG. 1, the sensors output data representing four parameters (three motion and one pressure). Preferably, a multiplexer 110 receives output signals from the motion detector and the pressure sensor 108, and outputs a multiplexed signal for transmission to a computer (shown in FIG. 7). The output of the multiplexer is connected to a lead 112. The lead

112 extends through a channel 103 in the elastomeric covering 102. The opposite end of the lead 112 has a suitable connector 114 attached to it, which may be a 0.32-centimeter (1/8 inch) miniplug, a Universal Serial Bus (USB) connector, a serial (RS-232) port, an "ETHERNET™" port, a MIDI port for connection to a musical instrument, a PDA port, a cellular phone port or other suitable connector.

In a system having a plurality of similar pointing devices 100, a hub capable of accepting inputs from multiple input devices may be provided to interface the plurality of pointing devices 100 to a single computer. For example, if there are multiple pointing devices having USB connectors, a USB hub 116 (connected to lead 118 and USB connector 120) may be used to connect the pointing devices to a single computer. Alternatively, the pointing device may omit the multiplexer, and output four analog signals from four respective output terminals. The pointing device 100 may have a wireless transmitter for communicating with the computer.

The lead 112 from the sensing package either connects one data line (carrying time or frequency multiplexed data), or multiple data lines each carrying a respective sensor's output. The connector (such as 1/8" miniplug) 114 optionally connects directly to the computer (FIG. 7) through a microphone input eliminating the need for a hub. The pointing device 100 may use the audio software driver or communicate through the optional hub 116 for controlling multiple puppets (as described below). The connector 114 may connect to a different computer port such as a USB or serial port, eliminating the need for a hub. Although FIG. 2 shows a two-input version, the system may include any number of inputs.

Any of the sensor types described herein may be used with clock shifting to the next lead. An additional clock cycle may be provided for subsequent processing of an optional unique identification number (described below). The sensors provide an analog signal that may be modulated with a single carrier frequency, or the signal from each lead may be modulated with a respectively different carrier frequency.

An optional analog to digital converter (ADC) may be provided for each of the analog sensor leads. In this case, a clock shift to the next lead sends a digital packet. For example, with eight bits per lead, which for 6 sensors yields six bytes per sample cycle.

An optional identifier (ID) circuit may be provided. The ID circuit may be a register or a read only memory (ROM) device, EEPROM, or the like. The unique identifier may be hard encoded at the factory (e.g., using a ROM), or the identifier may be downloaded from a computer into a flash EEPROM in the pointing device 100. As explained below with reference to FIG. 7, by providing a unique identifier for each pointing device unit 100, more than one unit may be used at the same time. The device identifier can function like an encryption key, to protect the user's preferences or to securely identify the user.

The output of the ID circuit and the output from one of the sensors are output to the multiplexing circuitry 110. The analog input may be time-domain multiplexed with the ID waveform. Alternatively, if the analog sensor signals are converted to digital form before transmission to the multiplexer, a digital input packet may be combined with ID information to form a larger packet including both. The pointing device 100 may contain additional identifier circuitry to add a port identifier number separate from the pointing device identifier number.

The analog waveform may have a separate carrier frequency or may be time domain multiplexed or interleaved with each sample, either on a bit, byte, or packet basis. Alternatively, if a digital packet format is used, the sensor data and ID information may be added to a multiplexing packet to form a larger packet including both types of data.

The pointing device 100 may obtain power from the computer (FIG. 7), from an internal battery, or by drawing power directly from the energy created by the sensor from the piezoelectric effect.

ALTERNATIVE SENSORS

The piezoelectric device may be an origami sensor having cut coils, and may have either a cubic or tetrahedral shape. Preferably, the cut coils on each face of the motion detector are attached to a single weight at a center of the motion detector. Optionally, each cut coil on each face of the motion detector has its own weight attached.

FIGS. 5A and 5B show a sensor system 500 including origami cutouts, which may be used in place of the sensor 108 shown in FIG. 2. A thin sensor film 500 having six faces 501-506 is folded to form a cube (although a tetrahedron, shown in FIGS. 4A and 4B, or other three-dimensional shapes may be used in alternative embodiments). A spiral pattern 511-516 is cut into each face of thin sensor film 501-506, respectively. Each coil can be pressed towards the center (e.g., C1, C3 and C6) and attached to a weight that is suspended at the center of the folded shape.

When the pointing device is moved, the weight applies forces to each of the coils eliciting a voltage. For the cube 500, each face 501-506 has a corresponding opposite face measuring force with an inverse effect on voltage.

For the tetrahedron shown in FIGS. 4A and 4B, each side faces three other sides, measuring an inverse effect on their faces.

Additional circuitry (not shown) may be included in the exemplary sensor configuration. An analog sample and hold is provided for each of the analog sensor leads. For the exemplary origami sensor of FIGS. 2, 3A and 3B, the leads are:

1. A free – for pressure discrimination
2. A weighted – for motion discrimination
3. B free – pressure
4. B weighted – motion
5. C free – pressure
6. C weighted – motion

For a tetrahedral sensor (FIGS. 4A and 4B), the leads are:

1. A tension
2. B tension
3. C tension
4. D tension

For a cubic sensor (FIGS. 5A and 5B), the leads are:

1. A0 tension
2. A1 tension
3. B0 tension
4. B2 tension
5. C0 tension
6. C1 tension

FIG. 6 shows a tetrahedral edge sensor 600. Sensor 600 has six edges to detect pressure directly from a squeeze of the deformable elastomeric material of cover 102. Optionally, sensor 600 may have weighted edges 602 to detect motion through inertial force whenever the pointing device 100 is moved. The weights 610 increase the momentum of the sensors 602, so that the deformation of the sensors is exaggerated. Alternatively, weights may be placed at each node 608.

Sensor 600 is used in conjunction with an application driver that can discriminate pressure from motion. The driver can discriminate pitch, yaw, and roll. A plurality of signal leads 604 are provided, one for each edge of the tetrahedron 600. The outputs 604 of the sensor either connect to multiplexing/conversion circuitry 110 or lead out to separate analog lines. There is an input lead from each edge of tetrahedron. Optionally each connecting node 608 broadcasts a wireless signal of its state without requiring any lead wire. As shown in FIG. 6 by dotted lines 606, non-sensing leads connect each node 608 to another edge 602. The non-sensing leads 606 either follow a sensing edge 602 to another node 608 or may run directly to another node 608. The connecting nodes 608 for leads 606 and sensing edges 602 may simply be vertices for an origami tetrahedron or connecting nodes for self supporting edge sensors.

In one embodiment, a sensor similar to that used in the "GYROPOINT™" mouse may be used.

In another embodiment, a sensor such as the "ACH-04-08-05" accelerometer/shock sensor from Measurement Specialties, Inc. of Valley Forge PA may be used. The ACH-04-08-05 sensor has three piezoelectric sensing elements oriented to measure acceleration in x, y and z linear axes, and uses very low power. Alternatively, an "ACH-04-08-01" sensor by Measurement Specialties, Inc. may be used to measure linear acceleration in the x and y directions and rotation about the z axis.

In addition to the motion detection capability, pointing device 100 also includes a pressure sensing capability. An internal pressure sensor is included, which may be, for example, a thin film piezo sensor that detects a bending of a strip or a sensor such as the "MTC Express™" from Tactex Controls Inc. of Cerritos, CA. This control surface is pressure sensitive, and also senses multiple points of contact, using a fiber optic-based, pressure sensitive, Smart Fabric called "KINOTEX™." This fabric is constructed of cellular urethane or silicone sandwiched between protective membranes. The fabric has an embedded fiber optic array that generates an optical signal when the material is touched, or when force is applied. The coordinates and area of the pressure, and its magnitude can be determined from the received signals. The material can generate a pressure profile of the shape of a hand touching it.

As noted above, the pointing device 100 may include a circuit that outputs a unique identifier for each pointing device. There are many applications for this feature. For example, the feature allows the pointing device 100 to serve a user identification and/or authentication function. A user could carry around his or her pointing device with a unique identifier output signal, and connect it to any desired computer having an Internet connection. The application program could request a remote server to download previously established software preferences or upload the user's current software preferences. This enables a person to log on at any computer connected to the Internet, access his or her software (e.g., virtual puppet and stage application), or download web bookmarks. Alternatively, the user could use the pointing device 100 as a key to access copy protected software, functioning like a parallel port dongle. Thus, the use of a pointing device 100 with a built-in unique identifier enhances the user's mobility and access to services.

Further, the pointing device may be used for authentication at any computer to which it is connected. For example, because the unit uniquely identifies itself, the unit can be used in a way that allows it to bind to each individual user. For example, the unique identifier may be used in combination with a password, IP address or a user signature. For example, the user may sign his or her name using the pointing device to control movement of a virtual writing implement. The user's handwriting may be recognized using a conventional handwriting recognition algorithm, such as any of those described in U.S. Patents 5768423, 5757959, 5710916, 5649023 or 5553284, all of which are expressly incorporated by reference herein in their entireties. The combination of the unique device identifier and the user signature provides reliable authentication.

Further still, the unique identifier may be used to make the user's preferences more portable. For example, the identifier may be associated with the design (i.e., shape, color, and the like) of the cover 102. The identifier for the pointing device may also be associated with different shapes and colors of cursors. The cursor that appears on the screen may have the same shape or color as the cover 102 of the input device 100, which is associated with a known identifier. For example, a blue spherical pointing device may be associated with a round, blue cursor, a puppet shaped pointing device may be associated with a puppet shaped cursor, an alien-shaped pointing device may be associated with an alien-shaped cursor, and so on.

Alternatively, the input device packaging may be completely different from the shape and color of the computer cursor, or puppet object. If the puppet application program is stored in a server that is accessible via the Internet, or other local area network (LAN) or wide area network (WAN) or wireless services such as CDMA, the user may select from any of a plurality of different puppets from a gallery. This is one of the user preferences that may follow her around from client computer to client computer.

VIRTUAL PUPPET SYSTEM

FIG. 7 shows a computer system 700 according to another aspect of the invention. The computer system 700 includes a computer 701 having a processor 702, a memory 706, a display 708, and an input port 712.

At least one computer input pointing device 100, as described above with reference to FIG. 2, is coupled to the input port 712 of the computer 701. The pointing device 100 has at least one motion detector 108, capable of detecting motion in at least three dimensions, and at least one pressure sensor capable of sensing pressure quantitatively. A multiplexer 110 receives output signals from the motion detector 108 and the pressure sensor, and outputs a signal for transmission to the computer 701. Alternatively, the lead from each sensor may output an analog signal.

The computer 701 further comprises a storage device 704, which may be a hard disk drive, a high capacity removable disk drive (e.g., "ZIP" drive by Iomega Corporation), a read only memory (ROM), CD-ROM drive, a digital versatile disk (DVD) ROM drive, or the like. Either the memory 706 or the storage device 704 has stored therein computer program code for causing the computer to show an object 710 on the display 708. The object has a plurality of portions 710a-710d that are selectively movable in response to motion or squeezing of the pointing device 100. The exemplary object is an animated character 710 controlled by input parameters from the pointing device. Such an animated character is referred to herein as a "virtual puppet". The virtual puppet has a plurality of independently movable body parts 710a-710d. Although the example only shows movable arms and legs, any part of the virtual puppet 710 may be movable.

According to another aspect of the invention, a method is provided for controlling a computer. The method includes the steps of: receiving a plurality of signals from a computer input pointing device 100, the signals representing quantifiable pressure and motion in at least three dimensions; and outputting a video, audio or tactile output signal to the output device 100, the output signal having at least two characteristics that are capable of being varied separately from each other.

FIG. 10 shows an exemplary method for operating the computer 701. The method includes the steps of:

- receiving a plurality of signals from a computer input pointing device 100, the signals representing quantifiable pressure and motion in at least three dimensions;
- displaying a virtual puppet 710 on the display 708, the virtual puppet having at least two portions 710a-710d that are capable of being moved separately from each other; and
- showing movement of the portions 710a-710d of the virtual puppet 710 in response to the pressure and motion signals.

At step 1010, the animated character 710, figure or other object is displayed on the display 708. At step 1020, when the user squeezes pointing device 100, steps 1030-1050 are executed. At step 1030, the driver module 904 updates the idealized pressure value Pi and translates Pi into the normalized pressure value P. At step 1040, the application program processes the normalized pressure P into an animated figure action. At step 1050, the application updates the animated figure according to the action, and displays the result on the display 708.

At step 1060, when the user moves the pointing device 100, steps 1070-1080 are executed. At step 1070, the driver module 904 of the software updates the idealized motion vector Mxi, Myi, Mzi and translates the vector into a normalized motion vector Mx, My, Mz. At step 1080, the application program processes the motion vector Mx, My, Mz into animated figure motion, and outputs the moving figure to the display 708.

An exemplary method for operating the pointing device 100 comprises the steps of:

1. moving the pointing device 100;
2. transmitting at least three motion signals from the pointing device 100 to a computer 701, the motion signals including signals representing translations in one or more dimension, or rotations in one or more dimensions, or a combination of translations and rotations;
3. squeezing at least one portion of the pointing device 100; and
4. transmitting quantifiable pressure signals from the pointing device 100 to the computer 701.

Preferably, all parameters measured by the sensors 108 in the pointing device 100 are mapped to motions of the virtual puppet 710, such as mouth moving open and closed, the motions of limbs, or the expression of emotional intensity. The pressure measurement is particularly suitable for use in providing quantitative inputs to the computer to create results having continuously variable intensity. Thus, a light squeeze may result in a small kick, whereas a hard squeeze results in a high kick.

The example of FIG. 7 includes a hub 116 and at least a second computer input pointing device 100 capable of sensing motion in at least three dimensions and a pressure sensor. Both the first and second computer input pointing devices 100 are connected to the hub 116, which in turn is connected the input port of the computer 701. Each of the first and second computer input pointing devices 100 controls a respective virtual puppet 710 and 711.

As shown in FIG. 8, the computer program code includes a range of motion tree 800 for the virtual puppet 710. The range of motion tree 800 restricts a range of possible motion of the virtual puppet 710 about a current position of the virtual puppet. Preferably, the computer program code includes a respective unique range of motion tree for each of a plurality of users.

The exemplary range of motion tree 800 covers head, left and right shoulder, left and right elbow, left and right wrist, and left and right grip. The tree limits the range of motion from each node. For example, the nodes may be delimited as follows:

1. Head Hxyz
2. Shoulder Sxyz

3. Elbow Exyz
4. Wrist Wxyz
5. Grip Gxyz

The limits may be expressed in rectangular coordinates, such as (x0,y0,z0), (x1,y1,z1). Alternatively, the limits may be expressed as delta ranges. For some objects, it may be more convenient to express the limits in polar coordinates, which have a 1:1 mapping to rectangular coordinates.

The range of motion tree 800 can express a hierarchy of motions. For example, in the case of the head, the range of motion may be express as:

(Hx0, Hx1), (Hy0, Hy1), (Hz0,Hz1) => H*

where H* denotes range of motion

For the shoulder , the range of motion may be express as:

(Sx0, Sx1), (Sy0, Sy1), (Sz0,Sz1) => S*

One of ordinary skill can readily see that similar ranges of motion can be specified for elbow, wrist, and grip

All motion then extends the range of the tree

H*.S*.E*.W*.G*

State information restricts the range of possible motion about the last position of puppet. The state information is mapped to a user model, and further restricts possible ranges of motion. For example,

Hxyz:H* => (Hx00,Hx11), (Hy00 Hy11), (Hz00,Hz11)

A user model adds probabilities for motion at each node of the tree. For example, the user model may identify whether the user moves her shoulders or shakes her wrists. In an exemplary user model for "User n", the probabilities may be expressed as:

Un: (x0,x0), (y0,y1), (z0,z1)

As an alternative to the tree search, the probabilities of motion may be mapped to a voxel space. The probabilities could be precompiled with user probabilities, where three-dimensional motion space is broken up into small cubes, analogous to three-dimensional pixels. Each voxel point can be ascribed a probability, and each voxel can contains a range of motion probability. Voxels may also include application restrictions on the range of motion probability.

Another task for the software is identifying the orientation of the pointing device, to allow use of the orientation as a parameter. In one embodiment, conformation of curves is used as a process of matching the signal curve over time from the three-dimensional sensor space to three-dimensional application space. This is analogous to a three-dimensional jigsaw puzzle or Chinese wood block puzzle, in which a piece may be rotated in any of three dimensions. Using voxel space, it is possible to constrain the orientation of the sensor motion curve to only possible ranges from the "range of motion tree" 800 to only allow possible ranges from the application space. It is further possible to find a most likely orientation of sensor motion curve based on probabilities of each motion represented as likelihood coefficients for each voxel point.

Orientation can be determined by software. The exemplary software uses conformation mapping of curves of X, Y, Z (and optionally P) to the range of motions of either the left or right hand. Mapping could emanate from an explicit model or from trainable classifiers, such as neural nets. An application may request the user to orient the pointing device 100 by holding the device in his or her left or right hand and selecting items on the display 708.

The user either controls an object on the display 708, or navigates in space, where the user acts as the object, with a point of view that shifts. In either case, the range of object motion may be less than the range of motion of the pointing device 100. Thus, the software maps the actual gesture of the input device to the best fitting object motion.

