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(54) **METHOD AND APPARATUS FOR OPERATING FUNCTIONS OF ELECTRONIC DEVICE HAVING FLEXIBLE DISPLAY**

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(57) **ABSTRACT**

The present invention comprises a flexible display that surrounds the front surface of an electronic device and a control unit that controls operation of functions of the flexible display-based electronic device. The control unit may display a plurality of icons corresponding to an application or a specific function in at least one area among sub areas of the flexible display; the control unit may sense an input for selecting at least one icon among the plurality of icons; the control unit may sense an input for swiping the at least one selected icon to at least one area among main areas of the flexible display; and the control unit may process a control such that an application or a specific function, which corresponds to the at least one selected icon, is executed, and a screen corresponding to the execution is displayed in the main area corresponding to the sensed swipe input.
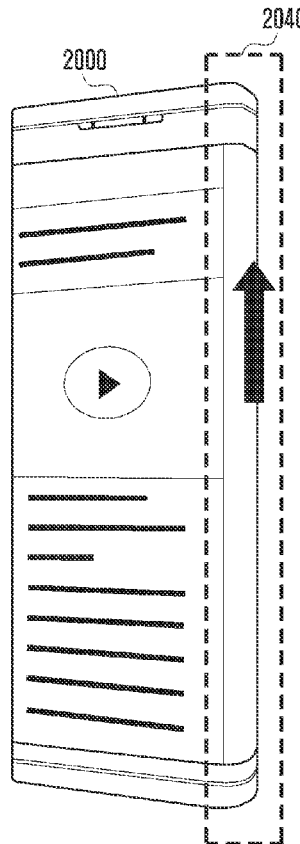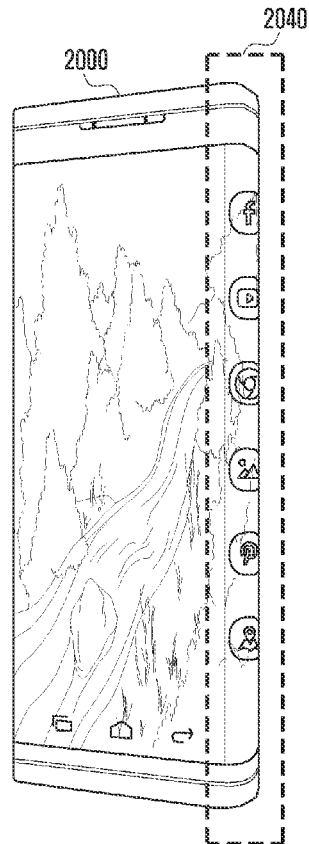
FIG. 1

100

140
147   APPLICATION
145   APPLICATION PROGRAMMING INTERFACE (API)
143   MIDDLEWARE
141   KERNEL

104   ELECTRONIC DEVICE

106   SERVER

162   NETWORK

ELECTRONIC DEVICE (101)

120   PROCESSOR

130   MEMORY

110   BUS

150   INPUT AND OUTPUT INTERFACE

160   DISPLAY

170   COMMUNICATION INTERFACE

164

102   ELECTRONIC DEVICE

FIG. 2

FIG. 3

300

310

APPLICATION [370]

| HOME [371] | DIALER [372] | SMS/MMS [373] | IM [374] | BROWSER [375] | CAMERA [376] | ALARM [377] | PAYMENT [385] |
| CONTACT [378] | VOICE DIAL [379] | E-MAIL [380] | CALENDAR [381] | MEDIA PLAYER [382] | ALBUM [383] | WATCH [384] | |

API [360]

MIDDLEWARE [330]

APPLICATION MANAGER [341]	WINDOW MANAGER [342]	MULTIMEDIA MANAGER [343]	RESOURCE MANAGER [344]	PAYMENT MANAGER [354]
POWER MANAGER [345]	DATABASE MANAGER [346]	PACKAGE MANAGER [347]	CONNECTIVITY MANAGER [348]	RUN-TIME LIBRARY [335]
NOTIFICATION MANAGER [349]	LOCATION MANAGER [350]	GRAPHIC MANAGER [351]	SECURITY MANAGER [352]	

KERNEL [320]

SYSTEM RESOURCE MANAGER [321]

DEVICE DRIVER [323]

