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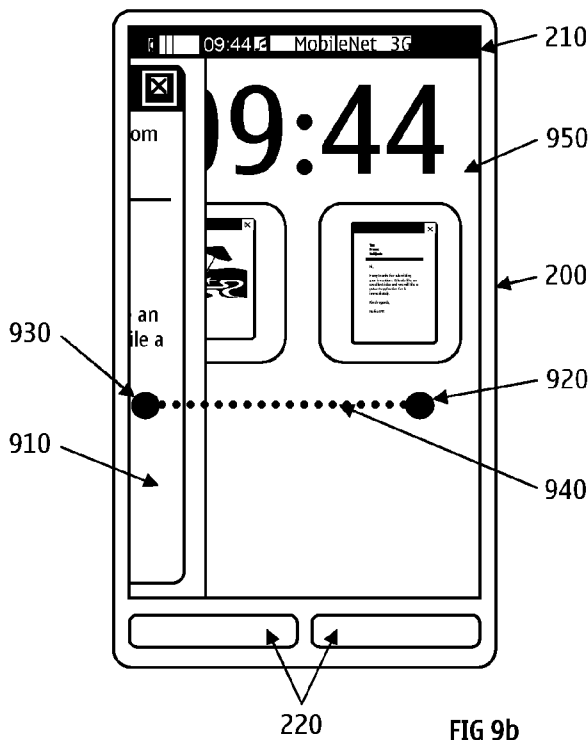
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[Continued on next page]

(54) Title: MODE SWITCHING

(57) Abstract: Based on one or more characteristics of a received translation input, a computing device is switched between two or more states. The translation input may be a touch input, for example a drag operation. The states may relate to locked and unlocked states, idle screens, or other suitable examples.



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MODE SWITCHING

TECHNICAL FIELD

[0001] The present application relates generally to a method, apparatus, and
5 computer program product for switching a device between states based upon the
characteristics of a received translation input.

BACKGROUND

[0002] Some electronic devices are switchable between different operating states,
10 for example a locked state in which certain functions are disabled, and an unlocked state in
which those functions are enabled. Such switching may controlled by a user interface.

SUMMARY

[0003] According to a first example, there is provided a method comprising:
15 receiving a translation input; determining that at least one characteristic of the translation
input meets at least one predefined criterion; and in response to the determination,
switching a computing device from a locked state into an unlocked state.

[0004] According to a second example, there is provided apparatus comprising: a
processor; and memory including computer program code, the memory and the computer
20 program code configured to, working with the processor, cause the apparatus to perform at
least the following: receive a translation input; determine that at least one characteristic of
the translation input meets at least one predefined criterion; and switch a computing device
from a locked state into an unlocked state in response to the determination.

[0005] According to a third example, there is provided a computer program
25 product comprising a computer-readable medium bearing computer program code
embodied therein for use with a computer, the computer program code comprising: code
for receiving a translation input; code for determining that at least one characteristic of the
translation input meets at least one predefined criterion; and code for switching a
computing device from a locked state into an unlocked state in response to the
30 determination.

[0006] According to a fourth example, there is provided apparatus comprising:
means for receiving a translation input; means for determining that at least one

characteristic of the translation input meets at least one predefined criterion; and means for, in response to the determination, switching a computing device from a locked state into an unlocked state.

[0007] According to a fifth example, there is provided a method comprising:
5 receiving a translation input; determining whether at least one characteristic of the translation input meets a first set of one or more criteria; and if the at least one characteristic is determined to meet the first set of criteria, switching a computing device from a first state into a second state, wherein: in said first state an application is in focus and a first display relating to the application is displayed, and in said second state the
10 application is not in focus.

[0008] According to a sixth example, there is provided apparatus comprising: a processor; and memory including computer program code, the memory and the computer program code configured to, working with the processor, cause the apparatus to perform at least the following: receiving a translation input; determine whether at least one
15 characteristic of the translation input meets a first set of one or more criteria; and if the at least one characteristic is determined to meet the first set of criteria, switch a computing device from a first state into a second state, wherein: in said first state an application is in focus and a first display relating to the application is displayed, and in said second state the application is not in focus..

[0009] According to a seventh example, there is provided a computer program product comprising a computer-readable medium bearing computer program code embodied therein for use with a computer, the computer program code comprising: code for receiving a translation input; code for determining whether at least one characteristic of the translation input meets a first set of one or more criteria; and code for switching a
25 computing device from a first state into a second state if the at least one characteristic is determined to meet the first set of criteria, wherein: in said first state an application is in focus and a first display relating to the application is displayed, and in said second state the application is not in focus..

[0010] According to an eighth example, there is provided apparatus comprising:
30 means for receiving a translation input; means for determining whether at least one characteristic of the translation input meets a first set of one or more criteria; and means for, if the at least one characteristic is determined to meet the first set of criteria, switching

a computing device from a first state into a second state, wherein: in said first state an application is in focus and a first display relating to the application is displayed, in said second state the application is not in focus.

5 **BRIEF DESCRIPTION OF THE DRAWINGS**

[0011] For a more complete understanding of example embodiments of the present invention, reference is now made to the following description taken in connection with the accompanying drawings in which:

10 [0012] FIGURE 1 is an illustration of an apparatus according to an example of the invention;

[0013] FIGURE 2 is an illustration of a device according to an example of the invention;

[0014] FIGURE 3a-c is an illustration of a device according to an example of the invention;

15 [0015] FIGURE 4a-d is an illustration of a device according to further example of the invention;

[0016] FIGURE 5 is an illustration of a device according to an example of the invention;

20 [0017] FIGURE 6a-c is an illustration of a device according to an example of the invention;

[0018] FIGURE 7a-c is an illustration of a device according to three further examples of the invention;

[0019] FIGURE 8a-d is an illustration of a device according to an example of the invention;

25 [0020] FIGURE 9a-c is an illustration of a device according to an example of the invention;

[0021] FIGURE 10 is a flow chart illustrating a method according to an example of the invention; and

30 [0022] FIGURE 11 is a flow chart illustrating a method according to another example of the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

[0023] Example embodiment of the present invention and their potential advantages are understood by referring to FIGURES 1 through 11 of the drawings.

[0024] FIGURE 1 illustrates an apparatus 100 according to an example embodiment of the invention. The apparatus 100 may comprise at least one antenna 105
5 that may be communicatively coupled to a transmitter and/or receiver component 110. The apparatus 100 may also comprise a volatile memory 115, such as volatile Random Access Memory (RAM) that may include a cache area for the temporary storage of data. The apparatus 100 may also comprise other memory, for example, non-volatile memory 120, which may be embedded and/or be removable. The non-volatile memory 120 may
10 comprise an EEPROM, flash memory, or the like. The memories may store any of a number of pieces of information, and data – for example an operating system for controlling the device, application programs that can be run on the operating system, and user and/or system data. The apparatus may comprise a processor 125 that can use the stored information and data to implement one or more functions of the apparatus 100, such
15 as the functions described hereinafter. In some example embodiments, the processor 125 and at least one of volatile 115 or non-volatile 120 memory may be present in the form of an Application Specific Integrated Circuit (ASIC), a Field Programmable Gate Array (FPGA), or any other application-specific component.

[0025] The apparatus 100 may comprise one or more User Identity Modules
20 (UIMs) 130. Each UIM 130 may comprise a memory device having a built-in processor. Each UIM 130 may comprise, for example, a subscriber identity module, a universal integrated circuit card, a universal subscriber identity module, a removable user identity module, and/or the like. Each UIM 130 may store information elements related to a subscriber, an operator, a user account, and/or the like. For example, a UIM 130 may store
25 subscriber information, message information, contact information, security information, program information, and/or the like.

[0026] The apparatus 100 may comprise a number of user interface components. For example, a microphone 135 and an audio output device such as a speaker 140. The apparatus 100 may comprise one or more hardware controls, for example a plurality of
30 keys laid out in a keypad 145. Such a keypad 145 may comprise numeric (for example, 0-9) keys, symbol keys (for example, #, *), alphabetic keys, and/or the like for operating the apparatus 100. For example, the keypad 145 may comprise a conventional QWERTY (or

local equivalent) keypad arrangement. The keypad may instead comprise a different layout, such as E.161 standard mapping recommended by the Telecommunication Standardization Sector (ITU-T). The keypad 145 may also comprise one or more soft keys with associated functions that may change depending on the input of the device. In addition, or alternatively, the apparatus 100 may comprise an interface device such as a joystick, trackball, or other user input component.

[0027] The apparatus 100 may comprise one or more display devices such as a screen 150. The screen 150 may be a touchscreen, in which case it may be configured to receive input from a single point of contact, multiple points of contact, and/or the like. In such an example embodiment, the touchscreen may determine input based on position, motion, speed, contact area, and/or the like. Suitable touchscreens may involve those that employ resistive, capacitive, infrared, strain gauge, surface wave, optical imaging, dispersive signal technology, acoustic pulse recognition or other techniques, and to then provide signals indicative of the location and other parameters associated with the touch. A “touch” input may comprise any input that is detected by a touchscreen including touch events that involve actual physical contact and touch events that do not involve physical contact but that are otherwise detected by the touchscreen, such as a result of the proximity of the selection object to the touchscreen. The touchscreen may be controlled by the processor 125 to implement an on-screen keyboard.

[0028] The touchscreen and/or other user interface components of the apparatus 100 may be used to detect a translation input. A translation input is a user input having start and a displacement input between the two, define a translation. For example, a touch-drag between two points on a touchscreen or other touch-sensitive surface is a translation input, as would be a click-drag using a mouse or other pointing and selection device.

[0029] FIGURE 2 illustrates a device 200 that is an example of the apparatus 100 of FIGURE 1. The device has a touch screen 210 and hardware buttons 220, although different hardware features may be present. For example, instead of a touchscreen 210 the device 200 may have a non-touch display upon which a cursor can be presented, the cursor being movable by the user according to inputs received from the hardware buttons 220, a trackball, a mouse, or any other suitable user interface component.

[0030] Device 200 may be switchable between locked and unlocked states. In the unlocked states one or more user inputs are registered by user input components of the

device 200 (e.g. the touchscreen 210 and the buttons 220) and in response to these user inputs the device performs functions that are associated with the inputs. Such actions might be, for example, launching a particular application, displaying a particular menu, or performing other UI navigation or data entry functions.

5 **[0031]** In the locked mode, the device is configured not to perform at least some of these functions in response to user inputs that would trigger them were the device in the unlocked mode. This may be achieved, for example, by registering user inputs at the user input components, but blocking the device from performing the associated functions. Alternatively, the user input components may be blocked from registering the user inputs
10 when the device is in the locked mode – for example by deactivating the user input components. In some example embodiments a combination of approaches may be used – for example, deactivating only some user input components but blocking the performance of the functions associated with inputs registered by at least some the remaining user input components. In some example embodiments, extra functions are provided while the device
15 is in the unlocked state, and these may be mapped to new user inputs or user inputs for which the unlocked-state functions have been blocked. For example, an extra function may be provided to switch the device 200 to the unlocked state in response to the registration of a particular user input whilst the device is in the locked state.