A simple example is controlling a cartoon character that merely has a range of motion of stage-left and stage-right. Here, the range of motion of the puppet is constrained to two dimensions. There are several phases of control that should be considered to gauge its affect in the virtual world. For example: whether the pointing device is operated as a left-handed device or a right-handed device; whether the line 112 is sticking up or down; the current model or user range of motions; the current state of pressure; and the current desired range of controlled object motion. Controlled objects on the display 708 generally have a limited destination range.

As an alternative to the range of motion tree 800, one can require manual orientation of the pointing device 100. For example, the application can show a picture of the pointing device 100 with the lead 112 pointing down to the floor. One hemisphere of the squeezable, deformable cover may have special markings that faces away from the display 708. This technique eliminates the need for conformation of curves, since the orientation is 1:1, puppet to application.

FIG. 9 is a block diagram showing the virtual puppet modules and their connections to each other and the underlying software layer. The user module 900 contains the states of:

1. grasp – The user is picking up device.
2. orient – The user is matching device orientation to application and screen feedback
3. Squeeze – The user is pressing in on squishy covering
4. Move – The user is moving device

5. Release – The user is putting down the device
6. state – The module reports user state to other modules

A sensor module 902 has processes A, B, C, D corresponding to each sensor output, whether analog or digital.

A driver module 904 translates sensor values to application values. The driver module 904 may use a trainable classifier, such as a neural network, where each sensor output has correlating inputs to the drivers idealized X, Y, Z, P. The driver module 904 correlates user states to range of sensor input. The states, "grasp," "orient," "squeeze," "move," and "release" each have a characteristic effect on each of the sensors.

For instance, "grasp" may have a pressure curve, as the user grabs and picks up the puppet. As another example, "squeeze" may have a longer continuous pressure curve when compared to grasp. Each instance of state may have separate set of coefficients for a trainable classifier.

The software correlates the application state to the domain of sensor output, to reduce the set of possible outcomes. For instance, a two-dimensional stage for cartoon characters may be limited to "stage left" and "stage right". The program updates the user module state from the application state and application position.

The application module 906 accepts X, Y, Z, and P data from the driver module 904, and reports the application X, Y, Z, P state to the driver module as state information. Optionally, the application module 906 reports user state information to pass from the driver module 904 to the user module 900.

A mouse module 908 is a special program for emulating a mouse. The mouse module 908 uses a special application module for the report state. Mouse module 908 translates X, Y movement of the pointing device 100 to mouse X,Y motion, and translates Z and P parameters of the pointing device 100 to mouse Left, Right, and double click.

FIGS. 11-13 show the transformations that are performed by various exemplary software modules, depending on the specific types of sensors 902 included in the pointing device 100.

FIG. 11 covers the example described above, in which the motion detector measures x, y, and z accelerations, and pressure is also measured. The sensors 902 include motion sensors 1100 and pressure sensor 1110. A program Sm 1120 translates the raw output of sensor 1100 to an idealized motion vector, Mxi, Myi, Mzi, 1140 that is provided to the driver 904. A second translator Tm 1160 translates the idealized motion to an application motion vector Mx, My, Mz 1180, which is provided to the application 906. A program Sp 1130 translates the raw output of sensor 1110 to an idealized pressure Pi, 1150 that is provided to the driver 904. A second translator Tp 1170 translates the idealized pressure Pi to an application pressure P 1190, which is provided to the application 906.

FIG. 12 covers a second example, in which an origami detector measures x, y, and z accelerations, and pressure. The sensors 902' include unweighted sensors 1200 and weighted sensors 1210. A program Sm 1220 discriminates between unweighted and weighted sensors to produce an idealized motion vector, Mxi, Myi, Mzi, 1240 that is provided to the driver 904'. A second translator Tm 1260 translates the idealized motion to an application motion vector Mx, My, Mz 1280, which is provided to the application 906'. A program Sp 1230 discriminates between unweighted and weighted sensors to produce an idealized pressure Pi, 1250 that is provided to the driver 904'. A second translator Tp 1270 translates the idealized pressure Pi to an application pressure P 1290, which is provided to the application 906'.

FIG. 13 covers a third example, in which a tetrahedral detector measures x, y, and z accelerations; x, y and z rotations; and pressure. The sensors 902'' include tetrahedral sensor 1300. A program Sm 1310 translates the output of sensor 1300 to an idealized motion vector, Mxi, Myi, Mzi, 1340 that is provided to the driver 904''. A second translator Tm 1370 translates the idealized motion to an application motion vector Mx, My, Mz 1371, which is provided to the application 906''. A third translator Sr 1320 translates the sensor information to an idealized rotation vector Rxi, Ryi, Rzi. A fourth translator Tr 1380 translates the idealized rotation Rxi, Ryi, Rzi to an application rotation Rx, Ry, Rz 1350, which is provided to the application 906''. A fifth translator Sp 1330 translates the output of sensor 1300 to an idealized pressure Pi, 1360 that is provided to the driver 904''. A sixth translator Tp 1390 translates the idealized pressure Pi to an application pressure P 1391, which is provided to the application 906''.

FIG. 14 is a flow chart diagram of an exemplary method for operating the pointing device 100.

At step 1419, the system waits for the user to take an action, i.e., a motion or a squeeze. The system returns to the wait state 1419 after each action, and can transition from the wait state 1419 to any of the states, "grasp" 1420, "orient" 1432, "squeeze" 1437, "move" 1442 or "release" 1447.

At step 1420, the user grasps the device. At step 1421 the sensor 902 registers the motion. At step 1422, the driver module 904 wakes up in "grasp mode".

At step 1423, if this is the first session for the pointing device 100, then step 1424 is executed, and the device is calibrated. Control is transferred to step 1425. At step 1425, if this is the first time the user is using the pointing device 100, then at step 1426, the user registers himself or herself. An association is thus formed between the user and the particular pointing device, making use of the (optional) unique identifier chip in the pointing device 100. Control is transferred to step 1427. At step 1427, if a login is required, then step 1428 is executed. At step 1428, the user logs in, either by using the keyboard, or by a unique motion with the pointing device 100 (such as writing the user's signature). Control is transferred to step 1429.

At step 1429, the system checks whether there are user-specific coefficients available on the system for translating this specific user's style of motion, rotation and pressure from raw sensor data to idealized measurement data. If data are available, then step 1430 is executed. At step 1430, the default coefficients are replaced by the previously determined user-specific coefficients. Control is transferred to step 1431. At step 1431, the user login is translated to rotation and orientation coefficients. The system returns to the wait state 1419

At step 1432, the user orients the device. At step 1433, a rotation calibration is initiated by asking the user to orient the device in one or more predetermined positions. At step 1434, a stream of data points are recorded. At step 1435, conforming X, Y and Z rotations are constructed. At step 1436, a determination is made whether sufficient data have been collected to conform the rotation measurements to the actual rotations. If not, then control is returned to step 1433. Otherwise, the system returns to the wait state 1419.

At step 1437, the user squeezes the pointing device 100. At step 1438, the driver module 904 updates the idealized pressure Pi, and translates the same to the normalized pressure P. At step 1439, the pressure is provided to the application, which processes the pressure. At step 1440, if the application is finished with processing the squeeze operation, then control returns to step 1419 (the wait state). If not, then step 1441 is executed, to determine whether driver module 904 detects a lull or pause in the squeezing. If there is a pause, then control is transferred to step 1419 (wait state). Otherwise, step 1438 is executed again.

At step 1442, the user moves the pointing device 100. At step 1443, the driver module 904 updates the idealized motion vector Mxi, Myi, Mzi, and translates the same into the normalized motion vector Mx, My, Mz. At step 1444, the application program processes the normalized motion vector Mx, My, Mz. At step 1445, if the application is done with processing the movement of the pointing device 100, then control transfers to step 1419 (wait state). Otherwise, step 1446 is executed, to determine whether the driver detects a lull in the motion. If there is a pause, then control is transferred to step 1419 (wait state). Otherwise, step 1443 is executed again.

At step 1447, the user releases the pointing device 100. At step 1448, the driver module 904 enters a sleep state. At step 1449, the application is notified that the pointing device has entered the sleep state.

Listed below is a set of pseudo-code that may be used to construct a software system suitable for handling input signals from the exemplary pointing device 100.

Definition of Terms

A, B, C, D, E, F, G sensor strip oriented along a sensing plane

Au, Bu,... unweighted portion of sensor

Aw, Bw,... weighted portion of sensor

Mxi, Myi, Mzi idealized (un-normalized) X, Y, Z value

Mx, My, Mz, Mp normalized X, Y, Z values used by application

Ox, Oy, Oz orientation vector to translate idealized to normalized X,Y,Z values

Pi idealized pressure value

P normalized pressure value

Sm translate sensor outputs to idealized motion

Sr translate sensor outputs to idealized rotational motion

Sp translate sensor outputs to idealize pressure

Tm translate idealized motion to application motion

Tp translate idealized pressure to application pressure

Tr translate idealized rotational motion
to application rotational motion

Accelerometer ABC with pressure D

Sm: A maps to Mxi
B maps to Mzi
C maps to Mzi

Sp: D maps to Pi

Tm: (Mxi, Myi, Mzi) rotationally maps to (Mx, My, Mz)

Tp: Pi maps to P

Origami sensor with ABC flaps with each flap having

an un-weighted (u)

and weighted (w) section

Sp: (Au, Bu, Cu) maps to (Pi)

Sm: (Aw, Bw, Cw, Pi) maps to (Mxi, Myi, Mzi)

Tm: (Mxi, Myi, Mzi) rotationally maps to (Mx, My, Mz)

Tp: Pi maps to P

Tetrahedral sensor ABCDEF with six strips

Sp: (ABCDEF) maps to Pi

Sm: (ABCDEF, Rxi, Ryi, Rzi) maps to Mxi

(ABCDEF, Rxi, Ryi, Rzi) maps to Myi

(ABCDEF, Rxi, Ryi, Rzi) maps to Mzi

Sr: (ABCDEF, Mxi, Myi, Mzi) maps to Rxi

(ABCDEF, Mxi, Myi, Mzi) maps to Ryi

(ABCDEF, Mxi, Myi, Mzi) maps to Rzi

Tm: (Mxi, Myi, Mzi) rotationally maps to (Mx, My, Mz)

Tr: (Rxi, Ryi, Rzi) rotationally maps to (Rx, Ry, Rz)

Tp: Pi maps to P

Calibration

ask user to center device

user moves device and

wait for activity and the lull or press

ask user to trace shape on XY axis

user moves device

while software collects ABCD points

translate ABCD data points to Ox, Oy sensor coefficients

ask user to move in and out on Z axis

user moves device in and out

while software collects ABCD points

translate ABCD points to Oz sensor coefficients

Registration

after calibration

ask user to create login signature

determine cultural orientation

left-right vs. right-left, etc.

accept user's input

while software collects ABCD points

translate input to Ox, Oy, Oz over time

Login

ask user to reproduce login signature

set orientation based upon cultural

left-right vs. right-left context

replaces manual orientation

to draw shape on X-Y axis

Orientation

if manual orientation

ask user to move input device to center of area

with cord facing direction (floor)

and front face facing direction

set Ox, Oy, Oz to (0,0,0)

else

while waiting for input device to stop

or pressure state to signal squeeze state
save last few Mxi, Myi, Mzi states

Although the exemplary application program described above is a virtual puppet program, there are many uses for a pointing device 100 according to the present invention. For example, the output of the pointing device may be mapped to the parameters of a visual synthesizer, such as the shifting of a color palette, the drawing or motion of an object. Alternatively, the output of device 100 may be mapped to parameters of a sound synthesizer, such as pitch, timbre, amplitude, or placement in three-dimensional sonic space.

Although the exemplary virtual puppet application is configured so that one pointing device 100 controls a single virtual puppet 710, the software can be configured to operate more than one virtual puppet (or other object) using a single input pointing device 100. For example, assuming that the pointing device includes sensors for measuring x, y, and z accelerations and pressure P, the first puppet 710 may be controlled by the x and y accelerations, and the second puppet 711 may be controlled by z and P. The first and second objects need not be identical objects, or even objects of the same type.

For example, the first object may be a virtual puppet, and the second object may be the background scenery or sound. By x and y movements, the puppet 710 is controlled, and by z and P, the user can vary the background from day to night, or from silence to the sound of thunder.

To use two input devices 100, software applications can us the Mouse API for selecting or navigating or use a Driver API. For example, the driver for Digitizer (or Graphics) tablets may allow more than one pen to be used at the same time. Emulating a mouse can be accomplished by installing a driver and going beyond a mouse can be accomplished by modifying the application program. One can also overlay other input devices, such as a graphics tablet, with yet another driver.

Further, the output signals from the exemplary pointing device 100 may be mapped to those of conventional input devices in an emulation mode. For example, the outputs may be mapped to the x and y positions of a conventional mouse and the left or right click signals from depressing the mouse buttons. Mapping the x, y and z (or x, y and P) parameters into x and y parameters only may require the computer to determine the orientation of the pointing device 100, such as moving on a predominantly x-y plane, a y-z plane, or the z-x plane, or combinations of all three. Alternatively, individual user profiles may be used to determine the current orientation.

Although the exemplary use for two pointing devices is to control two different virtual puppets, a second pointing device may be used to expand the number of parameters for an application. For example, in an audiovisual application, one pointing device 100 may control various aspects of the video signal, while another pointing device may be used to control the audio signals.

Although the exemplary pointing device is sensitive to motion and pressure, additional sensors may also be included. For example, a microphone may be incorporated into the pointing device, for operation of voice activated software, or for storage of sounds.

Although the exemplary embodiment described above has the virtual puppet application program running locally in the computer 701, the application program may be executed in other processors located remotely, either as a sole process or in parallel with other instances of the application program on other processors. The local computer can communicate with other computers via a telecommunication network, which may be a LAN, WAN, Internet, or wireless protocols.

The present invention may be embodied in the form of computer-implemented processes and apparatus for practicing those processes. The present invention may also be embodied in the form of computer program code embodied in tangible media, such as floppy diskettes, read only memories (ROMs), CD-ROMs, hard drives, "ZIP™" drives, or any other computer-readable storage medium, wherein, when the computer program code is loaded into and executed by a computer, the computer becomes an apparatus for practicing the invention. The present invention may also be embodied in the form of computer program code, for example, whether stored in a storage medium, loaded into and/or executed by a computer, or transmitted over some transmission medium, such as over the electrical wiring or cabling, through fiber optics, or via electromagnetic radiation, wherein, when the computer program code is loaded into and executed by a computer, the computer becomes an apparatus for practicing the invention. When implemented on a general-purpose processor, the computer program code segments configure the processor to create specific logic circuits.

Although the invention has been described in terms of exemplary embodiments, it is not limited thereto. Rather, the appended claim should be construed broadly, to include other variants and embodiments of the invention that may be made by those skilled in the art without departing from the scope and range of equivalents of the invention.

What is claimed is:

1. A hand-held computer input pointing device, comprising:

at least one motion detector, the at least one motion detector being capable of detecting motion in at least three dimensions; and

at least one pressure sensor capable of sensing pressure quantitatively,

wherein the input device is operable within a hand of a user to transmit signals from the motion detector and the pressure sensor, without contacting a base, work surface or pad.

2. The pointing device of claim 1, wherein the at least one motion detector includes at least one of the group consisting of an accelerometer and a piezoelectric device.

3. The pointing device of claim 2, wherein the at least one motion detector includes at least three piezoelectric strips oriented in three orthogonal directions.

4. The pointing device of claim 3, wherein each of the three piezoelectric strips has a respective weight thereon to translate motion to a voltage.

5. The pointing device of claim 3, wherein the piezoelectric device is an origami sensor having cut coils, the origami sensor having either a cubic or tetrahedral shape.

6. The pointing device of claim 1, wherein the motion sensor includes a tetrahedral shaped device having six edge sensors.

7. The pointing device of claim 1, wherein the motion detector and pressure sensor are contained within a squeezable housing.

8. The pointing device of claim 7, wherein the housing is an elastomeric ball.

9. The pointing device of claim 1, wherein the motion sensor is capable of sensing pitch, yaw and roll.

10. The pointing device of claim 1, wherein the motion sensor is capable of sensing x-acceleration, y-acceleration and z-acceleration.

11. The pointing device of claim 1, further comprising a memory device that stores and outputs an identifier that is unique to the computer input pointing device.

12. A computer system comprising:

a computer having a processor, a memory, an output device, and an input port; and

a hand-held computer input pointing device coupled to the input port of the computer, the pointing device comprising:

at least one motion detector, the at least one motion detector being capable of detecting motion in at least three dimensions; and

at least one pressure sensor capable of sensing pressure quantitatively,

wherein the input device is operable within a hand of a user to transmit signals from the motion detector and the pressure sensor, without contacting a base, work surface or pad.

13. The computer system of claim 12, wherein:

the output device is a display;

the computer further comprises a storage device, and

one of the group consisting of the memory and the storage device has stored therein computer program code for causing the computer to show an object on the display, the object having a plurality of portions that are selectively movable in response to motion or squeezing of the pointing device.

14. The computer system of claim 13, wherein the object is an animated character controlled by input parameters.

15. The computer system of claim 14, further comprising a hub and at least a second computer input pointing device capable of sensing motion in at least three dimensions and a pressure sensor, the first and second computer input pointing devices being connected to the USB hub, wherein each of the first and second computer input pointing devices controls a respective animated character.

