DIVERGENT
LANGUAGE SOLUTIONS

DECLARATION OF ACCURACY

I, David Baldwin, declare the following:

1. I am over 18 years of age and competent to make this declaration.

2. I am a qualified Japanese to English translator.

3. I have translated the attached document identified as JPH09-311625.

4. I affirm that the translated text has been translated and edited to the best of my ability and knowledge to accurately reflect the content, meaning, and style of the original text and constitutes in every respect a correct and true translation of the original document.

5. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and 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 Section 1001 of Title 18 of the United States Code.

I hereby certify under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Dated and signed on August 8, 2019.

(Translator's Signature)

David Baldwin

(Translator's Printed Name)

183 Madison Avenue, Suite 416 | New York, NY 10016 | p 917.979.4513 | f 415.525.4313
600 California Street, 11th Floor | San Francisco, CA 94108 | p 415.400.4538 | f 415.525.4313

(12) Unexamined Patent Application Publication (A)
(19) Japan Patent Office (JP)
(11) Patent Application Publication No. H9-311625
(43) Publication Date: Dec. 2, 1997 (Heisei 9)

(51) Int. Cl.[6]	Ident. Code	Internal Ref. No.	FI	Technical Indication
G09B 29/00			G09B 29/00	A
G01C 21/00			G01C 21/00	B
G08G 1/0969			G08G 1/0969	

Examination Request: Not Made No. of Claims: 13 FD (16 Pages Total)

(21) Filing No. H8-149740

(22) Filing Date May 22, 1996 (Heisei 8)

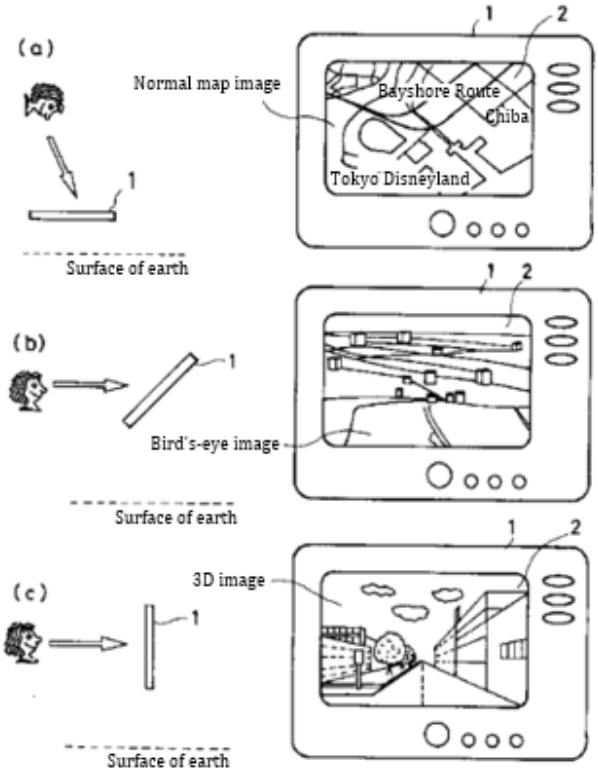
(71) Applicant 000002185
Sony Corp.
6-7-35 Kita Shinagawa, Shinagawa-ku, Tokyo

(72) Inventor Kiyokazu Ikeda
c/o Sony Corp.
6-7-35 Kita Shinagawa, Shinagawa-ku, Tokyo

(74) Agent Atsuo Waki, Patent Attorney (and One Other)

(54) [Title] DISPLAY DEVICE, MAP DISPLAY DEVICE, DISPLAY METHOD, AND MAP DISPLAY METHOD

(57) [Abstract]
[Problem] To realize display that is easy to view and use for a user, display with a large information amount, and display that is interesting.
[Resolution Means] By detecting a posture and/or movement state of a main body of a display device and changing a display content to match conditions such as a posture or movement of the main body of the device, display matching an actual orientation, display according to a posture of the device, switching between three-dimensional display and flat display, and the like are realized.



[Scope of Patent Claims]

[Claim 1] A display device, comprising:

a state detection means of detecting a posture state and/or a movement state of a main body of the display device;

a display means; and

a display control means that can display a predetermined image on the display means and, based on detection information from the state detection means, change a display state of the displayed image.

[Claim 2] A display device, comprising:

a state detection means of detecting a posture state and/or a movement state of a main body of the map display device;

a map-information storage means of storing map information;

a display means; and

a display control means that can display a map image based on map information read from the map-information storage means on the display means and, based on detection information from the state detection means, change a display aspect or a map display region of the displayed map image.

