IMPROVED MOBILE COMMUNICATION TERMINAL AND METHOD THEREFORE

Field of invention

The invention relates to a method in a mobile communications device, comprising: providing foreground picture data, providing background picture data, determining a first position and amount of the picture background data to display on a display unit in the mobile communications device, determining a first position and amount of the foreground picture data to display on the display unit in the mobile communications device, displaying the background and foreground picture data according to the determined first positions and amounts on said display unit.

The invention further relates to a mobile communications device comprising: a display unit, a control unit adapted to provide foreground picture data, provide background picture data, determine a first position and amount of the background picture data to display on the display unit, determine a first position and amount of the foreground picture data to display on the display unit, the display unit is adapted to display the background and foreground picture data according to the determined first positions and amounts.

Technical background

A mobile communications device basically comprises an set of buttons and a joystick, a screen, by which the user is given feedback from the mobile communications device, and electronic circuitry providing the communication application by which the mobile communications device is able to communicate with other communications devices via a base station system.

A mobile communications device of this basic kind is well-known in the art and there is no need for any detailed description of this basic features of the mobile communications device.

As soon as the mobile communications device is turned on, the operating system of the mobile communications device starts running. The operating system handles e.g. the interaction between the display unit, the input unit, and the communications unit. The operating system also handles other kinds of applications, such as a contact management application, a calendar application, a settings application for setting the behaviour of the phone and its operating system, a web application, etc.

The operating system is adapted to in a desktop view show the different applications on the display unit in the form of so-called icons. The icons are basically graphic representations of imaginary start buttons. The user navigates, using the joystick or the buttons, between the icons on the desktop. Usually, one of the icons is always highlighted or otherwise indicated. When the user presses the arrow buttons or actuates the joystick, the icon being located adjacent, in the intended direction, the previously highlighted icon will be highlighted.

When the joystick or a physical selection button is pressed down, the application associated with the at the time highlighted icon is activated. The window of the thus activated application is shown on the screen of the mobile communications device. It is also common that each icon in the desktop view are entrances to another set of icons, usually presented as a list in order for the user to distinguish if he/she is on the top desktop level or at a lower level below an icon of the desktop level. When the icon of the list is selected the associated application is activated and as mentioned above the window of the application is shown in the window of the

mobile communications device. When the user has done the desired operations within the application, the user exits the application. The user is at this point presented with the desktop or the list of icons depending on from where the applications was activated.

The users of the mobile communications devices want to have relatively small and lightweight devices. This in turn will give significant limitations concerning the available maximum size of the screen of the mobile communications device. Moreover, a larger screen will need more power than a smaller one, which in turn gives that a mobile communications device with a large screen will require a larger battery or will need to be recharged more often.

The user is presented with a plurality of icons on the rather limited size of the desktop. However, the number of icons is limited since each icon must be larger than a smallest acceptable size in order for the user to be able to easily distinguish what application or group of applications the respective icon is associated with.

As the mobile communications devices is provided with more and more applications, this navigation system will experience more short-comings. The applications must be grouped to a larger extent than before which will force the user to make a more complex navigation in order to reach the desired application. Since the mobile communications device need to be small, the navigation tools, such as buttons and joystick, are also subject to size limitations. This size limitation of the navigation tools will, in combination with the complex navigation, introduce a ergonomical risk to the user. When using the joystick, the user will e.g. be moving his/hers thumb a lot and in a complex movement patterns. Moreover, the user will have to have a strong focus on the screen which will strain the users eye.

These problems have become especially aggravated by the introduction of web browsers in the mobile

communications devices. It is difficult to navigate through a web content using the above described navigation.

Summary of the invention

It is an object of the invention to address the above discussed problems. This has in accordance with the invention been achieved by a method in a mobile communications device and by a mobile communications device.

In accordance with an aspect of the invention it relates to a method in a mobile communications device, comprising: providing foreground picture data, providing background picture data, determining a first position and amount of the picture background data to display on a display unit in the mobile communications device, determining a first position and amount of the foreground picture data to display on the display unit in the mobile communications device, displaying the background and foreground picture data according to the determined first positions and amounts on said display unit, receiving direction data, from an input device in the mobile communications device, defining a direction of movement of said displayed amount of foreground picture data on said display unit, determining, based on the received direction data, a second position and amount of the background picture data to display, determining, based on the received direction data, a second position and amount of the foreground picture data to display, wherein the second position associated with the background picture data corresponds to a first displacement in or opposite said direction of movement relative to the first position; and the second position associated with the foreground picture data corresponds to a second displacement in said direction of movement relative to the first position, wherein the relative change of position of the background picture data is different from

the relative change of position of the foreground picture data.

