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ELECTRONIC DEVICE FOR DISPLAYING USER INTERFACE FOR USE AND MANAGEMENT OF DEVICE INCLUDED IN HOUSE, AND OPERATING METHOD THEREOF

Abstract

A method performed by an electronic device for controlling a plurality of devices in a house is provided. The method includes displaying a first user interface where a plurality of first objects corresponding to a plurality of devices are arranged according to a predetermined layout to correspond to a structure of a house, identifying a first user input for selecting a category of a device to be controlled through a second object included in the first user interface, identifying at least one device included in the selected category in response to identifying the first user input, displaying a second user interface where at least one first object corresponding to the at least one device is arranged according to a layout, identifying a second user input for changing a location on the layout of one first object among the at least one first object displayed on the second user interface according to the layout, determining whether a device corresponding to the one first object is relocatable in response to identifying the second user input, when it is determined that the device corresponding to the one first object is relocatable, changing and displaying the location on the layout of the one first object to correspond to the second user input, and, when it is determined that the device corresponding to the one first object is not relocatable, displaying information indicating that relocating is impossible.

Related U.S. Application Data

Publication Classification

Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION(S) [0001] This application is a continuation application, claiming priority under 35 U.S.C. § 365(c), of an International application No. PCT/KR2023/013836, filed on Sep. 14, 2023, which is based on and claims the benefit of a Korean patent application number 10-2022-0143797, filed on Nov. 1, 2022, in the Korean Intellectual Property Office, the disclosure of which is incorporated by reference herein in its entirety.

BACKGROUND
1. Field
[0002] The disclosure relates to an electronic device and an operation method thereof for displaying a user interface to use and manage devices in a house.
2. Description of Related Art
[0003] The growth of wireless communication technology leads to development of smart apartment-related techniques for controlling devices (e.g., televisions (TVs), air conditioners, fridges, air purifiers, smart plugs, or lightings) in an apartment on the user's portable terminal. In relation, developed are cloud services for bundling and linking built-in IoT devices, home services, and IoT networks disposed in the apartment to all smart devices through the user's portable terminal and user interfaces related to the cloud services. Through the user interface for a smart apartment, users may easily control various devices in a house through simple operations of a portable terminal.
[0004] The above information is presented as background information only to assist with an understanding of the disclosure. No determination has been made, and no assertion is made, as to whether any of the above might be applicable as prior art with regard to the disclosure.
SUMMARY
[0005] As the types and number of devices placed in houses increase, a user interface for smart apartments that is easy for users to use is required.
[0006] Aspects of the disclosure are to address at least the above-mentioned problems and/or disadvantages and to provide at least the advantages described below. Accordingly, an aspect of the disclosure is to provide an electronic device and an operation method thereof for displaying a user interface to allow the user to easily control devices placed in a house.
[0007] Another aspect of the disclosure is to provide an electronic device and an operation method thereof for displaying a user interface to, when devices are added or removed or relocated in a house, allow the user to easily recognize the same and apply the change.
[0008] Another aspect of the disclosure is to provide an electronic device and an operation method thereof for displaying a user interface to easily control devices using a specific mode or an

automation function.

[0009] Additional aspects will be set forth in part in the description which follows and, in part, will be apparent from the description, or may be learned by practice of the presented embodiments.

[0010] In accordance with an aspect of the disclosure, a method performed by an electronic device for controlling a plurality of devices in a house is provided. The method includes displaying a first user interface where a plurality of first objects corresponding to the plurality of devices are disposed according to a predetermined layout to correspond to a structure of the house, identifying a first user input for selecting a category of a device to be controlled through a second object included in the first user interface, identifying at least one device included in the selected category in response to identifying the first user input, displaying a second user interface where at least one first object corresponding to the at least one device is disposed according to the layout, identifying a second user input for changing a location on the layout of one first object among the at least one first object displayed on the second user interface according to the layout, determining whether a device corresponding to the one first object is relocatable in response to identifying the second user input, when it is determined that the device corresponding to the one first object is relocatable, changing and displaying the location on the layout of the one first object to correspond to the second user input, and when it is determined that the device corresponding to the one first object is not relocatable, displaying information indicating that relocating is impossible.

[0011] The method further includes receiving information about the predetermined layout from memory of the electronic device or a server providing a smart apartment service. The method wherein the predetermined layout includes a plurality of areas, and the plurality of areas respectively correspond to spaces in the house.

[0012] The method wherein the plurality of areas include a shared area corresponding to a shared space other than the house.

[0013] The method wherein the second user input for changing the location on the layout of the one first object includes an input of dragging the one first object from one area among the plurality of areas to another area.

[0014] The method further includes identifying a user input for enlarging one area among the plurality of areas, and enlarging and displaying the one area.

[0015] The method further includes identifying one or more first objects displayed in the one area, identifying an operation state of one or more devices corresponding to the one or more first objects, and displaying one or more objects including an operation state of the identified one or more devices.

[0016] The method further includes, when determining that the device corresponding to the one first object is relocatable, displaying information indicating that relocating according to the second user input succeeds.

[0017] The method further includes receiving information about whether the device corresponding to the one first object is a fixed device from the server, and determining whether the device corresponding to the one first object is relocatable based on the received information.

[0018] The method further includes identifying a user input for selecting an operation mode of the electronic device, identifying at least one operation device controlled according to the operation mode, and displaying an object indicating a result of executing the at least one operation device.

[0019] In accordance with another aspect of the disclosure, an electronic device for controlling a plurality of devices in a house is provided. The electronic device includes memory, comprising one or more storage media, storing instructions, and at least one processor communicatively coupled to the memory, wherein the instructions, when executed by the at least one processor individually or collectively, cause the electronic device to display a first user interface where a plurality of first objects corresponding to the plurality of devices are disposed according to a predetermined layout to correspond to a structure of the house, identify a first user input for selecting a category of a device to be controlled through a second object included in the first user interface, identify at least

one device included in the selected category in response to identifying the first user input, display a second user interface where at least one first object corresponding to the at least one device is disposed according to the layout, identify a second user input for changing a location on the layout of one first object among the at least one first object displayed on the second user interface according to the layout, determine whether a device corresponding to the one first object is relocatable in response to identifying the second user input, when it is determined that the device corresponding to the one first object is relocatable, change and display the location on the layout of the one first object to correspond to the second user input, and when it is determined that the device corresponding to the one first object is not relocatable, display information indicating that relocating is impossible.

[0020] The instructions that, when executed by the at least one processor individually or collectively, further cause the electronic device to receive information about the predetermined layout from a memory of the electronic device or a server providing a smart apartment service.

[0021] The predetermined layout includes a plurality of areas, and the plurality of areas respectively correspond to spaces in the house.

[0022] The plurality of areas include a shared area corresponding to a shared space other than the house.

[0023] The second user input for changing the location on the layout of the one first object includes an input of dragging the one first object from one area among the plurality of areas to another area.

[0024] The instructions that, when executed by the at least one processor individually or collectively, further cause the electronic device to identify a user input for enlarging one area among the plurality of areas, and enlarge and display the one area.

[0025] The instructions that, when executed by the at least one processor individually or collectively, further cause the electronic device to identify one or more first objects displayed in the one area, identify an operation state of one or more devices corresponding to the one or more first objects, and display one or more objects including an operation state of the identified one or more devices.

[0026] The instructions that, when executed by the at least one processor individually or collectively, further cause the electronic device to, when determining that the device corresponding to the one first object is relocatable, display information indicating that relocating according to the second user input succeeds.

