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(54) **ELECTRONIC DEVICE FOR DISPLAYING VIRTUAL OBJECT, AND CONTROL METHOD THEREFOR**

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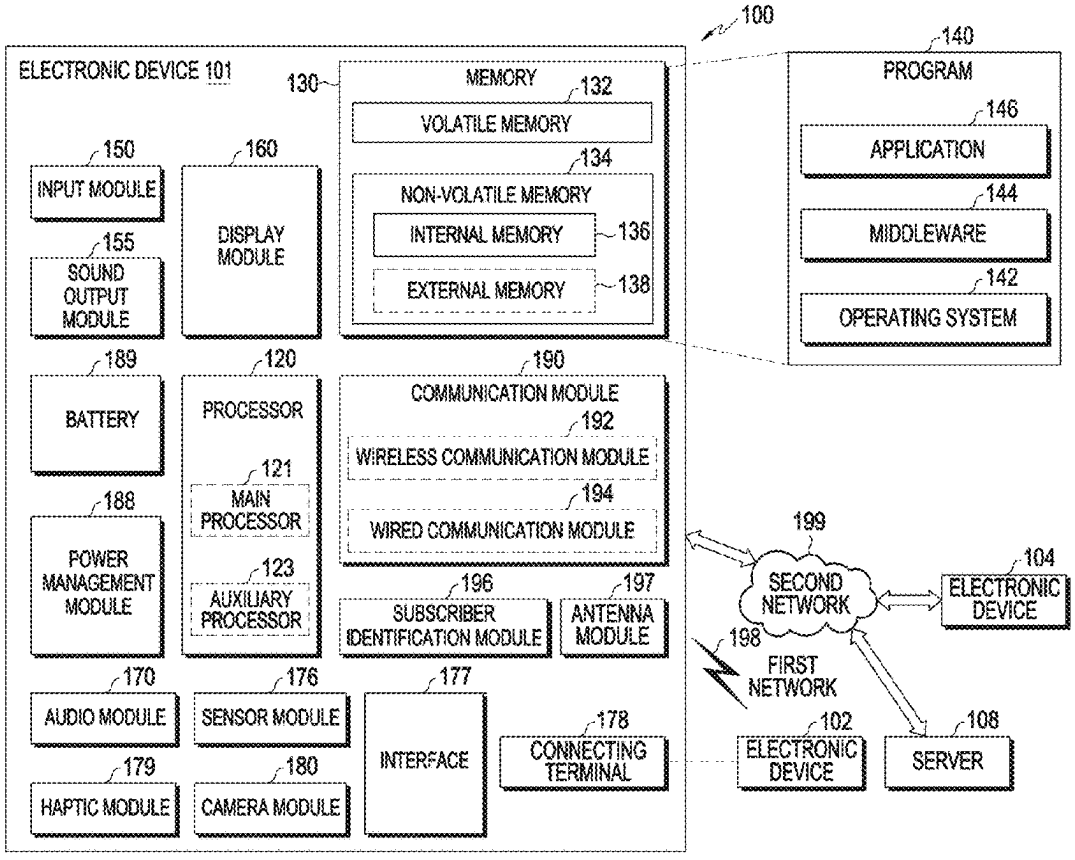
(57) **ABSTRACT**

An electronic device is provided. The electronic device includes a communication module, a camera module, a display module, memory, comprising one or more storage media, storing instructions, and at least one processor communicatively coupled to the communication module, the camera module, the memory, and the display module, wherein the instructions, when executed by the at least one processor individually or collectively, cause the processor to establish communication with an external electronic device through the communication module, display a first image and a first object through the display module based on information obtained from the external electronic device, change, based on a user input, information associated with the first object, transmit, to the external electronic device, the changed information associated with the first object, obtain, from the external electronic device, information associated with the first object changed by the external electronic device, and display, based on the information changed by the external electronic device, the first object through the display module.



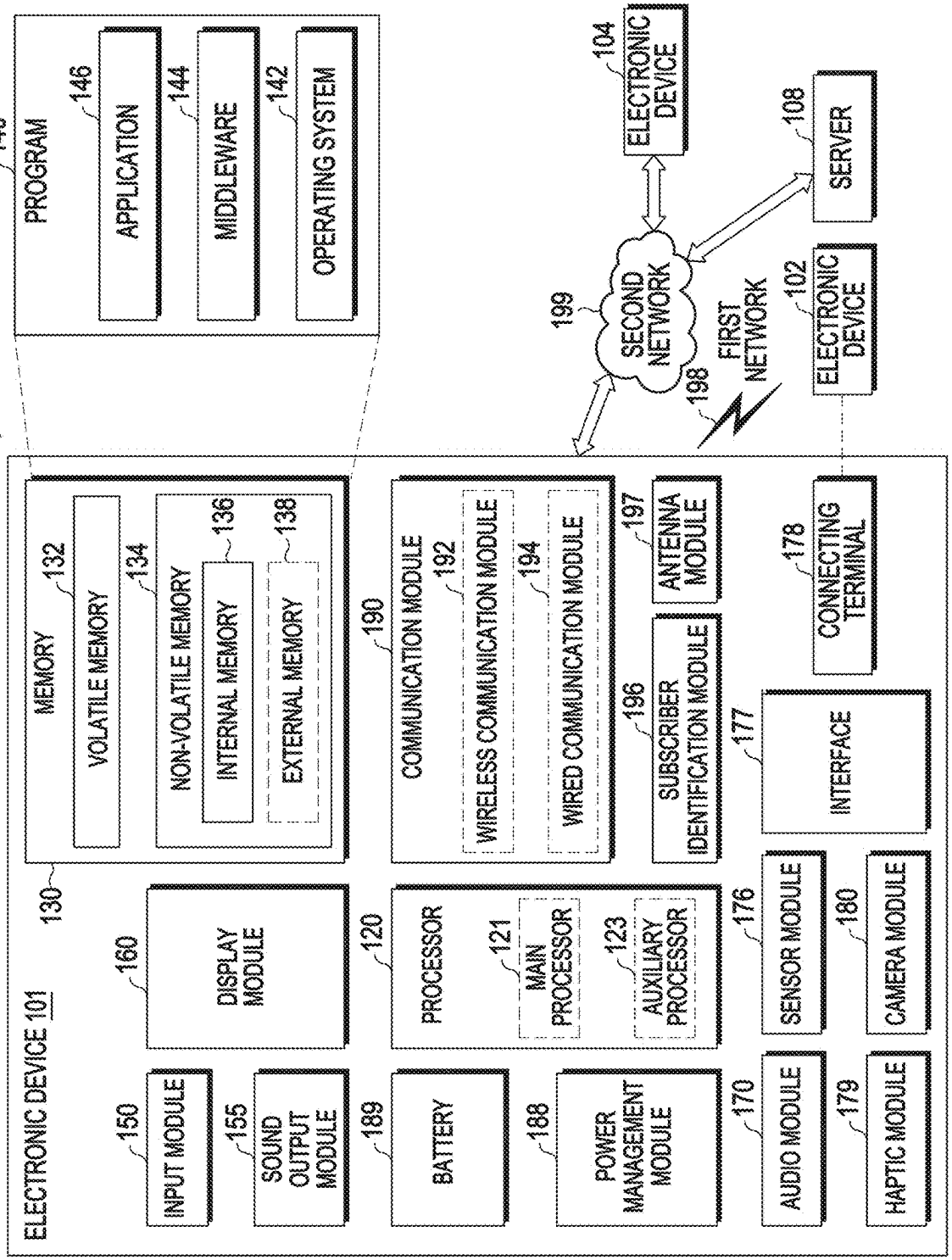

100
ELECTRONIC DEVICE 101
130
MEMORY
132
VOLATILE MEMORY
134
NON-VOLATILE MEMORY
136
INTERNAL MEMORY
138
EXTERNAL MEMORY
190
COMMUNICATION MODULE
192
WIRELESS COMMUNICATION MODULE
194
WIRED COMMUNICATION MODULE
197
ANTENNA MODULE
196
SUBSCRIBER IDENTIFICATION MODULE
177
INTERFACE
178
CONNECTING TERMINAL
160
DISPLAY MODULE
120
PROCESSOR
121
MAIN PROCESSOR
123
AUXILIARY PROCESSOR
176
SENSOR MODULE
180
CAMERA MODULE
150
INPUT MODULE
155
SOUND OUTPUT MODULE
189
BATTERY
188
POWER MANAGEMENT MODULE
170
AUDIO MODULE
179
HAPTIC MODULE
140
PROGRAM
146
APPLICATION
144
MIDDLEWARE
142
OPERATING SYSTEM
199
SECOND NETWORK
198
FIRST NETWORK
104
ELECTRONIC DEVICE
102
ELECTRONIC DEVICE
108
SERVER

FIG. 1

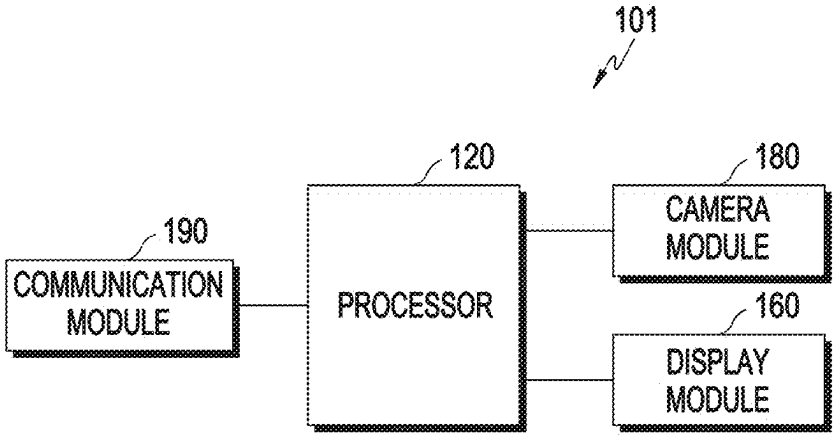

101
120
180
190
CAMERA MODULE
COMMUNICATION MODULE
PROCESSOR
160
DISPLAY MODULE

FIG. 2

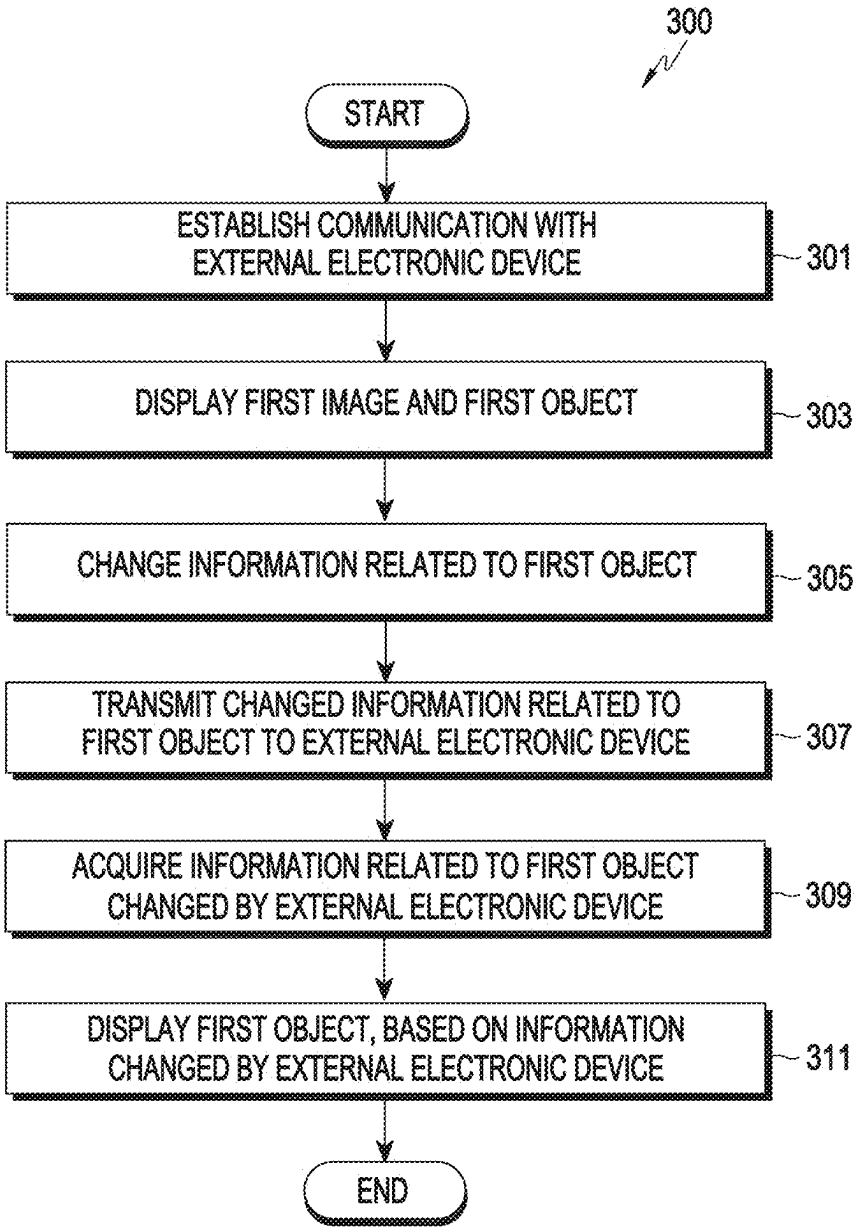

300
START
ESTABLISH COMMUNICATION WITH EXTERNAL ELECTRONIC DEVICE
301
DISPLAY FIRST IMAGE AND FIRST OBJECT
303
CHANGE INFORMATION RELATED TO FIRST OBJECT
305
TRANSMIT CHANGED INFORMATION RELATED TO FIRST OBJECT TO EXTERNAL ELECTRONIC DEVICE
307
ACQUIRE INFORMATION RELATED TO FIRST OBJECT CHANGED BY EXTERNAL ELECTRONIC DEVICE
309
DISPLAY FIRST OBJECT, BASED ON INFORMATION CHANGED BY EXTERNAL ELECTRONIC DEVICE
311
END

