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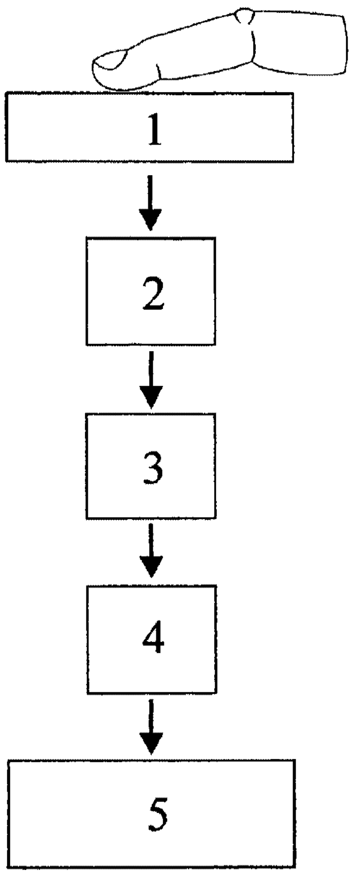

(57) Abstract: Sign generator for information or communication devices comprising at least one touch and/or pressure activated sensor and a display, the sensor being capable of measuring movements in two dimensions, analysing means connected to said sensor for categorising two dimensional movements sensed by the sensor according to a chosen set of categories, translating means including a predetermined table of categories of two dimensional movements corresponding to a chosen set of signs and indicating the chosen sign or signs on the display.

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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.

Method and generator for inputting characters

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

The compact size of such devices has reduced the dimensions of their keyboards. Such devices are therefore normally equipped with a keyboard as illustrated in fig. 1 where the number of keys are far less than the standard letters a user needs to input meaningful text. The solution for present cellular phones is to let each number key represent 3 or 4 subsequent letters as per fig. 1. For example the key usually giving number 6 will in the alpha-numeric mode define one of the letters m, n or o, pending the number of times the key is pressed. Thus the word "hello" may be written by pressing key number 4 twice, key number 3 twice, key number 5 thrice, key number 5 thrice and key number 6 thrice, thus pressing the keys a total of 13 times. The user needs to memorise the positions of these alphanumeric keys, or look up their positions and shift finger position from key to key, as per the above example. This makes text input by reduced keyboards a cumbersome and time-consuming effort.

There is a strong development trend of such handheld devices to make them increasingly smaller, lighter and yet cheaper. Yet their functionality continuously increases as they offer more information and data to the user, and there-fore would benefit from larger displays. However, such increased displays should preferably not increase the overall dimensions of the already compact information/communication devices. Presently the two largest elements of the front panel of such information/communication devices are the display and the reduced keyboard, as per fig. 1, where generally the reduced keyboard still occupies more space than the display. The only efficient way to increase the display size without increasing the overall dimensions of the device is to reduce the keyboard to a minimum size, as indicated in fig. 2 without loosing versatility and convenience of the text input process.

There are several known solutions to make the text input process based on current keyboard types as per fig. 1. One manufacturer, Ericsson, provides an external QWERTY keyboard as a plug-in device to their cellular phones. This solution has, however, the disadvantages of extra size, weight and costs, being directly contrary to user requirements for increasingly smaller, lighter, cheaper and more versatile cell phones.

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 the cursor movements as it limits cursor movements 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.

Generating text/character input on such reduced keyboards is therefore a slow and cumbersome process, even for alphabetic languages like the Latin language. However, a large part of the world's population uses sign-based languages, such as Chinese, Japanese, Korean, etc. Sign-based languages may comprise hundreds of thousands of signs, aggravating the problem of text input by keyboards considerably.

A known solution for text input by sign-based languages is the Zi 8™ provided by ZiCorp, aimed at simplifying character input by Chinese signs through a limited keyboard as shown in fig. 1. It 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 alphabet letters are assigned to the number keys, as illustrated in fig. 1. This solution enables input of Chinese characters by a reduced keyboard as per fig. 1, but does not resolve the main problems. A keyboard of considerable size is still required, but 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 a 16x16 pixel matrix it is not suitable for use as a fingerprint sensor, since the resolution is unsufficient.

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