US009270805B2

(12) **United States Patent**
Yang

(10) **Patent No.: US 9,270,805 B2**
(45) **Date of Patent: Feb. 23, 2016**

(54) **MOBILE TERMINAL AND CONTROLLING METHOD THEREOF**

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(73) Assignee: **LG ELECTRONICS INC.**, Seoul (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/555,071**

(22) Filed: **Nov. 26, 2014**

(65) **Prior Publication Data**

US 2015/0172438 A1 Jun. 18, 2015

(30) **Foreign Application Priority Data**

Dec. 17, 2013 (KR) 10-2013-0156874

(51) **Int. Cl.**

H04M 1/725	(2006.01)
G04G 21/04	(2013.01)
G06F 3/0488	(2013.01)
G06F 1/16	(2006.01)
G04G 9/00	(2006.01)

(52) **U.S. Cl.**

CPC ***H04M 1/72533*** (2013.01); ***G04G 9/0064*** (2013.01); ***G04G 21/04*** (2013.01); ***G06F 1/163*** (2013.01); ***G06F 3/04883*** (2013.01); ***G06F 3/04886*** (2013.01); ***H04M 1/7253*** (2013.01)

(58) **Field of Classification Search**

CPC H04M 1/72533; H04M 1/7253; G04G 9/0064; G06F 1/163

See application file for complete search history.

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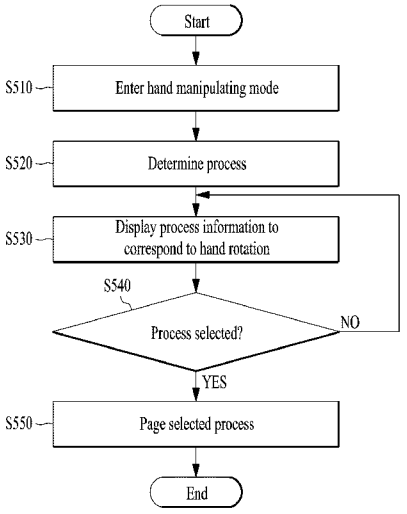
Primary Examiner — Nathan Mitchell

(74) *Attorney, Agent, or Firm* — Lee, Hong, Degerman, Kang & Waimey

(57) **ABSTRACT**

A mobile terminal, including a touchscreen, a wireless communication unit, and a controller, displays an analog watch type interface including a hand that is rotatable in response to user input; receives first information from an external terminal when a preset condition is met, wherein the received first information is related to at least one process previously executed in the external terminal; displays second information associated with a specific one of the at least one previously executed process in response to a touch input causing rotation of the hand on the touchscreen, the displayed second information corresponding to a rotation angle of the rotated hand; and transmits third information related to the second information to the external terminal in response to selection of the displayed second information such that the specific one of the at least one previously executed process is paged in the external terminal.

20 Claims, 19 Drawing Sheets



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* cited by examiner

FIG. 1

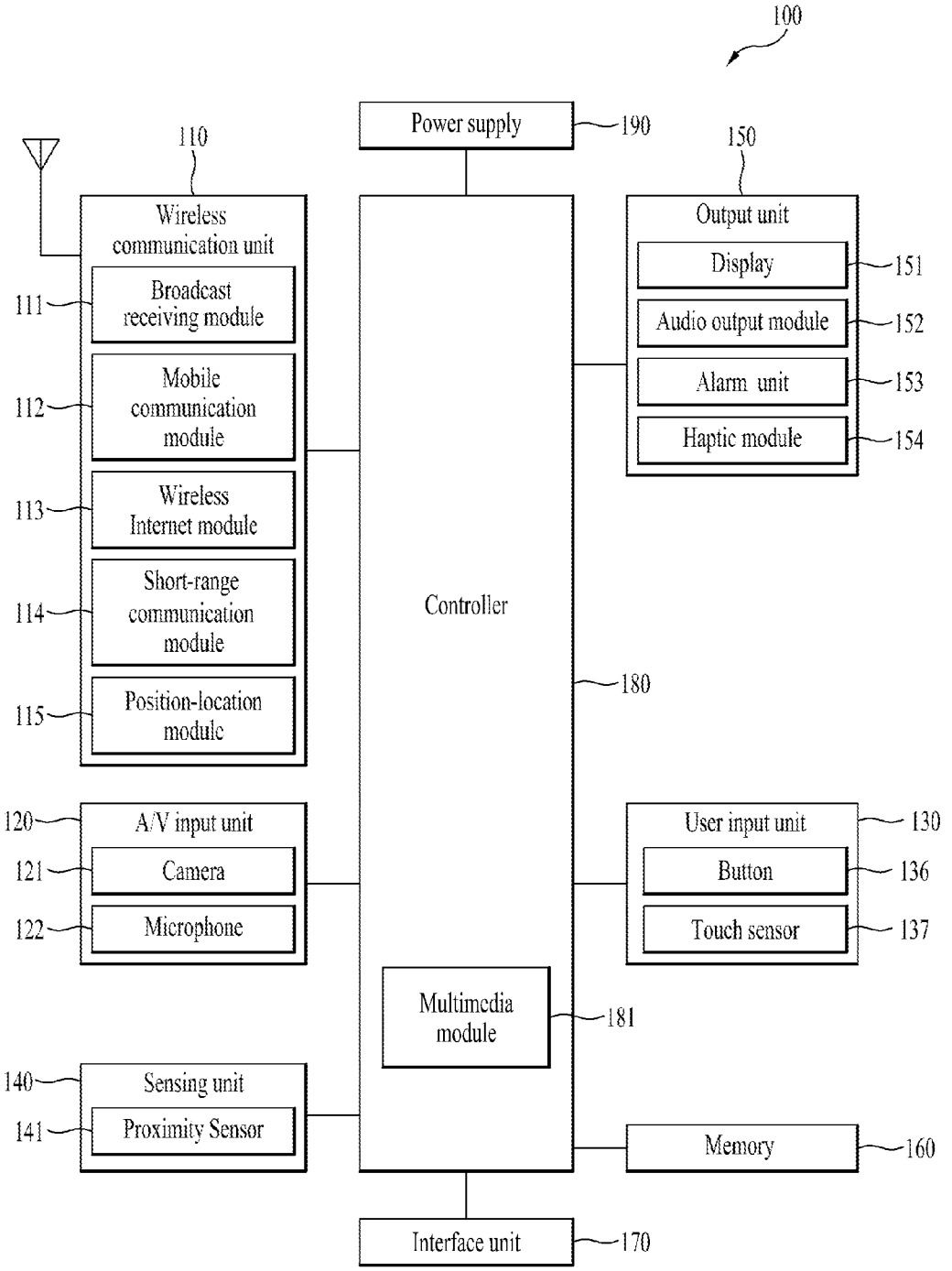
100
Power supply
190
110
150
Wireless communication unit
Broadcast receiving module
111
Mobile communication module
112
Wireless Internet module
113
Short-range communication module
114
Position-location module
115
Output unit
Display
151
Audio output module
152
Alarm unit
153
Haptic module
154
Controller
180
120
A/V input unit
121
Camera
122
Microphone
User input unit
130
Button
136
Touch sensor
137
Multimedia module
181
140
Sensing unit
141
Proximity Sensor
Memory
160
Interface unit
170

