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### **ELECTRONIC DEVICE, AND VIDEO PLAYBACK METHOD BASED ON EXTENSION OR REDUCTION OF FLEXIBLE DISPLAY IN ELECTRONIC DEVICE**

#### **Abstract**

An electronic device comprises: a first housing; a second housing accommodating at least a part of the first housing, and connected to the first housing to enable sliding of the first housing; a flexible display connected to the first housing; a driving unit for moving the first housing and the flexible display in the extension direction or the reduction direction; a memory; and a processor, wherein the memory stores instructions configured to, when executed by the processor, cause the electronic device to: identify one from among a reduced state, a moving state and an extended state of the flexible display based on a video clip playback event, and control the flexible display such that, in the reduced state, a first image included in the video clip is displayed in a display area of the reduced state, in the moving state, video is displayed in the display area of the moving state using at least a part of the video clip, and, in the extended state, a second image included in the video clip is displayed in the display area of the extended state.

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## Background/Summary

### CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of International Application No. PCT/KR2023/018341 designating the United States, filed on Nov. 15, 2023, in the Korean Intellectual Property Receiving Office and claiming priority to Korean Patent Application Nos. 10-2022-0164936, filed on Nov. 30, 2022, and 10-2022-0179565, filed on Dec. 20, 2022, in the Korean Intellectual Property Office, the disclosures of each of which are incorporated by reference herein in their entireties.

### BACKGROUND

#### Field

[0002] The disclosure relates to an electronic device including a flexible display.

#### Description of Related Art

[0003] As electronic, information, and communication technologies have advanced, various functions are being integrated into a single portable communication or electronic device. For example, a smartphone includes a communication function as well as functions of a sound playback device, an imaging device, or an electronic notebook, and various functions can be implemented in the smartphone through the installation of additional applications.

[0004] As the use of personal or portable communication devices such as smartphones becomes more common, user demand for portability and ease of use has increased. For example, a touchscreen display can serve as a screen, for example, an output device that outputs visual information, while also providing a virtual keypad that replaces a mechanical input device (e.g., a button-type input device). This has enabled portable communication devices or electronic devices to become compact while offering the same or even better usability (e.g., larger screens).

Furthermore, the commercialization of flexible displays, such as foldable or rollable displays, is expected to further improve the portability and ease of use of electronic devices.

[0005] An image or video set on a lock screen or a home background screen in electronic devices may be displayed at a predetermined video size and/or speed. In an electronic device that include a flexible display, the flexible display can slide in or out (e.g., slide movement) to transition from a retracted state to an extended state or from an extended state to a retracted state, thereby changing the size of the display area.

### SUMMARY

[0006] According to an example embodiment of the disclosure, an electronic device may include: a first housing; a second housing configured to accommodate at least a portion of the first housing and connected to the first housing to enable a sliding movement of the first housing; a flexible display connected to the first housing; a driving unit including a motor configured to move the first

housing and the flexible display in an extension direction or a retraction direction; and at least one processor, comprising processing circuitry, wherein at least one processor, individually and/or collectively, may be configured to cause the electronic device to: identify one state from among a retracted state, a moving state, and an extended state of the flexible display, based on a video clip playback event; in the retracted state of the flexible display, display, in a display area of the retracted state, a first image included in a video' in the moving state of the flexible display, display, in a display area of the moving state, a video using at least a portion of the video clip; and in the extended state of the flexible display, control the flexible display to display, in a display area of the extended state, a second image included in the video clip.

[0007] According to an example embodiment of the disclosure, a method for video playback based on extension or retraction of a flexible display in an electronic device may include: identifying one state from among a retracted state, a moving state, and an extended state of a flexible display, based on a video clip playback event; in the retracted state, displaying a first image included in a video clip on the flexible display of the retracted state; in the moving state, displaying a video on the flexible display of the moving state using at least a portion of the video clip; and in the extended state, displaying a second image included in the video clip on the flexible display of the extended state.

[0008] According to an example embodiment of the disclosure, in a non-transitory computer-readable storage medium storing instructions, the instructions are configured to, when executed by at least one processor, comprising processing circuitry, individually and/or collectively, of an electronic device, cause the electronic device to perform at least one operation, the at least one operation including: identifying one state from among a retracted state, a moving state, and an extended state of a flexible display, based on a video clip playback event; in the retracted state, displaying a first image included in a video clip on the flexible display of the retracted state; in the moving state, displaying a video on the flexible display of the moving state using at least a portion of the video clip; and in the extended state, displaying a second image included in the video clip on the flexible display of the extended state.

[0009] According to various example embodiments of the disclosure, a more personalized home background screen or lock screen video display may be possible by adjusting and displaying the size of a video on a home background screen or a lock screen in conjunction with the extended or retracted state of the flexible display in the electronic device.

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## Description

### BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The above and other aspects, features and advantages of certain embodiments of the present disclosure will be more apparent from the following detailed description, taken in conjunction with the accompanying drawings, in which:

[0011] FIG. 1 is a block diagram illustrating an example electronic device in a network environment according to various embodiments;

[0012] FIG. 2A is a diagram illustrating a state in which the display area of a flexible display is accommodated in a housing according to various embodiments;

[0013] FIG. 2B is a diagram illustrating a state in which the display area of a flexible display is visible to the outside of a housing according to various embodiments;

[0014] FIG. 3 is a diagram illustrating examples of the retracted and extended states of a flexible display of an electronic device according to various embodiments;

[0015] FIG. 4 is a block diagram illustrating an example configuration of an electronic device according to various embodiments;

[0016] FIG. 5 is a flowchart illustrating an example video clip playback operation based on the

extension or retraction of a flexible display in an electronic device according to various embodiments;

[0017] FIG. **6** is a diagram illustrating example screens displayed on a display when an electronic device is in a retracted state, a moving state, and an extended state according to various embodiments;

[0018] FIG. **7** is a flowchart illustrating example video clip generation in an electronic device according to various embodiments;

[0019] FIG. **8A** is a diagram illustrating image frames of a video according to various embodiments;

[0020] FIG. **8B** is a diagram illustrating an example of setting the size and area of at least one image between a first image corresponding to a retracted state and a second image corresponding to an extended state according to various embodiments;

[0021] FIG. **9** is a flowchart illustrating an example operation of generating a video clip based on the number of images according to frame criteria according to various embodiments;

[0022] FIG. **10** is a flowchart illustrating an example operation of generating a video clip based on a display's movement time according to time criteria according to various embodiments;

[0023] FIG. **11** is a flowchart illustrating an example operation of generating a video clip based on the number of images and a display's movement time according to hybrid criteria according to various embodiments;

[0024] FIG. **12A** is a diagram illustrating the length of movement based on the extension of a display according to various embodiments;

[0025] FIG. **12B** is a diagram illustrating lines connecting vertices of a first area in a first image to respective vertices of a second area in a second image according to various embodiments;

[0026] FIG. **12C** is a diagram illustrating the size and area of each of at least one image between a first image and a second image according to various embodiments;

[0027] FIG. **13** is a flowchart illustrating an example video clip playback operation when a display transitions from a retracted state to an extended state according to various embodiments;

[0028] FIG. **14** is a flowchart illustrating an example video clip playback operation when a display transitions from an extended state to a retracted state according to various embodiments;

[0029] FIG. **15** is a diagram illustrating an example screen on which a video clip is played on a lock screen according to various embodiments;

[0030] FIG. **16** is a diagram illustrating an example screen on which a video clip is played on a home background screen according to various embodiments;

[0031] FIG. **17** is a diagram illustrating example screens for selecting a video and an editing method during video clip generation according to various embodiments;

[0032] FIG. **18A** is a diagram illustrating an example screen displayed when generating a video clip based on the moving time of a display according to time criteria according to various embodiments;

[0033] FIG. **18B** is a diagram illustrating an example screen displayed when generating a video clip based on a user input according to frame criteria according to various embodiments; and

[0034] FIG. **18C** is a diagram illustrating an example screen displayed during video clip generation based on hybrid criteria according to various embodiments.

[0035] In describing the drawings, the same or similar reference numerals may be used for the same or similar components.

#### DETAILED DESCRIPTION

[0036] The terms used herein are used simply to describe various example embodiments and are not intended to limit the scope of the disclosure. The singular expressions may include plural expressions unless the context clearly indicates otherwise. All terms used herein, including technical or scientific terms, may have the same meaning as generally understood by those skilled in the art of the disclosure. Terms defined in commonly used dictionaries may be interpreted as

having the same or similar meaning as the meaning the terms have in the context of the related art, and unless explicitly defined herein, the terms are not interpreted as having an ideal or excessively formal meaning. In some cases, even terms defined herein are not to be interpreted as excluding embodiments of the disclosure.

[0037] FIG. 1 is a block diagram illustrating an example electronic device **101** in a network environment **100** according to various embodiments.

[0038] Referring to FIG. 1, the electronic device **101** in the network environment **100** may communicate with an electronic device **102** via a first network **198** (e.g., a short-range wireless communication network), or at least one of an electronic device **104** or a server **108** via a second network **199** (e.g., a long-range wireless communication network). According to an embodiment, the electronic device **101** may communicate with the electronic device **104** via the server **108**. According to an embodiment, the electronic device **101** may include a processor **120**, memory **130**, an input module **150**, a sound output module **155**, a display module **160**, an audio module **170**, a sensor module **176**, an interface **177**, a connecting terminal **178**, a haptic module **179**, a camera module **180**, a power management module **188**, a battery **189**, a communication module **190**, a subscriber identification module (SIM) **196**, or an antenna module **197**. In various embodiments, at least one of the components (e.g., the connecting terminal **178**) may be omitted from the electronic device **101**, or one or more other components may be added in the electronic device **101**. In various embodiments, some of the components (e.g., the sensor module **176**, the camera module **180**, or the antenna module **197**) may be implemented as a single component (e.g., the display module **160**).

[0039] The processor **120** may execute, for example, software (e.g., a program **140**) to control at least one other component (e.g., a hardware or software component) of the electronic device **101** coupled with the processor **120**, and may perform various data processing or computation. According to an embodiment, as at least part of the data processing or computation, the processor **120** may store a command or data received from another component (e.g., the sensor module **176** or the communication module **190**) in volatile memory **132**, process the command or the data stored in the volatile memory **132**, and store resulting data in non-volatile memory **134**. According to an embodiment, the processor **120** may include a main processor **121** (e.g., a central processing unit (CPU) or an application processor (AP)), or an auxiliary processor **123** (e.g., a graphics processing unit (GPU), a neural processing unit (NPU), an image signal processor (ISP), a sensor hub processor, or a communication processor (CP)) that is operable independently from, or in conjunction with, the main processor **121**. For example, when the electronic device **101** includes the main processor **121** and the auxiliary processor **123**, the auxiliary processor **123** may be adapted to consume less power than the main processor **121**, or to be specific to a specified function. The auxiliary processor **123** may be implemented as separate from, or as part of the main processor **121**. Thus, the processor **120** may include various processing circuitry and/or multiple processors. For example, as used herein, including the claims, the term “processor” may include various processing circuitry, including at least one processor, wherein one or more of at least one processor, individually and/or collectively in a distributed manner, may be configured to perform various functions described herein. As used herein, when “a processor”, “at least one processor”, and “one or more processors” are described as being configured to perform numerous functions, these terms cover situations, for example and without limitation, in which one processor performs some of recited functions and another processor(s) performs other of recited functions, and also situations in which a single processor may perform all recited functions. Additionally, the at least one processor may include a combination of processors performing various of the recited/disclosed functions, e.g., in a distributed manner. At least one processor may execute program instructions to achieve or perform various functions.