16. The computer system of claim 14, wherein the computer program code includes a range of motion tree for the animated character, the range of motion tree restricts a range of possible motion of the animated character about a current position of the animated character.

17. The computer system of claim 16, wherein the computer program code includes a

respective unique range of motion tree for each of a plurality of users.

18. The computer system of claim 16, wherein the computer program code includes a module for using output signals from the computer input pointing device to emulate output signals from a mouse.

19. The pointing device of claim 4, wherein each of the three piezoelectric strips has at least two sections, including a weighted section and an unweighted section.

20. The pointing device of claim 5, wherein the cut coils on each face of the motion detector are attached to a single weight at a center of the motion detector.

21. The pointing device of claim 1, further comprising a multiplexer that receives output signals from the motion detector and the pressure sensor, for outputting a multiplexed signal for transmission to a computer, wherein the motion detector, pressure sensor and multiplexer are contained within a squeezable housing.

22. The pointing device of claim 7, wherein the squeezable housing has at least one tactile feature to provide a tactile cue for orienting the pointing device.

23. The pointing device of claim 7, wherein the squeezable housing has at least one visible feature to provide a visual cue for orienting the pointing device.

24. A method for operating a computer having an output device, comprising the steps of:

receiving a plurality of signals from a computer input pointing device, the signals representing quantifiable pressure and motion in at least three dimensions; and

outputting a video, audio or tactile output signal to the output device, the output signal having at least two characteristics that are capable of being varied separately from each other.

25. The method of claim 24, wherein:

the output device is a display;

the step of outputting includes displaying an animated character on the display, and moving at least two portions the animated character separately from each other.

26. A method for operating a computer input pointing device, comprising the steps of:

moving the pointing device;

transmitting at least three motion signals from the pointing device to a computer, the motion signals including signals representing translations in one or more dimension, or rotations in one or more dimensions, or a combination of translations and rotations;

squeezing at least one portion of the pointing device; and

transmitting quantifiable pressure signals from the pointing device to the computer.

27. The method of claim 26, further comprising the steps of:

speaking into a microphone contained within the pointing device; and

transmitting an audio signal from the microphone to the computer.