The second position associated with the background picture data may correspond to a first displacement in said direction of movement relative to the first position.

The first distance may be shorter than the second distance.

The method may further comprise displaying the background and foreground picture data according to the determined second positions and amounts.

In accordance with an aspect of the invention it relates to a mobile communications device comprising: a display unit, a control unit adapted to provide foreground picture data, provide background picture data, determine a first position and amount of the background picture data to display on the display unit, determine a first position and amount of the foreground picture data to display on the display unit, the display unit is adapted to display the background and foreground picture data according to the determined first positions and amounts, the control unit is adapted to receive direction data, from an input unit in the mobile communications device, the direction data defining a direction of movement of said displayed amount of foreground picture data on said display unit, wherein said control unit is adapted to determine, based on the received direction data, a second position and amount of the background picture data to display, the second position associated with the background picture data corresponds to a first displacement in or opposite said direction of movement relative to the first position; determine, based on the received direction data, a second position and amount of the foreground picture data to display, the second position associated with the foreground picture data corresponds to a second displacement in said direction of movement relative to the first position, wherein the

relative change of position of the background picture data is different from the relative change of position of the foreground picture data.

The second position associated with the background picture data may correspond to a first displacement in said direction of movement relative to the first position.

The first distance may be shorter than the second distance.

The display unit may be adapted to display the background and foreground picture data according to the determined second positions and amounts.

Brief description of the drawings

The invention will by way of example be described in more detail with reference to the appended schematic drawings, which shows a presently preferred embodiment of the invention.

Fig 1 shows the basic components of a mobile communications device and system.

Fig 2a-2e shows the image shown in the screen when the mobile communications device is transferred between a first and a second navigation mode.

Fig 3 graphically shows the complete virtual dashboard in the second navigation mode.

Fig 4a-d shows different navigation steps in the second navigation mode.

Fig 5 shows a navigation step (selection) in the second navigation mode.

Fig 6 shows different abstraction levels (data subsets) of the application content.

Detailed description of preferred embodiments

Fig 1 is a schematic block diagram of a mobile telecommunication terminal 100 according to a preferred embodiment of the present invention. A transceiver 110 is used for communicating with a base station 102 via an

antenna 111. The base station 102 is in communication with other mobile telecommunication terminals 105 via a mobile communications network, and stationary terminals 107 via e.g. a public switched telephone network (PSTN). The transceiver 110 may be arranged to operate in various frequency bands, such as 880 - 915 MHz and 925 - 960 MHz (GSM900), 1710 - 1785 MHz and 1805 - 1880 MHz (GSM1800), 1850 - 1910 MHz and 1930 - 1990 MHz (GSM1900), and 1885-2025 MHz and 2110-2200 MHz (UMTS). It is appreciated that other frequency bands are equally possible depending on the specifications of the network in which the mobile telecommunication terminal 100 is to operate.

A control unit 120 is coupled to the transceiver 110. The control unit 120 may comprise signal processing circuitry in order to process e.g. voice data and message data (e.g. SMS or MMS) from a user of the mobile telecommunication terminal 100 and provide the transceiver 110 with the processed data for transmission to the base station 102. Likewise, the control unit 120 may comprise signal processing circuitry for processing data received from the other telecommunication terminals 105, 107 in order to provide the user of the mobile telecommunication terminal 100 with e.g. audio, image, video or message data. Alternatively (not shown) some or all of the signal processing functionality may be provided by specialized circuitry in the mobile telecommunication terminal 100.

The control unit 120 is coupled to a display 130 for providing a user of the mobile telecommunication terminal 100 with visual data regarding e.g. a specific call in progress, telecommunication numbers stored in the mobile telecommunication terminal 100, signal strength of the wireless communication link 104, messages received from other mobile telecommunication terminals, etc.