[0040] The auxiliary processor **123** may control at least some of functions or states related to at least one component (e.g., the display module **160**, the sensor module **176**, or the communication module **190**) among the components of the electronic device **101**, instead of the main processor

**121** while the main processor **121** is in an inactive (e.g., sleep) state, or together with the main processor **121** while the main processor **121** is in an active state (e.g., executing an application). According to an embodiment, the auxiliary processor **123** (e.g., an image signal processor or a communication processor) may be implemented as part of another component (e.g., the camera module **180** or the communication module **190**) functionally related to the auxiliary processor **123**. According to an embodiment, the auxiliary processor **123** (e.g., the neural processing unit) may include a hardware structure specified for artificial intelligence model processing. An artificial intelligence model may be generated by machine learning. Such learning may be performed, e.g., by the electronic device **101** where the artificial intelligence is performed or via a separate server (e.g., the server **108**). Learning algorithms may include, but are not limited to, e.g., supervised learning, unsupervised learning, semi-supervised learning, or reinforcement learning. The artificial intelligence model may include a plurality of artificial neural network layers. The artificial neural network may be a deep neural network (DNN), a convolutional neural network (CNN), a recurrent neural network (RNN), a restricted Boltzmann machine (RBM), a deep belief network (DBN), a bidirectional recurrent deep neural network (BRDNN), deep Q-network or a combination of two or more thereof but is not limited thereto. The artificial intelligence model may, additionally or alternatively, include a software structure other than the hardware structure.

[0041] The memory **130** may store various data used by at least one component (e.g., the processor **120** or the sensor module **176**) of the electronic device **101**. The various data may include, for example, software (e.g., the program **140**) and input data or output data for a command related thereto. The memory **130** may include the volatile memory **132** or the non-volatile memory **134**.

[0042] The program **140** may be stored in the memory **130** as software, and may include, for example, an operating system (OS) **142**, middleware **144**, or an application **146**.

[0043] The input module **150** may receive a command or data to be used by another component (e.g., the processor **120**) of the electronic device **101**, from the outside (e.g., a user) of the electronic device **101**. The input module **150** may include, for example, a microphone, a mouse, a keyboard, a key (e.g., a button), or a digital pen (e.g., a stylus pen).

[0044] The sound output module **155** may output sound signals to the outside of the electronic device **101**. The sound output module **155** may include, for example, a speaker or a receiver. The speaker may be used for general purposes, such as playing multimedia or playing record. The receiver may be used for receiving incoming calls. According to an embodiment, the receiver may be implemented as separate from, or as part of the speaker.

[0045] The display module **160** may visually provide information to the outside (e.g., a user) of the electronic device **101**. The display module **160** may include, for example, a display, a hologram device, or a projector and control circuitry to control a corresponding one of the display, hologram device, and projector. According to an embodiment, the display module **160** may include a touch sensor adapted to detect a touch, or a pressure sensor adapted to measure the intensity of force incurred by the touch.

[0046] The audio module **170** may convert a sound into an electrical signal and vice versa. According to an embodiment, the audio module **170** may obtain the sound via the input module **150**, or output the sound via the sound output module **155** or a headphone of an external electronic device (e.g., an electronic device **102**) directly (e.g., wiredly) or wirelessly coupled with the electronic device **101**.

[0047] The sensor module **176** may detect an operational state (e.g., power or temperature) of the electronic device **101** or an environmental state (e.g., a state of a user) external to the electronic device **101**, and then generate an electrical signal or data value corresponding to the detected state. According to an embodiment, the sensor module **176** may include, for example, a gesture sensor, a gyro sensor, an atmospheric pressure sensor, a magnetic sensor, an acceleration sensor, a grip sensor, a proximity sensor, a color sensor, an infrared (IR) sensor, a biometric sensor, a temperature sensor, a humidity sensor, or an illuminance sensor.

[0048] The interface **177** may support one or more specified protocols to be used for the electronic device **101** to be coupled with the external electronic device (e.g., the electronic device **102**) directly (e.g., wiredly) or wirelessly. According to an embodiment, the interface **177** may include, for example, a high definition multimedia interface (HDMI), a universal serial bus (USB) interface, a secure digital (SD) card interface, or an audio interface.

[0049] A connecting terminal **178** may include a connector via which the electronic device **101** may be physically connected with the external electronic device (e.g., the electronic device **102**). According to an embodiment, the connecting terminal **178** may include, for example, a HDMI connector, a USB connector, a SD card connector, or an audio connector (e.g., a headphone connector).

[0050] The haptic module **179** may convert an electrical signal into a mechanical stimulus (e.g., a vibration or a movement) or electrical stimulus which may be recognized by a user via his tactile sensation or kinesthetic sensation. According to an embodiment, the haptic module **179** may include, for example, a motor, a piezoelectric element, or an electric stimulator.

[0051] The camera module **180** may capture a still image or moving images. According to an embodiment, the camera module **180** may include one or more lenses, image sensors, image signal processors, or flashes.

[0052] The power management module **188** may manage power supplied to the electronic device **101**. According to an embodiment, the power management module **188** may be implemented as at least part of, for example, a power management integrated circuit (PMIC).

[0053] The battery **189** may supply power to at least one component of the electronic device **101**. According to an embodiment, the battery **189** may include, for example, a primary cell which is not rechargeable, a secondary cell which is rechargeable, or a fuel cell.

[0054] The communication module **190** may support establishing a direct (e.g., wired) communication channel or a wireless communication channel between the electronic device **101** and the external electronic device (e.g., the electronic device **102**, the electronic device **104**, or the server **108**) and performing communication via the established communication channel. The communication module **190** may include one or more communication processors that are operable independently from the processor **120** (e.g., the application processor (AP)) and supports a direct (e.g., wired) communication or a wireless communication. According to an embodiment, the communication module **190** may include a wireless communication module **192** (e.g., a cellular communication module, a short-range wireless communication module, or a global navigation satellite system (GNSS) communication module) or a wired communication module **194** (e.g., a local area network (LAN) communication module or a power line communication (PLC) module). A corresponding one of these communication modules may communicate with the external electronic device via the first network **198** (e.g., a short-range communication network, such as Bluetooth™, wireless-fidelity (Wi-Fi) direct, or infrared data association (IrDA)) or the second network **199** (e.g., a long-range communication network, such as a legacy cellular network, a 5G network, a next-generation communication network, the Internet, or a computer network (e.g., LAN or wide area network (WAN))). These various types of communication modules may be implemented as a single component (e.g., a single chip), or may be implemented as multi components (e.g., multi chips) separate from each other. The wireless communication module **192** may identify and authenticate the electronic device **101** in a communication network, such as the first network **198** or the second network **199**, using subscriber information (e.g., international mobile subscriber identity (IMSI)) stored in the subscriber identification module **196**.

[0055] The wireless communication module **192** may support a 5G network, after a 4G network, and next-generation communication technology, e.g., new radio (NR) access technology. The NR access technology may support enhanced mobile broadband (eMBB), massive machine type communications (mMTC), or ultra-reliable and low-latency communications (URLLC). The wireless communication module **192** may support a high-frequency band (e.g., the mmWave band)

to achieve, e.g., a high data transmission rate. The wireless communication module **192** may support various technologies for securing performance on a high-frequency band, such as, e.g., beamforming, massive multiple-input and multiple-output (massive MIMO), full dimensional MIMO (FD-MIMO), array antenna, analog beam-forming, or large scale antenna. The wireless communication module **192** may support various requirements specified in the electronic device **101**, an external electronic device (e.g., the electronic device **104**), or a network system (e.g., the second network **199**). According to an embodiment, the wireless communication module **192** may support a peak data rate (e.g., 20 Gbps or more) for implementing eMBB, loss coverage (e.g., 164 dB or less) for implementing mMTC, or U-plane latency (e.g., 0.5 ms or less for each of downlink (DL) and uplink (UL), or a round trip of 1 ms or less) for implementing URLLC.

[0056] The antenna module **197** may transmit or receive a signal or power to or from the outside (e.g., the external electronic device) of the electronic device **101**. According to an embodiment, the antenna module **197** may include an antenna including a radiating element including a conductive material or a conductive pattern formed in or on a substrate (e.g., a printed circuit board (PCB)). According to an embodiment, the antenna module **197** may include a plurality of antennas (e.g., array antennas). In such a case, at least one antenna appropriate for a communication scheme used in the communication network, such as the first network **198** or the second network **199**, may be selected, for example, by the communication module **190** (e.g., the wireless communication module **192**) from the plurality of antennas. The signal or the power may then be transmitted or received between the communication module **190** and the external electronic device via the selected at least one antenna. According to an embodiment, another component (e.g., a radio frequency integrated circuit (RFIC)) other than the radiating element may be additionally formed as part of the antenna module **197**.

[0057] According to various embodiments, the antenna module **197** may form a mmWave antenna module. According to an embodiment, the mmWave antenna module may include a printed circuit board, a RFIC disposed on a first surface (e.g., the bottom surface) of the printed circuit board, or adjacent to the first surface and capable of supporting a designated high-frequency band (e.g., the mmWave band), and a plurality of antennas (e.g., array antennas) disposed on a second surface (e.g., the top or a side surface) of the printed circuit board, or adjacent to the second surface and capable of transmitting or receiving signals of the designated high-frequency band.

[0058] At least some of the above-described components may be coupled mutually and communicate signals (e.g., commands or data) therebetween via an inter-peripheral communication scheme (e.g., a bus, general purpose input and output (GPIO), serial peripheral interface (SPI), or mobile industry processor interface (MIPI)).

[0059] According to an embodiment, commands or data may be transmitted or received between the electronic device **101** and the external electronic device **104** via the server **108** coupled with the second network **199**. Each of the electronic devices **102** or **104** may be a device of a same type as, or a different type, from the electronic device **101**. According to an embodiment, all or some of operations to be executed at the electronic device **101** may be executed at one or more of the external electronic devices **102**, **104**, or **108**. For example, if the electronic device **101** should perform a function or a service automatically, or in response to a request from a user or another device, the electronic device **101**, instead of, or in addition to, executing the function or the service, may request the one or more external electronic devices to perform at least part of the function or the service. The one or more external electronic devices receiving the request may perform the at least part of the function or the service requested, or an additional function or an additional service related to the request, and transfer an outcome of the performing to the electronic device **101**. The electronic device **101** may provide the outcome, with or without further processing of the outcome, as at least part of a reply to the request. To that end, a cloud computing, distributed computing, mobile edge computing (MEC), or client-server computing technology may be used, for example. The electronic device **101** may provide ultra low-latency services using, e.g., distributed computing



or mobile edge computing. In an embodiment, the external electronic device **104** may include an internet-of-things (IoT) device. The server **108** may be an intelligent server using machine learning and/or a neural network. According to an embodiment, the external electronic device **104** or the server **108** may be included in the second network **199**. The electronic device **101** may be applied to intelligent services (e.g., smart home, smart city, smart car, or healthcare) based on 5G communication technology or IoT-related technology.

[0060] FIG. 2A is a diagram illustrating a state in which the display area of a flexible display is accommodated in a housing according to various embodiments. FIG. 2B illustrates a state in which the display area of a flexible display is visible to the outside of a housing according to various embodiments.

[0061] FIGS. 2A and 2B illustrate a structure in which a flexible display **203** extends to the right when viewed from the front of an electronic device **101**. The state illustrated in FIG. 2A may be defined as a first housing **201** being closed with respect to a second housing **202**, and the state illustrated in FIG. 2B may be defined as the first housing **201** being open with respect to the second housing **202**. Depending on the situation, the “closed state” or “open state” may be defined as a state in which the electronic device is closed or opened.

[0062] Referring to FIGS. 2A and 2B, the electronic device **101** may include housings **201** and **202**. The housings **201** and **202** may include a second housing **202** and a first housing **201** disposed movably relative to the second housing **202**. In various embodiments, the electronic device **101** may be interpreted as having a structure in which the second housing **202** is disposed to be slidable on the first housing **201**. According to an embodiment, the first housing **201** may be disposed to reciprocate a certain distance relative to the second housing **202** in an illustrated direction, for example, in a direction indicated by arrow {circle around (1)}. The configuration of the electronic device **101** in FIG. 2A and FIG. 2B may be fully or partially identical to the configuration of the electronic device **101** in FIG. 1.

[0063] According to an embodiment, the first housing **201** may be referred to, for example, as a first structure, a slide portion, or a slide housing, and may be disposed to be reciprocable on the second housing **202**. According to an embodiment, the first housing **201** may accommodate various electrical and electronic components, such as a circuit board or a battery. The second housing **202** may be referred to, for example, as a second structure, a main portion, or a main housing, and may guide the movement of the first housing **201**. A portion (e.g., a first display area **A1**) of the display **203** may be seated in the first housing **201**. According to an embodiment, the other portion (e.g., a second display area **A2**) of the display **203** may be accommodated in the second housing **202** (e.g., a slide-in operation) or visible to the outside of the second housing **202** (e.g., a slide-out operation) as the first housing **201** moves (e.g., slides) relative to the second housing **202**. According to an embodiment, a motor, a speaker, a shim socket, and/or a sub-circuit board electrically connected to a main circuit board may be disposed in the first housing **201**. The main circuit board on which electrical components such as an application processor (AP) and a communication processor (CP) are mounted may be disposed in the second housing **202**.