[0032] FIGURES 3a-3c illustrate an example of a method of switching the device
20 200 of FIGURE 2 from a locked state into an unlocked state. FIGURE 3a illustrates an example of the device 200 in its locked state. The device is displaying an icon 300 that represents the locked state of the device. The icon 300 in the example is an image of a lock, but it may be a different image, text, or any other displayable representation. The icon 300 is displayed within a first locus 310 of the display 210, the first locus in this case
25 corresponding to the position and size of the icon 200, although it could potentially be any area of the display 210.

[0033] In some examples, the first locus 310 may be visually or otherwise distinguished from all or part of the rest of the display 210 – in this example it is distinguished by the presentation of the icon 300. Other ways to distinguish the first locus
30 310 would be to draw it in a differentiating colour, or representing the extent of the first locus 310 using haptic feedback. The first locus may be so distinguished whenever the

device 200 is in the locked state, or only when certain other criteria are also met – for example when a translation input is detected starting within the first locus 310.

[0034] FIGURE 3a also illustrates a second locus 320. In the illustrated example, the second locus 330 is remote from the first locus 310, but the two loci may be
5 contiguous. Similarly, there is illustrated a remaining area 330 that consists of the display area that forms neither part of the first locus 310 nor the second locus 320 – but in other examples the first and second loci 310 320 together cover the whole display area. Either or both of the first and second loci 310 320 may represent point locations (e.g. a single pixel of the display 210) or two-dimensional (or other multi-dimensional) areas on the display
10 210. In some examples, the second locus 320 may correspond to a periphery of the display 210, so that a translation input is said to end at the second locus 320 when it leaves the display 210 by crossing its outer edge or coming within a predetermined range of its outer edge. The use of the periphery and other criteria in this manner may, in some embodiments, help the user interface to distinguish between translation inputs that are
15 intended to change the state of the device, and translation inputs that merely correspond to e.g. panning actions within an application.

[0035] In FIGURE 3b the user has dragged the icon 300 out of the first locus 310 and into the second locus 320. The icon 300 may be dragged using a touch-drag input where a finger or other stylus is contacted with the display 210, brought within a threshold
20 distance of it, or otherwise acts upon the display 210 to commence the drag input, before being translated across the display 210. The drag may end when stylus ceases to act upon the display. Alternatively, a cursor may be controlled by a mouse, trackball, trackpad, joystick, directional buttons, or other controlling means in order, and positioned over the icon 300 or at a predetermined position relative to the icon 300 and moved to perform the
25 translation. In the latter case the drag could be initiated and terminated by pressing and releasing a selection button, or using another suitable user interface component. Other methods of controlling a translation input relative to the icon will may be used, for example drags that are controlled using voice instructions, eye-tracking, and the like. In some examples, the translation input must be actively ended in the second locus 320 by the
30 user (e.g. by the user lifting his finger in the case of a touchscreen drag), but in other examples it is enough that the translation enters or comes within a predetermined range of the second locus 320.

[0036] In FIGURE 3c the user has completed the drag of the icon 300 to a position within the second locus 210 and has terminated the drag, for example (in the case of a touch screen) by lifting his finger from the display 210. The device determines that the user has dragged the icon 300 out of the first locus 310 and into the second locus 320 and in response to this determination the device is switched from its locked state to an unlocked state.

[0037] FIGURE 3a-3c illustrate an example embodiment where the unlocking of the device 200 is dependent upon dragging an icon 300 between a first locus 310 and a second locus 320. However, it is not essential that an icon or other object is actually dragged. Instead, in some examples it is enough that a translation input (e.g. a swipe touch gesture, or the movement of a cursor) is determined from the first locus to the second locus. The icon 300 may, however, be used to provide visual feedback to the user during the gesture. Visual feedback may also/alternatively be provided by drawing a visual trail on the display 210, illustrating the path of the translation input as it is moved.

[0038] In response to the start of the translation input, other visual indications may, in some examples, be made to the user. For example, user interface elements on the display 210 may move, change colour, or otherwise be emphasised to the user. A visual representation of the second locus may be emphasised, for example by changing its colours and/or by moving it into a convenient position to be designated as the termination point of the translation input. In examples where more than one second locus are provided, the second loci may be moved into an arrangement such as a pie menu for ready access by the user making the translation input.

[0039] In the example of FIGURE 3a-c, the second locus corresponded to a predetermined area of the screen that did not necessarily have any associated function.

FIGURES 4a-d illustrate another example where the second locus has a particular function associated with it.

[0040] FIGURE 4a shows the device 200 displaying an item 420 which is an alert relating to a received e-mail message. In practice, such alert may relate to other events, such as the receipt of an SMS message, a missed call, a calendar event, and so on.

Although the example of an alert is used in FIGURE 4a-4d, the item may in fact be another displayed element, such as a shortcut to an application or function on the device (e.g. a shortcut to a camera application or a particular website). Regardless of whether it is an

alert, a shortcut, or something else entirely, the item has associated with it a function that can be performed by the device. The particular function will be dependent upon the particular item, but for example a shortcut to a website may be associated with the function of opening a browser window and loading that website, and a received message alert may be associated with the function of opening a messaging client and displaying that message.

[0041] FIGURES 4b and 4c illustrate the dragging of the lock icon 300 away from the first locus 310 and towards the item 420. The second locus is defined relative to the location of the second item, in this example such that the two share the same position and size (although other arrangements are possible).

[0042] When it is determined that the end point of the drag is within the second locus, the device 200 responds by switching to its unlocked state and performing the function that is associated with the second locus. In the example of FIGURES 4a-4d the associated function is launching the e-mail client and opening the newly received message, and FIGURE 4d illustrates this.

[0043] Although only one item 420 with an associated function is illustrated in FIGURES 4a-d, more than one item may be present and the items may have different associated inputs. For example, where a message alert and a camera application shortcut are displayed, dragging the icon to the message alert may unlock the device 200 and cause the function of launching the messaging client and opening the message to be performed, while dragging the icon to the camera application shortcut may cause the device 200 to be unlocked and the function of launching the camera application to be performed. Dragging the icon over two or more items in a single translation input may in some example embodiments cause the device 200 to be unlocked and the functions associated with each of those items to be performed.

[0044] In some example embodiments, the device 200 is returned to its locked state as soon as the function associated with the item has been completed. In some other example embodiments, the function is associated with a particular application and the device 200 is returned to its locked state once the associated application has been closed (e.g. in the example where the item is a message alert associated with the function of launching a messaging client and opening a message, the device 200 may be returned to its locked state once the messaging client is closed). In some other example embodiments, switching the device to an unlocked state comprises switching the device into a state in

which only certain functions are unlocked – for example, in Figure 4d the e-mail application window relating to the new message may be unlocked for user input, but other functions (e.g. the hardware keys 220 of the device) may remain locked.

[0045] In some examples, a plurality of second loci may be provided, with
5 different second loci associated with different functions. For example, FIGURE 5 illustrates a translation input can be started at a first locus 500 corresponding to an unlock icon, and end at one of a plurality of second loci 520, 530, 540, 560, different ones of the second loci being associated with different functions. In the example of FIGURE 5, the second loci are associated with launching a phone application, launching an SMS client,
10 launching an e-mail client, and launching a music application, although other suitable functions may be associated with the loci.

[0046] As described in relation to FIGURES 3a-3c, it is not necessarily the case that the translation input in FIGURES 4a-4d is a drag input on an icon, or that the user actively ends the input within the second locus. Instead, other types of translation input
15 may be used in other examples.

[0047] FIGURES 6a-c illustrate an example where rather than the user entering a translation input that ends at a locus associated with a particular function (e.g. launching an e-mail application), it is the locus of the start of the translation input that is associated with the function.

[0048] For example, FIGURE 6a illustrates a device 200 in a locked state, on whose display 210 is displayed an e-mail notification 610 at a first locus 600 and an unlock area at a second locus 610. The e-mail notification 600 is displayed in response to the reception of a new e-mail message.

[0049] In FIGURE 6b a translation input has been received from the user
25 between a location within the first locus 600, corresponding to the original position of the e-mail notification 610, and a location within the second locus (the unlock area) 620. In response to this input the notification 610 has been translated to the location within the second locus 620, providing visual feedback to the user.

[0050] In FIGURE 6c, the user has terminated the translation input at the location
30 within the second locus 620, and in response the device has been switched to its unlocked state, the e-mail client 630 opened, and the new message represented by to the notification 610 has been automatically opened. This is the functionality that was associated with the

first locus 610, but only performed in response to the translation input from the first locus 610 to the second locus 620.

[0051] FIGURE 6a-c is a specific example of an implementation of a more general idea. As described above with respect to other examples, it is not necessary that a notification or other representation be displayed at the first locus 610, or that the unlock area 620 is displayed at the second locus. Similarly, the function associated with the first locus need not be to open an e-mail message, it could be any other function relating to a received message and/or notification, or any other function that the device 200 can perform.

10 [0052] In some example embodiments, a plurality of first loci may be provided, each associated with a different function in an analogue of FIGURE 5.

[0053] In FIGURES 3a-3c, and 4a-4d, 5, and 6a-c the device was switched between its locked and unlocked states in response to a translation input that started and ended within predefined loci; however, there are other ways in which a translation input can be recognised as a command to unlock the device. FIGURES 7a-c illustrates some of these different ways.

[0054] FIGURE 7a illustrates a continuous translation input between a start point 710 and an end point 730. The total length 730 along the path of the input is determined and the device 200 is unlocked only if the total length is greater than a threshold amount. The threshold amount may be predetermined, e.g. by the user or the device manufacturer, or it may be determined dynamically, for example as a function of the length of time that has passed since the device was last in its unlocked state. For example, it may be that a greater length of input is required to unlock the device when it has not locked for a long time (e.g. an hour), whereas a shorter length may be required when the device was unlocked recently (e.g. 10 seconds ago).

[0055] In FIGURE 7a, it was the total length 730 of the translation input that was determined and compared to a threshold value – this total length being the full path of the input. FIGURE 7b shows an example where the straight-line distance 740 between the start and end points 710, 720 is measured and compared to a threshold instead of the total length 730.

[0056] In some examples, the end point 720 is defined as the location at which the user actively terminates the translation operation (e.g. ceases to touch the display 210

in the example of a touch drag operation), but in other examples the end point 720 may be a current end point of an ongoing translation input. For example, as the translation input is entered, the distance of the current end point may extend briefly beyond the threshold value from the start point, but then return within it before the translation input terminates.

5 In this example where the distance between the start and current end points is used, the device 200 will switch to its unlocked state when the threshold value is exceeded.