[0027] The instructions that, when executed by the at least one processor individually or collectively, further cause the electronic device to receive information about whether the device corresponding to the one first object is a fixed device from the server, and determine whether the device corresponding to the one first object is relocatable based on the received information.

[0028] The instructions that, when executed by the at least one processor individually or collectively, further cause the electronic device to identify a user input for selecting an operation mode of the electronic device, identify at least one operation device controlled according to the operation mode, and display an object indicating a result of executing the at least one operation device.

[0029] In accordance with another aspect of the disclosure, one or more non-transitory computer-readable storage media storing one or more computer programs including computer-executable instructions that, when executed by one or more processors of an electronic device individually or collectively, cause the electronic device to perform operations are provided. The operations include displaying a first user interface where a plurality of first objects corresponding to a plurality of devices are disposed according to a predetermined layout to correspond to a structure of a house, identifying a first user input for selecting a category of a device to be controlled through a second object included in the first user interface, identifying at least one device included in the selected category in response to identifying the first user input, displaying a second user interface where at least one first object corresponding to the at least one device is disposed according to the layout,

identifying a second user input for changing a location on the layout of one first object among the at least one first object displayed on the second user interface according to the layout, determining whether a device corresponding to the one first object is relocatable in response to identifying the second user input, when it is determined that the device corresponding to the one first object is relocatable, changing and displaying the location on the layout of the one first object to correspond to the second user input, and, when it is determined that the device corresponding to the one first object is not relocatable, displaying information indicating that relocating is impossible.

[0030] According to the examples of the disclosure, devices in a house may be easily managed and controlled by the user.

[0031] Further, when there is a change in device layout such as a change in the location of devices in a house or a new device is added, the user may easily apply the changes.

[0032] Other aspects, advantages, and salient features of the disclosure will become apparent to those skilled in the art from the following detailed description, which, taken in conjunction with the annexed drawings, discloses various embodiments of the disclosure.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0033] The above and other aspects, features, and advantages of certain embodiments of the disclosure will be more apparent from the following description taken in conjunction with the accompanying drawings, in which:

[0034] FIG. **1** is a block diagram illustrating a configuration of an electronic device according to an embodiment of the disclosure;

[0035] FIG. **2** is a block diagram illustrating a configuration of a program according to an embodiment of the disclosure;

[0036] FIG. **3** illustrates an example of a user interface displayed on an electronic device according to an embodiment of the disclosure;

[0037] FIG. **4** illustrates an operation flow of an electronic device according to an embodiment of the disclosure;

[0038] FIG. **5** illustrates an example of a user interface for device editing of an electronic device according to an embodiment of the disclosure;

[0039] FIG. **6** illustrates an example of a user interface for device editing of an electronic device according to an embodiment of the disclosure;

[0040] FIG. **7** illustrates an example of a user interface for device identification and editing of an electronic device according to an embodiment of the disclosure;

[0041] FIG. **8**A illustrates an example of a user interface for device use of an electronic device according to an embodiment of the disclosure;

[0042] FIG. **8**B illustrates an example of a user interface for device use of an electronic device according to an embodiment of the disclosure;

[0043] FIG. **9** illustrates an example of a user interface for mode change of an electronic device according to an embodiment of the disclosure; and

[0044] FIG. **10** illustrates an example of a user interface for automation function use of an electronic device according to an embodiment of the disclosure.

[0045] Throughout the drawings, like reference numerals will be understood to refer to like parts, components, and structures.

DETAILED DESCRIPTION

[0046] The following description with reference to the accompanying drawings is provided to assist in a comprehensive understanding of various embodiments of the disclosure as defined by the claims and their equivalents. It includes various specific details to assist in that understanding

but these are to be regarded as merely exemplary. Accordingly, those of ordinary skill in the art will recognize that various changes and modifications of the various embodiments described herein can be made without departing from the scope and spirit of the disclosure. In addition, descriptions of well-known functions and constructions may be omitted for clarity and conciseness.

[0047] The terms and words used in the following description and claims are not limited to the bibliographical meanings, but, are merely used by the inventor to enable a clear and consistent understanding of the disclosure. Accordingly, it should be apparent to those skilled in the art that the following description of various embodiments of the disclosure is provided for illustration purpose only and not for the purpose of limiting the disclosure as defined by the appended claims and their equivalents.

[0048] It is to be understood that the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise. Thus, for example, reference to "a component surface" includes reference to one or more of such surfaces.

[0049] It should be appreciated that the blocks in each flowchart and combinations of the flowcharts may be performed by one or more computer programs which include instructions. The entirety of the one or more computer programs may be stored in a single memory device or the one or more computer programs may be divided with different portions stored in different multiple memory devices.

[0050] Any of the functions or operations described herein can be processed by one processor or a combination of processors. The one processor or the combination of processors is circuitry performing processing and includes circuitry like an application processor (AP, e.g. a central processing unit (CPU)), a communication processor (CP, e.g., a modem), a graphics processing unit (GPU), a neural processing unit (NPU) (e.g., an artificial intelligence (AI) chip), a Wi-Fi chip, a Bluetooth® chip, a global positioning system (GPS) chip, a near field communication (NFC) chip, connectivity chips, a sensor controller, a touch controller, a finger-print sensor controller, a display driver integrated circuit (IC), an audio CODEC chip, a universal serial bus (USB) controller, a camera controller, an image processing IC, a microprocessor unit (MPU), a system on chip (SoC), an IC, or the like.

[0051] FIG. **1** is a block diagram illustrating an electronic device in a network environment according to an embodiment of the disclosure.

[0052] Referring to FIG. **1**, the electronic device **101** in the network environment **100** may communicate with at least one of an electronic device **102** via a first network **198** (e.g., a short-range wireless communication network), or 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 an embodiment, at least one (e.g., the connecting terminal **178**) of the components may be omitted from the electronic device **101**, or one or more other components may be added in the electronic device **101**. According to an embodiment, some (e.g., the sensor module **176**, the camera module **180**, or the antenna module **197**) of the components may be integrated into a single component (e.g., the display module **160**).

[0053] 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 configured to use lower power than the main processor **121** or to be specified for a designated function. The auxiliary processor **123** may be implemented as separate from, or as part of the main processor **121**.

[0054] 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. The artificial intelligence model may be generated via 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.

[0055] 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**.

[0056] 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**.

[0057] The input module **150** may receive a command or data to be used by other 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, keys (e.g., buttons), or a digital pen (e.g., a stylus pen).

[0058] 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.

[0059] The display module **160** may visually provide information to the outside (e.g., a user) of the electronic device **101**. The display **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 **160** may include a touch sensor configured to

detect a touch, or a pressure sensor configured to measure the intensity of a force generated by the touch.

[0060] 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**.

[0061] 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 accelerometer, 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.

[0062] 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.

[0063] 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, an HDMI connector, a USB connector, an SD card connector, or an audio connector (e.g., a headphone connector).

[0064] The haptic module **179** may convert an electrical signal into a mechanical stimulus (e.g., a vibration or motion) 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.

[0065] 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.

[0066] 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).

[0067] 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.

[0068] 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 **104** via a first network **198** (e.g., a short-range communication network, such as

Bluetooth™ wireless-fidelity (Wi-Fi) direct, or infrared data association (IrDA)) or a second network **199** (e.g., a long-range communication network, such as a legacy cellular network, a fifth generation (5G) network, a next-generation communication network, the Internet, or a computer network (e.g., local area network (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 or 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**.