[0064] According to an embodiment, the first housing **201** may include a first plate **211** (e.g., a slide plate). The first plate **211** may include a first face (e.g., a first face **F1** in FIG. 2B) forming at least a portion of the first plate **211** and a second face **F2** facing in a direction opposite to that of the first face **F1**. According to an embodiment, the first plate **211** may support at least a portion (e.g., the first display area **A1**) of the display **203**. According to an embodiment, the first housing **201** may include the first plate **211**, a (1-1)th sidewall **211a** extending from the first plate **211**, a (1-2)th sidewall **211b** extending from the (1-1)th sidewall **211a** and the first plate **211**, and a (1-3)th sidewall **211c** extending from the (1-1)th sidewall **211a** and the first plate **211** and parallel to the (1-2)th sidewall **211b**.

[0065] According to an embodiment, the second housing **202** may include a second plate **221** (a main case), a (2-1)th sidewall **221a** extending from the second plate **221**, a (2-2)th sidewall **221b**

extending from the (2-1)th sidewall **221a** and the second plate **221**, and a (2-3)th sidewall **221c** extending from the (2-1)th sidewall **221a** and the second plate **221** and parallel to the (2-2)th sidewall **221b**. According to an embodiment, the (2-2)th sidewall **221b** and the (2-3)th sidewall **221c** may be formed perpendicular to the (2-1)th sidewall **221a**. According to an embodiment, the second plate **221**, the (2-1)th sidewall **221a**, the (2-2)th sidewall **221b**, and the (2-3)th sidewall **221c** may be formed with one side (e.g., a front face) opened to accommodate (or surround) at least a portion of the first housing **201**. For example, the first housing **201** may be coupled to the second housing **202** in a at least partially surrounded state, and may slide a direction parallel to the first face **F1** or the second face **F2**, for example, in the direction of arrow {circle around (1)}, while being guided by the second housing **202**. According to an embodiment, the second plate **221**, the (2-1)th sidewall **221a**, the (2-2)th sidewall **221b**, and/or the (2-3)th sidewall **221c** may be integrally formed. According to an embodiment, the second plate **221**, the (2-1)th sidewall **221a**, the (2-2)th sidewall **221b**, and/or the (2-3)th sidewall **221c** may be formed as a separate housing and may be combined or assembled.

[0066] According to an embodiment, the second plate **221** and/or the (2-1)th sidewall **221a** may cover at least a portion of the flexible display **203**. For example, at least a portion of the flexible display **203** may be accommodated in the second housing **202**, and the second plate **221** and/or the (2-1)th sidewall **221a** may cover a portion of the flexible display **203** accommodated in the second housing **202**.

[0067] According to various embodiments, the first housing **201** is moveable in an open state and a closed state relative to the second housing **202** in a first direction (e.g., the direction of {circle around (1)}) parallel to the (2-2)th sidewall **221b** or the (2-3)th sidewall **221c**, and the first housing **201** may move to be positioned at a first distance from the (2-1)th sidewall **221a** in the closed state and positioned at a second distance from the (2-1)th sidewall **221a**, which is longer than the first distance, in the open state. In various embodiments, in the closed state, the first housing **201** may surround a portion of the (2-1)th sidewall **221a**.

[0068] According to an embodiment, the electronic device **101** may include a display **203**, a key input device **241**, a connector hole **243**, an audio module (not shown), or a camera module (**249b**). Although not shown, the electronic device **101** may further an indicator (e.g., an LED device) or various sensors. The configurations of the display **203**, the audio module (not shown), and the camera module (**249b**) in FIG. 2A and FIG. 2B may be fully or partially identical to the configurations of the display module **160**, the audio module **170**, and the camera module **180** in FIG. 1.

[0069] According to various embodiments, the display **203** may include a first display area **A1** and a second display area **A2**. According to an embodiment, the first display area **A1** may be disposed on the first housing **201**. For example, the first display area **A1** may extend substantially across at least a portion of the first face **F1** and may be disposed on the first face **F1**. The second display area **A2** may extend from the first display area **A1** and may be inserted or accommodated into the second housing **202** (e.g., a structure) or visible to the outside of the second housing **202**, depending on sliding of the first housing **201**.

[0070] According to various embodiments, the second display area **A2** may move while being substantially guided by one area of the first housing **201**, to be accommodated into the second housing **202** or into a space formed between the first housing **201** and the second housing **202**, or visible to the outside. According to an embodiment, the second display area **A2** may be moved based on sliding of the first housing **201** in the first direction (e.g., the direction indicated by arrow {circle around (1)}). For example, during the sliding of the first housing **201**, a portion of the second display area **A2** may be deformed into a curved surface shape at a location corresponding to a curved surface of the first housing **201**.

[0071] According to various embodiments, when viewed from above the first plate **211** (e.g., the slide plate), when the first housing **201** moves from a closed state to an open state, the second

display area **A2** may gradually be made visible to the outside of the second housing **202**, thereby substantially forming a planar surface with the first display area **A1**. The display **203** may be coupled with or disposed adjacent to a touch sensing circuit, a pressure sensor capable of measuring the intensity (pressure) of a touch, and/or a digitizer for detecting a magnetic stylus pen. In an embodiment, the second display area **A2** may be at least partially accommodated in the second housing **202**, and even in the state (e.g., the closed state) shown in FIG. 2A, a portion of the second display area **A2** may be visible to the outside. According to an embodiment, regardless of the closed or open state, the visible portion of the second display area **A2** may be positioned on a portion of the first housing, and the portion of the second display area **A2** may maintain a curved surface shape.

[0072] According to an embodiment, the electronic device **101** may include at least one hinge structure (not shown). The hinge structure may connect the first housing **201** to the second housing **202**. For example, the hinge structure may be connected to the first plate **211** and the second plate **221**. According to an embodiment, the hinge structure may transmit a driving force to the first housing **201** to guide the sliding of the first housing **201**. For example, the hinge structure may include an elastic material (e.g., a spring) and may provide an elastic force in a first direction (e.g., the direction of {circle around (1)} in FIG. 2B) based on the sliding of the first housing **201**. According to an embodiment, the hinge structure may be excluded.

[0073] According to an embodiment, the key input device **241** may be positioned in one area of the first housing **201**. Depending on appearance and use, the electronic device **101** may be designed to omit the illustrated key input device **241** or to include additional key input device(s). According to an embodiment, the electronic device **101** may include a key input device not shown, such as a home key button, or a touch pad disposed around the home key button. According to an embodiment, at least a portion of the key input device **241** may be disposed on the (2-1)th sidewall **221a**, (2-2)th sidewall **221b**, or (2-3)th sidewall **221c** of the second housing **202**.

[0074] According to various embodiments, the connector hole **243** may be omitted according to various embodiments, and may accommodate a connector (e.g., a USB connector) for transmitting and receiving power and/or data to and from an external electronic device. Although not shown, the electronic device **101** may include multiple connector holes **243**, and some of the multiple connector holes **243** may function as connector holes for transmitting and receiving audio signals to and from an external electronic device. In the illustrated embodiment, the connector hole **243** is disposed on the second-third sidewall **221c**, but the disclosure is not limited thereto, and the connector hole **243** or a connector hole not shown may be disposed on the (2-1)th sidewall **221a** or the (2-2)th sidewall **221b**.

[0075] According to an embodiment, the first housing **201** may include the first plate **211** and a slide cover (not shown). The first plate **211** and the slide cover (not shown) may be mounted to (e.g., at least partially connected to) the second housing **202**, and may linearly reciprocate on the second housing **202** in one direction (e.g., in the direction of arrow {circle around (1)} in FIG. 2B). According to an embodiment, the first plate **211** may support the display **203**. For example, the first plate **211** may include a first face **F1**, and the first display area **A1** of the display **203** may be substantially positioned on the first face **F1** and maintained in a flat plate shape. The slide cover may protect the display **203** positioned on the first plate **211**. For example, at least a portion of the display **203** may be positioned between the first plate **211** and the slide cover. According to an embodiment, the first plate **211** and the slide cover may be formed of a metallic material and/or a non-metallic (e.g., polymer) material. According to an embodiment, the first plate **211** may accommodate at least some of the components of the electronic device **101** (e.g., the battery **189** in FIG. 1, a motor (not shown), and a rack (not shown)). According to various embodiments, the second housing **202** may accommodate at least one or multiple substrates. For example, the second housing **202** may include a circuit board (or a main circuit board) (not shown), wherein the main circuit board may be equipped with a processor, memory, and/or an interface. The processor may

include one or more of, for example, a central processing unit, an application processor, a graphics processing unit, an image signal processor, a sensor hub processor, or a communications processor. According to various embodiments, the circuit board may include a flexible printed circuit board type radio frequency cable (FRC). For example, the circuit board may be disposed on at least a portion of the second plate **221** and may be electrically connected to an antenna module (e.g., the antenna module **197** in FIG. **1**) and a communication module (e.g., the communication module **190** in FIG. **1**).

[0076] According to an embodiment, the memory may include, for example, volatile memory or non-volatile memory.

[0077] According to an embodiment, the interface may include, for example, a high-definition multimedia interface (HDMI), a universal serial bus (USB) interface, an SD card interface, and/or an audio interface. The interface may electrically or physically connect the electronic device **101** to an external electronic device, for example, and may include a USB connector, an SD card/MMC connector, or an audio connector.

[0078] According to an embodiment, the electronic device **101** may further include a separate sub-circuit board spaced apart from the circuit board within the second housing **202**. The subcircuit board may be electrically connected to electrical components, such as a battery or speakers and/or a shim socket, disposed at an end area of the electronic device **101**, to transmit signals and power.

[0079] According to an embodiment, the battery is a device for supplying power to at least one component of the electronic device **101** and may include, for example, a non-rechargeable primary cell, a rechargeable secondary cell, or a fuel cell. At least a portion of the battery may be substantially coplanar with, for example, a circuit board. The battery may be integrally disposed within the electronic device **101**, or may be removably disposed in the electronic device **101**.

[0080] According to an embodiment, the electronic device **101** may include a rack (not shown), disposed on the second housing **202** (e.g., the second plate **221**) to guide the sliding of the first housing **201** (e.g., the first plate **211**), and a motor (not shown) configured to transmit a driving force to a gear (not shown) for rotational movement along the rack.

[0081] FIG. **3** is a diagram illustrating examples of retracted and extended states of a flexible display of an electronic device according to various embodiments.

[0082] Referring to FIG. **3**, the electronic device **101** according to an embodiment may display a first display area **A1** in a retracted state **<301>**.

[0083] The display **203** according to an embodiment may move in an extension direction (slide-out direction) relative to the second housing **202**, based on a user's physical force or a driving force generated in the extension direction in the retracted state **<301>**. According to an embodiment, the display **203** may be in an extended state **<302>** when the display **203** has moved up to the maximum movable distance in the extension direction (slide-out direction) relative to the second housing **202**, and may be in a moving state (or partially extended state) when the display **460** is moving or has moved less than the maximum movable distance in the extended direction (slide-out direction) relative to the second housing **202**. In the extended state **<302>**, at least a portion (e.g., **A2**) of the display **203** may be visible to the front face of the electronic device **101**, thereby extending the display area. The display **203** according to an embodiment may move in a retraction direction (slide-in direction) relative to the second housing **202** based on a driving force generated in the retraction direction or a physical force from a user. According to an embodiment, the display **203** may be in a retracted state **<301>** when the display **203** has moved in the retraction direction (slide-in direction) relative to the second housing **202** up to a maximum movable distance.

[0084] According an embodiment, in the retracted state **<301>**, the electronic device **101** may display an image having a first size using the first display area **A1**. In an extended state **<302>**, the electronic device **101** according to an embodiment may display an image having a second size using the first display area **A1** and the extended display area **A2**. In the moving state, the electronic device **101** according to an embodiment may display an image in a display area extended by a

movement length that is greater than the first display area **A1** and less than the second display area **A2** of the display **203**.

[0085] FIG. **4** is a block diagram illustrating an example configuration of an electronic device according to various embodiments.