FIG. 4

400

440

440   470

401

410   420

401

FIG. 5

500

520

530   540

510

510   520   530

FIG. 6

```
                    ┌─────────────┐
                    │    START    │
                    └─────────────┘
                           │
                           ▼
        ┌────────────────────────────────────┐
        │        DETECT EVENT INPUT          │──── 601
        └────────────────────────────────────┘
                           │
                           ▼
        ┌────────────────────────────────────┐
        │        DETERMINE INPUT EVENT       │──── 602
        └────────────────────────────────────┘
                           │
                           ▼
        ┌────────────────────────────────────┐
        │  PERFORM FUNCTION CORRESPONDING TO EVENT │──── 603
        └────────────────────────────────────┘
                           │
                           ▼
        ┌────────────────────────────────────┐
        │ CONTROL DISPLAY ACCORDING TO PERFORMED FUNCTION │──── 604
        └────────────────────────────────────┘
                           │
                           ▼
                    ┌─────────────┐
                    │     END     │
                    └─────────────┘
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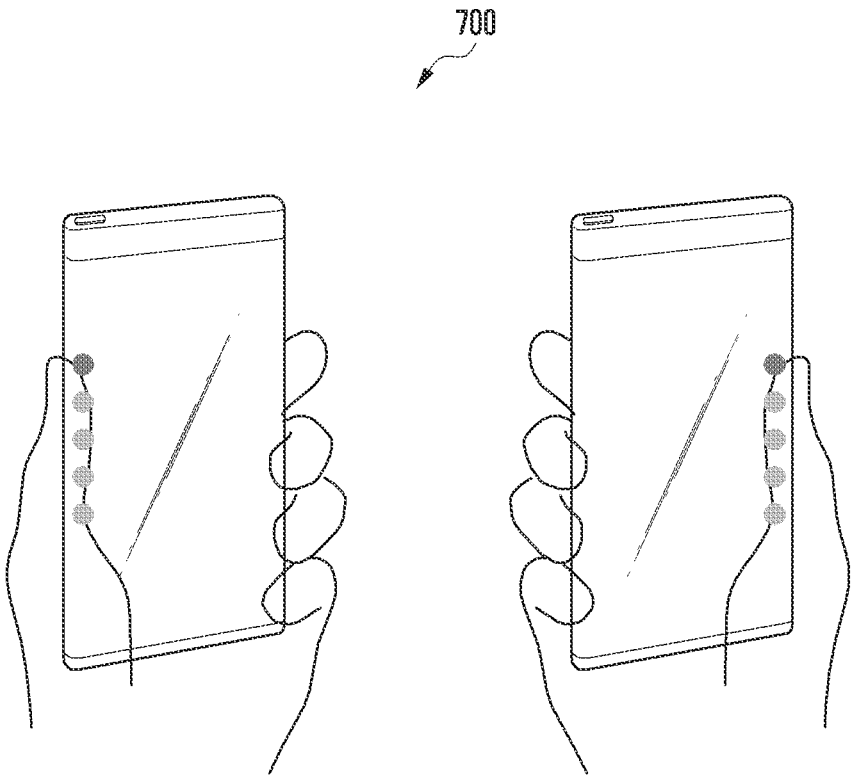
FIG. 7

700

FIG. 8

FIG. 9

FIG. 10

FIG. 11

1100

FIG. 12A

FIG. 12B

FIG. 13

FIG. 14

FIG. 15

FIG. 16

1600

Emily Blunt

[1690]

1600

1621a

Swipe
to Front

[1680]

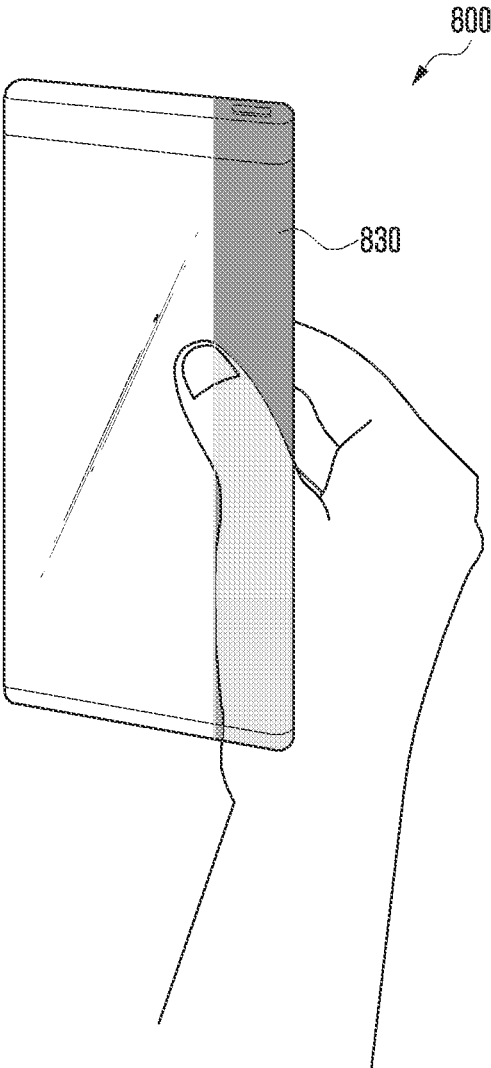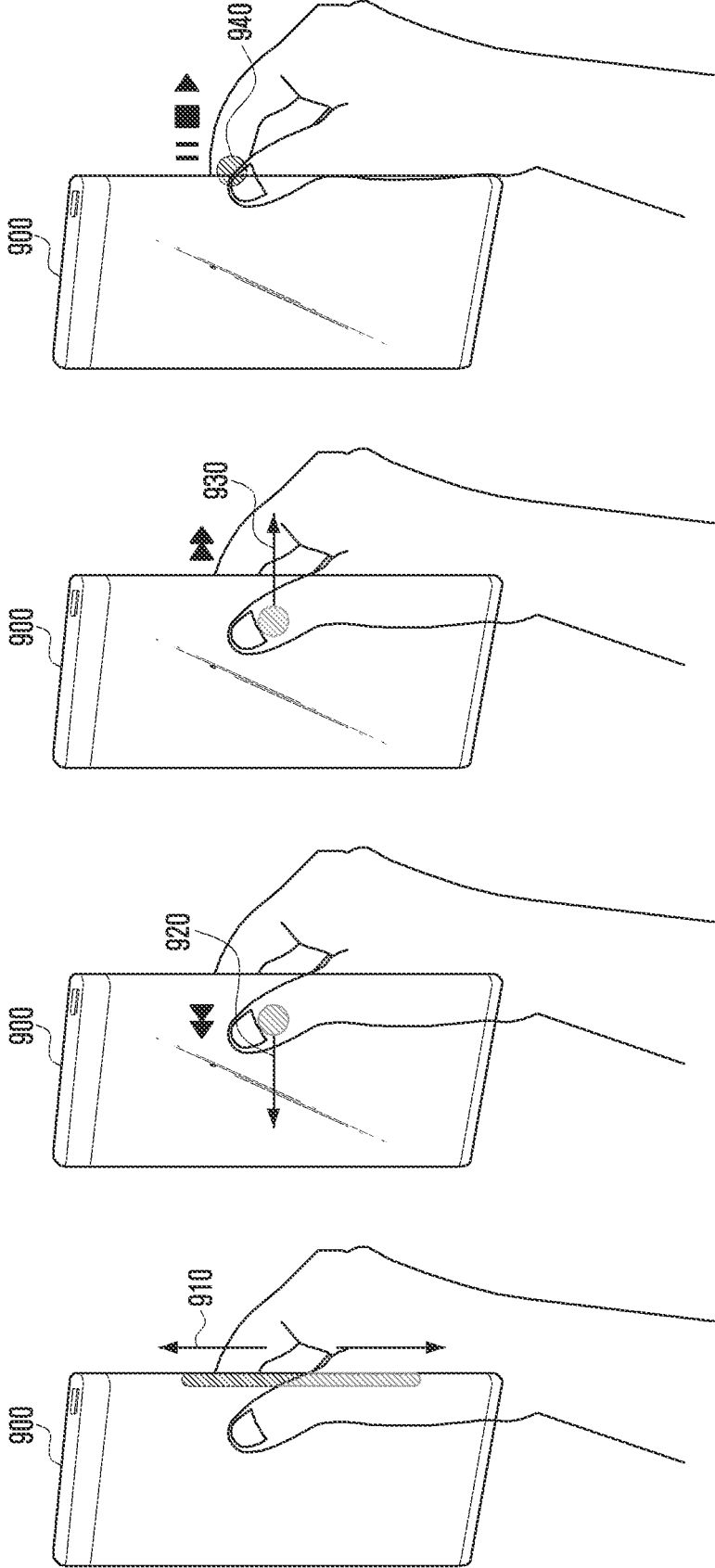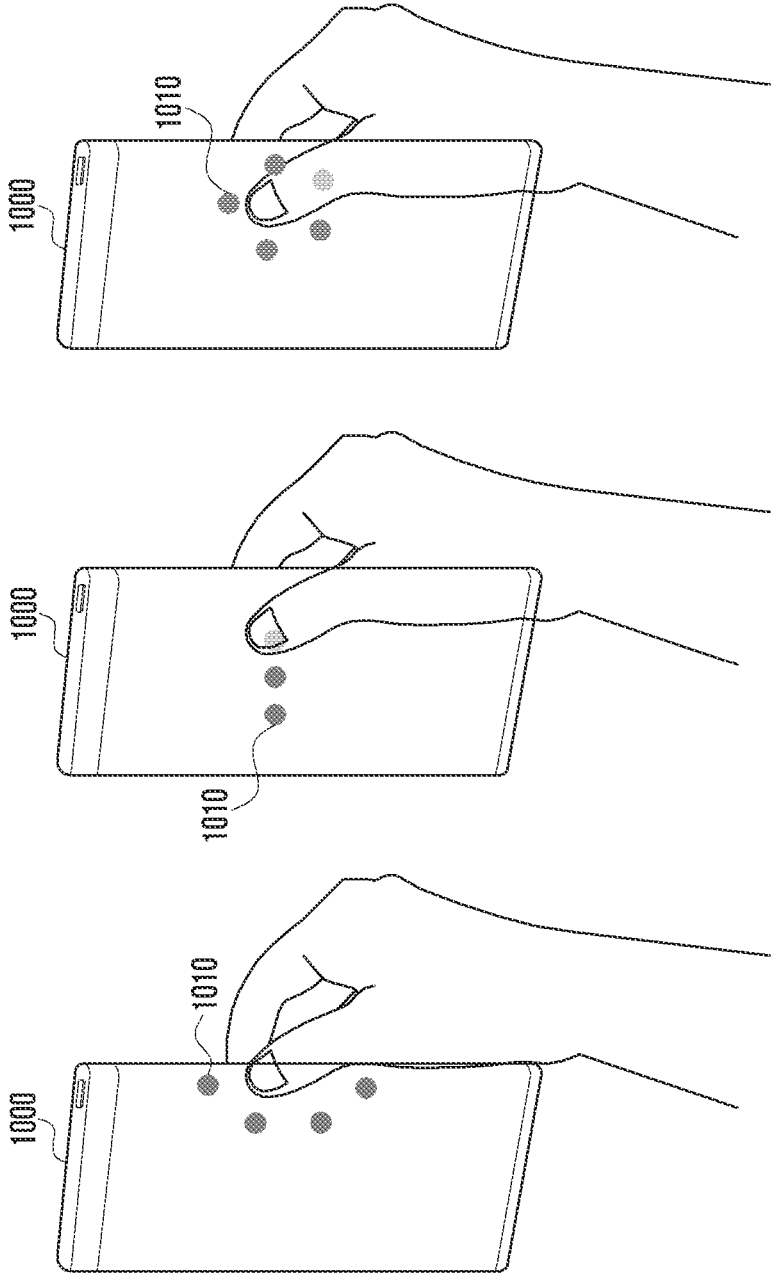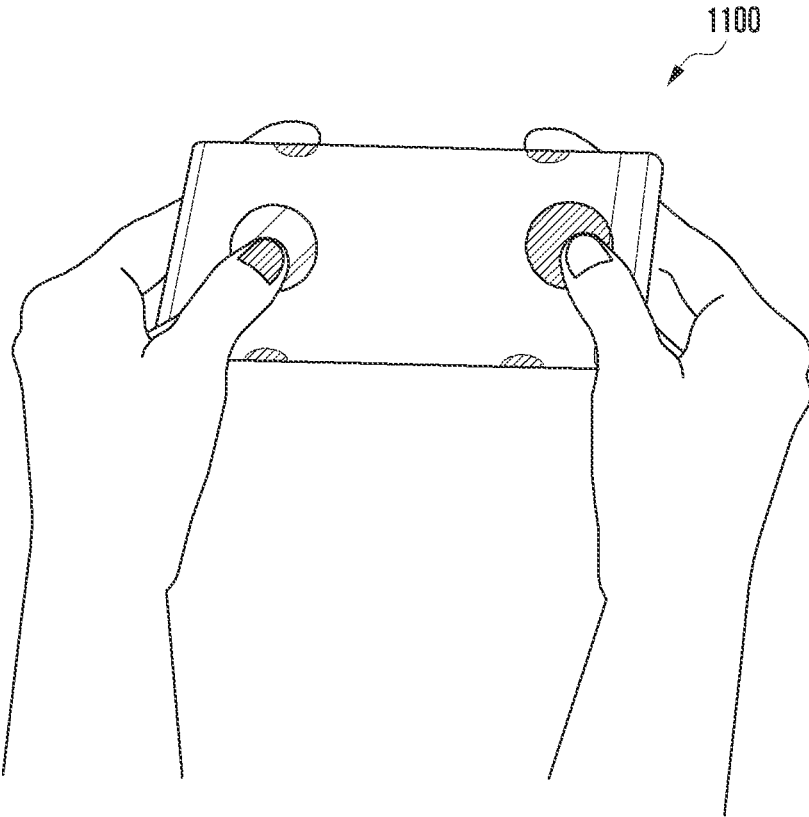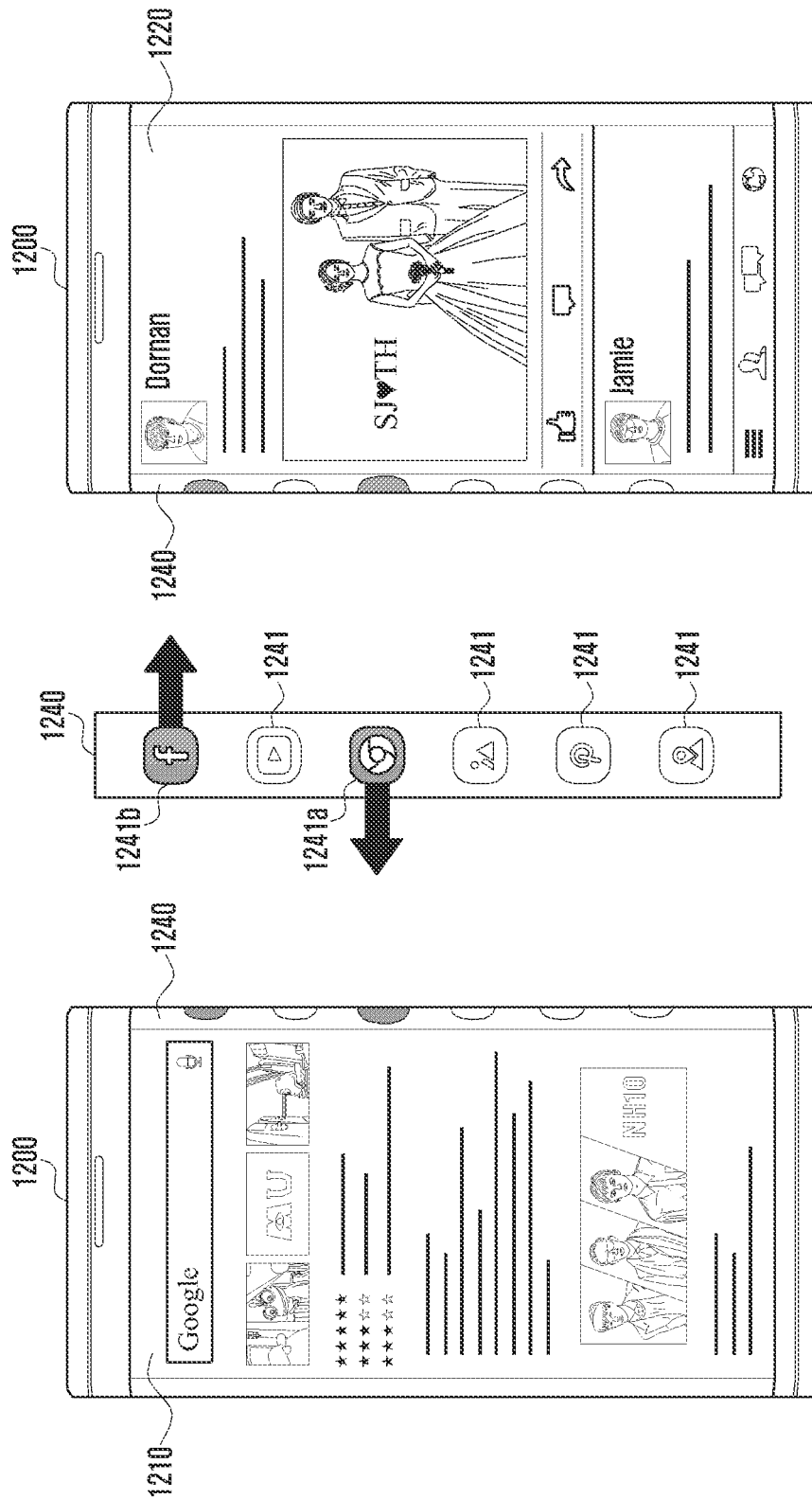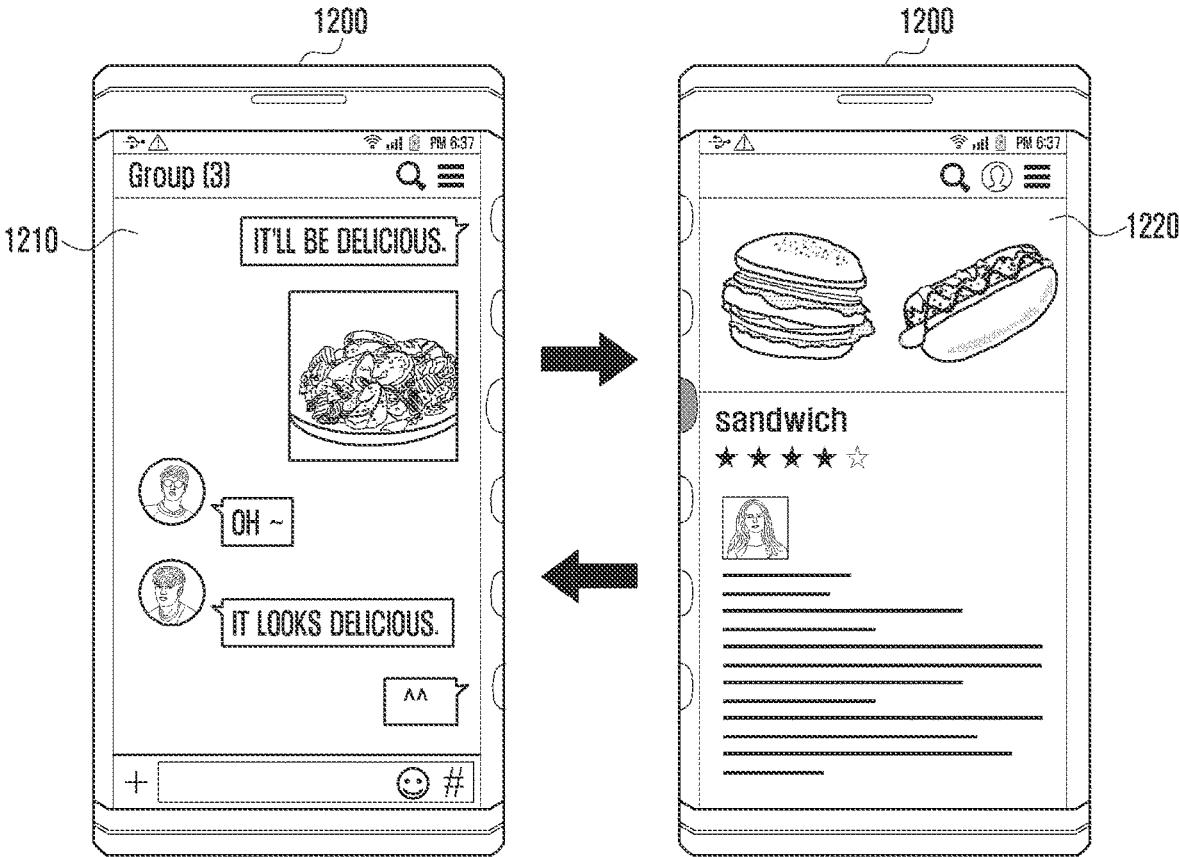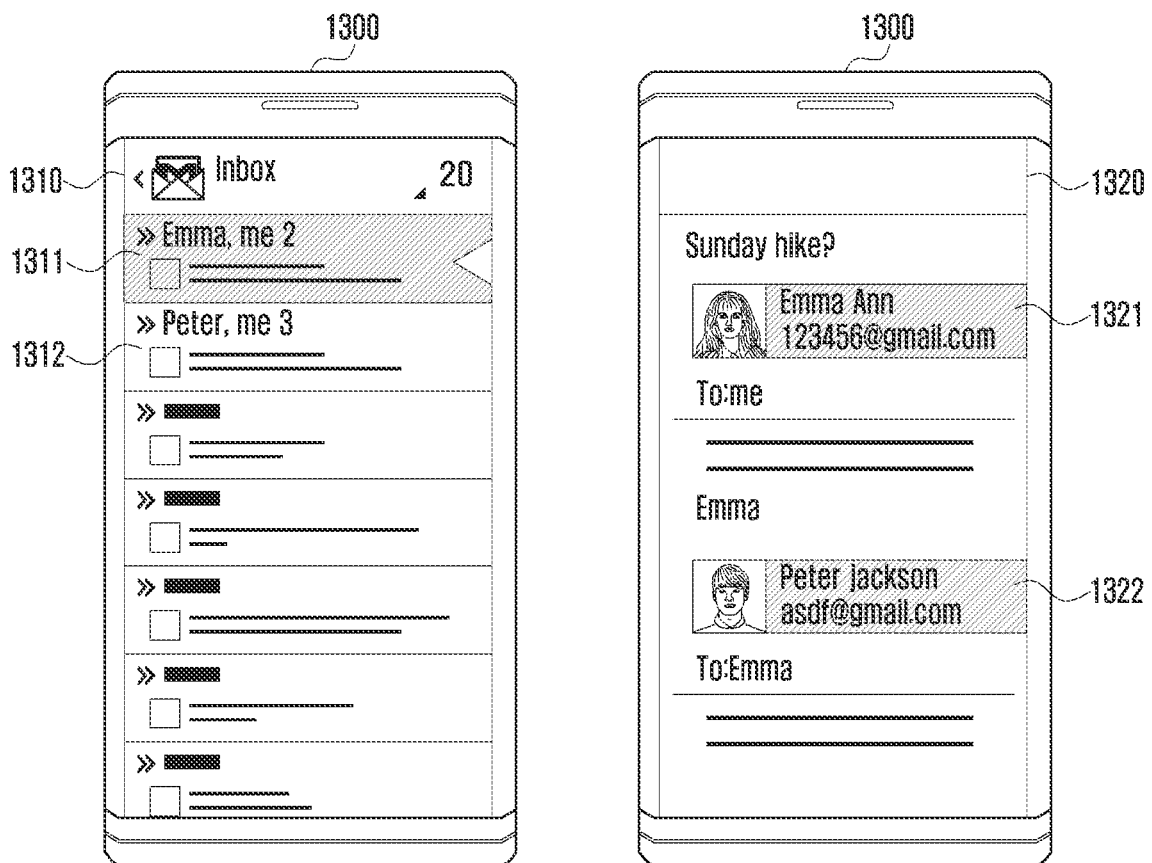1620

1600

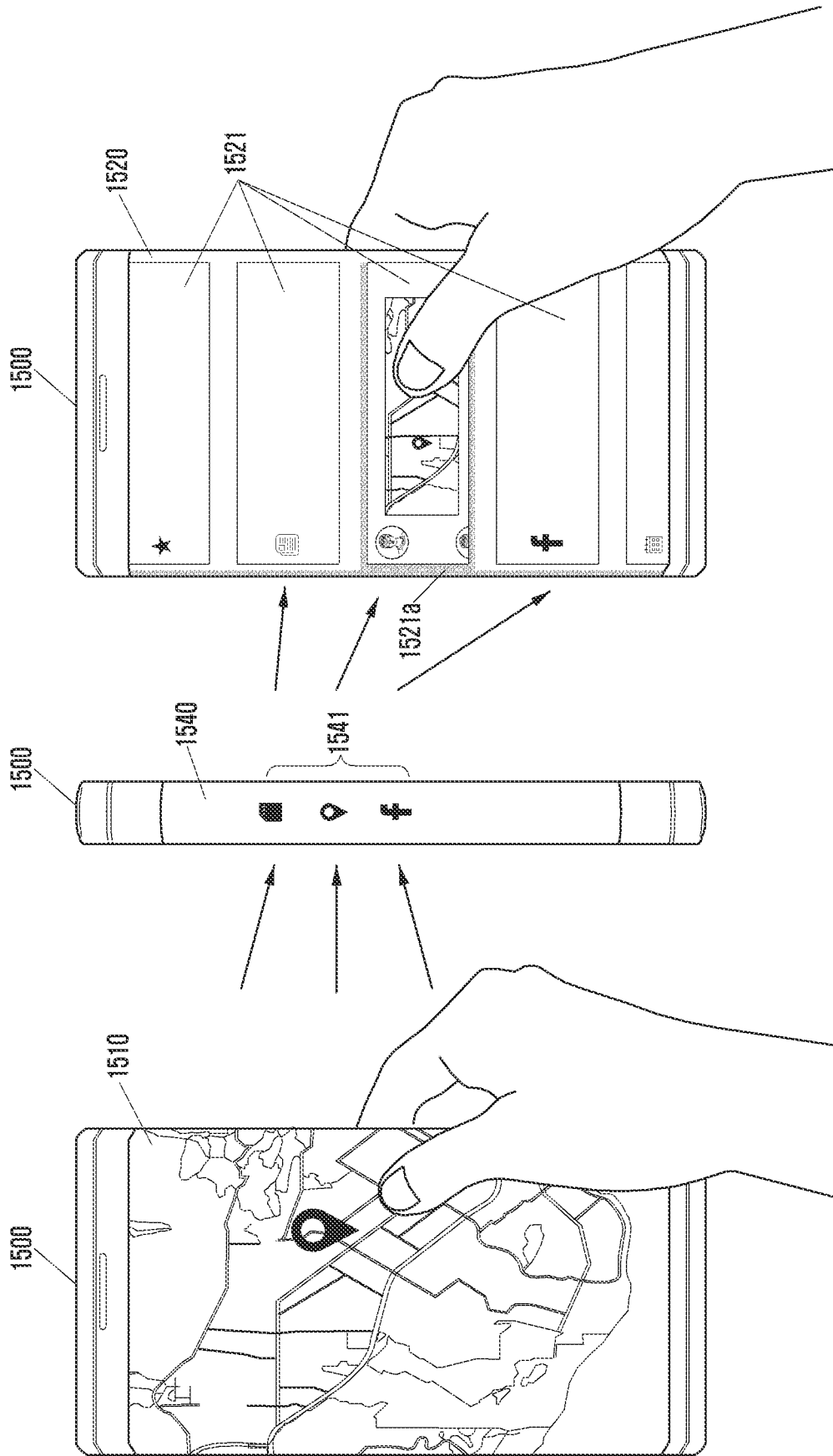1621
1621
1621a
1621
1621

[1670]

1610

1600

[1660]
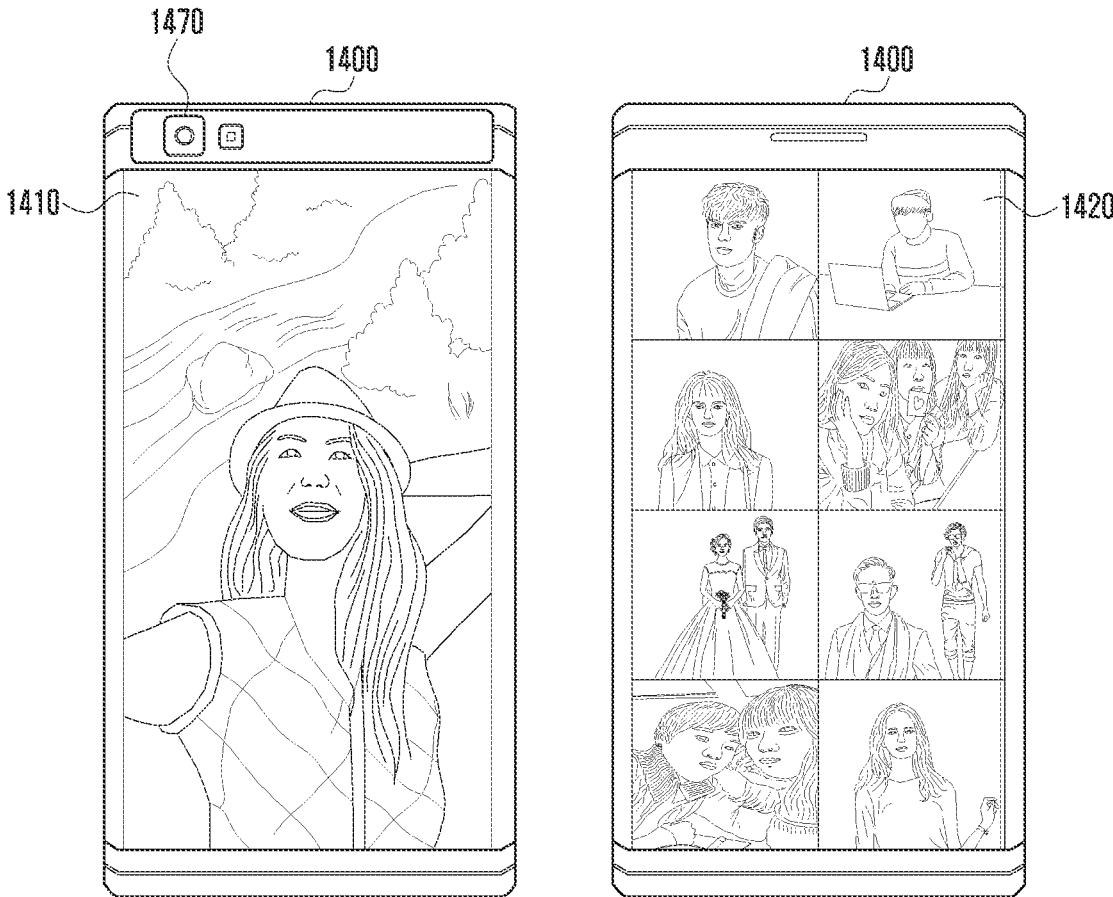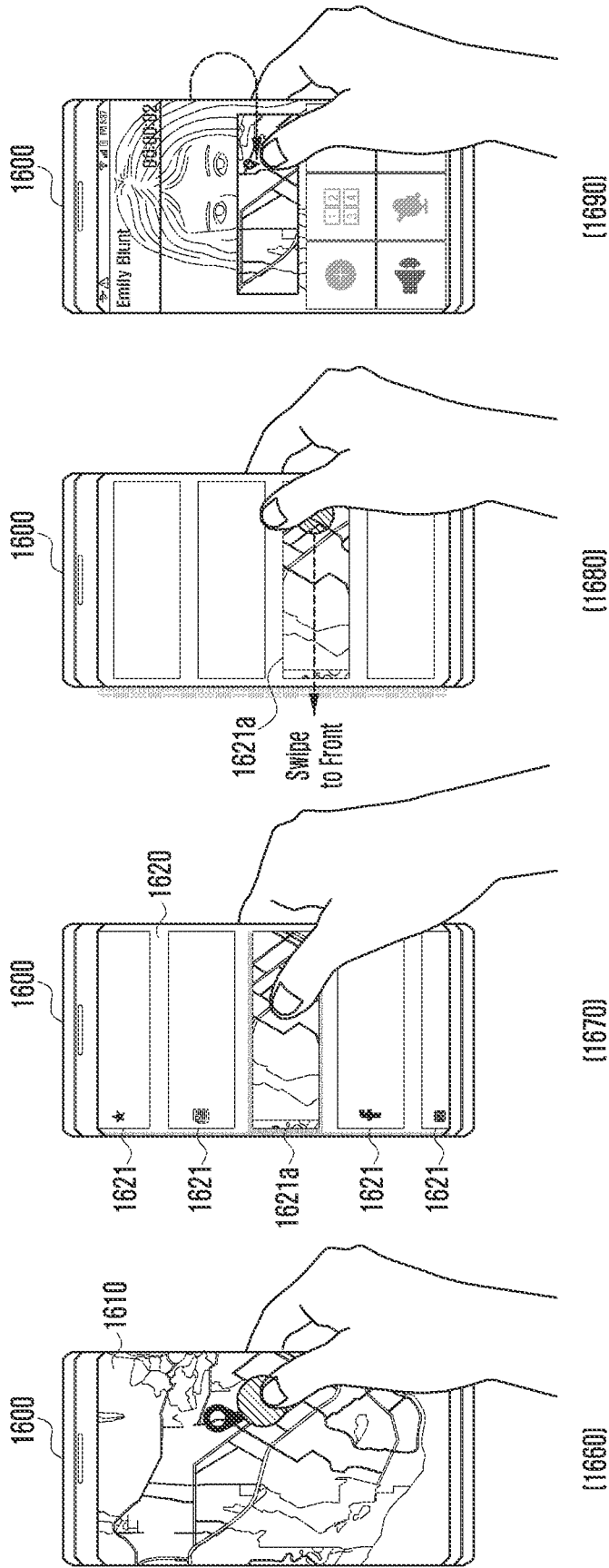
FIG. 17
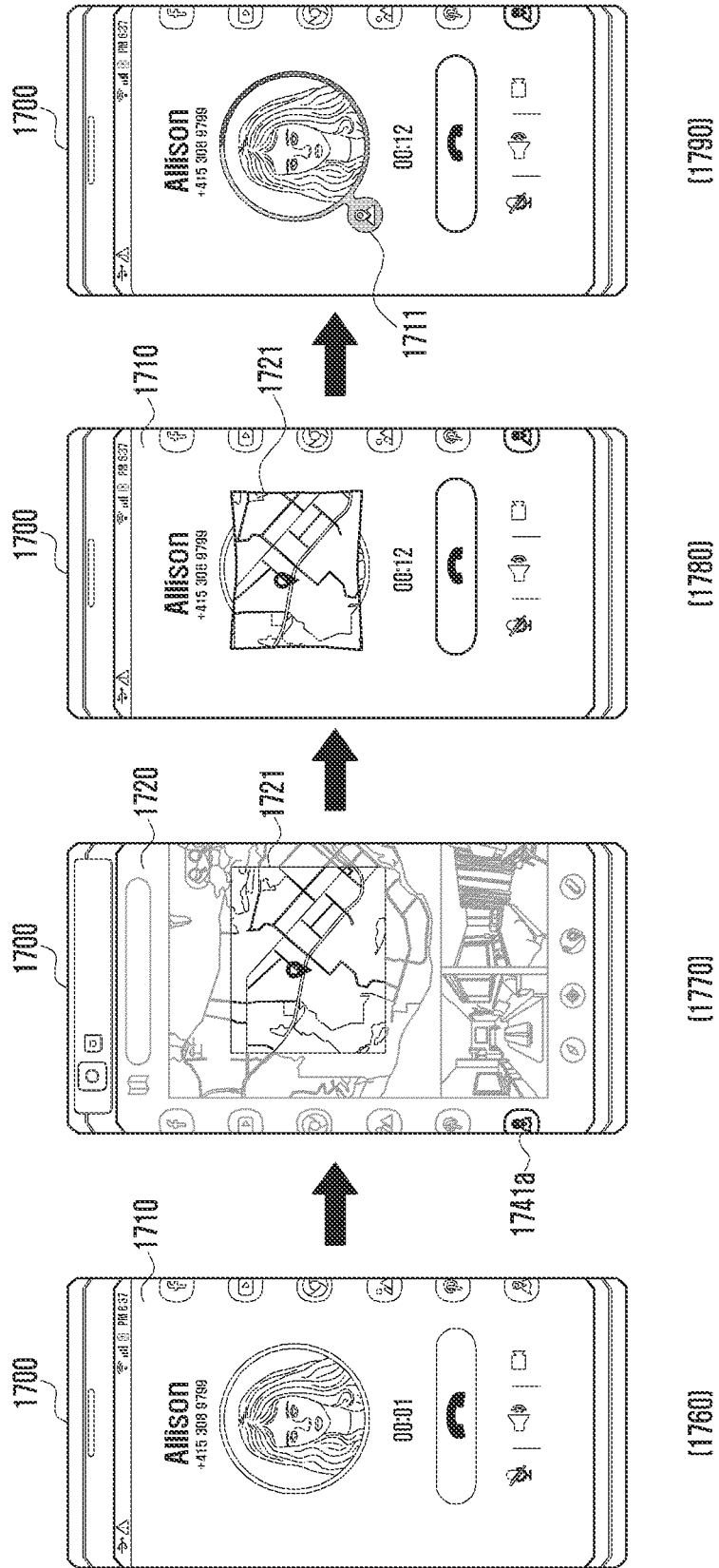
FIG. 18
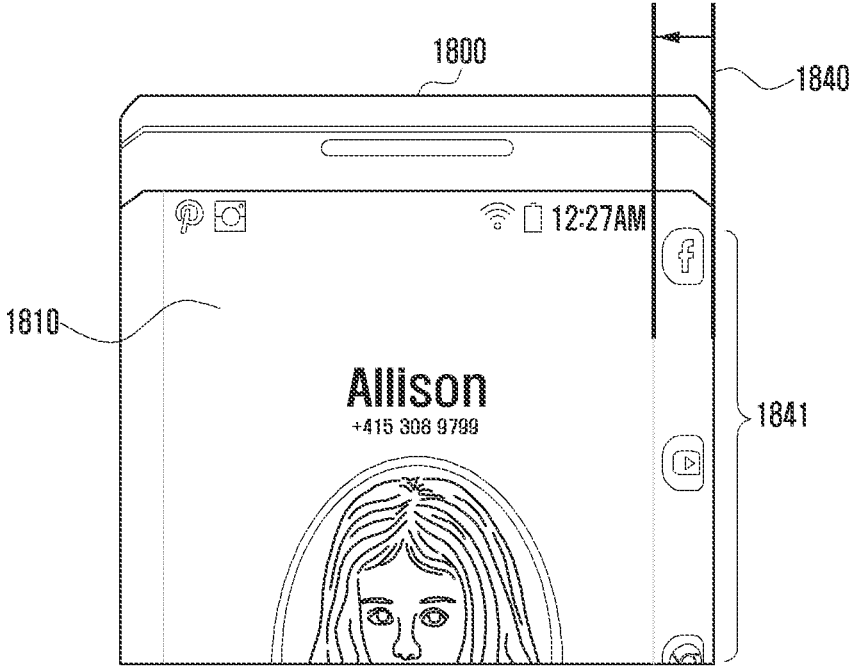
FIG. 19
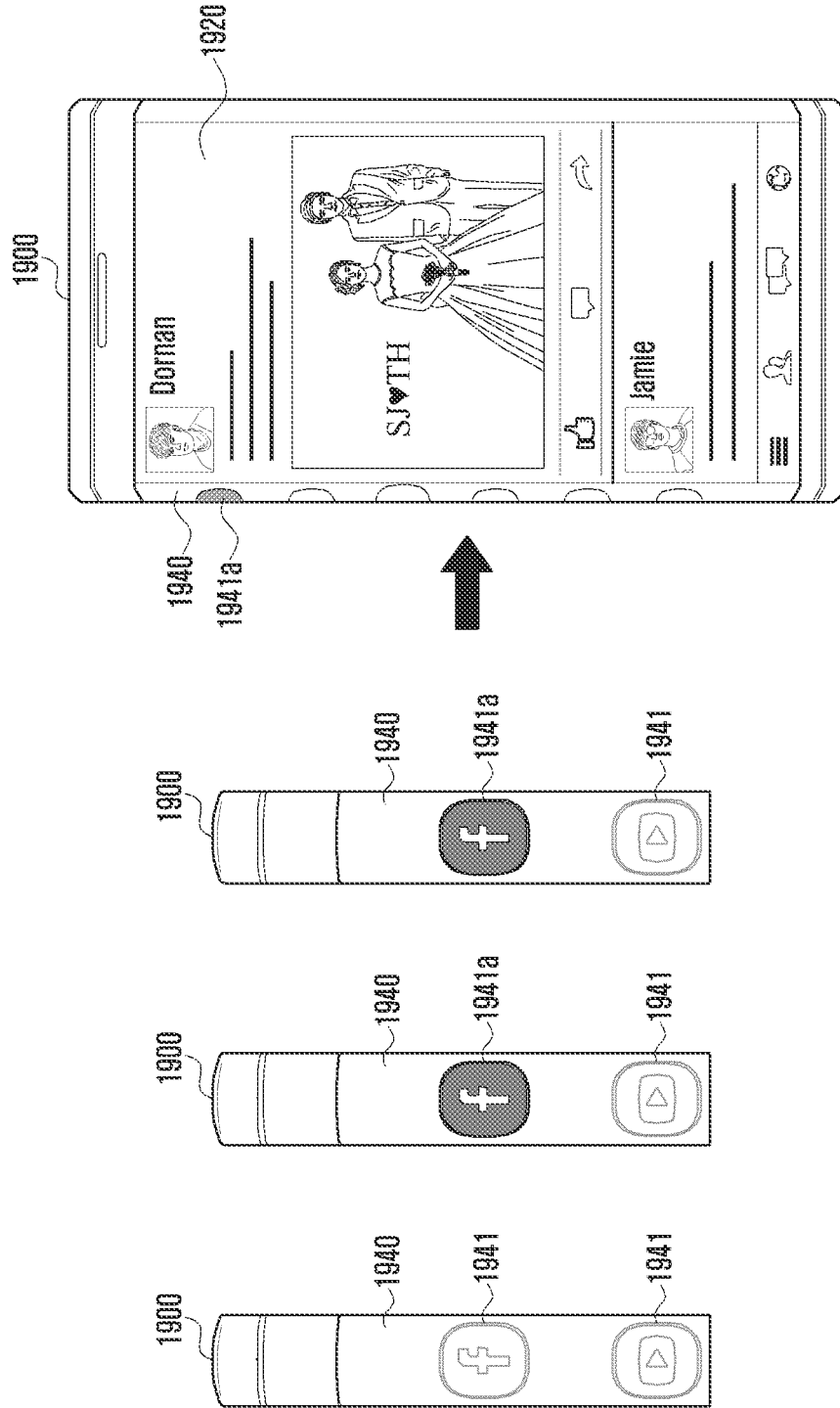
FIG. 20
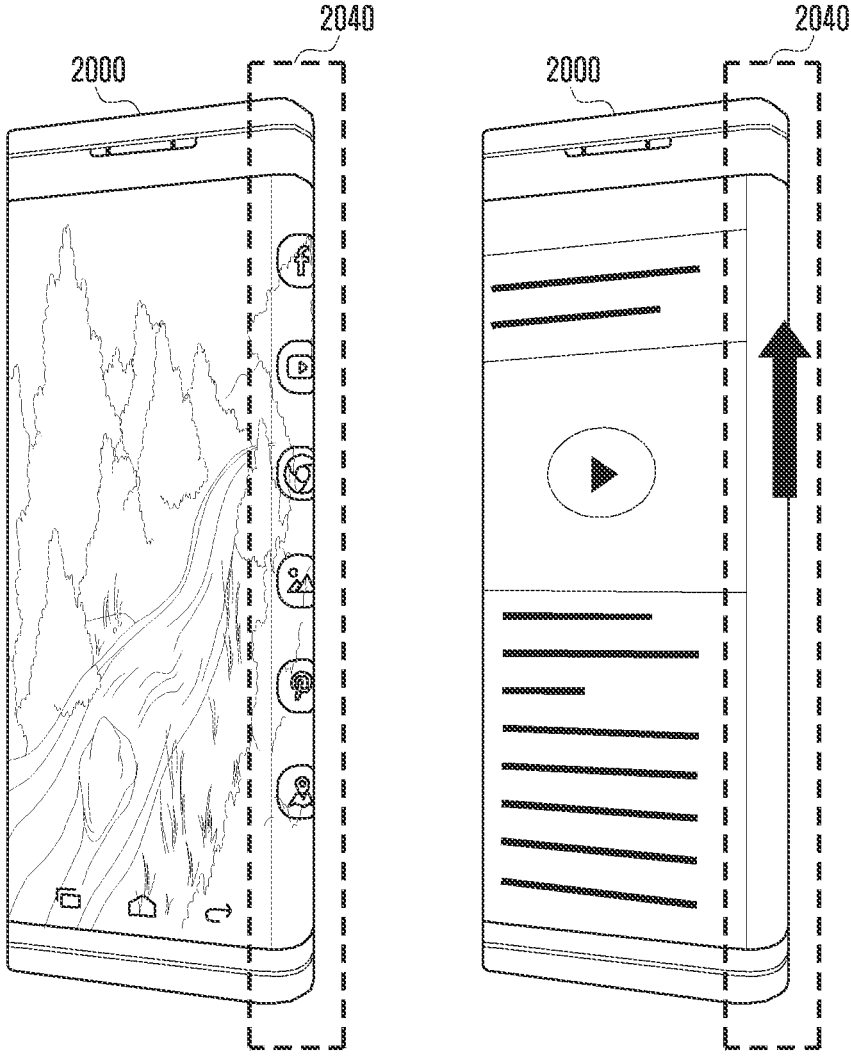
FIG. 21A
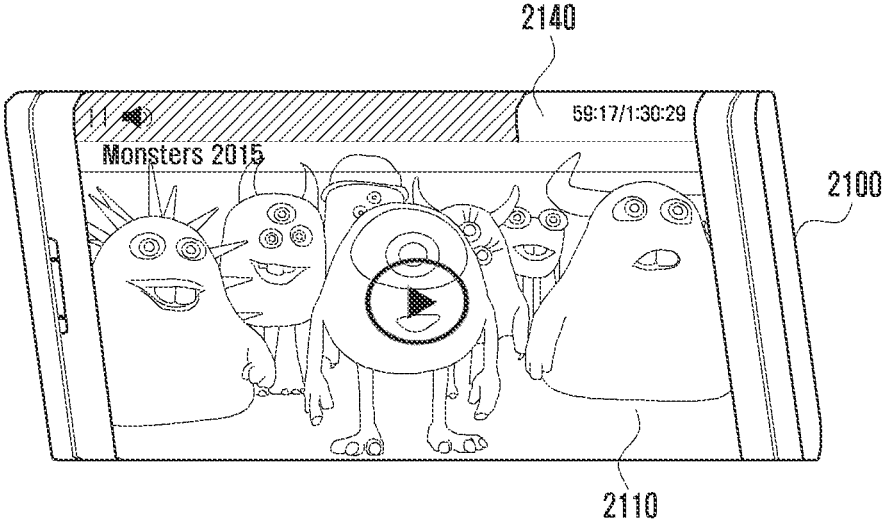
FIG. 21B

FIG. 21C

FIG. 21D

FIG. 22

2200

2215

Monsters 2015

2210

2211

59:17/1:30:28

2200

2221

Monsters 2015

2210

2211

facebook

59:17/1:30:28

2200

facebook

Emma Ann   Jason Hiking

2221

News feed

Message

Event

Friend

2210

FIG. 23A

2300

2310

2330

2330

2330

1 2 3 4 5
6 7 8 9 10

A B ∨
C D

[2370]

2310

2330

Vol +

[2360]

FIG. 23B

FIG. 24

2410

2430

[2490]

2400

2430

2450

2410
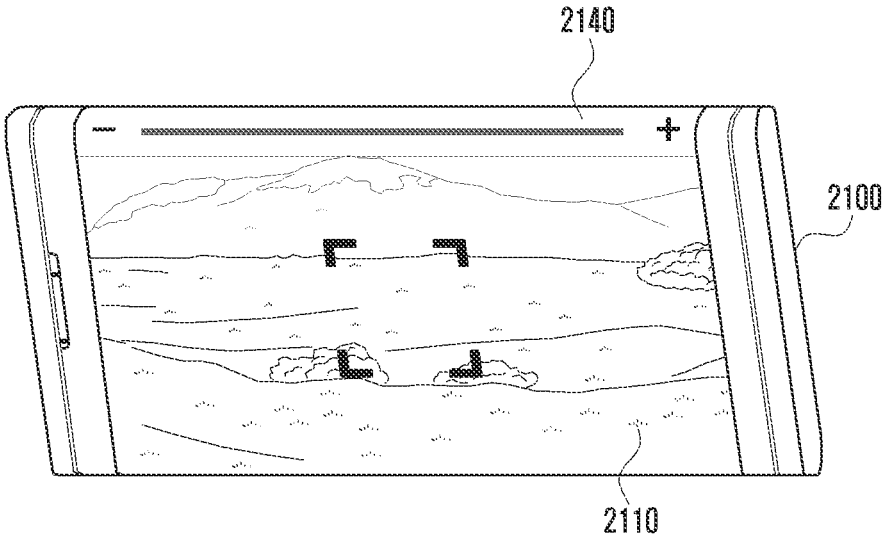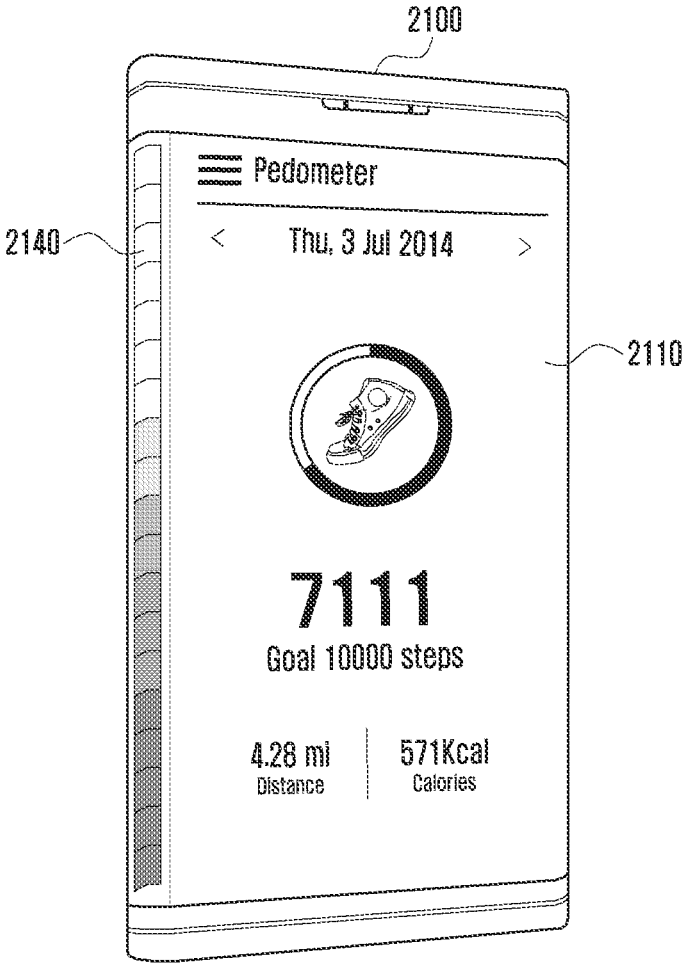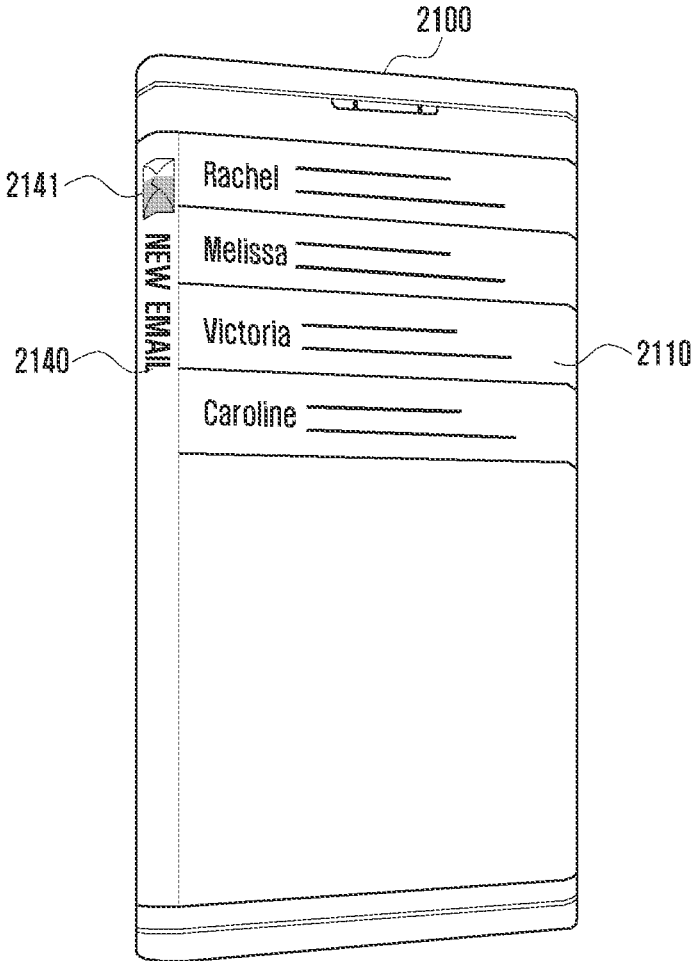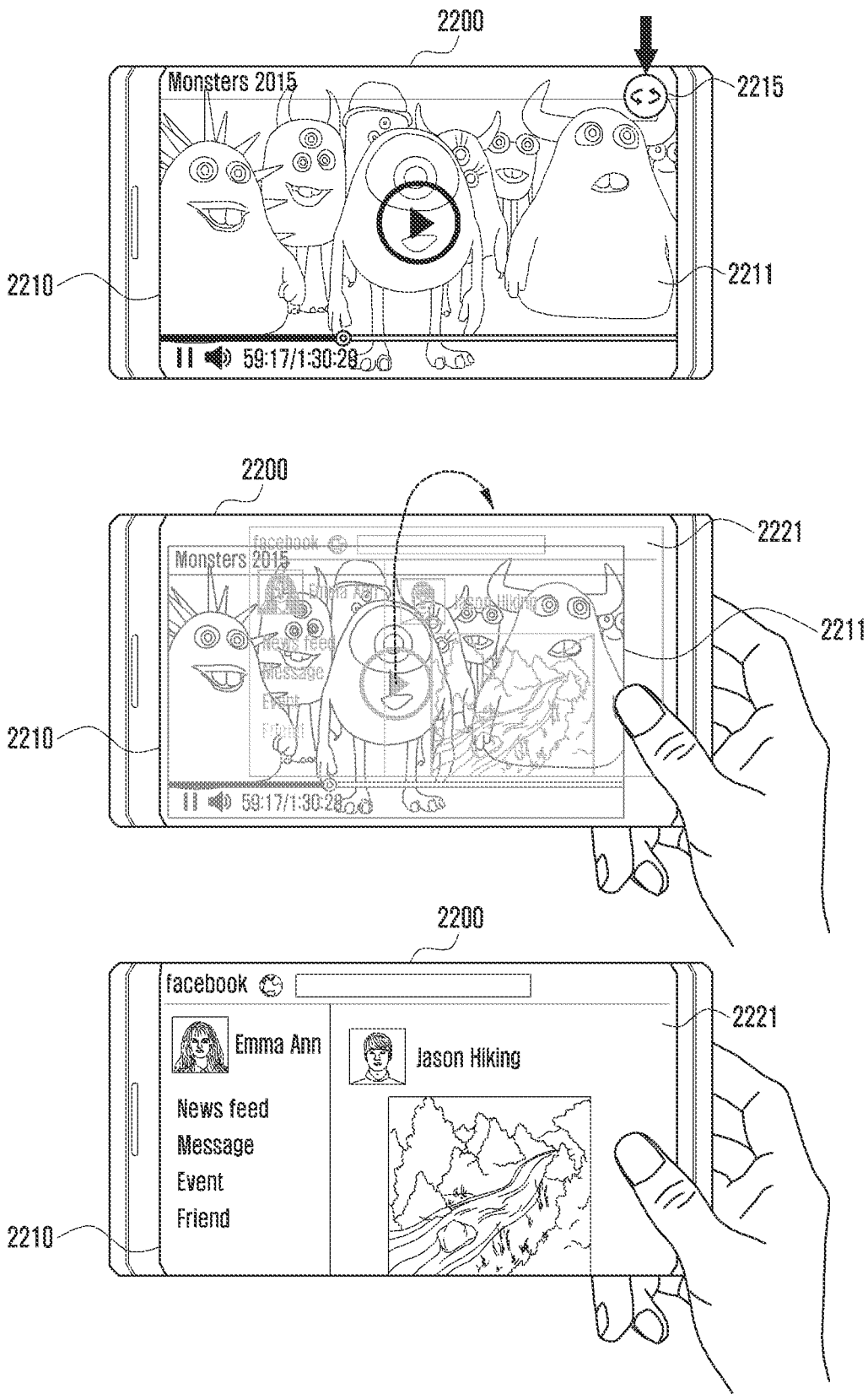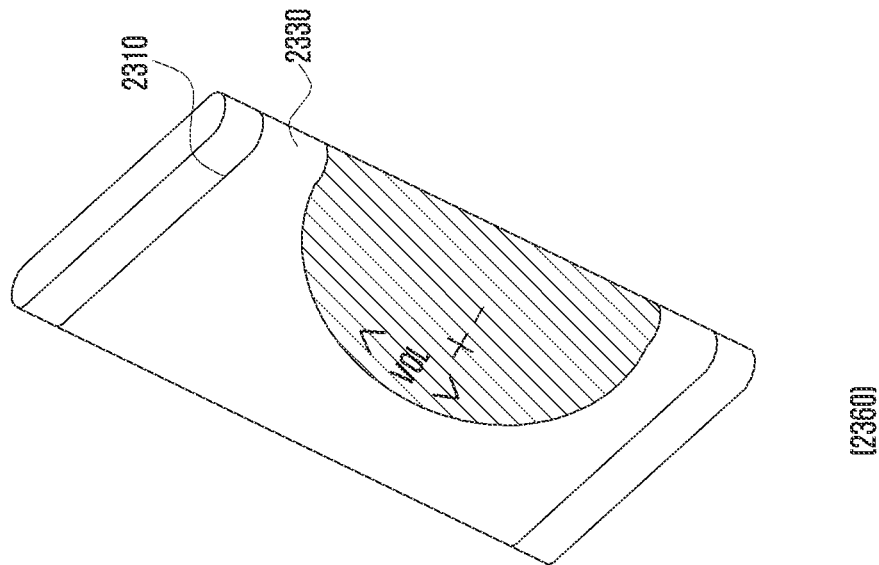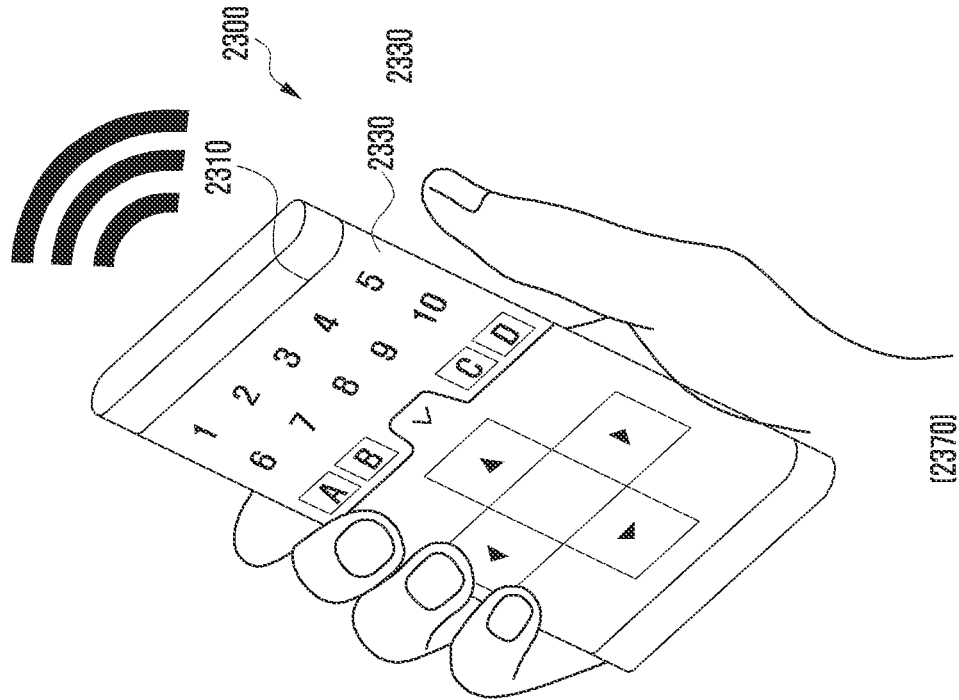
[2480]

METHOD AND APPARATUS FOR OPERATING FUNCTIONS OF ELECTRONIC DEVICE HAVING FLEXIBLE DISPLAY

CROSS-REFERENCE TO RELATED APPLICATION(S)

[0001] This application is a continuation application of prior application Ser. No. 16/067,347, filed on Jun. 29, 2018, which is a U.S. National Stage application under 35 U.S.C. § 371 of an International application number PCT/KR2017/000400, filed on Jan. 12, 2017, which was based on and claimed priority under 35 U.S.C § 119(a) of a Korean patent application number 10-2016-0003804, filed on Jan. 12, 2016, in the Korean Intellectual Property Office, the disclosure of which is incorporated by reference herein in its entirety.

TECHNICAL FIELD

[0002] Various embodiments of the present invention relate to a flexible display of an electronic device and a method of operating the same.

BACKGROUND ART

[0003] Nowadays, with the development of digital technology, various mobile terminals capable of processing communication and personal information while moving, such as a mobile communication terminal, personal digital assistant (PDA), electronic organizer, smart phone, and tablet personal computer (PC), have been released. The mobile terminals are in a mobile convergence step that can perform functions of other terminals as well as original functions thereof.

[0004] Recently, a flexible display and an electronic device having a flexible display implemented by a combination of the flexible display and the electronic device have been developed. The flexible display indicates a display that can freely bend and spread.

[0005] In particular, nowadays, research and development of an electronic device having a flexible display has been performed. Therefore, there is necessity for development in an external shape of the electronic device having a flexible display and a research for improving convenience of a function control of an electronic device using the flexible display mounted in the electronic device.
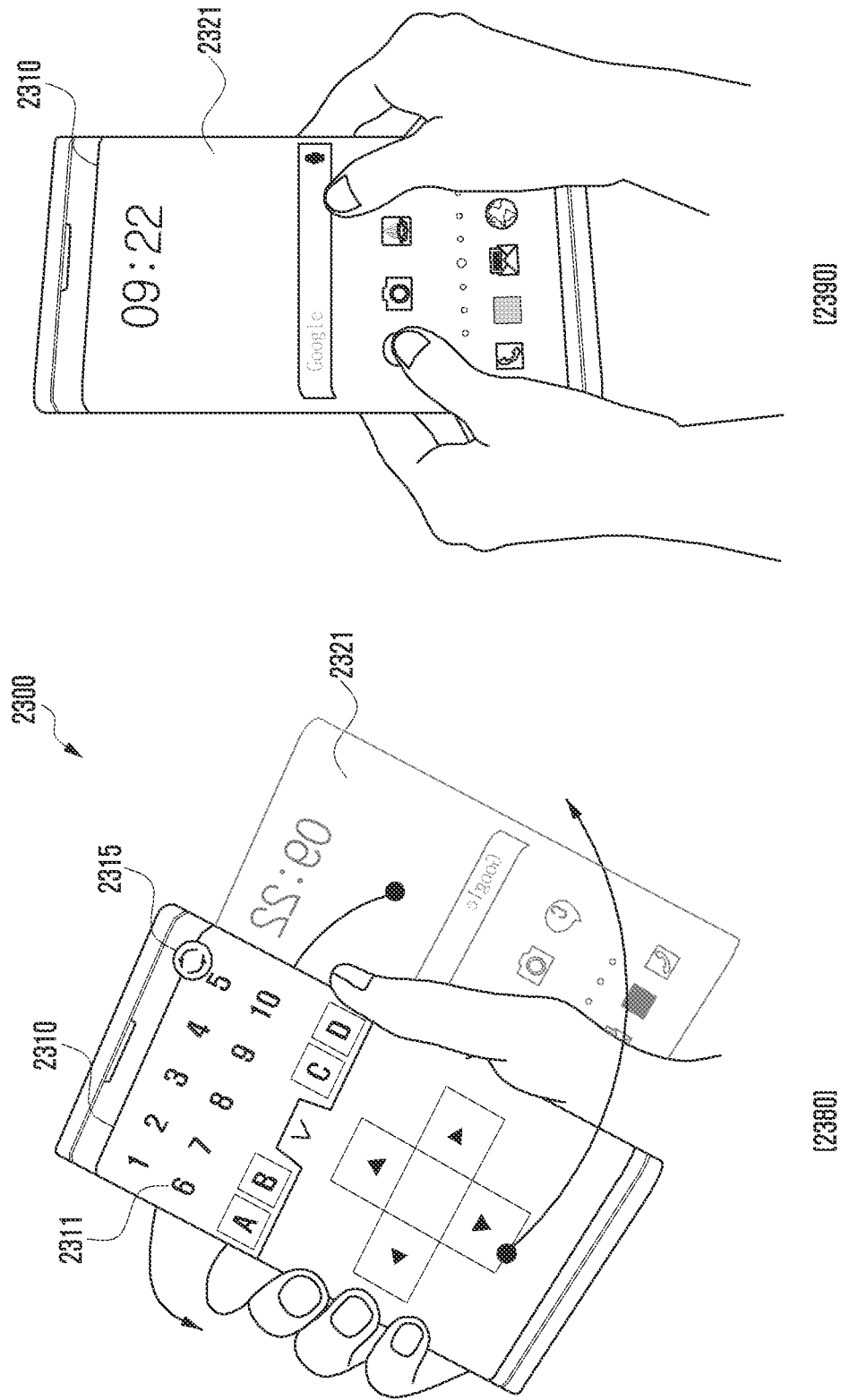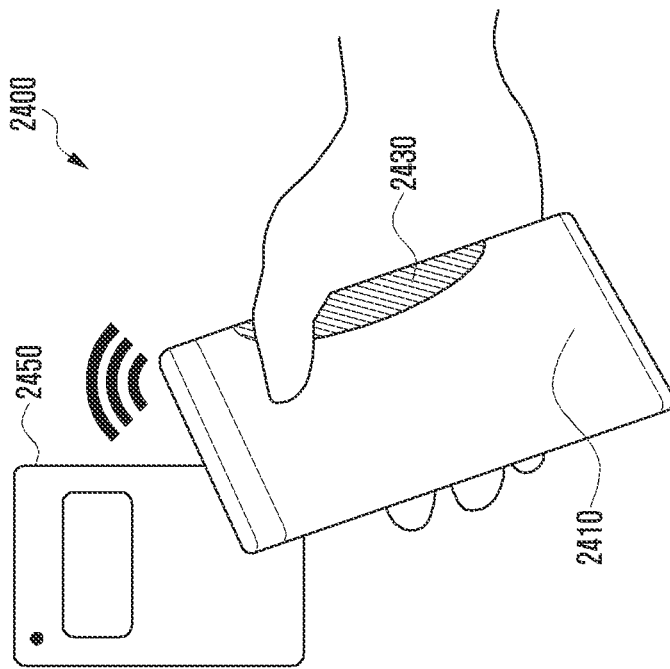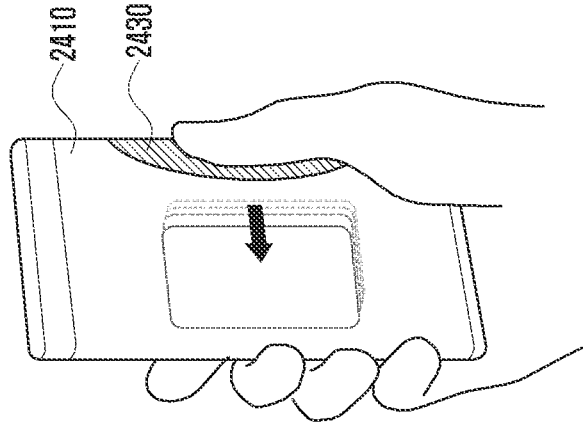
DISCLOSURE OF INVENTION

Technical Problem

[0006] The present invention provides an electronic device and a method of operating a function thereof that can extend a display area to a side surface and a rear surface as well as a front surface of the electronic device by implementing a flexible display in the electronic device.

[0007] The present invention further provides an electronic device and a method of operating a function thereof that can divide a flexible display into a main area of a front surface and a rear surface and a sub-area of a side surface and that can support a function control and a function display of the electronic device using the sub-area in the electronic device having the flexible display.

[0008] The present invention further provides an electronic device and a method of operating a function thereof that can support easy and quick access to information related to a screen displayed in a main area using a sub-area of the flexible display and that can enhance usability and operability of a user for a function control of the electronic device using a sub-area.

Solution to Problem

[0009] In accordance with an aspect of the present invention, an electronic device includes a flexible display configured to enclose an front surface of the electronic device; and a controller configured to control an electronic device function operation based on the flexible display, wherein the controller controls to display a plurality of icons corresponding to an application or a specific function in at least one area of sub-areas of the flexible display, to detect an input for selecting at least one icon of the plurality icons, to detect a swipe input of the selected at least one icon in at least one area of main areas of the flexible display, to execute the application or the specific function corresponding to the selected at least one icon, and to display a screen according to the execution in the main area in which the swipe input is detected.

Advantageous Effects of Invention

[0010] In a flexible display of an electronic device and a method of operating the same according to various embodiments, by using a display extended to a side surface of the electronic device, utilization of the electronic device can be increased.

[0011] In a flexible display of an electronic device and a method of operating the same according to various embodiments, by controlling a front surface and a rear surface of the electronic device through a display extended to a side surface of the electronic device, convenience can be provided to the user.

[0012] In a flexible display of an electronic device and a method of operating the same according to various embodiments, when the flexible display is interworked or connected with an external electronic device, the electronic device can easily control the external electronic device through a graphical user interface (GUI) provided in the electronic device.

BRIEF DESCRIPTION OF DRAWINGS

[0013] FIG. 1 is a block diagram illustrating a configuration of an electronic device in a network environment according to various embodiments.

[0014] FIG. 2 is a block diagram illustrating a configuration of an electronic device according to various embodiments.

[0015] FIG. 3 is a block diagram illustrating a configuration of a program module according to various embodiments.

[0016] FIG. 4 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0017] FIG. 5 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0018] FIG. 6 is a flowchart illustrating an electronic device having a flexible display according to various embodiments.

[0019] FIG. 7 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0020] FIG. 8 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0021] FIG. 9 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0022] FIG. 10 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0023] FIG. 11 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0024] FIGS. 12A to 12B are diagrams illustrating an electronic device having a flexible display according to various embodiments.

[0025] FIG. 13 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0026] FIG. 14 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0027] FIG. 15 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0028] FIG. 16 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0029] FIG. 17 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0030] FIG. 18 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0031] FIG. 19 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0032] FIG. 20 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0033] FIGS. 21A to 21D are diagrams illustrating an electronic device having a flexible display according to various embodiments.

[0034] FIG. 22 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

[0035] FIGS. 23A and 23B are diagrams illustrating an electronic device having a flexible display according to various embodiments.

[0036] FIG. 24 is a diagram illustrating an electronic device having a flexible display according to various embodiments.

MODE FOR THE INVENTION

[0037] Hereinafter, various embodiments of this document will be described with reference to the accompanying drawings. However, it should be understood that technology described in this document is not limited to a specific embodiment and includes various modifications, equivalents, and/or alternatives of an embodiment of this document. The same reference numbers are used throughout the drawings to refer to the same or like parts.

[0038] In this document, an expression such as "have," "may have," "comprise," or "may comprise" indicates existence of a corresponding characteristic (e.g., constituent element such as a numerical value, function, operation, or component) and does not exclude the presence of another characteristic.

[0039] In this document, an expression such as "A or B", "at least one of A or/and B", or "one or more of A or/and B" may include all possible combinations of together listed items. For example, "A or B," "at least one of A and B," or "one or more of A or B" may indicate all of (1) a case of including at least one A, (2) a case of including at least one B, and (3) a case of including both at least one A and at least one B.

[0040] In the present disclosure, expressions including ordinal numbers, such as "first" and "second," etc., may modify various elements. However, such elements are not limited by the above expressions. For example, the above expressions do not limit the sequence and/or importance of the elements. The above expressions are used merely for the purpose to distinguish an element from the other elements. For example, a first user device and a second user device indicate different user devices although both of them are user devices. For example, a first element could be termed a second element, and similarly, a second element could be also termed a first element without departing from the scope of the present disclosure.

[0041] In the case where a component is referred to as being "connected" or "accessed" to other component, it should be understood that not only the component is directly connected or accessed to the other component, but also there may exist another component between them. Meanwhile, in the case where a component is referred to as being "directly connected" or "directly accessed" to other component, it should be understood that there is no component therebetween. The terms used in the present disclosure are only used to describe specific various embodiments, and are not intended to limit the present disclosure. As used herein, the singular forms are intended to include the plural forms as well, unless the context clearly indicates otherwise. Singular forms are intended to include plural forms unless the context clearly indicates otherwise.

[0042] An expression "configured to" used in this document may be interchangeably used with, for example, "suitable for", "having the capacity to", "designed to", "adapted to", "made to", or "capable of" according to a situation. A term "configured to" does not always mean "specifically designed to" in hardware. Alternatively, in any situation, an expression "device configured to" may mean that the device is "capable of" being configured together with another device or component. For example, a "processor configured to perform phrases A, B, and C" may be a generic-purpose processor (e.g., CPU or application processor) that executes an exclusive processor (e.g., an embedded processor) for performing a corresponding operation or at least one software program stored at a memory device to perform a corresponding operation.

[0043] Terms used in this document are used for describing a specific embodiment and do not limit a range of another embodiment. Unless the context otherwise clearly indicates, words used in the singular include the plural, and the plural includes the singular. Terms used here including a technical or scientific term have the same meaning as that which may be generally understood by a person of common skill in the art. Terms defined in a general dictionary among terms used in this document may be analyzed as the same meaning as or a meaning similar to that in a context of related technology, and unless it is clearly defined in this document, the term is not analyzed as having an ideal or

excessively formal meaning. In some cases, a term defined in this document cannot be analyzed to exclude the embodiments of this document.

[0044] An electronic device according to various exemplary embodiments of the present invention may be a device including a communication function. For example, the electronic device may include at least one of a smart phone, tablet personal computer (PC), mobile phone, video phone, e-book reader, desktop PC, laptop PC, netbook computer, personal digital assistant (PDA), portable multimedia player (PMP), MPEG 3 (MP3) player, mobile medical equipment, camera, wearable device (e.g., head-mounted-device (HMD) such as electronic glasses), electronic clothing, electronic bracelet, electronic necklace, electronic accessory, electronic tattoo, and smart watch.

[0045] In any embodiment, the electronic device may be a smart home appliance. The smart home appliance may include at least one of, for example, a television, digital video disk (DVD) player, audio device, refrigerator, air-conditioner, cleaner, oven, microwave oven, washing machine, air cleaner, set-top box, home automation control panel, security control panel, television box (e.g., Samsung HomeSync™, AppleTV™, or Google TV™), game console (e.g., Xbox™, PlayStation™), electronic dictionary, electronic key, camcorder, and electronic frame.