[0069] The wireless communication module **192** may support a 5G network, after a fourth generation (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 millimeter wave (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.

[0070] The antenna module **197** may transmit or receive a signal or power to or from the outside (e.g., the external electronic device). According to an embodiment, the antenna module **197** may include one antenna including a radiator formed of a conductor or conductive pattern formed 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., an antenna array). In this case, at least one antenna appropriate for a communication scheme used in a communication network, such as the first network **198** or the second network **199**, may be selected from the plurality of antennas by, e.g., the communication module **190**. 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, other parts (e.g., radio frequency integrated circuit (RFIC)) than the radiator may be further formed as part of the antenna module **197**.

[0071] 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.

[0072] 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)).

[0073] 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**. The external electronic devices **102** or **104** each may be a device of the same 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** or **104** or the server **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 another 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 health-care) based on 5G communication technology or IoT-related technology.

[0074] FIG. **2** is a block diagram illustrating the program according to an embodiment of the disclosure. According to an embodiment, the program **140** illustrated in block diagram **200** may include an operating system (OS) **142** to control one or more resources of the electronic device **101**, middleware **144**, or an application **146** executable in the OS **142**. The OS **142** may include, for example, Android™, iOS™, Windows™, Symbian™, Tizen™, or Bada™. At least part of the program **140**, for example, may be pre-loaded on the electronic device **101** during manufacture, or may be downloaded from or updated by an external electronic device (e.g., the electronic device **102** or **104**, or the server **108**) during use by a user.

[0075] The OS **142** may control management (e.g., allocating or deallocation) of one or more system resources (e.g., process, memory, or power source) of the electronic device **101**. The OS **142**, additionally or alternatively, may include one or more driver programs to drive other hardware devices of the electronic device **101**, for example, the input device **150**, the sound output device **155**, the display device **160**, the audio module **170**, the sensor module **176**, the interface **177**, the haptic module **179**, the camera module **180**, the power management module **188**, the battery **189**, the communication module **190**, the subscriber identification module **196**, or the antenna module **197**.

[0076] The middleware **144** may provide various functions to the application **146** such that a function or information provided from one or more resources of the electronic device **101** may be used by the application **146**. The middleware **144** may include, for example, an application manager **201**, a window manager **203**, a multimedia manager **205**, a resource manager **207**, a power manager **209**, a database manager **211**, a package manager **213**, a connectivity manager **215**, a notification manager **217**, a location manager **219**, a graphic manager **221**, a security manager **223**, a telephony manager **225**, or a voice recognition manager **227**.

[0077] The application manager **201**, for example, may manage the life cycle of the application **146**. The window manager **203**, for example, may manage one or more graphical user interface (GUI) resources that are used on a screen. The multimedia manager **205**, for example, may identify one or more formats to be used to play media files, and may encode or decode a corresponding one of the media files using a codec appropriate for a corresponding format selected from the one or more formats. The resource manager **207**, for example, may manage the source code of the application **146** or a memory space of the memory **130**. The power manager **209**, for example, may

manage the capacity, temperature, or power of the battery **189**, and determine or provide related information to be used for the operation of the electronic device **101** based at least in part on corresponding information of the capacity, temperature, or power of the battery **189**. According to an embodiment, the power manager **209** may interwork with a basic input/output system (BIOS) (not shown) of the electronic device **101**.

[0078] The database manager **211**, for example, may generate, search, or change a database to be used by the application **146**. The package manager **213**, for example, may manage installation or update of an application that is distributed in the form of a package file. The connectivity manager **215**, for example, may manage a wireless connection or a direct connection between the electronic device **101** and the external electronic device. The notification manager **217**, for example, may provide a function to notify a user of an occurrence of a specified event (e.g., an incoming call, message, or alert). The location manager **219**, for example, may manage locational information on the electronic device **101**. The graphic manager **221**, for example, may manage one or more graphic effects to be offered to a user or a user interface related to the one or more graphic effects.

[0079] The security manager **223**, for example, may provide system security or user authentication. The telephony manager **225**, for example, may manage a voice call function or a video call function provided by the electronic device **101**. The voice recognition manager **227**, for example, may transmit a user's voice data to the server **108**, and receive, from the server **108**, a command corresponding to a function to be executed on the electronic device **101** based at least in part on the voice data, or text data converted based at least in part on the voice data. According to an embodiment, the middleware **244** may dynamically delete some existing components or add new components. According to an embodiment, at least part of the middleware **144** may be included as part of the OS **142** or may be implemented as another software separate from the OS **142**.

[0080] The application **146** may include, for example, a home **251**, a dialer **253**, a short message service (SMS)/multimedia messaging service (MMS) **255**, an instant message (IM) **257**, a browser **259**, a camera **261**, an alarm **263**, a contact **265**, a voice recognition **267**, an email **269**, a calendar **271**, a media player **273**, a contact **275**, a watch **277**, a health **279** (e.g., for measuring the degree of workout or biometric information, such as blood sugar), or an environmental information **281** (e.g., for measuring air pressure, humidity, or temperature information) application. According to an embodiment, the application **146** may further include an information exchanging application (not shown) that is capable of supporting information exchange between the electronic device **101** and the external electronic device. The information exchange application, for example, may include a notification relay application adapted to transfer designated information (e.g., a call, message, or alert) to the external electronic device or a device management application adapted to manage the external electronic device. The notification relay application may transfer notification information corresponding to an occurrence of a specified event (e.g., receipt of an email) at another application (e.g., the email application **269**) of the electronic device **101** to the external electronic device. Additionally or alternatively, the notification relay application may receive notification information from the external electronic device and provide the notification information to a user of the electronic device **101**.

[0081] The device management application may control the power (e.g., turn-on or turn-off) or the function (e.g., adjustment of brightness, resolution, or focus) of the external electronic device or some component thereof (e.g., a display device or a camera module of the external electronic device). The device management application, additionally or alternatively, may support installation, delete, or update of an application running on the external electronic device.

[0082] FIG. **3** illustrates an example of a user interface of an electronic device according to an embodiment of the disclosure. The electronic device of FIG. **3** may represent a device corresponding to the electronic device **101** of FIG. **1**.

[0083] The user interface **300** according to an embodiment refers to the user interface displayed on the user terminal (e.g., smartphone) to identify and control various types of IoT devices (e.g., TVs,

refrigerators, air conditioners, air purifiers, sound bars, etc.) and other devices (e.g., lighting devices, batch light-off devices, cooktops, smart hoods, ventilators, etc.) disposed in a house such as an apartment.

[0084] The user interface displayed on the electronic device according to an embodiment may display objects corresponding to devices disposed in the house in the form of icons. With the development of technology related to IoT devices, various types and a large number of devices may be increasingly included in the house. In the user interface for IoT device management, displaying devices in the form of a map view, i.e., icons disposed for each room in the house, rather than displaying devices in the form of cards or a list, may lead users to easy use, contributing to enhancing user experience. Further, when the map view is applied to a preset mode (e.g., sleep mode, away mode, tropical night mode, etc.) and automation functions, devices related to the mode and automation function may be grasped at a glance, and how they operate may be easily identified, providing an effect that makes the mode and automation easier to use.