However, in the example where the end point 720 is taken to be the location at which the translation input is terminated, the device 200 will remain in the locked state because the distance between the start point 710 and this end point 720 is less than the threshold value.

10 [0057] FIGURE 7c illustrates yet another example, in which it is the maximum deviation 740 of a translation input from a straight line path between its start point 710 and end point 720 that is measured. Again, the end point that defines the path may be the current end point, or the end point at which the user terminates the translation input.

[0058] In one example, the device 200 is unlocked only if the maximum
15 deviation 740 is less than a threshold value. In another example, the device 200 is unlocked only if the maximum deviation is greater than a threshold value. In other examples, the device 200 is unlocked only if the maximum deviation 740 lies within a particular range of values.

[0059] It is possible to measure other characteristics of a translation input in
20 order to determine whether or not the device 200 should be unlocked. Suitable characteristics may include, but are not limited to: the pressure applied to a touch sensitive surface (e.g. a touchscreen) during the translation input; the distance of an object from a touch sensitive surface during the translation input; and the minimum, average, or maximum speeds of the translation input. The device may be unlocked if a selected one or
25 more characteristic is measured to be less than a threshold value, greater than a threshold value, or within a continuous or discontinuous range of values. Similarly the device may be unlocked if a function of one or more measurements of one or more characteristics is determined to be less than a threshold value, greater than a threshold value, or within a continuous or discontinuous range of values. Suitable functions may include mean and
30 other averaging functions.

[0060] In some examples, the device 200 may only switch to its unlocked state in the event that more than one of the above conditions are satisfied. For example, it may be

required that a translation input has a total path length 730 greater than a first threshold value, in combination with a maximum deviation of less than a second threshold value.

[0061] FIGURES 8a-d illustrate an example of the device 200 in which the first locus comprises the entire display 210, or at least a substantially all of the display 210 (e.g. there may be a small status bar or the like that is not within the first locus). A lock screen 810 is displayed on the display, the lock screen 810 indicating to the user that the device 200 is in a locked state. In some further examples, the lock screen 810 may include portions of the display that are deactivated or otherwise placed in a low-power state (e.g. not backlit) in order to conserve power whilst the device 200 is in the locked state.

[0062] In FIGURE 8b the user has begun a translation input at a location 820 within the first locus (i.e. substantially anywhere on the display 210).

[0063] In FIGURE 8c the user has continued the translation input to location 840, along path 840. As the input moves along the path 840, at least a portion of the lock screen 810 has been translated along the path, revealing a content screen 840 beneath it.

Although the content screen may contain content with which the user can interact (e.g. virtual buttons and other user interface components), such interaction may be disabled until such time as the device 200 is switched to its unlocked state.

[0064] When the translation input is terminated, a decision is made as based on the input as to whether or not the device 200 should be switched from its locked state into an unlocked state. The decision may be based, for example, on the location of the end of the translation input (e.g. is it within a second locus located at a periphery of the display) and/or a determination that the path 840 exceeds a threshold length.

[0065] In the event that the device 200 is to be switched to its unlocked state, any remaining visible portion of the unlock screen 810 is removed from the display 210, as shown in FIGURE 8d. User interaction with the content of the content screen 840 may be enabled.

[0066] Conversely, if the decision is made to maintain the device 200 in its locked state, the lock screen 810 may be returned to its original location covering the content screen 840, as shown in FIGURE 8a, and the device 200 is not switched to its unlocked state.

[0067] Example embodiments have been described in which a device is switched, based on the characteristics of a translation input, between locked and unlocked states.

However, devices may be switched between other states based upon the characteristics of a translation input.

[0068] FIGURES 9a-c illustrate an example in which the characteristics of a translation input determine the switching of a device 200 between a first and second state. In the first state, shown by FIGURE 9a, an e-mail application is in focus, an e-mail display 910 associated with the e-mail application filling substantially all of the area of the device's display 210. Although an e-mail application is illustrated, other types of application or any other software component presenting a user interface or other content on the display 210 may be selected. Similarly, the display of the application or other component fills all, substantially all, or only part of the device's display area.

[0069] In FIGURE 9b, the user has initiated a translation input at location 920, for example by touching the display 200 at this location. The translation input is then continued to location 930, along path 940, for example by dragging the finger across the display to location 930.

[0070] As the translation input is extended along path 940, the e-mail display 910 may be translated along the same path. Such a translation is shown in FIGURE 9c. As the e-mail display 910 is translated, it reveals an idle screen display 950 beneath it.

[0071] An idle screen, sometimes known as a "home screen" is a display that provides a root navigation level within a device's user interface. It may, for example, be displayed when no applications are running, or when no applications are currently in focus. Because of the root nature of the home screen, it is commonly used to display the current time, upcoming calendar events, event notifications, and other information relating to the device and/or its content. An idle screen, or a home screen, may also be referred to by the more general term "root navigation display". A root navigation display is a display that lies at the root of a navigation session -- in other words, other displays may be closed/hidden to work backwards to the root navigation display, but there is no further scope to navigate backwards from the root navigation display. The root navigation display may be thought of as residing at the most fundamental level in a tree structure of potential displays.

[0072] Although an idle screen has been selected for the purposes of illustration, other function may be selected in practice. For example, the idle screen may be replaced

by a task manager, a main menu (i.e. a menu from which applications may be launched), or any other suitable display.

[0073] Based on the characteristics of the translation input, it is determined whether the device is to be switched from its first state (in which the e-mail application is in focus) into a second state. In the second state, the idle screen (or other suitable function) is in focus, and the e-mail application is out of focus and in some example embodiments is terminated. Suitable characteristics are described above, in relation to the other examples.

5 [0074] If it is determined that the device 200 is not to be switched from the first state into the second state, the e-mail display 910 is returned to cover the idle screen display 1010 (as shown in FIGURE 9a) and the e-mail application remains in focus.

[0075] However, if it is determined that the device is to be switched from the first state into the second state, then any remaining visible portion of the e-mail display 1010 is removed from the display 210, and the idle screen display 950 replaces it. Any components in the idle screen display 950 that are capable of user interaction may be enabled in response to the switch to the second state. This is illustrated in FIGURE 9c.

15 [0076] The example idle screen display 950 of FIGURE 9c includes user-selectable representations 960, 970 of applications that are running on the device but are not currently in focus. These include a representation 970 of the e-mail application that was in focus in the first state. A suitable representation may be based upon a screenshot of the e-mail display 910 immediately prior to its loss of focus, or a live representation of the e-mail display 910 (i.e. a representation that continues to be updated as the e-mail display 010 would be, were it in focus).

[0077] In an example embodiment a selectable representation is based on information other than a screenshot of a represented application. For example, there may be a subset of information associated with the application that may allow a user to recognize the application. For example, a selectable representation of an instant message conversation may be based on information associated with a participant of the conversation, such as a name, and image, and/or the like, a representation of the last message of the conversation, and/or the like. In such an example, information associated with the instant message conversation may be omitted from the selectable representation, such as previous messages, controls, and/or the like. In another example, a selectable representation of a telephony application may be based on information associated with a

participant in a call, such as an image, name, and/or the like, a call duration indicator, and/or the like. In such an example, information associated with the telephony application may be omitted from the selectable representation, such as controls, keypad indications, and/or the like. Without limiting the scope of the claims in any way, at least one possible
5 technical advantage of basing the selectable representation on a subset of application information is reducing the amount of information comprised in a selectable representation.

[0078] In an example embodiment, the device generates the selectable representation based on a subset of information so that at least part of the information
10 associated with the represented application is omitted from the selectable representation. The device may generate the selectable representation based on a determination of which subset of information may allow a user to recognise the application. The determination of the subset of information may be performed by the device based on at least one
15 characteristic of the application. For example, the device may determine the subset of information based, at least in part, on a type associated with the application. For example, the device may determine that the subset of information for a selectable representation of a messaging application should include participant information and information associated with the most recent message. In another example, the subset of information may be pre-determined. In such an example, the subset of information may be determined by a setting,
20 by programming, by a table, and/or the like.

[0079] In response to a user selection of the representation 1070 of the e-mail application, the focus may be restored to the e-mail application by switching the device
200 from the second state back to the first state.

[0080] In example embodiments where switching from the first to second state
25 terminates the application in focus in the first state, the representations 960, 970 in the idle screen display 950 may include a representation of the terminated application. Selecting the representation of the terminated application in such cases may cause the application to be re-launched. In some further example embodiments, the application may be re-launched with the same context that it had when it was terminated, effectively returning the
30 device 200 back to its first state.

[0081] In some examples performing a translation input when the device is already in the second state may cause the device to re-enter the first state, or to switch to a different state entirely. For example, when more than one

[0082] In further examples, different characteristics of the translation input may
5 cause the device to be switched into different states in which another display is presented on the display. The other display may relate to a settings menu, an alternative idle screen, a main menu, a different root navigation display, a messaging or other application, or any other suitable function of the device. For example, a translation input in a first direction may cause a display relating to a second state to be uncovered and the device to be
10 switched to the second state, whilst a translation input in a second direction causes a display relating to a third state to be uncovered and the device switched to that third state. In some examples, a translation input in a particular direction may cause a predetermined application to be launched, or function to be performed. For example, a drag gesture towards the top of the display may cause the device to launch an e-mail application,
15 whereas a drag towards the right hand side of the display may cause the device to be placed in a silent mode.

[0083] If the device is already displaying a root navigation display (for example an idle or home screen) when the translation input is received, the device may be switched to a state that is associated with a different root navigation display. This switching may be
20 circular so that if the translation input is repeated a sufficient number of times then the state of the device eventually returns to the the originally displayed root navigation display. Such functionality may find application in examples where the device is configured to present more than one homescreen, amongst others examples.

[0084] In examples where the device is configured to present multiple root
25 navigation displays and the translation input has the effect of switching the device from an application to one of these root navigation displays, the choice of root navigation display (and therefore of the second state) may be determined to be the root navigation state from which the application was directly launched (e.g. by selecting an option associated with the application in the root navigation display). Where the application has not been directly
30 launched from a root navigation display but instead from another application (e.g. where a web browser has been launched by selecting a hyperlink embedded in a message displayed by an e-mail application) then the second state may be determined to be the state in which

that other application is running, or the the root navigation display from which the other application was itself launched (either directly, or via a chain of other applciaitons).

[0085] Similarly, where multiple root navigation displays are available, switching from a state in which an application is running need not necessarily involve switching to a the root navigation display from which that application was launched. Instead, the switch
5 may be to a different root navigation display (e.g. the most recent root navigation display to be displayed by the device).

[0086] FIGURE 10 illustrates an example method 1000 for implementing functionality described above. On beginning 1010 the method starts with the reception
10 1020 of a translation input, for example a drag operation on a touch screen. The method then determines 1030 that a at least one characteristic of the translation input, for example the length of the input or the location of its start and end points, meets at least one predefined criterion, and in response to that determination a computing device is switched
1040 from a locked state into an unlocked state. The method then ends 1050.