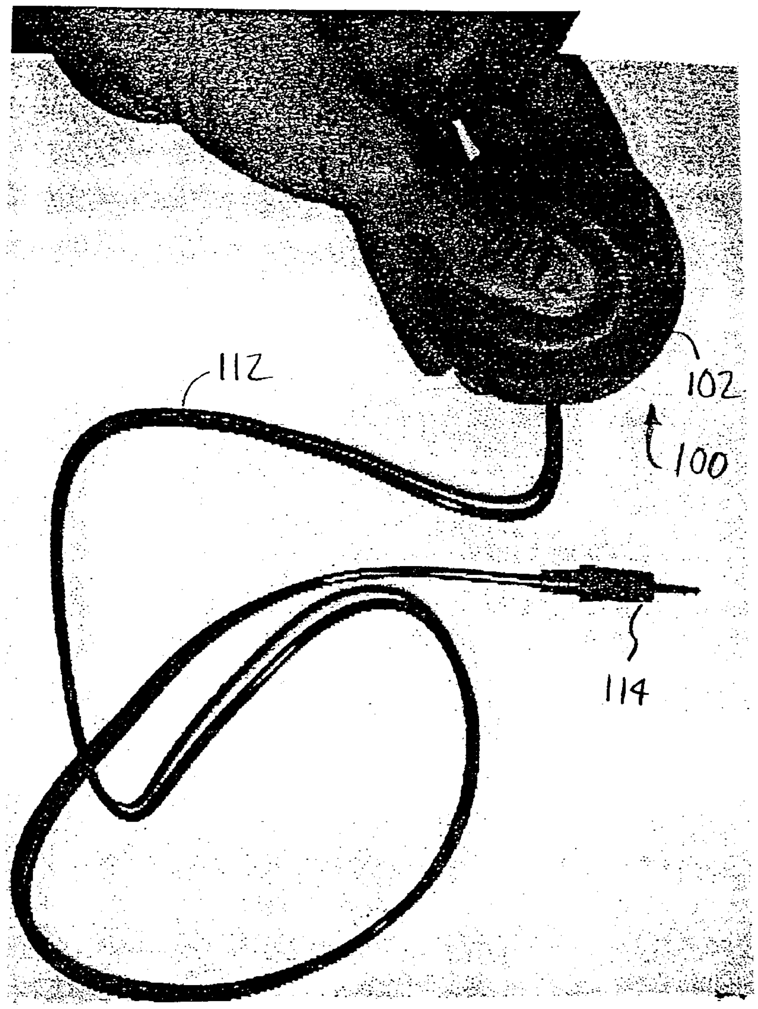


FIG. 1

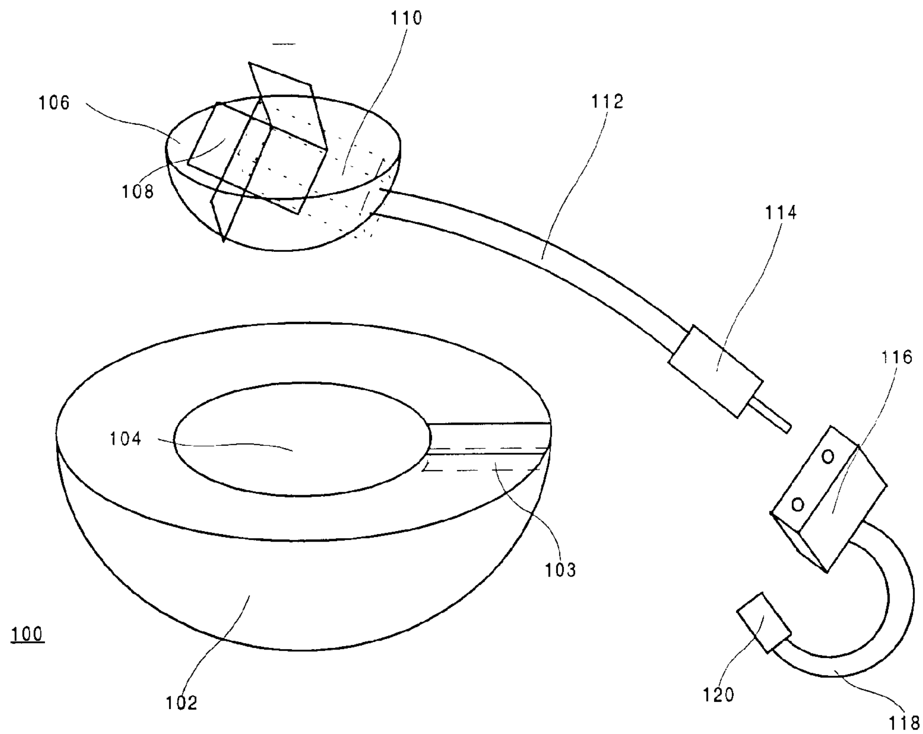


FIG. 2

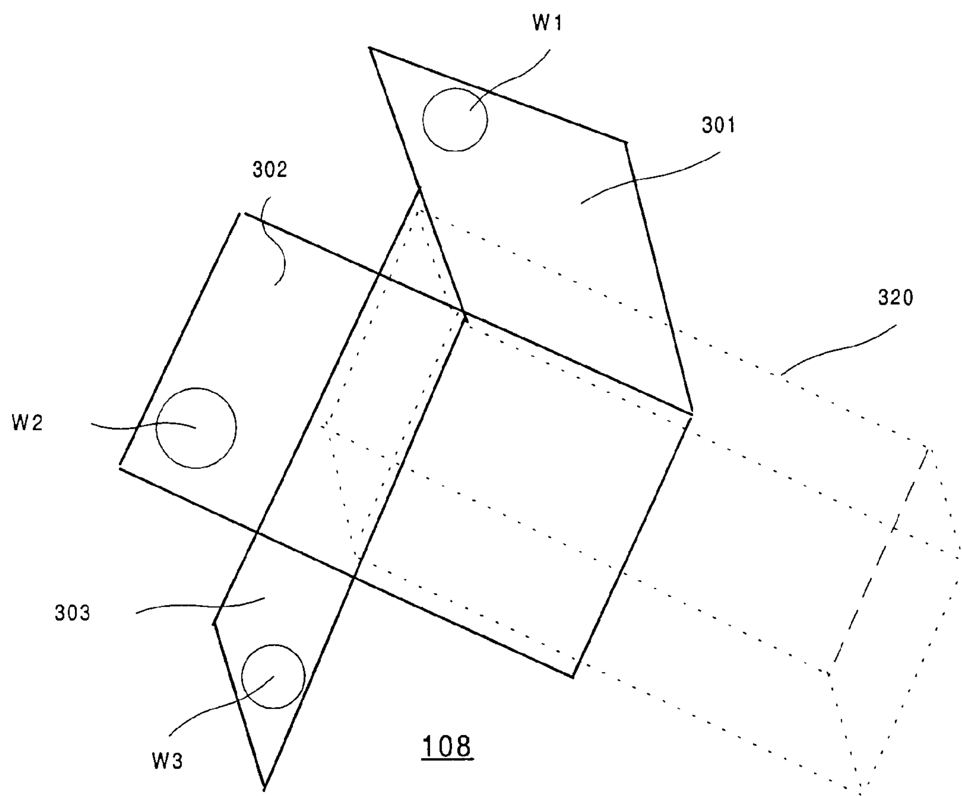


FIG. 3A

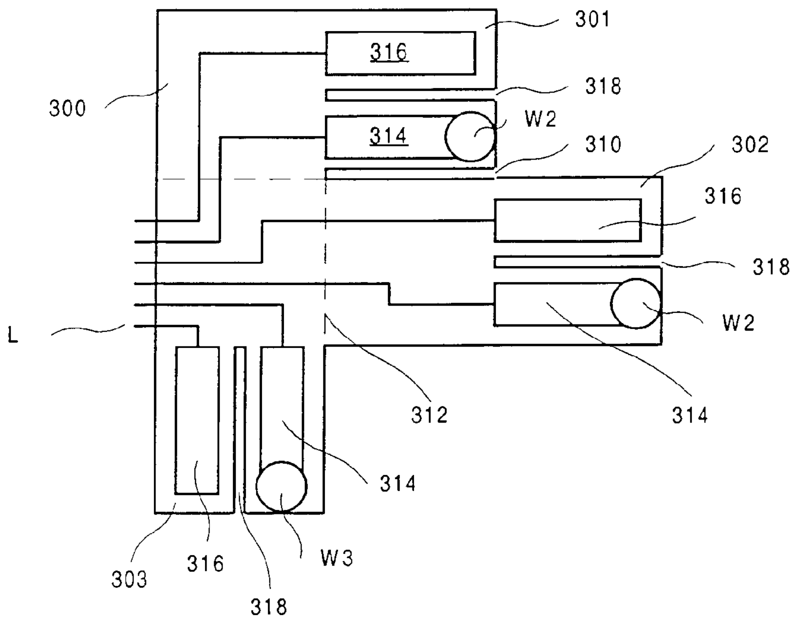

301
316
318
300
314
W2
310
302
316
318
L
W2
312
314
314
303
316
W3
318

FIG. 3B

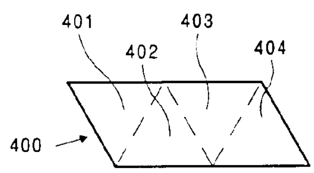


FIG. 4A

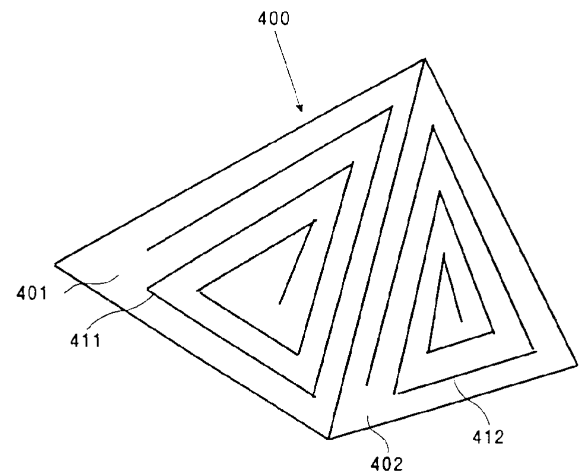


FIG. 4B

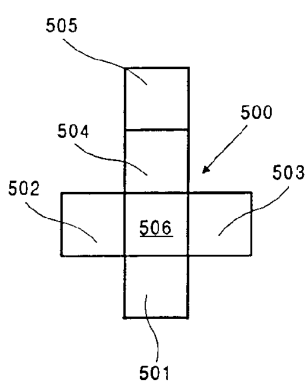


FIG. 5A

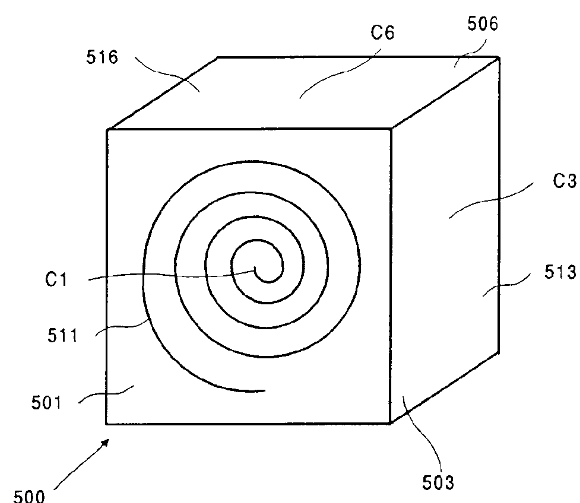


FIG. 5B

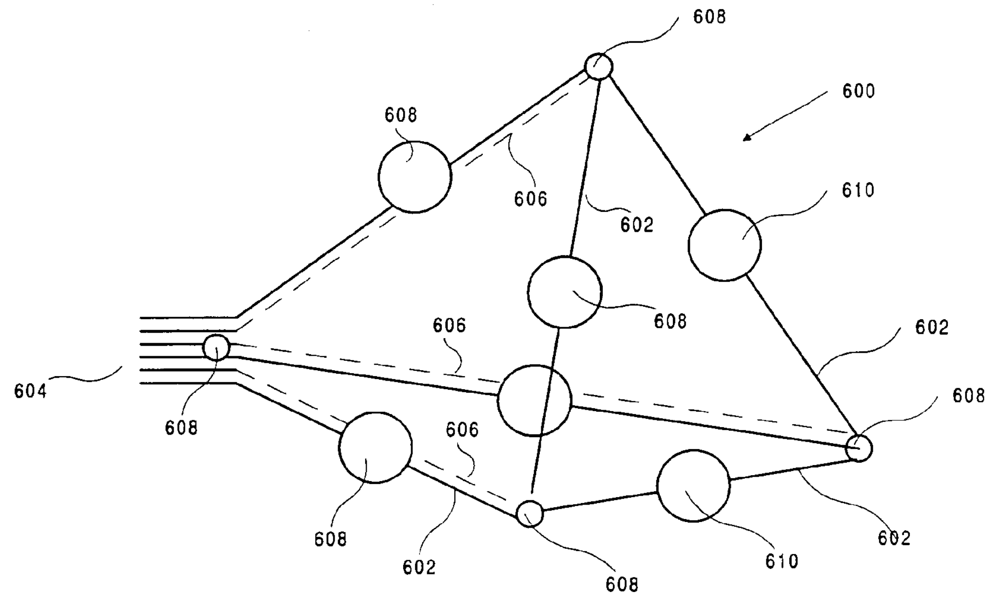

608
600
608
606
602
610
608
606
602
604
608
606
608
608
602
608
610
602

FIG. 6

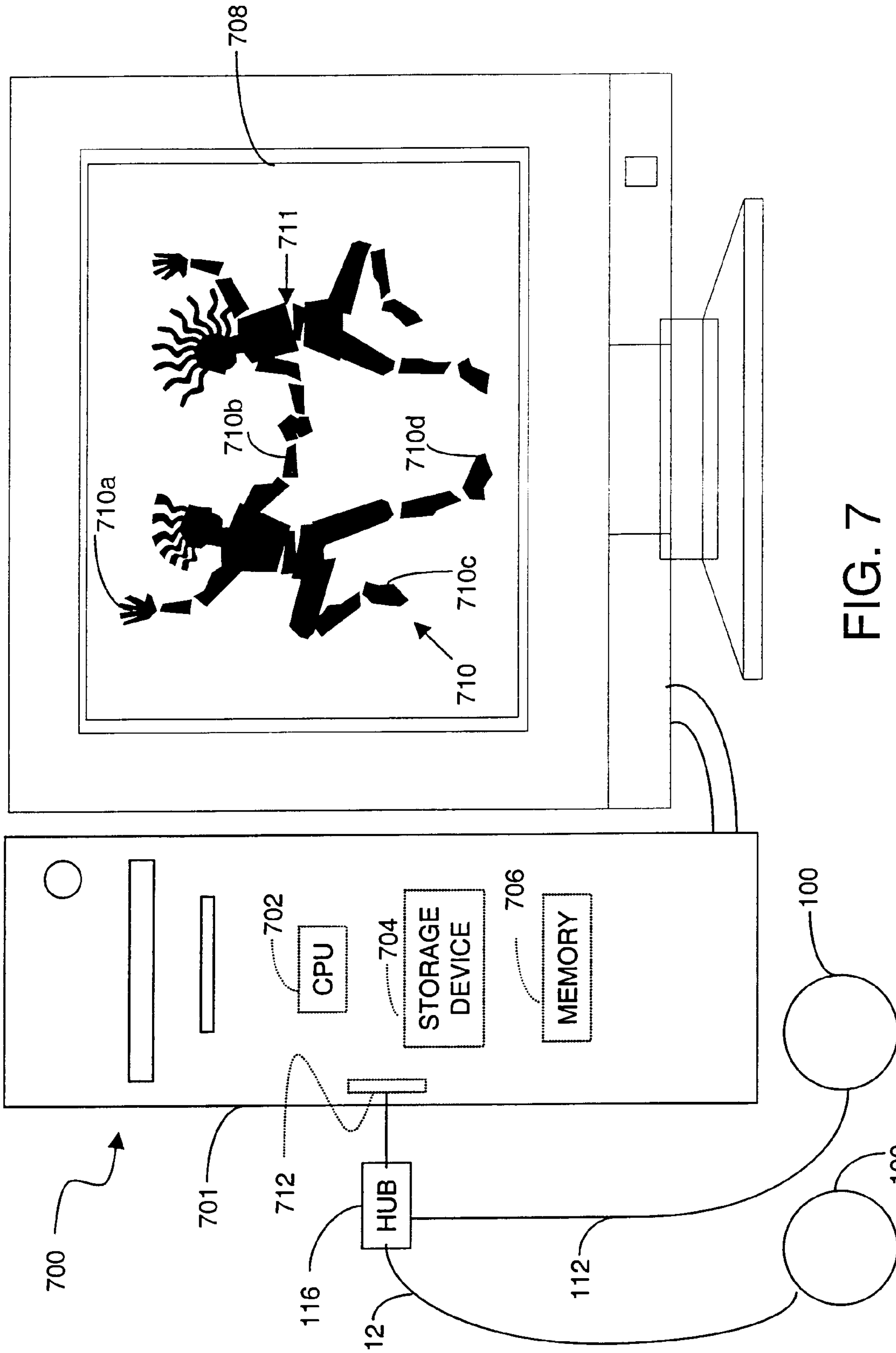

708
711
710a
710b
710d
710c
710
702
CPU
704
STORAGE DEVICE
706
MEMORY
100
100
700
701
712
HUB
116
112
112

FIG. 7

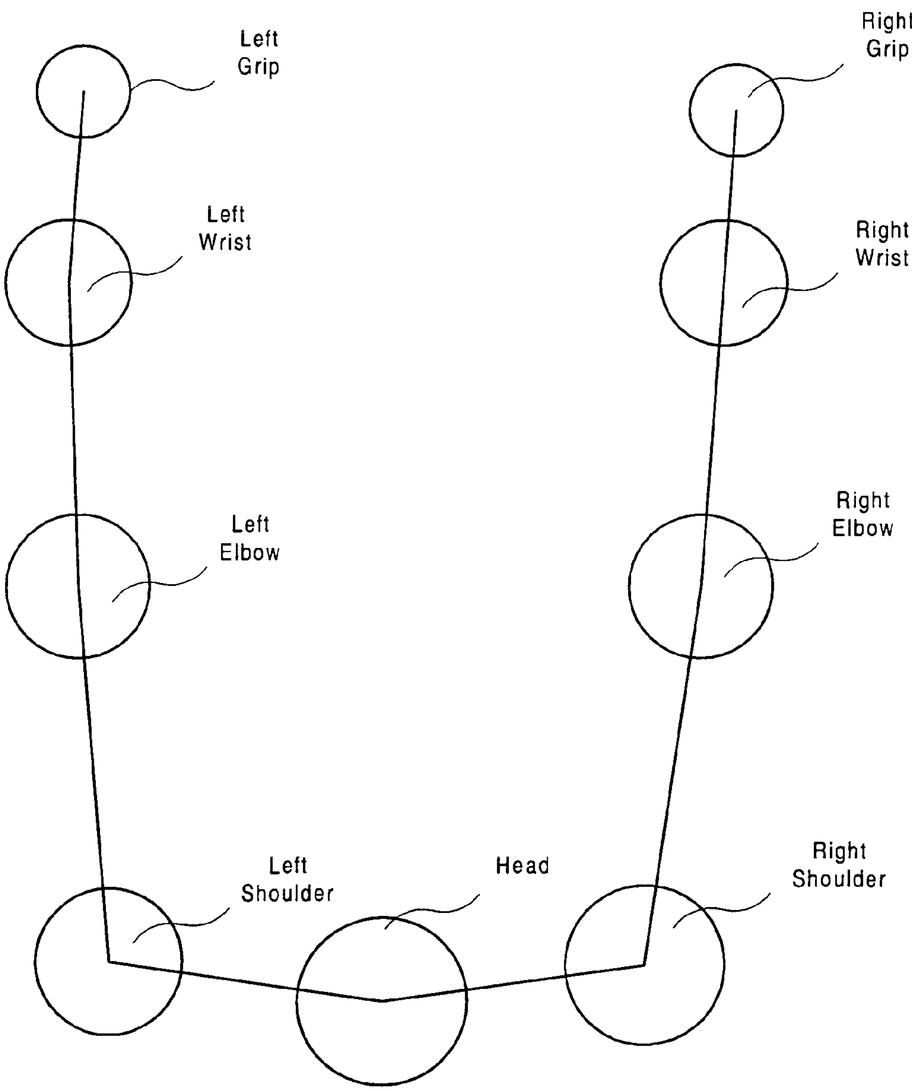

Left
Grip
Right
Grip
Left
Wrist
Right
Wrist
Left
Elbow
Right
Elbow
Left
Shoulder
Head
Right
Shoulder

FIG. 8

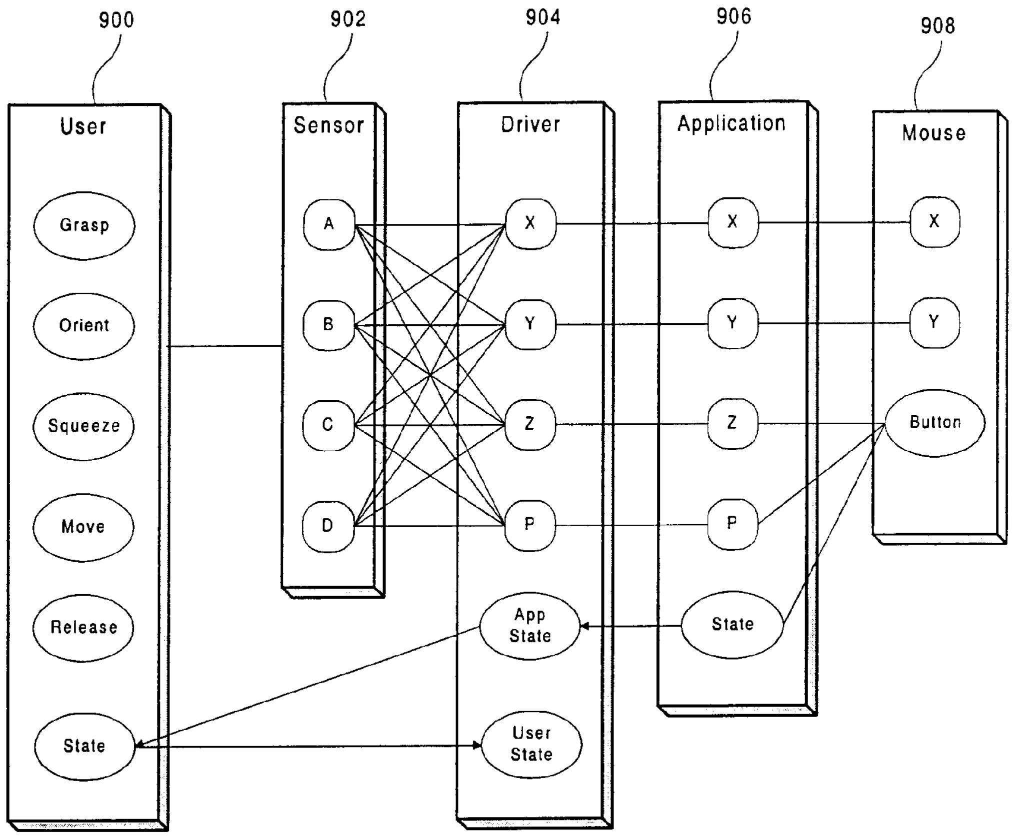

900
902
904
906
908
User
Grasp
Orient
Squeeze
Move
Release
State
Sensor
A
B
C
D
Driver
X
Y
Z
P
App State
User State
Application
X
Y
Z
P
State
Mouse
X
Y
Button

FIG. 9

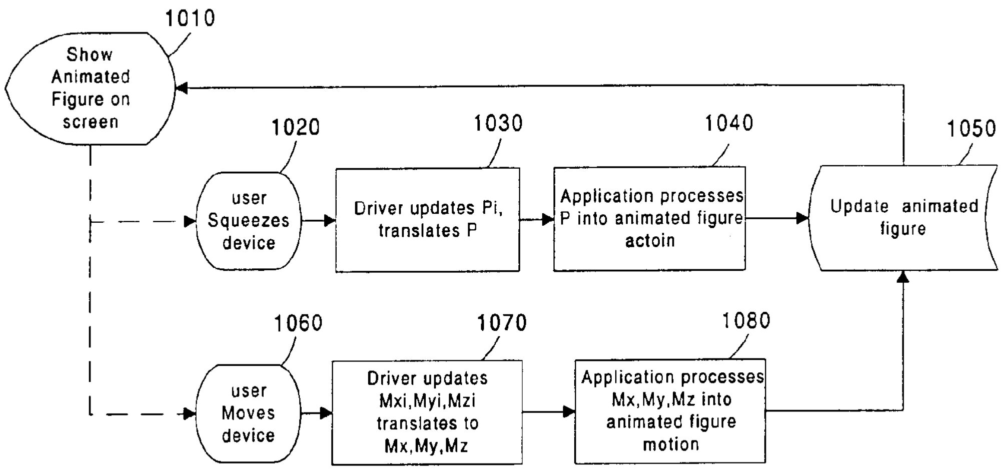

1010
Show Animated Figure on screen
1020
user Squeezes device
1030
Driver updates Pi, translates P
1040
Application processes P into animated figure actoin
1050
Update animated figure
1060
user Moves device
1070
Driver updates Mxi,Myi,Mzi translates to Mx,My,Mz
1080
Application processes Mx,My,Mz into animated figure motion

FIG. 10

FIG. 11

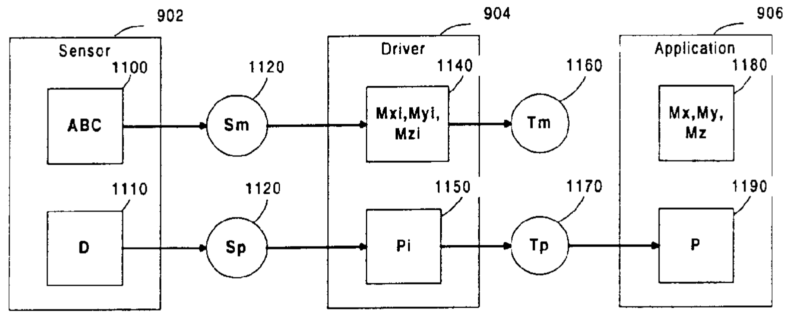


FIG. 12

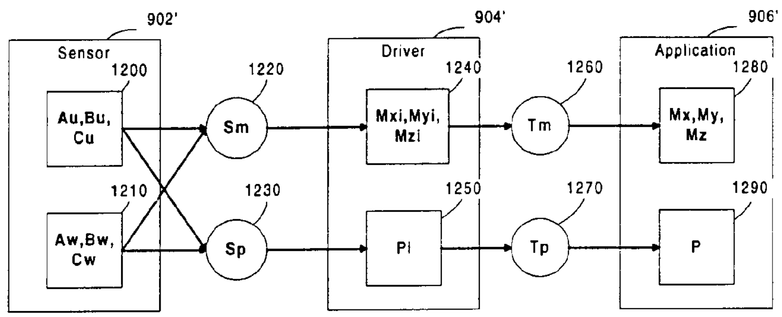
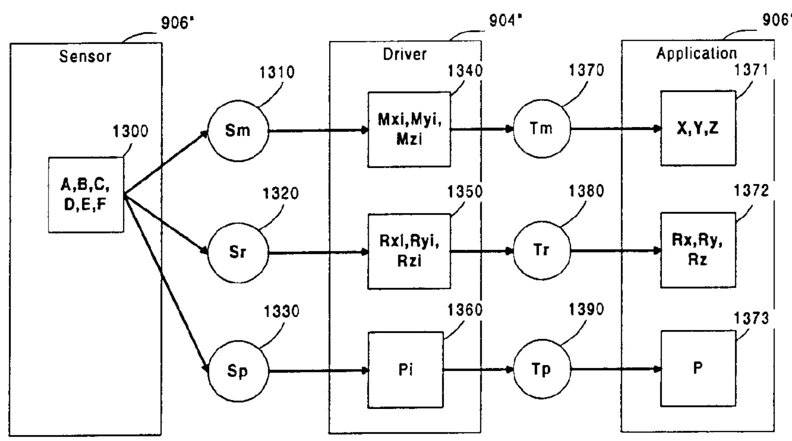


FIG. 13



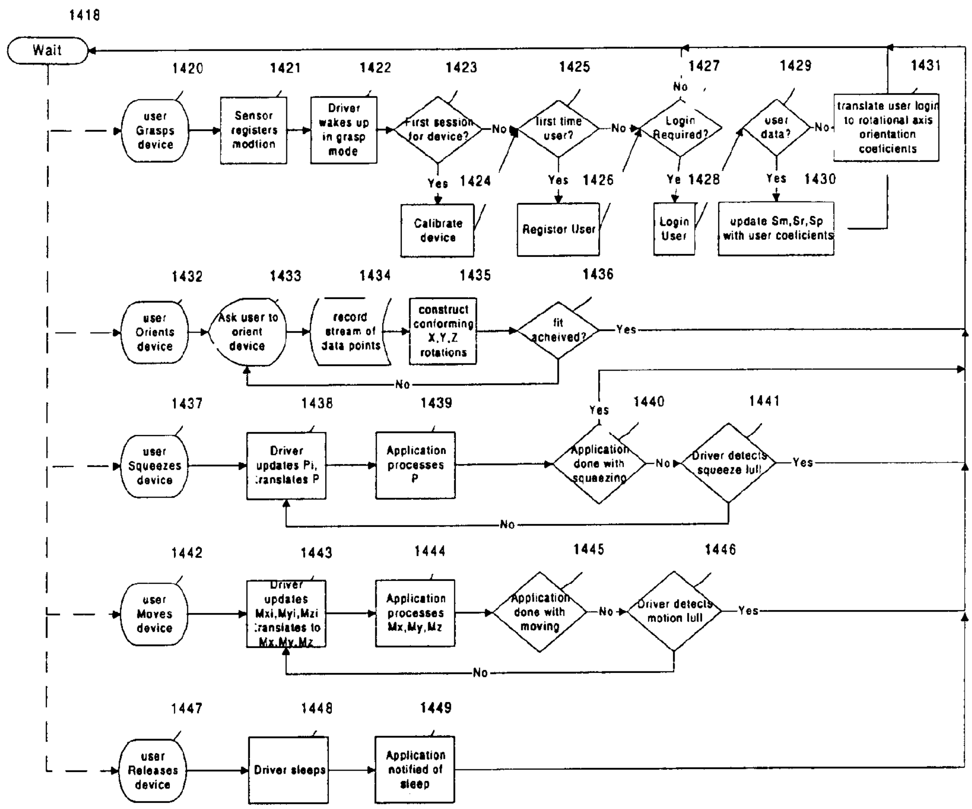

1418
Wait
1420
user Grasps device
1421
Sensor registers modtion
1422
Driver wakes up in grasp mode
1423
First session for device?
No
Yes
1424
Calibrate device
1425
first time user?
No
Yes
1426
Register User
1427
Login Required?
No
Ye
1428
Login User
1429
user data?
No
Yes
1430
update Sm,Sr,Sp with user coeficients
1431
translate user login to rotational axis orientation coeficients
1432
user Orients device
1433
Ask user to orient device
1434
record stream of data points
1435
construct conforming X,Y,Z rotations
1436
fit acheived?
Yes
No
1437
user Squeezes device
1438
Driver updates Pi, translates P
1439
Application processes P
1440
Application done with squeezing
Yes
No
1441
Driver detects squeeze lull
Yes
No
1442
user Moves device
1443
Driver updates Mxi,Myi,Mzi translates to Mx,My,Mz
1444
Application processes Mx,My,Mz
1445
Application done with moving
No
1446
Driver detects motion lull
Yes
No
1447
user Releases device
1448
Driver sleeps
1449
Application notified of sleep

FIG. 14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/10579

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : G09G 5/00
US CL : 345/156
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 345/156, 157, 158, 161, 163; 364/709.11; 273/148