[0046] In another embodiment, an electronic device may include at least one of various medical devices (e.g., various portable medical measurement devices (blood sugar measurement device, heartbeat measurement device, blood pressure measurement device, or body temperature measurement device), magnetic resonance angiography (MRA) device, magnetic resonance imaging (MRI) device, computed tomography (CT) device, scanning machine, and ultrasonic wave device), navigation device, global positioning system (GPS) receiver, event data recorder (EDR), flight data recorder (FDR), vehicle infotainment device, ship electronic equipment (e.g., ship navigation device, gyro compass), avionics, security device, vehicle head unit, industrial or home robot, automatic teller's machine (ATM) of a financial institution, point of sales (POS) of a store, and Internet of things (e.g., bulb, various sensors, electricity or gas meter, sprinkler, fire alarm, thermostat, street light, toaster, exercise mechanism, hot water tank, heater, boiler).

[0047] According to any embodiment, the electronic device may include at least one of a portion of furniture or a building/structure, electronic board, electronic signature receiving device, projector, and various measurement devices (e.g., water supply, electricity, gas, or electric wave measurement device). In various embodiments, the electronic device may be a combination of one or more of the foregoing various devices. An electronic device according to any embodiment may be a flexible electronic device. Further, the electronic device according to an embodiment of this document is not limited to the foregoing devices and may include a new electronic device according to technology development.

[0048] FIG. 1 is a block diagram illustrating a configuration of an electronic device according to an embodiment of the present disclosure.

[0049] Referring to FIG. 1, the electronic device 100 may include a bus 110, a processor 120, a memory 130, a user input module 140, a display module 150, a communication module 160, and other similar and/or suitable components.

[0050] The bus 110 may be a circuit which interconnects the above-described elements and delivers a communication (e.g., a control message) between the above-described elements.

[0051] The processor 120 may receive commands from the above-described other elements (e.g., the memory 130, the user input module 140, the display module 150, the communication module 160, etc.) through the bus 110, may interpret the received commands, and may execute calculation or data processing according to the interpreted commands.

[0052] The memory 130 may store commands or data received from the processor 120 or other elements (e.g., the user input module 140, the display module 150, the communication module 160, etc.) or generated by the processor 120 or the other elements. The memory 130 may include programming modules, such as a kernel 131, middleware 132, an Application Programming Interface (API) 133, an application 134, and the like. Each of the above-described programming modules may be implemented in software, firmware, hardware, or a combination of two or more thereof.

[0053] The kernel 131 may control or manage system resources (e.g., the bus 110, the processor 120, the memory 130, etc.) used to execute operations or functions implemented by other programming modules (e.g., the middleware 132, the API 133, and the application 134). Also, the kernel 131 may provide an interface capable of accessing and controlling or managing the individual elements of the electronic device 100 by using the middleware 132, the API 133, or the application 134.

[0054] The middleware 132 may serve to go between the API 133 or the application 134 and the kernel 131 in such a manner that the API 133 or the application 134 communicates with the kernel 131 and exchanges data therewith.

[0055] Also, in relation to work requests received from one or more applications 134 and/or the middleware 132, for example, may perform load balancing of the work requests by using a method of assigning a priority, in which system resources (e.g., the bus 110, the processor 120, the memory 130, etc.) of the electronic device 100 can be used, to at least one of the one or more applications 134.

[0056] The API 133 is an interface through which the application 134 is capable of controlling a function provided by the kernel 131 or the middleware 132, and may include, for example, at least one interface or function for file control, window control, image processing, character control, or the like.

[0057] The user input module 140, for example, may receive a command or data as input from a user, and may deliver the received command or data to the processor 120 or the memory 130 through the bus 110.

[0058] The display 150 may include a liquid crystal display (LCD), a light-emitting diode (LED) display, an organic LED (OLED) display, a microelectromechanical systems (MEMS) display, or an electronic paper display. The display 150 may display, for example, various contents, such as a text, an image, a video, an icon, and a symbol, to a user. The display 150 may include a touch screen and may receive a touch, gesture, proximity, or hovering input using an electronic pen or a part of a user's body.

[0059] The communication module 160 may connect communication between another electronic device 102 and the electronic device 100.

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[0060] The communication module **160** may support a predetermined short-range communication protocol (e.g., Wi-Fi, BlueTooth (BT), and Near Field Communication (NFC)), or predetermined network communication **162** (e.g., the Internet, a Local Area Network (LAN), a Wide Area Network (WAN), a telecommunication network, a cellular network, a satellite network, a Plain Old Telephone Service (POTS), or the like). Each of the electronic devices **102** and **104** may be a device which is identical (e.g., of an identical type) to or different (e.g., of a different type) from the electronic device **100**. Further, the communication module **160** may connect communication between a server **164** and the electronic device **100** via the network **162**.

[0061] The MST may generate a pulse in response to transmission data using an electromagnetic signal, and the pulse may generate a magnetic field signal. The electronic device **101** may transfer the magnetic field signal to a POS device, and the POS device may detect the magnetic field signal using an MST reader. The POS device may recover the data by converting the detected magnetic field signal to an electrical signal.

[0062] The GNSS may be, for example, a GPS, a global navigation satellite system (GLONASS), a BeiDou navigation satellite system (hereinafter, "BeiDou"), or Galileo, which is the European global satellite-based navigation system. In the present document, "GPS" may be interchangeably used with "GNSS" hereinafter. The wired communication may include, for example, at least one of universal serial bus (USB), high definition multimedia interface (HDMI), recommended standard 232 (RS-232), power line communication, and plain old telephone service (POTS).

[0063] Each of the first and second external electronic devices **102** and **104** may be a device of which the type is different from or the same as that of the electronic device **101**. The server **106** may include a group of one or more servers. According to embodiments of the present disclosure, all or a portion of operations that the electronic device **101** will perform may be executed by another or plural electronic devices, such as the first external electronic device **102**, the second external electronic device **104** or the server **106**. In the case where the electronic device **101** executes any function or service automatically or in response to a request, the electronic device **101** may not perform the function or the service internally, but alternatively or additionally, it may request at least a portion of a function associated with the electronic device **101** from another device, such as the external electronic device **102** or **104** or the server **106**. The other electronic device may execute the requested function or additional function and may transmit the execution result to the electronic device **101**. The electronic device **101** may provide the requested function or service using the received result or may additionally process the received result to provide the requested function or service. To this end, for example, cloud computing, distributed computing, or client-server computing may be used.

[0064] FIG. **2** is a block diagram illustrating a configuration of hardware **200** according to an embodiment of the present disclosure.

[0065] The hardware **200** may be, for example, the electronic device **100** illustrated in FIG. **1**.

[0066] Referring to FIG. **2**, the hardware **200** may include one or more processors **210**, a Subscriber Identification Module (SIM) card **214**, a memory **220**, a communication module **230**, a sensor module **240**, a user input module **250**, a display module **260**, an interface **270**, an audio coder/decoder (codec) **280**, a camera module **291**, a power management module **295**, a battery **296**, an indicator **297**, a motor **298** and any other similar and/or suitable components.

[0067] The processor **210** (e.g., the processor **120**) may include one or more Application Processors (APs) **211**, or one or more Communication Processors (CPs) **213**. The processor **210** may be, for example, the processor **120** illustrated in FIG. **1**. The AP **211** and the CP **213** are illustrated as being included in the processor **210** in FIG. **2**, but may be included in different Integrated Circuit (IC) packages, respectively. According to an embodiment of the present disclosure, the AP **211** and the CP **213** may be included in one IC package.

[0068] The AP **211** may execute an Operating System (OS) or an application program, and thereby may control multiple hardware or software elements connected to the AP **211** and may perform processing of and arithmetic operations on various data including multimedia data. The AP **211** may be implemented by, for example, a System on Chip (SoC). According to an embodiment of the present disclosure, the processor **210** may further include a Graphical Processing Unit (GPU) (not illustrated).

[0069] The CP **213** may manage a data line and may convert a communication protocol in the case of communication between the electronic device (e.g., the electronic device **100**) including the hardware **200** and different electronic devices connected to the electronic device through the network. The CP **213** may be implemented by, for example, a SoC. According to an embodiment of the present disclosure, the CP **213** may perform at least some of multimedia control functions. The CP **213**, for example, may distinguish and authenticate a terminal in a communication network by using a subscriber identification module (e.g., the SIM card **214**). Also, the CP **213** may provide the user with services, such as a voice telephony call, a video telephony call, a text message, packet data, and the like.

[0070] Further, the CP **213** may control the transmission and reception of data by the communication module **230**. In FIG. **2**, the elements such as the CP **213**, the power management module **295**, the memory **220**, and the like are illustrated as elements separate from the AP **211**. However, according to an embodiment of the present disclosure, the AP **211** may include at least some (e.g., the CP **213**) of the above-described elements.

[0071] According to an embodiment of the present disclosure, the AP **211** or the CP **213** may load, to a volatile memory, a command or data received from at least one of a non-volatile memory and other elements connected to each of the AP **211** and the CP **213**, and may process the loaded command or data. Also, the AP **211** or the CP **213** may store, in a non-volatile memory, data received from or generated by at least one of the other elements.

[0072] The SIM card **214** may be a card implementing a subscriber identification module, and may be inserted into a slot formed in a particular portion of the electronic device **100**. The SIM card **214** may include unique identification information (e.g., Integrated Circuit Card IDentifier (IC-CID)) or subscriber information (e.g., International Mobile Subscriber Identity (IMSI)).

[0073] The memory **220** may include an internal memory **222** and an external memory **224**. The memory **220** may be, for example, the memory **130** illustrated in FIG. **1**. The internal memory **222** may include, for example, at least one

of a volatile memory (e.g., a Dynamic RAM (DRAM), a Static RAM (SRAM), a Synchronous Dynamic RAM (SDRAM), etc.), and a non-volatile memory (e.g., a One Time Programmable ROM (OTPROM), a Programmable ROM (PROM), an Erasable and Programmable ROM (EPROM), an Electrically Erasable and Programmable ROM (EEPROM), a mask ROM, a flash ROM, a Not AND (NAND) flash memory, a Not OR (NOR) flash memory, etc.). According to an embodiment of the present disclosure, the internal memory 222 may be in the form of a Solid State Drive (SSD). The external memory 224 may further include a flash drive, for example, a Compact Flash (CF), a Secure Digital (SD), a Micro-Secure Digital (Micro-SD), a Mini-Secure Digital (Mini-SD), an extreme Digital (xD), a memory stick, or the like.

[0074] The communication module 230 may include a wireless communication module 231 or a Radio Frequency (RF) module 234. The communication module 230 may be, for example, the communication module 160 illustrated in FIG. 1. The wireless communication module 231 may include, for example, a Wi-Fi part 233, a BT part 235, a GPS part 237, or a NFC part 239. For example, the wireless communication module 231 may provide a wireless communication function by using a radio frequency. Additionally or alternatively, the wireless communication module 231 may include a network interface (e.g., a LAN card), a modulator/demodulator (modem), or the like for connecting the hardware 200 to a network (e.g., the Internet, a LAN, a WAN, a telecommunication network, a cellular network, a satellite network, a POTS, or the like).

[0075] The RF module 234 may be used for transmission and reception of data, for example, transmission and reception of RF signals or called electronic signals. Although not illustrated, the RF unit 234 may include, for example, a transceiver, a Power Amplifier Module (PAM), a frequency filter, a Low Noise Amplifier (LNA), or the like. Also, the RF module 234 may further include a component for transmitting and receiving electromagnetic waves in a free space in a wireless communication, for example, a conductor, a conductive wire, or the like.

[0076] The sensor module 240 may include, for example, at least one of a gesture sensor 240A, a gyro sensor 240B, an atmospheric pressure sensor 240C, a magnetic sensor 240D, an acceleration sensor 240E, a grip sensor 240F, a proximity sensor 240G, a Red, Green and Blue (RGB) sensor 240H, a biometric sensor 240I, a temperature/humidity sensor 240J, an illuminance sensor 240K, and a Ultra Violet (UV) sensor 240M. The sensor module 240 may measure a physical quantity or may sense an operating state of the electronic device 100, and may convert the measured or sensed information to an electrical signal.

