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**TOKKONEN**(10) **Pub. No.: US 2010/0315369 A1**(43) **Pub. Date: Dec. 16, 2010**(54) **METHOD AND USER INTERFACE FOR  
ENTERING CHARACTERS**(30) **Foreign Application Priority Data**

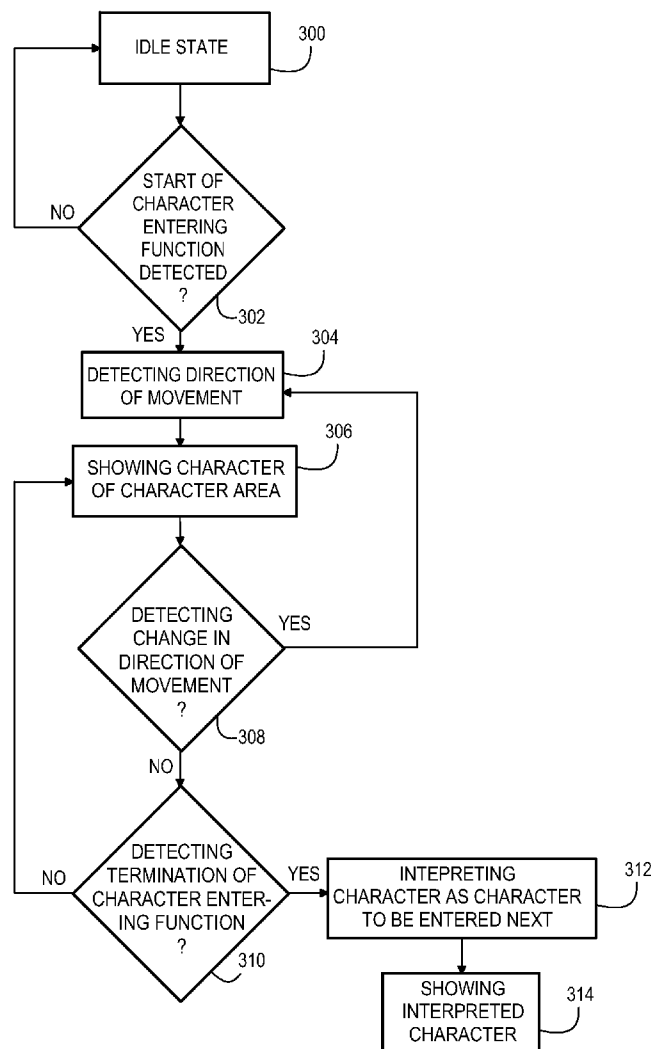
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**G06F 3/041** (2006.01)(52) **U.S. Cl.** ..... **345/173**(57) **ABSTRACT**(21) Appl. No.: **12/862,223**(22) Filed: **Aug. 24, 2010****Related U.S. Application Data**(63) Continuation of application No. 11/132,479, filed on  
May 19, 2005, which is a continuation of application  
No. PCT/FI03/00889, filed on Nov. 19, 2003.

A direction of movement indicated by an input device is detected when a start of a character entering function has been detected. The entered character is shown on the character area on a display, towards which character area the direction of movement indicated by the input device is proceeding. The termination of the character entering function is detected, and the character towards whose character area the direction of movement was last detected to proceed as the character to be entered next is detected.