FIG. 2

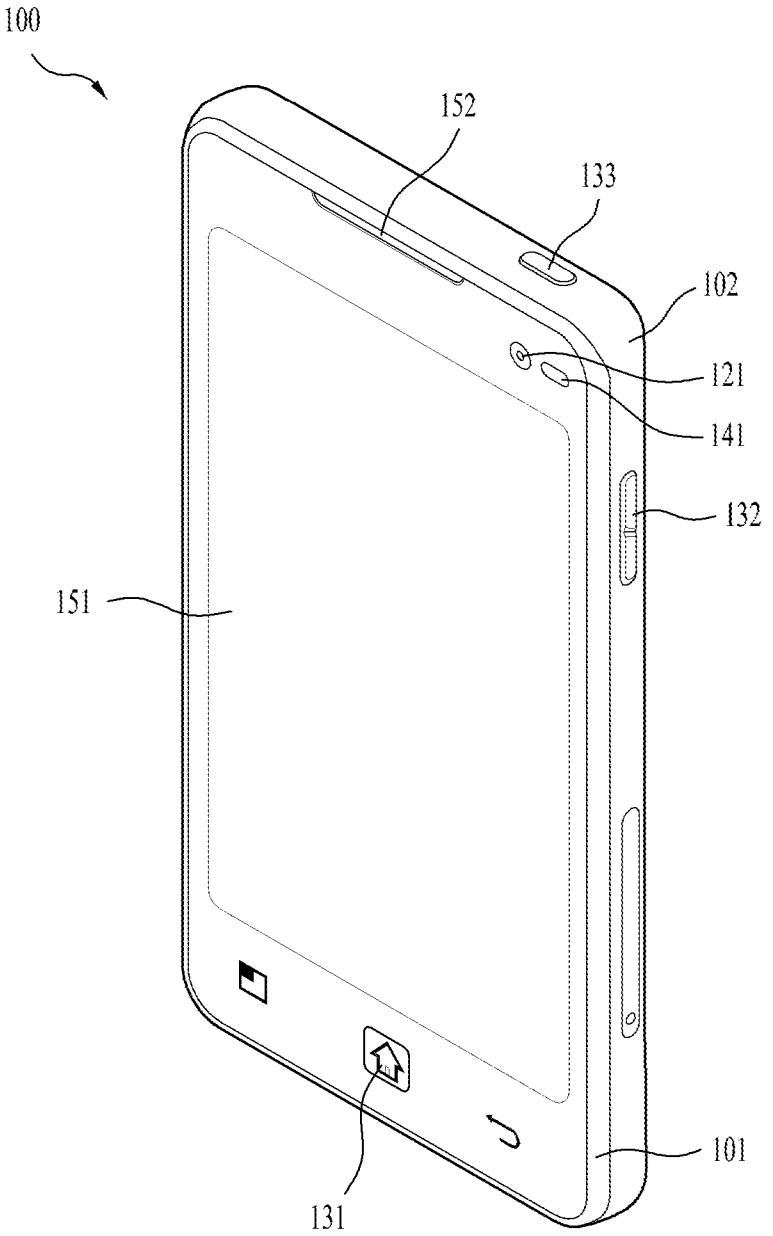

FIG. 3A

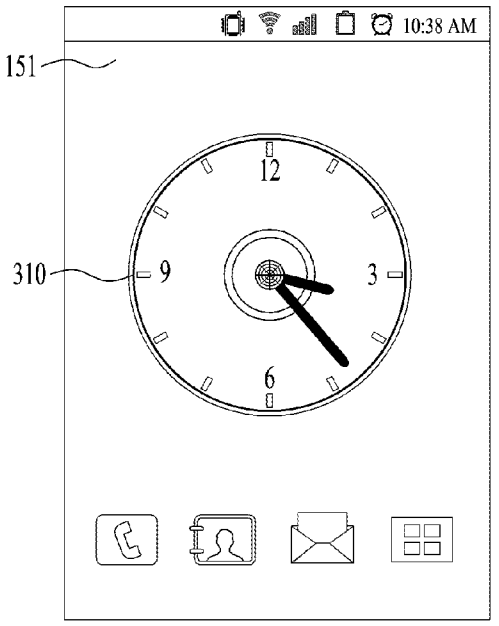

FIG. 3B

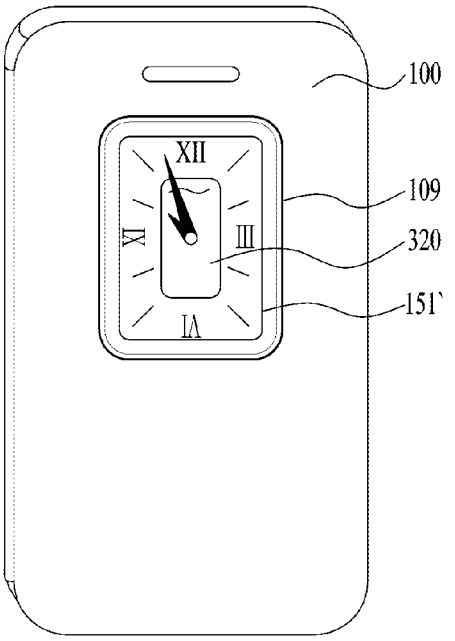

FIG. 3C

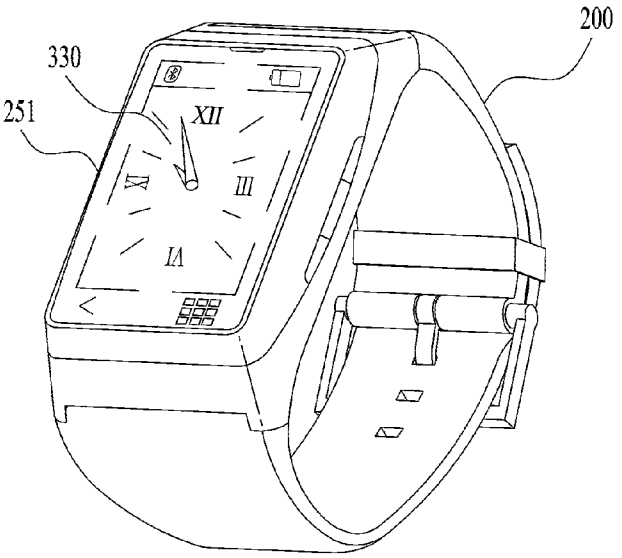

FIG. 4

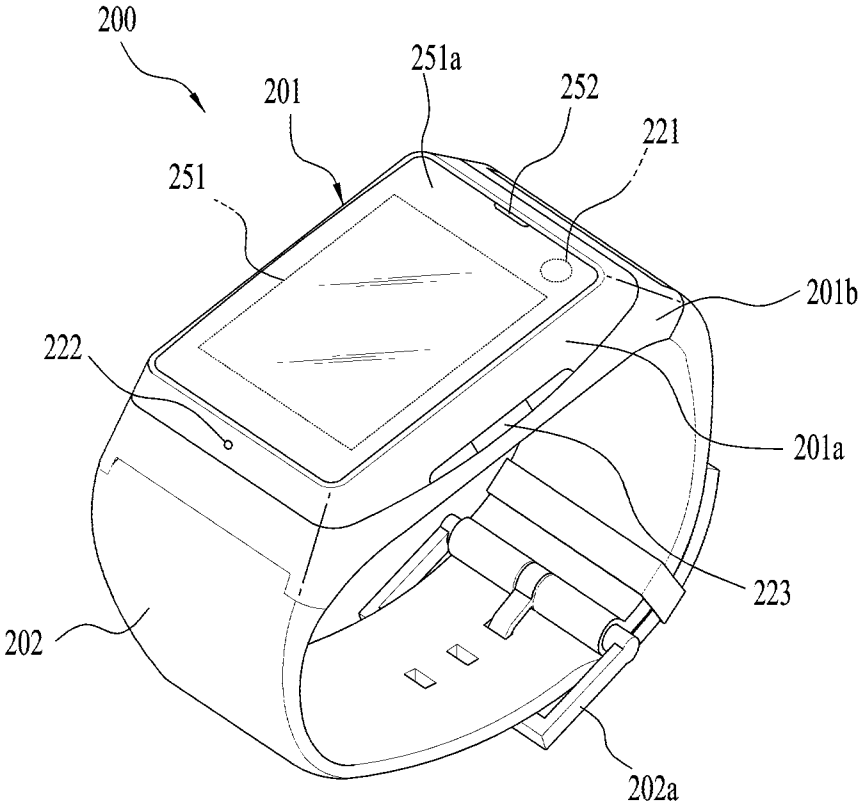

FIG. 5

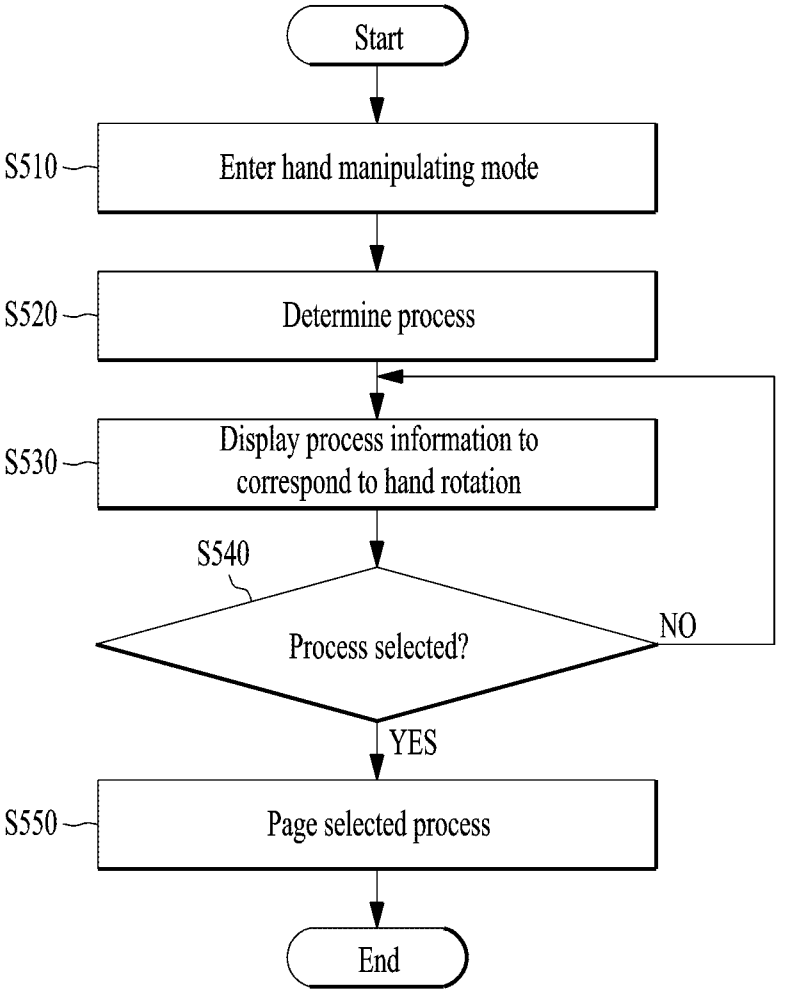
Start
S510
Enter hand manipulating mode
S520
Determine process
S530
Display process information to correspond to hand rotation
S540
Process selected?
NO
YES
S550
Page selected process
End

FIG. 6A

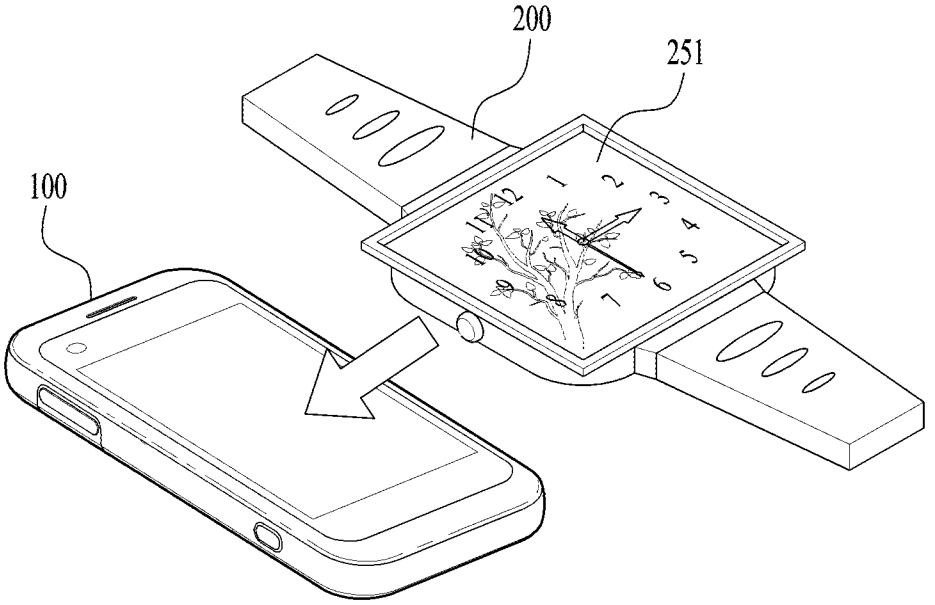

FIG. 6B

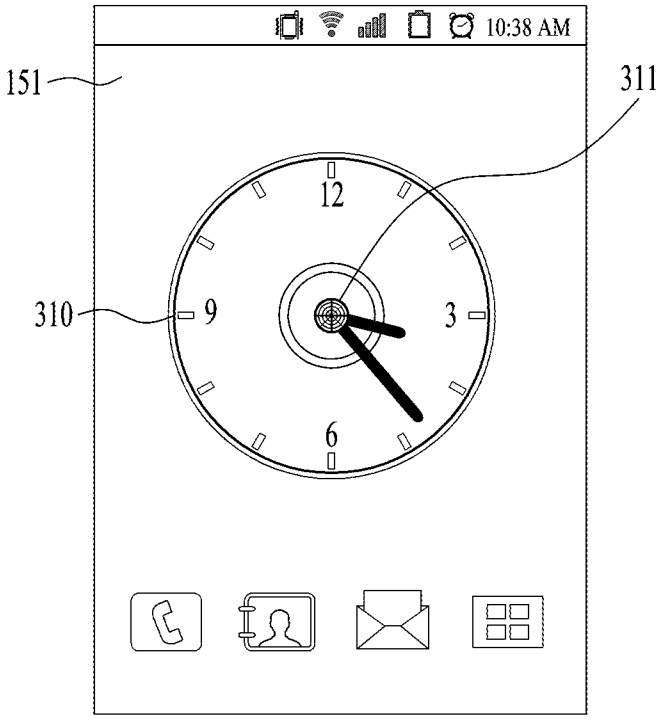

FIG. 7A FIG. 7B FIG. 7C

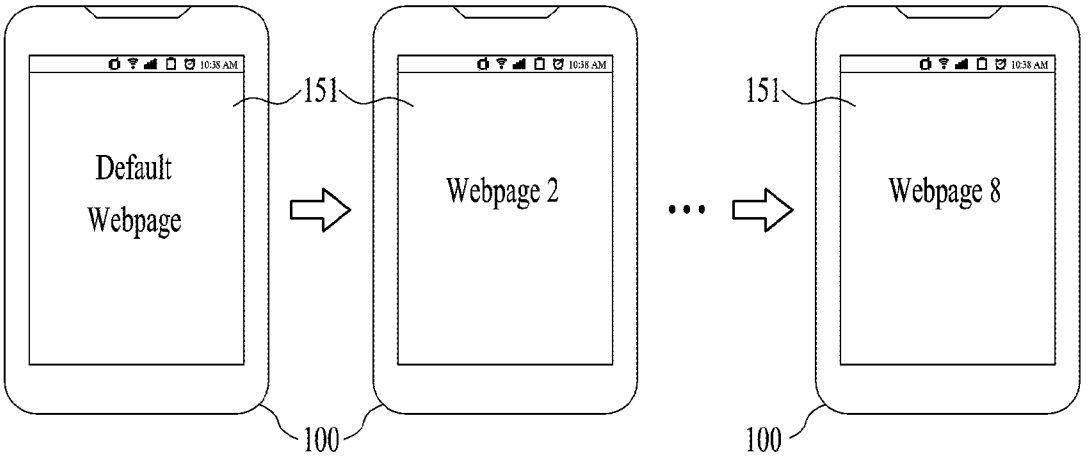

FIG. 8A

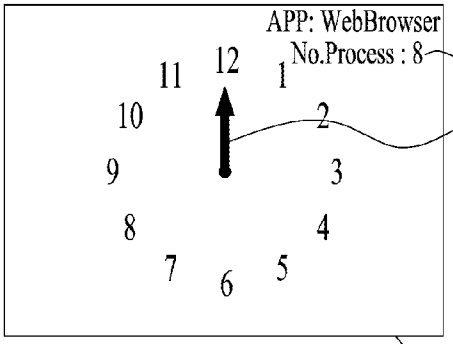

FIG. 8B

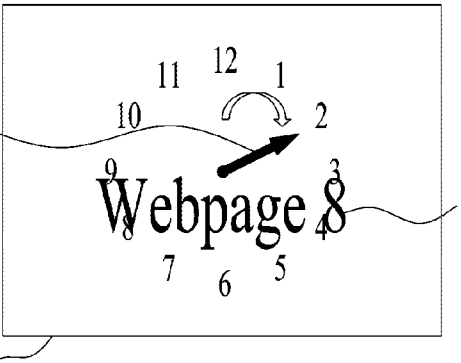

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FIG. 8C

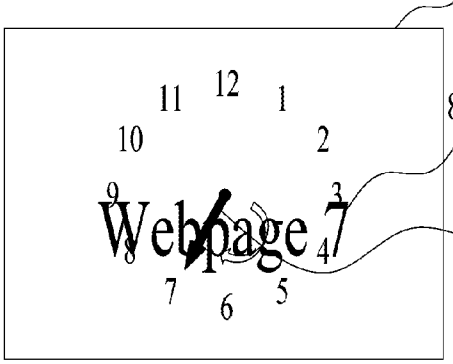

FIG. 8D

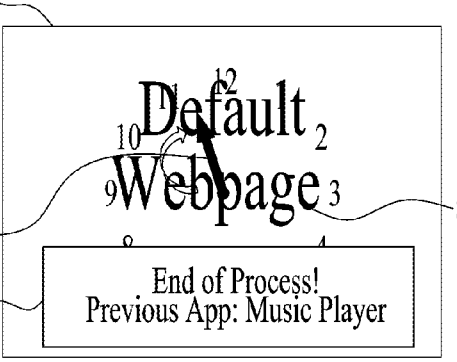

FIG. 9

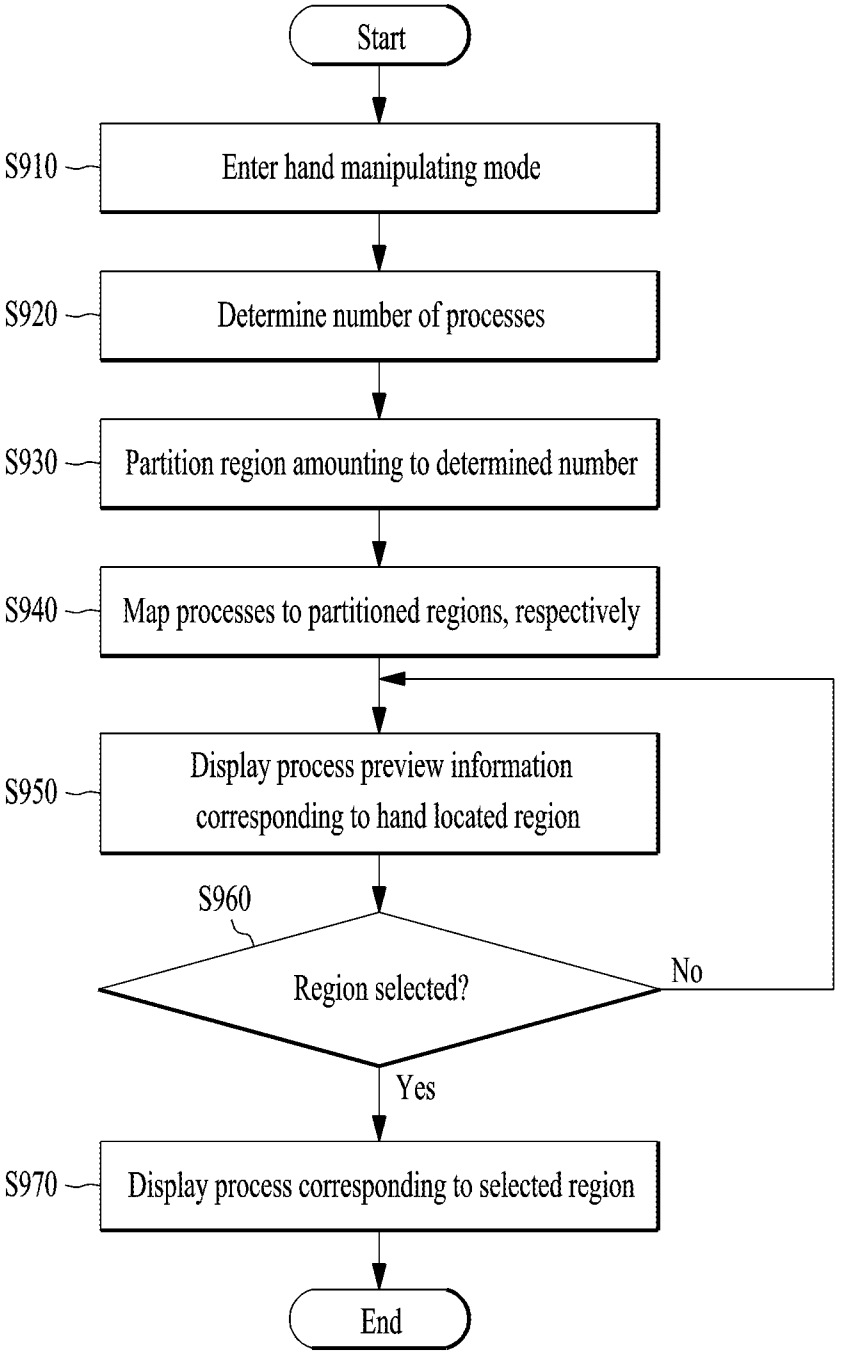
Start
S910
Enter hand manipulating mode
S920
Determine number of processes
S930
Partition region amounting to determined number
S940
Map processes to partitioned regions, respectively
S950
Display process preview information corresponding to hand located region
S960
Region selected?
No
Yes
S970
Display process corresponding to selected region
End

