MOBILE ELECTRONIC DEVICE, CONTROLLING METHOD THEREOF AND NON-TRANSITORY RECORDING MEDIUM THEREOF

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ABSTRACT

A mobile electronic device, a controlling method and a non-transitory recording medium thereof are provided. In the method, an input signal is received through a touch screen of the mobile electronic device while the mobile electronic device is in a first state. Then, a movement track of the input signal is obtained if a starting point of the input signal is located in a status bar display area of the touch screen, and a displacement in a specific direction of the input signal is calculated. Finally, an information frame is dragged out and displayed, and the mobile electronic device is switched to a second state if the displacement in the specific direction reaches a predetermined value. Thereby, an intuitional way for showing information while the mobile electronic device is in the second state is provided, and accordingly, the convenience in operating the mobile electronic device is improved.
Start

Receive an input signal through a touch panel 210

Whether a starting point of the input signal is located in a non-display area 220

Yes
Obtain a movement track of the input signal 230

Whether the movement track contains a specific direction 240

Yes
Calculate a displacement of the input signal 250
Switch the mobile electronic device to a screen lock state when the displacement reaches a predetermined value 260

End

FIG. 2
Start

Receive an input signal through a touch panel 410

Whether a starting point of the input signal is located in a status bar display area 420

Yes

Obtain a movement track of the input signal 430

Whether the movement track contains a specific direction 440

Yes

Calculate a displacement of the input signal 450

Switch the mobile electronic device to a screen lock state when the displacement reaches a predetermined value 460

End

FIG. 4
MOBILE ELECTRONIC DEVICE, CONTROLLING METHOD THEREOF AND NON-TRANSITORY RECORDING MEDIUM THEREOF

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This is a continuation application of and claims the priority benefit of U.S. application Ser. No. 12/272,811, filed on Nov. 18, 2008, now allowed, which claims the priority benefit of Taiwan application serial no. 97113776, filed on Apr. 16, 2008. The entirety of each of the above-mentioned patent applications is hereby incorporated by reference herein and made a part of this specification.

BACKGROUND

[0002] 1. Field of the Invention

[0003] The present invention generally relates to a mobile electronic device having a touch screen, and more particularly, to a method for controlling the mobile electronic device and a non-transitory recording medium thereof.

[0004] 2. Description of Related Art

[0005] Along with the development of technologies, consumers' requirement cannot be met by simply integrating multiple functions into one electronic device. The operation of a fully functional electronic device has to be very convenient in order to meet the increasing demand of today's consumers. For example, hardware keypad is usually used as the input interface for mobile phones in early stage. However, touch screen has gradually replaced hardware keypad as the input interface of mobile phones for it is more convenient, intuitive, durable, and inexpensive.

[0006] During the operation, the mobile phone having a touch screen may be set to different state (e.g. the operational state or the screen lock state, etc.) to facilitate the desired result. Accordingly, a convenient mechanism for switching to different state has to be provided. Furthermore, since a great number of phone features are available in today's mobile phones and numerous applications are designed to be installed therein, users are able to obtain various information through the mobile phones. However, when a user wants to get several kind of information, the user has to launch the corresponding applications one after another to browse the related information via the user interfaces of each application. The launching of multiple applications will use up a lot of operation time, which will give users a negative impression.

SUMMARY

[0007] The present invention provides a controlling method for a mobile electronic device having a touch screen, wherein the touch screen includes a status bar display area and an operation area. In the present method, an input signal is received through the touch screen while the mobile electronic device is in a first state. Then, whether a starting point of the input signal is located in the status bar display area is determined. A movement track of the input signal is obtained if the starting point is located in the status bar display area, and a displacement in a specific direction of the input signal is calculated. Finally, the mobile electronic device is switched to a second state when the displacement in the specific direction reaches a predetermined value.

[0008] According to an embodiment of the present invention, the step of switching the mobile electronic device to the second state when the displacement in the specific direction reaches the predetermined value includes dragging an information frame from an edge of the touch screen closest to the starting point along the specific direction to display the information frame on the touch screen.