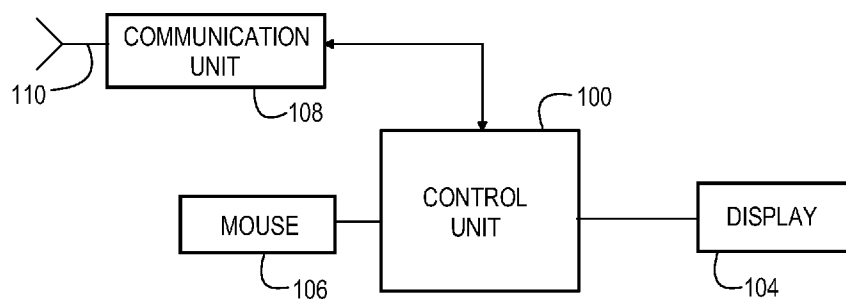


Fig. 1

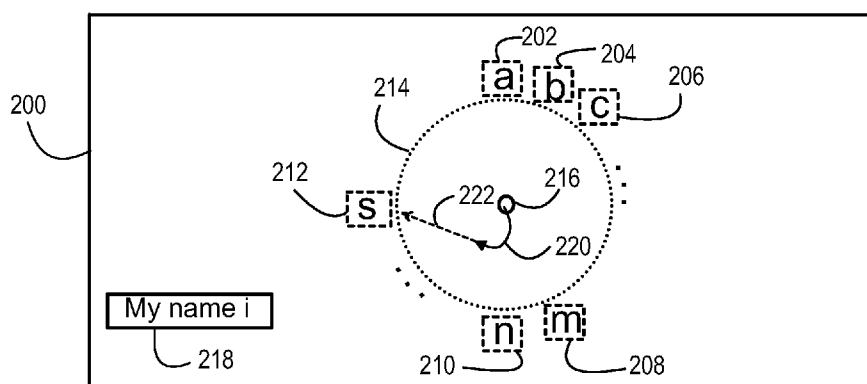


Fig. 2A

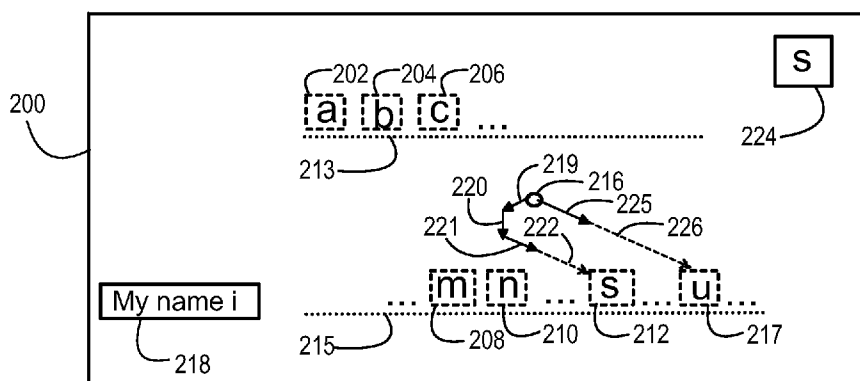


Fig. 2B

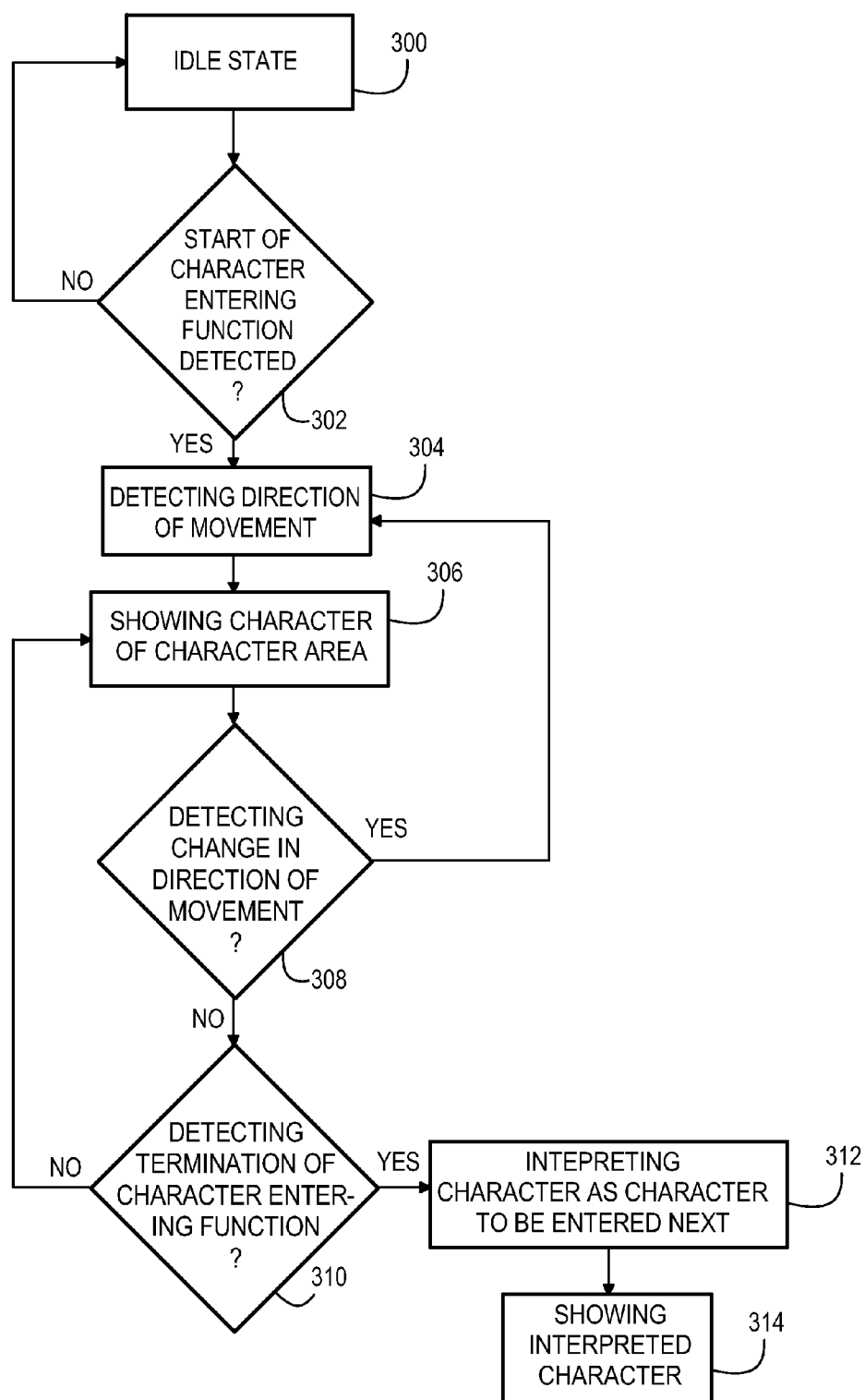


Fig. 3

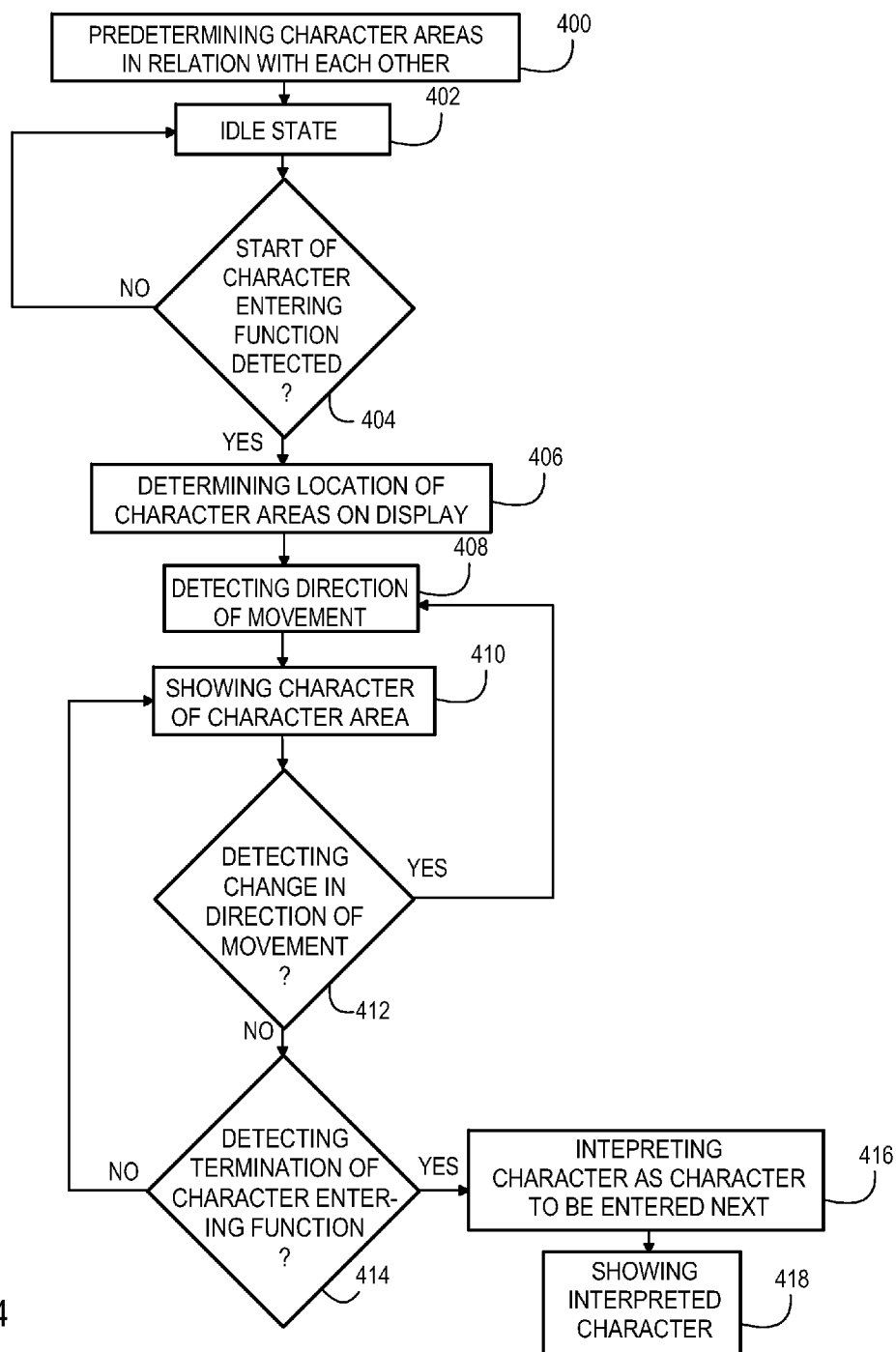


Fig. 4

## METHOD AND USER INTERFACE FOR ENTERING CHARACTERS

### CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This is a continuation application of application Ser. No. 11/132,479, filed May 19, 2005, which is a continuation of International Application No. PCT/FI03/000889 filed on Nov. 19, 2003, which claims priority to European Patent Application No. 02102606.7 filed on Nov. 20, 2002, the contents of which are incorporated herein by reference in their entirety.

### FIELD

[0002] The invention relates to a method for entering characters in a user interface of an electronic device, and a user interface of an electronic device.

### BACKGROUND

[0003] Electronic devices, such as mobile telephones, are continuously reduced in size. A special problem in the usage of an electronic device is the entering of text. Eventually the keypad used in electronic devices, such as a character keypad, becomes impracticable, because it is difficult for the user of the device to press extremely small keys. Since separate keypads in the devices increase the size of the devices, small electronic devices with only a touch screen as the user interface have become common. In electronic devices, touch screens are often used to replace the mouse and the keypad, for example. The user gives control commands to the device by touching contact areas visible on the touch screen.

[0004] Several portable devices are provided with a feature that identifies handwriting, by means of which the device converts handwritten text, for example, into composed text. There are different automatic identification methods of handwritten symbols in which the characters of the entered text are written directly on the touch screen. The user writes characters in an area for writing characters on a touch screen by means of a pen or a finger, for example. The device then identifies the written character based on the detected contact points in said area. Also some text entry systems have been proposed, wherein the characters visible on the touch screen of an electronic device are selected by sliding a pen or a finger over the character to be entered.

[0005] The current text entry systems, such as handwriting or speech recognition systems, are often slow and error prone. Also in the handwriting systems the area reserved on the touch screen for writing characters is small, which makes it hard to write in said area in a moving vehicle, for example. If the selection of the characters is conducted by sliding a pen over the desired character visible on the touch screen, it is difficult to hit the correct character when, for example, the writer's hand shakes in a rush hour bus.