FIG. 10A

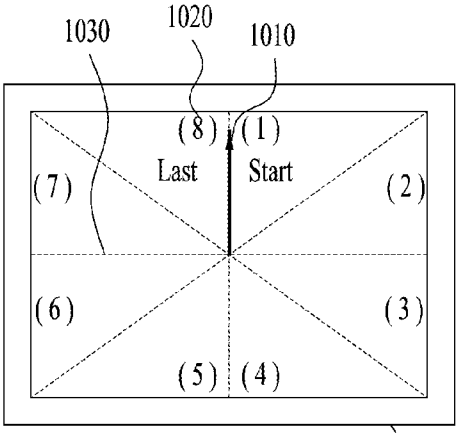

FIG. 10B

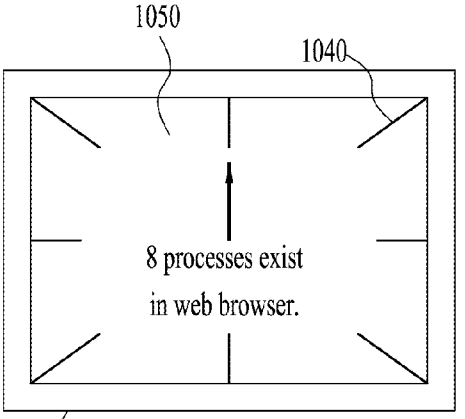

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FIG. 10C

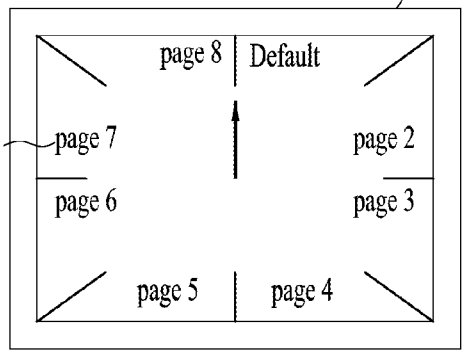


FIG. 10D

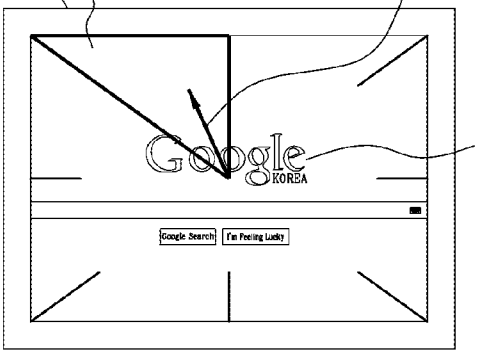


FIG. 10E

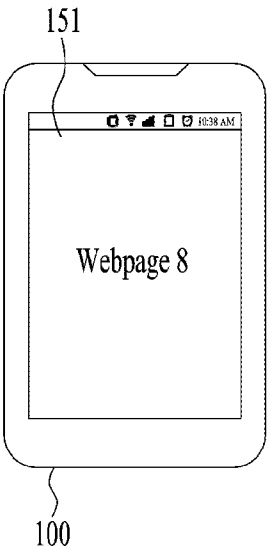


FIG. 10F

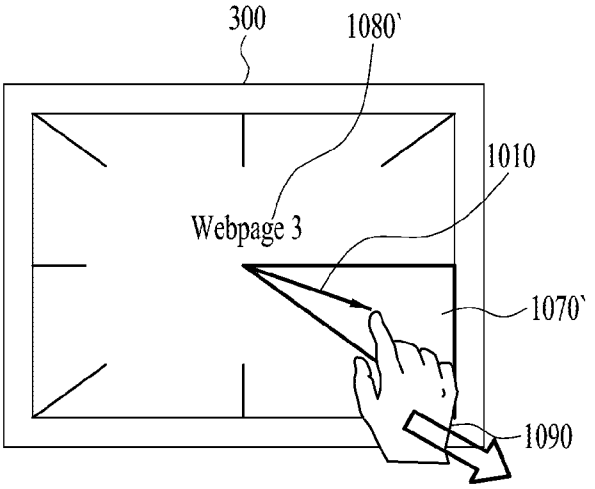


FIG. 10G

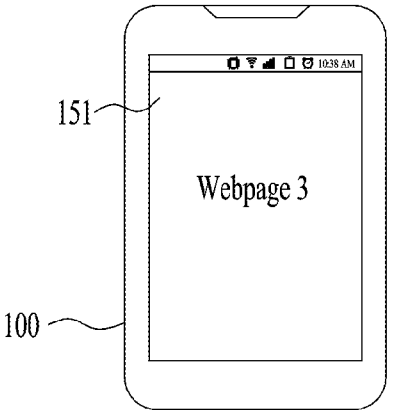
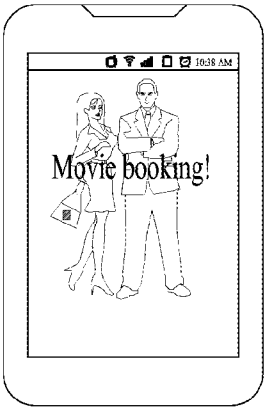
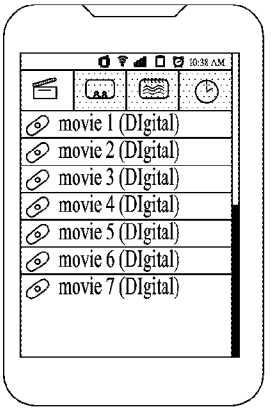


FIG. 11A



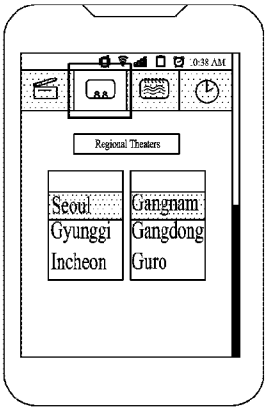
Movie booking application running

FIG. 11B



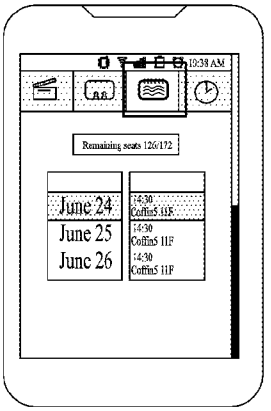
Movie selection

FIG. 11C



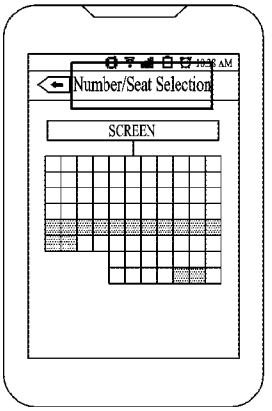
Theater information selection

FIG. 11D



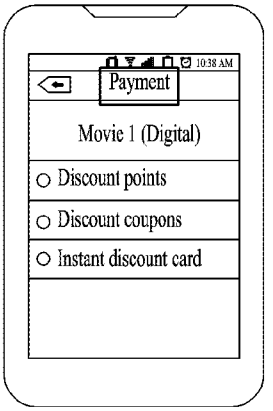
Time information selection

FIG. 11E



Seat selection

FIG. 11F



Payment

FIG. 11G

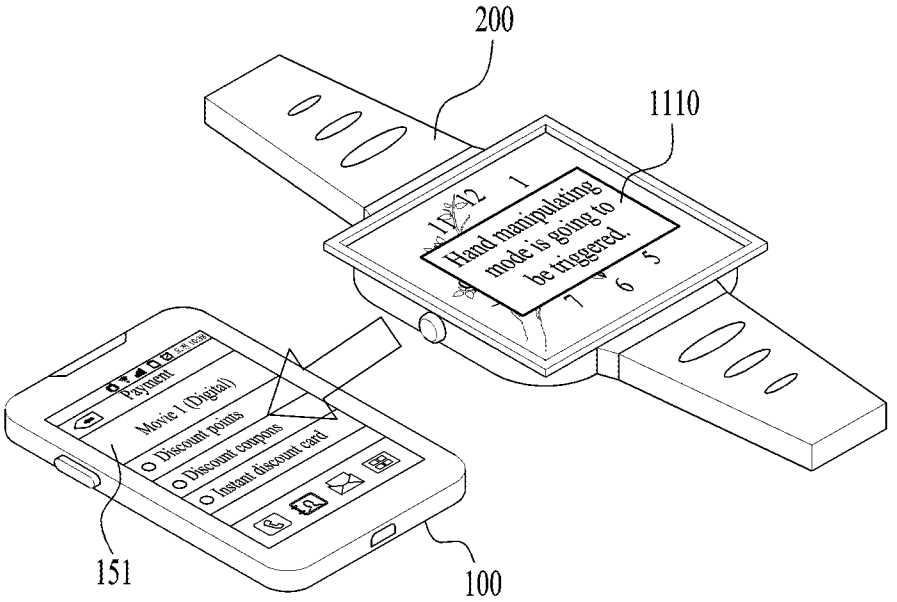

200
1110
Hand manipulating mode is going to be triggered.
Payment
Movie 1 (Digital)
Discount points
Discount coupons
Instant discount card
151
100

FIG. 12A

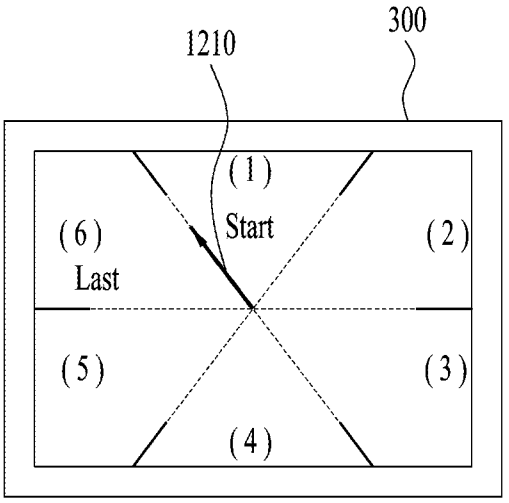


FIG. 12B

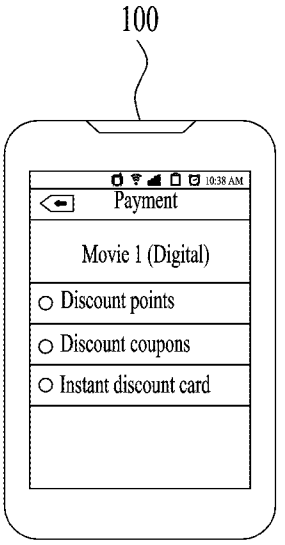


FIG. 12C

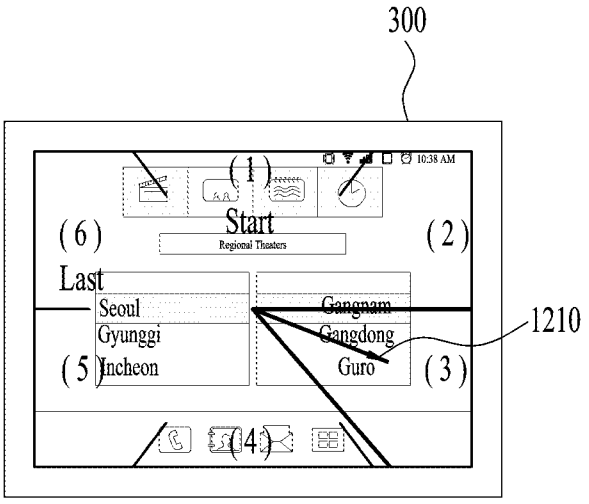


FIG. 12D

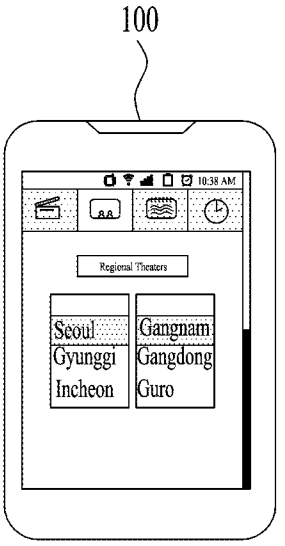


FIG. 13

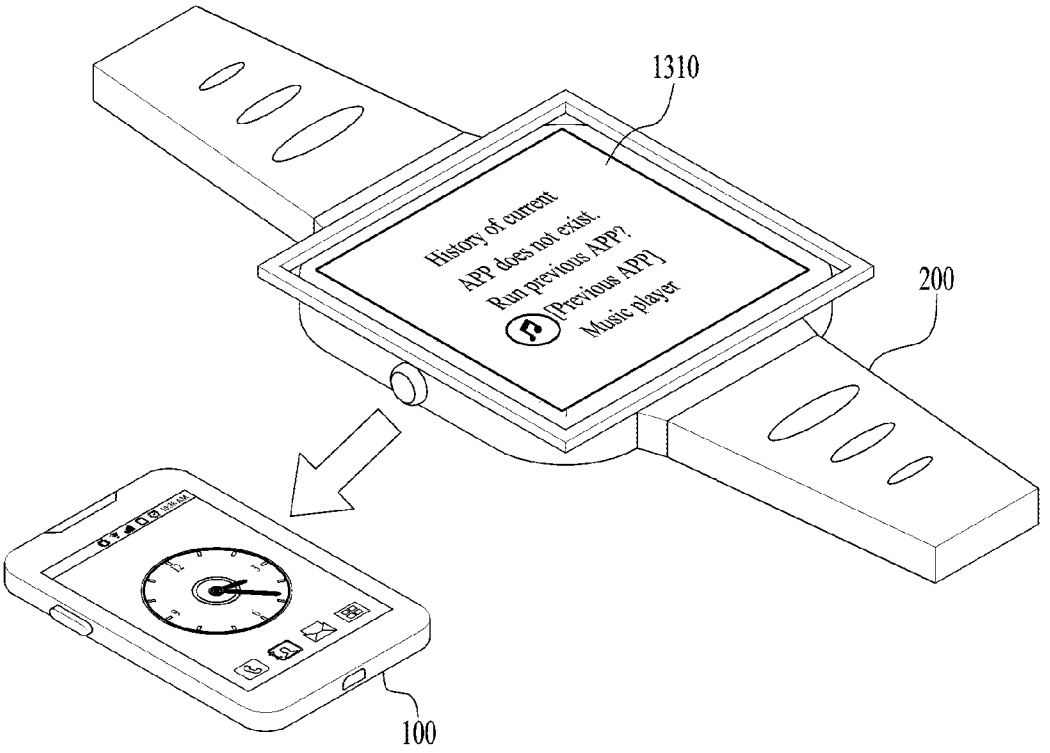
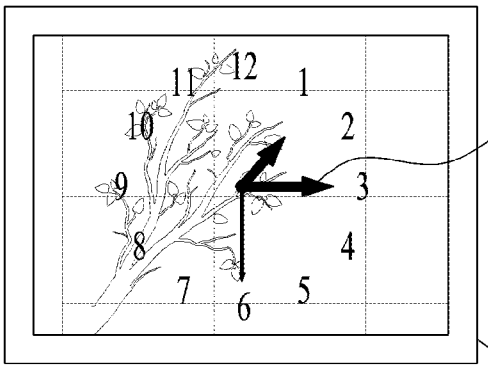
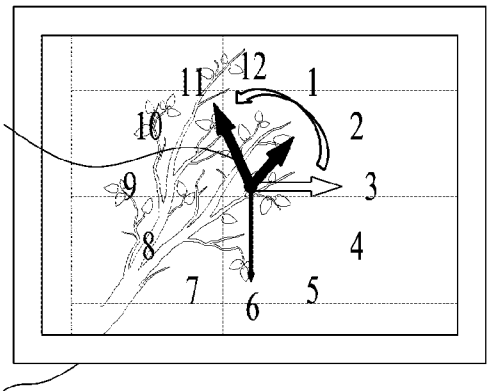