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y ---- A	US 5,703,623 A (HALL et al) 30 December 1997, col. 5, lines 14-38, col.6, lines 44-58, col. 9, lines 20-37.	1-4, 6-14, 16-19, 21-27 -------------- 5, 15, 20
Y ---- A	US 5,757,360 A (NITTA et al) 26 May 1998, col. 5, line 64-col. 6, line 54, col. 7, lines 30-52.	1-4, 6-14, 16-19, 21-27 -------------- 5, 15, 20

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 JUNE 2000	11 JUL 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer SRILAKSHMI KUMAR For Virginia Kagan Telephone No. (703) 306-5575

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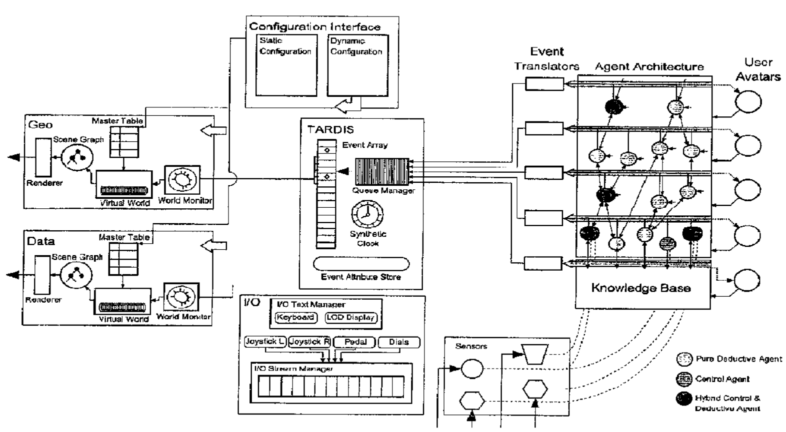
[Continued on next page]

(54) **Title:** AN EVENT HANDLING SYSTEM

Shapes Vector Functional Architecture



(57) **Abstract:** An event handling system to schedule and translate semantic deductions from Intelligent Agents and sensors into events capable of being made observable by a Recepient system such as monitor that provides a particular view of virtual objects and events is desclosed. The event handling system also encapsulates the system's notion of time. In fact, a human observer can schift the system along the temporal axis (up to the present) in order to replay events, or undertake analyses as a result of speeded-up or slowed-down notions of system time. The event handling system receives events from Clients/Sources via connections through the event handling system Input Portals, and uses Shared Memory as its form of inter process communication with the Monitors. The event handling system makes events available for a recipient observation sub-system to read and provide their particular view. There can be many Clients and Recipient systems connected to the event handling system at the same time.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

AN EVENT HANDLING SYSTEM

Part 1 SHAPES VECTOR

1 Shapes Vector Introduction

Shapes Vector is the name given by the inventors to a particular collection of highly versatile but independent systems that can be used to make real world systems observable by a human operator. By providing an observation system the human may be able to detect using one or more of their senses anomalies and the like in the real world system. More particularly, the invention/s disclosed herein are in the field of information observation and management.

To assist the reader, a particular combination of these elements is described in an example. The example is in the field of computer network intrusion detection, network security management and event surveillance in computer networks. It will however be apparent to those skilled in the art that the elements herein described can exist and operate separately and in different fields and combinations to that used in the example.

The different system elements developed by the inventors are the result of the use of several unusual paradigms that while separately make a their contribution also act synergistically to enhance the overall performance and utility of the arrangement they form part of.

An embodiment in the computer network field is used to illustrate an observation paradigm that works with a collection of elements, to provide a near real-time way for observing information infrastructures and data movement. The user (human observer) is provided sophisticated controls and interaction mechanisms that will make it easier for them to detect computer network intrusion and critical security management events in real time as well as allow them to better analyse past events. The user may be computer assisted as will be noted where appropriate. However, as stated previously each of the elements of the system disclosed herein are also capable of being used independently of the other. It is possible for each of them to be used in different combinations, alone or in conjunction with other elements as well as being the precursor for elements not yet created to suit a particular environment or application.

Whilst the Shapes Vector embodiment provided is primarily meant to aid computer intrusion detection, the system and or components of it, can be arranged to suit a variety of other applications, e.g data and knowledge mining, command and control, and macro logistics.

Shapes Vector is a development in which a number of key technologies have been created that include:

• a high-performance *multi-layer observation* facility presenting the user with a semantically dense depiction of the network under consideration. To cater to the individual observational capacities and preferences of user analysts, the specifics of the depiction are highly user-customable and allow use of more than just the users visual and mental skill;

• *a framework for "intelligent agents"*; artificial intelligent software entities which are tasked with co-operatively processing voluminous raw factual observations. The agents can generate a semantically higher-level picture of the network, which incorporates security relevant knowledge explicitly or implicitly contained within the raw input (however, such agents can be used to process other types of knowledge);

• *special user interface hardware* designed especially to support Defensive Information Operations in which several user analysts operate in real-time collaboration (Team-Based Defensive Information Operations).

• an *inferencing strategy* which can coexist with traditional deductive mechanisms. This inferencing strategy can introduce certainty measures for related concepts.

The subject matter of this disclosure is complicated and it is both a hindrance and a necessity to present particular elements of the Shapes Vector system in the same document.

However, it will be apparent to those skilled in the art that each element that makes up the Shapes Vector system is capable of independent existence and operation in different environments.

To reflect to some degree the independence of the elements disclosed, this specification is comprised of different parts that each have their own paragraph numbering but page numbering is consistent with their being included in a single document.

Part 1

Shapes Vector Introduction

Part 2

Shapes Vector Master Architecture and Intelligent Agent Architecture

Part 3

Data View Specification

Part 4

Geo View Specification

Part 5

Tardis (Event Handler) Specification

A detailed index of the various parts and sections is provided on the last pages of the specification to assist random access to the information provided herein or to make cross-referencing simpler.

Part 1 is an overview of the Shapes Vector embodiment that describes a particular environment and discloses in a general way some of the elements that make up the total system. Parts 2, 3, 4 and 5 disclose fundamental aspects of the Intelligent Agent Architecture, Data View, Geo View and the Tardis (Event Handler) specification respectively, terms that will be more familiar once the specification is read and understood.

This patent specification introduces the Shapes Vector system by firstly describing in Sections 1 and 2 of Part 1, the details of its top-level architecture. Included are details of the hardware and software components present in a system presently under construction. Section 3 of Part 1, gives an overview of the first set of observation (some times referred to as visualisation) paradigms, which have been incorporated into the system. Two different views of computer/telecommunications networks are described in this section, both presenting a three-dimensional "cyberspace" but with vastly different approaches to the types of entities modelled in the space and how they are positioned (and dynamically repositioned). Some preliminary comments are offered as to the effectiveness of one of these views, "Geo View", for network defence. "Geo View" is another of those terms that will be better understood after a reading of the document.

A description of the intelligent agent architecture follows in Section 4 of Part 1, including an overview of the multi-layered Shapes Vector Knowledge Architecture (SVKA) plus details of the inferencing strategies. The knowledge processing approach is very general, and is applicable to a wide variety of problems. Sections 5 and 6 of Part 1 describe special techniques employed within the Tardis (Event Handling) system to assist a user analyst to observe the time-varying behaviour of a network. Two principal mechanisms are detailed, Synthetic Strobes and Selective Zoom, along with some hypotheses as to how such mechanisms might be extended to offer even greater flexibility. Section 7 of Part 1 of the patent specification details a comparative analysis of related research and a set of conclusions summarising the broad thrusts of the Shapes Vector system.

More detailed disclosures of these elements of the invention are provided in Parts 2, 3, 4 and 5.

In reading this specification, it should be noted that while some issues are dealt with in detail, the specification is also used to disclose as many of the paradigms and strategies employed as possible, rather than discussing any one paradigm in depth. In an attempt to provide an example of how these paradigms and strategies are used, several new mechanisms for dealing with information in a real-time environment are described in the context of the information security field but in no way are the examples meant to limit the application of the mechanisms revealed.

Observation is a term used in this specification to embody the ability of a human to observe by experience through a variety of their senses. The senses most used by a human user include sight, hearing and touch. In the embodiment and system developed thus far all of those senses have been catered for. However, the term observe is not used in any limiting way. It may become possible for a human's other senses to be used to advantage not only in the scenario of computer system security but others within the realm of the imagination of the designer using the principles and ideas disclosed herein. A human could possibly usefully use their other senses of smell, taste and balance in particular future applications.

In this specification the term clients is used to refer to a source of events based on real and virtual objects operating in the real world and the term monitors is used to refer to one or more recipient systems that make the events observable to a human user.

The following discussion will provide background information relating to the described embodiment of the invention or existing paradigms and strategies and when it does so it is intended purely to facilitate a better understanding of the invention/s disclosed herein. However, it should be appreciated that any discussion of background information is not an acknowledgment or admission that any of that material was published, known or part of the common general knowledge as at the filing date of the application.

2 Architectural Components

2.1 Primary Functional Architecture

At the coarsest level, the Shapes Vector system can be considered to be composed of a series of "macro-objects," shown in Figure 1. These modules interact with one another in various ways: the lines in the figure indicate which objects interact with others. The functions performed by each of these macro-objects and the purpose and meaning of the various inter-object interactions are described in the parts and sections that follow.

2.1.1 Configuration Interface and I/O Sub-system

The Configuration Interface and I/O macro-objects collectively encapsulate all functionality, involving interaction with the user of the Shapes Vector system. They in turn interact with the Display, Tardis (Event Management) and Intelligent Agent macro-objects to carry out the user's request. In addition to being the point of user interaction with the system, this user-interface macro-object also provides the ability to customise this interaction. Refer to Figure 1, which displays the Functional Architecture of Shapes Vector. A user can interactively specify key parameters, which govern the visual and other environments generated by Shapes Vector and the modes of interaction with those environments. Such configurations can be stored and retrieved across sessions allowing for personal customisation.

Individual users can set up multiple configurations for different roles for which they might wish to use the system. Extensive undo/redo capabilities are provided in order to assist with the investigation of desired configurations.

The observation of the Shapes Vector world is user-customable by direct interaction with a structure called the "Master Table" (see Section 3). In this table the user can in one example, associate visual attributes, such as shape, colour and texture, with classes of objects and their security-relevant attributes.

A user interacts with the Shapes Vector system via any number of input and output devices, which may be configured according to each individual user's preferences. The input devices may be configured at a device-specific level, for example by setting the acceleration of a trackball, and at a functional level, by way of further example, by assigning a trackball to steer a visual navigation through a 3-dimensional virtual world representative of a computer network. The Appendix to Part 1 describes the typical user interface hardware presented to a Shapes Vector user.

2.1.2 Sensors

Sensors can take many forms. They can be logical or physical. A typical example would be an Ethernet packet sniffer set to tap raw packets on a network. In another example, the sensor can be the output of a PC located at a remote part of a network, which undertakes pre-processing before sending its readings of itself or the network back to the main Shapes Vector system components. Other examples are Software or

Hardware to capture packets in a digital communication network, to examine the internal or operating state of a computer or to analyse audit records created by a computer of network device. Sensors transmit their data into the level one portion of the Intelligent Agent Gestalt (this term will also have more meaning after further reading of the specification) for further processing. Some of the processing involved could entail massaging of data for Knowledge Base storage, or perhaps simple logical deductions (first order logic facts).

2.1.3 Intelligent Agent Architecture

2.1.3.1 Knowledge Base

The Knowledge object is essentially a knowledge base containing facts about the overall domain of discourse relevant to Shapes Vector. The knowledge is represented in terms of context-free Entities and Relationships, allowing for its efficient storage in a relational database. Entities constitute not only physical devices such as computers and printers, but also logical objects such as files and directories. Each entity possesses a set of security-relevant attributes, which are stored within the knowledge base. For each stored observation of an entity attribute, there is accompanying meta-data that includes the time of discovery, which agent or sensor discovered it and an expiry time for the data. The current knowledge base models several types of inter-entity relationships, including physical connectivity, physical or logical containment, bindings between processors and processes, roles of processes in client-server communications, origin and destination of packet entities, and so on.

2.1.3.2 Intelligent Agents and Ontologies

The Intelligent Agent macro-object encapsulates the artificial intelligence aspects of the Shapes Vector system. It specifically incorporates a (potentially very large) family of intelligent agent, software entities imbued with expert knowledge in some particular domain of discourse over which they may make deductions. Agents within the Shapes Vector systems are arranged into a series of "abstraction layers" or "logical levels" with each agent existing at only one such layer. Agents operate by accepting knowledge of a particular abstraction, possibly from several sources in lower layers, and generating new knowledge of a higher level of abstraction through a deductive process. An agent that resides at layer *n* of the Shapes Vector Knowledge Architecture must receive its input knowledge in the form of assertions in a knowledge representation known as the "Level *n* Shapes Vector ontology". Any deductive product from such an agent is expressed in terms of the (more abstract) "Level n+1 Shapes Vector ontology".

Entities in the Intelligent Agent macro-object can be broken into categories: data-driven entities and goal-driven entities. The former group is characterised by a processing model wherein all possible combinations of input facts are considered with an eye towards generating the maximum set of outputs. A common method employed being forward chaining. Goal-driven entities adhere to a different execution model: given a desirable output, combinations of inputs are considered until that output is indicated, or all combinations are exhausted.

Intelligent Agents and the goals and functionality of the Shapes Vector Knowledge Architecture are covered in more depth in Section 4 of this part of the specification and in Part 2 of the specification.

2.1.4 The Tardis

The Tardis is a real-time event management system. Its task is to schedule and translate the semantic deductions from Intelligent Agents and sensors into events capable of being visualised by the display module or sub-system. The Tardis also encapsulates the Shapes Vector system's notion of time. In fact, the operator can shift the system along the temporal axis (up to the present) in order to replay events, or undertake analyses as a result of speeded-up or slowed-down notions of system time.

2.1.5 Monitor

Monitor preferably renders three-dimensional (3D) views of objects and their interactions in real-time. As can be seen, there are a number of basic views defined all of which can be navigated. Each different view is based on a fundamental visualisation paradigm. For example, Geo View is based on location of virtual objects within a space-time definition, whereas Data View's location of virtual objects within its space is based on the data interaction.

Several reusable modules make up the composition of each view. These include elements such as data structures identifying the shapes, textures, and visual relationships permitted for each class of object, as well as common rendering methods for representing the view's Universe.

The paradigms for some of the views are discussed in more detail in later sections. It will be appreciated that the visualisation paradigms are in fact specific embodiments of the observational requirement of the system, wherein a human user can use one or more of their senses to receive information, that could include aural and haptic interaction.

2.2 The Hardware

In a preferred embodiment of this invention, the hardware architecture of the Shapes Vector system consists of a primary server equipped with a powerful computational engine and high-performance 3D graphics capabilities, a database server, a dedicated 100BaseT Ethernet network, one PC with specialised 3D audio hardware, and one PC with user input devices attached. A preferred configuration is shown schematically in Figure 2.

The preferred observational environment of the Shapes Vector world can be rendered in 3D stereo to provide aural information and preferably viewed using Crystal Eyes ™ shutter glasses synchronised to the display to provide purely visual information. Crystal Eyes ™ was chosen for visualisation, as this product allows the user to be immersed in a 3D world on a large screen while still permitting real world interaction with fellow team-members and the undertaking of associated tasks, e.g. writing with a pencil and pad, that are features not available with head-mounted displays.

In addition to 3D graphics capabilities, there is a sound rendering board, which is used to generate multi-channel real-time 3D audio. Both the 3D graphics and sound rendering board make use of head tracking information in producing their output. The graphics renderer makes use of tracking information to alter the perspective of the displayed world so that the user experiences the effect of moving around a fixed virtual world. The sound renderer makes use of head movement tracking information to alter the sound-scape so that the user also experiences the effect of moving around in a fixed world with relevant sounds. That is, where a particular sound source will be perceived to be coming from the same fixed place irrespective of the users head movement. The perception of direction in 3D sound is enhanced by the ability to turn one's head and listen. For instance, it is often difficult to determine whether a sound is coming from in front or behind without twisting one's head slightly and listening to determine in which ear a sound is received first or loudest. These perceptive abilities are second nature to humans and utilisation of them is a useful enhancement of the information presentation capabilities of Shapes Vector.

A joystick and rudder pedals preferably provide the primary means of navigation in the 3D world. User input to the system is to be provided primarily through the touch screen and via voice recognition software running on a PC. Haptic actuators are realisable using audio components to provide a feeling of say roughness as the user navigates over a portion of the virtual world. Many other actuators are possible depending on the degree of feedback and altering required by the user.

The initial prototype of Shapes Vector had the user input/output devices connected to a workstation or PC with software connecting the remote peripherals with the User Interface proper. The layout of the Shapes Vector workstation (ie, the physical arrangement of the user interface hardware) will vary depending upon the operational role and the requirements of individual users, as described in the Appendix to Part 1 of the specifcation.

2.3 System Software

In the embodiment described herein Shapes Vector is implemented as a distributed system with individual software components that communicate between each other via TCP/IP sockets. A simple custom protocol exists for encoding inter-process communication. To limit performance degradation due to complex operating system interaction, the system processes are used only for relatively long-lived elements of control (e.g. the knowledge base server, or an intelligent agent). Shorter-lived control is implemented through threads.