[0077] Additionally/alternatively, the sensor module 240 may include, for example, an E-nose sensor (not illustrated), an ElectroMyoGraphy (EMG) sensor (not illustrated), an ElectroEncephaloGram (EEG) sensor (not illustrated), an ElectroCardioGram (ECG) sensor (not illustrated), a fingerprint sensor (not illustrated), and the like. Additionally or alternatively, the sensor module 240 may include, for example, an E-nose sensor (not illustrated), an EMG sensor (not illustrated), an EEG sensor (not illustrated), an ECG sensor (not illustrated), a fingerprint sensor, and the like. The sensor module 240 may further include a control circuit (not illustrated) for controlling one or more sensors included therein.

[0078] The user input module 250 may include a touch panel 252, a pen sensor 254 (e.g., a digital pen sensor), keys 256, and an ultrasonic input unit 258. The user input module 250 may be, for example, the user input module 140 illustrated in FIG. 1. The touch panel 252 may recognize a touch input in at least one of, for example, a capacitive scheme, a resistive scheme, an infrared scheme, and an acoustic wave scheme. Also, the touch panel 252 may further include a controller (not illustrated). In the capacitive type, the touch panel 252 is capable of recognizing proximity as well as a direct touch. The touch panel 252 may further include a tactile layer (not illustrated). In this event, the touch panel 252 may provide a tactile response to the user.

[0079] The pen sensor 254 (e.g., a digital pen sensor), for example, may be implemented by using a method identical or similar to a method of receiving a touch input from the user, or by using a separate sheet for recognition. For example, a key pad or a touch key may be used as the keys 256. The ultrasonic input unit 258 enables the terminal to sense a sound wave by using a microphone (e.g., a microphone 288) of the terminal through a pen generating an ultrasonic signal, and to identify data. The ultrasonic input unit 258 is capable of wireless recognition. According to an embodiment of the present disclosure, the hardware 200 may receive a user input from an external device (e.g., a network, a computer, or a server), which is connected to the communication module 230, through the communication module 230.

[0080] The display module 260 may include a panel 262 or a hologram 264. The display module 260 may be, for example, the display module 150 illustrated in FIG. 1. The panel 262 may be, for example, a Liquid Crystal Display (LCD) and an Active Matrix Organic Light Emitting Diode (AM-OLED) display, and the like. The panel 262 may be implemented so as to be, for example, flexible, transparent, or wearable. The panel 262 may include the touch panel 252 and one module. The hologram 264 may display a three-dimensional image in the air by using interference of light. According to an embodiment of the present disclosure, the display module 260 may further include a control circuit for controlling the panel 262 or the hologram 264.

[0081] The interface 270 may include, for example, a High-Definition Multimedia Interface (HDMI) 272, a Universal Serial Bus (USB) 274, a projector 276, and a D-sub-miniature (D-sub) 278. Additionally or alternatively, the interface 270 may include, for example, SD/Multi-Media Card (MMC) (not illustrated) or Infrared Data Association (IrDA) (not illustrated).

[0082] The audio codec 280 may bidirectionally convert between a voice and an electrical signal. The audio codec 280 may convert voice information, which is input to or output from the audio codec 280, through, for example, a speaker 282, a receiver 284, an earphone 286, the microphone 288 or the like.

[0083] The camera module 291 may capture an image and a moving image. According to an embodiment, the camera module 291 may include one or more image sensors (e.g., a front lens or a back lens), an Image Signal Processor (ISP) (not illustrated), and a flash LED (not illustrated).

[0084] The power management module 295 may manage power of the hardware 200. Although not illustrated, the power management module 295 may include, for example,

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a Power Management Integrated Circuit (PMIC), a charger Integrated Circuit (IC), or a battery fuel gauge.

[0085] The PMIC may be mounted to, for example, an IC or a SoC semiconductor. Charging methods may be classified into a wired charging method and a wireless charging method. The charger IC may charge a battery, and may prevent an overvoltage or an overcurrent from a charger to the battery. According to an embodiment of the present disclosure, the charger IC may include a charger IC for at least one of the wired charging method and the wireless charging method. Examples of the wireless charging method may include a magnetic resonance method, a magnetic induction method, an electromagnetic method, and the like. Additional circuits (e.g., a coil loop, a resonance circuit, a rectifier, etc.) for wireless charging may be added in order to perform the wireless charging.

[0086] The battery fuel gauge may measure, for example, a residual quantity of the battery 296, or a voltage, a current or a temperature during the charging. The battery 296 may supply power by generating electricity, and may be, for example, a rechargeable battery.

[0087] The indicator 297 may indicate particular states of the hardware 200 or a part (e.g., the AP 211) of the hardware 200, for example, a booting state, a message state, a charging state and the like. The motor 298 may convert an electrical signal into a mechanical vibration. The processor 210 may control the sensor module 240.

[0088] Although not illustrated, the hardware 200 may include a processing unit (e.g., a GPU) for supporting a module TV. The processing unit for supporting a module TV may process media data according to standards such as, for example, Digital Multimedia Broadcasting (DMB), Digital Video Broadcasting (DVB), media flow, and the like. Each of the above-described elements of the hardware 200 according to an embodiment of the present disclosure may include one or more components, and the name of the relevant element may change depending on the type of electronic device. The hardware 200 according to an embodiment of the present disclosure may include at least one of the above-described elements. Some of the above-described elements may be omitted from the hardware 200, or the hardware 200 may further include additional elements. Also, some of the elements of the hardware 200 according to an embodiment of the present disclosure may be combined into one entity, which may perform functions identical to those of the relevant elements before the combination.

[0089] The term "module" used in the present disclosure may refer to, for example, a unit including one or more combinations of hardware, software, and firmware. The "module" may be interchangeable with a term, such as "unit," "logic," "logical block," "component," "circuit," or the like. The "module" may be a minimum unit of a component formed as one body or a part thereof. The "module" may be a minimum unit for performing one or more functions or a part thereof. The "module" may be implemented mechanically or electronically. For example, the "module" according to an embodiment of the present disclosure may include at least one of an Application-Specific Integrated Circuit (ASIC) chip, a Field-Programmable Gate Array (FPGA), and a programmable-logic device for performing certain operations which have been known or are to be developed in the future.

[0090] FIG. 3 is a block diagram illustrating a configuration of a programming module 300 according to an embodiment of the present disclosure.

[0091] The programming module 300 may be included (or stored) in the electronic device 100 (e.g., the memory 130) or may be included (or stored) in the electronic device 200 (e.g., the memory 230) illustrated in FIG. 1. At least a part of the programming module 300 may be implemented in software, firmware, hardware, or a combination of two or more thereof. The programming module 300 may be implemented in hardware (e.g., the hardware 200), and may include an OS controlling resources related to an electronic device (e.g., the electronic device 100) and/or various applications (e.g., an application 370) executed in the OS. For example, the OS may be Android, iOS, Windows, Symbian, Tizen, Bada, and the like.

[0092] Referring to FIG. 3, the programming module 300 may include a kernel 310, a middleware 330, an API 360, and/or the application 370.

[0093] The kernel 310 (e.g., the kernel 131) may include a system resource manager 311 and/or a device driver 312. The system resource manager 311 may include, for example, a process manager (not illustrated), a memory manager (not illustrated), and a file system manager (not illustrated). The system resource manager 311 may perform the control, allocation, recovery, and/or the like of system resources. The device driver 312 may include, for example, a display driver (not illustrated), a camera driver (not illustrated), a Bluetooth driver (not illustrated), a shared memory driver (not illustrated), a USB driver (not illustrated), a keypad driver (not illustrated), a Wi-Fi driver (not illustrated), and/or an audio driver (not illustrated). Also, according to an embodiment of the present disclosure, the device driver 312 may include an Inter-Process Communication (IPC) driver (not illustrated).

[0094] The middleware 330 may include multiple modules previously implemented so as to provide a function used in common by the applications 370. Also, the middleware 330 may provide a function to the applications 370 through the API 360 in order to enable the applications 370 to efficiently use limited system resources within the electronic device. For example, as illustrated in FIG. 3, the middleware 330 (e.g., the middleware 132) may include at least one of a runtime library 335, an application manager 341, a window manager 342, a multimedia manager 343, a resource manager 344, a power manager 345, a database manager 346, a package manager 347, a connectivity manager 348, a notification manager 349, a location manager 350, a graphic manager 351, a security manager 352, and any other suitable and/or similar manager.

[0095] The runtime library 335 may include, for example, a library module used by a complier, in order to add a new function by using a programming language during the execution of the application 370. According to an embodiment of the present disclosure, the runtime library 335 may perform functions which are related to input and output, the management of a memory, an arithmetic function, and/or the like.

[0096] The application manager 341 may manage, for example, a life cycle of at least one of the applications 370. The window manager 342 may manage GUI resources used on the screen. The multimedia manager 343 may detect a format used to reproduce various media files and may encode or decode a media file through a codec appropriate

for the relevant format. The resource manager **344** may manage resources, such as a source code, a memory, a storage space, and/or the like of at least one of the applications **370**.

[0097] The power manager **345** may operate together with a Basic Input/Output System (BIOS), may manage a battery or power, and may provide power information and the like used for an operation. The database manager **346** may manage a database in such a manner as to enable the generation, search and/or change of the database to be used by at least one of the applications **370**. The package manager **347** may manage the installation and/or update of an application distributed in the form of a package file.

[0098] The connectivity manager **348** may manage a wireless connectivity such as, for example, Wi-Fi and Bluetooth. The notification manager **349** may display or report, to the user, an event such as an arrival message, an appointment, a proximity alarm, and the like in such a manner as not to disturb the user. The location manager **350** may manage location information of the electronic device. The graphic manager **351** may manage a graphic effect, which is to be provided to the user, and/or a user interface related to the graphic effect. The security manager **352** may provide various security functions used for system security, user authentication, and the like. According to an embodiment of the present disclosure, when the electronic device (e.g., the electronic device **100**) has a telephone function, the middleware **330** may further include a telephony manager (not illustrated) for managing a voice telephony call function and/or a video telephony call function of the electronic device.

[0099] The middleware **330** may generate and use a new middleware module through various functional combinations of the above-described internal element modules. The middleware **330** may provide modules specialized according to types of OSs in order to provide differentiated functions. Also, the middleware **330** may dynamically delete some of the existing elements, or may add new elements. Accordingly, the middleware **330** may omit some of the elements described in the various embodiments of the present disclosure, may further include other elements, or may replace the some of the elements with elements, each of which performs a similar function and has a different name.

[0100] The API **360** (e.g., the API **133**) is a set of API programming functions, and may be provided with a different configuration according to an OS. In the case of Android or iOS, for example, one API set may be provided to each platform. In the case of Tizen, for example, two or more API sets may be provided to each platform.

[0101] The applications **370** (e.g., the applications **134**) may include, for example, a preloaded application and/or a third party application. The applications **370** (e.g., the applications **134**) may include, for example, a home application **371**, a dialer application **372**, a Short Message Service (SMS)/Multimedia Message Service (MMS) application **373**, an Instant Message (IM) application **374**, a browser application **375**, a camera application **376**, an alarm application **377**, a contact application **378**, a voice dial application **379**, an electronic mail (e-mail) application **380**, a calendar application **381**, a media player application **382**, an album application **383**, a clock application **384**, and any other suitable and/or similar application.

[0102] At least a part of the programming module **300** may be implemented by instructions stored in a non-transitory computer-readable storage medium. When the instructions are executed by one or more processors (e.g., the one or more processors **210**), the one or more processors may perform functions corresponding to the instructions. The non-transitory computer-readable storage medium may be, for example, the memory **220**. At least a part of the programming module **300** may be implemented (e.g., executed) by, for example, the one or more processors **210**. At least a part of the programming module **300** may include, for example, a module, a program, a routine, a set of instructions, and/or a process for performing one or more functions.