### BRIEF DESCRIPTION OF THE INVENTION

[0006] It is an object of the invention to provide a method and a user interface so as to alleviate prior art problems. This is achieved by a method for entering characters in a user interface of an electronic device, the user interface comprising: a display and an input device, the method comprising: predetermining a given character area on the display for each character, which character areas are in relation with each other in order to achieve a given character area pattern; detect-

ing a start of a character entering function; detecting a starting point on the display on the basis of the detected start of the character entering function. The method of the invention comprises: detecting the direction of movement indicated by the input device when the start of the character entering function has been detected; showing the character of the character area on the display towards which character area the direction of movement indicated by the input device is proceeding; detecting the termination of the character entering function and interpreting the character towards whose character area the direction of movement was last detected to proceed as the character to be entered next, when the termination of the character entering function is detected.

[0007] The invention also relates to a user interface for entering characters in an electronic device, the user interface comprising: a display for showing the entered characters; an input device for giving control commands for entering the characters; a control unit for controlling the functions of the user interface, the control unit being connected to the display and configured to: show characters on the display; receive control commands from the input device; predetermine a given character area on the display for each character, which character areas are in relation with each other in order to achieve a given character area pattern; detect a start of a character entering function; detect a starting point on the display on the basis of the detected start of the character entering function. The control unit is further configured to: detect the direction of movement indicated by the input device, when the start of the character entering function has been detected; show the character of the character area on the display, towards which character area the direction of movement indicated by the input device is proceeding; detect the termination of the character entering function and interpret the character towards whose character area the direction of movement was last detected to proceed as the character to be entered next, when the termination of the character entering function is detected.

[0008] The invention further relates to a computer program product encoding a computer program of instructions for executing a computer process for entering characters in a user interface of an electronic device, the user interface comprising: a display and an input device, the process comprising: predetermining a given character area on the display for each character, which character areas are in relation with each other in order to achieve a given character area pattern; detecting a start of a character entering function; detecting a starting point on the display on the basis of the detected start of the character entering function, the process further comprising: detecting the direction of movement indicated by the input device when the start of the character entering function has been detected; showing the character of the character area on the display towards which character area the direction of movement indicated by the input device is proceeding; detecting the termination of the character entering function; interpreting the character towards whose character area the direction of movement was last detected to proceed as the character to be entered next, when the termination of the character entering function is detected.

[0009] The invention also relates to a user interface for entering characters in an electronic device, the user interface comprising: display means for showing the entered characters; input means for giving control commands for entering the characters; processing means for controlling the functions of the user interface, the processing means being connected to

the display means and configured to: show characters on the display; receive control commands from the input means; predetermine a given character area on the display for each character, which character areas are in relation with each other in order to achieve a given character area pattern; detect a start of a character entering function; detect a starting point on the display on the basis of the detected start of the character entering function, wherein processing means further comprise: detection means for detecting the direction of movement indicated by the input device when the start of the character entering function has been detected; means for showing the character of the character area on the display towards which character area the direction of movement indicated by the input device is proceeding; means for detecting the termination of the character entering function; interpreting means for interpreting the character towards whose character area the direction of movement was last detected to proceed as the character to be entered next, when the termination of the character entering function is detected.

**[0010]** Preferred embodiments of the invention are described in the dependent claims.

**[0011]** The method and the user interface of the invention provide several advantages. In a preferred embodiment of the invention the method of entering characters is especially fast, easy and accurate. Great accuracy is not required of the users of the user interface according to the invention in order to select the right characters to be entered.

#### LIST OF THE DRAWINGS

**[0012]** In the following, the invention will be described in greater detail with reference to the preferred embodiments and the accompanying drawings, in which

**[0013]** FIG. 1 shows a device of the invention;

**[0014]** FIGS. 2A and 2B show details of a display of the device of the invention;

**[0015]** FIG. 3 is a block diagram of an embodiment of the invention; and

**[0016]** FIG. 4 is a block diagram of another embodiment of the invention.

#### DESCRIPTION OF THE EMBODIMENTS

**[0017]** The embodiments of the invention are applicable to portable electronic devices, such as a mobile station used as a terminal in telecommunication systems comprising one or more base stations and terminals communicating with the base stations. The device may be used for short-range communication implemented with a Bluetooth chip, an infrared or WLAN connection, for example. The portable electronic device is for example a mobile telephone or another device including telecommunication means, such as a portable computer, a handheld computer or a smart telephone. The portable electronic device may be a PDA (Personal Digital Assistant) device including the necessary telecommunication means for establishing a network connection, or a PDA device that can be coupled to a mobile telephone, for instance, for a network connection. The portable electronic device may also be a computer or PDA device not including telecommunication means.

**[0018]** FIG. 1 shows a block diagram of the structure of a portable electronic device. A control unit 100, typically implemented by means of a microprocessor and software or separate components, controls the basic functions of the device. The user interface of the device comprises a display

104, such as a touch screen implemented by manners known per se. In addition, the user interface of the device may include a loudspeaker and a keypad part. Depending on the type of device, there may be different and a different number of user interface parts. The device of FIG. 1, such as a mobile station, also includes conventional means 108 that implement the functions of a mobile station and include speech and channel coders, modulators and RF parts. The device also comprises an antenna 110.