The control unit 120 is moreover coupled to an input unit 140, which may be in the form of a keyboard/keypad; an on-screen touch-sensitive keyboard; a navigation wheel

or joystick for scrolling and selecting items, digits and/or characters shown on the display 120; etc. The input unit 140 may be integral with the mobile telecommunication terminal 100 or separate from the mobile telecommunication terminal 100, wherein the input unit is connected to the mobile telecommunication terminal when needed. The mobile telecommunication terminal 100 may alternatively be provided with an integral input unit 140 in the form of a small size keyboard, such as a 12-key numeric keypad (digits 0-9, * and #), for normal use as well as a connector for connecting an external input unit e.g. in the form of a QWERTY keyboard for entering larger amounts of text (not shown).

A memory 150 is connected to the control unit 120. The memory 150 may be a single memory or many different memories implemented on different chips, alone or together with other electronic circuitry, by means of different technologies (such as RAM, ROM, EPROM, EEPROM, Flash, etc) which all are accessible by the control unit 120.

A mobile communications device of this basic kind is well-known in the art and there is no need for any further detailed description of this basic features of the mobile communications device.

Fig 3 shows a mobile communications device comprising a set of buttons 1 and a joystick 2, a screen 3.

As soon as the mobile communications device is turned on, the operating system of the mobile communications device starts running. The operating system handles e.g. the interaction between the display unit 3, the input unit 1,2, and the communications unit.

The operating system is adapted to also handle other kinds of applications, such as a contact management application, a calendar application, a settings application for setting the behaviour of the phone and

its operating system, a web application, etc, when they are activated.

The operating system is adapted to, in a desktop view (see fig 2a), display the different available applications on the display unit 3 in the form of so-called icons 4. The icons 4 are basically graphic representations of imaginary start buttons. The user navigates, using the joystick 2 or the buttons 1, between the icons 4 on the desktop. In this desktop view in fig 1a, one of the icons 4a is highlighted as indicated by the square line around it. When the user presses the rightward button or actuates the joystick 2 to the right, the icon 4b to the right of the previously highlighted icon 4a will be highlighted.

When the joystick 2 or the physical selection button is pressed down, the application associated with the at the time highlighted icon 4a is activated. The window of the thus activated application is shown on the screen of the mobile communications device. It is also common that each icon in the desktop view are entrances to another set of icons, usually presented as a list in order for the user to be able distinguish if he/she is on the top desktop level or at a lower level below an icon of the desktop level. When the icon of the list is selected the associated application is activated and, as mentioned above, the window of the application is shown on the screen 3 of the mobile communications device. When the user has performed the desired operations within the selected application, the user exits the application. The user is at this point presented with the desktop or the list of icons depending on from where the applications was activated.

The mobile communications device has two different modes of navigating between different applications.

The first navigation mode is the mode described above where the user navigates a between a set of icons 4a, 4b on a desktop on which the icons are displayed.

This mode of navigation is known in the art and requires no further explanation.

The second navigation mode involves also an imaginary third dimension orthogonal to the two dimensions of the screen surface. In addition to moving up/down/left/right, this navigation mode supports the impression of a navigation in a third dimension by giving the impression of rising and falling in this third dimension.

The user may enter the second mode of navigation by selecting a specific icon 4a when navigating the desktop in accordance with the first navigation mode. This change of navigation mode may also be accomplished by the user pressing or holding a specific button for a certain time period (e.g. the #-button).

When the second navigation mode is to be activated, the mobile communications device will in a transfer mode display how the users view is raised relative not only to the desktop, but to the complete mobile communications device as shown in fig 2b-2d.

This is accomplished by continuously reducing the size of the image representing the desktop of the mobile communications device in the first navigation mode. As the desktop no longer completely fills the screen 3, the image of the desktop will be completed with a graphic representation of the mobile communications device (see fig 2b-2d). The graphic representation of the mobile communications device is reduced with the reducing of the desktop image. This will give an impression that the user will be raised upwardly relative the mobile communications device.

This impression may be further enhanced by displaying clouds introduced from the sides giving the impression that the user floats upwardly through the clouds.

At the end of the transition from the first navigation mode to the second navigation mode, the user will be presented with a virtual dashboard (see fig 2e).