[0103] Names of the elements of the programming module (e.g., the programming module **300**) according to an embodiment of the present disclosure may change depending on the type of OS. The programming module according to an embodiment of the present disclosure may include one or more of the above-described elements. Alternatively, some of the above-described elements may be omitted from the programming module. Alternatively, the programming module may further include additional elements. The operations performed by the programming module or other elements according to an embodiment of the present disclosure may be processed in a sequential method, a parallel method, a repetitive method, or a heuristic method. Also, some of the operations may be omitted, or other operations may be added to the operations.

[0104] A flexible display of an electronic device and a method of operating the same according to various embodiments of the present invention will be described in detail with reference to FIGS. **4** to **22**.

[0105] FIGS. **4** and **5** are diagrams illustrating an electronic device having a flexible display according to various embodiments.

[0106] The electronic device according to an embodiment of the present invention has a bent display of a form enclosing three surfaces or four surfaces thereof and may include constituent elements such as a flexible display in which a main area of a front surface and a rear surface of the electronic device and a sub-area of a side surface thereof according to such a form are integrally formed, a display for a function of the electronic device and a controller for controlling a function operation by interworking information of the main area and information of the sub-area. In an embodiment of the present invention, in addition to a form of the electronic device of FIGS. **4** and **5**, the flexible display of the present invention may be implemented into various forms.

[0107] With reference to FIG. **4**, an electronic device **400** of the present invention may include a flexible display, a main body **401** in which the flexible display is received and fastened, and additional devices formed in the main body to perform a function of the electronic device **400**. The additional devices may include a physical button **401** and a camera **470**.

[0108] According to various embodiments of the present invention, the flexible display is characterized in that it may be bent or rolled without being damaged through a thin and flexible substrate such as paper. FIG. **4** illustrates partial areas **410** and **420** of the flexible display.

[0109] With reference to FIG. **5**, in the present invention, areas displayed at a front surface or a rear surface of the flexible display are referred to as main areas **510** and **520**

and areas extended from the main areas **510** and **520** and bent in at least one side surface of a main body are referred to as sub-areas **530** and **540**.

[0110] In the main area according to various embodiments of the present invention, a main area of a front surface may be referred to as a first main area **510** and a main area of a rear surface may be referred to as a second main area **520**.

[0111] According to various embodiments of the present invention, in a sub-area, an area extended and bent from the first main area **510** and an area extended and bent from the second main area **520** may be referred to as a first sub-area **530**. In another embodiment, the first sub-area **530** may be an area in which an area extended and bent from the first main area **510** and an area extended and bent from the second main area **520** are connected.

[0112] According to various embodiments of the present invention, in the sub-area, an area extended and bent from the first main area **510** to be extended to the second main area **520** may be referred to as a second sub-area **540**.

[0113] A position of the first sub-area **530** divided on a flexible display of the electronic device **500** is not limited, and even if a direction of the electronic device **500** is changed to the left/right or up/down by the user, an area is changed in which the first sub-area **530** is positioned, but the first sub-area **530** may be changed while performing the same function (GUI display).

[0114] In the first sub-area **530**, whenever an executed application is changed, a GUI displayed to correspond thereto may be changed.

[0115] When the electronic device **500** is interworked with an external electronic device, the first sub-area **530** may display a GUI that can control a function related to the external electronic device. In an embodiment, the electronic device **500** may be connected or interworked with the external electronic device through 3.5 pie, type-c cable, Bluetooth, WiFi, etc.

[0116] The second sub-area **540** may display a plurality of images (e.g., icons) corresponding to an application or a function. The second sub-area **540** may display an icon corresponding to a frequently used application and function by a user input. In the second sub-area **540**, the electronic device **500** may detect a user gesture input such as drag and drop to the area to display a plurality of images corresponding to an application or a function in order to immediately use an application or a function. According to an embodiment, a size of the plurality of images may be adjusted according to the number displayed in the second sub-area **540**. According to an embodiment, the second sub-area **540** is scrolled; thus, more images may be controlled to display to the user.

[0117] According to various embodiments of the present invention, the second sub-area **540** may be a bent area connected to and extended from at least one of the first main area **510** and the second main area **520**. The electronic device **500** may detect a user selection input to an icon displayed in the second sub-area **540** and a swipe input to the first main area **510** or the second main area **520**. The electronic device **500** may execute an application or a function corresponding to the icon and display a screen related thereto in a determined area among the first main area **510** and the second main area **520** or in an area in which a swipe input is released in a direction in which the swipe input is detected.

[0118] Here, for convenience of description of the present invention, the main area and the sub-area are divided, but are not limited thereto.

[0119] An electronic device of the present invention may divide a flexible display into a main area of a front surface and a rear surface and a sub-area of a side surface and receive a control input for a function operation of the electronic device and a screen display according to a functional operation of the electronic device using the sub-area. That is, the flexible display may support an input and output and particularly, the flexible display may simultaneously or individually support an input and output to the sub-area. Operation examples according to an input and output by interworking of the main area and the sub-area will be described with reference to the following drawings.

[0120] FIG. **6** is a flowchart illustrating a method of operating a function using a flexible display in an electronic device according to various embodiments.

[0121] Before a description of FIG. **6**, according to various embodiments of the present invention, the electronic device may detect at least one event of a plurality of events. When the electronic device detects an event, the electronic device may determine an event intended by the user among a plurality of events according to a user input.

[0122] According to various embodiments of the present invention, a plurality of events that may be detected by the electronic device may include a function control event, content display event, content storing and sharing event, and screen conversion event.

[0123] When an external electronic device is connected to the electronic device or when a user input for performing a specific service is detected in the electronic device, a function control event according to various embodiments of the present invention may be detected.

[0124] An external electronic device connected to or interworked with the electronic device according to various embodiments of the present invention may include an IoT product group and other applications or devices requiring pay or control.

[0125] According to various embodiments of the present invention, a user interface according to a function control event may be a user interface for providing a function of the connected external electronic device or a specific service. The user interface may be displayed in a first sub-area. The user interface may be changed and displayed according to an interworked device, function, and application. The electronic device may detect a user input on the user interface displayed in the first sub-area and perform a function related to the external electronic device or a specific service or application according to the detected user input.

[0126] When a user touch to an icon displayed in the second sub-area and when swipe to a first main area or a second main area is detected, a content display event according to various embodiments of the present invention may be detected. The electronic device, having detected a user input may display a content of an application corresponding to the icon in the first main area or the second main area in which the user input is terminated.

[0127] When the electronic device detects a user selection on at least one content displayed on the main area and detects swipe in another main area (e.g., a second main area) other than the main area (e.g., a first main area) in which the content is displayed, a content display event according to various embodiments of the present invention may be

detected. Thereby, in another main area (e.g., a second main area), additional information about the selected content may be displayed.

[0128] In a content display event according to various embodiments of the present invention, the electronic device may detect an input for executing a specific application or function, and when the specific application or function is executed, the electronic device may display a related screen in the main area and display additional information related to the specific application or function in another main area.

[0129] In an embodiment, when the camera is executed, the electronic device may detect a content display event, display a preview image or a photographed image in one main area (e.g., the first main area), and display a gallery in which the photographed image is stored or an image related to the photographed image in another main area (e.g., the second main area).

[0130] In an electronic device according to an embodiment, the display is formed in multi-surfaces, and even when the camera module is provided only at one surface of the electronic device, the electronic device may photograph while viewing a preview image through a display provided at one surface. Accordingly, because the electronic device according to an embodiment may not provide each of the cameras at every surface, components can be reduced, and by generally using a rear camera having a higher performance than that of a front camera used for self-photographing, a high quality of picture may be obtained.

[0131] When the electronic device detects a user selection (e.g., long press) to a content displayed in one of main areas and swipe to another main area, a content storing and sharing event according to various embodiments of the present invention may be detected. The electronic device may display a plurality of plates that can distinguish contents stored at another main area. Further, the electronic device may display an image (e.g., icon) corresponding to a plurality of plates in a sub-area connected and bent between the main areas. In an embodiment, when the electronic device detects swipe of an object (e.g., images, text, etc.) of a content selected in the main area to another main area via one image of a sub-area, the electronic device may display the selected object in a plate corresponding to an image of the touched sub-area and store data of the content corresponding to the object.

[0132] When contents are displayed in each of the first main area and the second main area, if a user selection of the screen conversion icon displayed on the first main area and the second main area is detected, a screen conversion event according to various embodiments of the present invention may be detected. When the user's holding position is detected, a display position of the screen conversion icon may be changed. When the screen conversion icon is detected, the electronic device may overlap and display a content displayed on the first main area and a content displayed on the second main area, receive a user selection of one of them, and display the selected content in the first main area. Here, the first main area may be a user viewing area determined according to the user's holding position.

[0133] With reference to FIG. 6, the electronic device may detect an event input at operation 601 and determine an input event at operation 602.

[0134] In an embodiment, the electronic device may determine that a function control event has been detected. For example, the electronic device may determine that a connection to an external electronic device has been detected.

[0135] The electronic device may perform a function corresponding to the event at operation 603. The electronic device may control the flexible display according to the performed function at operation 604.

[0136] In an embodiment, when the connected external electronic device is a Bluetooth speaker, the electronic device may display a user interface corresponding to a function of the Bluetooth speaker in a sub-area, for example, a first sub-area. The electronic device may detect a user input on the user interface displayed in the first sub-area and perform a corresponding function according to the user input. In an embodiment, when a user interface that lowers a volume is selected by the user, the electronic device may detect the user interface and control to reduce a volume of the speaker connected by Bluetooth.

[0137] FIG. 7 is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0138] With reference to FIG. 7, an electronic device 700 may detect the user's holding position. By detecting the user's holding position, the electronic device 700 may determine one area of a plurality of areas thereof to a first sub-area. When determining a first sub-area, a second sub-area, a first main area, and a second main area, the electronic device 700 may detect and determine the user's holding position.

[0139] Further, in the electronic device 700, the first sub-area may be fixed according to user setting. In an embodiment, in the electronic device 700, one of a left hand mode and a right hand mode may be set by the user. The first sub-area may be determined according to a preset mode.

[0140] According to various embodiments of the present invention, the electronic device may detect a holding position in the first sub-area and display the user interface in an area adjacent to a thumb.

[0141] FIG. 8 is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0142] With reference to FIG. 8, an electronic device 800 may extend an area in which a first sub-area 830 is displayed for user convenience. The electronic device 800 may detect a user's gesture in a direction of one area of main areas and extend and display the first sub-area 830 to some areas of the main areas in which detection is terminated.

[0143] FIG. 9 is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0144] With reference to FIG. 9, an electronic device 900 may detect an input event of the user and determine that the event is a function control event, i.e., detection of earphone connection.