[0087] FIGURE 11 illustrates another example method 1100 for implementing functionality described above. On beginning 1110, the method starts with the reception
1120 of a translation input. It is then determined 1130 whether at least one characteristic of the translation input meets a first set of one or more criteria. If the at least one characteristic is determined to meet the first set of criteria, a computing device is switched
1240 from a first state into a second state. In the first state an application is in focus and a first display relating to the application is displayed, whereas in the second state the application is not in focus and a second display is displayed. The method then ends 1150.

[0088] Without in any way limiting the scope, interpretation, or application of the claims appearing below, a technical effect of one or more of the example embodiments
25 disclosed herein is that an improved user experience is provided, in which fewer user input actions are required to complete operations.

[0089] Example embodiments of the present invention may be implemented in software, hardware, application logic or a combination of software, hardware and application logic. The software, application logic and/or hardware may reside on a
30 removable memory, within internal memory or on a communication server. In an example embodiment, the application logic, software or an instruction set is maintained on any one of various conventional computer-readable media. In the context of this document, a

“computer-readable medium” may be any media or means that can contain, store, communicate, propagate or transport the instructions for use by or in connection with an instruction execution system, apparatus, or device, such as a computer, with examples of a computer described and depicted in FIGURE 1. A computer-readable medium may
5 comprise a computer-readable storage medium that may be any media or means that can contain or store the instructions for use by or in connection with an instruction execution system, apparatus, or device, such as a computer.

[0090] In some example embodiments, the invention may be implemented as an apparatus or device, for example a mobile communication device (e.g. a mobile telephone),
10 a PDA, a computer or other computing device, or a video game console.

[0091] If desired, the different functions discussed herein may be performed in a different order and/or concurrently with each other. Furthermore, if desired, one or more of the above-described functions may be optional or may be combined.

[0092] Although various aspects of the invention are set out in the independent
15 claims, other aspects of the invention comprise other combinations of features from the described example embodiments and/or the dependent claims with the features of the independent claims, and not solely the combinations explicitly set out in the claims.

[0093] It is also noted herein that while the above describes example
embodiments of the invention, these descriptions should not be viewed in a limiting sense.
20 Rather, there are several variations and modifications which may be made without departing from the scope of the present invention as defined in the appended claims.

WHAT IS CLAIMED IS

1. A method comprising:
receiving a translation input;
determining that at least one characteristic of the translation input meets at least one
5 predefined criterion; and
in response to the determination, switching a computing device from a locked state
into an unlocked state.
2. The method of claim 1, wherein the determination comprises:
10 determining that the length of the translation input is within a predetermined range.
3. The method of claim 1, wherein the determination comprises:
determining that a function of the deviation of the translation input from a
predetermined path is within a predetermined range.
15
4. The method of claim 1, wherein:
the transition input comprises a touch input; and
the determination comprises determining that a function of the pressure of said
touch input is within a predetermined range.
20
5. The method of claim 1, wherein the determination comprises:
determining that the transition input begins within a predetermined start locus; and
determining that the transition input ends within a predetermined end locus.
- 25 6. The method of claim 5, wherein:
one of the start and end loci is associated with a function of the computing device;
and
the method comprises the step of activating the function in response to the
determination.
30

7. The method of claim 6, further comprising:
presenting an alert to a user, the alert being associated with the function; and
wherein the said one of the start and end loci is indicated to the user by the
presentation of the alert.

5

8. The method of claim 7, wherein:
in response to the completion of the function:
the computing device is returned to its locked state, and
the presentation of the alert is ceased.

10

9. The method of claim 6, wherein:
the said one of the start and end loci is one of a plurality of function loci, each
function locus being associated with a different function of the computing device.

15

10. Apparatus comprising:
a processor; and
memory including computer program code,
the memory and the computer program code configured to, working with the
processor, cause the apparatus to perform at least the following:

20

receive a translation input;
determine that at least one characteristic of the translation input meets at least one
predefined criterion; and
switch a computing device from a locked state into an unlocked state in response to
the determination.

25

11. The apparatus of claim 10, wherein the determination comprises:
determining that the length of the translation input is within a predetermined range.

12. The apparatus of claim 10, wherein the determination comprises:
determining that a function of the deviation of the translation input from a
predetermined path is within a predetermined range.

5 13. The apparatus of claim 10, wherein:
the transition input comprises a touch input; and
the determination comprises determining that a function of the pressure of said
touch input is within a predetermined range.

10 14. The apparatus of claim 10, wherein the determination comprises:
determining that the transition input begins within a predetermined start locus; and
determining that the transition input ends within a predetermined end locus.

15 15. The apparatus of claim 14, wherein:
one of the start and end loci is associated with a function of the computing device;
and
the memory and the computer program code are further configured to, working
with the processor, cause the apparatus to activate the function in response to the
determination.

20 16. The apparatus of claim 15, wherein:
the memory and the computer program code are further configured to, working
with the processor, cause the apparatus to present an alert to a user, the alert being
associated with the function; and
25 the said one of the start and end loci is indicated to the user by the presentation of
the alert.

30 17. The apparatus of claim 16, wherein:
the memory and the computer program code are further configured to, working
with the processor, cause the apparatus to, in response to the completion of the function:
return the computing device to its locked state, and
cease the presentation of the alert.

18. The apparatus of claim 15, wherein:
the said one of the start and end loci is one of a plurality of function loci, each
function locus being associated with a different function of the computing device.

5 19. The apparatus of claim 10, being a mobile telephone.

20. The apparatus of claim 10, further being a video games console.

21. A computer program product comprising a computer-readable medium
10 bearing computer program code embodied therein for use with a computer, the computer
program code comprising:
code for receiving a translation input;
code for determining that at least one characteristic of the translation input meets at
least one predefined criterion; and
15 code for switching a computing device from a locked state into an unlocked state in
response to the determination.

22. A method comprising:
receiving a translation input;
20 determining whether at least one characteristic of the translation input meets a first
set of one or more criteria; and
if the at least one characteristic is determined to meet the first set of criteria,
switching a computing device from a first state into a second state, wherein:
in said first state an application is in focus and a first display relating to the
25 application is displayed, and
in said second state the application is not in focus.

23. The method of claim 22, further comprising:

displaying a second display whilst the device is in the second state, the second display including a selectable representation of the first display;

receiving a user selection of the selectable representation; and

5 in response to the user selection, switching the device back into the first state.

24. The method of claim 23, further comprising storing a screenshot of the first display in response to the determination, wherein the selectable representation is based upon the stored screenshot.

10

25. The method of claim 22, further comprising :

determining whether the at least one characteristic of the translation input meets a second set of one or more criteria, the first and second sets being mutually exclusive; and

if the at least one characteristic is determined to meet the second set of criteria,

15 switching a computing device from a first state into a third state that is different from the second state.

26. The method of claim 25, wherein the first set of criteria relate to the extension of the translation input in a first direction, and the second set of criteria relate to the extension of the translation input in a second direction that is different to the first direction.

20

27. The method of claim 25, wherein a different root navigation display is displayed in each of the second and third states.

25

28. The method of claim 22, wherein the determination comprises:

determining whether the length of the translation input is within a predetermined range.

30

29. The method of claim 22, wherein the determination comprises:

determining whether a function of the deviation of the translation input from a predetermined path is within a predetermined range.

30. The method of claim 22, wherein:
the transition input comprises a touch input; and
the determination comprises determining whether a function of the pressure of said
5 touch input is within a predetermined range.

31. The method of claim 22, wherein the determination comprises:
determining that the transition input begins within a predetermined start locus; and
determining that the transition input ends within a predetermined end locus.
10

32. Apparatus comprising:
a processor; and
memory including computer program code,
the memory and the computer program code configured to, working with the
15 processor, cause the apparatus to perform at least the following:
receiving a translation input;
determine whether at least one characteristic of the translation input meets a first
set of one or more criteria; and
if the at least one characteristic is determined to meet the first set of criteria, switch
20 a computing device from a first state into a second state, wherein:
in said first state an application is in focus and a first display relating to the
application is displayed, and
in said second state the application is not in focus.

33. The apparatus of claim 32, wherein the memory and the computer program
code are further configured to, working with the processor, cause the apparatus to:
display a second display whilst the device is in the second state, the second display
including a selectable representation of the first display;
receive a user selection of the selectable representation; and
30 switch the device back into the first state in response to the user selection.

34. The apparatus of claim 33, wherein the memory and the computer program code are further configured to, working with the processor, cause the apparatus to store a screenshot of the first display in response to the determination, wherein the selectable representation is based upon the stored screenshot.

5

35. The apparatus of claim 32, wherein the memory and the computer program code are further configured to, working with the processor, cause the apparatus to:

determine whether the at least one characteristic of the translation input meets a second set of one or more criteria, the first and second sets being mutually exclusive; and

10 if the at least one characteristic is determined to meet the second set of criteria, switch a computing device from a first state into a third state that is different from the second state.

36. The apparatus of claim 33, wherein a different root navigation display is
15 displayed in each of the second and third states.

37. The apparatus of claim 32, wherein the first set of criteria relate to the extension of the translation input in a first direction, and the second set of criteria relate to the extension of the translation input in a second direction that is different to the first
20 direction.

38. The apparatus of claim 32, wherein the determination comprises:
determining whether the length of the translation input is within a predetermined
range.

25

39. The apparatus of claim 32, wherein the determination comprises:
determining whether a function of the deviation of the translation input from a predetermined path is within a predetermined range.

30 40. The apparatus of claim 32, wherein:
the transition input comprises a touch input; and

the determination comprises determining whether a function of the pressure of said touch input is within a predetermined range.

41. The apparatus of claim 32, wherein the determination comprises:
determining that the transition input begins within a predetermined start locus; and
5 determining that the transition input ends within a predetermined end locus.

42. The apparatus of claim 32, being a mobile telephone.

43. The apparatus of claim 32, being a video games console.

10 44. A computer program product comprising a computer-readable medium bearing computer program code embodied therein for use with a computer, the computer program code comprising:

code for receiving a translation input;

15 code for determining whether at least one characteristic of the translation input meets a first set of one or more criteria; and

code for switching a computing device from a first state into a second state if the at least one characteristic is determined to meet the first set of criteria, wherein:

20 in said first state an application is in focus and a first display relating to the application is displayed, and

in said second state the application is not in focus.

45. The computer program product of claim 44, wherein the computer program code further comprises:

25 code for displaying a second display when the device is in the second state, the second display including a selectable representation of the first display;

code for receiving a user selection of the selectable representation; and

30 code for switching the device back into the first state in response to the user selection.

46 The computer program product of claim 45, wherein the computer program code further comprises code for storing a screenshot of the first display in response to the determination, wherein the selectable representation is based upon the stored screenshot.