FIG. 3

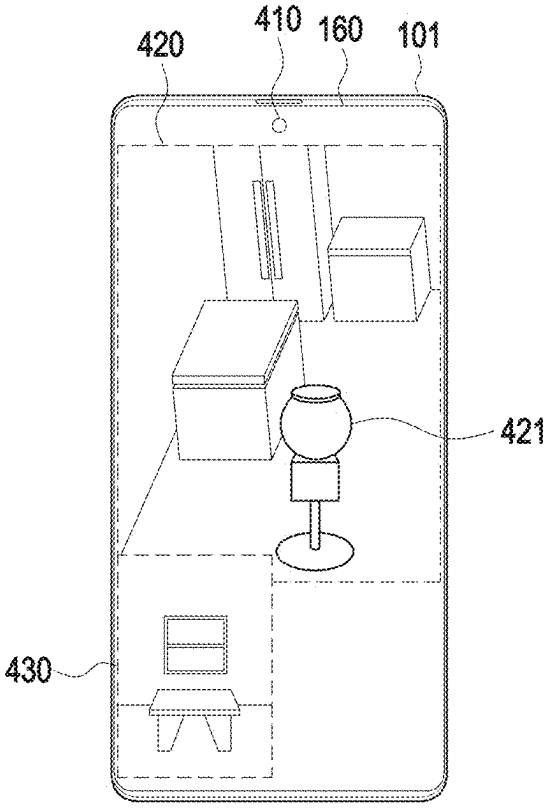


FIG. 4A

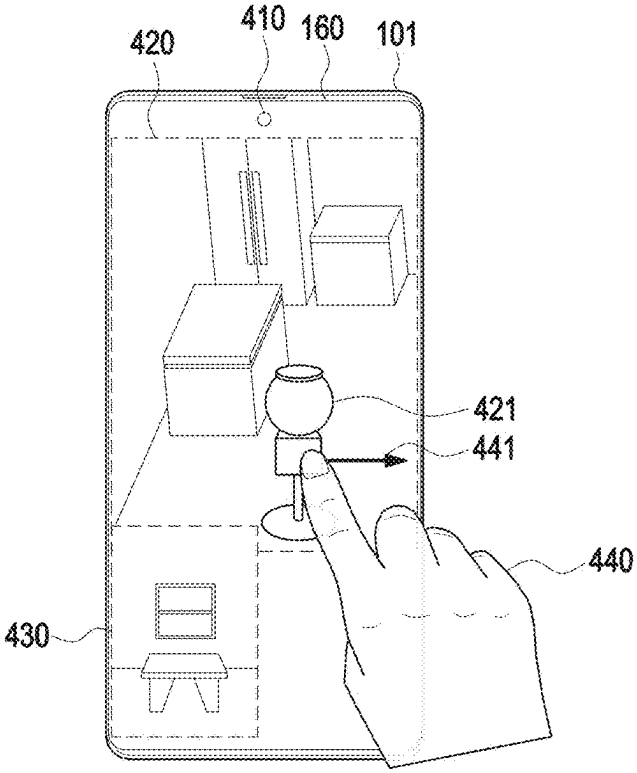


FIG. 4B

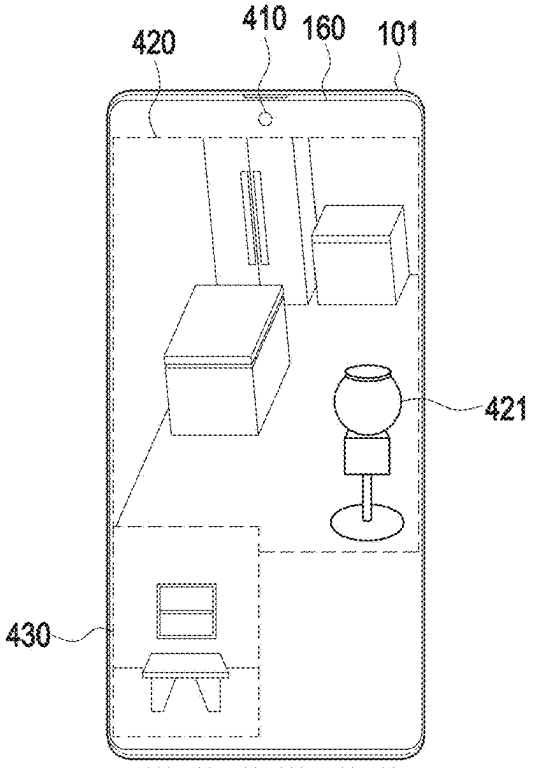


FIG. 4C

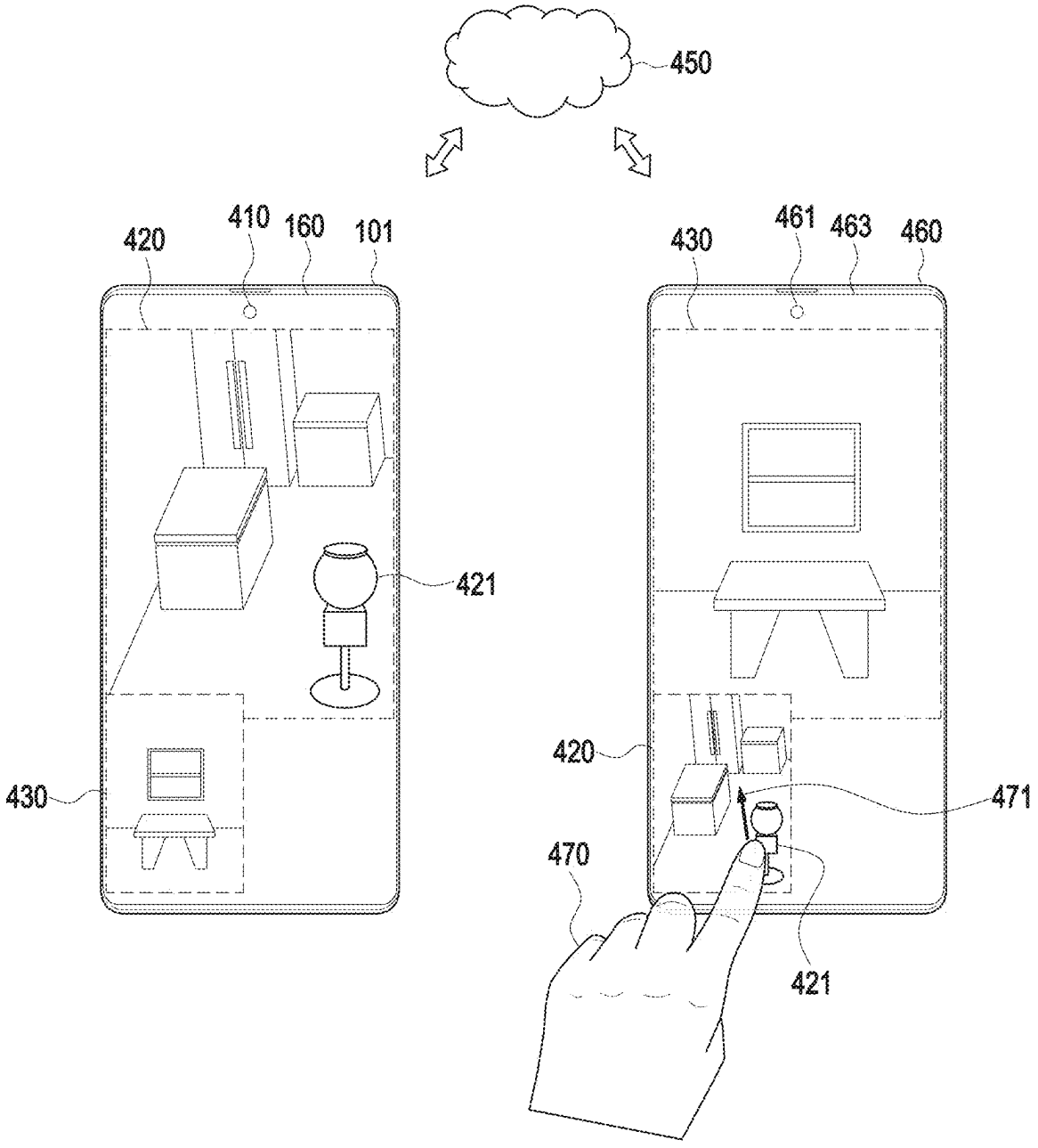


FIG. 4D

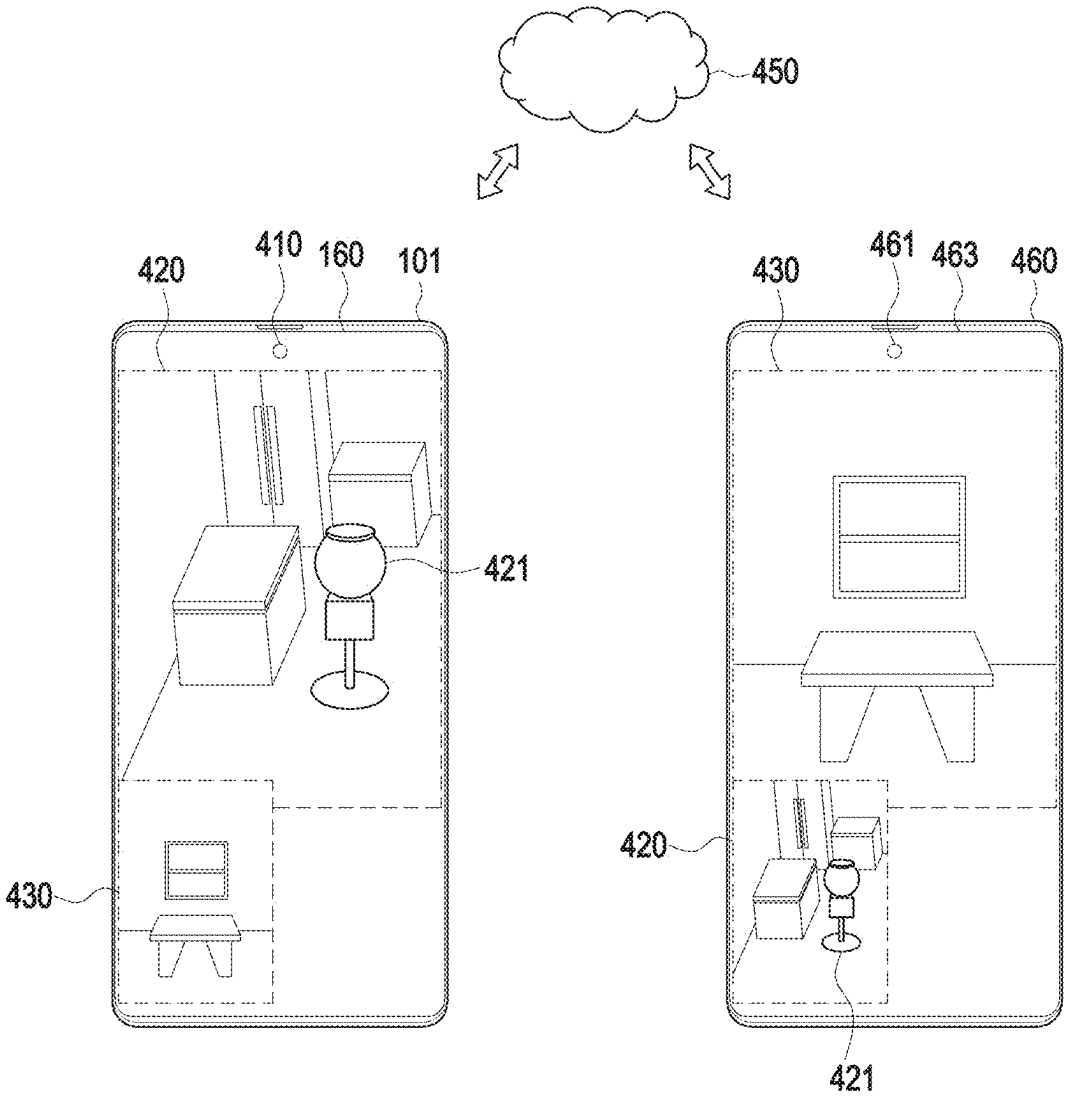


FIG. 4E

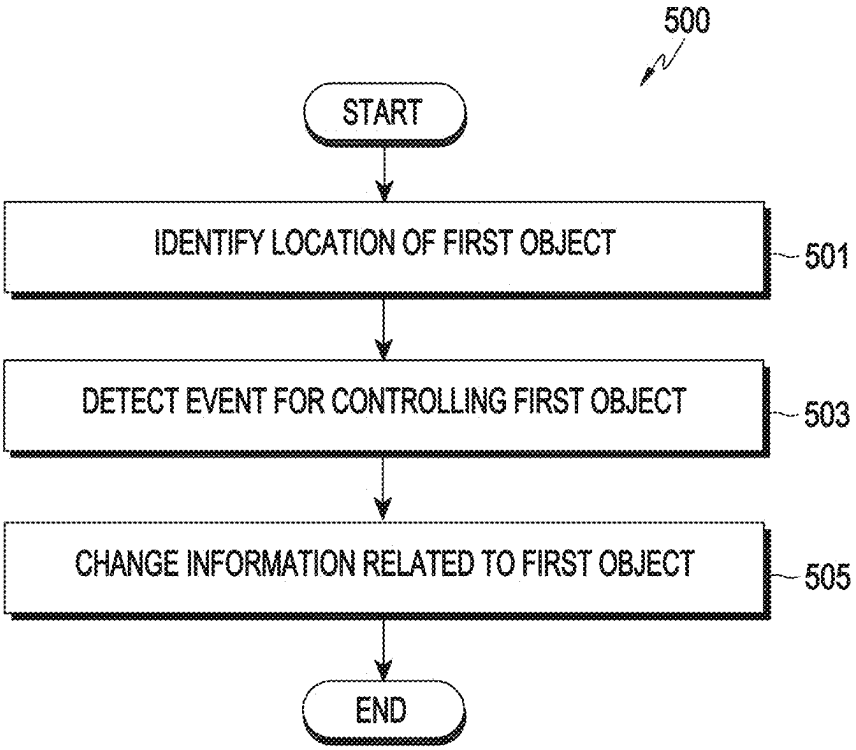

500
START
IDENTIFY LOCATION OF FIRST OBJECT
501
DETECT EVENT FOR CONTROLLING FIRST OBJECT
503
CHANGE INFORMATION RELATED TO FIRST OBJECT
505
END