[0085] Referring to FIG. **3**, the user interface **300** may include an object **311** representing information about the apartment, an object **313** for identifying a user input for adding a device to the user interface **300**, an object **315** for identifying a user input for performing another function (e.g., an edit function, a function through another mode, or an automation function) of the user interface **300**, a second object **319-1** or **319-2** for identifying a first user input for selecting a category of a device to be controlled, an object **317** for representing a category of a device currently displayed on the user interface **300**, and a plurality of first objects corresponding to devices disposed on a predetermined layout **320**.

[0086] In an embodiment, the electronic device may display information for indicating information about the apartment through the object **311**.

[0087] In an embodiment, the electronic device may identify a user input for adding a device to be displayed on the user interface **300** through the object **313**. For example, although not illustrated in the drawings, when the electronic device identifies a user input through the object **313**, the electronic device may display an object (not illustrated) (e.g., receiving device information through a pop-up window and selecting the location where the device is to be disposed) for receiving a user input for selecting information about a device to be added information about the location where the device to be added is to be disposed.

[0088] In an embodiment, when identifying the user input through the object **315**, the electronic device may display another object related to the use, editing, or performing another function of devices displayed on the user interface **300**. A description related thereto is given with reference to FIGS. **5** to **7**, **8**A, **8**B, **9**, and **10**.

[0089] In an embodiment, the user interface **300** may include an object **317** representing the category of devices currently being displayed on the electronic device. For example, referring to FIG. **3**, the object **317** may display information indicating that devices in all categories are displayed, such as "View all devices." For example, the categories may include display devices (e.g., TVs, monitors), cooling/heating devices (e.g., air conditioners), air quality-related devices (e.g., air purifiers, smart hoods, ventilators, etc.), ceiling-mounted lighting devices, other lighting devices than ceiling-mounted lighting devices, devices (e.g., smart plugs, refrigerators, etc.) capable of displaying power usage, and other devices (e.g., robot vacuums).

[0090] In an embodiment, when identifying a user input through the second object **319-1** or **319-2**, the electronic device may display a device included in a changed category. For example, when the electronic device identifies a user input through the second object **319-2**, the electronic device may display the next category rather than the view all devices category. The categories may be displayed in a predetermined order, when identifying a user input through the second object **319-2**, the next category may be displayed, and when identifying a user input through the second object **319-2**, the previous category may be displayed. In an embodiment, although not illustrated in the drawings, when identifying an input of swiping the screen to the left or right, the electronic device

may display the previous or next category.

[0091] In an embodiment, the layout **320** may mean data regarding a predetermined form corresponding to the structure of an apartment obtained through information stored in the memory of the electronic device or received from a server (not illustrated). For example, the layout may refer to data created to correspond to a floor plan representing the structure of a house where the user resides in the apartment. The example of the layout **320** illustrated in FIG. **3** is merely an example, and the layout **320** according to embodiments of the disclosure is not limited thereto. Even in the same apartment building, the layout may differ depending on the number, floor, or location (e.g., the number, size, structure, or arrangement of rooms).

[0092] In an embodiment, the layout **320** may include a first area **321**, a second area **322**, a third area **323**, a fourth area **324**, a fifth area **325**, and a sixth area **326**. Each area may refer to a room or space included in the house. For example, the second area **322** may refer to a kitchen space in the house. For example, the fourth area **324** may refer to a living room. For example, the fifth space may refer to a bedroom. In an embodiment, the sixth area **326** may refer to a shared area shared by all the occupants in the apartment building, not a dedicated area constituting the user's house.

[0093] In an embodiment, the user interface **300** may include a plurality of first objects corresponding to the plurality of devices included in the house. The plurality of first objects may have shapes of icons corresponding to the devices, respectively. The plurality of first objects may be displayed on the user interface **300** to correspond to the structure in which the device is disposed in the house.

[0094] In an embodiment, the table **301** represents a plurality of first objects displayed on the user interface **300**.

[0095] In an embodiment, the plurality of devices may include a lighting device, a smart plug, a batch light-off device, a system air conditioner, a display device, a smart hood, a ventilator, a curtain, a cooktop device, a refrigerator, an air purifier, and an interphone.

[0096] In an embodiment, although not illustrated in the drawings, the plurality of devices may further include a heating device, a door lock device, a gas valve device, a dryer, a washer, an audio device, an air conditioner, a clothing care machine, a dishwasher, a kimchi refrigerator, or the like.

[0097] In an embodiment, the plurality of first objects may respectively correspond to the plurality of devices described above, and may be displayed in the form of separate icons.

[0098] Referring to FIG. **3**, the first area **321** according to an embodiment may include first objects corresponding to a lighting device and a smart plug. The second area **322** according to an embodiment may include first objects corresponding to a refrigerator, a smart hood, a cooktop, and a lighting device. The third area **323** according to an embodiment may include first objects corresponding to a smart plug and a lighting device. The fourth area **324** according to an embodiment may include first objects corresponding to a display device, an interphone, two lighting devices, a curtain device, a system air conditioner, a ventilator, and an air purifier. The fifth area **325** according to an embodiment may include first objects corresponding to a lighting device, a system air conditioner, a curtain device, and a smart air conditioner. The sixth area **326** according to an embodiment may include first objects corresponding to a batch light-off device and an elevator device.

[0099] In an embodiment, each of the plurality of first objects may represent information (e.g., an operation state, a stopped state) about whether the device is operating. In the following description, a "first state" may be used in the same meaning as a state in which it is not operating (e.g., a light-off state, off), and a "second state" may be used in the same meaning as a state in which it is operating (e.g., a light-on state, on). For example, the lighting device included in the first area **321** may be in the first state. For example, the cooktop included in the second area **322** may be in the second state. For example, the air purifier included in the fourth area **324** may be in the second state.

[0100] In an embodiment, although not illustrated in the drawings, when identifying a user input of

rotating on the user interface **300**, the electronic device may rotate the screen in the direction according to the user input and display the user interface.

[0101] FIG. **4** illustrates an operation flow of an electronic device according to an embodiment of the disclosure. FIG. **5** illustrates an example of a user interface of an electronic device according to an embodiment of the disclosure. The electronic device of FIGS. **4** and **5** may be a device corresponding to the electronic device **101** of FIG. **1**. A first user interface **510**, a second user interface **520** or **540**, or a third user interface **530** or **550** described in FIGS. **4** and **5** may refer to a user interface corresponding to the user interface **300** of FIG. **3**, and content overlapping those described in FIG. **3** or components already defined in FIG. **3** may be skipped from the description.

[0102] According to an embodiment, in operation **410**, the electronic device may display a first user interface in which a plurality of first objects corresponding to a plurality of devices are disposed according to a predetermined layout to correspond to the structure of the house. The plurality of first objects may refer to the plurality of first objects described above with reference to FIG. **3**. In other words, the components illustrated in the form of circular icons in FIG. **5** may refer to the plurality of objects, respectively. The predetermined layout may correspond to the layout **320** described in FIG. **3**. The first user interface may refer to the user interface **300** of FIG. **3**. Referring to FIG. **5**, the electronic device may display the first user interface **510**. The first user interface **510** may include the plurality of first objects disposed according to the predetermined layout **320**. For example, the first user interface may include a first object **501** and an object **503**. The first object **501** may represent an object corresponding to an air purifier disposed in a fourth area (e.g., the fourth area **324**), i.e., the living room, and the object **503** may represent an object corresponding to a lighting device disposed in the fourth area (e.g., the fourth area **324**).

[0103] According to an embodiment, in operation **420**, the electronic device may identify a first user input for selecting a category of a device to be controlled through a second object included in the first user interface. The second object may refer to the second object **319-1** or **319-2** of FIG. **3**, and the first user input may refer to a user input identified through the second object **319-1** or **319-2**.