[0009] According to an embodiment of the present invention, wherein the information frame includes at least one type of information of a battery capacity, a signal strength, a date/time, a missed call, an unread e-mail, an unread short message, an unread voice mail, and a ring mode.

[0010] According to an embodiment of the present invention, wherein the information frame is a full screen frame completely covering the touch screen.

[0011] According to an embodiment of the present invention, wherein the specific direction is vertical direction or horizontal direction.

[0012] According to an embodiment of the present invention, the status bar display area is fixed to an upper position of the touch screen, and information displayed in the status bar display area includes at least a battery capacity, a signal strength, a date/time, or a ring mode.

[0013] The present invention provides a non-transitory recording medium for recording a computer program, wherein the computer program includes a plurality of program codes, and the computer program can be loaded into a mobile electronic device to allow the mobile electronic device to execute the foregoing controlling method.

[0014] The present invention provides a mobile electronic device including a touch screen, an input signal movement detecting module, and a processor module. The touch screen includes a status bar display area and an operation area. The input signal movement detecting module is connected to the touch screen and is used for determining whether a starting point of an input signal received by the touch screen while the mobile electronic device is in a first state is located in the status bar display area, obtaining a movement track of the input signal if the starting point is located in the status bar display area, and calculating a displacement in a specific direction of the input signal. The processor module is connected to the touch screen and the input signal movement detecting module and is used for switching the mobile electronic device to a second state when the displacement in the specific direction reaches a predetermined value.

[0015] According to an embodiment of the present invention, the processor module drags out an information frame from an edge of the touch screen closest to the starting point along the specific direction to display the information frame on the touch screen. In which, the information frame includes at least one type of information of a battery capacity, a signal strength, a date/time, a missed call, an unread e-mail, an unread short message, an unread voice mail, and a ring mode. In some embodiments, the information frame is a full screen frame completely covering the touch screen.

[0016] According to an embodiment of the present invention, wherein the specific direction is vertical direction or horizontal direction.

[0017] According to an embodiment of the present invention, the status bar display area is fixed to an upper position of the touch screen, and information displayed in the status bar display area includes at least a battery capacity, a signal strength, a date/time, and a ring mode, etc.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The accompanying drawings are included to provide a further understanding of the invention, and are incor-
porated in and constitute a part of this specification. The drawings illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

FIG. 1 is a block diagram of a mobile electronic device according to an embodiment of the present invention.

FIG. 2 is a flowchart of a method for entering a screen lock state according to an embodiment of the present invention.

FIG. 3 is a block diagram of a mobile electronic device according to another embodiment of the present invention.

FIG. 4 is a flowchart of a method for entering a screen lock state according to another embodiment of the present invention.

DESCRIPTION OF THE EMBODIMENTS

Reference will now be made in detail to the present preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers are used in the drawings and the description to refer to the same or like parts.

FIG. 1 is a block diagram of a mobile electronic device according to an embodiment of the present invention. Referring to FIG. 1, the mobile electronic device 100 includes a touch panel 110, an input signal movement detecting module 120, and a processor module 130. The mobile electronic device 100 may be a cell phone, a personal digital assistant (PDA), or a smartphone; however, the present invention is not limited thereto.

The touch panel 110 is used for detecting a touch operation of a user and receiving a corresponding input signal. In the present embodiment, the touch panel 110 includes a display area 111 and a non-display area 113. The display area 111 is used for displaying an operation frame (for example, a user interface of an application program) of the mobile electronic device 100. However, both the display area 111 and the non-display area 113 can receive an input signal generated by the touch operation of the user.

The input signal movement detecting module 120 is connected to the touch panel 110 and is used for determining whether a starting point of the input signal is located in the non-display area 113, obtaining a movement track of the input signal when the starting point is located in the non-display area 113, and calculating a vertical displacement of the input signal when the movement track contains a specific direction.

The processor module 130 is connected to both the touch panel 110 and the input signal movement detecting module 120 and is used for switching the mobile electronic device 100 to a screen lock state when the vertical displacement of the input signal reaches a predetermined value.