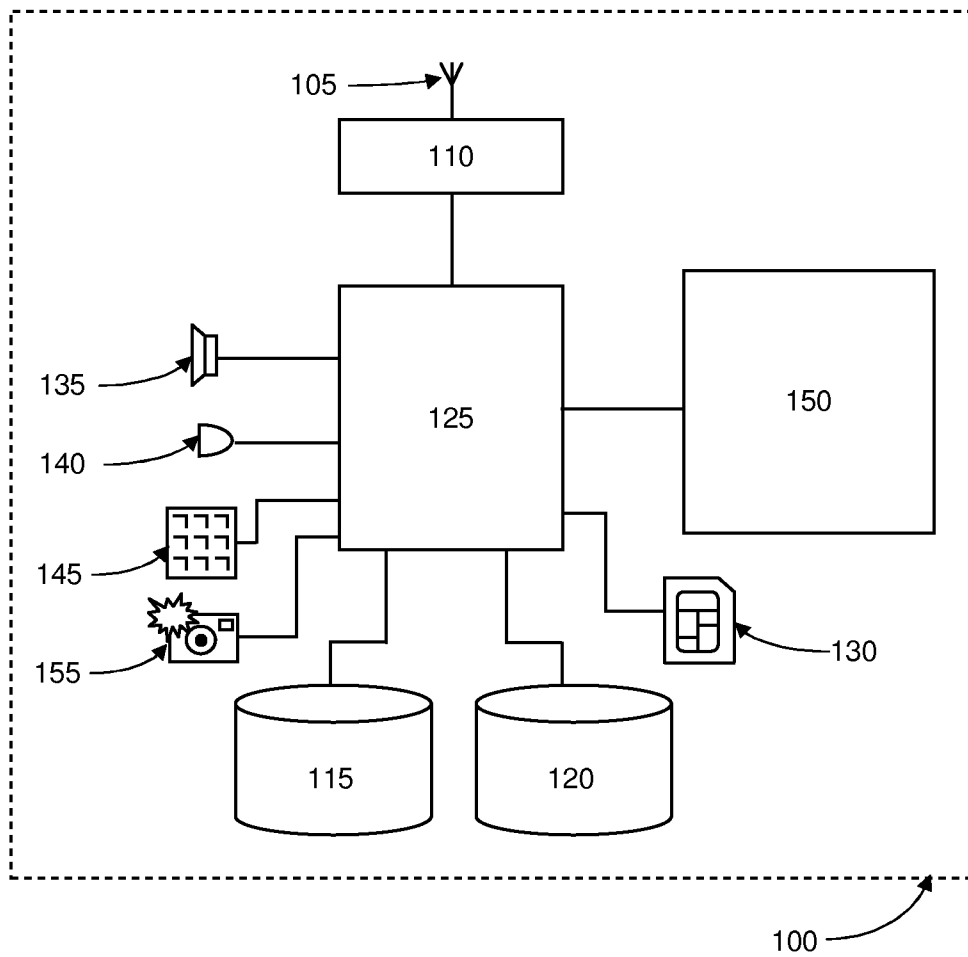
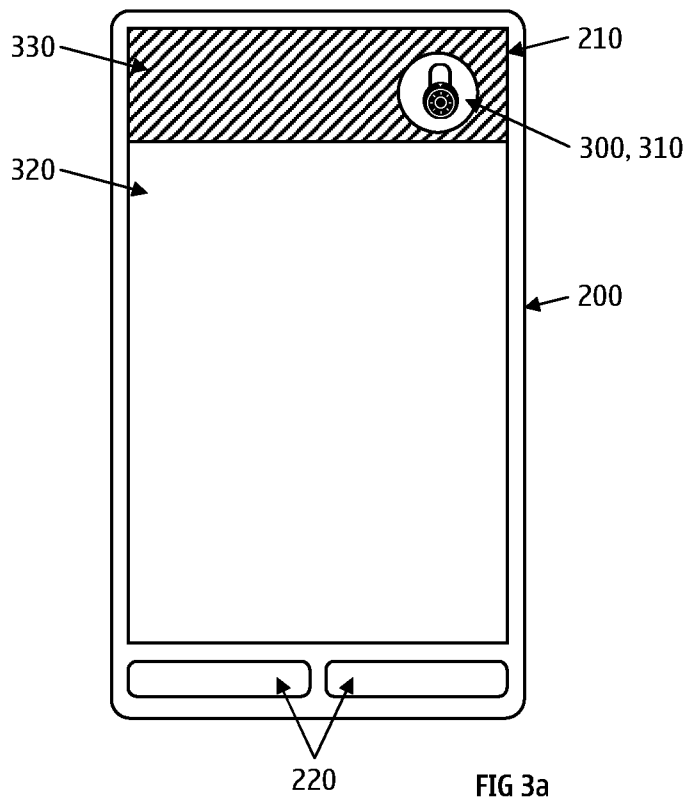
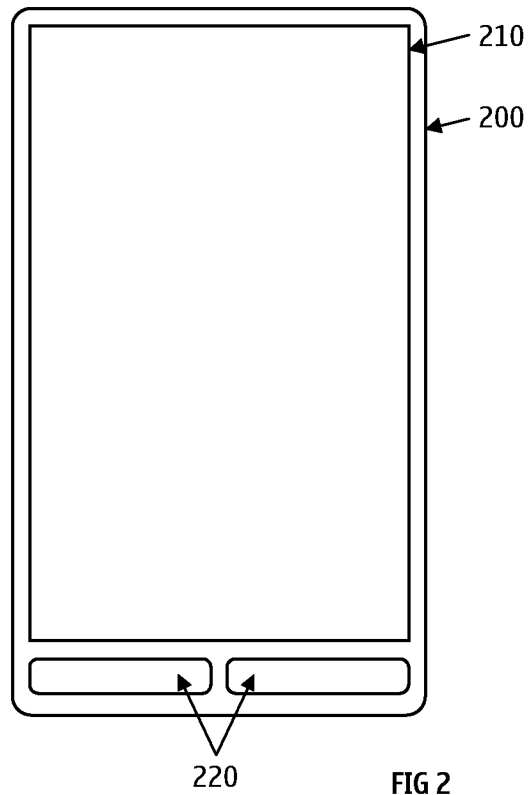


FIG. 1



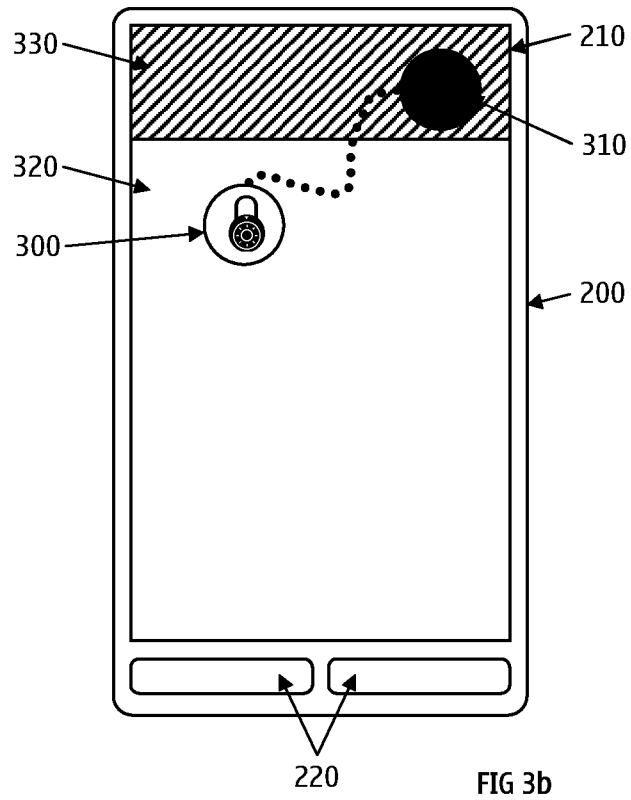


FIG 3b

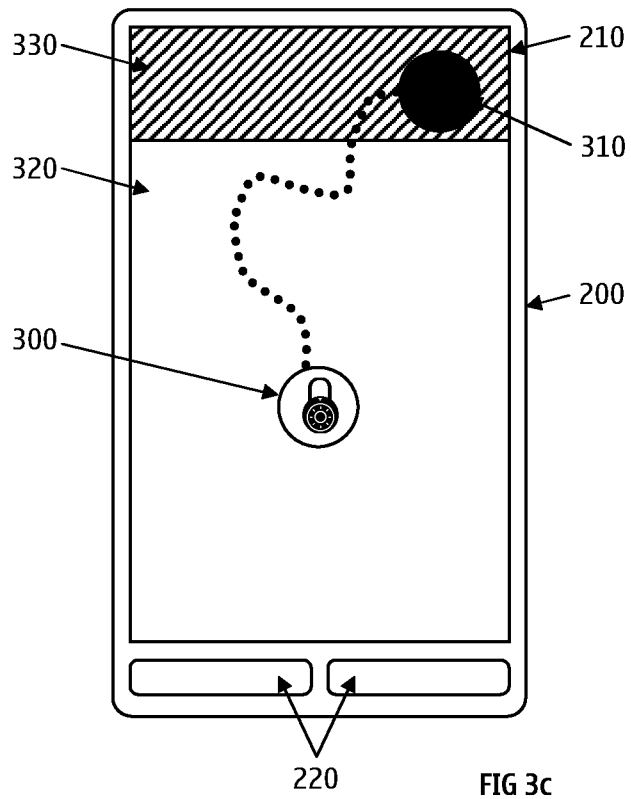
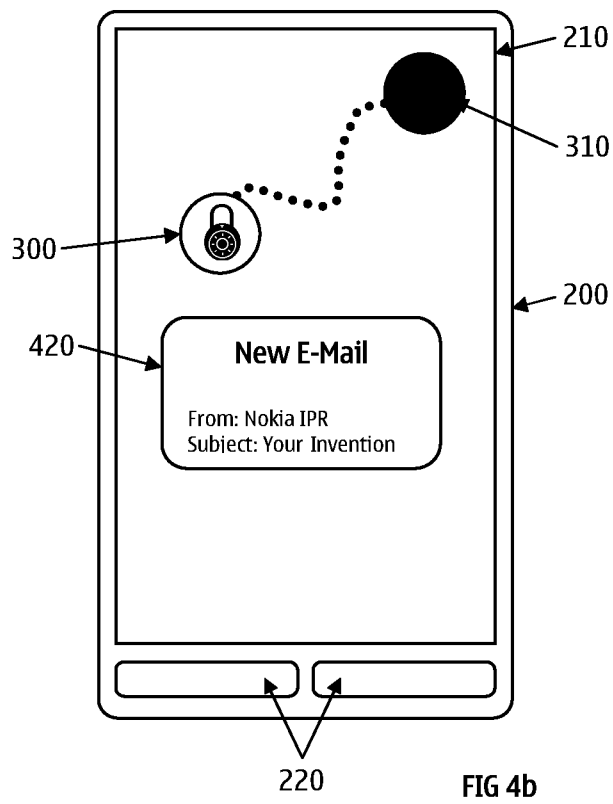
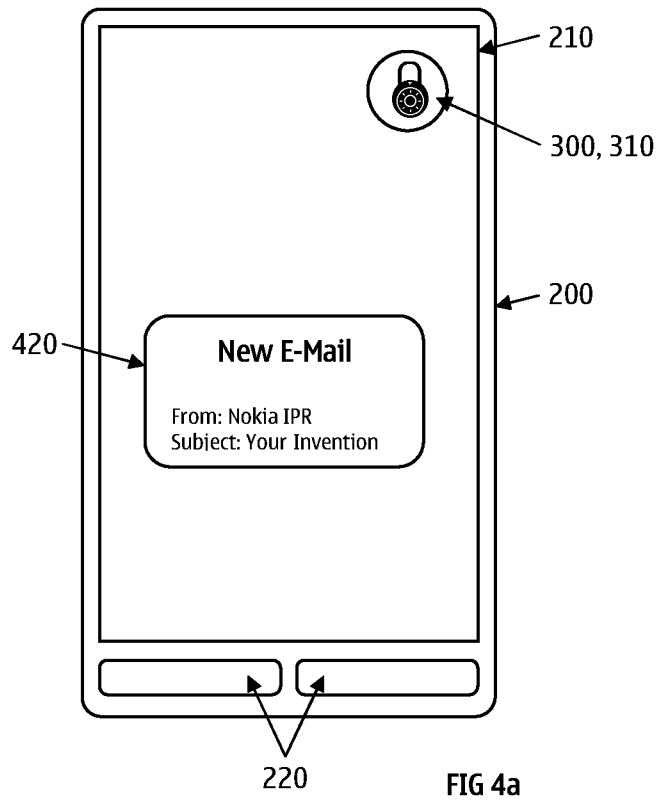