FIG. 5

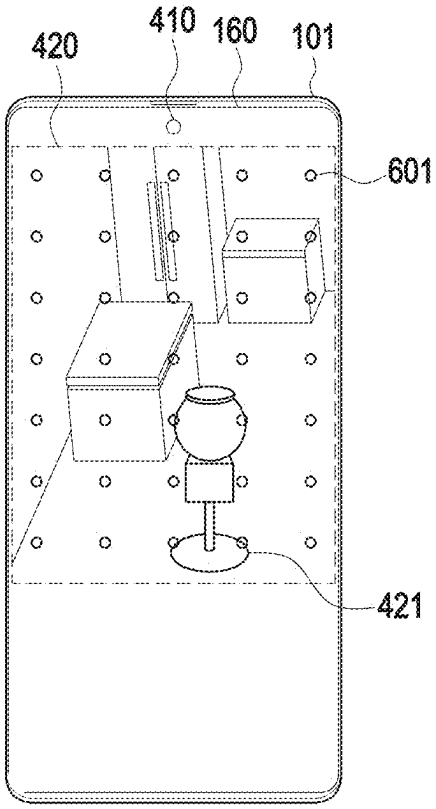


FIG. 6A

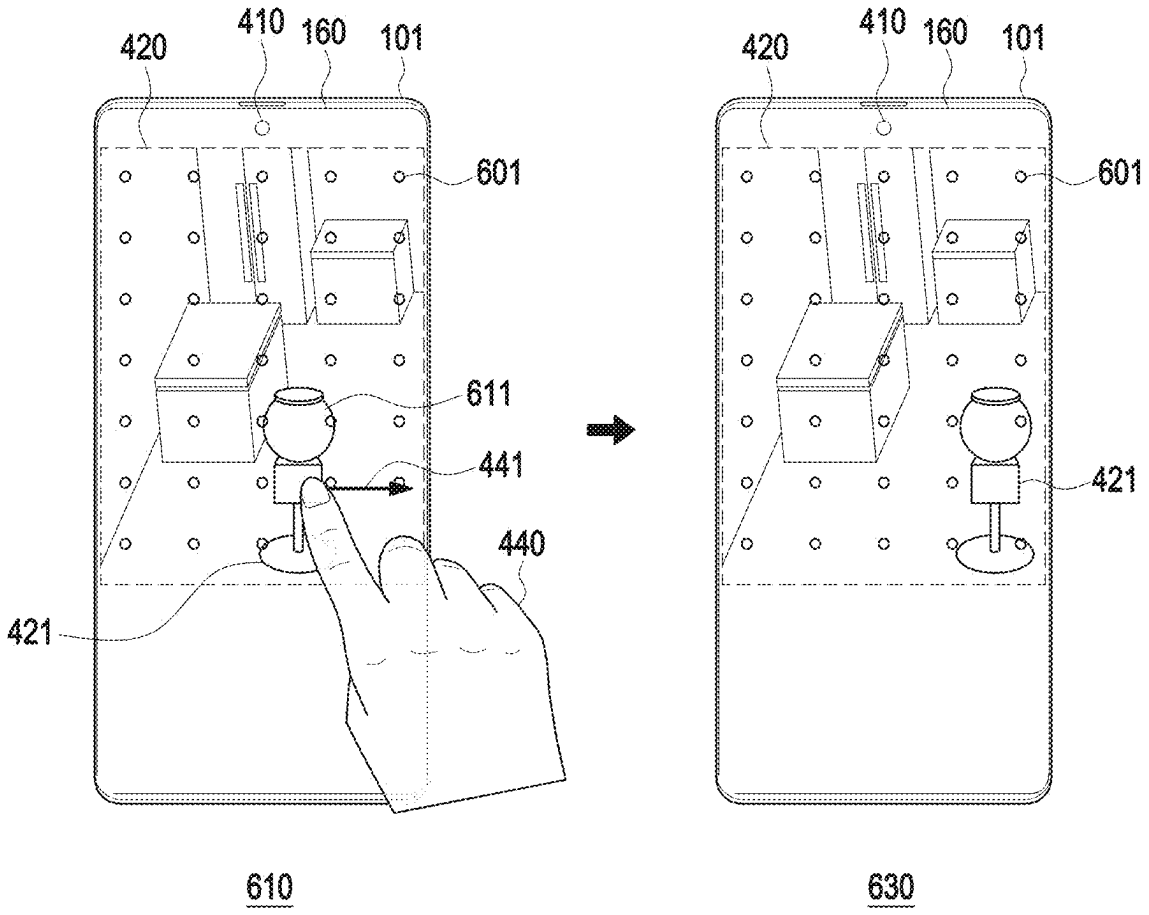

420
410
160
101
601
611
441
440
421
610
420
410
160
101
601
421
630

FIG. 6B

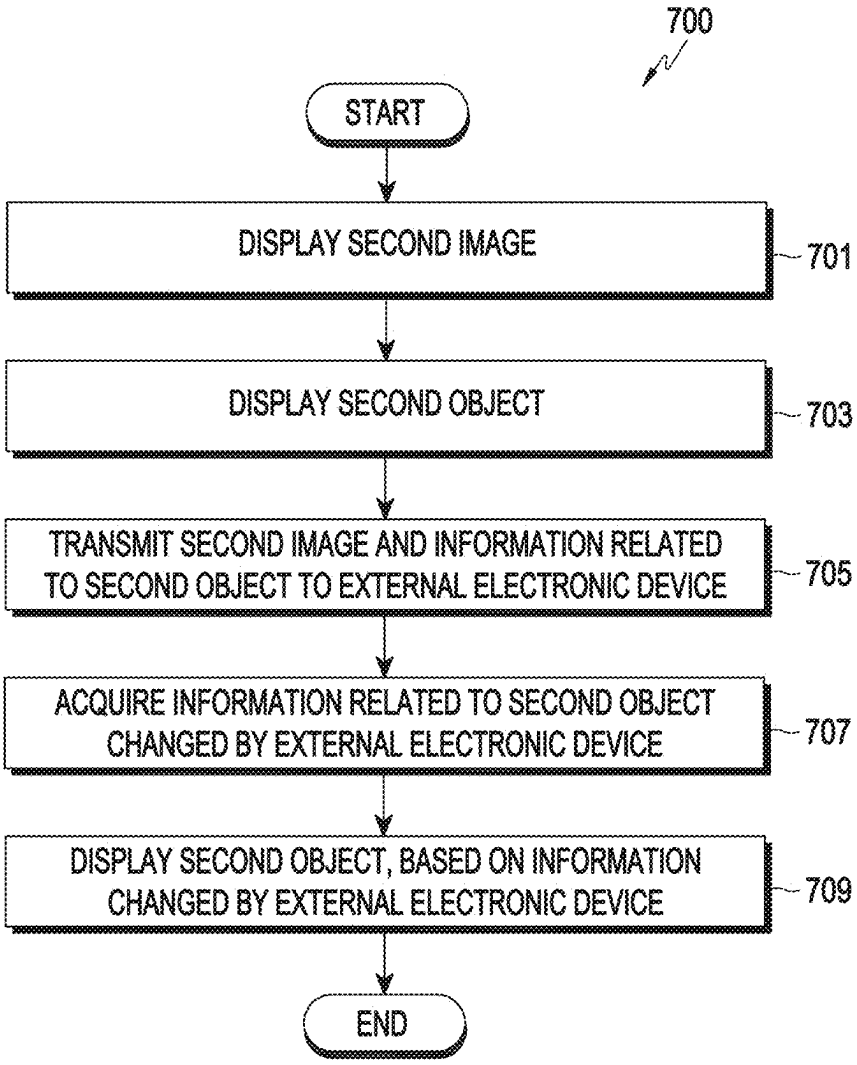

700
START
DISPLAY SECOND IMAGE
701
DISPLAY SECOND OBJECT
703
TRANSMIT SECOND IMAGE AND INFORMATION RELATED TO SECOND OBJECT TO EXTERNAL ELECTRONIC DEVICE
705
ACQUIRE INFORMATION RELATED TO SECOND OBJECT CHANGED BY EXTERNAL ELECTRONIC DEVICE
707
DISPLAY SECOND OBJECT, BASED ON INFORMATION CHANGED BY EXTERNAL ELECTRONIC DEVICE
709
END