[0145] The electronic device 900 may detect an earphone connection and display a user interface corresponding to a function related to the earphone in a sub-area, for example, the first sub-area. The electronic device 900 may detect a user input 910 on the user interface displayed in the first sub-area and perform a corresponding function according to the user input. Even if the user interface is not displayed in the first sub-area, when a user intuitive input is detected in the first sub-area, the electronic device 900 may perform a function corresponding thereto.

[0146] In an embodiment, when a user gesture that lowers a volume is detected in the first sub-area, the electronic device **900** may control to reduce a volume of a sound output to the earphone.

[0147] In another embodiment, when a user input **920** is detected on the user interface representing rewinding displayed in the first-sub area, the electronic device **900** may control to rewind reproducing music. In another embodiment, in order to rewind in the first sub-area, when a user input that drags in a left direction is detected, the electronic device **900** may control to rewind reproducing music.

[0148] In another embodiment, when a user input **930** is detected on a user interface representing quick winding displayed in the first sub-area, the electronic device **900** may control to rewind reproducing music. In another embodiment, when a user input that drags in a right direction is detected for quick winding in the first sub-area, the electronic device **900** may control to quickly wind reproducing music.

[0149] In another embodiment, when a user input **940** is detected on a user interface representing reproduction stop displayed in the first sub-area, the electronic device **900** may control to stop reproducing music. In another embodiment, for reproduction stop in the first sub-area, when a user input of tapping one time is detected, the electronic device **900** may control to stop reproducing music.

[0150] Although not shown, in another embodiment, when a user input (e.g., double tap) is detected on a user interface representing reproduction stop displayed in the first sub-area, the electronic device **900** may control to reproduce stop music. In another embodiment, when a user input of double tapping is detected in the first sub-area, the electronic device **900** may control to reproduce again stop music.

[0151] FIG. **10** is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0152] With reference to FIG. **10**, for an additional function corresponding to a content displayed on a main area, an electronic device **1000** may change and display a form of an execution icon **1010** corresponding to the additional function by extending the first sub-area according to a touch position on the main area of the user or according to a characteristic of the additional function.

[0153] According to various embodiments of the present invention, the electronic device **1000** may operate in a landscape mode or a portrait mode according to the connected or interworked external electronic device or function and change a position of an execution icon **1010** corresponding to an additional function in order to perform a both hand operation or a one hand operation.

[0154] FIG. **11** is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0155] With reference to FIG. **11**, an electronic device **1100** may detect an event input of the user and determine that the event is a function control event, i.e., a user input for executing a specific service or application.

[0156] In an embodiment, when the electronic device **1100** recognizes execution of a car game application by the user, the electronic device **1100** may display a user interface that can perform a function related to a car game in a first sub-area. In an embodiment, the electronic device **1100** may display a user interface that can perform a function related to the car game in other areas as well as the first sub-area.

[0157] FIGS. **12A** to **12B** are diagrams illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0158] With reference to FIG. **12A**, an electronic device **1200** may detect a content display event. According to an embodiment, when the electronic device **1200** detects a user touch input to at least one icon **1241a** or **1241b** of at least one icon **1241** displayed in a second sub-area **1240** and a swipe input to a first main area **1210** or a second main area **1220**, the electronic device **1200** may detect a content display event. The electronic device **1200**, having detected the user input may display a content of an application corresponding to the selected icon **1241a** in the first main area **1210** or the second main area **1220** in which a user input is terminated.

[0159] According to an embodiment, the electronic device **1200** may detect a user selection of an icon **1241a** corresponding to a web browser application and swipe to the first main area **1210**. The electronic device **1200** may display a content of the web browser application on the first main area **1210**. Thereby, the user may use a web browser on the first main area **1210**.

[0160] Further, the electronic device **1200** may detect a user selection of an icon **1241b** corresponding to an SNS application and swipe to the second main area **1220**. While executing the SNS application, the electronic device **1200** may automatically attach a content displayed on the first main area **1210** to the SNS application. In another embodiment, the electronic device **1200** may display a content of the SNS application on the second main area **1220**.

[0161] With reference to FIG. **12B**, in the first main area **1210** of the electronic device **1200**, a chat application may be executed and a related screen may be displayed. When the user wants to perform a search using a web browser without screen conversion while using a chat application displayed in the first main area **1210**, the user may select an icon corresponding to the web browser application displayed in the second sub-area **1240** and swipe the icon to the second main area **1220** in which the chat application is not shown. The electronic device **1200**, having detected this may display a content of a web browser application, which is an application corresponding to the icon displayed in the second sub-area **1240** in the second main area **1220**. The user may execute and display the web browser application in the second main area **1220** with the foregoing simple manipulation while using a chat program in the first main area **1210**.

[0162] According to an embodiment, the electronic device **1200** may detect a selection of an icon corresponding to the web browser application displayed in the second sub-area **1240** while displaying a screen related to a music reproduction application or a web page in the first main area **1210**. When the user wants to search for music lyrics by using a web browser without screen conversion while using the music reproduction application displayed in the first main area **1210**, the user may select an icon corresponding to a web browser application displayed in the second sub-area **1240** and swipe the icon to the second main area **1220** in which a chat application is not displayed. The electronic device **1200**, having detected this may display a content of a web browser application, which is an application corresponding to the icon displayed in the second sub-area **1240** in the second main area **1220**. By executing a web browser application activated in the second main area **1220** by turning backward the electronic device **1200** while using a

music reproduction program in the first main area **1210**, the user may search for a title related to music.

[0163] FIG. **13** is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0164] With reference to FIG. **13**, an electronic device **1300** may detect a content display event. When the electronic device **1300** detects a user selection on at least one content displayed on a main area and detects swipe to another main area (e.g., a second main area **1320**) other than a main area (e.g., a first main area **1310**) in which a content is displayed, the electronic device **1300** may detect a content display event. Thereby, additional information about the selected content may be displayed in another main area (e.g., the second main area **1320**).

[0165] In an embodiment, the electronic device **1300** may detect a user selection on an e-mail list displayed on the first main area **1310**. The electronic device **1300** may detect a user selection to at least one e-mail **1311** and **1312** of an e-mail list and a swipe input to the second main area **1320**. Thereby, the electronic device **1300** may display additional information about the selected e-mails **1311** and **1312** in the second main area **1320**. Additionally, when the electronic device **1300** simultaneously or sequentially detects the input to a plurality of e-mails **1311** and **1312** on the first main area **1310**, the electronic device **1300** may simultaneously or sequentially display additional information about the plurality of e-mails **1321** and **1322** in the second main area **1320**.

[0166] In an embodiment, the electronic device **1300** may detect a user selection onto an e-mail list displayed on the first main area **1310**. The electronic device **1300** may detect a user selection to at least one e-mail **1311** and **1312** of an e-mail list and a swipe input to the second main area **1320**. Thereby, the electronic device **1300** may display a writing window that can write a reply to the selected email in the second main area **1320**. Additionally, when the electronic device **1300** simultaneously or sequentially detects the input to a plurality of e-mails **1311** and **1312** on the first main area **1310**, the electronic device **1300** may simultaneously or sequentially display a writing window that can write a reply to the plurality of e-mails in the second main area **1320**. The user may immediately write a reply e-mail in the second main area **1320** by turning the electronic device **1300** backward.

[0167] FIG. **14** is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0168] With reference to FIG. **14**, in an electronic device **1400**, a camera **1470** may be executed by the user. Accordingly, the electronic device **1400** may detect a content display event and display a preview image or a photographed image in one main area (e.g., a first main area **1410**). The electronic device **1400** may display a gallery in which a photographed image is stored in another main area (e.g., a second main area **1420**) or an image related to the photographed image.

[0169] FIG. **15** is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0170] With reference to FIG. **15**, when an electronic device **1500** detects a user selection (e.g., long press) to a

content displayed in one of main areas and swipe to another main area, the electronic device **1500** may detect a content storing and sharing event.

[0171] The electronic device **1500** may execute a clip art function in another main area. When the clip art function is executed, the electronic device **1500** may display a plurality of plates that can distinguish contents stored at another main area. Further, the electronic device **1500** may display an image (e.g., an icon) corresponding to the plurality of plates in a sub-area connected and bent between the main areas.

[0172] When the electronic device **1500** detects swipe of an object (e.g., image, text) of a selected content in the main area to another main area through an image of one of sub-areas, the electronic device **1500** may display the selected object in a plate corresponding to an image of the touched sub-area and store data of the content corresponding to the object at a storage area related to the image.

[0173] In an embodiment, the electronic device **1500** may execute a map application in a first main area **1510** to display a content corresponding thereto. The electronic device **1500** may detect a user selection onto the content and a swipe input to a second main area **1520**. For example, the electronic device **1500** may detect a long press input or a double tap input of the user on the content and a swipe input to the second main area **1520**.

[0174] In another embodiment, when the electronic device **1500** detects a user selection (e.g., long press) to a content displayed in one of main areas and swipe to another main area, a content storing and sharing event may be detected. The electronic device **1500** may display a plurality of plates **1521** that can distinguish contents stored at another main area (e.g., the second main area **1520**). Further, the electronic device **1500** may display an image (e.g., an icon) corresponding to a plurality of plates in the sub-area connected and bent between the main areas. In an embodiment, when the electronic device **1500** detects swipe of an object (e.g., image, text) of a content selected in the main area to another main area (e.g., a second main area **1520**) via one image **1541** of a second sub-area **1540**, the electronic device **1500** may display the selected object in a plate corresponding to an image of the touched second sub-area **1540** and store data of the content corresponding to the object at a storage area (e.g., the memory **130**) related to the image.

[0175] The electronic device **1500** may give an effect **1521***a* in order to enable the user to determine that the plate has been selected while displaying the selected object in a plate corresponding to an image of the touched second sub-area **1540** on the second main area **1520**. Further, when the electronic device **1500** detects a touch of an image of one of the second sub-areas **1541**, the electronic device **1500** may give an effect even to the second sub-area **1541** to enable the user to determine.

[0176] According to various embodiments of the present invention, when the electronic device **1500** detects a user selection (e.g., long press) to a content displayed in one of main areas and swipe to a sub-area, the electronic device **1500** may detect a content storing and sharing event.

[0177] By executing a clip art function on the second main area **1520**, the electronic device **1500** may display an image (e.g., an icon) that is not displayed, but corresponding to a plate displayed upon executing the clip art in one of sub-areas connected and bent between the main areas. For example, the area may be a second sub-area **1540**.

[0178] The electronic device **1500** may detect a user input that swipes and releases a selected content in at least one of images corresponding to the plate displayed in the second sub-area **1540**. The electronic device **1500** may detect a user input to store data corresponding to the content at a storage area (e.g., the memory **130**) related to a released image, even if the electronic device **1500** does not display an object corresponding to a content in the second sub-area **1540**.

[0179] FIG. **16** is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0180] With reference to reference number **1660** of FIG. **16**, when an electronic device **1600** detects a user selection (e.g., long press) to a content of a map application, which is a content displayed in a first main area **1610** and swipe to a second main area **1620**, the electronic device **1600** may detect a content storing and sharing event.