[0104] In an embodiment, the category of the device to be controlled may include a first category including all of the plurality of devices, a second category including display devices (e.g., TVs or monitors), a third category including heating/cooling devices (e.g., system air conditioners, floor-standing air conditioners, or heating devices), a fourth category including devices for controlling state quality (e.g., air purifiers, smart hoods, or ventilators), a fifth category including ceiling-mounted lighting devices, a sixth category including other lighting devices other than ceiling-mounted lighting devices, a seventh category including devices capable of displaying power usage (e.g., smart plugs or refrigerators), and an eighth category including other devices (e.g., robot vacuums or elevators).

[0105] In an embodiment, a predetermined order may be present between the categories of devices to be controlled. For example, there may be a predetermined order in the order of the first category to the eighth category. When the electronic device identifies the first user input through the second object **319-1** while the first category is displayed, the electronic device may display the second category. When the electronic device identifies the first user input through the second object **319-1** while the second category is displayed, the electronic device may display the third category. When the electronic device identifies the first user input through the second object **319-2** while the first category is displayed, the electronic device may display the eighth category. Referring to FIG. **5**, the electronic device may identify a user input through the first object **319-1** or the second object **319-2** displayed on the first user interface **510**.

[0106] According to an embodiment, in operation **430**, the electronic device may identify at least one device included in the selected category in response to identifying the first user input. For example, when the selected category is the first category, the electronic device may display first objects corresponding to all of the devices included in the house. For example, when the selected

category is the second category, the electronic device may display only the first object corresponding to the display device. In FIG. **5**, an example in which the first category is selected is described, and thus, all of the devices are displayed. However, when one of the second category to the eighth category is selected, the first object corresponding to some devices may not be displayed.

[0107] In an embodiment, when receiving a user input through the object **315**, the electronic device may display the object **517**. The object **517** may refer to an object representing other functions that may be performed by the electronic device displayed as a user input to the object **315** is identified. Although not illustrated in the drawings, the object **517** may include information about various functions related to the first user interface, such as a mode setting function and an automation operation function, in addition to the device editing function.

[0108] According to an embodiment, in operation **440**, the electronic device may display a second user interface in which at least one first object corresponding to the at least one device is disposed according to the layout.

[0109] In an embodiment, the second user interface may refer to a user interface displayed when receiving a user input through the object **315** in the user interface **300** and identifying a user input for device editing through the displayed object **517**.

[0110] In an embodiment, the second user interface **520** or **540** may include a plurality of first objects (e.g., the object **501** and the object **503**) displayed on the first user interface **510**.

[0111] In an embodiment, the electronic device may identify a second user input for editing through the first object displayed on the second user interface **520** or **540**. For example, although not illustrated in the drawings, when the electronic device switches to an editing mode (when receiving a user input through the object **517**) and displays the second user interface **520** or **540**, a plurality of first objects may change into the form of an FAB button to transform to be able to receive the user's input (e.g., drag, drag-and-drop, tap, etc.).

[0112] In an embodiment, when identifying a user input for editing the plurality of objects through the object **517**, the electronic device may display the second user interface **520** or **540**.

[0113] According to an embodiment, in operation **450**, the electronic device may identify a second user input for changing the location on the layout of one first object among at least one first object displayed according to the layout.

[0114] According to an embodiment, in operation **460**, in response to identifying the second user input, the electronic device may determine whether the device corresponding to one first object to be relocated is relocatable. Whether relocating is possible may be determined according to whether the device is built in the apartment not to be moved.

[0115] In an embodiment, the second or third user interface **520** or **530** may include an object **505** for identifying a user input for finishing editing of the plurality of first objects and returning to the original first user interface. When the electronic device identifies a user input through the object **505**, the electronic device may terminate the editing mode and return to the original mode (e.g., the first user interface).

[0116] In an embodiment, when the electronic device identifies whether the device is fixed and identifies that the device is fixed based on information about the device stored in the memory or the server, the electronic device may determine that the device corresponding to the selected first object is relocatable. Further, when the electronic device identifies that the device is not fixed, the electronic device may determine that the device corresponding to the selected first object is not relocatable.

[0117] According to an embodiment, when the electronic device determines that the device corresponding to the one first object is relocatable, in operation **470**, the electronic device may display a third user interface in which the one first object is relocated and displayed on the layout to correspond to the second user input.

[0118] According to an embodiment, when the electronic device determines that the device

corresponding to one first object is not relocatable, in operation **480**, the electronic device may display a fourth user interface including information that relocating is impossible.

[0119] For example, referring to FIG. **5**, the electronic device may identify a second user input **522** of dragging one first object **501** among at least one first object displayed according to the layout displayed through the second user interface **520**. The second user input to the first object **501** may refer to a user input to change the location of the first object **501** from a first location **524** included in the fourth area (e.g., the fourth area **324**) to a second location **526** included in the fifth area (e.g., the fifth area **325**). The electronic device may determine that the air purifier which is the device corresponding to the first object **501** is not fixed, but is relocatable. The electronic device may relocate the first object **501** from the first location **524** which is the existing location to the second location **526** and display it on the third user interface **530**.

[0120] Further, for example, referring to FIG. **5**, the electronic device may identify a second user input **542** of dragging or panning one object **503** among at least one first object displayed according to the layout displayed through the second user interface **540**. The second user input to the object **503** may refer to a user input to change the location of the object **503** from a first location **544** included in the fourth area (e.g., the fourth area **324**) to a second location **546** included in the fifth area (e.g., the fifth area **325**). The electronic device may determine that since the lighting device, which is a device corresponding to the object **503**, is fixed, relocating is impossible. The electronic device may display the object **503**, as it is, at the existing location **544** on the third user interface **550**.

[0121] In an embodiment, the third user interface **530** or **550** may include an object **532** or **552** indicating information about whether relocating of the first object has succeeded. For example, the third user interface **530** may include object **532** including information indicating that relocating of the first object has succeeded (e.g., "The air purifier has moved to the master bedroom"). For example, the third user interface **550** may include object **552** including information indicating that relocating of the first object has failed (e.g., "Light 8 is a fixed device in the smart apartment. It is not relocatable").

[0122] FIG. **6** illustrates an example of a user interface for device editing of an electronic device according to an embodiment of the disclosure. The electronic device of FIG. **6** may be a device corresponding to the electronic device **101** of FIG. **1**.

[0123] In an embodiment, the second user interface may refer to a user interface displayed when receiving a user input through the object **315** in the user interface **300** and identifying a user input for device editing through the displayed object **517**. The user interface **610** of FIG. **6** may represent an example of a user interface displayed when a user input is identified through the first object **601** on the second user interface.

[0124] In an embodiment, the electronic device may display an object **517** when identifying a user input through the object **315** of the user interface **300** or **510**. Thereafter, when identifying a user input for device editing through the object **517**, the electronic device may display a second user interface (e.g., the second user interface **520** or **540**) related to device editing.

[0125] In an embodiment, when the electronic device identifies a user input **612** through the first object **601** included in the second user interface for device editing, the electronic device may display an object **614** for receiving a user input for changing the device name.

[0126] In an embodiment, a user input **612** may include various types of user inputs such as a tap, a double tap, and a long press.

[0127] Referring to FIG. **6**, in an embodiment, when the electronic device identifies a user input for tapping the first object **601**, the electronic device may display the object **614**. The electronic device may identify a user input for inputting the name of the first object **601** through the object **614**. In response to identifying the user input for inputting the name of the first object **601**, the electronic device may set the input name as the name of the corresponding device.