FIG. 7

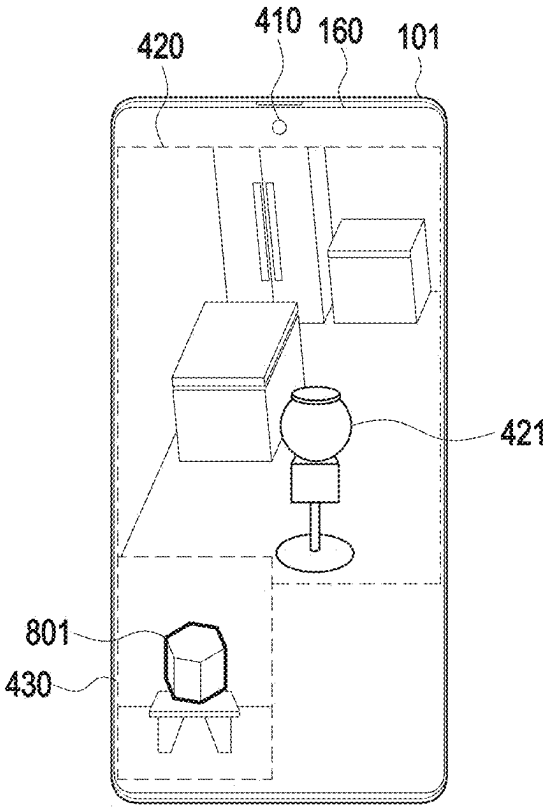


FIG. 8A

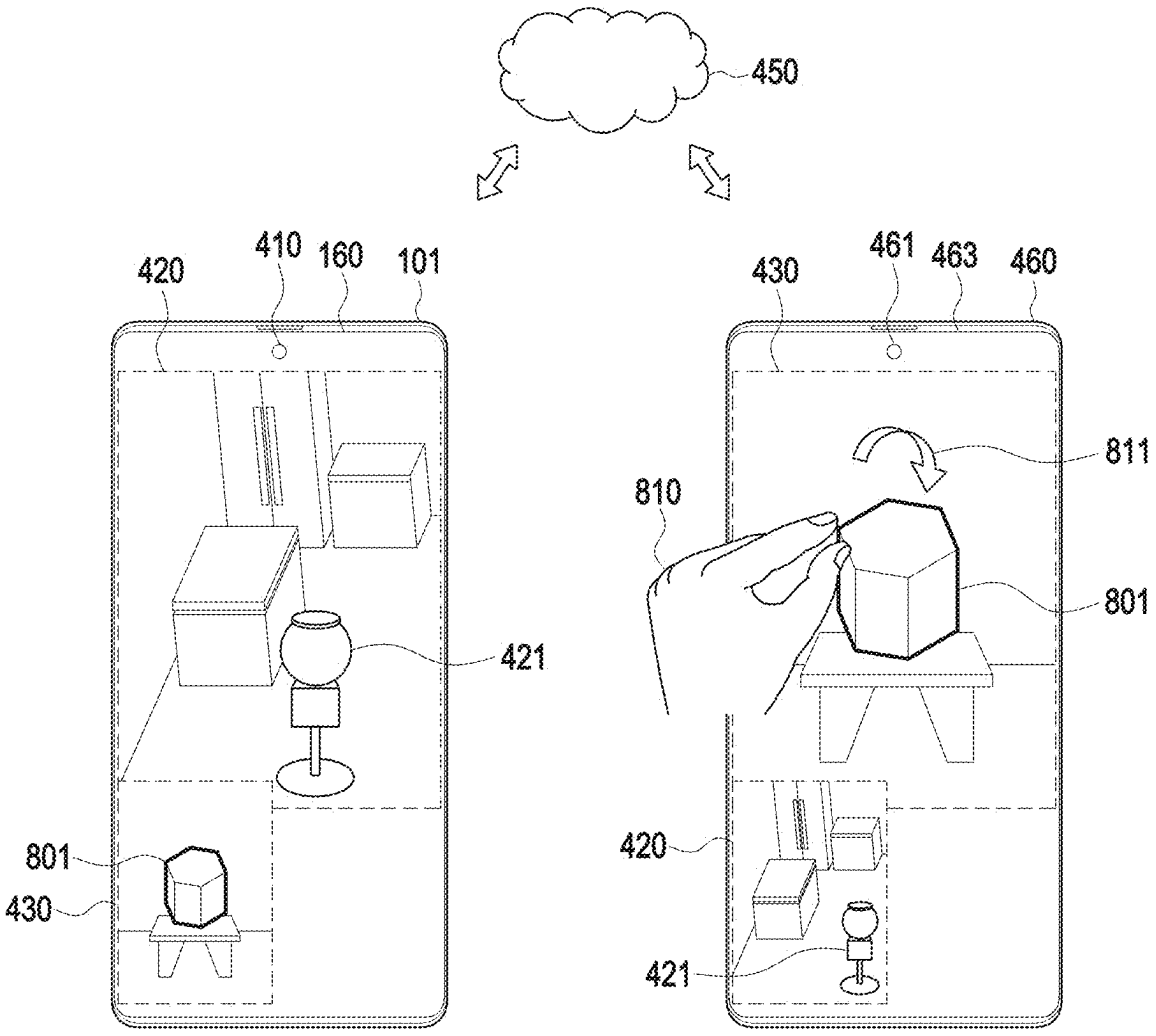

450
420
410
160
101
421
801
430
430
461
463
460
811
810
801
420
421

FIG. 8B

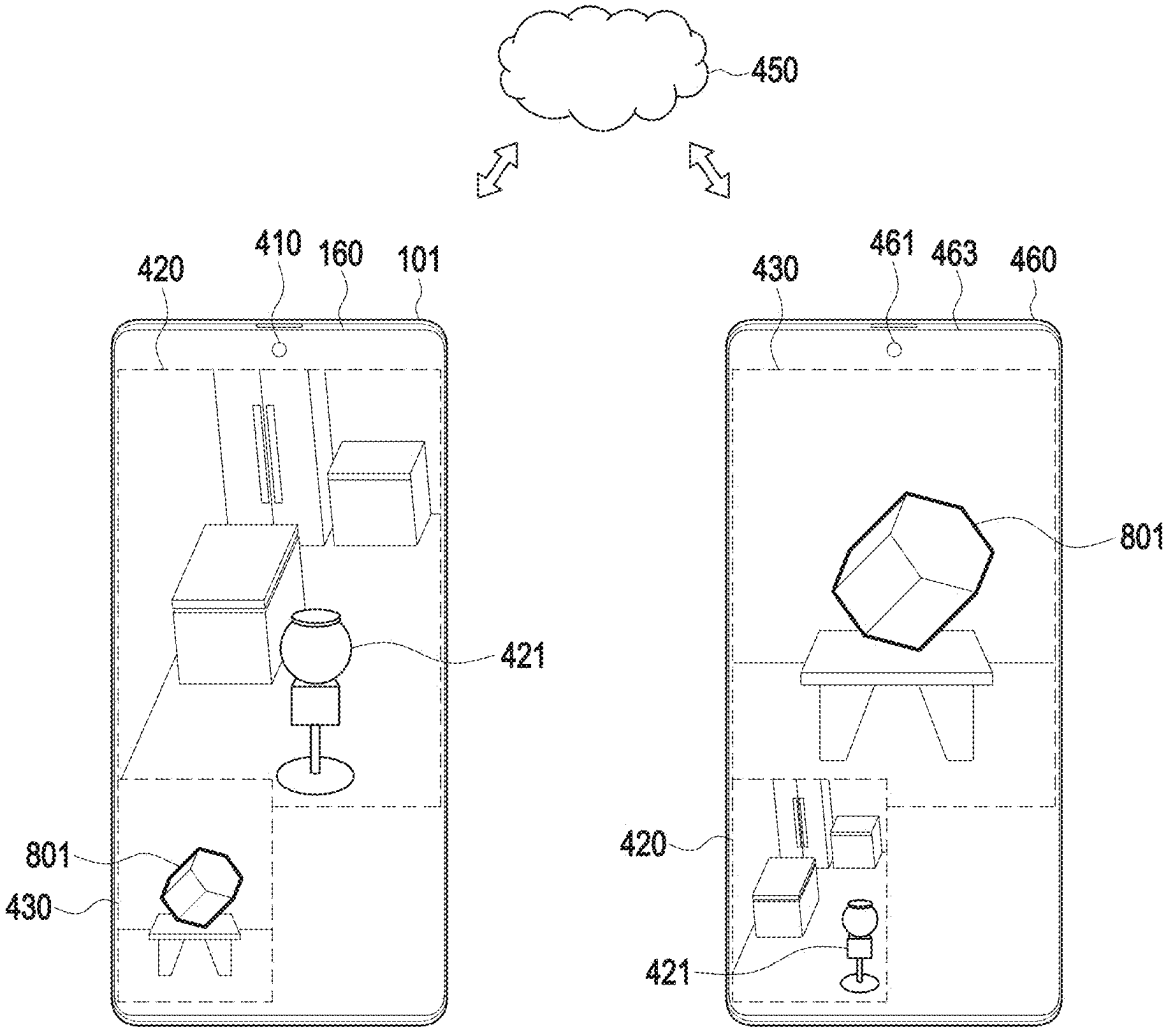


FIG. 8C

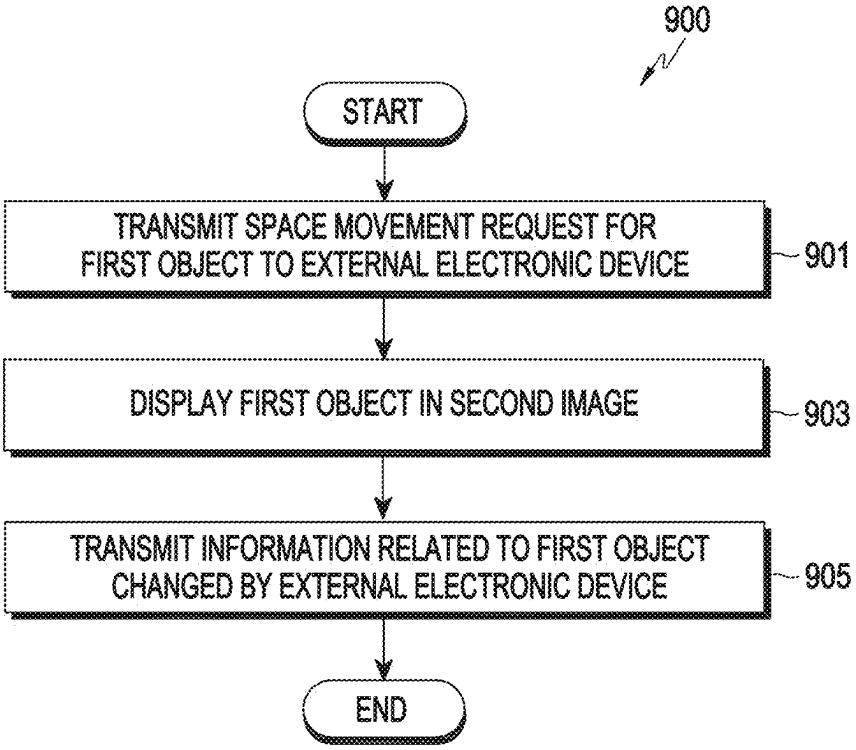

900
START
TRANSMIT SPACE MOVEMENT REQUEST FOR FIRST OBJECT TO EXTERNAL ELECTRONIC DEVICE
901
DISPLAY FIRST OBJECT IN SECOND IMAGE
903
TRANSMIT INFORMATION RELATED TO FIRST OBJECT CHANGED BY EXTERNAL ELECTRONIC DEVICE
905
END

FIG. 9

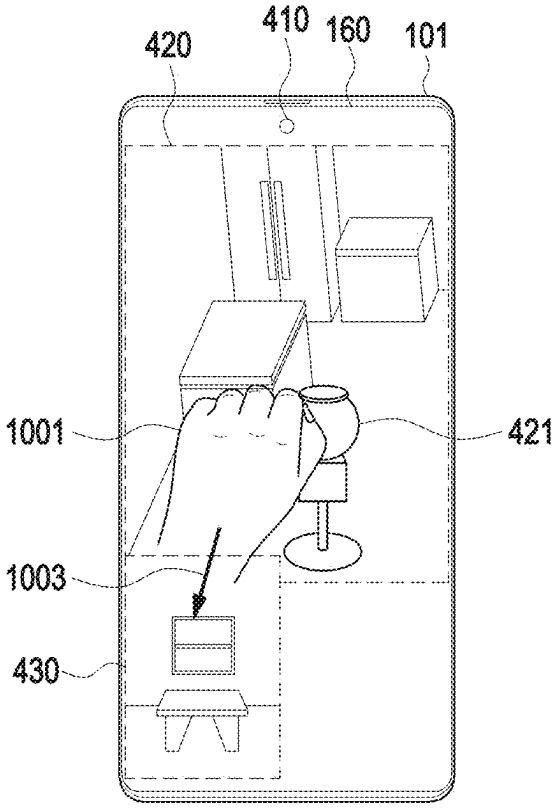


FIG. 10A

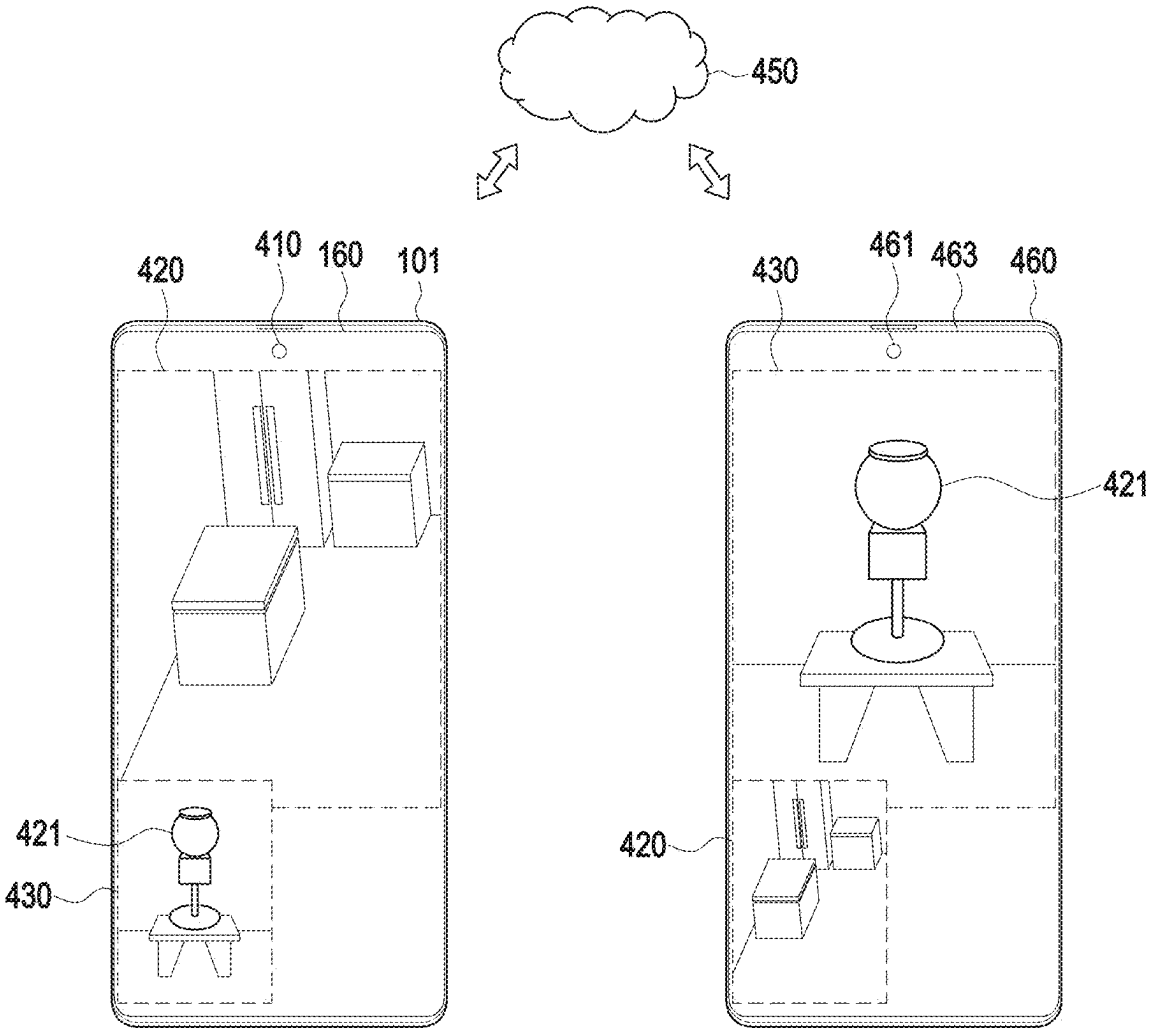


FIG. 10B

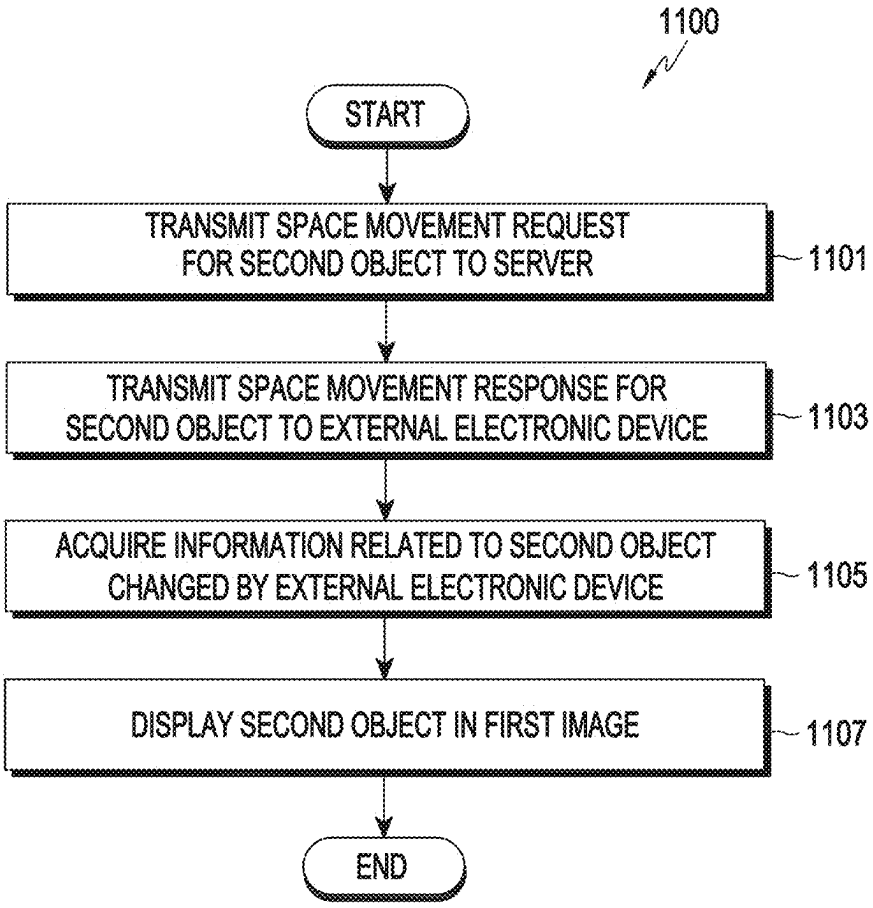

1100
START
TRANSMIT SPACE MOVEMENT REQUEST FOR SECOND OBJECT TO SERVER
1101
TRANSMIT SPACE MOVEMENT RESPONSE FOR SECOND OBJECT TO EXTERNAL ELECTRONIC DEVICE
1103
ACQUIRE INFORMATION RELATED TO SECOND OBJECT CHANGED BY EXTERNAL ELECTRONIC DEVICE
1105
DISPLAY SECOND OBJECT IN FIRST IMAGE
1107
END

FIG. 11

ELECTRONIC DEVICE FOR DISPLAYING VIRTUAL OBJECT, AND CONTROL METHOD THEREFOR

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/KR2023/018068, filed on Nov. 10, 2023, which is based on and claims the benefit of a Korean patent application number 10-2022-0150293, filed on Nov. 11, 2022, in the Korean Intellectual Property Office, and of a Korean patent application number 10-2022-0169842, filed on Dec. 7, 2022, in the Korean Intellectual Property Office, the disclosure of each of which is incorporated by reference herein in its entirety.