[0181] With reference to reference number **1670**, the electronic device **1600** displays a plurality of plates **1621** in the second main area **1620**, and when the electronic device **1600** detects that an object (e.g., images, text) of the selected content is swiped to the second main area **1620**, the electronic device **1600** may display the selected object in at least one plate **1621**a of a plurality of plates and store data of a content corresponding to the object. The electronic device **1600** may display the effect in a selected plate **1621**a among a plurality of plates **1621** displayed in the second main area **1620**.

[0182] Thereafter, the user may share a content stored at the electronic device **1600** while performing another function. With reference to reference numerals **1680** and **1690**, while communicating with another party (e.g., phone call), the electronic device **1600** may display a communication screen in the first main area **1610**. In an embodiment, the electronic device **1600** may execute and display a clip art function in the second main area **1620**. In another embodiment, when a function related to communication is executed and displayed in the first main area **1610**, the electronic device **1600** may execute and display a clip art function in the second main area **1620**.

[0183] With reference to reference numeral **1680**, the electronic device **1600** may detect a user input that selects an object displayed in at least one plate **1621**a of a plurality of plates of a clip art. The electronic device **1600** may detect a user selection of the object and a swipe input to the first main area **1610**. The electronic device **1600** may detect the user input and display a notification notifying that an object is selected in a sub-area in which swipe is detected, for example, a second sub-area **1640** and is shared in a first main area **1610**. For example, the notification may include lightening and a color change.

[0184] With reference to reference numeral **1690**, the electronic device **1600** may overlap and display one object selected by the user on the first main area **1610** that displays a screen that performs another function, for example, communication with another party. In an embodiment, when a swipe input of the user is released, the electronic device **1600** may share data of a content corresponding to the object with another party.

[0185] FIG. **17** is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0186] With reference to reference numeral **1760**, when an electronic device **1700** is communicating with another party

(e.g., phone call), the electronic device **1700** may display a communication screen in a first main area **1710**. The electronic device **1700** may display icons corresponding to a plurality of functions or applications displayed in a second sub-area **1740**. The electronic device **1700** may detect a user input that selects at least one **1741**a of icons and a swipe input to a second main area **1720**. The electronic device **1700** may execute and display a function or an application corresponding to the selected icon **1741**a in the second main area **1720** while maintaining a communication screen display in a first main area **1710**.

[0187] With reference to reference numeral **1770**, the electronic device **1700** may detect a user selection of the icon **1741**a corresponding to a map application among icons of the second sub-area **1740** and a swipe input to the second main area **1720**, execute the application in the second main area **1720**, and display a screen corresponding thereto. The electronic device **1700** may detect a user input for selecting one of contents related to the map application displayed on the second main area **1720**. In an embodiment, the input for selecting a content may include a long press or a double tap input. The content may be captured and an object **1721** corresponding to the content may be generated through the long press or the double tap input.

[0188] With reference to reference numeral **1780**, the electronic device **1700** may detect a swipe input of an object **1721** corresponding to a content selected by the user to the first main area **1710** in which a communication screen is displayed. The electronic device **1700** may move an object **1721** corresponding to a content selected by the user onto the first main area **1710** to overlap and display the object **1721** on a communication screen displayed on the first main area **1710**. When a swipe input of the user is released or when a swipe input of the user arrives on the first main area **1710**, the electronic device **1700** may transmit data of the content corresponding to the object **1721** to communicating another party. The content data may include an image of the content selected by the user, a web page in which the content is displayed, or a link address that can execute an application.

[0189] With reference to reference numeral **1790**, when transmission of data transmitted by the user is complete or when another party receives reception completion information of the data through a network, the electronic device **1700** may display a notification on the first main area **1710** that displays a communication screen. The notification may include a notification such as display of a random image at a periphery of a profile picture and a phone number of another party in the communication screen displayed on the first main area **1710**. In an embodiment, because transmission data are data related to a map, a map related icon **1711** may be displayed at a periphery of a profile picture and a phone number of another party.

[0190] FIG. **18** is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0191] With reference to FIG. **18**, an electronic device **1800** may divide and control a flexible display into a first main area **1810** and a second main area, which are main areas of a front surface and a rear surface thereof and a first sub-area and a second sub-area **1840**, which are sub-areas of a side surface thereof. In the second sub-area **1840**, a plurality of images (e.g., icon **1841**) corresponding to the plurality of applications or functions may be displayed.

[0192] In an embodiment, the electronic device **1800** may detect a user selection input on the second sub-area **1840** and a swipe input to an area, for example, the first main area **1810** in which a user views the electronic device **1800**. Whether the user views which area of the first main area **1810** and the second main area of the electronic device **1800** may be determined based on the user's holding position. Further, whether the user views which area of the first main area **1810** and the second main area of the electronic device **1800** may be determined by determining whether which mode of a preset left hand mode and right hand mode is activated.

[0193] The electronic device **1800**, having detected a user input may extend and move a size and position of an icon **1841** displayed in the second sub-area **1840** to an area in which the user's swipe input is released. In an embodiment, when the electronic device **1800** detects that the user uses the second main area thereof, the second sub-area **1840** extended and displayed to the first main area **1810** may be extended and displayed to the second main area in an opposite direction.

[0194] FIG. **19** is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0195] With reference to FIG. **19**, in a second sub-area **1940** of an electronic device **1900**, a plurality of images (e.g., icons **1941**) corresponding to a plurality of applications or functions may be displayed. The electronic device **1900** may display a plurality of icons **1941** with transparent, black and white, etc., in the second sub-area **1940**. When the electronic device **1900** detects an input such as a user's selection input and a swipe input, the electronic device **1900** may change and display a color of a selected icon **1941***a* among the icons **1941** displayed with transparent or black and white in order to represent user selection and activation.

[0196] In an embodiment, the electronic device **1900** may detect an input that selects one icon **1941***a* (e.g., SNS application) of a plurality of icons **1941** displayed with transparent and black and white in the second sub-area **1940** and a swipe input to a second main area **1920**. The electronic device **1900** may detect the user input to execute an application (e.g., SNS application) corresponding to the icon **1941***a* in the second main area **1920** and display a screen related to the application.

[0197] FIG. **20** is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0198] With reference to FIG. **20**, in a second sub-area **2040** of an electronic device **2000**, a plurality of images (e.g., icons) corresponding to a plurality of applications or functions may be displayed. The electronic device **2000** may detect a swipe input of the user in a direction from downward to upward on the second sub-area **2040**. When the electronic device **2000** detects a user input, the electronic device **2000** may control a plurality of images displayed on the second sub-area **2040** to disappear.

[0199] According to various embodiments of the present invention, when the electronic device **2000** detects a user input, the electronic device **2000** may enable a plurality of images displayed on the second sub-area **2040** to disappear and extend and display a content displayed on the first main area or the second main area to the second sub-area **2040**.

[0200] According to various embodiments of the present invention, an input detected on the second sub-area **2040** to enable a plurality of images to disappear is not limited to a swipe input from downward to upward. When the electronic device **2000** detects a gesture (e.g., a double tap) set by the user on the second sub-area **2040**, the electronic device **2000** may control the second sub-area **2040** to control a plurality of images to disappear.

[0201] According to various embodiments of the present invention, when a user input is detected in a plurality of images displayed in the second sub-area **2040** for a predetermined time, a display of the second sub-area **2040** may be terminated.

[0202] According to various embodiments of the present invention, the electronic device **2000** may detect that the user does not carry or view the electronic device **2000** through a motion sensor or an iris sensor thereof to control a plurality of images displayed in the second sub-area **2040** to disappear.

[0203] According to various embodiments of the present invention, when the electronic device **2000** detects a user input (e.g., a rubbing input, a tap input, drag from the top to the bottom, and drag from the bottom to the top) on a second sub-area **2040** in which a plurality of images are disappeared, the electronic device **2000** may display again a plurality of disappeared icons.

[0204] FIGS. **21A** to **21F** are diagrams illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0205] With reference to FIG. **21A**, an electronic device **2100** may display a moving picture screen in one area (e.g., a first main area **2110**) of the first main area **2110** and a second main area **2120**. The electronic device **2100** may display a reproduction bar representing a reproduction level of a moving picture screen displayed in at least one area (e.g., a second sub-area **2140**) of a first sub-area **2130** and the second sub-area **2140** connected to an area in which the moving picture screen is displayed.

[0206] In an embodiment, when a moving picture reproduction screen is displayed in the first main area **2110**, the electronic device **2100** the electronic device **2100** may detect a user input to a reproduction bar displayed on the second sub-area **2140**. The electronic device **2100** may control moving picture reproduction to a time corresponding to a user touch location on the reproduction bar.

[0207] According to various embodiments of the present invention, the electronic device **2100** may display a process of downloading a moving picture or a file in one area (e.g., the first main area **2110**) of the first main area **2110** and the second main area **2120**. The electronic device **2100** may display a progress bar representing a download level displayed in at least one area (e.g., the second sub-area **2140**) of the first sub-area **2130** and the second sub-area **2140** connected to an area in which the process is displayed.

[0208] With reference to FIG. **21B**, the electronic device **2100** may display a preview image corresponding to camera execution in one area (e.g., the first main area **2110**) of the first main area **2110** and the second main area **2120**. The electronic device **2100** may display a zoom bar that can control zoom-in or zoom-out of a preview image in at least one area (e.g., the second sub-area **2140**) of the first sub-area **2130** and the second sub-area **2140** connected to an area in which a preview image is displayed.

[0209] With reference to FIG. **21C**, the electronic device **2100** may display a health related application in one area (e.g., a first main area **2110**) of the first main area **2110** and

the second main area **2120**. The electronic device **2100** may display a state bar related to a health related application in at least one area (e.g., the second sub-area **2140**) of the first sub-area **2130** and the second sub-area **2140** connected to an area in which the health related application is displayed.

[0210] In an embodiment, the electronic device **2100** may display a pedometer application as a health related application in the first main area **2110**. The electronic device **2100** may display an image, for example, a bar graph representing the number of steps in at least one area (e.g., the second sub-area **2140**) of the first sub-area **2130** and the second sub-area **2140** connected to an area in which the pedometer application is displayed. In an embodiment, the electronic device **2100** may display a heart rate received from the electronic device **2100** or an external electronic devices **2100** interworked with the electronic device **2100**, and a moving path and moving speed of the electronic device **2100** on the second sub-area **2140**.

[0211] With reference to FIG. 21D, the electronic device **2100** may display an image (e.g., icon) related to an application or a function in one sub-area (e.g., the second sub-area **2140**) of sub-areas connected to at least one area of the first main area **2110** and the second main area **2120**. In an embodiment, the electronic device **2100** may display an icon **2141** related to a mail application in the second sub-area **2140**, and when a user selection is detected, the electronic device **2100** may display a screen related to a mail application corresponding to the icon **2141** in at least one area (e.g., the first main area **2110**) of the first main area **2110** and the second main area **2120**. When the electronic device **2100** detects a user selection of the icon **2141** of the email-related application displayed in the second sub-area **2140**, the electronic device **2100** may change and display a color in order to mean activation. In an embodiment, the electronic device **2100** may change and display a color of only a partial area of the icon **2141** to correspond to a ratio of unread emails to the entire emails of an email related application displayed in the second sub-area **2140**.