[0128] FIG. **7** illustrates an example of a user interface for device identification and editing of an

electronic device according to an embodiment of the disclosure. The user interface **710**, **720**, or **730** described in the description of FIG. **7** may refer to the second user interface described in FIGS. **4**, **5**, and **6**. In other words, the second user interface may refer to a user interface displayed when receiving a user input through the object **315** in the user interface **300** and identifying a user input for device editing through the displayed object **517**.

[0129] In an embodiment, the second user interface **710** may include a plurality of first objects (e.g., the first object **701**, the first object **703**, the first object **705**, the first object **707**, and the first object **709**).

[0130] In an embodiment, the second user interface **710** may include an object **704** (e.g., "done") for identifying a user input for terminating the editing function.

[0131] In an embodiment, when identifying a user input for enlarging a specific area through the second user interface **710**, the electronic device may display the second user interface **720** in which the specific area is enlarged. For example, when the electronic device identifies a user input **702** identified in the fourth area **324**, the electronic device may display the second user interface **720** in which the fourth area **324** is enlarged and displayed. When the user wants to identify and change the device included in the living room, only the area corresponding to the living room may be enlarged on the user interface, and as the area is enlarged, the size of the space for display increases, so that the electronic device may display various information.

[0132] In an embodiment, a user input **702** may include a user input (e.g., spread or pinch-out) for enlarging the screen.

[0133] In an embodiment, the user input **702** may be identified in at least one area included in the layout (e.g., the layout **320**). For example, the user input **702** may be identified in the first to sixth areas **321** to **326**. It may include a user input (e.g., spread or pinch-out) to enlarge the screen.

[0134] In an embodiment, the electronic device may enlarge and display the area in which the user input **702** is identified. For example, referring to FIG. **5**, since the user input **702** is identified in the fourth area **324**, the electronic device may display the second user interface **720** in which the fourth area **324** is enlarged.

[0135] According to an embodiment, the second user interface **720** may include a plurality of first objects included in the enlarged area and an object including information about states of devices corresponding to the plurality of first objects. For example, the second user interface **720** may include an object **721** including information about content (e.g., Channel #1) currently being played by the TV, which is the device corresponding to the first object **701**. For example, the second user interface **720** may include an object **723** including information about the current state (e.g., good air condition) of the air purifier, which is the device corresponding to the first object **703**. For example, the second user interface **720** may include an object **725** including information about the current wind strength (e.g., strong wind) of the ventilator, which is the device corresponding to the first object **705**. For example, the second user interface **720** may include an object **727** including information about the current state (e.g., an open state) of the curtain device, which is the device corresponding to the first object **707**. For example, the second user interface **720** may include an object **729** including information about the current state (e.g., set temperature: 21 degrees, current temperature: 25 degrees), of the system air conditioner, which is the device corresponding to the first object **709**.

[0136] In an embodiment, the second user interface **720** may include the object **722** including information about the area currently being enlarged and displayed. For example, the second user interface may include an object including information indicating that the currently enlarged area is the living room, which is the fourth area **324**.

[0137] In an embodiment, when the electronic device identifies a user input **732** through the object **722** included in the second user interface **720**, the electronic device may display the second user interface **730** including the object **722** for changing the name of the enlarged area. For example, when identifying a user input for selecting the object **722** (e.g., the living room), the electronic

device may display the second user interface **730** including the object **722** (e.g., changing the room name).

[0138] In an embodiment, although not illustrated in the drawings, when identifying a user input for selecting a plurality of first objects (e.g., the first objects **701**, **703**, **705**, **707**, and **709**) displayed on the second user interface **720**, the electronic device may display an object for identifying a user input for changing the name of the device corresponding to the selected first object.

[0139] FIG. **8**A illustrates an example of a user interface for device use of an electronic device according to an embodiment of the disclosure. FIG. **8**B illustrates an example of a user interface for device use of an electronic device according to an embodiment of the disclosure. The electronic device described in FIGS. **8**A and **8**B may refer to the electronic device of FIG. **1**. The user interface **810**, **820**, or **830** shown in FIGS. **8**A and **8**B may be a first user interface corresponding to the user interface **300** of FIG. **3**.

[0140] In an embodiment, the electronic device may display a first user interface including information about use of the device. The information about the use of the device may include a preview screen representing a result displayed when the device is used, and a screen including a special effect regarding the form in which the device operates.

[0141] In an embodiment, the information about the use of the device may include information indicating that the device is in the first state or the second state when the device provides only a single function (e.g., when the lighting device simply includes an on/off function). In an embodiment, when the device provides a plurality of functions (e.g., when the lighting device is capable of adjusting brightness in addition to turning on/off), the information about the use of the device may include information (e.g., brightness information) about each of the plurality of functions.

[0142] In an embodiment, in the electronic device, the first user interface may include a plurality of first objects. When the electronic device identifies a user input (e.g., tap) through the first object displayed on the first user interface, the electronic device may display information about the device use of the device corresponding to the first object where a user input is identified. FIG. **8**A may illustrate an example of a user interface displayed when a device provides only a single function, and FIG. **8**B may illustrate an example of a user interface displayed when a device provides a plurality of functions.

[0143] Referring to FIG. **8**A, in an embodiment, the electronic device may display a first object **811** representing a lighting device included in the second area **322** that is an area corresponding to the kitchen space through the first user interface **810**. The electronic device may shade the surroundings of the first object **811**, indicating that the lighting device is currently turned off. When the electronic device identifies a user input **813** through the first object **811**, the electronic device may display the first user interface **820**.

[0144] In an embodiment, the first user interface **820** may include an object **822** including a result displayed when the device corresponding to the first object **811** is controlled according to a user input **813** identified through the first object **811**. For example, the object **822** may represent a portion **824** that brightens up in the house when the lighting device is turned on. In an embodiment, the object **822** may have the form of a pop-up window.

[0145] In an embodiment, the electronic device may release the display of the object a predetermined time (e.g., 3 seconds) after the object **822** is displayed.

[0146] In an embodiment, the electronic device may display the first user interface **830** after releasing the display of the object **822**. The first user interface **830** may include a result of manipulating the first object **811**. For example, the electronic device may display the first object **811** to indicate that the lighting device corresponding to the first portion **824** is turned on through the first user interface **830**. Referring to FIG. **8**A, the electronic device may display the first object **811**, which used to be represented in the form that shading is included in the surroundings, in the form of a first object **811** in the form that no shading is included in the surroundings.

[0147] Referring to FIG. **8**B, the electronic device may display a first object **841** indicating a lighting device included in the second area, which is an area corresponding to the kitchen space, through the first user interface **840**. The electronic device may shade the surroundings of the first object **841**, indicating that the lighting device is currently turned off. When the electronic device identifies a user input **843** through the first object **841**, the electronic device may display the first user interface **850**.

[0148] In an embodiment, the first user interface **850** may include an object **852** including information about the use of the lighting device corresponding to the first object **841**. The object **852** including information about the use of the lighting device corresponding to the first object **841** may include an object **854** for adjusting the brightness of the lighting device and an object **856** for turning on or off the lighting device. When identifying a user input through the object **854**, the electronic device may adjust the brightness of the lighting device corresponding to the first object **841** to correspond to a user input. When identifying a user input through the object **856**, the electronic device may turn on or off the lighting device corresponding to the first object **841**.