The virtual dashboard is formed by or provided with a number of data subsets 5a, 5b displayed in graphic frames representing a first abstraction level of data. A the end of the transfer mode, the virtual dashboard and its data subsets may be introduced from the sides or outer perimeter of the screen 3 giving the impression that the user floats upwardly through it or between the graphical frames until the user stabilises at level above the dashboard. The basic data is provided by actively running applications, such as a web browser or the like, running under the supervision of the operating system of the mobile communications device. The applications comprising the complete amount of data is actively running in the operating system of the mobile communications device but are not displayed to the user. The displayed data subsets 5a, 5b are selected from the displayable information of the applications. The data subsets 5a, 5b are representative parts of the complete data provided by the application at a given instant.

As shown in fig 3, the virtual dashboard may comprise a plurality of data subsets not displayed in the screen 3. The user navigates in the plane of the virtual dashboard by using the joystick 2. By using the arrow button(s) 2b, the user may change which information item is highlighted.

In fig 4a, the top centre data subset 5a is highlighted. In fig 4b, the bottom centre data subset 5b is highlighted. In fig 4c and fig 4d, the left, middle data subset 5c is highlighted. The data subset 5c contains data extracted from an hidden, active application running in the operating system of the mobile communications device.

It may be noted, in the sequence from fig 4b to fig 4d, that the foreground picture formed by the data

subsets 5a-5c and the background picture 5d of the clouds has moved from their original positions indicated by A and B to their new positions indicated by A′ and B′.

The control unit determine a first position B and amount of the picture background data to display on the screen 3 and a first position A and amount of the foreground picture data 5a, 5b to display on the screen 3. The display unit displays the background and foreground picture data according to the determined first positions and amounts. The control unit receives direction data, from an input device in the mobile communications device, the direction data defining a direction of movement of said displayed amount of foreground picture data on said display unit. The control unit determines, based on the received direction data, a second position B′ and amount of the background picture data to display and, also based on the received direction data, a second position A′ and amount of the foreground picture data to display.

The second position B′ associated with the background picture data corresponds to a first displacement in or opposite said direction of movement relative to the first position B, and the second position A′ associated with the foreground picture data corresponds to a second displacement in said direction of movement relative to the first position A.

When the foreground and background pictures are moved in the same direction the user will experience that the subsets of data (foreground) is translated essentially in the plane of the screen 3. By moving the foreground and background in different directions it is possible to make the user experience a rolling action, where the data subsets 5a, 5b are located on a sphere being rotated relative to the screen 3 such that other data subsets appear.

By moving the foreground and background in the same direction and setting the movement of the background to

be slightly shorter or slower than the movement of the foreground the impression of depth is further enhanced.

When the control unit receives a selection data from the input unit indicating a selection of the highlighted data subset, the graphic frame associated with the selected subset of data is enlarged.

Depending upon which abstraction level the data subset is located the control unit will a) select a second data subset of the data from which the first data subset is selected and displaying this second data subset in the enlarged graphic frame, or b) displaying the data provided by the application in the enlarged graphic frame.

Thus, if it has been considered convenient to provide several abstraction levels, the selection of a data subset may give another more detailed data, but still a selected subset of a more detailed data. If it has been considered convenient to not provide any more abstraction levels beneath the selected data subset, the mobile communications device will display the actual application and the actual information in full detail.

This enlarged graphic frame comprising more detailed information compared to the selected data subset is shown in fig 5. This information may be the complete information of the application but it may also be a second subset of the complete information still remaining hidden.

The different abstraction levels and the selection of data subsets will hereinafter be discussed in more detail with reference to fig 6.

The user will initially be presented with the ordinary navigation mode using icons on a desktop 601 (as shown in detail in fig 2a) indicated at the bottom level of the pile of boxes in fig 6. When the user selects to change the navigation mode to the second navigation mode the user will after the transition be presented with the dashboard 602 of the second navigation mode (the second

lowest box). This dashboard is shown in detail in fig 3. The dashboard is provided with data subset icons 603 5a, 5b graphically presenting a representative part of the data displayable by the applications running in a hidden mode. When the user selects a data subset icon 5a, 5b, the graphic frame will be enlarged (see fig 5) and a interactive data subset 605 will be presented in the enlarged graphic frame. The application will still be running in a hidden mode and the data subset in the enlarged graphical frame will be a representative part of the complete data displayable by the application.

When the user desires to change to the navigation mode referred to as the first navigation mode, the user will experience the reverse movement compared to the changing to the second mode of navigation. Thus, the user will experience the movement from fig 2e to fig 2a. The user may choose the first or the second navigation mode as the default navigation mode.