Figure 3 indicates where the primary software modules will be running in the initial system as well as a schematic of the hardware modules they are associated with. While most of the implementation of the Shapes Vector system has been custom-coded, the system does make use of a number of different software technologies to supply service functionality. Intelligent Agents make extensive use of NASA's CLIPS system as a forward chaining engine, and also use Quintus Prolog ™ to implement backward chaining elements. Additionally, the knowledge base and its associated servers are preferably implemented using the Oracle ™ relational database management system.

The graphics engine of the Display macro-object is preferably built upon an in-house C++ implementation of the Java 3D API and utilises OpenGL ™ for the low-level rendering. The User Interface elements are built using Sun Visual Workshop ™ to produce X Windows Motif ™ GUI elements.

3 The "Classical" Visualisation Paradigm

The classical visualisation paradigm refers to methods that are derived from mechanisms such as geographic layout, and relatively static rules for objects. While some may not regard what is described here as entirely "classical", it serves to distinguish some of the visualisation methods from the relatively more "bizarre" and therefore potentially more interesting visualisation paradigms described in this specification.

Using by way of example information security as the environment to be modelled and observed the fundamental basis of the classical visualisation paradigm is to associate a security-relevant attribute with a visual entity or a visual property of an entity, eg. shape, colour, or texture.

A Shapes Vector hypothesis is that any visualisation paradigm is not only "sensitive" to its application, ie. some paradigms are better suited to specific classes of application, but that the implementation of the paradigm is sensitive to the specific user. It is thus claimed that not only should a visualisation system be customable to take into account the type of application, but also it must have highly customable features to take into account individual requirements and idiosyncrasies of the observer. That is, the customisability of the system is very fine-grained.

In fine grained customable systems, it is important that journal records and roll-back facilities are available in the certain knowledge that users will make so many changes that they will "lose" their way and not be sure how to return to a visual setting they find more optimal than the one they are currently employing.

In an embodiment, users can associate attributes to shapes, colour, texture, etc. via manipulation of a master table, which describes all visual entities (with security-relevant attributes) the system is able to monitor. This table contains user-customable definitions for shapes, colours, and textures employed in the visualisation of the entity. For example, the security attribute "read enable" can be associated with different colours, transparencies or textures. Part of the essence of Shapes Vector involves utilising the visualisation process as a method for users to divine (via inductive inference) patterns in the "security cyberspace". These patterns have an attached semantic. Typically, we expect users to note anomalies from the myriad system activities that represent authorised use of the system. Given these anomalies, the user will be able to examine them more closely via visualisation, or bring into play a set of Intelligent Agents to aid an in depth analysis by undertaking deductive inference.

Not withstanding the above, there is also a semantic gap between what an Intelligent Agent can deduce and what a user can discern using their senses. The approach in this embodiment is based on the hypothesis that in most cases the observational interface element will be employed for highlighting macro matters, while the agents will focus on micro matters. These micro deductions can be fed to the visualisation engine so that a user can observe potential overall state changes in a system, thereby permitting a user to oversee and correlate events in very large networks.

3.1 Geo View

Geo View is perhaps the most classical of the visualisation paradigms. Its basis is a two dimensional plane located in three-dimensional space. The plane represents the traditional geographic plane: location in the virtual plane represents the physical location of objects. Figure 4 is a depiction of a small network where the primary points of interest involve a set of computers and the data that is flowing between them. The sizes, shape, and texture of objects all carry an associated semantic. The double pyramid shapes with a third pyramid embedded at the top are representative of computers with network interfaces. Also quite visible is the packet flow between the computers in the star network. Although not explained here, to the trained eye the start of a telnet session, some web traffic, as well as X Windows elements is also represented.

The Shapes Vector system permits a user to select classes of objects and render them above the plane. In fact it is possible to render different classes of objects at different levels above or below the geographic base plane. This rendering tactic allows a user to focus on objects of interest without losing them in the context of the overall system. This "selective zoom" facility is described further in Section 5.2 of this part.

Figure 5 depicts a scene inside a machine object. In this view, two processors each with several processes are depicted. In an animated view of this scene the amount of processing power each of the processes is consuming is represented by their rate of rotation. Again, the size, texture, and specific aspects of their shape can and are used to depict various semantics.

The transparent cube depicts a readable directory in which is contained a number of files of various types.

In addition to the visualisation of various objects, the human observer can attach sounds and possibly haptic characteristics to objects. In particular, the system is capable of compiling a "sound signature" for an object (e.g. a process) and plays the resulting sound through speakers or headphones. This facility is quite powerful when detecting event changes that may have security significance. Indeed, in a concept demonstrator, a change in the code space of a process causes a distinct change in its sound. This alerts the user when listening to a process (e.g. printer daemon) with a well-known characteristic sound that something is not quite right. By inspecting the process visually, further confirmation can be forthcoming by noting that its characteristic appearance, e.g. colour, has changed. The use of haptic attributes can also be advantageous in certain circumstances.

One of the major issues that arise out of Geo View other than the basic geographic location of nodes, is the structural relationship of objects contained in a node. For example, how does one depict the structural relationship of files? Figure 5 gives some indication of a preferred view in a directory containing files and possibly further directories is rendered in a particular way. In a system such as UNIX, there is an well-understood tree structure inherent in its file system. In other operating systems, the structure is not so precise. In the description so far, Geo View still lacks a level of structural integrity, but it must be realised that any further structure, which is imposed, may invalidate the use of the view for various applications or specific user requirements.

Shapes Vector avoids some of the problems posed above by providing a further level of customisation by permitting a user to specify the structural relationship between classes of objects from a predetermined list (e.g. tree, ring). A run-time parser has been constructed to ensure that any structural specification must satisfy certain constraints, which guarantee that "nonsensical", or circular relationships, which are impossible to display, are not introduced.

1. Geo View is a three-dimensional virtual universe in which a real-world or virtual object may be represented by one or more virtual objects whose visual attributes are derived from attributes of the real-world object via a flexible user-specifiable mapping (called herein a "Master Table"). The placement of virtual objects typically having a shape within the universe is governed by the absolute or relative geographical location of the real-world object, and also by a flexible set of user-specified layout rules. Layout rules permit the specification of a structured layout for groups of shapes whose real-world objects and virtual objects have some commonality. The list of structures includes, but is not limited to linear, grids, star, ring and graph.
2. Changes to the visual attributes of shapes (e.g., size or height above a plane) may be made dynamically by a user (human observer). Such changes may be applied to all shapes in the universe or to those which match user-specified criteria. This facility is termed herein "Selective Zoom".
3. The user may configure Audio cues (sounds and/ or voices) to denote the attributes of represented objects (through a Master-Table configuration), or to denote the occurrence of a real-world event. Such cues may be associated with a point in three-dimensional space (i.e., positional sound), or they may be ambient.
4. The representation of real-world objects with rapidly time-changing attributes may be simplified by the use of Synthetic Strobes, flexible user-specified filters which shift changes in the visual attributes of a shape from one time-domain to another. Synthetic Strobes may be applied across the entire universe or selectively according to a flexible user-specification. Such strobes may also be used to shift slow changes in the attributes of a shape into a faster domain (e.g., so that a human may perceive patterns in very slowly altering real-world objects).
5. A user may select shapes within a Geo View universe (either interactively or by a flexible user-specified condition) and choose to have the corresponding set of

shapes in another view (e.g., a Data View or a different Geo View) highlighted in a visual manner. The specification of the condition defining correspondence of shapes between universes may be made in a flexible user-defined fashion.

A user may also specify structural arrangements to be used by Geo View in its layout functions. For example, "located-in", "in-between", and "attached-to" are some of the operators available. These allow a flexible layout of shapes and objects preserving user required properties without requiring specific coordinates being supplied for all objects.

3.2 Data View

A problem with Geo View is that important events can be missed if heavily interacting objects or important events are geographically dispersed and not sufficiently noticeable. In Section 5 of this part, we discuss mechanisms that can be utilised to avoid this problem in some circumstances. However, in this section we describe a preferred view that is also intended to address parts of this problem. Parts 3 and 4 of the specification provides a more detailed account of this approach.

Geo View has its roots in depicting actions and events that have physical devices and their location as an overriding theme. Of course logical entities are shown, but again they have a geographic theme. Data View, as its name suggests, is intended to provide a view where the basic paradigm is simply one of data driven events (eg. byte transfer) rather than geographic location. Heavily interacting objects, eg. producers and consumers of data, can be depicted as being located "close together". Unlike Geo View, where the location of an object tends to be relatively static during its lifetime (copying of files is simply a special case of bringing a new object into existence) interaction and data transfer between objects in Data View may be more dynamic. Thus, the location of objects is expected to be more dynamic. Therefore, rules are preferred so as to define the layout of objects not only from the perspective of whether interaction occurred, but also the amount of interaction, and the rate of interaction.

It is intended in a preferred embodiment to utilise Newtonian celestial mechanics and model interaction as forces on the interaction of objects as fundamental rules for the data view layout.

Each object has a mass that is based on its "size" (size is user defined eg. the size of a file or code in a process). User defined interaction between objects causes the equivalent of an electric charge to build. This charge is attractive, whereas "gravity" resulting from mass is repulsive. The build-up of charge tends to negate the force of gravity thereby causing objects to move closer together until some form of equilibrium is reached. Of course we need to adjust the basic Coulomb and Newton's laws in order for the forces to balance appropriately. To do so, we are lead to set axiomatically several calibration points. That is, we must decide axiomatically some equilibrium points; e.g. two objects of identical mass are in equilibrium *X* units apart with *Y* bytes per second flowing between them. Without these calibration points, the distance and motion of the objects may not provide optimal viewing. Further to this requirement, it can be inferred that the force formulae must be open to tinkering on a per user basis in order to permit each user to highlight specific interactions based on higher semantics related to the user's security mission. A further rule, which is preferred in this embodiment, is the rate of "decay" of charge on an object. Otherwise, interacting objects will simply move closer and closer together over time. This may be appropriate for some types of visual depiction for a user, but not for others. For example, retained charge is useful for a user to examine accumulative interaction over a time slice, but charge decay is a useful rule when examining interaction rates over a given time period.

The interaction mechanism described herein serves to indicate the basis for interaction between objects and their location in space to provide visual depiction of objects and their clusters for examination by a user in order to arrive at inductive hypotheses.

Figure 6 shows how Data View might visualise a collection of data-oriented objects (eg. files and/or servers) which interact with one another to varying degrees. Despite using proximity to show whether an object is interacting with another, further visual mechanisms are needed for the user to be able to analyse the type of data interaction, and the current state of affairs of interaction within a specified time slice. Hence we still need visual markers which directly link one object to another, for example an open socket connection between two processes, which actually has data in transit. These objects could initially be very far apart due to previous low interaction status. However, since they are now interacting a specific connection marker may be needed to highlight this fact. Given the type of interaction, the force formulae may be adjusted so as to provide a stronger effect of interaction. However, this mechanism is restricted to classes of objects and the interaction type, whereas the user may be particularly interested in interaction between two particular object instances. Hence a visual marker link would be more appropriate. Yet, one can imagine the complexity of a view if all markers are shown simultaneously. Hence actual connection lines, their size, shape, colour, motion and location, may be switched on and off via a set of defined criteria.

As for Geo View, Data View in its preferred embodiment, will come with its own Master Table describing shapes and textures for various attributes, as well as an input mechanism to describe relationships between objects based on a series of interaction possibilities. The objects presented in Data View may in some cases be quite different from those found in Geo View, while in other cases they will be similar or identical. Clearly the defining difference lies in the fact that Data View's Master Table will focus less on physical entities and more closely on logical entities and data driven events.

Thus the preferred main features of Data View are as follows:

1. A set of one or more two-dimensional virtual universes in which a real-world object may be represented by one or more shapes whose visual attributes are derived from attributes of the real-world object via a flexible user-specifiable mapping (called a "Master Table"). In one embodiment each universe is represented as a disc in a plane. The placement of a shape within a universe is governed by degree of interaction between the represented object and other objects represented in that universe. As an alternative, the view may be constructed as a set of one or more three-dimensional virtual universes with similar properties.
2. Interaction between a pair of real-world objects causes the pair of shapes that represent them to be mutually attracted. The magnitude of this force is mathematically derived from the level of interaction. Real world Objects which interact are furthermore mutually repelled by a "gravitational force", the magnitude of which is derived from attributes of the real-world objects in a flexible user-specified manner. In one embodiment all forces are computed as vectors in the plane of the universe. The velocity of a shape in the universe is proportional to the vector sum of the forces applied to the shape (i.e., in this embodiment there is no concept of acceleration).
3. Shapes within a universe may be tagged with what is termed herein a "flavor" if their real-world object's attributes match a flexible user-specified condition associated with that flavor. A pair of shapes may only attract or repel one another if they share one or more flavors.
4. Each shape within a universe maintains an explicit list of other shapes it "interacts" with. A pair of shapes may only attract or repel one another if each is in the interaction set of the other.
5. Each shape within a universe may have a "radius of influence" associated with it, a user-specified region of the universe surrounding the shape. A shape may only exert a force onto another shape if the latter is within the radius of influence of the former. The radius of influence of a shape may be displayed

visually. The selection of which shapes in the universe have radii of influence, and which of those radii should be displayed, may be either universal or by means of a flexible user-specified condition.

6. Each shape within a universe may optionally be visually linked to one or more shapes in a different universe by a "Marker" which represents a relationship between the real-world objects represented by the shapes. The selection of which shapes in which universes should be so linked is by means of a flexible user-specified condition.

7. Changes to the visual attributes of shapes (e.g., size or height above a plane) may be made dynamically by a user. Such changes may be applied to all shapes in the universe or to those which match user-specified criteria. This facility is termed "Selective Zoom".

8. The user may configure Audio cues (sounds and/or voices) to denote the attributes of represented objects, or to denote the occurrence of a real-world event. Such cues may be associated with a point in three-dimensional space, or they may be ambient.

9. The representation of real-world objects with rapidly time-changing attributes may be simplified by the use of Synthetic Strobes, flexible user-specified filters which shift changes in the visual attributes of a shape from one time-domain to another. Synthetic Strobes may be applied across the entire universe or selectively according to a flexible user-specification. Such strobes may also be used to shift slow changes in the attributes of a shape into a faster domain (e.g., so that a human may perceive patterns in very slowly altering real-world objects).

10. A user may select shapes within a Data View universe (either interactively or by a flexible user-specified condition) and choose to have the corresponding set of shapes in another view (e.g., a Geo View or a different Data View) highlighted in a visual manner. The specification of the condition defining

correspondence of shapes between universes may be made in a flexible user-defined fashion.

4 Intelligent Agents

Shapes Vector can utilise large numbers of Intelligent Agents (IA's), with different domains of discourse. These agents make inferences and pass knowledge to one another in order to arrive at a set of deductions that permit a user to make higher level hypotheses.

4.1 Agent Architecture

In order to achieve knowledge transfer between agents which is both consistent and sound, ontology becomes imperative. The task of constructing a comprehensive ontology capable of expressing all of the various types of shapes is non-trivial. The principal complication comes from the fact that the structural elements of the ontology must be capable of covering a range of knowledge ranging from the very concrete, through layers of abstraction and ultimately to very high-level meta-knowledge. The design of a suite of ontological structures to cover such a broad semantic range is problematic: it is unlikely to produce a tidy set of universal rules, and far more prone to produce a complex family of inter-related concepts with *ad hoc* exceptions. More likely, due to the total domain of discourse being so broad, ontology produced in this manner will be extremely context sensitive, leading to many possibilities for introducing ambiguities and contradictions.

To simplify the problem of knowledge representation to a point where it becomes tractable, the Shapes Vector system chooses to define a semantic layering of its knowledge-based elements. Figure 7 shows the basic structure of this knowledge architecture and thus the primary architecture of the set of Intelligent Agent's (AI's). At the very bottom of the hierarchy are factual elements, relatively concrete observations about the real world (global knowledge base). Factual element can draw upon by the next layer of knowledge elements: the simple intelligent agents. The communication of factual knowledge to these simple knowledge-based entities is by means of a simple ontology of facts (called the Level 1 Shapes Vector ontology). It is worthwhile noting that the knowledge domain defined by this ontology is quite rigidly limited to incorporate only a universe of facts -- no higher-level concepts or meta-concepts are expressible in this ontology. This simplified knowledge domain is uniform enough that a reasonably clean set of ontological primitives can provide a concise description. Also, an agent may not communicate with any "peers" in its own layer. It must communicate with a higher agent employing higher abstraction layer ontology. These higher agents may of course then communicate with a "lower agent". This rule further removes the chance of ambiguity and ontology complexities by forcing consistent domain restricted Ontologies.

An immediate and highly desirable consequence of placing these constraints on the knowledge base is that it becomes possible to represent knowledge as context free relations. Hence the use of relational database technology in storage and management of knowledge becomes possible. Thus, for simple selection and filtering procedures on the knowledge base we can utilise well known commercial mechanisms which have been optimised over a number years rather than having to build a custom knowledge processor inside each intelligent agent. Note that we are not suggesting that knowledge processing and retrieval is not required in an IA, but rather that by specifying certain requirements in a relational calculus (SQL preferably), the database engine assists us by undertaking a filtering process when presenting a view for processing by the IA. Hence the IA can potentially reap considerable benefits by only having to process the (considerably smaller) subset of the knowledge base which is relevant to the IA. This approach becomes even more appealing when we consider that the implementation of choice for Intelligent Agents is typically a logic language such as Prolog. Such environments may incur significant processing delays due to the heavy stack based nature of processing on modern Von Neumann architectures. However, by undertaking early filtering processes using optimised relational engines and a simple knowledge structure, we can minimise the total amount of data that is input into potentially time-consuming tree and stack based computational models.