**[0019]** The functions of the device are controlled by means of an input device, such as a mouse 106, a hand-held locator operated by moving it on a surface. When using a mouse 106, for example, a sign or symbol shows the location of a mouse cursor on the display 104 and often also the function running in the device, or its state. It is also possible that the display 104 is by itself the input device achieved by means of a touch screen such that the desired functions are selected by touching the desired objects visible on the display 104. The touch on the display 104 is carried out by means of a pen or a finger, for example.

**[0020]** The input device 104, 106 is for giving control commands for entering the characters. The control unit 100 controls the functions of the user interface and is connected to the display 104 and configured to show characters on the display 104. The control unit 100 receives control commands from the input device 104, 106. The entered character may be one or more letters, digits, images or a combination thereof including two or more characters. It is possible that there are different functions for entering certain kinds of characters. Thus, the characters of the alphabet and the numbers, for example, have separate specific character entering functions.

**[0021]** The characters are entered in a character entering function controlled by the control unit 100 of the electronic device. The character entering function operates such that the desired characters visible on the display 104, for example, are first selected by means of the input device. Then, the control unit interprets the selected character as the character to be entered next and displays the character on the display 104. In an embodiment of the invention the control unit 100 detects a start of a character entering function. The start of the character entering function is detected for instance on the basis of a touch on the display 104. Alternatively, the start of the character entering function is detected by means of a start signal given with an input device 104, 106. A touch on the display 104 results in the software in the memory of the control unit 100 detecting the start of the character entering function, and after that, the control unit 100 detects a starting point on the display 104, based on the detected start of the character entering function. The starting point on the display 104 may be a touch point on the display or a point where a mouse cursor was located at the moment when the start of the character entering function was detected, for example.

**[0022]** According to an embodiment of the invention, the control unit is configured to predetermine a given character area on the display 104 for each entered character, such as a character of the alphabet. The character areas are in relation with each other in order to form a given character area pattern. The character areas may virtually form a certain pattern, such as a circle or a triangle, on the display 104. Other possible character area patterns are linear lines, for example. The locations of the character areas on the display 104 are based on the location of the starting point, for example. If the character areas are in relation to the starting point on the display 104, the locations of the character areas change according to

the location of the starting point. During the character entering function, the characters are not visible on the display **104**. It is possible, however, that the character areas are visible on the display **104**. Alternatively, the character areas and/or the characters are visible on the display **104**.

**[0023]** When the start of the character entering function has been detected, the control unit **100** detects a direction of movement indicated by the input device **104**, **106**. The direction of movement is detected on the basis of a direction vector between the starting point and another point on the display **104**, to which other point the touch of the pen or the cursor of the mouse on the display **104** moves, for example. Next, the character of the character area on the display **104**, towards which character area the direction of movement indicated by the input device **104**, **106** is proceeding, is shown on the display **104**. Thus, only the character of the character area, towards which character area the direction of movement is proceeding, is visible on the display **104**. Alternatively, if all the characters are visible on the display, the character of the character area, towards which the direction of movement is proceeding, is shown with the help of outlining or lights, for example. The character area towards which the direction of movement is proceeding is determined in the control unit **100** by appropriate numerical methods, such as interpolation or extrapolation, known per se.

**[0024]** The control unit **100** continues to monitor the direction of movement indicated by the input device **104**, **106**. As the movement indicated by the input device **104**, **106** proceeds, the direction of movement is recalculated after given periods of time. The latest direction of movement is based on a direction vector calculated by means of two points selected from the route of the movement on the display **104**, the two points being at a given distance apart from each other, for example. If a change in the direction of movement is detected, then another character of the character area, towards which character area the new direction of movement is proceeding, is shown on the display **104**. The direction of movement can be determined also such that after the calculation of the direction vector, the starting point on the display **104** is interpreted to be also the starting point for the direction vector. Thus, the detection of the last direction of movement is based on the location of the starting point on the display **104** as well, for example.

**[0025]** The control unit **100** continues to monitor the direction of movement and to show the characters until termination of the character entering function is detected. The termination of the character entering function is detected when the movement indicated by the input device stops, for example. Alternatively the termination of the character entering function is detected on the basis of a signal given with the input device. In an embodiment of the invention, the speed of the movement indicated by the input device is detected after the start of the character entering function has been detected, and the termination of the character entering function is detected when the speed of the movement indicated by the input device is of a predetermined value.

**[0026]** The control unit **100** interprets the character towards whose character area the direction of movement was last detected to proceed as the character to be entered next when the termination of the character entering function is detected. The entered character is shown in an area for entered characters on the display **104**, for example.

**[0027]** If the termination of the character entering function is detected when the movement indicated by the input device

stops, a given period of time can be predetermined to lapse, during which time the movement of the input device is to be on halt, before the character towards whose character area the direction of movement was last detected to proceed is shown on the display **104**. Thus, if the user of the electronic device wishes to interrupt the entering of the characters, lifting the input device off the display before the given period of time has lapsed, results in exiting the character entering function without any character selection. The detection of lifting the input device off the display can be predetermined to result in other effects as well.