It is contemplated that there are numerous modifications of the embodiments described herein, which are still within the scope of the invention as defined by the appended claims.

It may be noted that in accordance with an aspect the invention may in short be said to relate to a method in a mobile communications device, comprising: providing foreground picture data, providing background picture data, displaying the background and foreground picture data according to determined first positions and amounts on said display unit, receiving direction data, determining, based on the received direction data, a second position and amount of the background picture data and foreground picture data to display, respectively, wherein the relative change of position of the background picture data is different from the relative change of position of the foreground picture data.

It may for instance be noted that the display unit and input unit may completely or partly integrated, such in a touch screen.

It is also contemplated that, at the first abstraction level in the second navigation mode, the applications may be partly or completely displayed to the user. In such a case it is preferred that they are shown in such a way that it gives the impression that they are located at a different height along the third dimension.

It should also be noted that the dashboard also may display icons by which associated applications may be activated.

It may also be noted that it is contemplated that the information items from the actively running applications may belong to different abstraction levels in respect of their application although they are displayed on the same level along the third dimension.

The movement in the plane of the virtual dashboard may be done automatically. This is done by using the navigation between the information items as an indication of the desired movement and by always putting the highlighted information item in the centre of the screen. When the user changes information item to highlight, the virtual dashboard moves to put the highlighted information item in the centre of the screen. It is also contemplated that instead the navigation between the information items may be done automatically. This is e.g. done by always highlighting the information item being in the centre of the screen.

Claims:

1. Method in a mobile communications device (100), comprising:

providing foreground picture data (5a, 5b, 5c),

providing background picture data (5d),

determining a first position (B) and amount of the picture background data to display on a display unit (130, 3) in the mobile communications device,

determining a first position (A) and amount of the foreground picture data to display on the display unit in the mobile communications device,

displaying the background and foreground picture data according to the determined first positions and amounts on said display unit,

receiving direction data, from an input device (140, 2, 2b) in the mobile communications device, defining a direction of movement of said displayed amount of foreground picture data on said display unit,

determining, based on the received direction data, a second position (B') and amount of the background picture data to display,

determining, based on the received direction data, a second position (A') and amount of the foreground picture data to display,

wherein the second position associated with the background picture data corresponds to a first displacement in or opposite said direction of movement relative to the first position;

and the second position associated with the foreground picture data corresponds to a second displacement in said direction of movement relative to the first position,

wherein the relative change of position of the background picture data is different from the relative change of position of the foreground picture data.

2. Method according to claim 1, wherein the second position associated with the background picture data corresponds to a first displacement in said direction of movement relative to the first position.

3. Method according to claim 1 or 2, wherein the first distance is shorter than the second distance.

4. Method according to any of claims 1 to 3, further comprising:

displaying the background and foreground picture data according to the determined second positions and amounts.

5. Mobile communications device (100) comprising:

a display unit (130, 3),

a control unit (120) adapted to

provide foreground picture data (5a, 5b, 5c),

provide background picture data (5d),

determine a first position (B) and amount of the background picture data to display on the display unit,

determine a first position (A) and amount of the foreground picture data to display on the display unit,

the display unit is adapted to display the background and foreground picture data according to the determined first positions and amounts,

the control unit is adapted to receive direction data, from an input unit (140, 2, 2b) in the mobile communications device, the direction data defining a direction of movement of said displayed amount of foreground picture data on said display unit,

wherein said control unit is adapted to

determine, based on the received direction data, a second position (B') and amount of the background picture data to display, the second position associated with the background picture data corresponds to a first

displacement in or opposite said direction of movement relative to the first position;

determine, based on the received direction data, a second position (A') and amount of the foreground picture data to display, the second position associated with the foreground picture data corresponds to a second displacement in said direction of movement relative to the first position,

wherein the relative change of position of the background picture data is different from the relative change of position of the foreground picture data.

6. Mobile communications device according to claim 5, wherein the second position associated with the background picture data corresponds to a first displacement in said direction of movement relative to the first position.

7. Mobile communications device according to claim 5 or 6, wherein the first distance is shorter than the second distance.

8. Mobile communications device according to any of claims 5 to 7, wherein the display unit is adapted to display the background and foreground picture data according to the determined second positions and amounts.

9. Computer program comprising software instructions adapted to perform a method according to any of claims 1 to 4.