[Claim 3] The map display device of claim 2, wherein the state detection means is provided with an incline sensor that detects an incline state of the main body of the map display device.

[Claim 4] The map display device of claim 2, wherein the state detection means is provided with an orientation sensor that detects an actual orientation.

[Claim 5] The map display device of claim 2, wherein the state detection means is provided with a movement-state sensor that detects a movement direction and/or a movement amount when the main body of the map display device is moved.

[Claim 6] The map display device of claim 2, wherein the map image displayed on the display means can be set with an absolute direction or a relative direction, and

the display control means changes a display state of the map image according to the posture state of the main body of the map display device detected by the state detection means so the set direction is substantially continually an upward direction in terms of gravity of the display means.

[Claim 7] The map display device of claim 2, wherein the display control means changes a display state of the map image according to an orientation state of the main body of the map display device detected by the state detection means so an orientation of the map image displayed on the display means substantially continually matches an actual orientation.

[Claim 8] The map display device of claim 2, wherein the display control means changes a display state of the map image according to the movement state of the main body of the map display device detected by the state detection means so the region displayed as the map image on the display means undergoes scrolling movement.

[Claim 9] The map display device of claim 2, wherein the

display control means changes a display state of the map image according to an incline state of the main body of the map display device detected by the state detection means so the map image displayed on the display means switches between a two-dimensional image and a three-dimensional image.

[Claim 10] The map display device of claim 2, further comprising: a current -position detection means; wherein

the display control means is configured to be able to synthesize and display on the display means the map image based on the map information read from the map-information storage means and a position-presenting image based on current-position information detected by the current-position detection means and, based on the detection information from the state detection means, change the display aspect or the map display region of the displayed map image.

[Claim 11] A display method of detecting a posture state and/or a movement state of a main body of a device having a display unit and changing a display state of an image displayed on the display unit according to the detected posture state and/or movement state of the main body of the device.

[Claim 12] A map display method of detecting a posture state and/or a movement state of a main body of a device having a display unit and, when displaying a map image based on predetermined map information on the display unit, changing a display aspect or a map display region of the map image according to the detected posture state and/or movement state of the main body of the device.

[Claim 13] The map display method of claim 12, wherein an incline posture of the main body of the device having the display unit is detected and the map image displayed on the display unit is switched between a two-dimensional image and a three-dimensional image according to a detected incline state.

[Detailed Description of the Invention]

[0001]

[Field] The present invention relates to a display device and a display method that change a display state according to a state of a main body of the display device and particularly relates to a map-image display device and a map-image display method.

[0002]

[Conventional Art] In recent years, as are widespread in, for example, navigation systems, devices that display a map image on a display are known. Many of these store map information on a medium such as a CD-ROM; read map information of a required region, a vicinity of a current position, or the like from the CD-ROM; and display a map image based on this read map information.

[0003]

[Problem to be Solved by the Invention] Now, in such conventional electronic map display, the displayed map image itself is displayed with a specified direction of a screen as up, regardless of a posture or the like of a main body of this display device. As such, a user needs to view the map image by mentally aligning cardinal directions of the map image with actual cardinal directions.

Moreover, from a flat map image, it is difficult to visualize different regions, and realizing map display with higher added value is in demand.

[0004]

[Means for Solving the Problem] In view of such problems, the present invention has as an object to provide a display device, a display method, a map-display device, and a map-display method that can realize display that is easy to view and use for a user and display that can impart added value and is interesting.

[0005] As such, the display device is provided with a state detection means of detecting a posture state and/or a movement state of a main body of the display device; a display means; and a display control means that can display a predetermined image on the display means and, based on detection information from the state detection means, change a display state of the displayed image. The display method detects a posture state and/or a movement state of a main body of a device having a display unit and changes a display state of an image displayed on the display unit according to the detected posture state and/or movement state of the main body of the device.

[0006] Furthermore, the map display device is provided with a map-information storage means of storing map information, a display control means being able to display a map image based on map information read from the map-information storage means on a display means and, based on detection information from a state detection means, change a display aspect or a map display region of the displayed map image. The map display method detects a posture state and/or a movement state of a main body of a device having a display unit and, when displaying a map image based on predetermined map information on the display unit, changes a display aspect or a map display region of the map image according to the detected posture state and/or movement state of the main body of the device.