In other words, through the operation of the input signal movement detecting module 120 and the processor module 130, a user needs only to touch the non-display area 113 on the touch panel 110 and move his finger (or any other input tool, such as a stylus) along the specific direction, and the mobile electronic device 100 is then switched from, for example, an operational state, to the screen lock state once the vertical displacement reaches the predetermined value.

The detailed steps for the mobile electronic device 100 to enter the screen lock state will be further described with reference to the following embodiment. FIG. 2 is a flowchart of a method for entering the screen lock state according to an embodiment of the present invention. Referring to both FIG. 1 and FIG. 2, first, in step 210, the touch panel 110 receives an input signal generated by a touch operation of a user.

Then, in step 220, the input signal movement detecting module 120 determines whether a starting point of the input signal is located in the non-display area 113. If the starting point of the input signal is located in the non-display area 113, then in step 230, a movement track of the input signal is obtained. Next, in step 240, whether the movement track contains a specific direction is determined. If the movement track contains the specific direction, then in step 250, a displacement (e.g., a vertical displacement) of the input signal is calculated.

For the convenience of description, it is assumed hereinafter that the specific direction is a downward direction. In an embodiment of the present invention, when the user touches the non-display area 113 and slides his finger (or any other input tool) vertically downwards, the input signal movement detecting module 120 starts to calculate the vertical displacement of the input signal. In another embodiment of the present invention, when the user touches the non-display area 113 and slides his finger towards left bottom or right bottom of the touch panel, the input signal movement detecting module 120 also calculates the vertical displacement of the input signal since the corresponding movement track contains the downward direction.

Finally, in step 260, the processor module 130 switches the mobile electronic device 100 to the screen lock state when the vertical displacement of the input signal reaches a predetermined value. As described in foregoing embodiment, the specific direction is a downward direction. Accordingly, the processor module 130 switches the mobile electronic device 100 to the screen lock state when the vertical component of the vertical displacement reaches the predetermined value.

When the processor module 130 switches the mobile electronic device 100 to the screen lock state, first, the processor module 130 drags and displays a screen lock frame in the display area 111 from an edge of the display area 111 closest to the starting point of the input signal along the movement track of the input signal. Then, the processor module 130 turns off the function of the mobile electronic device 100 for receiving operations. In an embodiment of the present invention, the processor module 130 only turns off the main functions (for example, functions for making phone calls, playing video/audio files, and capturing images) of the mobile electronic device 100. In other words, the user can still use some functions of the mobile electronic device 100 through the screen lock frame after the mobile electronic device 100 enters the screen lock state.

It has to be noted herein that the screen lock frame displayed by the processor module 130 is a full screen frame which completely covers the display area 111. Information displayed in the screen lock frame includes a battery capacity, a signal strength, a date/time, a missed call, an unread e-mail, an unread short message, an unread voice mail, and a ring mode, etc., wherein the missed call may correspond to a voice call or a video call, and the unread e-mail may be an unread text e-mail or multimedia e-mail. Thus, the user can still browse the related information of the mobile electronic device 100 through the screen lock frame after the mobile electronic device 100 enters the screen lock state.

Foregoing method for entering the screen lock state may be executed in any mobile electronic device having a
processor. In other words, foregoing embodiment can be designed as a computer program having a plurality of program codes, and the computer program is recorded in a computer-readable recording medium (for example, a CD, a floppy disk, or a removable hard disk, etc.). After the computer program is loaded into a mobile electronic device, the method described in foregoing embodiment for entering the screen lock state can then be executed by the mobile electronic device.

As described above, when a user uses a mobile electronic device disposed with a touch panel, the mobile electronic device which is originally in, for example, an operational state, is switched to a screen lock state through a sliding operation containing a specific direction and having a vertical displacement of a predetermined value.

The present invention is further described in the following embodiment with a mobile electronic device having a touch screen as an example. FIG. 3 is a block diagram of the mobile electronic device according to another embodiment of the present invention. Referring to FIG. 3, the mobile electronic device 300 in the present embodiment may be a cell phone, a PDA, or a smartphone; however, the present invention is not limited thereto. The mobile electronic device 300 includes a touch screen 310, an input signal movement detecting module 320, and a processor module 330.