FIG 3c



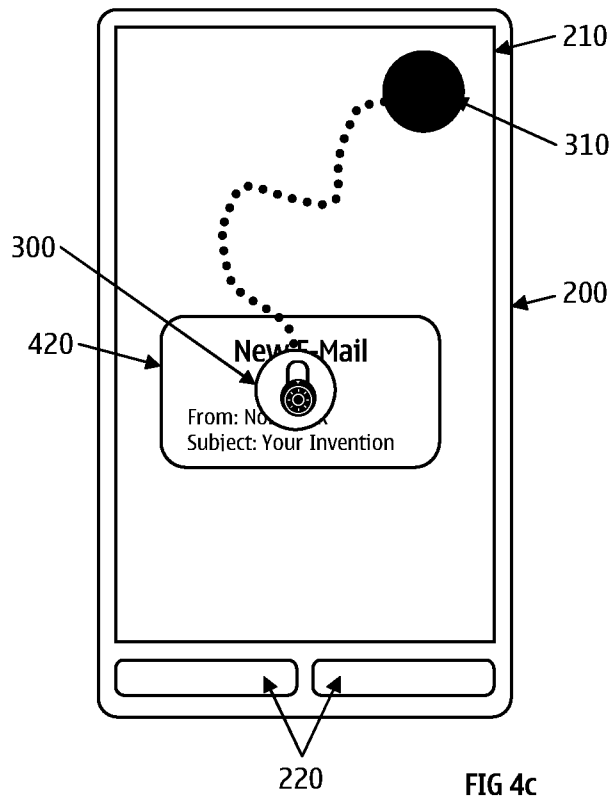


FIG 4c

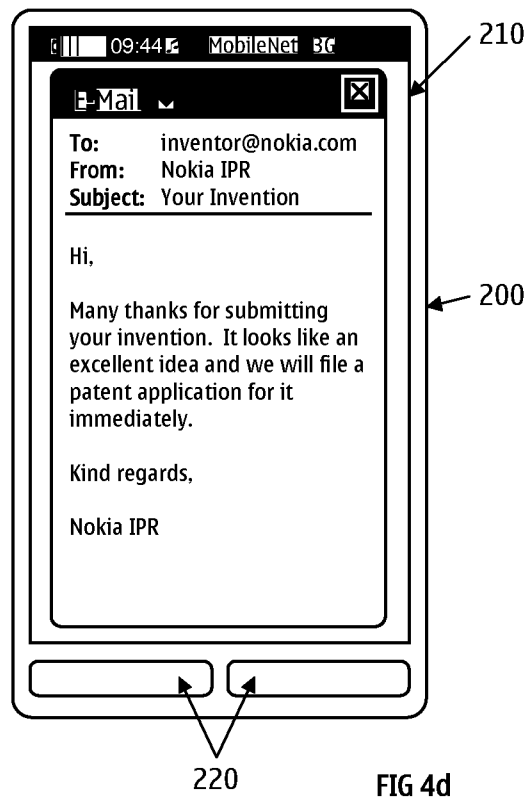
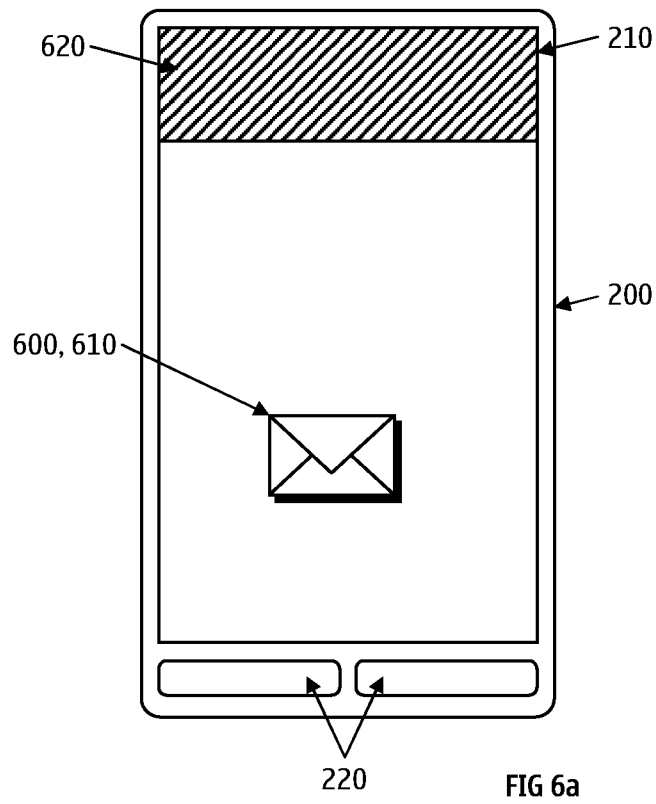
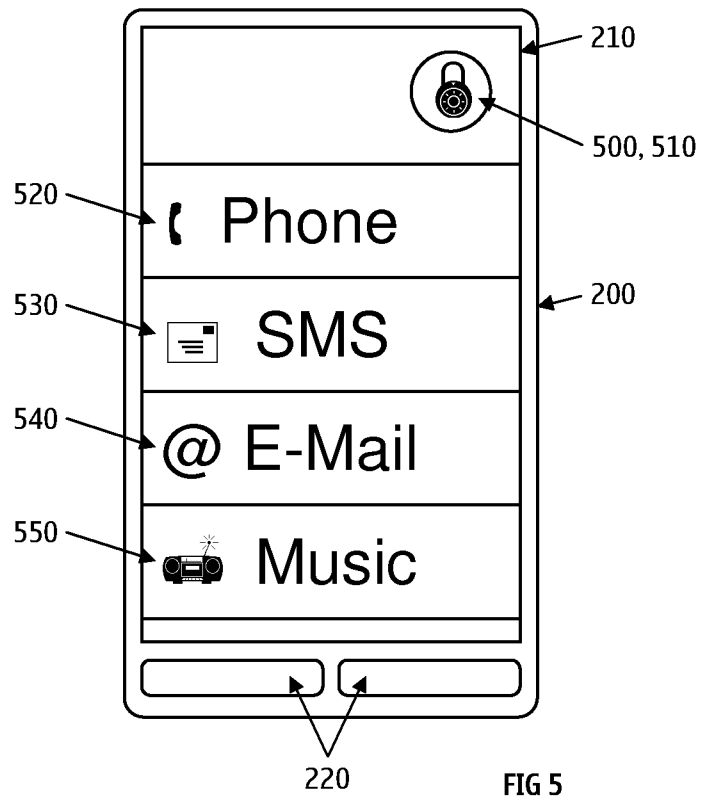
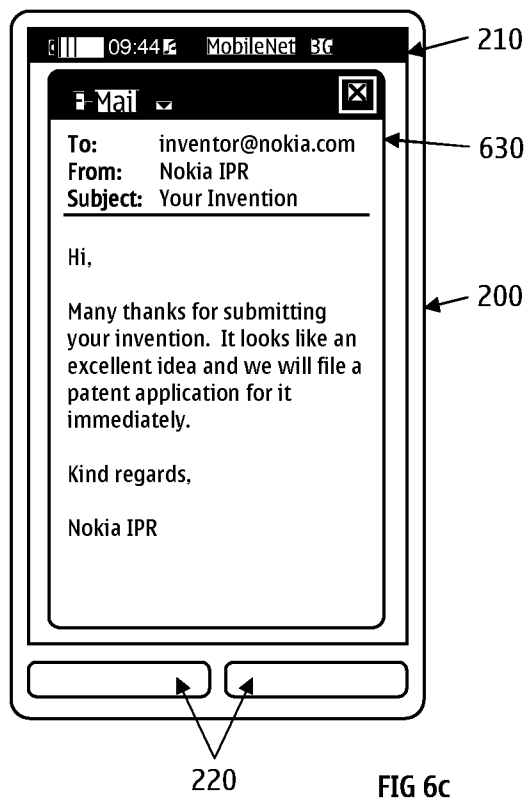