BACKGROUND

1. Field

[0002] The disclosure relates to an electronic device for displaying a virtual object and a method of controlling the same.

2. Description of Related Art

[0003] Recently, electronic devices are being developed in various forms for convenience of users, and provide various services or functions. Information according to execution of various services or functions of electronic devices provides various services by using augmented reality technology.

[0004] Augmented reality (AR) is one field of the virtual reality and refers to a computer graphic scheme that synthesizes a real environment and a virtual object or information and makes the object looked as an object existing in the original environment. Augmented reality corresponds to a technology that shows a virtual object overlaid on the real world viewed through the user's eyes, and is also called mixed reality (MR) because additional information and a virtual world are added to the real world, and only one image is shown in real time.

[0005] As smartphones have become widespread recently, the augmented reality technology can be applied to various real environments, and its scope of utilization is variously expanding to location-based services, mobile games, education fields, and the like. The augmented reality technology may provide an anchoring scheme that fixes objects displayed in the augmented reality space.

[0006] 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

[0007] 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 for displaying a virtual object and a method of controlling the same.

[0008] 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.

[0009] In accordance with an aspect of the disclosure, an electronic device is provided. The electronic device includes a communication module, a camera module, a display module, memory, comprising one or more storage media, storing instructions, and at least one processor communicatively coupled to the communication module, the camera module, the display module, and the memory, wherein the instructions, when executed by the at least one processor individually or collectively, cause the electronic device to establish communication with an external electronic device through the communication module, display a first image and a first object through the display module, based on information obtained from the external electronic device, change information associated with the first object, based on a user input, transmit the changed information associated with the first object to the external electronic device, obtain the information associated with the first object changed by the external electronic device, from the external electronic device, and display the first object through the display module, based on the information changed by the external electronic device.

[0010] In accordance with another aspect of the disclosure, a method by an electronic device is provided. The method includes establishing communication with an external electronic device through a communication module, displaying a first image and a first object through a display module, based on information obtained from an external electronic device, changing information associated with the first object, based on a user input, transmitting the changed information associated with the first object to the external electronic device, obtaining information associated with the first object changed by the external electronic device, from the external electronic device, and displaying the first object through the display module, based on the information changed by the external electronic device.

[0011] 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 establishing communication with an external electronic device through a communication module, displaying a first image and a first object through a display module, based on information obtained from an external electronic device, changing information associated with the first object, based on a user input, transmitting the changed information associated with the first object to the external electronic device, obtaining information associated with the first object changed by the external electronic device, from the external electronic device, and displaying the first object through the display module, based on the information changed by the external electronic device.

[0012] 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.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] 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:

[0014] FIG. **1** is a block diagram of an electronic device within a network environment according to an embodiment of the disclosure;

[0015] FIG. **2** is a block diagram illustrating an example of a configuration of the electronic device according to an embodiment of the disclosure;

[0016] FIG. **3** is a flowchart illustrating a method by which the electronic device displays virtual objects according to an embodiment of the disclosure;

[0017] FIGS. **4**A, **4**B, **4**C, **4**D, and **4**E are diagrams illustrating an example in which the electronic device controls virtual objects obtained from an external electronic device according to various embodiments of the disclosure;

[0018] FIG. **5** is a flowchart illustrating an operation in which the electronic device changes object-related information, based on an event for controlling a virtual object being detected according to an embodiment of the disclosure;

[0019] FIGS. **6**A and **6**B are diagrams illustrating an example in which the electronic device changes object-related information, based on an event for controlling a virtual object being detected according to various embodiments of the disclosure;

[0020] FIG. **7** is a flowchart illustrating an operation in which the electronic device generates a virtual object and transmits information related to the generated virtual object to the external electronic device according to an embodiment of the disclosure;

[0021] FIGS. **8**A, **8**B, and **8**C are diagrams illustrating an example in which the electronic device generates a virtual object and displays the generated virtual object, based on information obtained by the external electronic device according to various embodiments of the disclosure;

[0022] FIG. **9** is a flowchart illustrating an operation in which the electronic device changes spatial information of the virtual object generated by the external electronic device according to an embodiment of the disclosure;

[0023] FIGS. **10**A and **10**B are diagrams illustrating an example in which the electronic device changes spatial information of the virtual object generated by the external electronic device according to various embodiments of the disclosure; and

[0024] FIG. **11** is a flowchart illustrating an operation in which the electronic device transmits a spatial movement request for the virtual object to a server according to an embodiment of the disclosure.

[0025] Throughout the drawings, it should be noted that like reference numbers are used to depict the same or similar elements, features, and structures.

DETAILED DESCRIPTION

[0026] 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.

[0027] 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.

[0028] 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.

[0029] 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.

[0030] 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 wireless fidelity (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.

[0031] FIG. **1** is a block diagram illustrating an electronic device **101** in a network environment **100** according to an embodiment of the disclosure.

[0032] Referring to FIG. **1**, the electronic device **101** in the network environment **100** may communicate with an electronic device **102** via a first network **198** (e.g., a short-range wireless communication network), or at least one of an electronic device **104** or a server **108** via a second network **199** (e.g., a long-range wireless communication network). According to an embodiment, the electronic device **101** may communicate with the electronic device **104** via the server **108**. According to an embodiment, the electronic device **101** may include a processor **120**, memory **130**, an input module **150**, a sound output module **155**, a display module **160**, an audio module **170**, a sensor module **176**, an interface **177**, a connecting terminal **178**, a haptic module **179**, a camera module **180**, a power management module **188**, a battery **189**, a communication module **190**, a subscriber identification module (SIM) **196**, or an antenna module **197**. In some embodiments, at least one of the components (e.g., the connecting terminal **178**) may be omitted from the electronic device **101**, or one or more other components may be added

in the electronic device **101**. In some embodiments, some of the components (e.g., the sensor module **176**, the camera module **180**, or the antenna module **197**) may be implemented as a single component (e.g., the display module **160**).

[0033] 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 one embodiment, as at least part of the data processing or computation, the processor **120** may store a command or data received from another component (e.g., the sensor module **176** or the communication module **190**) in volatile memory **132**, process the command or the data stored in the volatile memory **132**, and store resulting data in non-volatile memory **134**. According to an embodiment, the processor **120** may include a main processor **121** (e.g., a central processing unit (CPU) or an application processor (AP)), or an auxiliary processor **123** (e.g., a graphics processing unit (GPU), a neural processing unit (NPU), an image signal processor (ISP), a sensor hub processor, or a communication processor (CP)) that is operable independently from, or in conjunction with, the main processor **121**. For example, when the electronic device **101** includes the main processor **121** and the auxiliary processor **123**, the auxiliary processor **123** may be adapted to consume less power than the main processor **121**, or to be specific to a specified function. The auxiliary processor **123** may be implemented as separate from, or as part of the main processor **121**.

[0034] The auxiliary processor **123** may control at least some of functions or states related to at least one component (e.g., the display module **160**, the sensor module **176**, or the communication module **190**) among the components of the electronic device **101**, instead of the main processor **121** while the main processor **121** is in an inactive (e.g., sleep) state, or together with the main processor **121** while the main processor **121** is in an active state (e.g., executing an application). According to an embodiment, the auxiliary processor **123** (e.g., an image signal processor or a communication processor) may be implemented as part of another component (e.g., the camera module **180** or the communication module **190**) functionally related to the auxiliary processor **123**. According to an embodiment, the auxiliary processor **123** (e.g., the neural processing unit) may include a hardware structure specified for artificial intelligence model processing. An artificial intelligence model may be generated by machine learning. Such learning may be performed, e.g., by the electronic device **101** where the artificial intelligence is performed or via a separate server (e.g., the server **108**). Learning algorithms may include, but are not limited to, e.g., supervised learning, unsupervised learning, semi-supervised learning, or reinforcement learning. The artificial intelligence model may include a plurality of artificial neural network layers. The artificial neural network may be a deep neural network (DNN), a convolutional neural network (CNN), a recurrent neural network (RNN), a restricted Boltzmann machine (RBM), a deep belief network (DBN), a bidirectional recurrent deep neural network (BRDNN), deep Q-network or a combination of two or more thereof but is not limited thereto. The artificial intelligence model may, additionally or alternatively, include a software structure other than the hardware structure.

[0035] 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**.

[0036] 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**.

[0037] The input module **150** may receive a command or data to be used by another component (e.g., the processor **120**) of the electronic device **101**, from the outside (e.g., a user) of the electronic device **101**. The input module **150** may include, for example, a microphone, a mouse, a keyboard, a key (e.g., a button), or a digital pen (e.g., a stylus pen).

[0038] 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.

[0039] The display module **160** may visually provide information to the outside (e.g., a user) of the electronic device **101**. The display module **160** may include, for example, a display, a hologram device, or a projector and control circuitry to control a corresponding one of the display, hologram device, and projector. According to an embodiment, the display module **160** may include a touch sensor adapted to detect a touch, or a pressure sensor adapted to measure the intensity of force incurred by the touch.

[0040] 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**.

[0041] The sensor module **176** may detect an operational state (e.g., power or temperature) of the electronic device **101** or an environmental state (e.g., a state of a user) external to the electronic device **101**, and then generate an electrical signal or data value corresponding to the detected state. According to an embodiment, the sensor module **176** may include, for example, a gesture sensor, a gyro sensor, an atmospheric pressure sensor, a magnetic sensor, an acceleration sensor, a grip sensor, a proximity sensor, a color sensor, an infrared (IR) sensor, a biometric sensor, a temperature sensor, a humidity sensor, or an illuminance sensor.

[0042] 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.

[0043] A connecting terminal **178** may include a connector via which the electronic device **101** may be physically connected with the external electronic device (e.g., the

electronic device **102**). According to an embodiment, the connecting terminal **178** may include, for example, a HDMI connector, a USB connector, a SD card connector, or an audio connector (e.g., a headphone connector).

[0044] The haptic module **179** may convert an electrical signal into a mechanical stimulus (e.g., a vibration or a movement) or electrical stimulus which may be recognized by a user via his tactile sensation or kinesthetic sensation. According to an embodiment, the haptic module **179** may include, for example, a motor, a piezoelectric element, or an electric stimulator.

[0045] 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.

[0046] The power management module **188** may manage power supplied to the electronic device **101**. According to one embodiment, the power management module **188** may be implemented as at least part of, for example, a power management integrated circuit (PMIC).

[0047] 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.

[0048] The communication module **190** may support establishing a direct (e.g., wired) communication channel or a wireless communication channel between the electronic device **101** and the external electronic device (e.g., the electronic device **102**, the electronic device **104**, or the server **108**) and performing communication via the established communication channel. The communication module **190** may include one or more communication processors that are operable independently from the processor **120** (e.g., the application processor (AP)) and supports a direct (e.g., wired) communication or a wireless communication. According to an embodiment, the communication module **190** may include a wireless communication module **192** (e.g., a cellular communication module, a short-range wireless communication module, or a global navigation satellite system (GNSS) communication module) or a wired communication module **194** (e.g., a local area network (LAN) communication module or a power line communication (PLC) module). A corresponding one of these communication modules may communicate with the external electronic device via the first network **198** (e.g., a short-range communication network, such as Bluetooth™, wireless-fidelity (Wi-Fi) direct, or infrared data association (IrDA)) or the second network **199** (e.g., a long-range communication network, such as a legacy cellular network, a fifth generation (5G) network, a next-generation communication network, the Internet, or a computer network (e.g., LAN or wide area network (WAN)). These various types of communication modules may be implemented as a single component (e.g., a single chip), or may be implemented as multi components (e.g., multi chips) separate from each other. The wireless communication module **192** may identify and authenticate the electronic device **101** in a communication network, such as the first network **198** or the second network **199**, using subscriber information (e.g., international mobile subscriber identity (IMSI)) stored in the subscriber identification module **196**.

[0049] 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.

[0050] The antenna module **197** may transmit or receive a signal or power to or from the outside (e.g., the external electronic device) of the electronic device **101**. According to an embodiment, the antenna module **197** may include an antenna including a radiating element composed of a conductive material or a conductive pattern formed in or on a substrate (e.g., a printed circuit board (PCB)). According to an embodiment, the antenna module **197** may include a plurality of antennas (e.g., array antennas). In such a case, at least one antenna appropriate for a communication scheme used in the communication network, such as the first network **198** or the second network **199**, may be selected, for example, by the communication module **190** (e.g., the wireless communication module **192**) from the plurality of antennas. The signal or the power may then be transmitted or received between the communication module **190** and the external electronic device via the selected at least one antenna. According to an embodiment, another component (e.g., a radio frequency integrated circuit (RFIC)) other than the radiating element may be additionally formed as part of the antenna module **197**.

[0051] According to various embodiments, the antenna module **197** may form a mm Wave 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.

[0052] 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)).

[0053] According to an embodiment, commands or data may be transmitted or received between the electronic device **101** and the external electronic device **104** via the server **108** coupled with the second network **199**. Each of the electronic devices **102** or **104** may be a device of a same type as, or a different type, from the electronic device **101**. According to an embodiment, all or some of operations to be executed at the electronic device **101** may be executed at one or more of the external electronic devices **102**, **104**, or **108**. For example, if the electronic device **101** should perform a function or a service automatically, or in response to a request from a user or another device, the electronic device **101**, instead of, or in addition to, executing the function or the service, may request the one or more external electronic devices to perform at least part of the function or the service. The one or more external electronic devices receiving the request may perform the at least part of the function or the service requested, or an additional function or an additional service related to the request, and transfer an outcome of the performing to the electronic device **101**. The electronic device **101** may provide the outcome, with or without further processing of the outcome, as at least part of a reply to the request. To that end, a cloud computing, distributed computing, mobile edge computing (MEC), or client-server computing technology may be used, for example. The electronic device **101** may provide ultra low-latency services using, e.g., distributed computing or mobile edge computing. In 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 healthcare) based on 5G communication technology or IoT-related technology.