[0086] Referring to FIG. **4**, an electronic device **401** (e.g., the electronic device **101** in FIG. **1**) according to an embodiment may include at least one processor (e.g., including processing circuitry) **420**, memory **430**, a flexible display **460**, a slide driving unit (e.g., including a motor) **465**, a sensor module (e.g., including at least one sensor) **476**, and/or a communication module (e.g., including communication circuitry) **490**. The electronic device **401** according to an embodiment is not limited thereto, and may be configured to further include various components or exclude some of the above components. The electronic device **401** according to an embodiment may further include all or a portion of the electronic device **101** illustrated in FIG. **1**.

[0087] The flexible display **460** (e.g., the display **160** in FIG. **1** or the display **203** in FIG. **2A**, **2B**, or **3**) (hereinafter, also referred to as the display) according to an embodiment may be in the form of a touch screen. When implemented in the form of a touch screen together with an input module, the display **460** may display various types of information produced in response to a user's touch actions. According to an embodiment, the display **460** may be configured to be rollable during a slid-in or slide-out operation. According to an embodiment, based on the slide-in or slide-out operation of the display **460**, the display **460** may be in a first state (e.g., a retracted state) in which a screen shown by the display **460** is retracted to the smallest size, in a second state (e.g., an extended state) in which the screen shown by the display **460** is extended to the largest size, or in a third state (e.g., a moving state) in which the screen shown by the display **460** is between the retracted state and the extended state. For example, the display **460** moves in a first direction (slide-out direction) with respect to the first housing **201** and/or the second housing **202**, thereby entering an extended state in which at least a portion (e.g., **A2**) is visible from the inside of the first housing **201** and/or the second housing **202** to the front face of the electronic device **101**. Furthermore, the display **460** moves from the first direction to a second direction (e.g., slide-in direction), opposite to the first direction, with respect to the first housing **201** and/or the second housing **202**, thereby entering a retracted state in which at least a portion (e.g., **A2**) is not visible to the front face of the electronic device **101**.

[0088] The slide driving unit **465** according to an embodiment may include a motor, a gear, and/or a rack, and may use the motor, gear, and/or rack to make the display **460** (e.g., the first housing **201** (or at least a portion (e.g., **A2**) of the display **203**) slide in or out. According to an embodiment, the motor may be driven by receiving power (or current) to transmit a driving force to the gear connected to the motor. The motor according to an embodiment may be implemented to provide a specified thrust (force) (e.g., a force of about 3 kgf) based on a repulsive force upon sliding in or out of the display **460**, and the motor may have a specified diameter (e.g., about 6.2 T or greater) to provide the specified force. The gear according to an embodiment may operate in conjunction with the rack based on the driving force from the motor, thereby enabling the display **460** to slide in or out.

[0089] According to an embodiment, the slide driving unit **465** may use a driving force from the motor to cause the display **460** to slide in or out (e.g., an automatic slide), or may use both a driving force from the motor and a driving force from an external physical force (e.g., a pulling or pushing force from a user) to cause the display **460** to slide in or out (e.g., a semi-automatic slide). According to an embodiment, the slide driving unit **465** may not include the motor, and when the slide driving unit **465** does not include a motor, the driving force from an external physical force (e.g., a pulling or pushing force from a user) may be used to cause the display **460** to slide in or out (e.g., a manual slide).

[0090] The sensor module **476** (e.g., the sensor module **176** in FIG. **1**) according to an embodiment may include at least one sensor. According to an embodiment, the at least one sensor may perform

sensing to obtain the distance moved as the first housing **201** (or at least a portion of the display **460**) moves from a state (closed) in which the first housing **201** is slid in the second housing **202** to a state (opened state) in which the first housing is slid out from the second housing **202**, or vice versa. For example, the at least one sensor may include at least one Hall sensor (not shown). The at least one Hall sensor **320** according to an embodiment may include multiple Hall sensors (not shown), and the multiple Hall sensors (not shown) may be disposed at specified intervals in a section in which the first housing **201** (or at least a portion of the display **203**) reciprocates. Each of the multiple Hall sensors (not shown) may detect a magnetic field intensity (or a change in magnetic field intensity) and provide information about the detected magnetic field intensity (or data or values) (e.g., Hall IC raw data (X-axis, Y-axis, and Z-axis data)) to the processor **420**. For example, as the first housing **201** (or at least a portion of the display **460**) moves from a state (closed state) in which the first housing **201** is slid in the second housing **202** to a state (opened state) in which the first housing is slid out from the second housing **202**, or vice versa, a magnetic field caused by a magnet (not shown) in the first housing **201** may be detected by the multiple Hall sensors (not shown). The processor **420** according to an embodiment may identify (check, determine, or calculate) a distance (e.g., about several millimeters) by which the first housing **201** (or at least a portion of the display **460**) has slid out from the second housing **202**, based on information about the intensity of the magnetic field detected by each of the multiple Hall sensors (not shown). For example, the processor **420** may identify, in increments of about 1 mm, the distance by which the first housing **201** (or at least a portion of the display **460**) is slid out from the second housing **202**. Although an example in which the sensor module **476** includes a Hall sensor in accordance with an embodiment has been provided, the distance that the first housing **201** (or at least a portion of the display **460**) has slid out from the second housing **202** may also be identified by other known distance sensing methods.

[0091] The communication module **490** (e.g., the communication module **190** in FIG. **1**) according to an embodiment may include various communication circuitry and communicate with the external electronic device **104** based on control of the at least one processor **420** over the first network **198** (e.g., a short-range communication network, such as Bluetooth, wireless fidelity (WiFi) direct, or infrared data association (IrDA)) or the second network **199** (e.g., a long-range communication network, such as a legacy network, a 5G network, a next-generation communication network (e.g., new radio access technology (NR access technology)), the Internet, or a computer network (e.g., LAN or WAN)).

[0092] The at least one processor **420** (e.g., the processor **120** in FIG. **1**) according to an embodiment may include various processing circuitry and control the overall operation of the components included in the electronic device **401**. As noted above, the processor **420** may include various processing circuitry and/or multiple processors. For example, as used herein, including the claims, the term “processor” may include various processing circuitry, including at least one processor, wherein one or more of at least one processor, individually and/or collectively in a distributed manner, may be configured to perform various functions described herein. As used herein, when “a processor”, “at least one processor”, and “one or more processors” are described as being configured to perform numerous functions, these terms cover situations, for example and without limitation, in which one processor performs some of recited functions and another processor(s) performs other of recited functions, and also situations in which a single processor may perform all recited functions. Additionally, the at least one processor may include a combination of processors performing various of the recited/disclosed functions, e.g., in a distributed manner. At least one processor may execute program instructions to achieve or perform various functions.

[0093] The processor **420** according to an embodiment may generate (or set or acquire) a video (e.g., a video clip, hereinafter also referred to as a “video clip”) to be displayed on a lock screen or home background screen using at least some of multiple images (or image frames) included in a

video that has been stored in the memory **430**, received via the communication module **490**, or captured using a camera module (e.g., the camera module **180**).

[0094] The processor **420** according to an embodiment may select a first image (e.g., the first image or the first image frame of a video clip) corresponding to the retracted state from the multiple images (or image frames) included in the video. According to an embodiment, the processor **420** may display the multiple images included in the video and select the first image based on a user input. The processor **420** according to an embodiment may set (e.g., crop), in the selected first image, a first area having a first size to be displayed in a first display area in the retracted state. For example, the processor **420** may identify an object included in the first image and set the first area around the object, or may set an area selected by user input in the first image as the first area.

[0095] The processor **420** according to an embodiment may select a second image (e.g., the last image or last image frame of the video clip) corresponding to an extended state from among the images following the first image included in the video. According to an embodiment, the processor **420** may display the multiple images included in the video and select one of the images following the first image as the second image, based on specified criteria (e.g., time criteria, frame criteria, or hybrid criteria). According to an embodiment, when selecting the second image based on time criteria, the processor **420** may select, based on a time taken for the display **460** to transition from the retracted state to the extended state of the display, an image corresponding to the time from the first image among the images as the second image. According to an embodiment, when selecting the second image based on frame criteria, the processor **420** may select one of the images following the first image as the second image based on a user input. According to an embodiment, when selecting the second image based on hybrid criteria, the processor **420** may select one of the images following the first image as the second image based on a user input within a range that is greater or less by a specified time than the time taken for the display **460** to transition from the retracted state to the extended state of the display.

[0096] The processor **420** according to an embodiment may set (e.g., crop), in the selected second image, a second area having a second size to be displayed in a second display area in the extended state. For example, the processor **420** may identify an object included in the second image and set the second area around the object, or may set, as the second area, an area selected by a user input in the second image. Based on the first size of the first image and the second size of the second image, the processor **420** according to an embodiment may identify a size and an area of each of at least one image included between the first image and the second image, and may set (crop) an identified area having an identified size in each of the at least one image. The processor **420** according to an embodiment may use the first area in the first image, the second area in the second image, and at least one area of each of the at least one image between the first image and the second image to generate (or acquire, set, or store) a video clip to be displayed on the lock screen or the background screen.

[0097] The processor **420** according to an embodiment may identify the occurrence of a video clip playback event. According to an embodiment, the processor **420** may identify the occurrence of an event that causes a video clip to be played on a lock screen in a locked state, or the occurrence of an event that causes a video clip corresponding to a background screen to be played back in a home state. The processor **420** according to an embodiment may identify a retracted state, a moving state, or an extended state of the display **460**, based on identifying the occurrence of the video clip playback event. The processor **420** according to an embodiment may identify whether the display **460** is in the retracted state, the moving state, or the extended state using sensor information detected by at least one sensor (e.g., a Hall sensor) included in the sensor module **476**. The processor **420** according to an embodiment may identify (check, determine, or calculate), when the display **460** is in the moving state, a distance (e.g., about several millimeters) by which the first housing **201** (or at least a portion of the display **460**) has slid out from the second housing **202**, and

may identify a movement distance of the display based on the identified slide-out distance.

[0098] The processor **420** according to an embodiment may display a first image (e.g., a first still image) included in a video clip in a display area in the retracted state (e.g., the first display area **A1**) when the display **460** is in the retracted state. For example, the first image may be an image included in a first image frame of multiple image frames of the video clip. The processor **420** according to an embodiment may play back at least a portion of the video clip in a display area in the moving state when the display **460** is in the moving state. The processor **420** according to an embodiment may match, in the moving state, each of at least one image following the first image included in a video to a corresponding movement length of the display **460**, and display the image (or a partial area of the image) corresponding to the corresponding movement length of the display **460** in the moving state. The processor **420** according to an embodiment may play back a portion of the video clip by successively displaying images corresponding to the movement lengths when the display **460** is moving. The processor **420** according to an embodiment may display a second image (e.g., a second still image) included in the video clip in a display area in the extended state (e.g., the second display area **A2**) when the display **460** is in the extended state. For example, the second image may be an image included in the last image frame of the video clip.

[0099] The memory **430** according to an embodiment may store application programs and data. For example, the memory **430** may store an application (a function or program) associated with a video clip playback operation based on identifying the retracted state, moving state, and/or extended state of the display **460**. The memory **430** according to an embodiment may store, in addition to a program (e.g., the program **140** in FIG. **1**) used to perform a function operation, various types of data that is generated during execution of the program **140**. The memory **430** may broadly include a program area **140** and a data area (not shown). The program area **140** may store program information related to driving the electronic device **401**, such as an operating system (OS) (e.g., the operating system **142** in FIG. **1**) to boot the electronic device **401**. The data area (not shown) may store transmitted and/or received data and generated data according to various embodiments. Furthermore, the memory **430** may include at least one storage medium among flash memory, hard disk, multimedia card micro-type memory (e.g., secure digital (SD) or extreme digital (XD) memory), RAM, and ROM.

[0100] According to an embodiment, the electronic device **401** may further include various components without being limited to the components shown in FIG. **4**. According to an embodiment, the electronic device **401** may further include an image processing module (not shown). The image processing module may perform, based on control of the processor **420**, 2D or 3D image processing and/or rendering operations associated with a video clip. In the above-described embodiment, the major components of the electronic device have been described with reference to the electronic device **401** in FIG. **4**. However, in various embodiments, not all of the components shown in FIG. **4** are required, and the electronic device **401** may be implemented to include additional components in addition to the components shown, or the electronic device **401** may be implemented by omitting or combining some of the illustrated components.