The placement of intelligent agents within the various layers of the knowledge hierarchy is decided based upon the abstractions embodied within the agent and the knowledge transforms provided by the agent. Two criteria are considered in determining whether a placement at layer *n* is appropriate:

• would the agent be context sensitive in the level *n* ontology? If so, it should be split into two or more agents.

• does the agent perform data fusion from one or more entities at level n? If so, it must be promoted to at least level *n+1* (to adhere to the requirement of no "horizontal" interaction)

Further discussion on intelligent agents and ontological issues can be found elsewhere in the specification.

4.2 Inferencing Strategies

The fundamental inferencing strategy underlying Shapes Vector is to leave inductive inferencing as the province of the (human) user and deductive inferencing as typically the province of the IA's. It is expected that a user of the system will examine deductive inferences generated by a set of IA's, coupled with visualisation, in order to arrive at an inductive hypothesis. This separation of duties markedly simplifies the implementation strategies of the agents themselves. Nevertheless, we propose further aspects that may produce a very powerful inferencing system.

4.2.1 Traditional

Rule based agents can employ either forward chaining or backward chaining, depending on the role they are required to fulfil. For example, some agents continuously comb their views of the knowledge base in attempts to form current, up to date, deductions that are as "high level" as possible. These agents employ forward chaining and typically inhabit the lower layers of the agent architecture. Forward chaining agents also may have data stream inputs from low level "sensors". Based on these and other inputs, as well as a set of input priorities, these agents work to generate warnings when certain security-significant deductions become true. Another set of agents within the Shapes Vector system will be backward chaining (goal driven) agents. These typically form part of the "User Avatar Set": a collection of knowledge elements which attempt to either prove or disprove user queries.

4.2.2 Vectors

While the traditional approach to inferencing is sufficient for simple IA's which deal principally in the domain of concrete fact, it is less suitable for agents (typically from higher layers) which must deal with uncertain and/or incomplete information. Typically, such agents operate in a more continuous knowledge domain than that underlying rule-based deductive inferencing, and as such are not easily expressed in either a purely traditional forward or backward chaining paradigm. For these higher level agents, we instead make use in this embodiment of an alternative inferencing strategy based upon notions of vector algebra in a multi-dimensional semantic space. This alternative strategy is employed in conjunction with more conventional backward chaining techniques. The use of each of the paradigms is dependent on the agent, and the domain of discourse.

Our vector-based approach to inferencing revolves around constructing an abstract space in which relevant facts and deductions may be represented by geometrical analogues (such as points and vectors), with the proper algebraic relationships holding true. In general, the construction of such a space for a large knowledge domain is extremely difficult. For Shapes Vector, we adopt a simplifying strategy of constructing several distinct deductive spaces, each limited to the (relatively small) domain of discourse of a single intelligent agent. The approach is empirical and is only feasible if each agent is restricted to a very small domain of knowledge so that construction of its space is not overly complex.

The definition of the deductive space for an IA is a methodical and analytical process undertaken during the design of the agent itself. It involves a consideration of the set of semantic concepts ("nouns") which are relevant to the agent, and across which the agent's deductions operate. Typically this concept set will contain elements of the agent's layer ontology as well as nouns which are meaningful only within the agent itself. Once the agent's concept set has been discovered, we can identify within it a subset of 'base nouns' -- concepts which cannot be defined in terms of other members of the set (This identification is undertaken with reference to a semi-formal 'connotation spectrum' (a comparative metric for ontological concepts).

Such nouns have two important properties:

- each is semantically orthogonal to every other base noun, and
- every member of the concept set which is not a base noun can be described as a combination of two or more base nouns.

Collectively, an IA's set of *n* base nouns defines an n-dimensional semantic space (in which each base noun describes an axis). Deductions relevant to the agent constitute points within this space; the volume bounded by spatial points for the full set of agent deductions represents the sub-space of possible outputs from that agent. A rich set of broad-reaching deductions leads to a large volume of the space being covered by the agent, while a limited deduction set results in a very narrow agent of more limited utility (but easier to construct). Our present approach to populating the deductive space is purely empirical, driven by human expert knowledge. The onus is thus upon the designer of the IA to generate a set of deductions, which (ideally) populate the space in a uniform manner. In reality, the set of deductions which inhabit the space can get become quite non-uniform ("clumpy") given this empirical approach. Hence rigorous constraint on the domain covered by an agent is entirely appropriate. Of course this strategy requires an appropriate mechanism at a higher abstract layer. However, the population of a higher layer agent can utilise the agents below them in a behavioural manner thereby treating them as sub-spaces.

Once an agent's deductive space has been constructed and populated with deductions (points), it may be used to draw inferences from observed facts. This is achieved by representing all available and relevant facts as vectors in the multi-dimensional semantic space and considering how these vectors are located with respect to deduction points or volumes. A set of fact vectors, when added using vector algebra may precisely reach a deduction point in the space. In that situation, a deductive inference is implied. Alternatively, even in the situation where no vectors or combinations of vectors precisely inhabits a deduction point, more uncertain reasoning can be performed using mechanisms such as distance metrics. For example, it may be implied that a vector, which is "close enough" to a deduction point, is a weak indicator of that deduction. Furthermore, in the face of partial data, vector techniques may be used to hone in on inferences by identifying facts (vectors), currently not asserted, which would allow for some significant deduction to be drawn. Such a situation may indicate that the system should perhaps direct extra resources towards discovering the existence (or otherwise) of a key fact.

The actual inferencing mechanism to be used within higher-level Shapes Vector agents is slightly more flexible than the scheme we have described above. Rather than simply tying facts to vectors defined in terms of the IA's base nouns, we instead define an independent but spatially continuous 'fact space'. Figure 8 demonstrates the concept: a deductive space has been defined in terms of a set of base nouns relevant to the IA. Occupying the same spatial region is a fact space, whose axes are derived from the agent's layer ontology. Facts are defined as vectors in this second space: that is, they are entities fixed with respect to the fact axes. However, since the fact space and deduction space overlap, these fact vectors also occupy a location with respect to the base noun axes. It is this location which we use to make deductive inferences based upon fact vectors. Thus, in the figure, the existence of a fact vector (arrow) close to one of the deductions (dots) may allow for assertion of that deduction with a particular certainty value (a function of exactly how close the vector is to the deduction point). Note that, since the axes of the fact space are independent of the axes of the deductive space, it is possible for the former to vary (shift, rotate and/or translate, perhaps independently) with respect to the latter. If such a variation occurs, fact vectors (fixed with regard to the fact axes) will have different end-points in deduction-space. Therefore, after such a relative change in axes, a different set of deductions may be inferred with different confidence ratings. This mechanism of semantic relativity may potentially be a powerful tool for performing deductive inferencing in a dynamically changing environment.

An interesting aspect of our approach to vector-based deductive inference is that it is based fundamentally upon ontological concepts, which can in turn be expressed as English nouns. This has the effect that the deductions made by an agent will resemble simple sentences in a very small dialect of pseudo-English. This language may be a useful medium for a human to interact with the agent in a relatively natural fashion.

While the inferencing strategy described above has some unorthodox elements in its approach to time-varying probabilistic reasoning for security applications, there are more conventional methods which may be used within Shapes Vector IA's in the instance that the method falls short of its expected deductive potential.

As described above, the vector-based deductive engine is able to make weak assertions of a deduction with an associated certainty value (based on distances in n-Dimensional space). This value can be interpreted in a variety of ways to achieve different flavours of deductive logic. For example, the certainty value could potentially be interpreted as a probability of the assertion holding true, derived from a consideration of the current context and encoded world knowledge. Such an interpretation delivers a true probabilistic reasoning system. Alternatively, we could potentially consider a more rudimentary interpretation wherein we consider assertions with a certainty above a particular threshold (e.g. 0.5) to be "possible" within a given context. Under these circumstances, the system would deliver a possiblistic form of reasoning. Numerous other interpretations are also possible.

Frame based systems offer one well understood (although inherently limited) alternative paradigm. Indeed, it is expected that some IA's will be frame based in any case (obtained off the shelf and equipped with an ontological interface to permit knowledge transfer with the knowledge base).

Other agents based on neural nets, Bayesian, or statistical profiling may also inhabit the Agent macro-object.

4.3 Other Applications

The IA architecture lends itself to other applications. For example, it is not uncommon for Defence organisations and institutions to maintain many databases in just as many formats. It is very difficult for analysts to peruse these databases in order to gain some required insight. There has been much effort aimed at considering how particular databases may be structured in order for analysts to achieve their objectives. The problem has proved to be difficult. One of the major hurdles is that extracting the analysts' needs and codifying them to structure the data leads to different requirements not only between analysts, but also different requirements depending on their current focus. One of the consequences is that in order to structure the data correctly, it must be context sensitive, which a relational database is not equipped to handle.

Shapes Vector can overcome many of the extant difficulties by permitting knowledge and deduction rules to be installed into an IA. This IA, equipped with a flexible user interface and strictly defined query language, can then parse the data in a database in order to arrive at a conclusion. The knowledge rules and analyst-centric processing are encoded in the IA, not in the structure of the database itself, which can remain flat and context free. The Shapes Vector system allows incremental adjustment of the IA without having to re-format and restructure a database either through enhancement of the IA, or through an additional IA with relevant domain knowledge. Either the IA makes the conclusion, or it can provide an analyst with a powerful tool to arrive at low level deductions that can be used to arrive at the desired conclusion.

5 Synthetic Stroboscopes and Selective Zoom

In this section, we discuss two mechanisms for overcoming difficulties in bringing important events to the fore in a highly cluttered visual environment: Synthetic Strobes and Selective Zoom.

5.1 Synthetic Strobes

One of the major difficulties with depicting data visually in a real-time system is determining how to handle broad temporal domains. Since the human is being used to provide inductive inference at the macro level, much data which needs to be represented visually may not be possible to show due to temporal breadth. For example, there may be a pattern in a fast packet stream, yet if we were to be able to see the pattern in the packet stream, other events which may also represent a significant pattern may be happening much more slowly (e.g. slowly revolving sphere). Yet the perception of both patterns simultaneously may be necessary in order to make an inductive hypothesis.

A scientist at MIT during World War Two invented a solution to this type of dilemma. By the use of a device (now well known in discos and dance studios) called a stroboscope, Edgerton was able to visualise patterns taking place in one temporal domain in another. One of the most striking and relatively recent examples was the visualisation of individual water droplets in an apparent stream produced by a rapid impellor pump. The stream looked continuous, but viewed under the strobe, each water droplet became distinctly apparent.

We can use the same concept of strobes, ie. synthetic strobes, to bring out multi temporal periodic behaviour in the Shapes Vector visualisation process. With a synthetic strobe, we can visualise packet flow behaviour more precisely, while still retaining a view of periodic behaviour that may be occurring much more slowly elsewhere.

Since we have potentially many different events and objects within our view, it becomes necessary to extend the original strobe concept so that many different types of strobes can be applied simultaneously. Unlike the employment of photonic based strobes, which can interfere with each other, we are able to implement strobes based on:

• Whole field of view

- Per object instance
- Per object class
- Per object attribute

In addition, multiple strobes can be applied where each has complex periodic behaviour or special overrides depending on specific conditions. The latter can also be seen from the oscilloscope perspective where a Cathode Ray Oscilloscope is triggered by an event in order to capture the periodic behaviour. Naturally, with a synthetic strobe, quite complex conditions can be specified as the trigger event.

Just as in the days of oscilloscopes, it is important to be able to have variable control over the triggering rate of a strobe. Accordingly, control of the strobes is implemented via a set of rheostats.

5.2 Selective Zoom

In order to see a pattern, it is sometimes necessary to zoom out from a vista in order to gain a very high level view of activity in a network. While this can be quite useful, it is intuitive that important events for certain classes of object will fail to be noticed due to wide dispersal across the vista. If a class of objects typically have a large Representation compared to others, then zooming out to see a pattern across a large vista is appropriate. However, if the class of objects in question is small, then zooming out causes them to be less noticeable when compared to much larger objects.

Selective Zoom overcomes this difficulty and others of a similar ilk by providing two mechanisms. The first mechanism allows a user to change quickly the relative sizes of objects in relation to others. This permits a user to zoom out in order to see a large vista while still retaining a discernible view of specific objects. The second mechanism permits movement and projection of objects onto planes "above" or "below" the primary grids used to layout a view.

As can be seen in the following paragraphs, selective zoom provides a generalised translation and rotation mechanism in three-dimensional Cartesian space.

While the above two mechanisms can surely find utility, selective zoom also provides a more sophisticated "winnowing" facility. This facility caters to a typical phenomenon in the way humans "sift" through data sets until they arrive at a suitable subset for analysis. In the case of focusing on a particular set of objects in order to undertake some inductive or deductive analysis, a human may quickly select a broad class of objects for initial analysis from the overall view despite *a priori* knowing that the selection may not be optimal. The user typically then undertakes either a refinement (selecting a further subset) or putting the data aside as a reference while reforming the selection criteria for selection. After applying the new criteria, the user may then use the reference for refinement, intersection, or union with previous criteria depending on what they see.

Via selective zoom (perhaps raised above the main view plane), a user can perform a selective zoom on a zoomed subset. This procedure can be undertaken re-cursively, all the while making subsets from the previous relative zoom. The effect can be made like a "staircasing" of views. Figure 9 (segments two and three) depicts the use of selective zoom where subsets of nodes have been placed above the main view plane. Note the set of nodes to the left were produced by a previous use of the zoom. This set need not be a subset of the current staircase.

Indeed the set to the left can be used to form rapidly a new selection criterion. The effects can be described by simple set theory. As implied above a user may also select any of the zoomed sets and translate them to another part of the field of view. These sets can also then be used again to form unions and intersections with other zoomed views or subsets of views that are generated from the main view.

Segment one of Figure 9 depicts the same view from above. Note the schematic style.

VDI has produced a visualisation toolkit in which a particular application depicts a set of machine nodes. By clicking on a representation of a node, it is "raised" from the map and so are the nodes to which it is connected. This may be interpreted as a simple form of one aspect of selective zoom. However, it is unclear whether this VDI application is capable of the range of features forming a generalised selective zoom. For example, the capability to implement set translation in three dimensional Cartesian space, along with union and intersection for rapid reselection and manipulation of arbitrary view sets, as well as relative size adjustment based on class, instance, or object attribute properties.

6 Temporal Hierarchies

Temporal hierarchies refer to three perceived issues: synthetic strobes along both directions of the temporal axis; user information overload, and dealing with data streams with Intelligent Agents. We discuss each in turn.

6.1 Strobes Revisited

In Section 5 we introduced the notion of a synthetic strobe which can be used to shunt rapid periodic behaviour along a "temporal axis" so that the behaviour becomes discernible to the human eye. This shunting was necessary since many patterns of behaviour occur far too rapidly (e.g. characteristics of packet flow and their contents). However, a limitation of synthetic strobes as described is that they shunt or map patterns in only one direction along the temporal axis. More precisely, rapid behaviour is shunted into a "slower" domain. Yet some behaviour of security significance may require a view which spans a relatively long time. Hence it was hypothesised that strobes must be able to not only show up rapid behaviour, but also show slow behaviour. To do this, Shapes Vector must be able to store events, and then be able to map a strobe over them in order to display the possible pattern. Essentially, it is preferable to be able to map behaviour, which can occur along a broad front of the temporal axis into a much smaller domain, which is perceptible to Humans. As an aside, it is a well known technique to see patterns of motion in the cosmos by strobing and playing at high speed various observations, e.g. star field movement to ascertain the celestial poles. However, what we propose here, apart from the relative novelty of taking this concept into cyberspace, is the additional unusual mechanism of complex trigger events in order to perceive the "small" events, which carry so much import over "long" time periods. We can assign triggers and functions on a scale not really envisaged even in terms of cosmological playback mechanisms.

Elsewhere, we discuss many other issues related to synthetic strobes. For example, the mechanisms for setting complex trigger conditions via "trigger boxes", the need for "synthetic time", its relation to real time, and generated strobe effects.

6.2 User Information Overload

Another reason for using strobes, even if the pattern is already within the temporal perception domain of the user, is that they can highlight potentially important behaviour from all the "clutter". Visualisation itself is a mechanism whereby certain trends and macro events can be perceived from an information rich data set. However, if related or semantically similar events mix together, and a particular small event is to be correlated with another, then some form of highlighting is needed to distinguish it in the visual environment. Without this sort of mechanism, the user may suffer data overload. Synthetic strobes designed to trigger on specific events, and which only affect particular classes of objects, are surmised to provide one mechanism to overcome this expected problem.