[0149] In an embodiment, when the electronic device identifies a user input for controlling the lighting device through the object **852**, the electronic device may display the first user interface **860**. The first user interface **860** may include an object **862** for displaying a result displayed when the device corresponding to the first object **841** operates according to a user input identified through the object **852**. For example, the object **862** may indicate a portion **864** that is brightened in the house and the degree of brightness thereof. In an embodiment, the object **862** may have the form of a pop-up window.

[0150] In an embodiment, the electronic device may release the display of the object a predetermined time (e.g., 3 seconds) after the object **862** is displayed.

[0151] In an embodiment, the electronic device may display the first user interface **870** after releasing the display of the object **862**. The first user interface **870** may include a first object **845**. The first object **845** may refer to an object reflecting a control result according to the user's input to the first object **841**. For example, the electronic device may display the first object **845** to indicate that the lighting device corresponding to the first object **841** has been controlled through the first user interface **850**. Referring to FIG. **8**B, the electronic device may display the first object **841**, which used to be represented in the form that no shading is included in the surroundings, in the form of a first object **845** in the form that no shading is included in the surroundings.

[0152] FIG. **9** illustrates an example of a user interface for mode change of an electronic device according to an embodiment of the disclosure. The electronic device described in FIG. **9** may represent a device corresponding to the electronic device **101** of FIG. **1**.

[0153] Referring to FIG. **9**, the electronic device according to an embodiment may display a third user interface **910**, **920**, or **930** for controlling devices included in the house according to a specific mode.

[0154] In an embodiment, the electronic device may display an object **517** in response to identifying a user input through the object **315**. The electronic device may display the third user interface **910**, **920**, or **930** in response to identifying a user input (not illustrated) for selecting a function for operating according to the mode through the object **517**.

[0155] In an embodiment, the third user interface **910**, **920**, or **930** may include an object **902** for representing information about the current mode and objects **903-1** and **903-2** for selecting the mode. For example, if a user input **901** is identified through the object **903-1** while displaying the third user interface **910**, the electronic device may display the third user interface **920**. For example, if a user input is identified through the object **903-1** while displaying the third user interface **920**, the electronic device may display the third user interface **930**. For example, if a user input is identified through the object **903-1** while displaying the third user interface **930**, the electronic device may display the third user interface **910**. For example, if a user input is identified through the object **903-2** while displaying the third user interface **910**, the electronic device may

display the third user interface **930**.

[0156] In an embodiment, the electronic device may display the first object included in the user interface according to the selected mode. For example, when the selected mode is the first mode (e.g., "away mode"), and the mode switches to the away mode, the electronic device may display the lighting devices included in each area all in the off state, display the curtain devices all in the off state, and display the interphone in the on state based on control results of the devices (e.g., changing the lighting devices into the off state and changing the curtains into the closed state). For example, when the selected mode is the second mode (e.g., "home mode"), and the mode switches to the home mode, the electronic device may display the third user interface **920** based on the control results of the devices (e.g., changing the lighting devices disposed in the first area and the second area into the on state, changing the air conditioner, ventilator, and air purifier included in the fourth area into the on state, and changing the air conditioner disposed in the fifth area into the off state). For example, when the selected mode is the third mode (e.g., "tropical night avoidance mode"), and the mode switches to the tropical night avoidance mode, the electronic device may display the third user interface **930** based on the control results of the device (e.g., changing the lighting device into the off state, changing the curtain into the closed state, or changing the air conditioner and the ventilator all into the off state).

[0157] In an embodiment, although not illustrated in the drawings, the third user interface **910**, **920**, or **930** may display the results of operation of the devices in the form of a preview (e.g., a special effect, etc.) when executing each mode.

[0158] In an embodiment, the third user interface **910**, **920**, or **930** may include an object (not illustrated) (e.g., "preview") for identifying a user input for previewing the operation results of the devices when operating according to the mode. For example, when the electronic device identifies a hovering input through an object for identifying a user input to preview the operation results of the devices included in the third user interface **910**, **920**, or **930**, the electronic device may display a pop-up window showing the operation results of devices or an FAB represented on each first object. By providing an IoT mode interface using the map view, it is possible to prevent other devices than those expected by the user from operating when the corresponding mode is pressed while showing the related devices associated with the mode name.

[0159] In an embodiment, although not illustrated in the drawings, the electronic device may display information about whether the devices have been successfully executed according to the mode. For example, the electronic device may represent the first objects corresponding to the devices whose execution has been completed in a specific color or form and the first objects corresponding to the devices whose execution has failed in a different color from the specific color or a different form.

[0160] FIG. **10** illustrates an example of a user interface for automation function use of an electronic device according to an embodiment of the disclosure. The electronic device of FIG. **10** may be a device corresponding to the electronic device **101** of FIG. **1**.

[0161] Referring to FIG. **10**, the electronic device according to an embodiment may display a third user interface **1010**, **1020**, or **1030** for controlling devices included in a house according to an automation function.

[0162] In an embodiment, the electronic device may display an object **517** in response to identifying a user input through the object **315**. The electronic device may display the third user interface **1010**, **1020**, or **1030** in response to identifying a user input (not illustrated) for selecting a function for operating according to the automation function through the object **517**.

[0163] In an embodiment, the third user interface **1010**, **1020**, or **1030** may include an object **1002** (e.g., "avoid tropical night") for representing information about the current automation function and objects **1003-1** and **1003-2** for selecting the automation function. For example, if a user input is identified through the object **1003-1** while displaying the third user interface **1010**, the electronic device may display the third user interface **1020**. For example, if a user input is identified through

the object **1003-1** while displaying the third user interface **1020**, the electronic device may display the third user interface **1030**. For example, if a user input is identified through the object **1003-1** while displaying the third user interface **1030**, the electronic device may display the third user interface **1010**. For example, if a user input is identified through the object **1003-2** while displaying the third user interface **1010**, the electronic device may display the third user interface **1030**.

[0164] In an embodiment, the third user interface **1010**, **1020**, or **1030** may include an object **1005** (e.g., start the automation function after 21 PM, 32 degrees Celsius or higher) indicating information about a triggering condition of the automation function and an object **1007** for identifying a user input regarding whether it is triggered.

[0165] In an embodiment, when identifying a user input **1009** through the third user interface **1020**, the electronic device may display the third user interface **1030**. The third user interface **1030** may represent a result of controlling devices according to the automation function (e.g., changing the lighting devices all into the off state and changing the air conditioner into the off state). The third user interface **1030** may include a modification of the object **1007** indicating that it is currently operating in response to the identified user input **1009** to the object **1007**.

[0166] In an embodiment, although not illustrated in the drawings, the electronic device may display the results of operation of the devices according to the selected automation function in the form of a preview. Further, the electronic device may display the results of controlling the devices (e.g., air conditioner on or light off) according to the automation function.

[0167] The electronic device according to various embodiments of the disclosure 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, or a home appliance. According to an embodiment of the disclosure, the electronic devices are not limited to those described above.

[0168] It should be appreciated that various embodiments of the 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. 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 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), it means that the element may be coupled with the other element directly (e.g., wiredly), wirelessly, or via a third element.

[0169] As used herein, the term "module" may include a unit implemented in hardware, software, or firmware, 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).