[0212] With reference to FIG. 21E, the electronic device **2100** may display an image (e.g., an icon **2142**) related to an application or a function in one sub-area (e.g., the second sub-area **2140**) of sub-areas connected to at least one area of the first main area **2110** and the second main area **2120**. In an embodiment, the electronic device **2100** may display an icon **2142** related to a communication application in the second sub-area **2140**, and when the electronic device **2100** detects a user selection, the electronic device **2100** may display a communication application corresponding to the icon **2142** on a screen related to at least one area (e.g., the first main area **2110**) of the first main area **2110** and the second main area **2120**. When the electronic device **2100** detects a user selection of the icon **2142** of the communi-cation related application displayed in the second sub-area **2140**, the electronic device **2100** may change and display a color thereof in order to mean activation. In an embodiment, the electronic device **2100** may change and display only a color of a partial area of the icon **2141** to correspond to a ratio of calls received during absence of a user to the entire reception and transmission of a communication related application displayed in the second sub-area **2140**.

[0213] With reference to FIG. 21F, the electronic device **2100** may display an image (e.g., an icon **2143**) related to an application or a function in one sub-area (e.g., the second sub-area **2140**) of sub-areas connected to at least one area of

a first main area **2110** and a second main area **2120**. In an embodiment, the electronic device **2100** may display an icon **2143** related to a bookmark or clipboard function in the second sub-area **2140**, and when the electronic device **2100** detects a user selection, the electronic device **2100** may set a bookmark or clipboard function corresponding to the icon **2143** to a bookmark among contents such as a plurality of applications or web pages in at least one area (e.g., the first main area **2110**) of the first main area **2110** and the second main area **2120** or may display contents stored at a clipboard in a list form.

[0214] In an embodiment, the electronic device **2100** may change a view format of contents that are set to a bookmark or stored at the clipboard. As shown in FIG. 21F, a view format of contents may be displayed in a thumbnail format.

[0215] According to various embodiments of the present invention, when the electronic device **2100** detects a user selection of the icon **2143** of a bookmark or clipboard function displayed in the second sub-area **2140**, the elec-tronic device **2100** may change and display a color thereof in order to represent activation.

[0216] According to various embodiments of the present invention, the electronic device **2100** may display contents formed with a plurality of pages such as a news screen or a book page on the first main area **2110** or the second main area **2120**. The electronic device **2100** may provide the effect of moving to a next page onto the first sub-area **2130** or the second sub-area **2140** connected to the displayed area. In an embodiment, in order to represent the effect of moving to a next page on the first sub-area **2130** or the second sub-area **2140**, the electronic device **2100** may display an image of a side surface of a book page and display a moving book page.

[0217] FIG. **22** is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0218] With reference to FIG. **22**, an electronic device **2200** may detect a screen conversion event. According to an embodiment, when contents are displayed in each of a first main area **2210** and a second main area **2220**, if the electronic device **2200** detects a user selection of a screen conversion icon **2215** displayed on the first main area **2210** or the second main area **2220**, the electronic device **2200** may detect a screen conversion event. A displayed location of the screen conversion icon **2215** may be changed accord-ing to detection of a user's holding position. When a user input is detected on the screen conversion icon **2215**, the electronic device **2200** may translucently overlap and dis-play on a content displayed in the first main area **2210** and a content displayed in the second main area **2220** and receive an input of a gesture that moves one of the contents toward the first main area **2210** from the user. The electronic device **2200** may display the selected content in the first main area **2210**. A non-selected content may be displayed in the second main area **2220**. Here, the first main area **2210** may be a user viewing area determined according to the user's holding position, and the second main area **2220** may be a non-viewing area of the user determined according to the user's holding position.

[0219] FIGS. **23**A and **23**B are diagrams illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0220] The electronic device may recognize at least one of peripheral external electronic devices and communicate

with the recognized electronic device. The electronic device may communicate with the external electronic device through WiFi, Bluetooth, iBeacon, RF, and NFC.

[0221] In an embodiment, with reference to FIGS. 23A and 23B, an external electronic device 2350 may be a television. With reference to reference numeral 2360, the electronic device 2300 may display a user interface that can control a function related to the external electronic device 2350 in a first sub-area 2330 in response to a connection in communication with the external electronic device 2350. The user interface may be a user interface that can adjust a channel or a volume of the television, which is the external electronic device 2350.

[0222] With reference to reference numeral 2370, an electronic device 2300 may detect a user gesture in a direction of one area (e.g., the first main area 2310) of main areas from a first sub-area 2330 in which a user interface is displayed. The electronic device 2300 may extend and display the first sub-area 2330 or a user interface displayed in the first sub-area 2330 to a partial area of a main area (e.g., a first main area 2310) in which detection of a user gesture is terminated.

[0223] In an embodiment, the electronic device may extend the first sub-area 2330 to the entire first main area 2310 according to an area in which detection of the user gesture is terminated.

[0224] With reference to reference numeral 2380 of FIG. 23B, the electronic device 2300 may detect a screen conversion event. According to an embodiment, a user interface 2311 that can control a function related to a television, which is the external electronic device 2350 may be displayed in the first main area 2310, and a home screen 2321 of the electronic device may be displayed in the second main area (not shown).

[0225] According to an embodiment, the first main area 2310 may be a user viewing area determined according to the user's holding position, and the second main area may be an area in which the user does not view and determined according to the user's holding position.

[0226] The electronic device 2300 may respond to detection of selection of the user's screen conversion icon 2315 and display a home screen 2321 of the electronic device 2300 displayed in the second main area in the first main area 2310, as shown in reference numeral 2390. Further, the user interface 2311 that can control a function related to the external electronic device 2350 displayed in the first main area 2310 may be displayed in the second main area.

[0227] FIG. 24 is a diagram illustrating an operation using a flexible display in an electronic device according to various embodiments of the present invention.

[0228] According to an embodiment, with reference to reference numeral 2480, an electronic device 2400 may have a payment function. When the electronic device 2400 is tagged to a device 2450 that performs a payment function, such as point of sales (POS) of a store or is positioned adjacent to the POS, the electronic device 2400 may display a user interface that can control a payment function in a first sub-area 2430.

[0229] With reference to reference numeral 2490, the electronic device may display a card that can pay in the first sub-area 2430. When the card is selected by the user, the electronic device 2400 may move and display the selected card to one (e.g., a first main area 2410) of main areas. Further, the electronic device 2400 may display a user interface that requests user authentication for payment. The user may be authenticated through a user interface that requests user authentication displayed in the first sub-area 2430.

[0230] In the foregoing description, a flexible display of an electronic device and a method of operating the same according to an embodiment of the present invention have been described through the present specification and drawings and specific terms have been used, but exemplary embodiments disclosed in this specification and drawings are suggested as a specific example to easily describe the present invention and to help understanding thereof and do not limit the scope of the present invention. That is, various embodiments based on the technical concept in the present invention will be apparent to those of ordinary skill in the art.

1. An electronic device comprising:
a flexible display including a first main area disposed on a front surface of the electronic device, a second main area disposed on a rear surface of the electronic device, and a sub-area connected and bent between the first main area and the second main area such that the sub-area comprises a curved surface in at least a portion thereof, wherein the first main area, the second main area, and the sub-area are integrally formed; and
at least one processor configured to control an electronic device function operation based on the flexible display, wherein the at least one processor is configured to control to:
display a plurality of icons, each of the icons respectively corresponding to an application in the sub-area,
identify, in response to detecting a first input for selecting at least one icon of the plurality of icons in the sub-area, an application corresponding to the selected at least one icon,
execute the application in response to detecting a release of a second input continuously inputted from an input of the sub-area, and
display an execution screen of the application in an area where the release of the second input is detected on the first main area and the second main area.

2. The electronic device of claim 1, wherein the first input and the second input include selection input for the at least one icon of the plurality icons and swipe input toward the first main area or the second main area.

3. The electronic device of claim 1, wherein the second input is continuous input from the first input.

4. The electronic device of claim 1, wherein the second input is swipe input toward the first main area or the second main area.

5. The electronic device of claim 1, wherein the at least one processor is further configured to:
attach a content of another application which is executed in the main area which is not executed the application to the application executed according to a release of the second input.

6. The electronic device of claim 1, wherein the at least one processor is further configured to:
detect a selection input to at least one content on a screen displayed in the main area,
detect a swipe input of the selected content to the other main area, and

display additional information related to the content in the other main area.

7. The electronic device of claim **6**, wherein the at least one processor is further configured to:

store the selected at least one content based on a long press selection input and the swipe input to the other main area.

8. The electronic device of claim **1**, wherein the at least one processor is further configured to:

detect a swipe input of a user interface displayed in the sub-area, and

extend the user interface to a partial or entire area of the first main area or the second area in which the swipe input is released according to an area in which detection of the swipe input released.

9. A method for controlling a flexible display of an electronic device, wherein the flexible display includes a first main area disposed on a front surface of the electronic device, a second main area disposed on a rear surface of the electronic device, and a sub-area extended from the first main area and the second main area, the method comprising:

displaying a plurality of icons, each of the icons respectively corresponding to an application in the sub-area;

identifying, in response to detecting a first input for selecting at least one icon of the plurality of icons in the sub-area, an application corresponding to the selected at least one icon;

executing the application in response to detecting a release of a second input continuously inputted from an input of the sub-area; and

displaying an execution screen of the application in an area where the release of the second input is detected on the first main area and the second main area.

10. The method of claim **9**, wherein the first main area, the second main area, and the sub-area are integrally formed.

11. The method of claim **9**, wherein the first input and the second input include selection input for the at least one icon

of the plurality icons and swipe input toward the first main area or the second main area.

12. The method of claim **9**, wherein the second input is continuous input from the first input.

13. The method of claim **9**, wherein the second input is swipe input toward the first main area or the second main area.

14. The method of claim **9**, wherein the sub-area is connected and bent between the first main area and the second main area.

15. The method of claim **9**, wherein the sub-area comprises a curved surface in at least a portion thereof.

16. The method of claim **9**, further comprising:

attaching a content of another application which is executed in the main area which is not executed the application to the application executed according to a release of the second input.

17. The method of claim **9**, further comprising

detecting a selection input to at least one content on a screen displayed in the main area;

detecting a swipe input of the selected content to the other main area; and

displaying additional information related to the content in the other main area.

18. The method of claim **17**, further comprising:

storing the selected at least one content based on a long press selection input and the swipe input to the other main area.

19. The method of claim **9**, further comprising:

detecting a swipe input of a user interface displayed in the sub-area; and

extending the user interface to a partial or entire area of the first main area or the second area in which the swipe input is released according to an area in which detection of the swipe input released.

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