[0054] FIG. **2** is a block diagram illustrating an example of a configuration of an electronic device **101** (for example, the electronic device **101** of FIG. **1**) according to an embodiment of the disclosure.

[0055] Referring to FIG. **2**, in an embodiment, the electronic device **101** may include a communication module **190**, a camera module **180**, a display module **160**, and at least one processor **120** operatively connected to the communication module **190**, the camera module **180**, and the display module **160**.

[0056] In an embodiment, the communication module **190** may be included in the communication module **190** of FIG. **1**. In an embodiment, the communication module **190** may communicate with an external electronic device (for example, the electronic device **102** or the electronic device **104** of FIG. **1**) through a first network (for example, the first network **198** of FIG. **1**) or a second network (for example, the second network **199** of FIG. **1**). In an embodiment, the external electronic device may be an electronic device capable of performing an operation based on an application such as a smartphone, a tablet PC, a laptop, a smart TV, and a desktop. In an embodiment, the electronic device **101** (for example, the communication module **190**) may transmit data to the external electronic device and/or receive data from the external electronic device. In an embodiment, the electronic device **101** may transmit and/or receive a voice and/or an image to/from the external electronic device. The electronic device **101** may transmit and receive information associated with a virtual object to and from the external electronic device. Information transmitted and/or received by the electronic device **101**, based on communication with the external electronic device is described below with reference to FIGS. **3**, **4**A to **4**E, **5**, **6**A, **6**B, **7**, **8**A to **8**C, **9**, **10**A, **10**B, and **11**.

[0057] In an embodiment, the camera module **180** may be included in the camera module **180** of FIG. **1**. In an embodiment, the camera module **180** may include a plurality of cameras. In an embodiment, the camera module **180** may include a front camera disposed in a direction facing a user's face from the electronic device **101** and at least one rear camera disposed in a direction in which the user faces a subject.

[0058] In an embodiment, the display module **160** may be included in the display module **160** of FIG. **1**. In an embodiment, the display module **160** may display an image acquired by the camera module **180**. For example, the display module **160** may display an image acquired by the front camera or an image acquired by the rear camera. In an embodiment, the display module **160** may display an image acquired from the external electronic device and/or a virtual object through the first network **198** or the second network **199** of FIG. **1**. The display module **160** may display a dynamic image (for example, a preview image or a moving image) and/or a still image acquired from the camera module **180** and/or the external electronic device.

[0059] In an embodiment, the processor **120** may be included in the processor **120** of FIG. **1**. In an embodiment, the processor **120** may perform the overall operation for displaying a virtual object and controlling the displayed virtual object. In an embodiment, the processor **120** may include one or more processors for controlling a virtual object. One or more processors may be operatively connected to the communication module **190**, the camera module **180**, and the display module **160**. The operation performed to control the virtual object by the processor **120** according to an embodiment is described below with reference to FIGS. **3**, **4**A to **4**E, **5**, **6**A, **6**B, **7**, **8**A to **8**C, **9**, **10**A, **10**B, and **11**.

[0060] Although FIG. **2** illustrates that the electronic device **101** includes the communication module **190**, the camera module **180**, the display module **160**, and/or the processor **120**, but is not limited thereto. For example, the electronic device **101** may further include at least one element illustrated in FIG. **2**. For example, the electronic device **101** may include a sensor module (for example, the sensor module **176** of FIG. **1**) configured to detect a user's gesture. The electronic device **101** may include memory (for example, the memory **130** of FIG. **1**) configured to store instructions. The instructions may cause the electronic device **101** to, when executed by the processor **120**, perform at least one operation. The detailed operation performed by the electronic device **101** is described below with reference to FIGS. **3**, **4**A to **4**E, **5**, **6**A, **6**B, **7**, **8**A to **8**C, **9**, **10**A, **10**B, and **11**. In the disclosure, "the processor performing the operation" may include "the memory causing the electronic device to, when executed by the processor, perform the operation".

[0061] FIG. **3** is a flowchart **300** illustrating a method by which an electronic device (for example, the electronic device **101** of FIG. **2**) displays a virtual object according to an embodiment of the disclosure.

[0062] In an embodiment, operations illustrated in FIG. **3** are not limited to the illustrated orders, but may be performed in various orders. According to an embodiment, more operations than the operations illustrated in FIG. **3** may be performed, or at least one operation fewer than illustrated may be performed.

[0063] Referring to FIG. **3**, in operation **301**, the electronic device **101** (for example, the processor **120** of FIG. **2**) may establish communication with an external electronic device (for example, the electronic device **102** or the electronic device **104** of FIG. **1**) in an embodiment.

[0064] In an embodiment, the electronic device **101** may establish communication with the external electronic device through a communication module (for example, the communication module **190** of FIG. **2**). In an embodiment, the electronic device **101** may make a request for a video call to the external electronic device through the communication module **190**. For example, the electronic device **101** may transmit an SIP request message to the external electronic device, based on a session description protocol (SDP) and/or a session initiation protocol (SIP). In an embodiment, the electronic device **101** may make a request for a video conference to the external electronic device through the communication module **190**, and an application executed by the electronic device **101** to establish communication with the external electronic device is not limited to the above-described example. The electronic device **101** may obtain, from the external electronic device, acceptance of the video call generated based on the request. For example, the electronic device **101** may obtain, from the external electronic device, an SIP response message generated based on the SIP request message. The electronic device **101** may form a data transmission channel between the electronic device **101** and the external electronic device, based on acquisition of acceptance of the video call from the external electronic device. For example, the electronic device **101** may establish a media session between the electronic device **101** and the external electronic device such as an Internet Protocol (IP) multimedia subsystem (IMS) data channel. In an embodiment, the electronic device **101** may transmit a voice and/or an image to the external electronic device through the data transmission channel. The electronic device **101** may acquire a voice and/or an image from the external electronic device through the data transmission channel. The electronic device may further obtain, from the external electronic device, spatial coordinates of the image obtained from the external electronic device. The spatial coordinates of the image may be three-dimensional spatial information for mapping a virtual object to a reality image. In an embodiment, the electronic device **101** may further obtain (or receive), from the external electronic device, information associated with the virtual object. In an embodiment, the information related to the virtual object may include a location, a rotation angle, and/or attribute information of the virtual object in the reality image. The information related to the virtual object may further include a change record of the location, the rotation angle, and/or the attribute information of the virtual object. The information related to the virtual object is not limited to the above-described example.

[0065] In operation **303**, the electronic device **101** may display a first image and a first object in an embodiment.

[0066] In an embodiment, the electronic device **101** may display the first image and the first object through a display module (for example, the display module **160** of FIG. **2**), based on information obtained from the external electronic device. In an embodiment, the information which the electronic device **101** obtained from the external electronic device may include spatial coordinates of the first image and information related to the first object. In an embodiment, when an additional function of virtual information is activated based on a user input, the electronic device **101** may obtain the spatial coordinates of the first image and the information related to the first object from the external electronic device. In an embodiment, the spatial coordinate of the first image and the information related to the first object may be stored in advance by the external electronic device. The spatial coordinates of the first image and the information related to the first object may be stored in advance in a server (for example, the server **108** of FIG. **1**). In an embodiment, the electronic device **101** or the external electronic device may model a reality image to a three-dimensional spatial coordinates, based on a camera module and/or LiDAR. In an embodiment, the electronic device **101** or the external electronic device may model a three-dimensional space for mapping the virtual object to the reality image, based on the reality image regardless of whether a data channel stream is formed between the electronic device **101** and the external electronic device. The first image may be a reality image obtained by the external electronic device. The first object may be a virtual object generated by the external electronic device. In an embodiment, the first object may be a virtual object in a shape such as furniture, a picture, or a pet, but there is no limitation. In an embodiment, the information related to the first object may include a location of the first object in the spatial coordinates of the first image, a rotation angle of the first object, and attribute information of the first object. In an embodiment, the electronic device **101** may display the first image obtained from the external electronic device in at least a partial area of the display module **160**. The electronic device **101** may display the first object obtained from the external electronic device in at least a partial area of the area in which the first image is displayed. In an embodiment, the electronic device **101** may display the first object in a layer higher than the first image by disposing the first object in a modeled three-dimensional spatial coordinates. The electronic device **101** may display mixed reality obtained by anchoring the virtual object to the reality space by displaying the first image and the first object.

[0067] In an embodiment, the electronic device **101** may further display an image obtained by a camera module (for example, the camera module **180** of FIG. **2**) in the display module **160**. For example, the electronic device **101** may control the display module **160** to display an image obtained by a front camera or an image obtained by a rear camera. The electronic device **101** may transmit the image obtained by the camera module **180** to the external electronic device through the communication module **190**. The electronic device **101** may display the first image obtained from the external electronic device and the image obtained by the camera module **180** through the display module **160**, so as to share the image with the external electronic device in real time.

[0068] In operation **305**, in an embodiment, the electronic device **101** may change the information associated with the first object.

[0069] In an embodiment, the electronic device **101** may change the information associated with the first object, based on a user input in the state in which communication

with the external electronic device is established. In an embodiment, the user input may be a gesture detected based on the image obtained by the camera module **180**. For example, the electronic device **101** may detect a gesture of a user's body, based on the image obtained by the front camera or the rear camera. In an embodiment, based on identification that the image obtained by the front camera is shared with the external electronic device, the electronic device **101** may detect a gesture, based on the image obtained by the rear camera. In an embodiment, based on identification that the image obtained by the rear camera is shared with the external electronic device, the electronic device **101** may detect a gesture, based on the image obtained by the front camera. In an embodiment, the electronic device **101** may detect a gesture, based on the image obtained by one of the front camera and the rear camera and transmit the image to the external electronic device. For example, the electronic device **101** may detect a gesture, based on the image obtained by the front camera and transmit the image obtained by the front camera to the external electronic device. The electronic device **101** may detect a gesture, based on the image obtained by the rear camera and transmit the image obtained by the rear camera to the external electronic device.

[0070] In an embodiment, the user input may be a touch event for the display module **160**. The electronic device **101** may change the information associated with the first object, based on the touch event being detected for the display module **160**.

[0071] In an embodiment, the user input may be sensing information obtained by a controller (for example, the external electronic device **102** of FIG. **1**). In an embodiment, the controller may acquire sensing information for controlling a virtual object in the state in which communication with the electronic device **101** is established. The controller may include a device such as a glove or a smart ring but is not limited thereto. The electronic device **101** may change the information related to the first object, based on information related to a user's gesture acquired by the controller.

[0072] In an embodiment, the electronic device **101** may change at least one of the location, the rotation angle, and/or the attribute information of the first object in the spatial coordinates of the first image, based on a user input. For example, based on a user's gesture being detected, the electronic device **101** may remap the location of the first object to the spatial coordinates of the first image, so as to remotely control the location of the first object generated by the external electronic device. In an embodiment, based on a user input of selecting the first object being acquired, the electronic device **101** may display a function bar for controlling the first object through the display module **160**. In an embodiment, the function bar may include at least one option for movement within an area of the first image, movement within an area of the image acquired by the electronic device **101**, or a change in the attribute information of the first object. The example of the function bar is not limited thereto. In an embodiment, the electronic device **101** may identify composition of the first object disposed in at least a partial area of the first image by moving the first object within the area of the first image. For example, when the first image is a reality image of the living room, the electronic device **101** may identify in advance the composition of the living room in which furniture is placed by moving the first object in a future shape within the area of the first image during a video call with the external electronic device. In an embodiment, the electronic device may identify the first object disposed in at least a partial area of the first image by changing the attribute information of the first object. For example, the electronic device **101** may identify in advance various colors of a frame for a picture on the wall by changing color information of the first object in a frame shape during a video call with the external electronic device.

[0073] In operation **307**, in an embodiment, the electronic device **101** may transmit the changed information associated with the first object to the external electronic device.

[0074] In an embodiment, the electronic device **101** may transmit at least one of the location, the rotation angle, and/or the attribute information of the first object in at least a partial area of the display module **160** corresponding to the first image changed based on a user input to the external electronic device through a media session. For example, when the location of the first object in the spatial coordinates of the first image is remapped, the electronic device **101** may transmit the changed coordinates of the first object to the external electronic device. In an embodiment, the external electronic device may change the information related to the first object transmitted to the electronic device **101**, based on the changed information related to the first object. The external electronic device may further change the information related to the first object, based on a user input for the external electronic device.

[0075] In operation **309**, in an embodiment, the electronic device **101** may obtain the information associated with the first object changed by the external electronic device.

[0076] In an embodiment, the electronic device **101** may obtain the information associated with the first object further changed by the external electronic device after operation **307**. For example, when the location, the rotation angle, and/or the attribute information of the first object is further changed by the external electronic device, the electronic device **101** may acquire the information related to the first object from the external electronic device through a media session. After operation **303**, when communication with the external electronic device has been established, the electronic device **101** may acquire the first image from the external electronic device. For example, when the spatial coordinates of the first image is changed by movement of the external electronic device, the electronic device **101** may acquire the changed spatial coordinates of the first image from the external electronic device.

[0077] In operation **311**, in an embodiment, the electronic device **101** may display the first object, based on the information changed by the external electronic device.

[0078] In an embodiment, the electronic device **101** may display the first image and the first object through the display module **160**, based on the information further changed by the external electronic device. In an embodiment, the electronic device **101** may control the virtual object in an inverse object by exchanging virtual object information mapped to the reality image in real time while the image is shared with the external electronic device.

[0079] FIGS. **4**A, **4**B, **4**C, **4**D, and **4**E are diagrams illustrating an example in which an electronic device (for example, the electronic device **101** of FIG. **2**) controls virtual objects obtained from an external electronic device

(for example, the electronic device **102** or the electronic device **104** of FIG. **1**) according to various embodiments of the disclosure.

[0080] Referring to FIG. **4**A, in an embodiment, the electronic device **101** may share a first image **420** and a second image **430** with the external electronic device and display a first object **421** in an area of the first image **420**.