1310
History of current
APP does not exist.
Run previous APP?
[Previous APP]
Music player
200
100

FIG. 14A



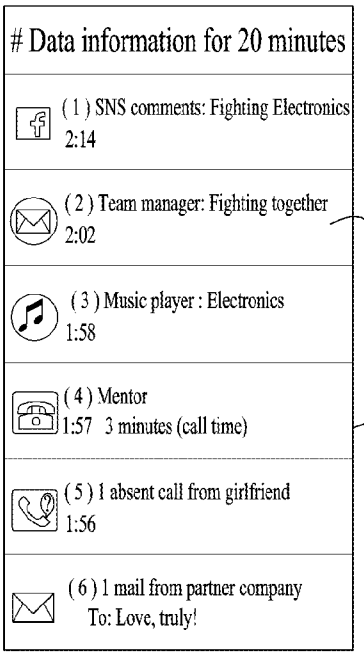
1410

FIG. 14B



300

FIG. 14C



1420

151

FIG. 14D

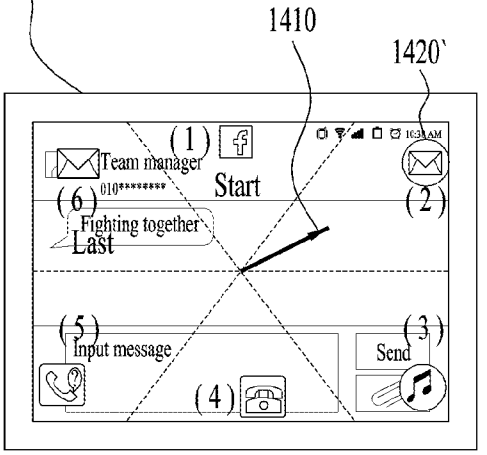


FIG. 15A

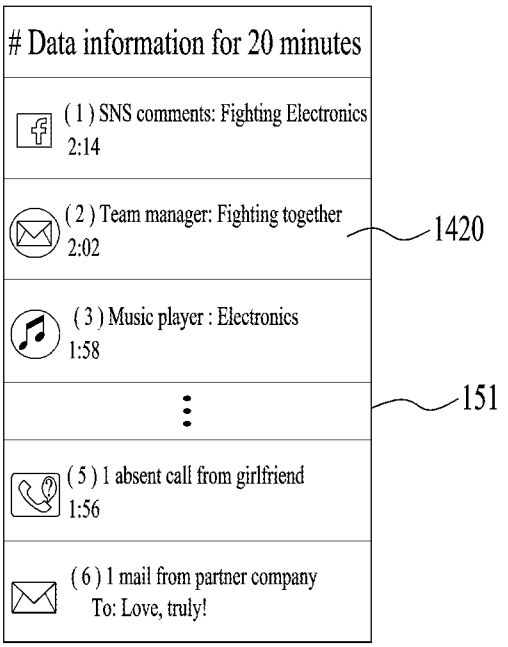


FIG. 15B

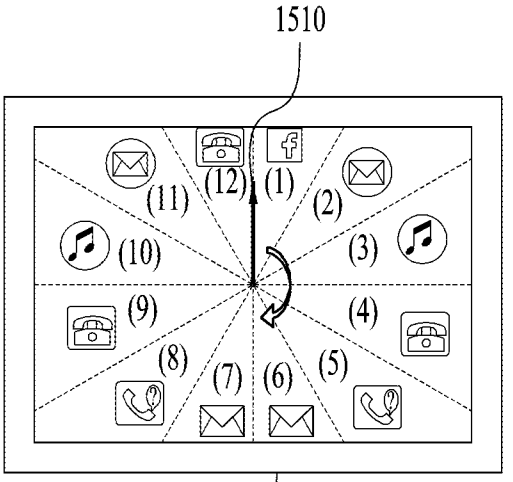


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FIG. 15C

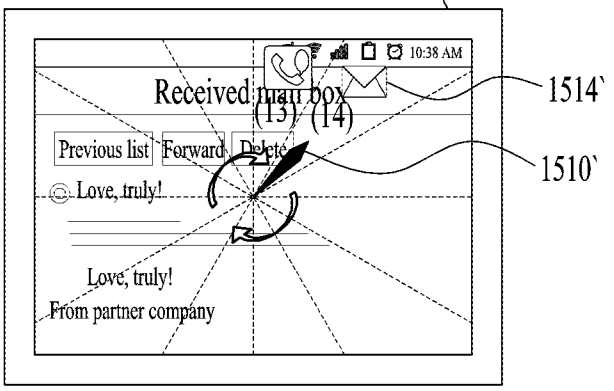

FIG. 16A

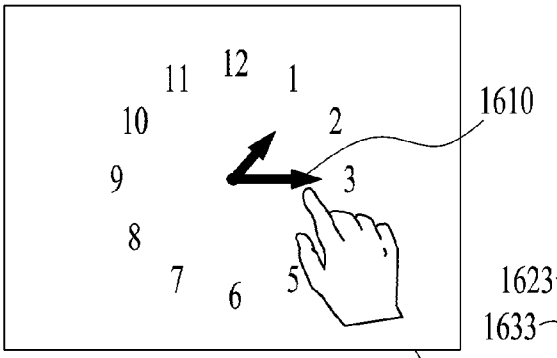

FIG. 16B

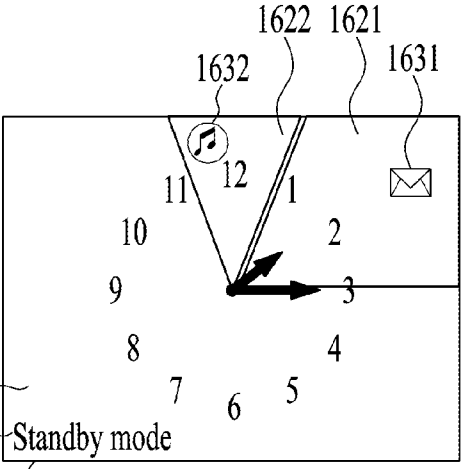

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FIG. 16C

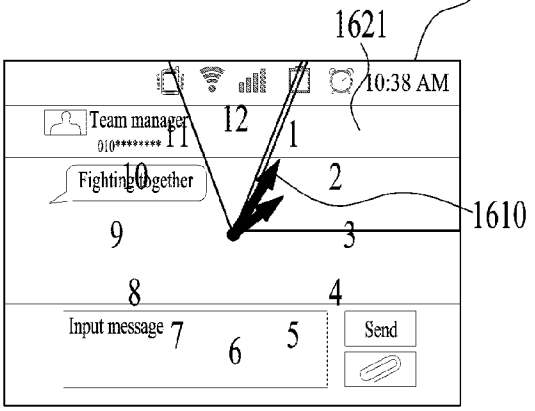


FIG. 16D

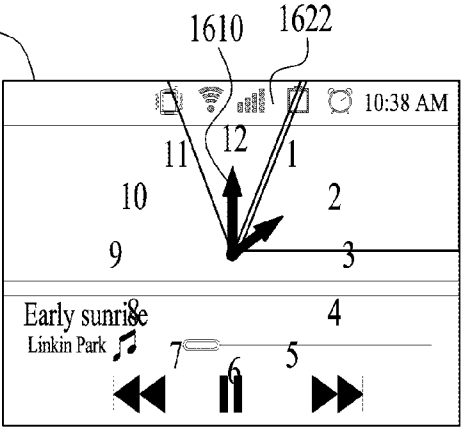
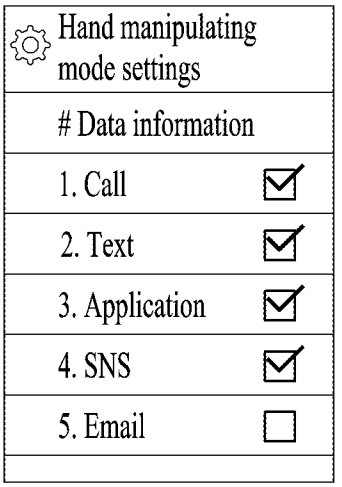


FIG. 17


Hand manipulating mode settings
Data information
1. Call
2. Text
3. Application
4. SNS
5. Email

MOBILE TERMINAL AND CONTROLLING METHOD THEREOF

Pursuant to 35 U.S.C. §119(a), this application claims the benefit of earlier filing date and right of priority to Korean Application No. 10-2013-0156874, filed on Dec. 17, 2013, the contents of which are hereby incorporated by reference herein in their entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a mobile terminal, and more particularly, to a mobile terminal and controlling method thereof. Although the present invention is suitable for a wide scope of applications, it is particularly suitable for facilitating a search for a previously performed job per process or time.

2. Discussion of the Related Art

Generally, terminals can be classified into mobile/portable terminals and stationary terminals. The mobile terminals can be further classified into handheld terminals and vehicle mount terminals according to possibility of user's direct portability.

As functions of the terminal are getting diversified, the terminal tends to be implemented as a multimedia player provided with composite functions such as photographing of photos or videos, playback of music or video files, game play, broadcast reception and the like for example.

To support and increase the terminal functions, it may be able to consider the improvement of structural parts and/or software parts of the terminal.

Recently, as various and complicated functions can be performed through mobile terminals, the demand for a mobile terminal capable of conveniently searching and paging a previously performed job per process or time is rising.

SUMMARY OF THE INVENTION

Accordingly, the present invention is directed to a mobile terminal and controlling method thereof that substantially obviate one or more problems due to limitations and disadvantages of the related art.

An object of the present invention is to provide a mobile terminal and controlling method thereof, by which a previously performed job can be conveniently searched and paged per process or time.

In particular, one object of the present invention is to provide a mobile terminal and controlling method thereof, by which a process or time can be selected using a watch of an analog type displayed on a touchscreen.

Technical tasks obtainable from the present invention are non-limited by the above-mentioned technical tasks. And, other unmentioned technical tasks can be clearly understood from the following description by those having ordinary skill in the technical field to which the present invention pertains.

Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objectives and other advantages of the invention may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, a mobile terminal according to one embodiment of the present invention may include a touchscreen, a wireless communication unit configured to communicate with an external terminal, and a controller, if a preset condition is met, receiving an information on a process previously performed in the external terminal from the external terminal through the wireless communication unit, the controller, if a hand rotatable on the touchscreen is rotated in response to a touch input, controlling a process information corresponding to one of processes included in the received information to be displayed on the touchscreen in response to a rotation angle of the hand, the controller, if the displayed process information is selected, controlling an information on the selected process to be sent to the external terminal in order for the process corresponding to the selected region to be paged in the external terminal.

In another aspect of the present invention, as embodied and broadly described herein, a mobile terminal according to another embodiment of the present invention may include a touchscreen and a controller, if a preset condition is met, determining an information on a previously performed process, the controller, if a hand rotatable on the touchscreen is rotated in response to a touch input, controlling a process information corresponding to one of the determined processes to be displayed on the touchscreen in response to a rotation angle of the hand, the controller, if the displayed process information is selected, controlling a process corresponding to the selected region to be paged.

In another aspect of the present invention, as embodied and broadly described herein, a method of controlling a mobile terminal according to one embodiment of the present invention may include the steps of displaying an analog watch on a touchscreen of a 1^{st} mobile terminal, if a preset condition is met, sending an information on a process previously performed in a 2^{nd} mobile terminal to the 2^{nd} terminal, rotating a hand rotatable on the touchscreen of the 1^{st} mobile terminal in response to a touch input, displaying a process information corresponding to one of processes included in the sent information on the touchscreen of the 1^{st} mobile terminal in response to a rotation angle of the hand, selecting the displayed process information in the 1^{st} mobile terminal, sending an information on the selected process to the 2^{nd} mobile terminal from the 1^{st} mobile terminal, and paging the selected process in the 2^{nd} mobile terminal.

Accordingly, the present invention provides the following effects and/or features.

First of all, a previously performed job can be conveniently searched and paged per process or time.

Secondly, a process or timing point can be conveniently changed and selected in a manner of moving the hands of an analog type watch displayed on a touchscreen.

Effects obtainable from the present invention may be non-limited by the above mentioned effect. And, other unmentioned effects can be clearly understood from the following description by those having ordinary skill in the technical field to which the present invention pertains.

It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate

embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

FIG. **1** is a block diagram of a mobile terminal according to one embodiment of the present invention;

FIG. **2** is a front perspective diagram of a mobile terminal according to one embodiment of the present invention;

FIGS. **3**A to **3**C are diagrams for one example of a configuration that an analog type watch applicable to embodiments of the present invention is displayed on a touchscreen;

FIG. **4** is a perspective diagram for one example of a mobile terminal **100** of a watch type according to one embodiment of the present invention;

FIG. **5** is a flowchart for one example of a method for searching and paging a previously performed process using an analog type watch in a mobile terminal according to one embodiment of the present invention;

FIGS. **6**A and **6**B are diagrams for one example of a procedure for triggering a hand manipulating mode according to one embodiment of the present invention;

FIGS. **7**A to **7**C are diagrams for one example of a procedure for a webpage reading to proceed in a mobile terminal according to one embodiment of the present invention;

FIGS. **8**A to **8**D are diagrams for one example of a procedure for performing a hand manipulating mode in a watch type mobile terminal according to one embodiment of the present invention;

FIG. **9** is a flowchart for one example of a method for searching and paging a previously performed process through a region division of an analog type watch in a mobile terminal according to one embodiment of the present invention;

FIGS. **10**A to **10**D are diagrams for one example of a procedure for performing a hand manipulating mode in a watch type mobile terminal according to one embodiment of the present invention;

FIGS. **10**E to **10**G are diagrams for one example of a process paging method in response to a selection of a region corresponding to a specific process in a mobile terminal according to one embodiment of the present invention;

FIGS. **11**A to **11**F are diagrams for one example of a process proceeding procedure in a mobile terminal according to one embodiment of the present invention;

FIG. **11**G is a diagram for one example of a configuration that a hand manipulating mode is triggered in response to a tag to a watch type mobile terminal in a mobile terminal according to one embodiment of the present invention;

FIGS. **12**A to **12**D are diagrams for one example of a paging procedure in accordance with a process selection in a mobile terminal according to one embodiment of the present invention;

FIG. **13** is a diagram for one example of an operation in case that a hand manipulation mode is unable to be triggered in a watch type mobile terminal according to one embodiment of the present invention;

FIGS. **14**A to **14**D are diagrams for one example of a procedure for confirming and paging a process in accordance with a time change through an analog watch in a mobile terminal according to another embodiment of the present invention;

FIGS. **15**A to **15**C are diagrams for one example of a configuration that a hand manipulating mode is performed if a predetermined number of processes or more exist in an interval selected by a minute hand in a mobile terminal according to another embodiment of the present invention;

FIGS. **16**A to **16**D are diagrams for one example of a configuration that a hand manipulating mode is performed in a mobile terminal according to further embodiment of the present invention; and

FIG. **17** is a diagram for one example of a menu configuration for selecting a target application, which is to be counted as a process in a hand manipulating mode, according to embodiments of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

In the following detailed description, reference is made to the accompanying drawing figures which form a part hereof, and which show by way of illustration specific embodiments of the invention. It is to be understood by those of ordinary skill in this technological field that other embodiments may be utilized, and structural, electrical, as well as procedural changes may be made without departing from the scope of the present invention. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or similar parts.