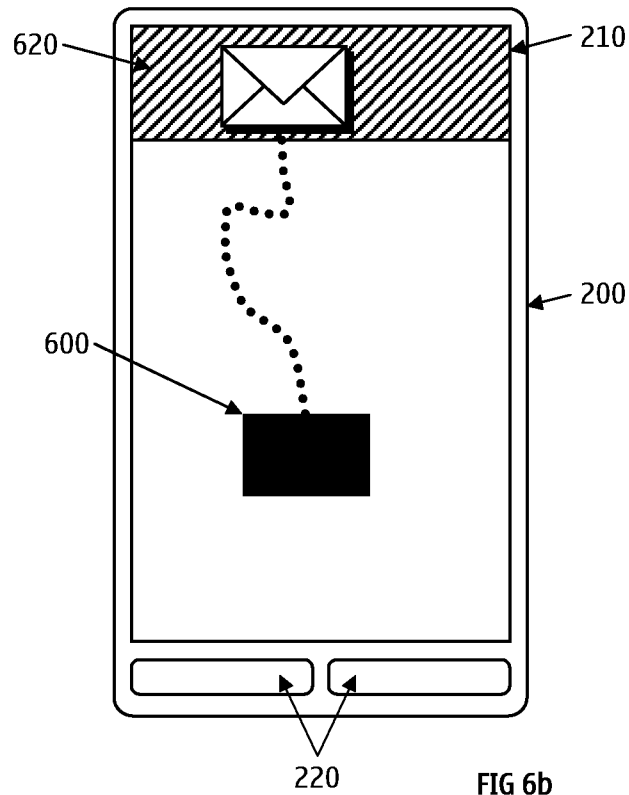
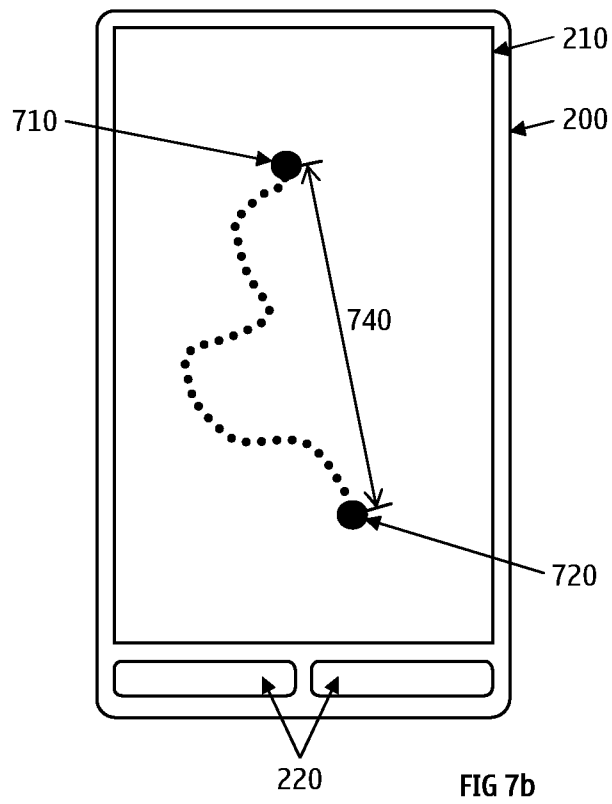
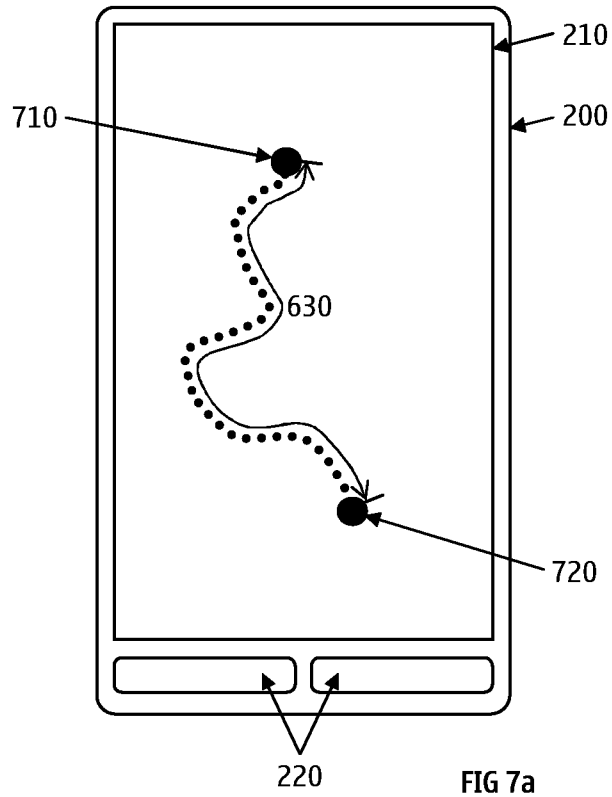
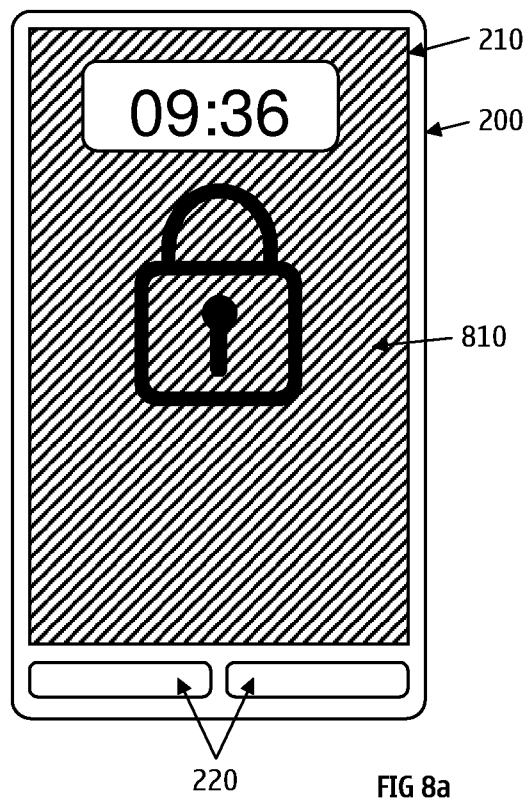
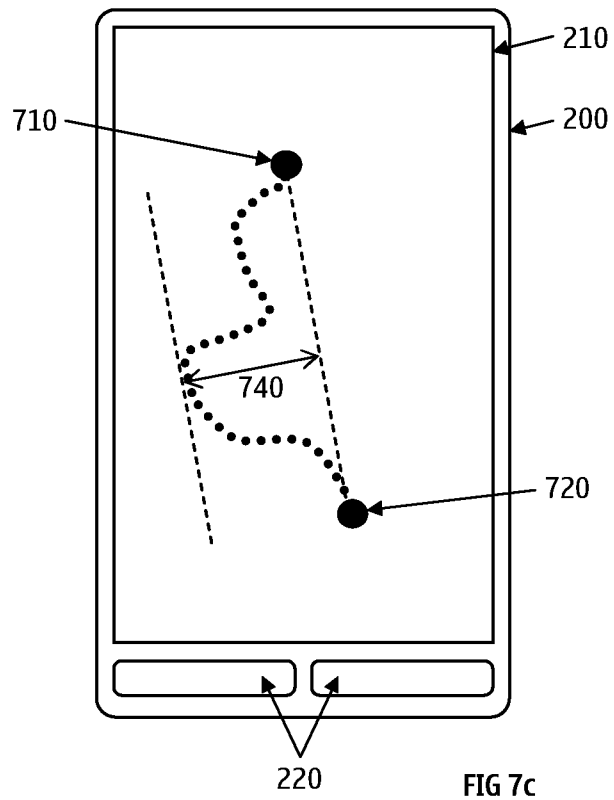