The touch screen 310 can be used for displaying frames and receiving touch operations of a user. Accordingly, the touch screen 310 serves as an input/output interface of the mobile electronic device 300. In the present embodiment, the touch screen 310 includes a status bar display area 311 and an operation area 313. As shown in FIG. 3, the status bar display area 311 is fixed to an upper position of the touch screen 310 and is used for displaying information such as a battery capacity, a signal strength, a date/time, an unread voice mail, and a ring mode. The operation area 313 located below the status bar display area 311 is used for displaying a user interface of different application programs and receiving an operation corresponding to the user interface when the mobile electronic device 300 is in an operational state.

The input signal movement detecting module 320 is connected to the touch screen 310 and is used for determining whether a starting point of an input signal generated by a touch operation of the user is located in the status bar display area 311 when the touch screen 310 receives the input signal. The input signal movement detecting module 320 obtains a movement track of the input signal if the starting point is located in the status bar display area 311 and calculates a vertical displacement of the input signal when the movement track contains a specific direction.

The processor module 330 is connected to both the touch screen 310 and the input signal movement detecting module 320 and is used for automatically switching the mobile electronic device 300 to the screen lock state when the vertical displacement of the input signal reaches a predetermined value. The detailed steps for the mobile electronic device 300 to enter the screen lock state will be described below with reference to FIG. 4.

First, in step 410, the touch screen 310 receives an input signal generated by a touch operation of a user. Then, in step 420, the input signal movement detecting module 320 determines whether a starting point of the input signal is located in the status bar display area 311. If the starting point is located in the status bar display area 311, the input signal movement detecting module 320 obtains a movement track of the input signal (step 430), determines whether the movement track contains a specific direction (for example, a downward direction) (step 440), and calculates a vertical displacement of the input signal if the movement track contains the specific direction (step 450).

Finally, in step 460, the processor module 330 switches the mobile electronic device 300 to the screen lock state when the vertical displacement of the input signal reaches a predetermined value. In the present embodiment, the specific direction is a downward direction, and accordingly the processor module 330 switches the mobile electronic device 300 to the screen lock state when the vertical component corresponding to the input signal reaches the predetermined value. Meanwhile, the processor module 330 sings and displays a screen lock frame from an edge of the touch screen 310 closest to the starting point of the input signal along the movement track and turns off the function of the mobile electronic device 300 for receiving operations. In an embodiment of the present invention, the processor module 330 does not turn off all the functions of the mobile electronic device 300 but only some of the main functions so that the user can still operate the other functions through the screen lock frame.

It can be understood from foregoing description that when the user touches the status bar display area 311 and slides his finger (or any other input tool) towards the bottom, lower left, or lower right of the touch screen 310, the mobile electronic device 300 is switched to the screen lock state once the vertical component corresponding to the vertical displacement reaches the predetermined value. After the mobile electronic device 300 enters the screen lock state, the user can see a screen lock frame which completely covers the touch screen 310. Namely, the screen lock frame is a full screen frame covering both the status bar display area 311 and the operation area 313. Since information such as a battery capacity, a signal strength, a date/time, a missed call (including voice call or video call), an unread e-mail (including text e-mail and multimedia e-mail), an unread short message, an unread voice mail, or a ring mode is displayed in the screen lock frame, the user can still obtain related information of the mobile electronic device 300 through the screen lock frame therefore won’t mistake the screen lock state as a system shutdown.

The method illustrated in FIG. 4 for entering the screen lock state can be executed in any mobile electronic device having a processor. Forgoing embodiment can be designed as a computer program including a plurality of program codes, and the computer program is recorded in a computer-readable recording medium (for example, a CD, a floppy disk, or a removable disk). The computer program can be loaded into the mobile electronic device to allow the mobile electronic device to execute foregoing method for entering the screen lock state.