As used herein, the suffixes 'module', 'unit' and 'part' are used to denote elements in order to facilitate the disclosure only. Therefore, significant meanings or roles are not given to the suffixes themselves, and it is understood that the suffixes 'module', 'unit' and 'part' can be used together or interchangeably.

Features of embodiments of the present invention are applicable to various types of terminals. Examples of such terminals include mobile terminals, such as mobile phones, user equipment, smart phones, mobile computers, digital broadcast terminals, personal digital assistants, portable multimedia players (PMP) and navigators. However, by way of non-limiting example only, further description will be with regard to a mobile terminal **100**, and it should be noted that such teachings may apply equally to other types of terminals such as digital TV, desktop computers and so on.

FIG. **1** is a block diagram of a mobile terminal **100** in accordance with an embodiment of the present invention. With reference to FIG. **1**, the mobile terminal **100** includes a wireless communication unit **110**, an A/V (audio/video) input unit **120**, a user input unit **130**, a sensing unit **140**, an output unit **150**, a memory **160**, an interface unit **170**, a controller **180**, and a power supply unit **190**. FIG. **1** shows the mobile terminal **100** having various components, but implementing all of the illustrated components is not a requirement. More or fewer components may be implemented according to various embodiments.

The wireless communication unit **110** typically includes one or more components which permit wireless communication between the mobile terminal **100** and a wireless communication system or network within which the mobile terminal **100** is located. For instance, the wireless communication unit **110** can include a broadcast receiving module **111**, a mobile communication module **112**, a wireless Internet module **113**, a short-range communication module **114**, and a position-location module **115**.

The broadcast receiving module **111** receives a broadcast signal and/or broadcast associated information from an external broadcast managing server via a broadcast channel. The broadcast channel may include a satellite channel and a terrestrial channel. At least two broadcast receiving modules **111** can be provided in the mobile terminal **100** to facilitate simultaneous reception of at least two broadcast channels or broadcast channel switching.

The broadcast managing server is generally a server which generates and transmits a broadcast signal and/or broadcast

associated information or a server which is provided with a previously generated broadcast signal and/or broadcast associated information and then transmits the provided signal or information to a terminal. The broadcast signal may be implemented as a TV broadcast signal, a radio broadcast signal, and/or a data broadcast signal, among other signals. If desired, the broadcast signal may further include a broadcast signal combined with a TV or radio broadcast signal.

The broadcast associated information includes information associated with a broadcast channel, a broadcast program, or a broadcast service provider. Furthermore, the broadcast associated information can be provided via a mobile communication network. In this instance, the broadcast associated information can be received by the mobile communication module **112**.

The broadcast associated information can be implemented in various forms. For instance, broadcast associated information may include an electronic program guide (EPG) of digital multimedia broadcasting (DMB) and an electronic service guide (ESG) of digital video broadcast-handheld (DVB-H).

The broadcast receiving module **111** may be configured to receive broadcast signals transmitted from various types of broadcast systems. By nonlimiting example, such broadcasting systems may include digital multimedia broadcasting-terrestrial (DMB-T), digital multimedia broadcasting-satellite (DMB-S), digital video broadcast-handheld (DVB-H), digital video broadcast-convergence of broadcasting and mobile services (DVB-CBMS), Open Mobile Alliance Broadcast (OMA-BCAST), the data broadcasting system known as media forward link only (MediaFLO™) and integrated services digital broadcast-terrestrial (ISDB-T). Optionally, the broadcast receiving module **111** can be configured to be suitable for other broadcasting systems as well as the above-noted digital broadcasting systems.

The broadcast signal and/or broadcast associated information received by the broadcast receiving module **111** may be stored in a suitable device, such as the memory **160**.

The mobile communication module **112** transmits/receives wireless signals to/from one or more network entities (e.g., a base station, an external terminal, and/or a server) via a mobile network such as GSM (Global System for Mobile communications), CDMA (Code Division Multiple Access), or WCDMA (Wideband CDMA). Such wireless signals may carry audio, video, and data according to text/multimedia messages.

The wireless Internet module **113** supports Internet access for the mobile terminal **100**. This module may be internally or externally coupled to the mobile terminal **100**. The wireless Internet technology can include WLAN (Wireless LAN), Wi-Fi, Wibro™ (Wireless broadband), Wimax™ (World Interoperability for Microwave Access), HSDPA (High Speed Downlink Packet Access), GSM, CDMA, WCDMA, or LTE (Long Term Evolution).

Wireless Internet access by Wibro™, HSPDA, GSM, CDMA, WCDMA, or LTE is achieved via a mobile communication network. In this regard, the wireless Internet module **113** may be considered as being a kind of the mobile communication module **112** to perform the wireless Internet access via the mobile communication network.

The short-range communication module **114** facilitates relatively short-range communications. Suitable technologies for implementing this module include radio frequency identification (RFID), infrared data association (IrDA), ultra-wideband (UWB), as well as the networking technologies commonly referred to as Bluetooth™ and ZigBee™, to name a few.

The position-location module **115** identifies or otherwise obtains the location of the mobile terminal **100**. According to one embodiment, this module may be implemented with a global positioning system (GPS) module. The GPS module **115** can precisely calculate current 3-dimensional position information based on at least longitude, latitude or altitude and direction (or orientation) by calculating distance information and precise time information from at least three satellites and then applying triangulation to the calculated information. Location information and time information are calculated using three satellites, and errors of the calculated location position and time information are then amended (or corrected) using another satellite. In addition, the GPS module **115** can calculate speed information by continuously calculating a real-time current location.

With continued reference to FIG. **1**, the audio/video (A/V) input unit **120** is configured to provide audio or video signal input to the mobile terminal **100**. As shown, the A/V input unit **120** includes a camera **121** and a microphone **122**. The camera **121** receives and processes image frames of still pictures or video, which are obtained by an image sensor in a video call mode or a photographing mode. Furthermore, the processed image frames can be displayed on the display **151**.

The image frames processed by the camera **121** can be stored in the memory **160** or can be transmitted to an external recipient via the wireless communication unit **110**. Optionally, at least two cameras **121** can be provided in the mobile terminal **100** according to the environment of usage.

The microphone **122** receives an external audio signal while the portable device is in a particular mode, such as phone call mode, recording mode and voice recognition. This audio signal is processed and converted into electronic audio data. The processed audio data is transformed into a format transmittable to a mobile communication base station via the mobile communication module **112** in a call mode. The microphone **122** typically includes assorted noise removing algorithms to remove noise generated in the course of receiving the external audio signal.

The user input unit **130** generates input data responsive to user manipulation of an associated input device or devices. Examples of such devices include a keypad, a dome switch, a touchpad (e.g., static pressure/capacitance), a jog wheel, and a jog switch. FIG. **1** also illustrates the user input unit **130** can include a button **136** (hard or soft button) and a touch sensor **137**.

The sensing unit **140** provides sensing signals for controlling operations of the mobile terminal **100** using status measurements of various aspects of the mobile terminal. For instance, the sensing unit **140** may detect an open/closed status of the mobile terminal **100**, the relative positioning of components (e.g., a display and keypad) of the mobile terminal **100**, a change of position (or location) of the mobile terminal **100** or a component of the mobile terminal **100**, a presence or absence of user contact with the mobile terminal **100**, and an orientation or acceleration/deceleration of the mobile terminal **100**.

As an example, a mobile terminal **100** configured as a slide-type mobile terminal is considered. In this configuration, the sensing unit **140** may sense whether a sliding portion of the mobile terminal is open or closed. According to other examples, the sensing unit **140** senses the presence or absence of power provided by the power supply unit **190**, and the presence or absence of a coupling or other connection between the interface unit **170** and an external device. According to one embodiment, the sensing unit **140** can include a proximity sensor **141**.

The output unit **150** generates output relevant to the senses of sight, hearing, and touch. Furthermore, the output unit **150** includes the display **151**, an audio output module **152**, an alarm unit **153**, a haptic module **154**, and a projector module **155**.

The display **151** is typically implemented to visually display (output) information associated with the mobile terminal **100**. For instance, if the mobile terminal is operating in a phone call mode, the display will generally provide a user interface (UI) or graphical user interface (GUI) which includes information associated with placing, conducting, and terminating a phone call. As another example, if the mobile terminal **100** is in a video call mode or a photographing mode, the display **151** may additionally or alternatively display images which are associated with these modes, the UI or the GUI.

The display module **151** may be implemented using known display technologies. These technologies include, for example, a liquid crystal display (LCD), a thin film transistor-liquid crystal display (TFT-LCD), an organic light-emitting diode display (OLED), a flexible display and a three-dimensional display. The mobile terminal **100** may include one or more of such displays.

Some of the displays can be implemented in a transparent or optical transmittive type, i.e., a transparent display. A representative example of the transparent display is the TOLED (transparent OLED). A rear configuration of the display **151** can be implemented as the optical transmittive type as well. In this configuration, a user may be able to see an object located at the rear of a terminal body on a portion of the display **151** of the terminal body.

At least two displays **151** can be provided in the mobile terminal **100** in accordance with one embodiment of the mobile terminal **100**. For instance, a plurality of displays can be arranged to be spaced apart from each other or to form a single body on a single face of the mobile terminal **100**. Alternatively, a plurality of displays can be arranged on different faces of the mobile terminal **100**.

If the display **151** and a sensor for detecting a touch action (hereinafter called 'touch sensor') are configured as a mutual layer structure (hereinafter called 'touchscreen'), the display **151** is usable as an input device as well as an output device. In this instance, the touch sensor can be configured as a touch film, a touch sheet, or a touchpad.

The touch sensor can be configured to convert pressure applied to a specific portion of the display **151** or a variation of capacitance generated from a specific portion of the display **151** to an electronic input signal. Moreover, the touch sensor is configurable to detect pressure of a touch as well as a touched position or size.

If a touch input is made to the touch sensor, a signal(s) corresponding to the touch input is transferred to a touch controller. The touch controller processes the signal(s) and then transfers the processed signal(s) to the controller **180**. Therefore, the controller **180** is made aware when a prescribed portion of the display **151** is touched.

Referring to FIG. **1**, a proximity sensor **141** can be provided at an internal area of the mobile terminal **100** enclosed by the touchscreen or around the touchscreen. The proximity sensor is a sensor that detects a presence or non-presence of an object approaching a prescribed detecting surface or an object existing (or located) around the proximity sensor using an electromagnetic field strength or infrared ray without mechanical contact. Hence, the proximity sensor **141** is more durable than a contact type sensor and also has utility broader than the contact type sensor.

The proximity sensor **141** can include one of a transmittive photoelectric sensor, a direct reflective photoelectric sensor, a mirror reflective photoelectric sensor, a radio frequency oscillation proximity sensor, an electrostatic capacity proximity sensor, a magnetic proximity sensor, and an infrared proximity sensor. If the touchscreen includes the electrostatic capacity proximity sensor, it is configured to detect the proximity of a pointer using a variation of an electric field according to the proximity of the pointer. In this configuration, the touchscreen (touch sensor) can be considered as the proximity sensor.

For clarity and convenience of explanation, an action for enabling the pointer approaching the touchscreen to be recognized as placed on the touchscreen may be named 'proximity touch' and an action of enabling the pointer to actually come into contact with the touchscreen may be named 'contact touch'. In addition, a position, at which the proximity touch is made to the touchscreen using the pointer, may mean a position of the pointer vertically corresponding to the touchscreen when the pointer makes the proximity touch.

The proximity sensor detects a proximity touch and a proximity touch pattern (e.g., a proximity touch distance, a proximity touch duration, a proximity touch position, a proximity touch shift state). Information corresponding to the detected proximity touch action and the detected proximity touch pattern can be output to the touchscreen.

The audio output module **152** functions in various modes including a call-receiving mode, a call-placing mode, a recording mode, a voice recognition mode, and a broadcast reception mode to output audio data which is received from the wireless communication unit **110** or is stored in the memory **160**. During operation, the audio output module **152** outputs audio relating to a particular function (e.g., call received, message received). The audio output module **152** may be implemented using one or more speakers, buzzers, other audio producing devices, and combinations of these devices.

The alarm unit **153** outputs a signal for announcing the occurrence of a particular event associated with the mobile terminal **100**. Typical events include a call received, a message received and a touch input received. The alarm unit **153** can output a signal for announcing the event occurrence by way of vibration as well as video or audio signal. The video or audio signal can be output via the display **151** or the audio output module **152**. Hence, the display **151** or the audio output module **152** can be regarded as a part of the alarm unit **153**.

The haptic module **154** generates various tactile effects that can be sensed by a user. Vibration is a representative one of the tactile effects generated by the haptic module **154**. The strength and pattern of the vibration generated by the haptic module **154** are controllable. For instance, different vibrations can be output in a manner of being synthesized together or can be output in sequence.

The haptic module **154** can generate various tactile effects as well as the vibration. For instance, the haptic module **154** may generate an effect attributed to the arrangement of pins vertically moving against a contact skin surface, an effect attributed to the injection/suction power of air though an injection/suction hole, an effect attributed to the skim over a skin surface, an effect attributed to a contact with an electrode, an effect attributed to an electrostatic force, and an effect attributed to the representation of a hot/cold sense using an endothermic or exothermic device.

The haptic module **154** can be implemented to enable a user to sense the tactile effect through a muscle sense of a finger or an arm as well as to transfer the tactile effect through

direct contact. Optionally, at least two haptic modules **154** can be provided in the mobile terminal **100** in accordance with an embodiment of the mobile terminal **100**.

The memory **160** is generally used to store various types of data to support the processing, control, and storage requirements of the mobile terminal **100**. Examples of such data include program instructions for applications operating on the mobile terminal **100**, contact data, phonebook data, messages, audio, still pictures (or photo), and moving pictures. Furthermore, a recent use history or a cumulative use frequency of each data (e.g., use frequency for each phonebook, each message or each multimedia file) can be stored in the memory **160**.