[0101] According to an example embodiment, an electronic device (e.g., the electronic device **101** in FIG. **1** or the electronic device **401** in FIG. **4**) may include a first housing (e.g., the first housing **201** in FIG. **2**), a second housing configured to accommodate at least a portion of the first housing and connected to the first housing to enable sliding of the first housing (e.g., according to a second embodiment in FIG. **2**, an electronic device **101** in FIG. **1** or the electronic device **401** in FIG. **4**) may include a first housing (e.g., the first housing **201** in FIG. **1**), a second housing (e.g., the second housing **202** in FIG. **2**) configured to accommodate at least a portion of the first housing and connected to the first housing to enable a sliding movement of the first housing, a flexible display (e.g., the display **160** in FIG. **1** or the flexible display **460** in FIG. **4**) connected to the first housing, a driving unit (e.g., the slide driving unit **465** in FIG. **4**) configured to move the first housing and the flexible display in an extension direction or a retraction direction, memory (e.g.,



the memory **130** in FIG. **1** or the memory **430** in FIG. **4**), and a processor (e.g., the processor **120** in FIG. **1** or the processor **420** in FIG. **4**). According to an example embodiment, the memory may store instructions which, when executed by the processor, cause the electronic device to identify one state from among a retracted state, a moving state, and an extended state of the flexible display, based on a video clip playback event. According to an embodiment, the at least one processor may, in the retracted state of the flexible display, display, in a display area of the retracted state, a first image included in a video clip. According to an embodiment, the at least one processor may, in the moving state of the flexible display, display, in a display area of the moving state, a video using at least a portion of the video clip. According to an embodiment, the at least one processor may store instructions configured to, in the extended state of the flexible display, control the flexible display to display, in a display area of the extended state a second image included in the video clip.

[0102] According to an example embodiment, the electronic device (e.g., electronic device **101** in FIG. **1** or the electronic device **401** in FIG. **4**) may further include a sensor module (e.g., the sensor module **176** in FIG. **1** or the sensor module **476** in FIG. **4**). According to an embodiment, the instructions may be further configured to cause the electronic device to identify, using the sensor module, a movement length moved by the flexible display in the retraction direction or the extension direction.

[0103] According to an example embodiment, the instructions may be further configured to cause the electronic device to match, in the moving state, each of at least one image following the first image included in the video clip to a corresponding movement length of the flexible display and successively display the at least one image based on an increase in the movement length of the flexible display.

[0104] According to an example embodiment, the instructions may be further configured to cause the electronic device to generate the video clip and store the generated video clip in the memory.

[0105] According to an example embodiment, the instructions may be further configured to cause the electronic device to select a first image corresponding to the retracted state from among multiple images included in a video. According to an embodiment, the instructions may be further configured to cause the electronic device to set a first area, having a first size corresponding to the retracted state, in the selected first image. According to an embodiment, the instructions may be further configured to cause the electronic device to select a second image corresponding to the extended state from among images following the first image among the multiple images. According to an embodiment, the instructions may be further configured to cause the electronic device to set a second area, having a second size corresponding to the extended state, in the selected second image. According to an embodiment, the instructions may be further configured to cause the electronic device to identify a size and an area of each of at least one image, included between the first image and the second image, among the multiple images, and to set the size and the area of each of the at least one image. According to an embodiment, the instructions may be further configured to cause the electronic device to generate the video clip using the first area in the first image, the second area in the second image, and at least one area of each of the at least one image.

[0106] According to an example embodiment, the video may be a video stored in the memory.

[0107] According to an example embodiment, the electronic device (e.g., the electronic device **101** in FIG. **1** or the electronic device **401** in FIG. **4**) may further include a communication module (e.g., the communication module **190** in FIG. **1** or the communication module **490** in FIG. **4**), and the video may be a video received via the communication module.

[0108] According to an example embodiment, the electronic device (e.g., the electronic device **101** in FIG. **1** or the electronic device **401** in FIG. **4**) may further include a camera module (e.g., the camera module **180** in FIG. **1**), and the video may be a video obtained via the camera module.

[0109] According to an example embodiment, the video clip playback event may include an event that causes the video clip to be played back on a lock screen.

[0110] According to an example embodiment, the video clip playback event may include an event

that causes the video clip to be played back on a home background screen.

[0111] FIG. 5 is a flowchart illustrating an example video clip playback operation based on extension or retraction of a flexible display in an electronic device according to various embodiments.

[0112] Referring to FIG. 5, a processor (e.g., the processor **120** in FIG. **1** or the processor **420** in FIG. **4**) of an electronic device (e.g., the electronic device **101** in FIG. **1** or the electronic device **401** in FIG. **4**) according to an embodiment may perform at least one of operations **510** to **530**.

[0113] In operation **510**, the processor **420** according to an embodiment may identify the occurrence of a video clip playback event. According to an embodiment, the processor **420** may identify the occurrence of an event that causes a video clip to be played on a lock screen in a locked state, or the occurrence of an event that causes a video clip corresponding to a background screen to be played in a home state.

[0114] In operation **520**, the processor **420** according to an embodiment may identify a retracted state, a moving state, or an extended state of the display **460** based on identifying the occurrence of the video clip playback event. The processor **420** according to an embodiment may use sensor information detected by at least one sensor (e.g., a Hall sensor) included in the sensor module **476** to identify whether the display **460** is in a retracted state, a moving state, or an extended state.

When the display **460** is in a moving state, the processor **420** according to an embodiment may identify (check, determine, or calculate) a distance (e.g., about several millimeters) by which the first housing **201** (or at least a portion of the display **460**) has slid out from the second housing **202**, and may identify a movement distance of the display based on the identified slid-out distance.

[0115] In operation **530**, the processor **420** according to an embodiment may control the display **460** to display a first image (e.g., a first still image) included in a video clip in the retracted state, play a video using a portion of the video clip in the moving state, and display a second image (e.g., a second still image) included in the video clip in the extended state. The processor **420** according to an embodiment may display the first image included in the video clip in a display area in the retracted state (e.g., the first display area **A1**) when the display **460** is in the retracted state. For example, the first image may be an image included in a first image frame among multiple image frames of the video clip. The processor **420** according to an embodiment may play at least a portion of the video clip in a display area in the moving state when the display **460** is in the moving state. The processor **420** according to an embodiment may match, in the moving state, each of at least one successive image following the first image included in the video to a corresponding movement length of the display **460**, and display the image (or a partial area of the image) corresponding to (or matched to) the corresponding movement length of the display **460** in the moving state. The processor **420** according to an embodiment may play a portion of the video clip by successively displaying the at least one image based on an increase in movement length while the display **460** is moving. The processor **420** according to an embodiment may display the second image (e.g., the second still image) included in the video clip in a display area in the extended state (e.g., the second display area **A2**) when the display **460** is in the extended state. For example, the second image may be an image included in the last image frame of the video clip.

[0116] A method for video playback based on extension or retraction of a flexible display (e.g., the display module **160** in FIG. **1** or the flexible display **460** in FIG. **4**) in an electronic device (e.g., the electronic device **101** in FIG. **1** or the electronic device **401** in FIG. **4**) according to an example embodiment may include an operation of identifying one state from among a retracted state, a moving state, and an extended state of the flexible display, based a video clip playback event. The method according to an example embodiment may include an operation of displaying, in the retracted state, a first image included in a video clip on the flexible display of the retracted state. The method according to an example embodiment may include an operation of displaying, in the moving state, a video on the flexible display of the moving state using at least a portion of the video clip. The method according to an example embodiment may include an operation of

displaying, in the extended state, a second image included in the video clip on the flexible display of the extended state.

[0117] The method according to an example embodiment may further include an operation of identifying, using a sensor module (e.g., the sensor module **176** in FIG. **1** or the sensor module **476** in FIG. **4**), a movement length moved by the flexible display in the retraction direction or the extension direction.

[0118] The method according to an example embodiment may include an operation of matching, in the moving state, each of at least one image following the first image included in the video clip to a corresponding movement length of the flexible display, and successively displaying the at least one image based on an increase in the movement length of the flexible display.

[0119] The method according to an example embodiment may further include an operation of generating the video clip and storing the generated video clip in memory of the electronic device.

[0120] The method according to an example embodiment may include an operation of selecting a first image corresponding to the retracted state from among multiple images included in a video. The method according to an example embodiment may include an operation of setting a first area, having a first size corresponding to the retracted state, in the selected first image. The method according to an example embodiment may include an operation of selecting a second image corresponding to the extended state from among images following the first image among the plurality of images. The method according to an example embodiment may include an operation of setting a second area, having a second size corresponding to the extended state, in the selected second image. The method according to an example embodiment may include an operation of identifying a size and an area of each of at least one image, included between the first image and the second image, among the plurality of images. The method according to an example embodiment may include an operation of setting the size and the area of each of the at least one image. The method according to an example embodiment may include an operation of generating the video clip using the first area in the first image, the second area in the second image, and at least one area of each of the at least one image.

[0121] In the method according to an example embodiment, the video may be a video stored in the memory of the electronic device.

[0122] In the method according to an example embodiment, the video may be a video received via a communication module of the electronic device.

[0123] In the method according to an example embodiment, the video may be a video obtained via a camera module of the electronic device.

[0124] In the method according to an example embodiment, the video clip playback event may include an event that causes the video clip to be played back on a lock screen or an event that causes the video clip to be played back on a home background screen.

[0125] FIG. **6** is a diagram illustrating example screens displayed on a display when an electronic device is in a retracted state, a moving state, and an extended state according to various embodiments.

[0126] Referring to FIG. **6**, the processor **420** (e.g., the processor **120** in FIG. **1**) of the electronic device **401** (e.g., the electronic device **101** in FIG. **1**) according to an embodiment may display, in a retracted state <**601**>, a first image **610** included in a first image frame among multiple image frames of a video clip in a first display area (e.g., the first display area **A1**). The processor **420** (e.g., the processor **120** in FIG. **1**) of the electronic device **401** (e.g., the electronic device **101** in FIG. **1**) according to an embodiment may play, in a moving state <**602**>, at least a portion **620** of the video clip in a display area that varies based on display movement. For example, when the display **460** moves in an extension direction in the retracted state, the processor **420** may play the at least a portion of the video clip by matching each of at least one image following the first image included in the video clip to a corresponding movement length of the display **460**, and successively displaying images (or some areas of the images) corresponding to the respective movement lengths

of the display **460** while moving the display **460**. When the display **460** is in an extended state **<603>**, the processor **420** according to an embodiment may display a second image **630** (e.g., a second still image), included in the last image frame among the multiple image frames of the video clip, in a display area in the extended state (e.g., the first display area **A1** and the second display area **A2**).

[0127] FIG. 7 is a flowchart illustrating an example of video clip generation in an electronic device according to various embodiments.

[0128] Referring to FIG. 7, a processor (e.g., the processor **120** in FIG. 1 or the processor **420** in FIG. 4) of an electronic device (e.g., the electronic device **101** in FIG. 1 or the electronic device **401** in FIG. 4) according to an embodiment may perform at least one of operations **710** to **750**.

[0129] In operation **710**, the processor **420** according to an embodiment may select a first image corresponding to a retracted state from among multiple images (e.g., image frames) included in a video. The processor **420** according to an embodiment may select the first image corresponding to the retracted state from among multiple images (or image frames) included in a video stored in the memory **430**, a video received via the communication module **490**, or a video captured using a camera module (e.g., the camera module **180**). The processor **420** according to an embodiment may display the multiple images included in the video on the display **460**, and based on a user input, may select the first image or select the first image among the multiple images.

[0130] In operation **720**, the processor **420** according to an embodiment may set (e.g., crop) a first area, which has a first size and is to be displayed in a display area in the retracted state (e.g., the first display area **A1**), in the selected first image. For example, the processor **420** may identify an object included in the first image, and may crop the first area around the object or crop, as the first area, an area selected by a user input in the first image.