In overview, the present invention provides a mobile electronic device, a method for entering a screen lock state and a recording medium thereof, wherein whether the mobile electronic device is switched to the screen lock state is determined according to a starting position of a touch operation of a user on a touch screen or a touch panel, the movement direction, and the value of the displacement. In the present invention, the screen lock function is turned on through touching and sliding operation instead of the conventional
method of clicking on an icon, so that the operation of the mobile electronic device is diversified and is made more convenient.

[0046] It will be apparent to those skilled in the art that various modifications and variations can be made to the structure of the present invention without departing from the scope or spirit of the invention. In view of the foregoing, it is intended that the present invention cover modifications and variations of this invention provided they fall within the scope of the following claims and their equivalents.

What is claimed is:

1. A controlling method for a mobile electronic device having a touch screen, wherein the touch screen comprises a status bar display area and an operation area, the method comprising:
   - receiving an input signal through the touch screen when the mobile electronic device is in a first state;
   - determining whether a starting point of the input signal is located in the status bar display area;
   - obtaining a movement track of the input signal if the starting point is located in the status bar display area;
   - calculating a displacement in a specific direction of the input signal; and
   - switching the mobile electronic device to a second state when the displacement in the specific direction reaches a predetermined value.

2. The method according to claim 1, wherein the step of switching the mobile electronic device to the second state when the displacement in the specific direction reaches the predetermined value comprises:
   - dragging an information frame from an edge of the touch screen closest to the starting point along the specific direction to display the information frame on the touch screen.

3. The method according to claim 2, wherein the information frame includes at least one type of information of a battery capacity, a signal strength, a date/time, a missed call, an unread e-mail, an unread short message, an unread voice mail, and a ring mode.

4. The method according to claim 2, wherein the information frame is a full screen frame completely covering the touch screen.

5. The method according to claim 1, wherein the specific direction is vertical direction or horizontal direction.

6. The method according to claim 1, wherein the status bar display area is fixed to an upper position of the touch screen, and information displayed in the status bar display area includes at least one or a combination of a battery capacity, a signal strength, a date/time, and a ring mode.

7. A mobile electronic device, comprising:
   - a touch screen, comprising a status bar display area and an operation area;
   - an input signal movement detecting module, coupled to the touch screen, for determining whether a starting point of an input signal received by the touch screen while the mobile electronic device is in a first state is located in the status bar display area, obtaining a movement track of the input signal if the starting point is located in the status bar display area, and calculating a displacement in a specific direction of the input signal; and
   - a processor module, coupled to the touch screen and the input signal movement detecting module, for switching the mobile electronic device to a second state when the displacement in the specific direction reaches a predetermined value.

8. The mobile electronic device according to claim 7, wherein the processor module is used for dragging an information frame from an edge of the touch screen closest to the starting point along the specific direction to display the information frame on the touch screen.

9. The mobile electronic device according to claim 8, wherein the information frame includes at least one type of information of a battery capacity, a signal strength, a date/time, a missed call, an unread e-mail, an unread short message, an unread voice mail, and a ring mode.

10. The mobile electronic device according to claim 8, wherein the information frame is a full screen frame completely covering the touch screen.

11. The mobile electronic device according to claim 7, wherein the specific direction is vertical direction or horizontal direction.

12. The mobile electronic device according to claim 7, wherein the status bar display area is fixed to an upper position of the touch screen, and information displayed in the status bar display area comprises at least one of a battery capacity, a signal strength, a date/time, and a ring mode.

13. A non-transitory recording medium, for recording a computer program, wherein the computer program comprises a plurality of program codes, and the computer program is loaded into a mobile electronic device to allow the mobile electronic device to execute a controlling method for the mobile electronic device, the method comprising:
   - receiving an input signal through a touch screen of the mobile electronic device when the mobile electronic device is in a first state, wherein the touch screen comprises a status bar display area and an operation area;
   - determining whether a starting point of the input signal is located in the status bar display area;
   - obtaining a movement track of the input signal if the starting point is located in the status bar display area;
   - calculating a displacement in a specific direction of the input signal; and
   - switching the mobile electronic device to a second state when the displacement in the specific direction reaches a predetermined value.