[0081] In an embodiment, the electronic device **101** may display the first image **420** and the first object **421** through a display module (for example, the display module **160** of FIG. **2**), based on information obtained from the external electronic device. In an embodiment, when an additional function of virtual information is obtained based on a user input, the electronic device **101** may obtain spatial coordinates of the first image **420** and information associated with the first object **421** from the external electronic device. In an embodiment, the electronic device **101** may display the first image **420** obtained from the external electronic device in at least a partial area of the display module **160**. The first image **420** may be a reality image obtained by the external electronic device. The electronic device **101** may display the first object **421** obtained from the external electronic device in at least a partial area of the area in which the first image **420** is displayed. In an embodiment, the electronic device **101** may display the first object **421** in a layer higher than the first image **420** by disposing the first object **421** in modeled three-dimensional spatial coordinates. The first object **421** may be a virtual object generated by the external electronic device. Referring to FIG. **4**A, the first object **421** may be a virtual object in a furniture shape, but there is no limitation. In an embodiment, the information associated with the first object **421** may include a location of the first object **421** in the spatial coordinates of the first image **420**, a rotation angle of the first object **421**, and attribute information of the first object **421**. The electronic device **101** may display mixed reality obtained by anchoring the virtual object to the reality space by displaying the first image **420** and the first object **421**.

[0082] In an embodiment, the electronic device **101** may further display the second image **430** obtained by a camera module (for example, the camera module **180** of FIG. **2**) on the display module **160**. For example, the electronic device **101** may control the display module **160** to display an image obtained by a front camera **410** or the second image **430** obtained by a rear camera. The electronic device **101** may transmit the second image **430** obtained by the camera module **180** to the external electronic device through the communication module **190**. The electronic device **101** may share the image with the external electronic device in real time by displaying the first image **420** obtained from the external electronic device or the second image **430** obtained by the camera module **180** through the display module **160**.

[0083] Referring to FIG. **4**B, in an embodiment, the electronic device **101** may change information associated with the first object **421**.

[0084] In an embodiment, the electronic device **101** may change the information associated with the first object **421**, based on a user input **440** in the state in which communication with the external electronic device is established. In an embodiment, the user input **440** may be a gesture detected based on an image obtained by the camera module **180**. For example, based on an image obtained by the front camera **410** or a rear camera, the electronic device **101** may detect a gesture of a user's body. In an embodiment, based on identification that the image acquired by the front camera **410** is shared with the external electronic device, the electronic device **101** may detect a gesture, based on the image acquired by the rear camera. In an embodiment, based on identification that the image acquired by the rear camera is shared with the external electronic device, the electronic device **101** may detect a gesture, based on the image acquired by the front camera **410**. In an embodiment, the electronic device **101** may detect a gesture, based on an image acquired by one of the front camera **410** and the rear camera, and transmit the image to the external electronic device. For example, the electronic device **101** may detect a gesture, based on an image acquired by the front camera **410**, and transmit the image acquired by the front camera **410** to the external electronic device. The electronic device **101** may detect a gesture, based on the image acquired by the rear camera and transmit the image acquired by the rear camera to the external electronic device.

[0085] In an embodiment, the user input **440** may be a touch event for the display module **160**. The electronic device **101** may change the information associated with the object **421**, based on the touch event being detected for the display module **160**.

[0086] In an embodiment, the user input **440** may be sensing information obtained by a controller. In an embodiment, the controller may acquire sensing information for controlling a virtual object in the state in which communication with the electronic device **101** is established. The controller may include a device such as a glove or a smart ring but is not limited thereto. The electronic device **101** may change the information associated with the first object **421**, based on information associated with the user's gesture acquired by the controller.

[0087] In an embodiment, the electronic device **101** may change at least one of a location, a rotation angle, and/or attribute information of the first object **421** in the spatial coordinates of the first image **420**, based on the user input **440**. For example, the electronic device **101** may move the location of the first object **421**, based on a user's detection being detected as indicated by reference numeral **441**. The electronic device **101** may remotely control the location of the first object **421** generated by the external electronic device by remapping the first object **421** to the spatial coordinates of the first image.

[0088] Referring to FIG. **4**C, in an embodiment, the electronic device **101** may identify composition of the first object **421** disposed in at least a partial area of the first image **420** by moving the first object **421** within the area of the first image **420**. For example, when the first image **420** is a reality image of the living room, the electronic device **101** may identify in advance the composition of the living room in which furniture is disposed by moving the first object **421** in the furniture shape within the area of the first image **420** during a video call with the external electronic device.

[0089] Referring to FIG. **4**D, in an embodiment, the electronic device **101** may transmit the changed information associated with the first object to the external electronic device **460**.

[0090] In an embodiment, the electronic device **101** may transmit at least one of the location, the rotation angle, and/or the attribute information of the first object **421** changed based on a user input (for example, the user input **440** of FIG. **4**B) to the external electronic device **460** through a network **450** (for example, the first network **198**

or the second network **199** of FIG. **1**). For example, the electronic device **101** may transmit the coordinates of the first object **421** remapped to the spatial coordinates of the first image **420** to the external electronic device **460**. In an embodiment, the external electronic device **460** may change the information associated with the first object **421** transmitted to the electronic device **101**, based on the changed information related to the first object **421**. The external electronic device **460** may display the first image **420**, the first object **421**, and the second image **430** through a display module **463** of the external electronic device **460**. The external electronic device **460** may further change the information related to the first object **421**, based on a user input **470** for the external electronic device **460**. In an embodiment, the external electronic device **460** may detect the user input **470**, based on an image acquired by a front camera **461** of the external electronic device **460**. For example, the external electronic device **460** may move the first object **421** within the first image **420**, based on the user input **470** for the external electronic device **460** as indicated by reference numeral **471**.

[0091] Referring to FIG. **4**E, in an embodiment, the electronic device **101** may obtain the information associated with the first object **421** changed by the external electronic device **460**.

[0092] In an embodiment, the electronic device **101** may obtain the information associated with the first object **421** further changed by the external electronic device **460**. In an embodiment, the electronic device **101** may display the first object **421** through the display module **160**, based on the information further changed by the external electronic device **460**. Referring to FIG. **4**E, the electronic device **101** may display the first image **420** and the first object **421** through the display module **160**, based on the information related to the first object **421** changed according to a user input (for example, the user input **470** of FIG. **4**D) for the external electronic device **460**. In an embodiment, the electronic device **101** may control the virtual object in an inverse direction by exchanging virtual object information mapped to the reality image in real time while the image is shared with the external electronic device **460**.

[0093] FIG. **5** is a flowchart **500** illustrating an operation in which an electronic device (for example, the electronic device **101** of FIG. **2**) changes object-related information, based on an event for controlling a virtual object being detected, according to an embodiment of the disclosure.

[0094] In an embodiment, operations illustrated in FIG. **5** are not limited to the illustrated orders, but may be performed in various orders. According to an embodiment, more operations than the operations illustrated in FIG. **5** may be performed, or at least one operation fewer than illustrated may be performed.

[0095] Referring to FIG. **5**, in operation **501**, the electronic device **101** (for example, the processor **120** of FIG. **2**) may identify a location of a first object (for example, the first object **421** of FIG. **4**A) in an embodiment.

[0096] In an embodiment, the electronic device **101** may identify the location of the first object **421** in spatial coordinates of a first image (for example, the first image **420** of FIG. **4**A). The electronic device **101** may identify the location of the first object **421** in the spatial coordinates of the first image **420**, based on the spatial coordinates of the first image and information related to the first object obtained from an external electronic device (For example, the external electronic device **460** of FIG. **4**D).

[0097] In operation **503**, in an embodiment, the electronic device **101** may detect an event for controlling the first object **421**.

[0098] In an embodiment, the electronic device **101** may detect the event for controlling the first object **421**, based on a user input for an area corresponding to the location of the first object **421**.

[0099] In an embodiment, the electronic device **101** may identify movement for controlling the first object **421** from the image obtained by the camera module **180** and detect the event for controlling the first object **421**, based on the identified movement. The electronic device **101** may control the first object **421**, based on whether movement for controlling the first object **421** is detected within the area corresponding to the first object **421**.

[0100] In an embodiment, the electronic device **101** may establish communication with a controller (for example, the electronic device **102** of FIG. **1**) through a communication module (for example, the communication module **190** of FIG. **1**) and detect an event for controlling the first object **421**, based on sensing information obtained from the controller (for example, the electronic device **102** of FIG. **1**). The electronic device **101** may control the first object **421**, based on whether the spatial coordinates corresponding to the sensing information is located within the area corresponding to the first object **421**.

[0101] In an embodiment, the electronic device **101** may detect the event for controlling the first object **421**, based on the sensing information obtained by the display module **160**. The electronic device **101** may control the first object **421**, based on whether the coordinates corresponding to sensing information is located within the area corresponding to the first object **421**.

[0102] In operation **505**, in an embodiment, the electronic device **101** may change the information associated with the first object.

[0103] In an embodiment, the electronic device **101** may change information associated with the first object **421**, based on the event for controlling the first object **421** being detected. The electronic device **101** may control the first object **421** generated by the external electronic device **460** by changing at least one of the location, the rotation angle, and/or the attribute information of the first object **421**.

[0104] FIGS. **6**A and **6**B are diagrams illustrating an example in which an electronic device (for example, the electronic device **101** of FIG. **2**) changes object-related information, based on an event for controlling a virtual object being detected according to various embodiments of the disclosure.

[0105] Referring to reference numeral **600** of FIG. **6**A, in an embodiment, the electronic device **101** (for example, the processor **120** of FIG. **2**) may identify the location of the first object **421**. In an embodiment, the electronic device **101** may identify the location of the first object **421** in spatial coordinates of the first image **420**. The electronic device **101** may identify the location of the first object **421** in the spatial coordinates of the first image **420**, based on the spatial coordinates of the first image **420** and information associated with the first object **421** obtained from the external electronic device **460**. Referring to FIG. **6**A, the electronic

device **101** may identify the location of the first object **421**, based on coordinates of one or more features **601** for the first image **420**.

[0106] Referring to reference numeral **610** of FIG. **6**B, in an embodiment, the electronic device **101** may change information associated with the first object **421**, based on an event for controlling the first object **421** being detected. In an embodiment, the electronic device **101** may detect the event for controlling the first object **421**, based on the user input **440** for the area corresponding to the location of the first object **421**. In an embodiment, the electronic device **101** may detect the event for controlling the first object **421**, based on the user input **440** for at least one feature **611** in the area corresponding to the location of the first object **621** among the one or more features **601** for the first image **420**. In an embodiment, the electronic device **101** may move the first object **421**, based on the user input **440** for the feature **611** in the area corresponding to the location of the first object **421** as indicated by reference numeral **441**. In an embodiment, the electronic device **101** may change information associated with the first object **421**, based on the event for controlling the first object **421** being detected. The electronic device **101** may control the first object **421** generated by the external electronic device **460** by changing at least one of the location, the rotation angle, and/or the attribute information of the first object **421**.

[0107] In an embodiment, referring to reference numeral **630**, the electronic device **101** may display the first object **421** in the area of the first image **420**, based on the changed information associated with the first object **421**. The electronic device **101** may transmit the changed information associated with the first object **421** to the external electronic device **460**.

[0108] FIG. **7** is a flowchart **700** illustrating an operation in which an electronic device (for example, the electronic device **101** of FIG. **2**) generates virtual objects and transmits information associated with the generated virtual objects to an external electronic device (for example, the electronic device **102** of FIG. **1**, the electronic device **102** of FIG. **1**, or the external electronic device **460** of FIG. **4**D) according to an embodiment of the disclosure.

[0109] In an embodiment, operations illustrated in FIG. **7** are not limited to the illustrated orders, but may be performed in various orders. According to an embodiment, more operations than the operations illustrated in FIG. **7** may be performed, or at least one operation fewer than illustrated may be performed.

[0110] Referring to FIG. **7**, in operation **701**, the electronic device **101** (For example, the processor **120** of FIG. **2**) may display a second image (for example, the second image **430** of FIG. **4**A) in an embodiment.

[0111] In an embodiment, the electronic device **101** may display the second image **430** obtained by a camera module (for example, the camera module **180** of FIG. **2**) through the display module **160**. For example, the electronic device **101** may control the display module **160** to display the second image **430** obtained by a front camera (for example, the front camera **410** of FIG. **4**A) or the second image **430** obtained by a rear camera.

[0112] In operation **703**, in an embodiment, the electronic device **101** may display a second object.

[0113] In an embodiment, the electronic device **101** may display the second object in at least a partial area of the display module **160** in which the second image **430** is displayed, based on a user input. In an embodiment, when an additional function of virtual information is activated based on a user input, the electronic device **101** may display the second object in at least a partial area of the display module **160** in which the second image **430** is displayed. In an embodiment, the second object may be a virtual object in a shape such as furniture, a picture, or a pet, but there is no limitation.

[0114] In operation **705**, in an embodiment, the electronic device **101** may transmit the second image **430** and information associated with the second object to the external electronic device **460**.

[0115] In an embodiment, the electronic device **101** may transmit the second image **430** obtained by the camera module **180** to the external electronic device **460** through a communication module (for example, the communication module **190** of FIG. **1**). The electronic device **101** may transmit spatial coordinates of the second image **430** to the external electronic device **460**. The electronic device **101** may store in advance the spatial coordinates of the second image **430** and the information related to the second object. In an embodiment, the spatial coordinates of the second image **430** and the information related to the second object may be stored in advance in a server (for example, the server **108** of FIG. **1**).

[0116] In operation **707**, in an embodiment, the electronic device **101** may obtain (or receive) the changed information associated with the second object from the external electronic device **460**.

[0117] In an embodiment, the electronic device **101** may obtain, from the external electronic device **460**, the information associated with the second object changed by the external electronic device **460**. In an embodiment, the external electronic device **460** may change the information related to the second object transmitted by the electronic device **101**, based on the changed information related to the second object. The external electronic device **460** may change the information related to the second object, based on a user input for the external electronic device **460**.

[0118] In operation **709**, in an embodiment, the electronic device **101** may display the second object, based on the information changed by the external electronic device **460**.