[0131] In operation **730**, the processor **420** according to an embodiment may select a second image corresponding to an extended state from among images following the first image included in the video. According to an embodiment, the processor **420** may display the multiple images included in the video and select one of images following the first image as the second image, based on specified criteria (e.g., time criteria, frame criteria, or hybrid criteria). According to an embodiment, when selecting the second image based on time criteria, the processor **420** may select, based on a time taken for the display **460** to transition from the retracted state to the extended state of the display, an image corresponding to the time from the first image among the images as the second image. According to an embodiment, when selecting the second image based on frame criteria, the processor **420** may select one of the images following the first image as the second image, based on user input. According to an embodiment, when selecting the second image based on hybrid criteria, the processor **420** may select one of the images following the first image as the second image, based on the user input, within a range that is greater or less by a specified time than the time taken for the display **460** to transition from the retracted state to the extended state of the display.

[0132] In operation **740**, the processor **420** according to an embodiment may set (e.g., crop) a second area, which has a second size and is to be displayed in a display area in the extended state (e.g., the first display area **A1** and the second display area **A2**), in the selected second image. For example, the processor **420** may identify an object included in the second image, and may crop the second area around the object or crop, as the second area, an area selected by user input in the second image.

[0133] In operation **750**, the processor **420** according to an embodiment may identify, based on the first image and the second image, a size and an area of each of at least one image included between the first image and the second image, and set the size and the area of each of the at least one image. For example, the processor **420** may identify a size and an area of each of at least one image included between the first image and the second image, based on a first size of the first image and a second size of the second image, and may set (crop) the identified area having the identified size in

each of the at least one image.

[0134] In operation **760**, the processor **420** according to an embodiment may generate (or obtain, set, or store) a video clip to be displayed on a lock screen or a home background screen using the first area in the first image, the second area in the second image, and at least one area of each of the at least one image between the first and second images.

[0135] FIG. **8A** is a diagram illustrating example image frames of a video according to various embodiments.

[0136] Referring to FIG. **8A**, a video according to an embodiment may include a video stored in the memory **430**, received via the communication module **490**, or captured using a camera module (e.g., the camera module **180**). Image frames **801** of the video according to an embodiment may include multiple images **810**, **820**, **830**, and **840**. The multiple images may include a greater or smaller number of images than the images **810** to **840**.

[0137] The processor **420** (e.g., the processor **120** in FIG. **1**) of the electronic device **401** (e.g., the electronic device **101** in FIG. **1**) according to an embodiment may select the first image **810** corresponding to a retracted state from among the multiple images **810**, **820**, **830**, and **840** included in the video. The processor **420** according to an embodiment may display the multiple images **810**, **820**, **830**, and **840** included in the video on the display **460** and, based on user input, may select the first image **810** or select the first image **810** among the multiple images **810**, **820**, **830**, and **840**. The processor **420** according to an embodiment may set (e.g., crop) a first area **811**, which has a first size and is to be displayed in a first display area in a retracted state, in the selected first image **810**. For example, the processor **420** may identify an object (e.g., a person or a main object) included in the first image **810**, and may crop the first area **811** around the object or crop, as the first area **811**, an area selected by a user input in the first image **810**.

[0138] The processor **420** according to an embodiment may select the second image **840** corresponding to an extended state from among the multiple images **810**, **820**, **830**, and **840** included in the video. The processor **420** according to an embodiment may display the multiple images **810**, **820**, **830**, and **840** included in the video on the display **460**, and select the second image **840** based on specified criteria, such as time criteria, frame criteria, or hybrid criteria.

[0139] The processor **420** according to an embodiment may set (e.g., crop) a second area **841**, which has a second size and is to be displayed in a second display area in the extended state, in the selected second image **840**. For example, the processor **420** may identify an object (e.g., a person or a main object) included in the second image **840**, and may crop the second area **841** around the object or crop, as the second area **841**, an area selected by user input in the second image **840**.

[0140] FIG. **8B** is a diagram illustrating an example of setting the size and area of at least one image between a first image corresponding to a retracted state and a second image corresponding to an extended state according to various embodiments.

[0141] Referring to FIG. **8B**, the processor **420** (e.g., the processor **120** in FIG. **1**) of the electronic device **401** (e.g., the electronic device **101** in FIG. **1**) according to an embodiment may, based on a first area **811** having a first size in a first image **810** and a second area **841** having a second size in a second image **840**, identify may identify a size and an area **821** or **831** of at least one image (e.g., **820** or **830**) included between the first image **810** and the second image **840**, and may set (crop) the identified area **821** or **831** having the identified size in the at least one image (e.g., **820** or **830**). The processor **420** according to an embodiment may generate (or acquire, set, or store) a video clip, which is to be displayed on a lock screen or a background screen, using the first area **811** of the first image **810**, the second area **841** of the second image **820**, and the at least one area **821** or **831** of each of the at least one image between the first image and the second image.

[0142] FIG. **9** is a flowchart illustrating an example operation of generating a video clip based on the number of images according to frame criteria according to various embodiments.

[0143] Referring to FIG. **9**, a processor (e.g., the processor **120** in FIG. **1** or the processor **420** in FIG. **4**) of an electronic device (e.g., the electronic device **101** in FIG. **1** or the electronic device

**401** in FIG. 4) according to an embodiment may perform at least one of operations **910** to **930**.

[0144] In operation **910**, the processor **420** according to an embodiment may divide the maximum movable length of the display **460** by the number of images in the video clip to identify a movement length corresponding to each image.

[0145] In operation **920**, the processor **420** according to an embodiment identifies vertices of each of the at least one image included between the first image **810** and the second image **820** by dividing each of lines, connecting vertices of the first area **811** in the first image **810** to respective vertices of the second area **841** in the second image **840**, by the number of images in the video clip, identify the size and area **821** or **831** of each of the at least one image using the vertices of each of the at least one image, and set (crop) the identified area **821** or **831** having the identified size in the at least one image (e.g., **820** or **830**).

[0146] In operation **930**, the processor **420** according to an embodiment may generate (or acquire, set, or store) a video clip, which is to be displayed on a lock screen or a background screen, by setting the first area **811** of the first image **810**, the second area **841** of the second image **840**, and the at least one area **821** or **831** of the at least one image **820** or **830** between the first image **810** and the second image **840** to be matched to the respective movement lengths of the display **460**, based on the movement lengths corresponding to the images.

[0147] FIG. **10** is a flowchart illustrating an example operation of generating a video clip based on a movement time of a display according to time criteria according to various embodiments.

[0148] Referring to FIG. **10**, a processor (e.g., the processor **120** in FIG. **1** or the processor **420** in FIG. **4**) of an electronic device (e.g., the electronic device **101** in FIG. **1** or the electronic device **401** in FIG. **4**) according to an embodiment may perform at least one of operations **1010** to **1030**.

[0149] In operation **1010**, the processor **420** according to an embodiment may identify a movement length corresponding to an image by dividing the maximum movable length of the display **460** by the product ( $C \times \text{FPS}$ ) of the display's maximum movement time ( $C$ ) and frames per second ( $\text{FPS}$ ).

[0150] In operation **1020**, the processor **420** according to an embodiment may identify vertices of each of at least one image included between the first image **810** and the second image **820** by dividing each of lines, connecting vertices of the first area **811** of the first image **810** to respective vertices of the second area **841** of the second image **840**, by the product ( $C \times \text{FPS}$ ) of the display's maximum movement time ( $C$ ) and frames per second ( $\text{FPS}$ ), identify a size and an area **821** or **831** of each of the at least one image using the vertices of each of the at least one image, and set (crop) the identified area **821** or **831** having the identified size in the at least one image (e.g., **820** or **830**).

[0151] In operation **1030**, the processor **420** according to an embodiment may generate (or acquire, set, or store) a video clip, which is to be displayed on a lock screen or a home background screen by setting the first area **811** of the first image **810**, the second area **841** of the second image **820**, and the at least one area **821** or **831** of each of the at least one image between the first and second images to be matched to the respective movement lengths of the display **460**, based on the movements lengths corresponding to the images.

[0152] FIG. **11** is a flowchart illustrating an example operation of generating a video clip based on the number of images and the movement time of a display according to hybrid criteria according to various embodiments.

[0153] Referring to FIG. **11**, a processor (e.g., the processor **120** in FIG. **1** or the processor **420** in FIG. **4**) of an electronic device (e.g., the electronic device **101** in FIG. **1** or the electronic device **401** in FIG. **4**) according to an embodiment may perform at least one of operations **1110** to **1130**.

[0154] In operation **1110**, the processor **420** according to an embodiment may identify a movement length corresponding to an image by dividing the maximum movable length of the display **460** by a value that is the sum of a specified value ( $((C \times \text{FTS}) \times N \%$ , where  $N$  is a natural number) and the product ( $C \times \text{FTS}$ ) of the display's maximum movement time ( $C$ ) and frames per second ( $\text{FPS}$ ).

[0155] In operation **1120**, the processor **420** according to an embodiment may identify vertices of each of at least one image included between the first image **810** and the second image **820** by

dividing each of lines, connecting vertices of the first area **811** in the first image **810** to respective vertices of the second area **841** in the second image **840**, by a value that is the sum of the specified value  $((C \times FTS) \times N \%)$ ,  $N$  is a natural number) and the product  $(C \times FTS)$  of the display's maximum movement time ( $C$ ) and frames per second ( $FPS$ ), identify a size and an area **821** or **831** of each of the at least one image using the vertices of each of the at least one image, and set (crop) the identified area **821** or **831** having the identified size in each of the at least one image (e.g., **820** or **830**).

[0156] In operation **1130**, the processor **420** according to an embodiment may generate (or acquire, set, or store) a video clip, which is to be displayed on a lock screen or a background screen by setting the first area **811** of the first image **810**, the second area **841** of the second image **820**, and the at least one area **821** or **831** of each of the at least one image between the first image and the second image to be matched to the respective movement lengths of the display **460**, based on the movement lengths corresponding to the images.

[0157] FIG. **12A** is a diagram illustrating example movement length based on the extension of a display according to various embodiments.

[0158] Referring to FIG. **12A**, the display **460** of an electronic device (e.g., the electronic device **101** in FIG. **1** or the electronic device **401** in FIG. **4**) according to an embodiment may have a first length **1261** which is the shortest transverse length of a display screen in a retracted state. The display **460** of the electronic device **401** according to an embodiment may have a second length **1262** that is the longest transverse length of the display screen in an extended state. The display **460** of the electronic device **401** according to an embodiment may be in the extended state when the display **460** is extended from the retracted state by a maximum movable distance **1265**.

[0159] The processor **420** (e.g., the processor **120** in FIG. **1**) of the electronic device **401** according to an embodiment may divide the maximum movable length **1265** of the display **460** by the number of images in a video clip to identify movement lengths **1213**, **1223**, **1233**, **1243**, and **1253** corresponding to the respective images. The processor **420** according to an embodiment may identify the movement lengths **1213**, **1223**, **1233**, **1243**, and **1253** corresponding to the respective images by dividing the maximum movable length of the display **460** by the product  $(C \times FPS)$  of the display's maximum movement time ( $C$ ) and frames per second ( $FPS$ ). The processor **420** according to an embodiment may identify the movement lengths **1213**, **1223**, **1233**, **1243**, and **1253** corresponding to the respective images by dividing the maximum movable length of the display **460** by a value that is the sum of a specified value  $((C \times FTS) \times N \%)$ , where  $N$  is a natural number) and the product  $(C \times FTS)$  of the display's maximum movement time ( $C$ ) and frames per second ( $FPS$ ).

[0160] FIG. **12B** is a diagram illustrating example lines connecting vertices of a first area in a first image to respective vertices of a second area in a second image according to various embodiments, and FIG. **12C** is a diagram illustrating the size and area of each of at least one image between the first image and the second image according to various embodiments.

[0161] Referring to FIGS. **12B** and **12C**, the processor **420** according to embodiment may identify vertices of each of at least one image **1220** to **1240** included between a first image **1210** and a second image **1250** by dividing each of lines, respectively connecting vertices **A1**, **A2**, **A3** and **A4** (which may be referred to as vertices **A1** to **A4**) of a first area **1211** in the first image **1210** to vertices **B1**, **B2**, **B3** and **B4** (which may be referred to as vertices **B1** to **B4**) of a second area **1241** in the second image **1240** among images in a video **1201**, by the number of the images **1210** to **1250** in the video clip, identify respective sizes and areas **1221**, **1231**, and **1241** of at least one image **1220** to **1240** using the vertices of each of the at least one image **1220** to **1240**, and set (crop) the identified areas **1221**, **1231**, and **1241** having the identified sizes in the at least one image **1220** to **1240**. The processor **420** according to embodiment may generate (or acquire, set, or store) a video clip, which is to be displayed on a lock screen or background screen, by setting the first area **1211** of the first image **1210**, the second area **1251** of the second image **1240**, and the at least one

area **1221**, **1231**, or **1241** of the at least one image **1220**, **1230**, or **1240** between the first image **1210** and the second image **1250** to be matched to the respective movement lengths **1213**, **1223**, **1233**, **1243**, and **1253** of the display **460** based on the movement lengths corresponding to the images.