FIG 4d









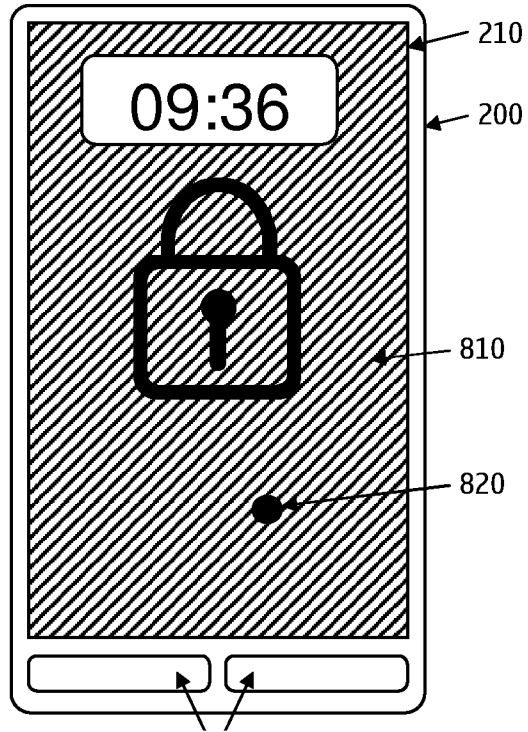


FIG 8b

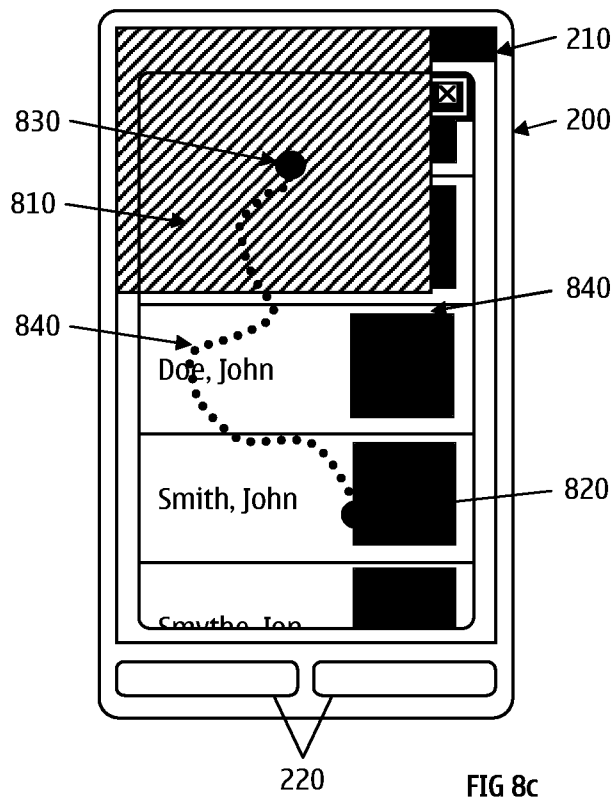
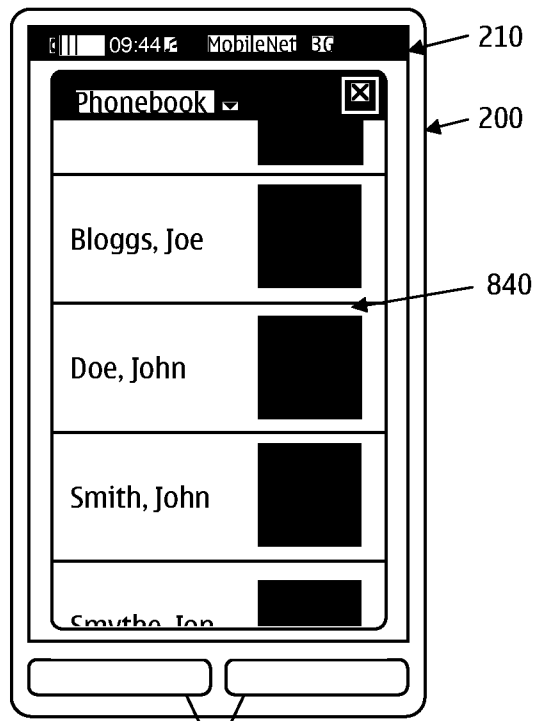
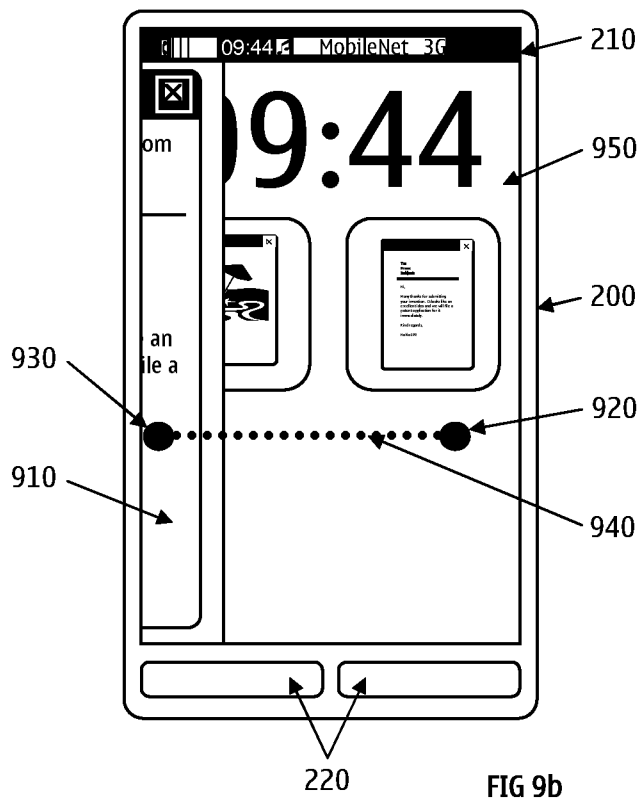
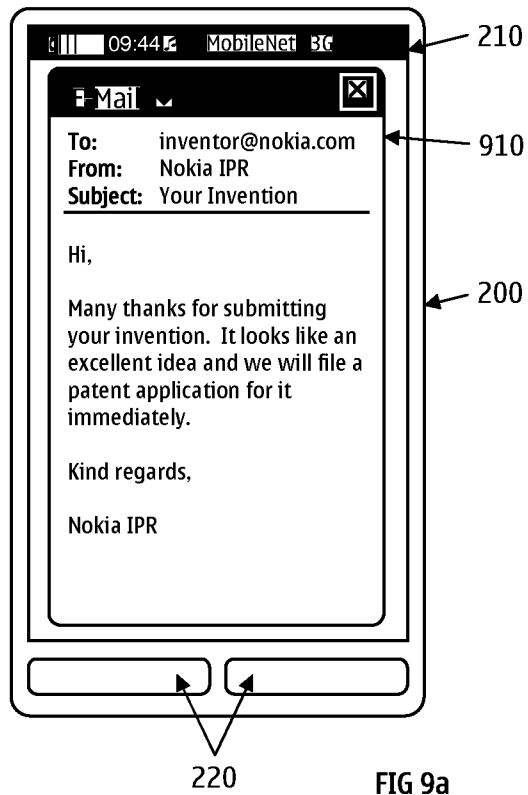


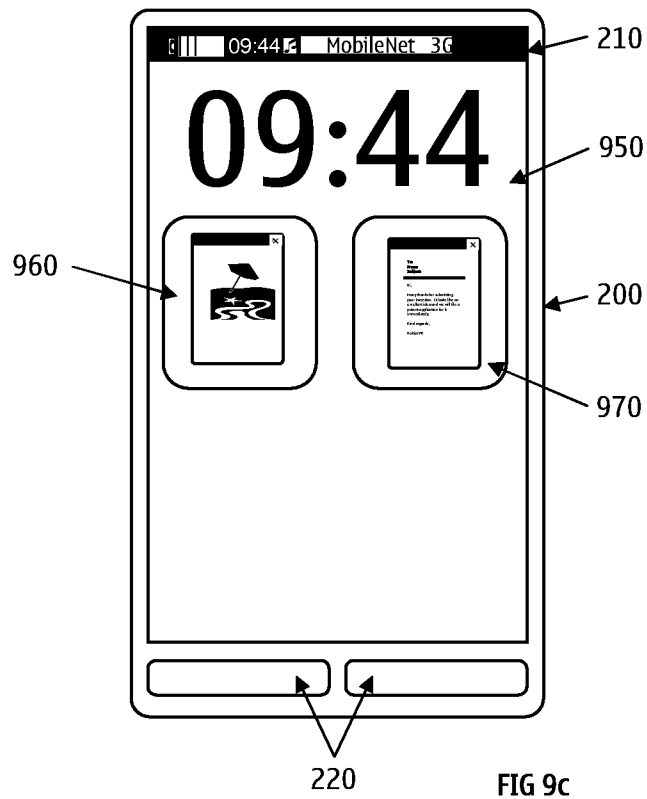
FIG 8c



220

FIG 8d





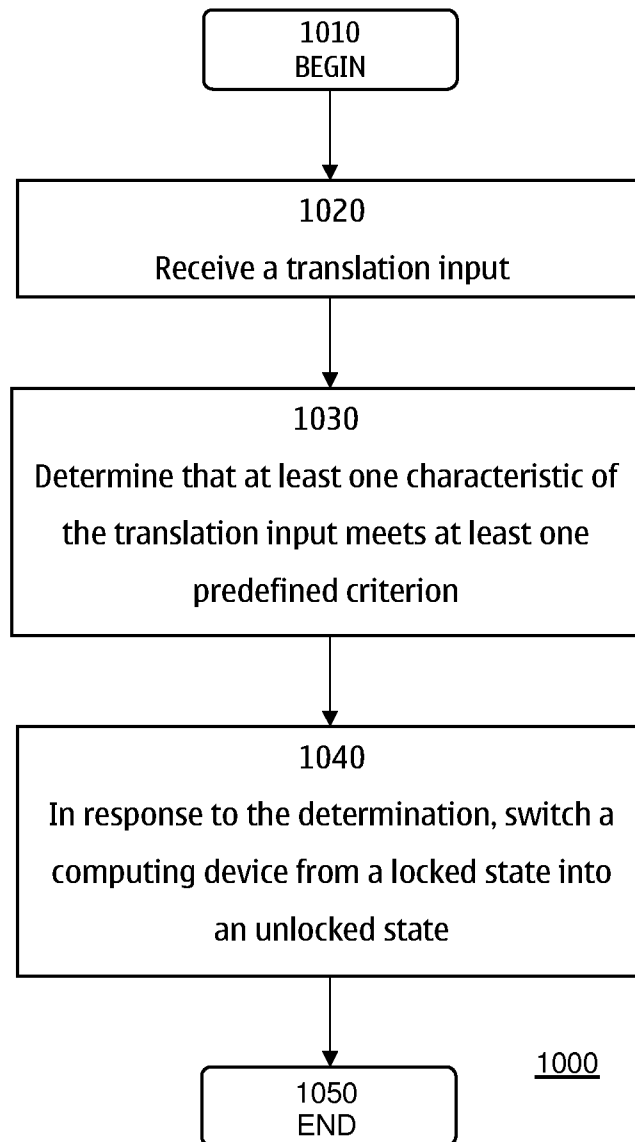


FIG. 10

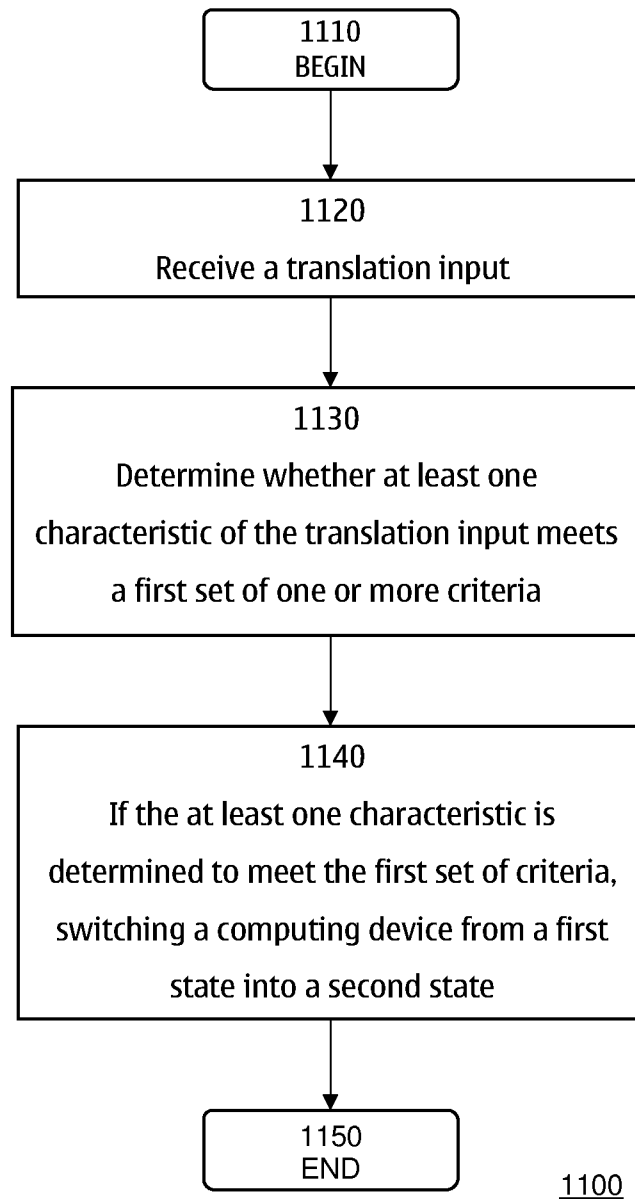


FIG. 11

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI2011/050739

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: H04B, G06F, H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

FI, SE, NO, DK

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2009/0267909 A1 (CHEN C et al.) 29 October 2009 (29.10.2009) [0005]-[0028], [0050]-[0054], [0061], [0076], [0080]-[0083], claims 1-26, figures 4A, 4B, 4C, 4D, 4E, 10D, 12	1-46
X	US 2007/0150842 A1 (CHAUDHRI I et al.) 28 June 2007 (28.06.2007) [0007]-[0012], claims 1-23	1, 10, 21
X	US 2009/0289916 A1 (DAI L) 26 November 2009 (26.11.2009) [0001]-[0006], claims 1-16	1, 10, 21
X	WO 2010/040670 A2 (TAT THE ASTONISHING TRIBE AB et al.) 15 April 2010 (15.04.2010) page 1: line 10-page 2: line 8, claims 1-35	1, 10, 21
X	US 2009/0006991 A1 (LINDBERG PJ et al.) 01 January 2009 (01.01.2009) [0005]-[0007], claims 1-20	1, 10, 21

 Further documents are listed in the continuation of Box C.

 See patent family annex.

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INTERNATIONAL SEARCH REPORT
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CLASSIFICATION OF SUBJECT MATTER

Int.Cl.

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