[0007] That is, in the present invention, by changing a display content to match conditions such as a posture or movement of the main body of the device, display matching an actual orientation, display according to a posture of the device, switching between three-dimensional display and flat display, and the like are realized.

[0008]

[Embodiments of the Invention] An embodiment of the present invention is described below by using as an example an electronic map device that displays a map image. The description is given in the following order.

1. Configuration of Electronic Map Device
2. Posture and Movement Detection by Sensors
3. Map Display Operations in Display-Orientation-Designated Mode
4. Map Display Operations in Actual-Orientation-Reflecting Mode
5. Map Display Operations in Vicinity-Map Display Mode
6. Map Display Operations in Virtual Display Mode
7. Map Display Operations in Navigation Display Mode
8. Composite Operation of Various Modes

[0009] 1. Configuration of Electronic Map Device

FIG. 1 illustrates a block diagram of the electronic map device of the present example, and FIG. 2 illustrates an appearance example of the electronic map device. As illustrated in FIG. 2, an electronic map device 1 is formed, for example, in a notebook shape of an extent that enables the display to be portable and has a display unit 2, which is a liquid-crystal display or the like, formed in an upper face. Moreover, used as a recording medium of electronic map data is, for example, a CD-ROM such as is used in a normal navigation system, and an insertion portion 3 for inserting this CD-ROM is provided.

[0010] Furthermore, various controllers 4 are formed for user control. As the controllers 4, it is sufficient to provide those of forms necessary for various controls, such as pressable keys and jog dials. Of course, these may be of other forms, such as slide switches or rotating knobs. Necessary controls include a power on/off control; a mode-setting control; an operation for selecting a map region to display; scrolling and zooming of screen display; a control of requesting, for example, presentation of various information; and the like, and any forms may be adopted as long as these controls can be performed. Moreover, a configuration may be such that control devices such as a mouse and a keyboard can be connected and used.

[0011] An internal configuration of the electronic map device 1 is as illustrated in FIG. 1, and a CPU 10 is provided as a part that performs overall operation control. Moreover, a RAM 11 is prepared as a work region used in operations such as control/computation by the CPU 10, and a ROM 12 is provided as a region for holding an operation program or the like.

[0012] A CD-ROM 20 inserted from the insertion portion 3 illustrated in FIG. 2 is loaded in a CD-ROM driver 14. The CD-ROM driver 14 is a part that performs a reproduction operation of the CD-ROM 20 based on CPU 10 control. The CD-ROM 20 loaded in the CD-ROM driver 14 is recorded with map information and additional information such as names of map locations and building height information. Information reproduced from the CD-ROM 20 by the CD-ROM driver 14 is taken in by the RAM 11 and subjected to necessary processing.

[0013] Furthermore, map-image information that is reproduced from the CD-ROM 20 and used for display is taken in by a map-image memory 15. The CPU 10 generates image data to display based on the map-image information and various additional information read from the CD-ROM 20 and deploys this to the map-image memory 15. A necessary portion of the image data held by the map-image memory 15 is then sent to a display driver 13, and map display of a certain region is executed on the display unit 2.

[0014] Furthermore, in the present example, the displayed map image is not limited to simply a normal map image recorded on the CD-ROM 20, and as described below, a bird's-eye image and a three-dimensional image (3D image) can be displayed. While image data of the bird's-eye image and the 3D image may of course be recorded in advance on the CD-ROM 20 and

a read bird's-eye image or 3D image be supplied as-is to the display driver 13 and displayed, to conserve a recording capacity of the CD-ROM 20, it is favorable to only record building heights, building and facility types, and the like as additional information for generating the bird's-eye image and the 3D image, using the map information and the additional information to generate the bird's-eye image and the 3D image by image synthesis processing. An image synthesis unit 16 is provided to perform this processing, and this unit can virtually generate bird's-eye images and 3D images of various regions (or images centered around various points on the map) based on CPU 10 control.

[0015] Furthermore, the present example has not only a map-display function but also a function similar to a navigation system. That is, map display centered around a current position is performed automatically to enable travel guidance to be executed. From this necessity for current-position detection, a GPS receiver 18 is provided. The GPS receiver 18 is a part for obtaining current-position information by a so-called GPS (global positioning system) and detects position information (latitude/longitude), absolute-orientation information, and velocity information based on a reception signal from a satellite. This information is supplied to the CPU 10.