[0162] FIG. **13** is a flowchart illustrating an example video clip playback operation when a display transitions from a retracted state to an extended state according to various embodiments.

[0163] Referring to FIG. **13**, a processor (e.g., the processor **120** in FIG. **1** or the processor **420** in FIG. **4**) of an electronic device (e.g., the electronic device **101** in FIG. **1** or the electronic device **401** in FIG. **4**) according to an embodiment may perform at least one of operations **1310** to **1370**.

[0164] In operation **1310**, the processor **420** according to an embodiment may, in a retracted state, display a first area of a first image in a video clip on the display **460**.

[0165] In operation **1320**, the processor **420** according to an embodiment may identify whether the display **460** is moving in an extension direction from the retracted state.

[0166] In operation **1330**, when the display **460** is moving in the extension direction from the retracted state (operation **1320**-Yes), the processor **420** according to an embodiment may play a video using at least one area set in each of at least one image following the first image in the video clip.

[0167] In operation **1340**, the processor **420** according to an embodiment may identify whether the display **460** stops the movement before an extended state.

[0168] In operation **1350**, when the display **460** stops moving before an extended state (operation **1340**-Yes), the processor **420** according to an embodiment may display, on the display **460**, a third area of a third image corresponding to a display movement length at the point when the movement stops. For example, when the moving of the display **460** is stopped during video playback, based on the display **460** being in the moving state, the processor **420** according to an embodiment may display, on the display **460**, an area of the image at the point when the movement stops.

[0169] In operation **1360**, when the display **460** does not stop moving before the extended state (**1340** operation-No), the processor **420** according to an embodiment may identify whether the display **460** is in the extended state. Unless the display **460** stops moving and is in the extended state (operation **1360**-No), the processor **420** according to an embodiment may maintain video playback, based on the display **460** being in the moving state.

[0170] In operation **1370**, when the display **460** is in the extended state without stopping moving (operation **1360**-Yes), the processor **420** according to an embodiment may display, on the display **460**, a second area in a second image, corresponding to the extended state, in the video clip.

[0171] FIG. **14** is a flowchart illustrating an example video clip playback operation when a display transitions from an extended state to a retracted state according to various embodiments.

[0172] Referring to FIG. **14**, a processor (e.g., the processor **120** in FIG. **1** or the processor **420** in FIG. **4**) of an electronic device (e.g., the electronic device **101** in FIG. **1** or the electronic device **401** in FIG. **4**) according to an embodiment may perform at least one of operations **1410** to **1470**.

[0173] In operation **1410**, when the display **460** is in an extended state, the processor **420** according to an embodiment may display a second area in a second image in a video clip on the display **460**.

[0174] In operation **1420**, the processor **420** according to an embodiment may identify whether the display **460** is moving in a retraction direction from the extended state.

[0175] In operation **1430**, when the display **460** is moving in the retraction direction from the extended state (operation **1420**-Yes), the processor **420** according to an embodiment may play a video using at least one area set in each of at least one image prior to the second image in the video clip.

[0176] In operation **1440**, the processor **420** according to an embodiment may identify whether the display **460** stops moving before the retracted state.

[0177] In operation **1450**, when the display **460** stops moving before the retracted state (operation **1440**-Yes), the processor **420** according to an embodiment may display, on the display **460**, a third



area of a third image corresponding to a display movement length at the point when the movement stops. For example, when the moving of the display **460** is stopped during video playback, based on the display **460** being in a moving state, the processor **420** according to an embodiment may display, on the display **460**, an area of an image at the point when the movement stops.

[0178] In operation **1460**, when the display **460** does not stop moving before the retracted state (operation **1440**-No), the processor **420** according to an embodiment may identify whether the display **460** is in the retracted state. Unless the display **460** stops moving and is in the retracted state (operation **1460**-No), the processor **420** according to an embodiment may continuously perform video playback, based on the display **460** being in the moving state.

[0179] In operation **1470**, when the display **460** is in the retracted state without stopping the movement (operation **1460**-Yes), the processor **420** according to an embodiment may display, on the display **460**, a first area in the first image, corresponding to the retracted state, in the video clip.

[0180] FIG. **15** is a diagram illustrating an example screen on which a video clip is played on a lock screen according to various embodiments.

[0181] Referring to FIG. **15**, the processor **420** (e.g., the processor **120** in FIG. **1**) of the electronic device **401** (e.g., the electronic device **101** in FIG. **1**) according to an embodiment may display, in a display area in a retracted state, a first image (e.g., a second still image) **1510** of a video clip on a lock screen when the display **460** is in a retracted state **<1501>** in a locked state. When the display **460** is in a moving state **<1502>** in the locked state, the processor **420** according to an embodiment may play a portion (e.g., a video) **1520** of the video clip in a display area in the moving state.

According to an embodiment, in the moving state **<1502>**, the processor **420** may match each of at least one image following the first image included in the video clip to a corresponding movement length of the display **460**, and display the video **1520** including the images (or some areas of images) corresponding to the respective movement lengths of the display **460**. For example, when the display **460** is moving, the processor **420** may play the portion **1520** of the video clip as a video by successively displaying the images corresponding to the movement lengths. When the display **460** is in an extended state **<1503>** in the locked state, the processor **420** according to an embodiment may display, in a display area in the extended state, a second image (e.g., a second still image) **1530** included in the video clip on a lock screen.

[0182] FIG. **16** is a diagram illustrating an example screen on which a video clip is played on a home background screen according to various embodiments.

[0183] Referring to FIG. **16**, the processor **420** (e.g., the processor **120** in FIG. **1**) of the electronic device **401** (e.g., the electronic device **101** in FIG. **1**) according to an embodiment may display a first image (e.g., a first still image) **1610** of a video clip on a home background screen with icons **1612** displayed when the display **460** is in a retracted state **<1601>** in a home state. When the display **460** is in a moving state **<1602>** in the home state, the processor **420** according to an embodiment may play, in a display area in the moving state, a portion (e.g., a video) **1620** of the video clip on the home background screen. According to an embodiment, in the moving state **<1602>**, the processor **420** may match each of at least one image following the first image included in the video clip to a corresponding movement length of the display **460**, and display the video **1620** including the images (or some areas of images) corresponding to the respective movement lengths of the display **460**. For example, when the display **460** is moving, the processor **420** may play the portion **1620** of the video clip as a video by successively displaying the images corresponding to the respective movement lengths. When the display **460** is in an extended state **<1603>** in the home state, the processor **420** according to an embodiment may display a second image (e.g., a second still image) **1630** included in the video clip on the home background screen with the icons **1612** displayed.

[0184] FIG. **17** is a diagram illustrating example screens for selecting a video and an editing method during video clip generation according to various embodiments.

[0185] Referring to FIG. **17**, the processor **420** according to an embodiment may display a

background screen and style screen **1710** for setting (or selecting) a background screen (or home background screen). The processor **420** according to an embodiment may display background screen types on the background screen and style screen **1710**. The background screen types may include an image type **1712** and a video type **1714**.

[0186] The processor **420** according to embodiment may display, based on a user input (or selection) (e.g., a touch input) for the image type **1712**, images (not shown) that can be set (or selected) as background screens in response to the image type **1712**. The processor **420** according to an embodiment may display, based on a user input (or selection) (e.g., a touch input) for the video type **1714**, a video selection screen **1720** that includes videos **1722** which are available for generating a video clip for the background screen in response to the video type **1714**. The processor **420** according to an embodiment may select, from among the videos **1722**, a video to be used to generate a video clip based on a user input (or selection) (e.g., a touch input) on the video selection screen **1720**.

[0187] The processor **420** according to embodiment may display a video editing style screen **1730** for setting (or selecting) an editing style for a video clip to be generated based on the selected video. The processor **420** according to an embodiment may display a time-based video editing **1732** item, a frame-based video editing **1734** item, and a hybrid video editing **1736** item on the video editing style screen **1730**. For example, the time-based video editing **1732** may be an editing item for generating a video clip based on the movement time of a display, and the frame-based video editing **1734** may be an editing item for generating a video clip based on the number of images. The hybrid video editing **1736** may be an editing item for generating a video clip based on the number of images and the movement time of the display.

[0188] FIG. **18A** is a diagram illustrating an example screen displayed when generating a video clip based on the movement time of a display according to time criteria in various embodiments.

[0189] Referring to FIG. **18A**, the processor **420** according to an embodiment may display a screen **1810** for generating a video clip based on the movement time of a display according to time criteria. The processor **420** according to an embodiment may select a first image **1814** corresponding to a retracted state, based on a user input (or selection) (e.g., a touch input), from among multiple images (or image frames) **1812** included in a video (e.g., selected for use in generating the video clip). The processor **420** according to an embodiment may set (e.g., crop) a first area **1815**, which has a first size and is to be displayed in a first display area in the retracted state, in the selected first image **1814**. For example, the processor **420** may identify an object included in the first image and set the first area **1815** around the object, or may set, as the first area **1815**, an area selected by a user input in the first image. According to an embodiment, when selecting a second image based on time criteria, the processor **420** may, based on a time taken for the display **460** to transition from the retracted state to an extended state of the display, select an image corresponding to the time from the first image **1814** among images as the second image **1816**. The processor **420** according to an embodiment may set (e.g., crop) a second area **1817**, which has a second size and is to be displayed in a second display area in the extended state, in the selected second image **1816**. For example, the processor **420** may identify an object included in the second image **1816** and set the second area **1817** around the object, or may set, as the second area **1817**, an area selected by a user input in the second image **1816**. Based on the first size of the first area **1815** and the second size of the second area **1817**, the processor **420** according to an embodiment may identify the size and area of each of at least one image included between the first image **1814** and the second image **1816**, and may set (crop) the identified area having the identified size in each of the at least one image. Based on storage **1819** being selected, the processor **420** according to an embodiment may generate (or acquire) a video clip, which is to be displayed on a background screen, using the first area **1815** of the first image **1814**, the second area **1817** of the second image **1816**, and the at least one area of each of the at least one image between the first image and the second image, and may store the generated video clip in the memory **430** based on

time criteria.

[0190] FIG. **18B** is a diagram illustrating an example screen displayed when generating a video clip based on a user input according to frame criteria according to various embodiments.

[0191] Referring to FIG. **18B**, the processor **420** according to an embodiment may display a screen **1820** for generating a video clip based on a user input according to frame criteria. The processor **420** according to an embodiment may select, based on the user input (or selection) (e.g., touch input), a first image **1824** corresponding to a retracted state from among multiple images (or image frames) **1822** included in a video (e.g., selected for use in generating a video clip). The processor **420** according to an embodiment may set (e.g., crop) a first area **1825**, which has a first size and is to be displayed in a first display area in the retracted state, in the selected first image **1824**. For example, the processor **420** may identify an object included in the first image **1824** and set the first area **1815** around the object, or may set, as the first area **1825**, an area selected by a user input in the first image **1824**. According to an embodiment, when selecting a second image **1826** based on frame criteria, the processor **420** may select, based on a user input, one of images **1823** following the first image **1824** as the second image **1827**. The processor **420** according to an embodiment may set (e.g., crop) a second area **1827**, which has a second size and is to be displayed in a second display area in the extended state, in the selected second image **1826**. For example, the processor **420** may identify an object included in the second image **1826** and set the second area **1827** around the object, or may set, as the second area **1827**, an area selected by a user input in the second image **1826**. Based on the first size of the first area **1825** and the second size of the second area **1827**, the processor **420** according to an embodiment may identify the size and area of each of at least one image included between the first image **1824** and the second image **1826**, and may set (crop) the identified area having the identified size in each of the at least one image. Based on storage **1829** being selected, the processor **420** according to an embodiment may generate (or acquire) a video clip, which is to be displayed on a background screen, using the first area **1825** of the first image **1824**, the second area **1827** of the second image **1826**, and the at least one area of each of the at least one image between the first image and the second image, and may store the generated video clip in the memory **430** based on time criteria.