[0170] Various embodiments as set forth herein may be implemented as software (e.g., the program **140**) including one or more instructions that are stored in a storage medium (e.g., internal memory **136** or external memory **138**) that is readable by a machine (e.g., the electronic device **101**). For example, a processor (e.g., the processor **120**) of the machine (e.g., the electronic device **101**) 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 complier or a code executable by an interpreter. The storage medium readable by the machine may be provided in the form of a non-transitory storage medium. Wherein, the term "non-transitory" simply means that the storage medium is a tangible device, and does 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.

[0171] 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 products may be traded as commodities between sellers and buyers. 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., Play Store™), 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.

[0172] 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. Some of the plurality of 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.

[0173] It will be appreciated that various embodiments of the disclosure according to the claims and description in the specification can be realized in the form of hardware, software or a combination of hardware and software.

[0174] Any such software may be stored in non-transitory computer readable storage media. The non-transitory computer readable storage media store one or more computer programs (software modules), the one or more computer programs include computer-executable instructions that, when executed by one or more processors of an electronic device individually or collectively, cause the electronic device to perform a method of the disclosure.

[0175] Any such software may be stored in the form of volatile or non-volatile storage such as, for example, a storage device like read only memory (ROM), whether erasable or rewritable or not, or in the form of memory such as, for example, random access memory (RAM), memory chips, device or integrated circuits or on an optically or magnetically readable medium such as, for example, a compact disk (CD), digital versatile disc (DVD), magnetic disk or magnetic tape or the like. It will be appreciated that the storage devices and storage media are various embodiments of non-transitory machine-readable storage that are suitable for storing a computer program or computer programs comprising instructions that, when executed, implement various embodiments of the disclosure. Accordingly, various embodiments provide a program comprising code for implementing apparatus or a method as claimed in any one of the claims of this specification and a non-transitory machine-readable storage storing such a program.

[0176] While the disclosure has been shown and described with reference to various embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the disclosure as defined by the appended claims and their equivalents.

Claims

1. A method performed by an electronic device for controlling a plurality of devices in a house, the method comprising: displaying a first user interface where a plurality of first objects corresponding to the plurality of devices are disposed according to a predetermined layout to correspond to a structure of the house; identifying a first user input for selecting a category of a device to be controlled through a second object included in the first user interface; identifying at least one device included in the selected category in response to identifying the first user input; displaying a second user interface where at least one first object corresponding to the at least one device is disposed according to the layout; identifying a second user input for changing a location on the layout of one first object among the at least one first object displayed on the second user interface according to the layout; determining whether a device corresponding to the one first object is relocatable in response to identifying the second user input; when it is determined that the device corresponding to the one first object is relocatable, changing and displaying the location on the layout of the one first object to correspond to the second user input; and when it is determined that the device corresponding to the one first object is not relocatable, displaying information indicating that relocating is impossible.

2. The method of claim 1, further comprising receiving information about the predetermined layout from memory of the electronic device or a server providing a smart apartment service.

3. The method of claim 1, wherein the predetermined layout includes a plurality of areas, and wherein the plurality of areas respectively correspond to spaces in the house.

4. The method of claim 3, wherein the plurality of areas include a shared area corresponding to a shared space other than the house.

5. The method of claim 3, wherein the second user input for changing the location on the layout of the one first object includes an input of dragging the one first object from one area among the plurality of areas to another area.

6. The method of claim 3, comprising: identifying a user input for enlarging one area among the plurality of areas; and enlarging and displaying the one area.

7. The method of claim 6, comprising: identifying one or more first objects displayed in the one area; identifying an operation state of one or more devices corresponding to the one or more first objects; and displaying one or more objects including an operation state of the identified one or more devices.

8. The method of claim 1, further comprising, when determining that the device corresponding to the one first object is relocatable, displaying information indicating that relocating according to the second user input succeeds.

9. The method of claim 2, further comprising: receiving information about whether the device corresponding to the one first object is a fixed device from the server; and determining whether the device corresponding to the one first object is relocatable based on the received information about whether the device corresponding to the one first object is the fixed device.

10. The method of claim 1, further comprising: identifying a user input for selecting an operation mode of the electronic device; identifying at least one operation device controlled according to the operation mode; and displaying an object indicating a result of executing the at least one operation device.

11. An electronic device for controlling a plurality of devices in a house, the electronic device comprising: memory, comprising one or more storage media, storing instructions; and at least one processor communicatively coupled to the memory, wherein the instructions, when executed by the at least one processor individually or collectively, cause the electronic device to: display a first user interface where a plurality of first objects corresponding to the plurality of devices are disposed according to a predetermined layout to correspond to a structure of the house, identify a first user

input for selecting a category of a device to be controlled through a second object included in the first user interface, identify at least one device included in the selected category in response to identifying the first user input, display a second user interface where at least one first object corresponding to the at least one device is disposed according to the layout, identify a second user input for changing a location on the layout of one first object among the at least one first object displayed on the second user interface according to the layout, determine whether a device corresponding to the one first object is relocatable in response to identifying the second user input, when it is determined that the device corresponding to the one first object is relocatable, change and display the location on the layout of the one first object to correspond to the second user input, and when it is determined that the device corresponding to the one first object is not relocatable, display information indicating that relocating is impossible.

12. The electronic device of claim 11, wherein the instructions that, when executed by the at least one processor individually or collectively, further cause the electronic device to receive information about the predetermined layout from the memory of the electronic device or a server providing a smart apartment service.

13. The electronic device of claim 11, wherein the predetermined layout includes a plurality of areas, and wherein the plurality of areas respectively correspond to spaces in the house.

14. The electronic device of claim 13, wherein the plurality of areas include a shared area corresponding to a shared space other than the house.

15. The electronic device of claim 13, wherein the second user input for changing the location on the layout of the one first object includes an input of dragging the one first object from one area among the plurality of areas to another area.

16. The electronic device of claim 13, wherein the instructions that, when executed by the at least one processor individually or collectively, further cause the electronic device to: identify a user input for enlarging one area among the plurality of areas; and enlarge and display the one area.

17. The electronic device of claim 16, wherein the instructions that, when executed by the at least one processor individually or collectively, further cause the electronic device to: identify one or more first objects displayed in the one area; identify an operation state of one or more devices corresponding to the one or more first objects; and display one or more objects including an operation state of the identified one or more devices.

18. The electronic device of claim 11, wherein the instructions that, when executed by the at least one processor individually or collectively, further cause the electronic device to, when determining that the device corresponding to the one first object is relocatable, display information indicating that relocating according to the second user input succeeds.

19. One or more non-transitory computer-readable storage media storing one or more computer programs including computer-executable instructions that, when executed by one or more processors of an electronic device individually or collectively, cause the electronic device to perform operations, the operations comprising: displaying a first user interface where a plurality of first objects corresponding to a plurality of devices are disposed according to a predetermined layout to correspond to a structure of a house; identifying a first user input for selecting a category of a device to be controlled through a second object included in the first user interface; identifying at least one device included in the selected category in response to identifying the first user input; displaying a second user interface where at least one first object corresponding to the at least one device is disposed according to the layout; identifying a second user input for changing a location on the layout of one first object among the at least one first object displayed on the second user interface according to the layout; determining whether a device corresponding to the one first object is relocatable in response to identifying the second user input; when it is determined that the device corresponding to the one first object is relocatable, changing and displaying the location on the layout of the one first object to correspond to the second user input; and when it is determined that the device corresponding to the one first object is not relocatable, displaying information

indicating that relocating is impossible.

20. The one or more non-transitory computer-readable storage media of claim 19, the operations further comprising receiving information about the predetermined layout from memory of the electronic device or a server providing a smart apartment service.