Moreover, data for various patterns of vibration and/or sound output in response to a touch input to the touchscreen can be stored in the memory **160**.

The memory **160** may be implemented using any type or combination of suitable volatile and non-volatile memory or storage devices including hard disk, random access memory (RAM), static random access memory (SRAM), electrically erasable programmable read-only memory (EEPROM), erasable programmable read-only memory (EPROM), programmable read-only memory (PROM), read-only memory (ROM), magnetic memory, flash memory, magnetic or optical disk, multimedia card micro type memory, card-type memory (e.g., SD memory or XD memory), or other similar memory or data storage device. Furthermore, the mobile terminal **100** can operate in association with a web storage for performing a storage function of the memory **160** on the Internet.

The interface unit **170** may be implemented to couple the mobile terminal **100** with external devices. The interface unit **170** receives data from the external devices or is supplied with power and then transfers the data or power to the respective elements of the mobile terminal **100** or enables data within the mobile terminal **100** to be transferred to the external devices. The interface unit **170** may be configured using a wired/wireless headset port, an external charger port, a wired/wireless data port, a memory card port, a port for coupling to a device having an identity module, audio input/output ports, video input/output ports, and/or an earphone port.

The identity module is a chip for storing various kinds of information for authenticating a usage authority of the mobile terminal **100** and can include a User Identify Module (UIM), a Subscriber Identity Module (SIM), and/or a Universal Subscriber Identity Module (USIM). A device having the identity module (hereinafter called 'identity device') can be manufactured as a smart card. Therefore, the identity device is connectible to the mobile terminal **100** via the corresponding port.

When the mobile terminal **100** is connected to an external cradle, the interface unit **170** becomes a passage for supplying the mobile terminal **100** with a power from the cradle or a passage for delivering various command signals input from the cradle by a user to the mobile terminal **100**. Each of the various command signals input from the cradle or the power can operate as a signal enabling the mobile terminal **100** to recognize that it is correctly loaded in the cradle.

The controller **180** typically controls the overall operations of the mobile terminal **100**. For example, the controller **180** performs the control and processing associated with voice calls, data communications, and video calls. The controller **180** may include a multimedia module **181** that provides multimedia playback. The multimedia module **181** may be configured as part of the controller **180**, or implemented as a separate component.

Moreover, the controller **180** can perform a pattern (or image) recognizing process for recognizing a writing input and a picture drawing input carried out on the touchscreen as characters or images, respectively.

The power supply unit **190** provides power required by various components of the mobile terminal **100**. The power may be internal power, external power, or combinations of internal and external power.

Various embodiments described herein may be implemented in a computer-readable medium using, for example, computer software, hardware, or some combination of computer software and hardware. For a hardware implementation, the embodiments described herein may be implemented within one or more application specific integrated circuits (ASICs), digital signal processors (DSPs), digital signal processing devices (DSPDs), programmable logic devices (PLDs), field programmable gate arrays (FPGAs), processors, controllers, micro-controllers, microprocessors, other electronic units designed to perform the functions described herein, or a selective combination thereof. Such embodiments may also be implemented by the controller **180**.

For a software implementation, the embodiments described herein may be implemented with separate software modules, such as procedures and functions, each of which performs one or more of the functions and operations described herein. The software codes can be implemented with a software application written in any suitable programming language and may be stored in memory such as the memory **160**, and executed by a controller or processor, such as the controller **180**.

FIG. **2** is a front perspective view of a mobile terminal according to one embodiment of the present invention. The mobile terminal **100** illustrated in FIG. **2** has a bar type terminal body. However, the mobile terminal **100** may be implemented in a variety of different configurations. Examples of such configurations include folder-type, slide-type, rotational-type, swing-type and combinations thereof. For ease of description, the following disclosure will primarily relate to a bar-type mobile terminal **100**. However, the present invention applies equally to other types of mobile terminals.

Referring to FIG. **2**, the mobile terminal **100** includes a case (a casing, housing, or cover) constituting an exterior of the mobile terminal. In the present embodiment, the case can be divided into a front case **101** and a rear case **102**. Various electric/electronic parts are loaded in a space (volume) provided between the front and rear cases **101** and **102**. Optionally, at least one middle case can be further provided between the front and rear cases **101** and **102** in addition.

The cases **101** and **102** are formed by injection molding of synthetic resin or can be formed of metal substance such as stainless steel (STS), titanium (Ti) or the like for example.

A display **151**, an audio output module **152**, a camera **121**, manipulating units **131** and **132**, a microphone **122**, and an interface unit **170** can be provided at the terminal body, and more particularly, at the front case **101**. Manipulating units **131** and **132** are part of the user input unit **130**.

The display **151** occupies most of a main face of the front case **101**. The audio output module **152** and the camera **121** are provided at an area adjacent to an end portion of the display **151**, while the manipulating unit **131** and the microphone **122** are provided at an area adjacent to the other end portion of the display **151**. The manipulating unit **132** and the interface unit **170** can be provided at lateral sides of the front and rear cases **101** and **102**. Another manipulating unit **133** can be provided on a top portion of the case **102**.

The user input unit **130** is manipulated (operated) to receive a command for controlling an operation of the terminal **100**. Furthermore, the user input unit **130** may include a plurality of manipulating units **131** and **132**. The manipulating units **131** and **132** can be referred to as a manipulating portion and may adopt any tactile mechanism that enables a user to perform a manipulation action by touch.

Content input by manipulating units **131** and **132** can be divided between the two. For instance, a command such as start, end, and scroll is input to first manipulating unit **131**. Furthermore, a command for a volume adjustment of sound output from the audio output module **152**, or a command for a switching to a touch recognizing mode of the display **151** can be input to second manipulating unit **132**.

Meanwhile, such a graphic for pointing at a specific object on a display unit or selecting a menu from the display unit as an arrow, a finger and the like is called a pointer or a cursor. However, the pointer is frequently used to mean a finger, a stylus pen or the like for a touch manipulation and the like. In order to clearly discriminate the pointer and the cursor from each other in this disclosure, a graphic displayed on a display unit is named a cursor and such a physical means for performing a touch, a proximity touch, a gesture and the like as a finger, a stylus pen and the like is named a pointer.

Process Search & Shortcut Using Analog Watch Displayed on Touchscreen

According to one embodiment of the present invention, it is proposed use a method of turning the hands of an analog type watch displayed on a touchscreen to search for a previously performed process.

In particular, in a process searching and paging (shortcut) method according to one embodiment of the present invention, when a specific trigger condition is met, an information corresponding to a previously performed process is displayed on an analog watch. If an information corresponding to a specific process is selected by a movement of a specific hand of the analog watch, a shortcut to the corresponding process can be executed.

In this case, the concept of a watch of an analog type can be compared to that of a watch of a digital type. And, the watch of the analog type means a watch configured to display a current hour in a manner that at least one hand of the watch makes a circular motion along a flow of time. And, the process is a unit of identifying a job and can be identified by an application unit or a function/menu/content change unit in a single application. For instance, when three different applications are sequentially run, it can be regarded as 3 processes are present. For another instance, in case that a webpage is changed 5 times due to a link selection, a favorites (or bookmark) selection or the like in a web browser application, it can be regarded as 5 processes are present. For further instance, in case that 10 images are watched in a gallery application, it can be regarded as 10 processes are present.

A process performed device and an analog watch displayed/manipulated device may include the devices equal to or different from each other. If those devices are different, a main agent in performing a process may include the mobile terminal **100**. And, the analog watch displayed device may include an external device connected to the mobile terminal **100** by wire/wireless. If a prescribed one of previously performed processes is selected through the external device, a paging of the corresponding process can be performed by the mobile terminal **100**.

A situation for displaying an analog watch according to the present invention is described in detail with reference to FIGS. **3**A to **3**C as follows.

FIGS. **3**A to **3**C are diagrams for one example of a configuration that an analog type watch applicable to embodiments of the present invention is displayed on a touchscreen.

Referring to FIG. **3**A, a watch of an analog type can be displayed in a shape of a watch widget **310** of a home screen on the touchscreen **151** of the mobile terminal **100**. Of course, the watch widget **310** may be displayed on a lock screen as well as on the home screen. For instance, referring to FIG. **3**B, an analog watch **320**, which is displayed through an exposed portion when a portion **151'** of the touchscreen **151** is exposed through an opening **109** provided to a cover, is applicable to the present invention. For another instance, referring to FIG. **3**C, an analog watch **330**, which is displayed on a touchscreen **251** of a watch type mobile terminal **200**, is applicable to the present invention as well. In this case, the watch type mobile terminal **200** is functionally dependent on the mobile terminal **100** in part at least or can operate independently.

The locations, shapes and situations for displaying the respective analog watches shown in FIGS. **3**A to **3**C are exemplarily provided, by which the analog watch according to the present invention is non-limited. For example, the analog watch according to the present invention is applicable to any situations in which the analog watch is displayable.

A mobile terminal of a watch type is described in detail with reference to FIG. **4** as follows.

FIG. **4** is a perspective view illustrating a watch-type mobile terminal **200** as one example a wearable device in accordance with embodiments of the present invention.

As illustrated in FIG. **4**, the watch-type mobile terminal **200** includes a main body **201** with a display unit **251** and a band **202** connected to the main body **201** to be wearable on a wrist.

The main body **201** may include a case having a certain appearance. As illustrated, the case may include a first case **201***a* and a second case **201***b* cooperatively defining an inner space for accommodating various electronic components. Other configurations are possible. For instance, a single case may alternatively be implemented, with such a case being configured to define the inner space, thereby implementing a mobile terminal **200** with a uni-body. In this case, various electrical/electronic parts included in the case can be configured to perform at least the same or similar functions of the respective components described with reference to FIG. **1**. For instance, a controller is provided to a watch type mobile terminal. And, a wireless communication unit, an interface unit, a memory and the like can be further provided to the watch type mobile terminal if necessary.

The watch-type mobile terminal **200** can perform wireless communication, and an antenna for the wireless communication can be installed in the main body **201**. The antenna may extend its function using the case. For example, a case including a conductive material may be electrically connected to the antenna to extend a ground area or a radiation area.

The display unit **251** is shown located at the front side of the main body **201** so that displayed information is viewable to a user. In some embodiments, the display unit **251** includes a touch sensor so that the display unit can function as a touch screen. As illustrated, window **251** a is positioned on the first case **201***a* to form a front surface of the terminal body together with the first case **201***a*.

The illustrated embodiment includes audio output module **252**, a camera **221**, a microphone **222**, and a user input unit **223** positioned on the main body **201**. When the display unit **251** is implemented as a touch screen, additional function keys may be minimized or eliminated. For example, when the touch screen is implemented, the user input unit **223** may be omitted.

The band **202** is commonly worn on the user's wrist and may be made of a flexible material for facilitating wearing of the device. As one example, the band **202** may be made of fur, rubber, silicon, synthetic resin, or the like. The band **202** may also be configured to be detachable from the main body **201**. Accordingly, the band **202** may be replaceable with various types of bands according to a user's preference.

In one configuration, the band **202** may be used for extending the performance of the antenna. For example, the band may include therein a ground extending portion (not shown) electrically connected to the antenna to extend a ground area.

The band **202** may include fastener **202***a*. The fastener **202***a* may be implemented into a buckle type, a snap-fit hook structure, a Velcro® type, or the like, and include a flexible section or material. The drawing illustrates an example that the fastener **202***a* is implemented using a buckle.

In the following description, a method or procedure for searching and paging a previously performed process through the watch of the analog type mentioned in the foregoing description is explained in detail with reference to FIG. **5**. For clarity, a state for running a function of searching and paging a process by manipulating a watch of an analog type shall be named 'hand manipulating mode'.

FIG. **5** is a flowchart for one example of a method for searching and paging a previously performed process using an analog type watch in a mobile terminal according to one embodiment of the present invention.

Referring to FIG. **5**, as a preset condition is met, a hand manipulating mode can be entered [S**510**]. In this case, the preset condition may mean one of a menu selection corresponding to a hand manipulating mode, a wire/wireless signal reception from an external environment and the like. For example, a case of receiving a signal externally may include one of a case of detecting that the watch type mobile terminal **200** comes in contact with the mobile terminal **100**, a case of detecting that the watch type mobile terminal **200** enters a range of a predetermined distance, a case of selecting a specific button from the watch type mobile terminal **200**, and the like. Of course, before the hand manipulating mode is entered, it is preferable that an analog watch is displayed in advance on at least one mobile terminal involved in the implementation of the present invention.

Subsequently, the controller **180** determines an information on a process previously performed prior to the hand manipulating mode entry. In particular, a process currently performed by the mobile terminal may be included in or excluded from the previously performed process in accordance with necessity or settings. In doing so, in determining the information on the process, the controller **180** can consider the number of processes. In determining the number of processes, a unit and time of a process can be taken into consideration. For instance, in case that a target of a process count includes a menu/content performed on a currently running application, it is able to count the number of menus/contents run/displayed until the hand manipulating mode entry after running the corresponding application. For another instance, if a target of the process count is performed by an application unit, the count target may be limited to the number of applications performed during a prescribed unit time.

Once the information on the process is determined, a single hand may be displayed on the analog watch. In this case, the displayed hand may be rotated or turned clockwise or counterclockwise in response to a user's touch input. In response to the hand rotation, the controller **180** can control the process information to be displayed on the watch displayed touchscreen to correspond to the hand rotation [S**530**]. In this case, 'corresponding to the hand rotation' may mean that an information displayed process is changed sequentially in response to a rotation of the hand at a predetermined angle. For instance, if the hand is rotated at 0~n degrees, the information on a last executed process is displayed. For another instance, if the hand is rotated at n~2n degrees, the information on a process executed prior to the last executed process can be displayed.

In this case, the information on the process can include a preview information. In particular, the preview information is the information for informing a user of a type or status of a process. When the corresponding process is run, a screenshot image, a text/icon information or the like may correspond to the preview information.

While the hand is rotated, when the information on the process desired to be paged by the user is displayed, if the user selects the corresponding process [S**540**], the selected process can be paged again [S**550**].

In the above procedure described with reference to FIG. **5**, if an analog watch displayed device is identical to a process performed/paged device, all the steps can be performed within the corresponding device. On the contrary, if an analog watch displayed device is different from a process performed and paged device, the step S**510** is simultaneously entered by the two devices. And, the step S**520** is performed by the process performed and paged device. Subsequently, if the information on the process is delivered to the analog watch displayed device, the step S**530** and the step S**540** can be performed in the analog watch displayed device. A result of the step S**540** can be delivered to the process performed and paged device to perform the step S**550** again.

Meanwhile, in order to provide information (i.e., count information and preview information) on a determined process, the controller **180** of the mobile terminal **100** can control information, which is necessary to provide information each time a process is created or changed, to be saved in the memory **160**.