**[0028]** Let us next study embodiments of the invention by means of FIGS. 2A and 2B. FIGS. 2A and 2B show a display **200** of an electronic device, such as a PDA device. The characters are selected by means of an input device, such as a pen or a mouse. A character, in turn, is one or more letters, digits, images or a combination thereof including two or more symbols. In FIGS. 2A and 2B the characters are letters of the alphabet. When wishing to start entering characters, the user of the device first starts the character entering function by using a pen or a mouse, for example. FIGS. 2A and 2B shown a starting point **216** on the display **200**, which starting point **216** is detected on the basis of the detected start of the character entering function. The user may, for example, touch the display **200** with a pen in order to start the character entering function. Then the starting point **216** is, for example, a point on the display **200** where the pen first touched. In FIGS. 2A and 2B the predetermined character areas **202**, **204**, **206**, **208**, **210**, **212** on the display **200** are also shown. On the display **200** there is also an area **218** for the entered characters.

**[0029]** In FIG. 2A the character areas **202-212** virtually form a circle **214** around the starting point **216**. A separate character area **202-212** is predetermined for each character in relation with each other and to the starting point **216**, for example. Thereby, where ever on the display **200** the starting point **216** is detected to locate, the character areas **202-212** are always at the same locations on the display **200** in relation to the starting point **216**. For example, in FIG. 2A the character areas **202-212** are in a circular form. The character areas **202-212** are predetermined in the settings of the electronic device by the manufacturer, for example. Alternatively, the user of the device chooses the desired character areas **202-212** by using different setting options of the device.

**[0030]** In order to choose a desired character to be entered, the user of the device next starts to move the pen, for example, on the display **200** towards the given character area **202-212** of the desired character. The characters to be entered are, for example, invisible on the display **200**. As the user moves the pen towards a given character area **202-212**, the character of the character area **202-212** towards which the movement of the pen is detected to proceed is shown on the display **200** by means of lights or outlining, for example. When the desired character is shown on the display, the user then selects the character by terminating the character entering function. The termination of the character entering function is detected when the user stops moving the pen or lifts the pen off the display **200**, for example. Alternatively, the termination of the character entering function is detected when the user presses a key of the mouse, for example.

**[0031]** In the situation of FIG. 2A the user has already entered some characters shown in the area for entered characters **218**. Next the user wishes to enter the character "s". At first the user touches the display with the pen at the starting point **216**. The starting point **216** is, for example, at the point

on the display that the touch of the pen hits first. Then the user starts moving the pen towards the character areas **202-212**. In FIG. 2A the route **220** of the pen moving on the display **200** is also shown. At first, the pen has moved towards the character area **210**. The character of the character area **210** is shown on the display **200** with lights, for example. When the user notices, on the basis of the characters shown on the display, that the movement of the pen is going to the wrong direction, he then adjusts the direction of the movement of the pen. Moving the pen towards the character area **212**, which character area **212** is predetermined for the character “s”, shows the character “s” on the display **200**. The user only has to move the pen for as long as the desired character is shown on the display **200**.

**[0032]** In FIG. 2A the pen is moved only a short distance on the display **200**, along the route **220** of the moving pen. As soon as the character area **212** towards which the direction of movement indicated by the pen is proceeding is detected, the movement of the pen can be stopped. The last detected direction of movement, before the detection of the termination of the character entering function, is shown in FIG. 2A with a dashed arrow **222**. As the user notices the desired character “s” on the display **200**, he terminates the character entering function in order to enter the character “s”. As the termination of the character entering function is detected, the character “s” is shown in the area **218** for entered characters. In order to enter the next character the user starts the character entering function, by touching the display **200** with a pen, for example.

**[0033]** If he has accidentally entered a wrong character or wishes to remove character already entered for some reason, the user may give control commands for editing the entered character. The control commands for editing are, for example, based on successive detections of sudden direction changes of movements indicated by the input device, such as the pen. The control command for removing the entered character comprises, for example, moving the pen first to the right and then moving the pen back to the left. Also other functions can be based on detections of sudden direction changes of movements indicated by the input device. Thus, for example, the entering of special characters or spaces can be accomplished by moving the input device in different directions in a predetermined fashion. The user may predetermine given successive movements of the input device to be associated to certain functions.

**[0034]** For a situation when the character entering function is in progress and the user wishes to stop entering characters entirely without selecting any characters, it is possible to predetermine a specific ending signal, the character entering function being interrupted once the ending signal has been detected by the control unit of the user interface. The detection of the input device moving randomly back and forth on the display, for example, can be interpreted as such an ending signal.

**[0035]** In FIG. 2B the areas **202-212** for the characters are linear in such a way that the character areas **202-212** are virtually forming two linear lines **213, 215** on the display **200** and on different sides of the starting point **216**. Alternatively, all the character areas **202-212** can virtually form a single linear line **213, 215** on the display **200**. It is possible that only a few character areas **202-212** for certain characters, such as the characters most commonly used, are located on the other side of the starting point **216** than where all the other character areas **202-212** for the other characters are located.

**[0036]** In an embodiment of the invention illustrated in FIG. 2B there is a character showing area **224** for showing the character of the character area **202-212** towards which the direction of movement of the input device is last detected to proceed. Additionally, the characters of the character areas **202-212** towards which the direction of movement of the input device is detected to proceed can be indicated with lights, outlining or with sounds of different tone height, for example.