6.3 Data Streams and IA's

One of the fundamental problems facing the use of IA's in the Shapes Vector system is the changing status of propositions. More precisely, under temporal shifts, all "facts" are predicates rather than propositions. This issue is further complicated when we consider that typical implementations of IA's do not handle temporal data streams. We address this problem by providing each IA with a "time aperture" over which it is currently processing. A user or a higher level agent can set the value of this aperture. Any output from an IA is only relevant to its time aperture setting (Figure 10). The aperture mechanism allows the avoidance of issues such as contradictions in facts over time, as well providing a finite data set in what is really a data stream. In fact, the mechanism being implemented in our system permits multiple, non-intersecting apertures to be defined for data input.

With time apertures, we can "stutter" or "sweep" along the temporal domain in order to analyse long streams of data. Clearly, there are a number of issues, which still must be dealt with. Chief amongst these is the fact that an aperture may be set which does not, or rather partially, covers the data set whereby a critical deduction must be made. Accordingly, strategies such as aperture change and multiple apertures along the temporal domain must be implemented in order to raise confidence that the relevant data is input in order to arrive at the relevant deduction.

While we are aware that we can implement apertures in order to supply us with useful deductions for a number of circumstances, it is still an open question as to how to achieve a set of sweep strategies for a very broad class of deductions where confidence is high that we obtain what we are scanning for. One area, which comes to mind, is the natural "tension" between desired aperture settings. For example, an aperture setting of 180 degrees (ie., the whole fact space) is desirable as this considers all data possible in the stream form the beginning of the epoch of capture to the end of time, or rather the last data captured. However, this setting is impractical from an implementation point of view, as well as introducing contradictions in the deductive process. On the other hand, a very small aperture is desirable in that implementation is easy along with fast processing, but can result in critical packets not being included in the processing scan.

7 Other Visualisation Efforts

Various techniques of visualisation have over the years been applied to the analysis of different domains of abstract data, with varying success. Several such attempts bear similarities to portions of the Shapes Vector system, either in the techniques employed or the broad aims and philosophies guiding those techniques. In this section we briefly describe the most significant of these related visualisation efforts, concentrating on the specific domains of security visualisation, network visualisation and communications-related data mining.

The following discussion providing some background to the invention is intended to facilitate a better understanding of the invention. However, it should be appreciated that the discussion is not an acknowledgment or admission that any of the material referred to was published, known or part of the common general knowledge in any relevant country as at the priority date of the application.

7.1 NetPARS

A proposal from NRaD and the NRL, the Network Propagation Assessment and Recovery System (NetPARS) is an effort to assist decision making in defensive information warfare. It aims to supply such support by means of rigorously tracking data quality within a system and estimating how degradations in quality propagate between data. Such a protocol would, it is claimed, be capable of providing intrusion detection services, assessment of security state and assist in recovery following an attack.

The proposed system architecture incorporates a set of mapping agents (responsible for keeping track of inter-relationships between data), sensor elements (capable of detecting intrusions and other reductions in data quality) and recovery elements. When a sensor detects the compromise of one or more data item, the system computes (via a forward propagating expert system) the extent to which this loss in quality is propagated to other data. This information is presented to the user to assist in the defence and/or containment of the compromise.

Ultimately it is envisaged that NetPARS will also incorporate a second knowledge engine. This takes a reported reduction in data quality and, by backward propagation, determines the tree of data items which could conceivably have been the initial cause of that reduction. This fault tree is a principal input to the process of recovery.

Although only sketchy details of the NetPARS proposal are available at present, the system would appear to have some superficial similarities to Shapes Vector. Both make use of forward and backward propagation of knowledge through a set of rules (although the function of backward propagation is quite different in the two systems). Also, both NetPARS and Shapes Vector incorporate agents, which are tasked with intrusion detection as an aid towards a human response. However, whereas the Shapes Vector architecture incorporates a broad range of such agents, it seems that the intrusion detection functionality of NetPARS is currently limited to a single class of attack (storage spoofing).

Beyond these superficial resemblances the two systems have little in common. NetPARS appears to place less importance upon visualisation technology, while in Shapes Vector this is an easily realisable feature where several novel visualisation techniques have been proposed. The NRaD/NRL proposal appears to focus heavily on a tight domain of data and its inter-relationship, while the Shapes Vector system aims to model a much larger concept space with a comprehensive ontology. Ontology can be made relevant to a great variety of application areas. Computer security as discussed in this specification is but one example. Shapes Vector also includes a potentially very powerful temporal control mechanism as well as intelligent agent architecture with user semantic bindings.

7.2 Security Visualisation

Eagle Netwatch is a commercial software package written by Raptor Systems Inc., which offers system administrators a visual representation of the security of their (firewall protected) network. The network is displayed by the tool as an interconnected set of coloured solids positioned in a three-dimensional virtual world. By replaying audit trails collected on the firewall this display is animated to illustrate particular gateway events which pertain to the system's security. During the playback of this security "movie," the user can rotate the virtual world to more clearly observe the activities of particular network elements. The tool also offers other visualisations of audit logs, most notably two-dimensional plots of gateway statistics against time.

The basic concept underlying Eagle Netwatch -- that by observing events in a visual representation of the network a (human user) may notice patterns signifying security events -- is similar to the Shapes Vector philosophy as described in Section 3. However, at the time of writing this information the Netwatch tool lacks much of the sophistication of the Shapes Vector environment including the capacity for real-time visualisation, the presence of intelligent deductive agents, the possibility of remote discovery and visual mechanisms for recognising temporal patterns.

7.3 Network Visualisation

AT&T Bell have constructed a set of prototype tools, collectively called SeeNet which provide tools for the visualisations of telecommunications traffic. The system displays the traffic between two locations by drawing a line on a two-dimensional geographical map. Line width and colour convey aspects of that traffic (e.g., volume). In visualising traffic on an international scale, the resulting map is typically wrapped around a sphere to give the impression of the globe. By observing trends in the visualised traffic, key performance bottlenecks in real-world telecommunications services (including the Internet) have been identified. Also by investigating observed "hot spots" in these representations, AT&T have been able to identify fraudulent use of their facilities.

A similar visualisation approach has been adopted by British Telecom in a prototype system for observing the parameters of their communications network. An outline map of Britain is overlaid with a representation of the BT network with a "skyscraper" projecting upwards from each switching node. The height of the skyscraper denotes the value of the metric being visualised (e.g., traffic or number of faults). The user can navigate freely through the resulting 3D environment. A second visualisation attempt undertaken by British Telecom considers a different three-dimensional visualisation of the communication network as an aid for network architects. A similar approach has been adopted by IBM's Zurich Research Laboratories in their construction of a tool for visualising a computer network's backbone within a full three-dimensional virtual (VRML) world. The goal of this latter system is to ease the task of administering such network backbones.

While Shapes Vector can render similar scenes via its Geo View methods, there is little else in common because of the existence of Data View, Selective View and Strobe when used as part of the visual element. The agent architecture and other elements further distinguish the Shapes Vector system.

7.4 Data Mining

The mining and visualisation of large data sets for the purpose of extracting semantic details is a technique that is applied to many application domains. Several recent efforts have considered such approaches for deriving visual metrics for web-server performance and also for conveying the inter-relatedness of a set of HTML documents. Research undertaken by the NCSA considers the first of these types of data mining in an immersive virtual reality environment called Avatar. The basic approach adopted in their performance measurement work is to construct a virtual world of "scattercubes", regions of space in which three of the many measured metrics are plotted against one another. The world contains enough scattercubes that every set of three metrics is compared in at least one. Users can browse this virtual world using either head-mounted displays or a virtual reality theatre, walking within a single cube and flying over the whole aggregation of cubes. More recently this same system has also been used for visualising the performance of massively parallel programs.

Other data-mining work has considered the derivation of semantics related to the interconnections of WWW-based information. The WAVE environment from the University of Arkansas aims to provide a 3D visualisation of a set of documents grouped according to conceptual analysis. Work at AT&T Bell considers plots of web-page access patterns which group pages according to their place in a web site's document hierarchy.

These efforts can be rendered with Shapes Vector's Data View display. The Avtar effort does not, however, share the Shapes Vector system's ability to effectively provide a semantic link between such data-oriented displays and geographic (or more abstract) views of the entities under consideration, nor represent the force paradigm's represented in Data View.

7.5 Parentage and Autograph

Parentage and its successor Autograph are visualisation tools constructed by the NSA for assisting analysts in the task of locating patterns and trends in data relating to operating communications networks. The tools act as post-processors to the collected data, analysing the interactions between senders and receivers of communications events. Based on this analysis the tools produce a representation of the network as a graph, with nodes describing the communications participants and the edges denoting properties of the aggregated communication observed between participants. The user of the system may choose which of a pre-defined palette of graph layouts should be used to render the graph to the screen. The scalability of the provided layouts is limited and, as a means of supporting large data-sets, the tool allows for the grouping of nodes into clusters which are represented as single nodes within the rendered graph. Additionally, facilities exist for the displayed graph to be animated to reflect temporal aspects of the collected data.

While the aims of the Parentage and Autograph systems have some intersection with the visual sub-systems of Shapes Vector, the systems differ in a number of important regards. Firstly, the NSA software is not designed for real-time analysis options. Secondly, the displays generated by Parentage and Autograph are not intended to provide strong user customisation facilities: the user may choose a layout from the provided palette, but beyond this no control of the rendered graph is available. Contrast this with the Shapes Vector approach which stipulates that each of the views of the security domain must be extremely customable to cater to the different abilities of users to locate patterns in the visual field (see Section 3).

It is interesting to note that this last point has been observed in practical use of Parentage and Autograph: while the provided visual palette allows some analysts to easily spot significant features, other users working with the same tools find it more difficult to locate notable items.

Appendix Part 1- Custom Control Environments for Shapes Vector

As described in the body of this section of the specification, the Shapes Vector system is a tool based upon the fundamental assertion that a user can visually absorb a large body of security-relevant data, and react. For such a capability and for a response to be effective, the Shapes Vector user must have access to a broad range of hardware peripherals, each offering a different style of interaction with the system. Section 2.2 of this part, describes the types of peripherals, which are present within the current system.

The exact physical configuration of peripherals presented to a user of the Shapes Vector system will depend upon the needs of the 'role' that user is playing within the (collaborative) information operation. It is considered that there are two types of operational roles: strategic/planning and tactical. Peripheral configurations catering to the specific interactive needs of users operating in each of these modes are outlined below.

A.1 Strategic Environment

Since the principal functions of a strategic Shapes Vector user focus primarily on non-real-time manipulation of data, there is little demand for speedy forms of interaction such as that afforded by joysticks and spaceballs. Instead, the core interactions available within this environment must be extremely precise: we envisage the use of conventional modes such as keyboard entry of requests or commands coupled with the gesture selection of items from menus (e.g. by mouse). Thus we would expect that a strategic Shapes Vector station might consist of a configuration similar to the traditional workstation: e.g., a desk with screen, Keyboard and mouse atop.

A.2 Tactical Environment

In the course of a Shapes Vector information operation, one or more of the operations team will be operating in a tactical mode. In such a mode, real-time data is being continually presented to the user and speedy (real-time) feedback to the system is of critical importance. Such interactions must primarily be made through high-bandwidth stream-based peripherals such as joysticks and dials. The complexity of the virtual environment presented by Shapes Vector suggests that a high number of different real-time interactions may be possible or desirable.

To provide a capacity for quickly switching between these possible functions, we choose to present the user with a large number of peripherals, each of which is responsible for a single assigned interaction. Since some system interactions are more naturally represented by joysticks (e.g. flying through the virtual cyberspace) while others are more intuitively made using a dial (e.g. synthetic strobe frequency) and so on, we must also provide a degree of variety in the peripheral set offered to the user.

The technical issues involved in providing a large heterogeneous peripheral set in a traditional desktop environment are prohibitive. To this end a preferred design for a custom tactical control environment has been developed. The user environment depicted in Figure 11 achieves the goal of integrating a large number of disparate input peripherals into a dense configuration such that a user may very quickly shift and apply attention from one device to another.

The following input devices are incorporated into a preferred Shapes Vector Tactical Control Station depicted in Fig. 11:

- two joysticks
- rudder pedals (not visible in the figure)
- two dial/switch panels
- keyboard (intended for the rare cases where slow but precise interaction is necessary)
- trackball

The principal display for the tactical user is a large projected screen area located some distance in front of the control station. However, a small LCD screen is also provided for displaying localised output (e.g. the commands typed on the keyboard).

PART 2 SHAPES VECTOR MASTER ARCHITECTURE-------------------------------

1. Introduction

The fundamental aspects of the Intelligent Agent Architecture (IAA) for the Shapes Vector system are discussed in this Part of the specification. Several unusual features of this architecture include a hierarchy of context free agents with no peer communication, a specific method for constructing ontologies which permits structured emergent behaviour for agents fusing knowledge, and the ability to undertake a semantic inferencing mechanism which can be related to human interfacing.

1.1 Shapes Vector Master Architecture

The master architecture diagram (Figure 1) shows six main sub-systems to Shapes Vector:

- Sensor system. This sub-system comprises sensors that collect data. A typical example would be an Ethernet packet sniffer. Sensors may be local or remote and the communication path from the sensor and the rest of the system can take many forms ranging from a UNIX socket, through to a wireless network data link.
- The Intelligent Agent Architecture (Gestalt). This sub-system, described extensively in this paper, is responsible for processing sensor data and making intelligent deductions based on that input.

• The Tardis. This sub-system is a real time manager of events and a global semantic mapper. It also houses the synthetic clock mechanism that is discused in a later Part of this specification. The Tardis is capable of taking deductions from the Agent Gestalt and mapping them to an event with a specific semantic ready for visualisation.
• The Visuals. This sub-system actually comprises a number of "view" modules that can be regarded as sub-systems in their own right. Each view is built from common components, but visualises events input to it from the Tardis according to a fundamental display paradigm. For example, Geoview displays events and objects based on a geographic location paradigm (wherein it is possible to layout objects according to a space coordinate system. Multiple interpretations of the layout are possible. A typical use though is to layout computers and other physical objects according to their physical location.) , whereas DataView lays out objects based on the level of interaction (forces) between them.
• The I/O system. This sub-system provides extensive faculties for users to navigate through the various views and interact with visualised objects.
• The Configuration system. This sub-system offers extensive features for customising the operation of all of the various sub-systems.

Essentially, the system operates by recording data from the sensors, inputting it into the Agent Gestalt, where deductions are made, passing the results into the Tardis, which then schedules them for display by the visualisation sub-system.

1.2 Precis of this part of the specification.

Portions of the information contained in the following sections will be a repeat of earlier sections of the specification. This is necessary due to the very large amount of information contained in this document and the need to refresh the readers memory of the information in the more detailed context of this part. Section 2 of this part discusses the fundamentals of the agent architecture, which includes a discourse on the basic inferencing strategies for Shapes Vector agents. These inferencing strategies, described in Section 3 of this part are based on epistemic principles for agents with a "low level of abstraction" to a semantic vector based scheme for reasoning under uncertainty. Of interest is the method utilised to link an agent's semantics with the semantics of interaction with a user. This link is achieved by adjusting and formalising a highly restricted subset of English.

In Section 4 of this part the basic rules of constructing an agent are described and of how they must inhabit the architectural framework. The architectural framework does not preclude the introduction of "foreign" agents as long as an interface wrapper is supplied to permit it to transfer its knowledge and deduction via the relevant ontological interfaces.

Section 5 of this part discusses the temporal aspects of intelligent agents. Section 6 of this part reveals some implications for the development of higher abstraction levels for agents when considering the fusing of data from lower abstraction level agents. The ontological basis for the first of these higher levels -- levels 2 -- are detailed in Section 7 of this part.

Section 8 of this part gives a brief overview of the requirement for intelligent interfaces with which a user may interact with the various elements of an agent Gestalt. Section 9 of this part provides some general comments on the architecture, while Section 10 of this part contrasts the system with the high-level work of Bass.

2. The Agent Architecture

Shapes Vector is intended to house large numbers of Intelligent Agents (IA's), with different domains of discourse. These agents make inferences and pass knowledge to one another in order to arrive at a set of deductions that permit a user to make higher level hypotheses.

2.1 Agent Architecture

The Shapes Vector system makes use of a multi-layer multi-agent knowledge processing architecture. Rather than attempting to bridge the entire semantic gap between base facts and high-level security states with a single software entity, this gap is divided into a number of abstraction layers. That is, we begin by considering the problem of mapping between base facts and a marginally more abstract view of the network. Once this (relatively easy) problem has been addressed, we move on to considering another layer of deductive processing from this marginally more abstract domain, to a yet more abstract domain. Eventually, within the upper strata of this layered architecture, the high-level concepts necessary to the visualisation of the network can be reasoned about in a straightforward and context-free fashion.

The resulting Shapes Vector Knowledge Architecture (SVKA) is depicted in Figure 7. The layered horizontal boxes within the figure represent the various layers of knowledge elements. At the very bottom of the figure lies the store of all observed base facts (represented as a shaded box). Above this lies a deductive layer (termed "Level 1" of the Knowledge Architecture) which provides the first level of translation from base fact to slightly more abstract concepts.

In order to achieve knowledge transfer between agents which is both consistent and sound, an ontology (ie. a formal knowledge representation) becomes imperative. Due to our approach of constructing our knowledge processing sub-system as a set of abstraction layers, we must consider knowledge exchange at a number of different levels of abstraction. To construct a single ontology capable of expressing all forms of knowledge present within the system is problematic due to the breadth of abstraction. Attempting such ontology it is unlikely to produce a tidy set of universal rules, and