In the following description, an analog watch displayed on a touchscreen shall be indicated by a reference number **300** irrespective of a display location/shape/device unless mentioned especially. Assume that an analog watch displayed device may include a watch type mobile terminal **200**. And, assume that a process performed and paged device may include a mobile terminal **100**. Moreover, assume a situation (e.g., Bluetooth paired states, etc.) that a data path for short range communication has been already established between the watch type mobile terminal **200** and the mobile terminal **100**.

FIGS. **6**A and **6**B are diagrams for one example of a procedure for triggering a hand manipulating mode according to one embodiment of the present invention.

Referring to FIG. **6**A, if a watch type mobile terminal **200** having an analog watch displayed currently thereon approaches a mobile terminal **100** in a predetermined distance or less or comes in contact with the mobile terminal **100**, a hand manipulating mode may be triggered. As one example of a method of determining a presence or non-presence of the approach/contact, there is NFC tagging using a short range communication module. And, it is a matter of course that any methods of determining a variation of a distance between the two mobile terminals are applicable to the corresponding determining method.

Referring to FIG. **6**B, in case that each of an analog watch displayed device and a process performed and paged device includes a mobile terminal **100**, a hand manipulating mode can be triggered by such a touch input as an input of selecting a hand rotation axis **311** of a watch widget **310** displayed on

a touchscreen **151**, an input of touching an hour hand and a minute hand simultaneously and the like.

Besides, it is a matter of course that a hand manipulating mode can be triggered by a selection of an icon of a shortcut to the hand manipulating mode or a selection of a key button set for the hand manipulating mode [not shown in the drawing].

In the following description, in case that each webpage read through a web browser is counted as a single process, a procedure for paging a previously read webpage is explained in detail with reference to FIGS. **7**A to **8**D.

FIGS. **7**A to **7**C are diagrams for one example of a procedure for a webpage reading to proceed in a mobile terminal according to one embodiment of the present invention. For clarity, a detailed webpage configuration is omitted and each webpage is identified by a text numbering.

Referring to FIG. **7**A, as a web browser application is run in a mobile terminal **100**, an initial webpage (i.e., 1^{st} webpage) is displayed on a touchscreen **151**. Thereafter, a 2^{nd} webpage can be displayed in response to a link selection or a favorites (or bookmark) selection [FIG. **7**B]. If a page search is additionally performed 6 times, an 8^{th} webpage can be displayed [FIG. **7**C]. In doing so, if a hand manipulating mode is triggered, an operation in a watch type mobile terminal is described in detail with reference to FIGS. **8**A to **8**D as follows.

FIGS. **8**A to **8**D are diagrams for one example of a procedure for performing a hand manipulating mode in a watch type mobile terminal according to one embodiment of the present invention. In FIGS. **8**A to **8**D, each time a hand rotates by 180 degrees, assume that a process information is changed. And, assume that a screenshot image of each process is displayed as a process information.

Referring to FIG. **8**A, as a hand manipulating mode is triggered, a hand **810**, which is to be rotated by a touch input, is displayed through a touch input in a manner of facing a 12 o'clock direction on an analog watch **300**. In doing so, a location of the hand may face other directions depending on default settings. And, a hand normally displayed on an analog watch can be additionally displayed as well as the hand manipulated by the touch input. Moreover, a summary information **820** on a process may be displayed. In this case, the summary information **820** may include an application information indicating a process of a prescribed application and a count information of the process, for example. Of course, more or less information may be further included in the summary information **820**.

In doing so, referring to FIG. **8**B, if the hand starts to rotate, a screenshot image **838** of an 8^{th} page corresponding to a most recently executed process can be displayed on a background. If the hand **810** continues to rotate to exceed 180 degrees in the initial direction, referring to FIG. **8**C, a screenshot image **837** of a 7^{th} webpage can be displayed on the background.

Thereafter, as the hand **810** continues to rotate in the same direction, referring to FIG. **8**D, while a screen shot image **831** of a default page (i.e. a 1^{st} page) is displayed on the background, if the hand **810** is further rotated over 180 degrees in the same direction, it is able to display a popup message **840** indicating that no more process change is available due to an end of process. In doing so, an information on an application (e.g., a music play application) previously run before a web browser can be included in the popup message **840**. While the popup message **840** is displayed, if the hand rotation continues, the state shown in FIG. **8**A is restored. As the hand keeps rotated, informations (e.g., a title, length and jacket image of a recently played music, etc.) on the process of the music play application can be sequentially displayed. In doing so, if a user inputs a touch-drag command to the hand **810** with a pointer in an external direction of the watch **300**, a process corresponding to a currently displayed process information can be selected. Hence, the selected process can be paged and displayed on the touchscreen **151** of the mobile terminal **100**. Of course, the touch-drag input in the external direction of the watch is exemplary. Besides, if the hand stays within an angle corresponding to a specific process over prescribed duration or there is a different type input such as an input of touching a region except the hand and the like, it is able to set the corresponding process to be selected.

On the other hand, if a hand is rotated in an opposite direction, process informations can be changed again from an oldest process to a latest process.

According to the example shown in FIGS. **8**A to **8**D, as the hand is rotated clockwise, the process is changed in order of time (recent past). Yet, it is a matter of course that a process change in accordance with a rotation direction of the hand can be set in reverse order. It is not mandatory for numerals to be displayed to indicate hours of the analog watch. It is not mandatory for a single hand to be displayed only. A hand displayed to face the 12 o'clock direction initially in mode can be changed into a direction indicated as a default. Namely, while an analog watch keeps being displayed without any change, if a prescribed hand rotates after a mode trigger, it is apparent to those skilled in the art that a preview information on a process may be displayed in response to the hand rotation, that a single hand may be displayed on an analog watch displayed display after the mode trigger, or that an intermediate configuration between the two courses may be available.

Meanwhile, according to one aspect of the present embodiment, in order for a user to intuitively watch the number of previously performed processes, a region of an analog watch displayed touchscreen is divided into sub-regions as many as the number of the processes and the corresponding processes can be then displayed in a manner of being mapped to the sub-regions, respectively. This is described in detail with reference to FIG. **9** as follows.

FIG. **9** is a flowchart for one example of a method for searching and paging a previously performed process through a region division of an analog type watch in a mobile terminal according to one embodiment of the present invention.

Referring to FIG. **9**, as a preset condition is met, a hand manipulating mode can be entered [S**910**]. In this case, the preset condition may mean one of a menu selection corresponding to a hand manipulating mode, a wire/wireless signal reception from an external environment and the like. For example, a case of receiving a signal externally may include one of a case of detecting that the watch type mobile terminal **200** comes in contact with the mobile terminal **100**, a case of detecting that the watch type mobile terminal **200** enters a range of a predetermined distance, a case of selecting a specific button from the watch type mobile terminal **200**, and the like. Of course, before the hand manipulating mode is entered, it is preferable that an analog watch is displayed in advance on at least one mobile terminal involved in the implementation of the present invention.

Subsequently, the controller **180** determines the number of previously performed processes prior to the hand manipulating mode entry [S**920**]. In particular, a process currently performed by the mobile terminal may be included in or excluded from the previously performed process in accordance with necessity or settings. Moreover, in determining the number of processes, a unit and time of a process can be taken into consideration. For instance, in case that a target of a process count includes a menu/content performed on a

currently running application, it is able to count the number of menus/contents run/displayed until the hand manipulating mode entry after running the corresponding application. For another instance, if a target of the process count is performed by an application unit, the count target may be limited to the number of applications performed during a prescribed unit time.

Once the number is determined, an internal region of the analog watch can be partitioned in a manner that an internal region of the currently displayed analog watch can correspond to the determined number of the processes [S**930**].

The processes are mapped to the partitioned regions, respectively [S**940**]. And, a preview information of the process corresponding to a region, in which a specific hand of the analog watch is located after movement, can be displayed [S**950**]. In this case, the preview information is the information for informing a user of a type or status of a process and may include one of a screenshot image on executing a corresponding process, a text/icon information and the like. In case that a schematic process identification information (e.g., a type of an application, a type of a menu/content, a title of an application, a title of a menu/content, etc.) is displayed as well in the step S**940**, an information further detailed than the identification information can be provided as the preview information in the step S**950**.

If one of the partitioned regions is selected [S**960**], the process corresponding to the selected region can be paged again [S**970**].

In the above procedure described with reference to FIG. **9**, if an analog watch displayed device is identical to a process performed and paged device, all the steps can be performed within the corresponding device. On the contrary, if an analog watch displayed device is different from a process performed and paged device, the step S**910** is simultaneously entered by the two devices. And, the step S**920** is performed by the process performed and paged device. Subsequently, if the information on the process is delivered to the analog watch displayed device, the steps S**930** to S**960** can be performed in the analog watch displayed device. A result of the step S**960** can be delivered to the process performed and paged device to perform the step S**970** again.

Of course, in a manner similar to that of FIG. **5**, in order to count the number of processes and provide information (i.e., schematic information and preview information) on the counted process, the controller **180** of the mobile terminal **100** can control information, which is required for the counting or the information providing each time a process is created/changed, to be saved in the memory **160**.

In the following description, in case that the hand manipulating mode is triggered by the method described with reference to FIG. **9**, an operation in the watch type mobile terminal is explained in detail with reference to FIG. **10**A to FIG. **10**G. In FIG. **10**A to FIG. **10**G, assume a case that 8 processes are performed in the mobile terminal **100** in the order shown in FIG. **7**C.

FIGS. **10**A to **10**D are diagrams for one example of a procedure for performing a hand manipulating mode in a watch type mobile terminal according to one embodiment of the present invention.

Referring to FIG. **10**A, as a hand manipulating mode is triggered, process related information (e.g., number of processes, identification information, preview image, etc.) can be sent to the watch type mobile terminal **200** from the mobile terminal **100**. In case that total 8 processes including 1^{st} to 8^{th} webpages are counted, referring to FIG. **10**A, the previously displayed analog watch **300** is divided into 8 equal parts and the processes can be mapped to the corresponding regions, respectively. In doing so, a single watch hand **1010** can be displayed between two random regions (e.g., 12 o'clock direction). And, a region identification information **1020** and/or a boundary line **1030** may be displayed as well as the hand. On the other hand, referring to FIG. **10**B, a boundary line **1040** in schematic shape and an information **1050** indicating the number of processes may be displayed together with the hand. Moreover, referring to FIG. **10**C, a webpage information **1060** may be displayed as a text on each of the regions. Of course, the informations displayed in accordance with the division of the internal region of the analog watch are exemplary. And, it is a matter of course that more or less informations can be displayed in accordance with necessity or settings.

A location of the watch hand **1010** can be changed through a touch input. Referring to FIG. **10**D, in case that the watch hand **1010** is moved to the region corresponding to the 8^{th} webpage, a visual effect **1070** can be displayed to represent the watch hand located region more clearly. And, a screenshot image **1080** of the 8^{th} webpage can be displayed in an internal space.

Thus, in the situation shown in one of FIGS. **10**A to **10**C, a user can schematically recognize each process. If a watch hand is moved in a manner shown in FIG. **10**D, the user can obtain further detailed information on a process corresponding to a location of the watch hand.

A case of selecting a specific region is described with reference to FIGS. **10**E to **10**G as follows.

FIGS. **10**E to **10**G are diagrams for one example of a process paging method in response to a selection of a region corresponding to a specific process in a mobile terminal according to one embodiment of the present invention.

Referring to FIG. **10**E, while a hand manipulating mode is performed on analog watch **300** displayed on the watch type mobile terminal **200**, a last displayed screen (i.e., a display of an 8^{th} webpage) can continue to be displayed on the mobile terminal **100** without any changes. In this situation, referring to FIG. **10**F, if a hand **1010** is moved to a region corresponding to a 3^{rd} webpage on the analog watch **300**, a visual effect **1070'** can be displayed to visually identify the corresponding region and a screenshot image **1080'** of the 3^{rd} webpage can be displayed within the watch. In doing so, if a user inputs a touch-drag command in an external watch direction to the hand **1010** using a pointer **1090**, a process (i.e., 3^{rd} webpage) corresponding to a region, at which the hand currently stays, can be selected. Hence, referring to FIG. **10**G, the 3^{rd} webpage can be paged and displayed on the touchscreen **151** of the mobile terminal **100**. The touch-drag input in the external watch direction is exemplary. The corresponding region can be set to be selected if an input of a different type (e.g., a case that the hand stays in a specific region over prescribed duration, a case that a hand staying region is touched, etc.) is applied.

Meanwhile, FIG. **10**E shows that no changes occur in the mobile terminal **100** in the course of selecting a process in the watch type mobile terminal **100**. Yet, the corresponding process can be paged and displayed temporarily by real time in response to a movement of the hand.

And, it is a matter of course that the change occurring on the touchscreen of the mobile terminal in accordance with a progress of the hand manipulating mode shown in FIGS. **10**E to **10**G is applicable to FIGS. **8**A to **8**D.

In the following description, the hand manipulating mode described with reference to FIG. **10**A to FIG. **10**G is further described in detail through a detailed example with reference to FIGS. **11**A to **12**D. FIGS. **11**A to **12**D show one example of a procedure for returning to a theater selecting step through a

hand manipulating mode if a user intends to change a theater in a payment step in the course of booking tickets through a move booking application.

FIGS. **11**A to **11**F are diagrams for one example of a process proceeding procedure in a mobile terminal according to one embodiment of the present invention. FIG. **11**G is a diagram for one example of a configuration that a hand manipulating mode is triggered in response to a tag to a watch type mobile terminal in a mobile terminal according to one embodiment of the present invention. FIGS. **12**A to **12**D are diagrams for one example of a paging procedure in accordance with a process selection in a mobile terminal according to one embodiment of the present invention;

FIGS. **11**A to **12**D show one example of performing a hand manipulating mode in a mobile terminal and a watch type mobile terminal according to one embodiment of the present invention.

Referring to FIGS. **11**A to **11**F, as a moving booking application is run, total 6 processes for displaying menus of an initial screen (**11**A), a movie selection (**11**B), a theater information selection (**11**C), a show time selection (**11**D), a seat selection (**11**E) and a payment (**11**F) can proceed in order.

In this situation, referring to FIG. **11**G, if a watch type mobile terminal **200** comes in contact with a mobile terminal **100** through NFC tag, a popup window **1110** can be displayed on the watch type mobile terminal **200** to indicate that a hand manipulating mode is triggered.

Hence, referring to FIG. **12**A, a region of an analog watch **300** is divided into 6 regions and a watch hand **1210** can be displayed between a 1^{st} process and a 6^{th} process. In doing so, referring to FIG. **12**B, a last displayed payment menu can continue to be displayed on the mobile terminal **100**. In doing so, referring to FIG. **12**C, if the user moves the watch hand **1210** to a 3^{rd} region to change a theater, a preview image of a theater information selection menu can be displayed within the analog watch. Thereafter, referring to FIG. **12**D, if the 3^{rd} region is selected by one of the aforementioned methods, the theater information selection menu can be paged on the mobile terminal **100**.