[0016] A sensor unit 17 is provided with sensors necessary to detect a posture state and a movement state of a main body of the electronic map device 1. Detection information from the sensor unit 17 is supplied to the CPU 10. Data and control signals are transmitted between the above units via a bus 19. Moreover, various control information from the control unit 4 illustrated in FIG. 2 is input to the CPU 10.

[0017] Based on the mode-setting control and a display-region-designating control from the control unit 4, the detection information from the sensor unit 17, detection information from the GPS receiver 18, and the operation program stored in the ROM 12, the CPU 10 controls the reproduction operation by the CD-ROM driver 14, the synthesis processing by the image synthesis unit 16, write/read operations of the map-image memory 15, and a display operation by the display driver 13. By this, map display sought by the user is executed on the display unit 2.

[0018] 2. Posture and Movement Detection by Sensors

Here, posture and movement detection of the main body of the electronic map device 1 by the sensor unit 17 is described. The sensor unit 17 is provided with an incline sensor function of detecting an incline state of the main body, an orientation sensor function of detecting an absolute orientation (north, south, east, and west), and a movement sensor function of detecting movement of the main body (movement direction and movement amount) and is equipped with various sensors necessary for these functions.

[0019] In the description, first, as illustrated in FIG. 2, directions of up, down, left, and right relative to a screen of the display unit 1 of the main body of the electronic map device 1 are referred to as screen-up, screen-down, screen-right, and screen-left so as to be distinguished from up and down in terms of earth's gravity and left and right in terms of absolute orientation.

[0020] FIG. 3 illustrates incline-state examples of the main body of the electronic map device 1. (a), (b), and (c) in FIG. 3 illustrate the main body of the electronic map device 1 rotated in a screen-up/screen-down direction around an axis from screen-left to screen-right. That is, in (a) in FIG. 3, the electronic map device 1 is substantially horizontal, and (b) and (c) in FIG. 3 illustrate postures of a screen-up portion being lifted upward in terms of gravity. Although not illustrated, a posture of a screen-down portion being lifted upward in terms of gravity is of course also possible. Moreover, (a), (d), and (e) in FIG. 3 illustrate the main body of the electronic map device 1 rotated in a screen-left/screen-right direction around an axis from screen-up to screen-down. That is, (d) and (e) in FIG. 3 illustrate postures of a screen-left portion being lifted upward in terms of gravity from the horizontal state in (a) in FIG. 3. Although not illustrated, a posture of a screen-right portion being lifted upward in terms of gravity is also possible.

[0021] As the sensor that detects these incline states, it is favorable to biaxially form in the sensor unit 17 an incline sensor made using, for example, a mercury switch or equip in the sensor unit a gravity sensor that detects the direction of gravity. The posture changes arise according to how the user holds the electronic map device 1, how the user places the device (horizontally, on a desk or the like, or vertically, leaning up against something), and the like.

[0022] Next, FIG. 4 illustrates relationships between the main body of the electronic map device 1 and an absolute orientation. (a) in FIG. 4 is a state wherein the screen-up portion faces the absolute orientation north, (b) in FIG. 4 is a state wherein the screen-left portion faces north, and (c) in FIG. 4 is a state wherein a portion between the screen-down portion and the screen-left portion faces north. As in the above for example, the present example also detects an orientation posture of the electronic map device 1 in terms of absolute orientation. As such, the sensor unit 17 is equipped with an orientation sensor such as an electronic compass. Conceivable as an actual example is, for example, adopting a magnetic-field sensor. Moreover, orientation information of a travel direction obtained by the GPS receiver 18 may be used as the orientation sensor.

[0023] FIG. 5 illustrates movement conditions of the main body of the electronic map device 1. The arrow in (a) in FIG. 5 illustrates, for example, a state wherein the user holds the electronic map device 1 horizontally in their hand and moves the device in front of their body so as to draw a circle, and the arrows in (b) in FIG. 5 illustrates a state wherein the device is moved in a certain direction, screen-up, -down, -left, or -right. In the present example, when the electronic map device 1 is moved in this manner, the movement direction and the movement amount are detected in terms of screen-up, -down, -left, and -right. As such, the sensor unit 17 is equipped with at least one sensor that can detect movement such as an acceleration sensor, velocity sensors, or a magnetic-field sensor. Note that the movement conditions may include, in addition to the movement of (a) and (b) in FIG. 5 in a state of the electronic map device 1 being horizontal relative to the earth's surface, the movement of (a) and (b) in FIG. 5 in a state of the device being vertical or diagonal relative to the

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.