**[0037]** Also in the situation of FIG. 2B the user has already entered some characters shown in the area for entered characters **218**. Next the user wishes to enter the character “s”. At first the user touches the display with the pen at the starting point **216**. The starting point **216** is, for example, at the point on the display that the touch of the pen hits first. In FIG. 2B the arrow lines **219, 220, 221, 225** illustrate the different directions to which the user moves the pen at given times. The user starts moving the pen towards the character areas **202-217**. First, the direction of the movement of the pen, indicated by the arrow line **219**, is towards the character area **208** for the letter “m”. The letter “m” of the character area **208** is shown on the display **200** when the user is moving the pen towards it. The letter “m” is shown in the character showing area **224**, for example. The user notices that the movement of the pen is going in the wrong direction and he next moves the pen slightly in another direction indicated by the arrow line **220**. Next the direction of the pen proceeds towards the area **210** for the letter “n”. Once again, the letter towards which the movement of the pen is detected to proceed is shown on the display **200** in the character showing area **224**, for example. The user then adjusts the direction of the movement of the pen a bit more until the direction, indicated by the arrow line **221**, is towards the character area **212** for the letter “s”. When the user moves the pen towards the character area **212** for the letter “s”, the letter “s” is shown on the display **200**. The last direction in which the movement of the pen is detected to proceed, before the character entering function is terminated, is indicated with the dashed arrow **222**.

**[0038]** In FIGS. 2A and 2B the last direction of movement indicated by the pen is detected on the basis of a direction vector generated with the help of two points from the route of the movement on the display **104**, the two points being at a given distance from each other, for example. In FIG. 2B, for example, the two points defining the direction vector indicated by the arrow line **221** are located at the beginning and at the end of the arrow line **221**. If the last direction of movement were detected based on the starting point **216** as well, the situation in FIGS. 2A and 2B would be different in such a way that the direction vector, indicated by the arrow line **221**, would then be considered to virtually start from the starting point **216**. The arrow line **225** shows the new location of the direction vector, corresponding to the arrow line **221** when the direction of movement is detected based on the starting point **216** as well. Here, the direction of movement indicated by the arrow line **225** would be interpreted to proceed towards the character area **217** for the letter “u”, for example. Thus, the last direction in which the movement of the pen would be detected to proceed before the character entering function is terminated is indicated with the dashed arrow **226**.

**[0039]** Once again, the user only has to move the pen for as long as the desired letter “s” is shown on the display **200**. In the situation of FIG. 2B, the letter “s” is shown on the display **200** when the pen is at the end of the arrow **221** that is proceeding towards the character area **212** for the letter “s”,



for example. Different limits can be preset to predetermine how long and/or for how far the pen, for example, has to be moved in a certain direction before the character of the character area **202-217** towards which the movement of the pen is detected to proceed, is shown on the display **200**. In an embodiment of the invention it is also possible that when the direction of movement of the input device is detected to change, a second character area **202-217** next to the first character area **202-217** towards which the direction of movement was first indicated to proceed, is shown on the display even before the direction of movement of the input device actually is detected to proceed exactly towards the second character area **202-217**.

**[0040]** When satisfied with the character shown on the display **200**, the user terminates the character entering function by stopping the movement of the pen, for example. As the termination of the character entering function is detected, the character "s" is shown in the area **218** for entered characters. In order to enter the next character the user starts the character entering function, by touching the display **200** with a pen, for example, or by continuing the movement of the pen after the previous character has been selected. Thus, it is possible to enter the desired characters even without lifting the pen from the display **200** between the character selections.

**[0041]** Let us next study an embodiment of the invention by means of FIG. 3. FIG. 3 shows a block diagram of the character entering method. A separate character area is predetermined for each character on the display, which character areas are in relation with each other. In block **300** the device is in an idle state and monitors the state of the user interface. In the idle state the start of the character entering function by touching the display of the user interface, for example, is feasible. Giving a start signal with another input device can start the character entering function as well. Such an input device may be for instance a separate keypad, provided the device comprises a keypad, and the start signal is for instance the depression of a given key or keys of the keypad. The input device may also be the display itself or a start signal area specified in the display area, the touching of which starts the character entering function.

**[0042]** If in block **302** the control unit detects the start of the character entering function, based for instance on a start signal given with an input device, the starting point on the display is detected and block **304** is entered, where the control unit starts detecting the direction of movement indicated by the input device. When the control unit has detected the direction of movement indicated by the input device, block **306** is entered, where the character of the character area towards which the direction of movement is directed, is shown on the display. Alternatively, the character is shown only after the direction of the movement indicated by the input device has been to the same direction for a given period of time. In an embodiment of the invention it is also possible that the most probable character area on the display towards which the direction of movement indicated by the input device is proceeding is detected in block **304**, and in block **306** the character of the most probable character area on the display towards which the direction of movement indicated by the input device is proceeding is shown on the display.

**[0043]** In block **308** possible changes in the direction of movement is observed. If in block **308** a change in the direction of movement is detected, block **304** is re-entered, where the direction of movement is detected. If in block **308** no changes in the direction of movement are detected, block **310**

is entered, where the termination of the character entering function is monitored. If in block **310** no termination of the character entering function is detected, block **306** remains, where the character of the character area towards which the direction of movement is directed, is shown on the display. When the termination of the character entering function in block **310** is detected, block **312** is entered, where the character towards whose character area the direction of movement was last detected to proceed is interpreted as the character to be entered next. Finally, in block **314** the interpreted character is shown on the display, in the area for entered characters, for example.