Meanwhile, while a currently running application is not present or a single process exists, a hand manipulating mode can be triggered. Such a case is described in detail with reference to FIG. **13** as follows.

FIG. **13** is a diagram for one example of an operation in case that a hand manipulation mode is unable to be triggered in a watch type mobile terminal according to one embodiment of the present invention.

Referring to FIG. **13**, as a web browser is executed in the mobile terminal **100**, while a default page is displayed only, the mobile terminal **100** may come in contact with the watch type mobile terminal **200**. Since a single process exists only, the controller **180** of the mobile terminal **100** can inform the watch type mobile terminal **200** that it is unable to trigger the hand manipulating mode. In doing so, if there exists a previously run application having a plurality of processes exist therein, the controller **180** can send an information on the existence of the previously run application to the watch type mobile terminal **200** as well. In this case, a message notifying that the triggering is impossible and a hand manipulating mode executable application information **1310** can be displayed on the watch type mobile terminal **200**.

Process Search & Page per Time through Hand Manipulation of Analog Watch

According to another embodiment of the present invention, a method of checking and paging processes run between a present time and a past time corresponding to a moved hand by moving a prescribed hand of an analog watch counterclockwise is provided.

FIGS. **14**A to **14**D are diagrams for one example of a procedure for confirming and paging a process in accordance with a time change through an analog watch in a mobile terminal according to another embodiment of the present invention.

Referring to FIG. **14**A, a minute hand **1410** of an analog watch **300** currently indicates a position '15 minutes'. If a user's touch input is applied, referring to FIG. **14**B, the minute hand **1410** can be moved to a position '55 minutes' from the position '15 minutes' counterclockwise.

If so, a hand manipulating mode according to another embodiment of the present invention can be triggered. If 6 processes have been run for the past 20 minutes in the mobile terminal **100** [FIG. **14**B], an internal region of the analog watch **300** can be partitioned into 6 regions [FIG. **14**D]. The processes shown in FIG. **14**C are mapped to the partitioned regions per time, respectively. And, an identification information on each of the mapped processes can be displayed. For instance, a message reception event **1420** second recently occurring in FIG. **14**C can be identified using a message icon **1420'** on a 2^{nd} region shown in FIG. **14**D. After completion of the space partition and process mapping of the analog watch, if a location of the hand **1410** is changed in response to a user's touch input, a screenshot image of the process corresponding to the changed location can be displayed within the watch. In doing so, if a region, in which the hand **1410** is located, is selected by one of the aforementioned methods, the process corresponding to the selected region can be paged and displayed on the mobile terminal **100**. Since a configuration of the region partition shown FIG. **14**D and the types of the informations displayed on the respective regions can be modified in a manner similar to that mentioned in the foregoing description of one embodiment of the present invention, redundant descriptions shall be omitted from the following description for clarity. Moreover, a list of the processes shown in FIG. **14**C may be displayed on the touchscreen **151** of the mobile terminal **100** in the course of the triggered hand manipulating mode, or may not.

If the analog watch **300** is currently displayed on the watch type mobile terminal **200** connected to the mobile terminal **100** in the course of the above-mentioned procedure, a controller of the watch type mobile terminal **200** can control information on the minute hand moved timing point to be sent to the mobile terminal **100**. Having obtained the timing point information, the controller **180** of the mobile terminal **100** can send the information (e.g., identification information, preview information, etc.) on the process previously run during the corresponding time to the watch type mobile terminal **200** again. Moreover, the watch type mobile terminal **200** can send information on the selected region to the mobile terminal **100** so that the process corresponding to the selected region can be paged in the mobile terminal **100**.

As mentioned in the foregoing description with reference to FIG. **5** and FIG. **8**, the above-mentioned function can be implemented by a method of changing a process in response to a rotation angle as well as by the region portioning method. For instance, as a minute hand rotates counterclockwise, if a hand manipulating mode is triggered, a hand is displayed in the first place with region partition. As the hand is rotated, information on a most recently performed process within the corresponding time range can be displayed. Thereafter, each time the rotation angle of the hand excess a predetermined angle, information on another process within the corresponding time range can be sequentially displayed.

Meanwhile, if there exist processes of which number exceeds a predetermined number during a minute hand moved time, an internal region of an analog watch may be partitioned into too many regions excessive to its size. In this case, it may be difficult for a user to select a user-desired process accurately through a movement of a hand. A solution for this case shall be described in detail with reference to FIG. **15** as follows.

FIGS. **15**A to **15**C are diagrams for one example of a configuration that a hand manipulating mode is performed if a predetermined number of processes or more exist in an interval selected by a minute hand in a mobile terminal according to another embodiment of the present invention. In FIGS. **15**A to **15**C, assume a case that a minute hand is moved back to 20 minutes in a manner similar to that shown in FIG. **14**. And, assume that an internal region of a watch is possibly partitioned into maximum 12 regions.

Referring to FIG. **15**A, when 14 processes are run for past 20 minutes, if a hand manipulating mode is triggered, an internal region of an analog watch **300** is partitioned into 12 regions so that only 12 events can displayed by being mapped to the corresponding spaces in order of event occurrence time closer to a current time [FIG. **15**B]. In doing so, if a user rotates a watch hand **1510** over 360 degrees clockwise, the remaining 2 processes can be displayed on the 1st region and the 2nd region in clockwise order, respectively. In doing so, in order to indicate 360-degree rotation, a shape of the watch hand can be changed into a new shape **1510'**. If the hand is moved counterclockwise again, it is able to return to the status shown in FIG. **15**B. In the status shown in FIG. **15**C, an identification information (e.g., an application icon **1514'** corresponding to a last process **1514**) of each region can be displayed. In case that the hand **1510'** stays in the region corresponding to the last process **1514**, a screenshot image of the corresponding process can be displayed within the watch.

The processes shown in FIG. **14**C are mapped to the partitioned regions per time, respectively. And, an identification on each of the mapped processes can be displayed. For instance, a message reception even **1420**, which has occurred second recently in FIG. **14**C, can be identified with a message icon **1420'** on the 2nd region shown in FIG. **14**D.

Meanwhile, according to another embodiment of the present invention, a process having run during a predetermined time unit can be displayed on an analog watch in a manner of corresponding to a running time. This is described in detail with reference to FIGS. **16**A to **16**D as follows.

FIGS. **16**A to **16**D are diagrams for one example of a configuration that a hand manipulating mode is performed in a mobile terminal according to further embodiment of the present invention.

Referring to FIG. **16**A, as a minute hand of an analog watch is selected through a long touch input, a hand manipulating mode according to another embodiment of the present invention can be triggered. Hence, an internal space of the watch is partitioned to correspond to each process run in a predetermined time (e.g., 1 hour, etc.) and an information on the each process can be displayed. For instance, referring to FIG. **16**B, a message application was run until about 10 minutes ago and a music play application was run until about 20 minutes ago. If a mobile terminal operates in standby mode ahead of about 20 minutes, an internal region of the watch can be partitioned into 3 regions. A message icon **1631** can be displayed on a 1st region **1621** closest to a current time. A music icon **1632** can be displayed on a 2nd region **1622** second closest to the current time. And, a text **1633** indicating the standby mode can be displayed on a 3rd region **1623**.

In doing so, referring to FIG. **16**C, if a minute hand **1610** is moved to the 1st region **1621**, a screenshot image of a message application can be displayed within the watch. If the minute hand **1610** is moved to the 2nd region **1622**, a screenshot image of a music play application can be displayed within the watch. Of course, if a hand located region is selected by one of the methods according to one embodiment of the present invention, a process corresponding to the selected region can be paged in the mobile terminal.

FIG. **17** is a diagram for one example of a menu configuration for selecting a target application, which is to be counted as a process in a hand manipulating mode, according to embodiments of the present invention.

Referring to FIG. **17**, a target application, which is to be counted as a process in hand manipulating mode, is set through a menu screen in advance. And, an execution of an unset application may be set not to be counted as a process according to the present invention.

It will be apparent to those skilled in the art that various modifications and variations can be specified into other form(s) without departing from the spirit or scope of the inventions.

According to one embodiment of the present invention, the above-described methods can be implemented in a program recorded medium as processor-readable codes. The processor-readable media include all kinds of recording devices in which data readable by a processor are saved. The processor-readable media include ROM, RAM, CD-ROM, magnetic tapes, floppy discs, optical data storage devices, and the like for example and also include carrier-wave type implementations (e.g., transmission via Internet).

The aforementioned embodiments are achieved by combination of structural elements and features of the present invention in a predetermined type. Each of the structural elements or features should be considered selectively unless specified separately. Each of the structural elements or features may be carried out without being combined with other structural elements or features. Also, some structural elements and/or features may be combined with one another to constitute the embodiments of the present invention.

It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the inventions. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

What is claimed is:

1. A wearable mobile terminal comprising:

a touchscreen configured to display an analog watch type interface including a hand that is rotatable in response to user input;

a wireless communication unit configured to communicate with an external terminal; and

a controller configured to:

cause the wireless communication unit to receive first information from the external terminal when a preset condition is met, wherein the received first information is related to at least one process previously executed in the external terminal;

cause the touchscreen to display second information associated with a specific one of the at least one previously executed process in response to a touch input causing rotation of the hand on the touchscreen, the displayed second information corresponding to a rotation angle of the rotated hand; and

cause the wireless communication unit to transmit third information related to the second information to the external terminal in response to selection of the displayed second information such that the specific one of the at least one previously executed process is paged in the external terminal.

2. The mobile terminal of claim **1**, wherein:

the specific process is a first process among the at least one previously executed process when the rotation angle is a first angle; and

the specific process is associated with a second process among the at least one previously executed process when the rotation angle is a second angle.

3. The mobile terminal of claim **1**, wherein the controller is further configured to:

divide the touchscreen into a plurality of regions such that a number of the plurality of regions corresponds to a number of the at least one previously executed process, each of the plurality of regions corresponding to a specific process of the at least one previously executed process; and

cause the touchscreen to display a preview image of the corresponding specific process when the hand is positioned at a specific one of the plurality of regions.

4. The mobile terminal of claim **3**, wherein the preview image is received from the external mobile terminal and comprises a screenshot image corresponding to the corresponding specific process.

5. The mobile terminal of claim **1**, wherein the preset condition comprises at least:

a first condition when the mobile terminal is located within a predetermined distance of the external terminal;

a second condition when a specific menu icon is selected at the mobile terminal or the external terminal; or

a third condition when a specific key button of the mobile terminal is selected.

6. The mobile terminal of claim **1**, wherein the at least one previously executed process comprises:

a plurality of applications previously executed in the external terminal;

a plurality of menus previously accessed during execution of an application in the external terminal; or

a plurality of contents previously output during execution of an application in the external terminal.

7. A mobile terminal comprising:

a touchscreen configured to display an analog watch type interface including a hand that is rotatable in response to user input; and

a controller configured to:

cause the touchscreen to display a plurality of information, each of the plurality of information associated with one of a plurality of processes previously performed in the mobile terminal;

cause the touchscreen to display process information corresponding to one of the plurality of previously performed processes in response to rotation of the hand to one of the plurality of displayed information, wherein different process information is displayed according to a rotation angle of the hand; and

page the corresponding one of the plurality of previously performed processes in response to selection of the displayed process information.

8. The mobile terminal of claim **7**, wherein:

the displayed process information is associated with a first process among the plurality of previously performed processes when the rotation angle is a first angle; and

the displayed process information is associated with a second process among the plurality of previously performed processes when the rotation angle is a second angle.

9. The mobile terminal of claim **7**, wherein the controller is further configured to:

divide the touchscreen into a plurality of regions such that a number of the plurality of regions corresponds to a number of the plurality of previously performed processes, each of the plurality of regions corresponding to a specific one of the plurality of previously performed processes; and

cause the touchscreen to display a preview image of the specific corresponding process when the hand is positioned at a specific one of the plurality of regions.

10. The mobile terminal of claim **9**, wherein the preview image comprises a screenshot image corresponding to the corresponding specific process.

11. The mobile terminal of claim **7**, wherein:

the controller is further configured to obtain the plurality of information when a preset condition is met; and

the preset condition comprises at least:

a first condition when the mobile terminal is located within a predetermined distance of an external terminal;

a second condition when a specific menu icon is selected; or

a third condition when a specific key button is selected.

12. The mobile terminal of claim **7**, wherein the plurality of processes comprise:

a plurality of previously executed applications;

a plurality of menus previously accessed during execution of an application; or

a plurality of contents previously output during execution of an application.

13. A method of controlling a first mobile terminal communicating with a second mobile terminal, the method comprising:

displaying an analog watch type interface, including a hand that is rotatable in response to user input, on a touchscreen of the first mobile terminal;

receiving first information from the second mobile terminal when a preset condition is met, wherein the received first information is related to at least one process previously executed in the second mobile terminal;

displaying second information associated with a specific one of the at least one previously executed processes in response to a touch input causing rotation of the hand on the touchscreen, the displayed second information corresponding to a rotation angle of the rotated hand; and

transmitting third information related to the second information to the second mobile terminal in response to selection of the displayed second information such that the specific one of the at least one previously executed processes is paged in the second mobile terminal.

14. The method of claim **13**, wherein:

the specific process is a first process among the at least one previously executed processes when the rotation angle is a first angle; and

the specific process is a second process among the at least one previously executed processes when the rotation angle is a second angle.

15. The method of claim **13**, further comprising:

dividing the touchscreen into a plurality of regions such that a number of the plurality of regions corresponds to a number of the at least one previously executed pro-

cesses, each of the plurality of regions corresponding to a specific process of the at least one previously executed processes; and

displaying a preview image of the corresponding specific process when the hand is positioned at a specific one of the plurality of regions.

16. The method of claim **15**, further comprising receiving the preview image from the second mobile terminal, wherein the preview image comprises a screenshot image corresponding to the corresponding specific process.

17. The method of claim **13**, wherein the preset condition comprises at least:

a first condition when the first mobile terminal is located within a predetermined distance of the second mobile terminal;

a second condition when a specific menu icon is selected at the first mobile terminal or the second mobile terminal; or

a third condition when a specific key button of the first mobile terminal is selected.

18. The method of claim **13**, wherein the at least one previously executed process comprises:

a plurality of applications previously executed in the second mobile terminal;

a plurality of menus previously accessed during execution of an application in the second mobile terminal; or

a plurality of contents previously output during execution of an application in the second mobile terminal.

19. The method of claim **13**, wherein:

the at least one previously executed process comprises a plurality of web pages accessed in a web browser executed at the second mobile terminal such that one of the plurality of web pages is selectable by the rotation of the hand;

the method further comprises displaying a number of the plurality of web pages; and

the second information comprises information associated with one of the plurality of web pages.

20. The method of claim **19**, further comprising displaying information related to a next application that is not the web browser when the hand is rotated more than a threshold angle.

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