[0192] FIG. **18C** is a diagram illustrating an example screen displayed during video clip generation based on hybrid criteria according to various embodiments.

[0193] Referring to FIG. **18C**, the processor **420** according to an embodiment may display a screen **1830** for generating a video clip based on the movement time of a display and a user input according to hybrid criteria. The processor **420** according to an embodiment may select, based on the user input (or selection) (e.g., touch input), a first image **1834** corresponding to a retracted state from among multiple images (or image frames) **1832** included in a video (e.g., selected for use in generating a video clip). The processor **420** according to an embodiment may set (e.g., crop) a first area **1835**, which has a first size and is to be displayed in a first display area in the retracted state, in the selected first image **1834**. For example, the processor **420** may identify an object included in the first image **1834** and set the first area **1835** around the object, or may set, as the first area **1835**, an area selected by a user input in the first image **1834**. According to an embodiment, when selecting a second image based on the hybrid criteria, the processor **420** may select one of images **1833** following the first image as the second image **1836**, based on the user input, within a range that is greater or less by a specified time than the time taken for the display **460** to transition from the retracted state to an extended state of the display. The processor **420** according to an embodiment may set (e.g., crop) a second area **1837**, which has a second size and is to be displayed in a second display area in the extended state, in the selected second image **1836**. For example, the processor **420** may identify an object included in the second image **1836** and set the second area **1837** around the object, or may set, as the second area **1837**, an area selected by a user input in the second image **1836**. Based on the first size of the first area **1835** and the second size of the second area **1837**, the processor **420** according to an embodiment may identify the size and area of each of

at least one image included between the first image **1834** and the second image **1836**, and may set (crop) the identified area having the identified size in each of the at least one image. Based on storage **1839** being selected, the processor **420** according to an embodiment may generate (or obtain) a video clip, which is to be displayed on a background screen, using the first area **1835** of the first image **1834**, the second area **1837** of the second image **1836**, and the at least one area of each of the at least one image between the first image **1834** and the second image **1834**, and may store the generated video clip in the memory **430** based on time criteria.

[0194] The electronic device according to various embodiments may be one of various types of electronic devices. The electronic devices may include, for example, a portable communication device (e.g., a smartphone), a computer device, a portable multimedia device, a portable medical device, a camera, a wearable device, a home appliance, or the like. According to an embodiment of the disclosure, the electronic devices are not limited to those described above.

[0195] It should be appreciated that various embodiments of the present disclosure and the terms used therein are not intended to limit the technological features set forth herein to particular embodiments and include various changes, equivalents, or replacements for a corresponding embodiment. With regard to the description of the drawings, similar reference numerals may be used to refer to similar or related elements. It is to be understood that a singular form of a noun corresponding to an item may include one or more of the things, unless the relevant context clearly indicates otherwise. As used herein, each of such phrases as “A or B,” “at least one of A and B,” “at least one of A or B,” “A, B, or C,” “at least one of A, B, and C,” and “at least one of A, B, or C,” may include any one of, or all possible combinations of the items enumerated together in a corresponding one of the phrases. As used herein, such terms as “1st” and “2nd,” or “first” and “second” may be used to simply distinguish a corresponding component from another, and does not limit the components in other aspect (e.g., importance or order). It is to be understood that if an element (e.g., a first element) is referred to, with or without the term “operatively” or “communicatively”, as “coupled with,” “coupled to,” “connected with,” or “connected to” another element (e.g., a second element), the element may be coupled with the other element directly (e.g., wiredly), wirelessly, or via a third element.

[0196] As used in connection with various embodiments of the disclosure, the term “module” may include a unit implemented in hardware, software, or firmware, or any combination thereof, and may interchangeably be used with other terms, for example, “logic,” “logic block,” “part,” or “circuitry”. A module may be a single integral component, or a minimum unit or part thereof, adapted to perform one or more functions. For example, according to an embodiment, the module may be implemented in a form of an application-specific integrated circuit (ASIC).

[0197] Various embodiments as set forth herein may be implemented as software (e.g., the program) including one or more instructions that are stored in a storage medium (e.g., internal memory or external memory) that is readable by a machine (e.g., the electronic device). For example, a processor (e.g., the processor) of the machine (e.g., the electronic device) may invoke at least one of the one or more instructions stored in the storage medium, and execute it, with or without using one or more other components under the control of the processor. This allows the machine to be operated to perform at least one function according to the at least one instruction invoked. The one or more instructions may include a code generated by a compiler or a code executable by an interpreter. The machine-readable storage medium may be provided in the form of a non-transitory storage medium. Wherein, the “non-transitory” storage medium is a tangible device, and may not include a signal (e.g., an electromagnetic wave), but this term does not differentiate between where data is semi-permanently stored in the storage medium and where the data is temporarily stored in the storage medium.

[0198] According to an embodiment, a method according to various embodiments of the disclosure may be included and provided in a computer program product. The computer program product may be traded as a product between a seller and a buyer. The computer program product may be

distributed in the form of a machine-readable storage medium (e.g., compact disc read only memory (CD-ROM)), or be distributed (e.g., downloaded or uploaded) online via an application store (e.g., PlayStore™), or between two user devices (e.g., smart phones) directly. If distributed online, at least part of the computer program product may be temporarily generated or at least temporarily stored in the machine-readable storage medium, such as memory of the manufacturer's server, a server of the application store, or a relay server.

[0199] According to various embodiments, each component (e.g., a module or a program) of the above-described components may include a single entity or multiple entities, and some of the multiple entities may be separately disposed in different components. According to various embodiments, one or more of the above-described components may be omitted, or one or more other components may be added. Alternatively or additionally, a plurality of components (e.g., modules or programs) may be integrated into a single component. In such a case, according to various embodiments, the integrated component may still perform one or more functions of each of the plurality of components in the same or similar manner as they are performed by a corresponding one of the plurality of components before the integration. According to various embodiments, operations performed by the module, the program, or another component may be carried out sequentially, in parallel, repeatedly, or heuristically, or one or more of the operations may be executed in a different order or omitted, or one or more other operations may be added.

[0200] According to various embodiments, in a non-volatile storage medium storing commands, the commands may be configured to, when executed by an electronic device, cause the electronic device to perform at least one operation, wherein the at least one operation includes an operation of identifying one state from among a retracted state, a moving state, and an extended state of a flexible display, based on a video clip playback event, an operation of displaying, in the retracted state, a first image included in a video clip on the flexible display of the retracted state, an operation of displaying, in the moving state, a video on the flexible display of the moving state using at least a portion of the video clip, and an operation of displaying, in the extended state, a second image included in the video clip on the flexible display of the extended state.

[0201] Furthermore, various embodiments of the disclosure, described in this disclosure including the drawings, are merely presented as examples to easily describe the technical content of the various embodiments of the disclosure and to aid in understanding the various embodiments of the disclosure, and are not intended to limit the scope of the disclosure. Therefore, the scope of the disclosure should be interpreted as including not only the examples described herein but also all modifications, alternatives or variations derived based on the technical idea of the disclosure, including the appended claims and their equivalents. It will also be understood that any of the embodiment(s) described herein may be used in conjunction with any other embodiment(s) described herein.

## Claims

1. An electronic device comprising: a first housing; a second housing configured to accommodate at least a portion of the first housing and connected to the first housing to enable a sliding movement of the first housing; a flexible display connected to the first housing; a driving unit comprising a motor configured to move the first housing and the flexible display in an extension direction or a retraction direction, memory; and at least one processor, comprising processing circuitry wherein the memory stores instructions, wherein at least one processor, individually and/or collectively, is configured to execute the instructions and to cause the electronic device to: identify one state from among a retracted state, a moving state, and an extended state of the flexible display, based on a video clip playback event; and control the flexible display to: in the retracted state of the flexible display, display, in a display area of the retracted state, a first image included in a video clip; in the moving state of the flexible display, display, in a display area of the moving

- state, a video using at least a portion of the video clip; and in the extended state of the flexible display, display, in a display area of the extended state, a second image included in the video clip.
2. The electronic device of claim 1, further comprising a sensor module, comprising at least one sensor, wherein at least one processor, individually and/or collectively, is configured to cause the electronic device to identify, using the sensor module, a movement length moved by the flexible display in the retraction direction or the extension direction.
  3. The electronic device of claim 1, wherein at least one processor, individually and/or collectively, is configured to cause the electronic device to match, in the moving state, each of at least one image following the first image included in the video clip to a corresponding movement length of the flexible display and successively display the at least one image based on an increase in the movement length of the flexible display.
  4. The electronic device of claim 1, wherein at least one processor, individually and/or collectively, is configured to cause the electronic device to generate the video clip and store the generated video clip in the memory.
  5. The electronic device of claim 1, wherein at least one processor, individually and/or collectively, is configured to cause the electronic device to: select a first image corresponding to the retracted state from among multiple images included in a video; set a first area, having a first size corresponding to the retracted state, in the selected first image; select a second image corresponding to the extended state from among images following the first image among the multiple images; set a second area, having a second size corresponding to the extended state, in the selected second image; identify a size and an area of each of at least one image, included between the first image and the second image, among the multiple images; set the size and the area of each of the at least one image; and generate the video clip using the first area in the first image, the second area in the second image, and at least one area of each of the at least one image.
  6. The electronic device of claim 1, wherein the video includes a video stored in the memory.
  7. The electronic device of claim 1, further comprising: a communication module comprising communication circuitry, wherein the video includes a video received via the communication module.
  8. The electronic device of claim 1, further comprising: a camera module, comprising a camera, wherein the video includes a video obtained via the camera module.
  9. The electronic device of claim 1, wherein the video clip playback event comprises an event that causes the video clip to be played back on a lock screen.
  10. The electronic device of claim 1, wherein the video clip playback event comprises an event that causes the video clip to be played back on a home background screen.
  11. A method for video playback based on extension or retraction of a flexible display in an electronic device, the method comprising: identifying one state from among a retracted state, a moving state, and an extended state of the flexible display, based a video clip playback event; in the retracted state, displaying a first image included in a video clip on the flexible display of the retracted state; in the moving state, displaying a video on the flexible display of the moving state using at least a portion of the video clip; and in the extended state, displaying a second image included in the video clip on the flexible display of the extended state.
  12. The method of claim 11, further comprising identifying, using a sensor module comprising at least one sensor, a movement length moved by the flexible display in the retraction direction or the extension direction.
  13. The method of claim 11, comprising matching, in the moving state, each of at least one image following the first image included in the video clip to a corresponding movement length of the flexible display, and successively displaying the at least one image based on an increase in the movement length of the flexible display.
  14. The method of claim 11, further comprising generating the video clip and storing the generated video clip in a memory of the electronic device.

- 15.** The method of claim 11, comprising: selecting a first image corresponding to the reduced state from among multiple images included in a video; setting a first area, having a first size corresponding to the retracted state, in the selected first image; selecting a second image corresponding to the extended state from among images following the first image among the multiple images; setting a second area, having a second size corresponding to the extended state, in the selected second image; identifying a size and an area of each of at least one image, included between the first image and the second image, among the plurality of images; setting the size and the area of each of the at least one image; and generating the video clip using the first area in the first image, the second area in the second image, and at least one area of each of the at least one image.
- 16.** The method of claim 11, wherein the video includes a video stored in the memory of the electronic device.
- 17.** The method of claim 11, wherein the video includes a video received via a communication module, comprising communication circuitry, of the electronic device.
- 18.** The method of claim 11, wherein the video includes a video obtained via a camera module, comprising a camera, of the electronic device.
- 19.** The method of claim 11, wherein the video clip playback event comprises an event that causes the video clip to be played back on a lock screen and/or an event that causes the video clip to be played back on a home background screen.
- 20.** A non-transitory computer-readable storage medium storing commands, wherein the commands, when executed by at least one processor, comprising processing circuitry, individually and/or collectively, of an electronic device, cause the electronic device to perform at least one operation, wherein the at least one operation comprises: identifying one state from among a retracted state, a moving state, and an extended state of a flexible display, based on a video clip playback event; in the retracted state, displaying a first image included in a video clip on the flexible display of the retracted state; in the moving state, displaying a video on the flexible display of the moving state using at least a portion of the video clip; and in the extended state, displaying a second image included in the video clip on the flexible display of the extended state.
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