**[0044]** Let us next study another embodiment of the invention by means of FIG. 4. FIG. 4 shows a block diagram of the character entering method. In block **400** a separate character area is predetermined for each character on the display, which character areas are in relation with each other in order to achieve a given character area pattern. In block **402** the device is in an idle state and monitors the state of the user interface. If in block **404** the control unit detects the start of the character entering function, based for instance on a start signal given with an input device, the starting point on the display is detected and block **406** is entered, where the control unit determines, on the basis of the location of the starting point, the locations of the character areas on the display. Thus, where ever on the display the starting point is detected to locate, the character areas are always in relation with the starting point. The character areas may be in form of a circle around the starting point, for example.

**[0045]** In block **408** the control unit starts detecting the direction of movement indicated by the input device. When the control unit has detected the direction of movement indicated by the input device, block **410** is entered, where the character of the character area towards which the direction of movement is directed is shown on the display. Then, if in block **412** a change in the direction of movement is detected, block **408** is re-entered. If in block **412** no changes in the direction of movement are detected, block **414** is entered, where the termination of the character entering function is monitored. If in block **414** no termination of the character entering function is detected, block **410** remains. When the termination of the character entering function in block **414** is detected, block **416** is entered, where the character towards whose character area the direction of movement was last detected to proceed is interpreted as the character to be entered next. Finally, in block **418** the interpreted character is shown on the display, in the area for entered characters, for example.

**[0046]** Even though the invention is described above with reference to an example according to the accompanying drawings, it is clear that the invention is not restricted thereto but it can be modified in several ways within the scope of the appended claims.

What is claimed is:

1. A device, comprising:

- a touch screen configured to display a keypad and receive touch inputs to the keypad, wherein the touch inputs comprise at least a first touch input and one more touch movements that are input in sequence without lifting of the touch inputs from the keypad; and
- a processor configured via software to cause the device at least to:

detect the start of a character entering function that comprises at least the first touch input to the keypad that enters a first character;

detect the one more touch movements on the touch screen subsequent to the character entering function, wherein endings of each of the touch movements correspond to locations of the keypad that cause entering one or more respective other characters;

detect a termination of the character entering function; and

displaying at least the first and other characters on an area of the touch screen that displays entered characters.

2. The device of claim 1, wherein the termination of the character entering function comprises a lifting of the touch inputs following the one or more touch movements.

3. The device of claim 1, wherein the termination of the character entering function comprises a stopping of movement of the touch inputs following the one or more touch movements.

4. The device of claim 1, wherein the endings of at least one of the one or more touch movements comprises a change in direction of the touch inputs that corresponds to the beginning of a subsequent touch movement of the one or more touch movements that follows the at least one touch movement.

5. The device of claim 1, wherein the endings of at least one of the touch movements comprises stopping of movement the touch inputs.

6. The device of claim 1, wherein the processor further causes the device to detect a random back and forth input to the touch screen during the character entering function and, in response thereto, ending the character entering function without entering the first and other characters.

7. The device of claim 1, wherein the processor further causes the device to detect sudden direction changes of movement input to the touch screen during the character entering function and, in response thereto, executing a control command for editing.

8. The device of claim 1, wherein the processor further causes the device to detect sudden direction changes of movement input to the touch screen during the character entering function and, in response thereto, entering a special character.

9. A method, comprising:

receiving touch inputs to a keypad of a touch screen, wherein the touch inputs comprise at least a first touch input and one more touch movements that are input in sequence without lifting of the touch inputs from the keypad;

detecting the start of a character entering function that comprises at least the first touch input to the keypad that enters a first character;

detecting the one more touch movements on the touch screen subsequent to the character entering function, wherein endings of each of the touch movements correspond to locations of the keypad that cause entering one or more respective other characters;

detecting a termination of the character entering function; and

displaying at least the first and other characters on an area of the touch screen that displays entered characters.

10. The method of claim 9, wherein the termination of the character entering function comprises a lifting of the touch inputs following the one or more touch movements.

11. The method of claim 9, wherein the termination of the character entering function comprises a stopping of movement of the touch inputs following the one or more touch movements.

12. The method of claim 9, wherein the endings of at least one of the one or more touch movements comprises a change in direction of the touch inputs that corresponds to the beginning of a subsequent touch movement of the one or more touch movements that follows the at least one touch movement.

13. The method of claim 9, wherein the endings of at least one of the touch movements comprises stopping of movement of the touch inputs.

14. The method of claim 9, further comprising detecting a random back and forth input to the touch screen and, in response thereto, ending the character entering function without entering the first and other characters.

15. The method of claim 9, further comprising detecting sudden direction changes of movement input to the touch screen during the character entering function and, in response thereto, executing a control command for editing.

16. The method of claim 9, further comprising detecting sudden direction changes of movement input to the touch screen during the character entering function and, in response thereto, entering a special character.

17. A computer program product encoding a computer program of instructions for executing the method of claim 9 as a computer process.

18. A user interface device, comprising:

means for receiving touch inputs to a keypad of a touch screen, wherein the touch inputs comprise at least a first touch input and one more touch movements that are input in sequence without lifting of the touch inputs from the keypad;

means for detecting the start of a character entering function that comprises at least the first touch input to the keypad that enters a first character;

means for detecting the one more touch movements on the touch screen subsequent to the character entering function, wherein endings of each of the touch movements correspond to locations of the keypad that cause entering one or more respective other characters;

means for detecting a termination of the character entering function; and

means for displaying at least the first and other characters on an area of the touch screen that displays entered characters.

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