(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
4 April 2002 (04.04.2002)

PCT

(10) International Publication Number
WO 02/28067 A1

(51) International Patent Classification[7]: H04M 1/247, G06F 3/00

(21) International Application Number: PCT/NO01/00384

(22) International Filing Date:
20 September 2001 (20.09.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
20004863 27 September 2000 (27.09.2000) NO

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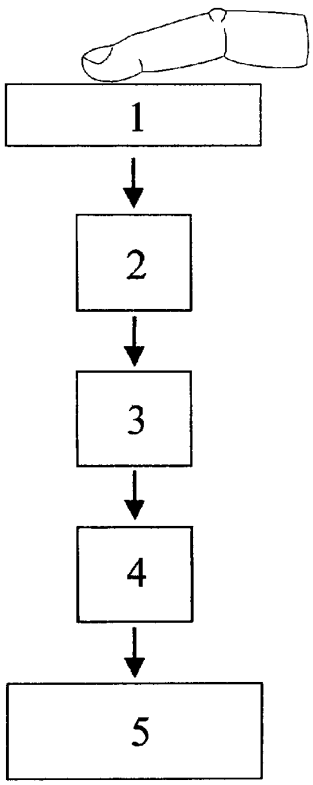
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian

[Continued on next page]

(54) Title: METHOD AND SYSTEM FOR INPUTTING CHARACTERS



(57) Abstract: Method and system for generating complex text input by sequences of finger touches on a single sign generator in cellular phones including a display and a sign generator, the sign generator including a finger touch sensitive sensor being adapted to sense movements in at least one dimension, analysing means, and translation means, measuring omni-directional finger movements across the sensor in two dimensions, using the analysing means for categorising omni-directional finger movements across the sign generator according to predefined sets of finger movement sequences including directional and touch/no-touch finger movement sequences, using the translating means including uniquely defined command table for translating the categorised finger movements into signals controlling the display as results of the finger movements on the sensor.

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patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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.

Method and system for inputting characters

This invention relates to a sign/character generator represented by a fingerprint sensor with navigation means, for text/sign input to information and communication devices with displays, like set-top boxes, cellular phones, palmtop PCs, PDAs, etc.

The present information society provides the users with an increasing number of information and communication devices for numerous purposes, and the use of such information and communication devices are expected to accelerate both in types of devices and the number of users of the respective devices.

Most of these information and communication devices contains, or give access to privileged and/or sensitive information. This accentuates the need for access control by identity verification of the user. This has traditionally been handled by passwords or PIN codes. However, these are not personal as they can be given to other persons by the owner, or stolen from the owner. Accordingly there is a strong trend to base access control on biometrics which is mathematical description of characteristic elements of the owner's body or behaviour that can not be separated from this person, and which describes him uniquely. Many forms of biometrics for identity verification is available, but the dominating type of biometrics appear to be fingerprints as it uniquely defines the person, is easy to scan and is not feel to intrude the user's privacy. Hence many types of fingerprint sensors have been made. One such fingerprint sensor is described in EP 735.502.

Implementation of such sensors in information and communication devices on an industrial scale with large volumes is in most cases pending the benefits established through a cost versus benefit analysis. It is also in many cases a question of available space on the device. The utilisation of such identity verification devices as e.g. fingerprint sensors will therefore be significantly enhanced if it can be combined with other functionality, and

especially if it thereby can replace other devices. These two aspects will be illustrated for some typical information and communication devices below.

Cellular phones normally contain a reduced keyboard, typically as shown in fig. 1. Such reduced keyboards have far less keys than the letters, characters and signs required to input complex text messages. This is partly resolved by assigning several characters to each key, as illustrated in fig. 1. However, even with a multiple character representation on such reduced keyboards, the number of keys are so limited that it poses a significant constrain on available characters/signs that can be represented on such reduced keyboard.

Some solutions have been introduced, but they generally do not provide sufficient cost/benefit ratio and functionality to effectively penetrate the market. One example is a full QWERTY keyboard provided by the cellular phone manufacturer Ericsson. However, this external keyboard is large and expensive and counteracts the general trend to make cellular phones increasingly more compact, lighter and cheaper.

Another known solution is the Nokia Naviroller™ in which a mechanical barrel on the front panel is rolled by the finger, bringing up a vertical column of signs and characters on the display. Selection of a particular sign or character is performed by mechanically pressing down the barrel. In practice this is not a faster solution than moving the finger from key to key and pressing the selected key one or multiple times. The Naviroller™ solution also imposes a serious constrain on cursor movements as it limits cursor control to one dimension; <up> and <down>, except for pressing the barrel for character selection.

Tegic Communications has developed a system called T9™ whereby software logic search for legal letter combinations of a particular language, thereby minimising the multiple presses of any key representing multiple characters, as shown in fig. 1. This is an elegant solution as the number of finger taps is presumably significantly reduced, but the negative aspect is that it requires a translation program

for each language, and that these must be stored in the phone memory. Motorola is said to have developed a similar solution, called iTap™, thus having the same problems.

Sign handling of another known type is the Zi 8™ provided by ZiCorp, to facilitate character input by Chinese signs through a reduced keyboard as per fig. 1. The Zi 8™ solution is based on the fact that Chinese signs are composed of so-called basic strokes, which sequence defines a particular sign. These basic strokes are assigned to the keys, much in a similar way as the letters are assigned to the number keys, as shown in fig. 1. This solution enables input of Chinese characters by a regular cellular phone keyboard, as per fig. 1, but does not resolve the main problems of using a keyboard for sign/character input to a cellular phone. A keyboard is still required, and due to size limitations it normally contains far less keys than the characters/signs required to compose a meaningful message. The finger therefore has to be moved around the keyboard, and each key may need to be pressed down mechanically multiple times to select a message.

US 5,982,303 describes a joystick to feed characters, numbers and function categories into a processor. The method according to this publication may be use to write non-latin signs and to control a cursor. The publication mentions the use of eight keys for providing the control signals and represents a large and complicated solution. A similar solution is described in US 4,680,577.

It is an object of this invention to provide a simple solution for feeding information into a small unit, e.g. a cellular phone, by using sensors which have already been provided for other purposes.

US 5,088,070 describes the use of several dedicated switches on a wrist watch. Although it is more compact than the abovementioned solution it still represents an unnecessary large structure on the limited available space.

US 6,057,540 describes an optical sensor with navigation utilities. It's dimensions and complexity, however, makes unsuitable for usse in mobile phones and similar. Also, as the sensor described here preferably uses

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