[0119] In an embodiment, the electronic device **101** may display the second object through the display module **160**, based on the information changed by the external electronic device **460**. In an embodiment, the electronic device **101** may control the virtual object in an inverse object by exchanging virtual object information mapped to the reality image in real time while the image is shared with the external electronic device.

[0120] FIGS. **8**A, **8**B, and **8**C are diagrams illustrating an example in which an electronic device (for example, the electronic device **101** of FIG. **2**) generates virtual objects and displays the generated virtual objects, based on information obtained by an external electronic device (for example, the electronic device **102** of FIG. **1**, the electronic device **102** of FIG. **2**, or the external electronic device **460** of FIG. **4**D) according to various embodiments of the disclosure.

[0121] Referring to FIG. **8**A, in an embodiment, the electronic device **101** (for example, the processor **120** of FIG. **2**) may display the second image **430** and a second object **801**.

[0122] In an embodiment, the electronic device **101** may display the second image **430** obtained by a camera module

(for example, the camera module **180** of FIG. **2**) through the display module **160**. For example, the electronic device **101** may control the display module **160** to display the second image **430** acquired by the front camera **410** or the second image **430** acquired by the rear camera. In an embodiment, the electronic device **101** may display the second object **801** in at least a partial area of the display module **160** in which the second image **430** is displayed based on a user input. In an embodiment, when an additional function of virtual information is activated based on a user input, the electronic device **101** may display the second object **801** in at least a partial area of the display module **160** in which the second image **430** is displayed. In an embodiment, the second object **801** may be a virtual object displayed in a layer higher than the reality image.

[0123] Referring to FIG. **8**B, in an embodiment, the electronic device **101** may transmit the second image **430** and information associated with the second object **801** to the external electronic device **460** through the network **450** (for example, the first network **198** or the second network **199** of FIG. **1**).

[0124] In an embodiment, the electronic device **101** may transmit the second image **430** obtained by the camera module **180** to the external electronic device **460** through a communication module (for example, the communication module **190** of FIG. **1**). The electronic device **101** may transmit spatial coordinates of the second image **430** to the external electronic device **460**. The electronic device **101** may store in advance the spatial coordinates of the second image **430** and the information related to the second object. In an embodiment, the spatial coordinates of the second image **430** and the information related to the second object may be stored in advance in a server (for example, the server **108** of FIG. **1**). In an embodiment, the external electronic device **460** may display the second image **430** and the second object **801** through the display module **463** of the external electronic device **460**, based on the information related to the second object **801** transmitted by the electronic device **101**. The external electronic device **460** may change the information related to the second object, based on a user input **810** for the external electronic device **460**. For example, the external electronic device **460** may change a rotation angle of a second object **801**, based on the user input **810** for the external electronic device **460** as indicated by reference numeral **811**.

[0125] Referring to FIG. **8**C, in an embodiment, the electronic device **101** may obtain changed information associated with the second object **801** from the external electronic device **460**. The electronic device **101** may display the second object **801**, based on the information changed by the external electronic device **460**. For example, the electronic device **101** may display the second object **801** in at least a partial area of the second image **430**, based on the rotation angle of the second object **801** changed by the external electronic device **460**. In an embodiment, the electronic device **101** may control the virtual object in an inverse object by exchanging virtual object information mapped to the reality image in real time while the image is shared with the external electronic device.

[0126] FIG. **9** is a flowchart **900** illustrating an operation in which an electronic device (for example, the electronic device **101** of FIG. **2**) changes spatial information of ownership of virtual objects generated by an external electronic device (for example, the electronic device **102** of FIG. **1**, the electronic device **102** of FIG. **1**, or the external electronic device **460** of FIG. **4**D) according to an embodiment of the disclosure.

[0127] In an embodiment, operations illustrated in FIG. **9** are not limited to the illustrated orders, but may be performed in various orders. According to an embodiment, more operations than the operations illustrated in FIG. **9** may be performed, or at least one operation fewer than illustrated may be performed.

[0128] Referring to FIG. **9**, in operation **901**, the electronic device **101** (for example, the processor **120** of FIG. **2**) may transmit a spatial movement request for a first object (for example, the first object **421** of FIG. **4**A) to the external electronic device **460** in an embodiment.

[0129] In an embodiment, the electronic device **101** may transmit a request for changing spatial information of the first object **421** to the external electronic device **460**, based on a user input. In an embodiment, the spatial movement request for the first object **421** may be a request for mapping the first object **421** to a second image (for example, the second image **430** of FIG. **4**A) from a first image (for example, the first image **420** of FIG. **4**A) by changing the spatial information of the first object **421**. In an embodiment, the user input may be an event of moving the location of the first object **421** from the first image **420** to the second image **430** but is not limited thereto. Based on the spatial movement request from the electronic device **101** being acquired, the external electronic device **460** may transmit a response to the request to the electronic device **101**, based on communication with a server (for example, the server **108** of FIG. **1**). In an embodiment, based on communication with the server **108**, the external electronic device **460** may transmit a spatial movement response to the electronic device **101**, based on identification that the spatial movement request acquired from the electronic device **101** is valid. Based on communication with the server **108**, the external electronic device **460** may transmit a space maintenance response to the electronic device **101**, based on identification that the spatial movement request acquired from the electronic device **101** is not valid.

[0130] In an embodiment, the first object **421** may be a virtual object of which ownership can be identified based on a non-fungible token (NFT). In an embodiment, the spatial movement request for the first object **421** may be a request for changing ownership for the first object **421**. The change in ownership may be an operation of changing the owner of the virtual object, based on a virtual token that proves possession of digital assets using blockchain technology such as NFT. In an embodiment, the electronic device **101** may transmit a request for changing the ownership of the first object **421** to the external electronic device **460**. The external electronic device **460** may transmit a request for changing the owner of the first object **421** from the user of the external electronic device **460** to the user of the electronic device **101** to a server that manages the ownership of the virtual object, based on the request for changing the ownership being received. In an embodiment, the server that manages the ownership may change the owner of the first object **421** from the user of the external electronic device **460** to the user of the electronic device **101**, based on the request received from the external electronic device **460**. In an embodiment, the server that manages the ownership may

transmit a response to the change in the ownership of the first object **421** to the external electronic device **460** and/or the electronic device **101**.

[0131] In operation **903**, in an embodiment, the electronic device **101** may display the first object **421** in the area of the second image **430**.

[0132] In an embodiment, the electronic device **101** may display the first object **421** in at least a partial area of the area in which the second image **430** is displayed, based on the spatial movement response generated based on the request, being obtained (or received) from the external electronic device **460**. In an embodiment, the electronic device **101** may control the first object **421** within the second image **430** by displaying the first object **421** in the second image **430**.

[0133] In operation **905**, in an embodiment, the electronic device **101** may transmit the changed information associated with the first object **421** to the external electronic device **460**.

[0134] In an embodiment, the electronic device **101** may transmit the second image **430**, spatial information of the second image, and information associated with the first object **421** disposed within the second image **430** to the external electronic device **460**. The external electronic device **460** may display the second image **430**, based on the information obtained from the electronic device **101** and display the first spatially moved first object **421** in the second image **430**.

[0135] FIGS. **10**A and **10**B are diagrams illustrating an example in which an electronic device (for example, the electronic device **101** of FIG. **2**) changes ownership of virtual objects generated by an external electronic device (for example, the electronic device **102** of FIG. **1**, the electronic device **102** of FIG. **1**, or the external electronic device **460** of FIG. **4**D) according to various embodiments of the disclosure.

[0136] Referring to FIG. **10**A, in an embodiment, the electronic device **101** (for example, the processor **120** of FIG. **2**) may transmit a spatial movement request for the first object **421** to the external electronic device (for example, the external electronic device **460** of FIG. **4**A), based on a user input **1001**. In an embodiment, the user input **1001** may be an event of moving the location of the first object **421** from the first image **420** to the second image **430** as indicated by reference numeral **1003** but is not limited thereto. Based on the spatial movement request from the electronic device **101** being obtained, the external electronic device **460** may transmit a response to the request to the electronic device **101**, based on communication with a server (for example, the server **108** of FIG. **1**). In an embodiment, based on communication with the server **108**, the external electronic device **460** may transmit a spatial movement response to the electronic device **101**, based on identification that the spatial movement request obtained from the electronic device **101** is valid. Based on communication with the server **108**, the external electronic device **460** may transmit a space maintenance response to the electronic device **101**, based on identification that the spatial movement request acquired from the electronic device **101** is not valid.

[0137] In an embodiment, the first object **421** may be a virtual object of which ownership can be identified based on an NFT. In an embodiment, the spatial movement request for the first object **421** may be a request for changing ownership of the first object **421**. In an embodiment, the change in ownership may be an operation of changing the ownership of the virtual object, based on blockchain technology such as the NFT. In an embodiment, the electronic device **101** may transmit a request for changing the ownership of the first object **421** to the external electronic device **460**. The external electronic device **460** may transmit a request for changing the owner of the first object **421** from the user of the external electronic device **460** to the user of the electronic device **101** to a server that manages the ownership of the virtual object, based on the request for changing the ownership being received. In an embodiment, the server that manages the ownership may change the owner of the first object **421** from the user of the external electronic device **460** to the user of the electronic device **101**, based on the request received from the external electronic device **460**. In an embodiment, the server that manages the ownership may transmit a response to the change in the ownership of the first object **421** to the external electronic device **460** and/or the electronic device **101**.

[0138] Referring to FIG. **10**B, in an embodiment, the electronic device **101** may display the first object **421** in the area of the second image **430**, based on a spatial movement response generated based on the request, being obtained (or received) from the external electronic device **460**. In an embodiment, the electronic device **101** may display the first object **421** in at least a partial area of the area in which the second image **430** is displayed. In an embodiment, the electronic device **101** may control the first object within the second image **430** by displaying the first object **421** in the second image **430**.

[0139] The electronic device **101** may transmit the changed information associated with the first object **421** to the external electronic device **460**. In an embodiment, the electronic device **101** may transmit the second image **430**, spatial information of the second image, and information related to the first object **421** disposed within the second image **430** to the external electronic device **460**. The external electronic device **460** may display the second image **430**, based on the information obtained from the electronic device **101** and display the first object **421** of which the ownership is changed in the second image **430**. In an embodiment, the electronic device **101** may perform spatial movement of the virtual object and/or change the ownership, based on the information related to the virtual object being exchanged with the external electronic device **460**.

[0140] FIG. **11** is a flowchart **1100** illustrating an operation in which an electronic device (for example, the electronic device **101** of FIG. **2**) transmits a spatial movement request for a virtual object to a server (for example, the server **108** of FIG. **1**) according to an embodiment of the disclosure.

[0141] In an embodiment, operations illustrated in FIG. **11** are not limited to the illustrated orders, but may be performed in various orders. According to an embodiment, more operations than the operations illustrated in FIG. **11** may be performed, or at least one operation fewer than illustrated may be performed.

[0142] Referring to FIG. **11**, in operation **1101**, the electronic device **101** (for example, the processor **120** of FIG. **2**) may transmit a spatial movement request for a second object (for example, the second object **801** of FIG. **8**A) to the server **108** in an embodiment.

[0143] In an embodiment, the electronic device **101** may transmit the spatial movement request for the second object **801** to the server **108**, based on the spatial movement request for the second object **801** being obtained from an external

electronic device (for example, the external electronic device **460** of FIG. **4**D). In an embodiment, the spatial movement request for the first object **421** may be a request for mapping the first object **421** to a second image (for example, the second image **430** of FIG. **4**A) from a first image (for example, the first image **420** of FIG. **4**A) by changing the spatial information of the first object **421**. In an embodiment, when the spatial movement request obtained from the external electronic device **460** is valid, the electronic device **101** may acquire a spatial movement response from the server **108**. In an embodiment, when the spatial movement request acquired from the external electronic device **460** is not valid, the electronic device **101** may acquire a space maintenance response from the server **108**.

[0144] In operation **1103**, in an embodiment, the electronic device **101** may transmit the spatial movement response of the second object to the external electronic device (for example, the electronic device **102** of FIG. **1**, the electronic device **102** of FIG. **1**, or the external electronic device **460** of FIG. **4**D).

[0145] In an embodiment, the electronic device **101** may transmit the spatial movement response of the second object **801** to the external electronic device **460**, based on the spatial movement response generated based on the request, being obtained (or received) from the server **108**.

[0146] In an embodiment, the first object **421** may be a virtual object of which ownership can be identified based on an NFT. In an embodiment, the spatial movement request for the first object **421** may be a request for changing ownership of the first object **421**. In an embodiment, the change in ownership may be an operation of changing the ownership of the virtual object, based on blockchain technology such as the NFT. In an embodiment, the electronic device **101** may transmit a request for changing the ownership of the first object **421** to the external electronic device **460**. The external electronic device **460** may transmit a request for changing the owner of the first object **421** from the user of the external electronic device **460** to the user of the electronic device **101** to a server that manages the ownership of the virtual object, based on the request for changing the ownership being received. In an embodiment, the server that manages the ownership of the virtual object may be a server different from the server **108** that manages space information of the virtual object and/or space information of the three-dimensional space obtained by the camera. In an embodiment, the server that manages the ownership may change the owner of the first object **421** from the user of the external electronic device **460** to the user of the electronic device **101**, based on the request received from the external electronic device **460**. In an embodiment, the server that manages the ownership may transmit a response to the change in the ownership of the first object **421** to the external electronic device **460** and/or the electronic device **101**.

[0147] In operation **1105**, in an embodiment, the electronic device **101** may obtain information associated with the second object changed by the external electronic device **460**.

[0148] In an embodiment, the electronic device **101** may obtain information associated with the second object **801** changed by the external electronic device **460** from the external electronic device **460**. In an embodiment, the information related to the second object **801** may include at least one of a location, a rotation angle, and/or attribute information of the second object **801** of which the location is changed from a second image (for example, the second image **430** of FIG. **4**A) to a first image (for example, the first image **420** of FIG. **4**A).

[0149] In operation **1107**, in an embodiment, the electronic device **101** may display the second object in the area of the first image.

[0150] In an embodiment, the electronic device **101** may display the second object **801** in at least a partial area of the display module **160** on which the first image **420** is displayed, based on information changed by the external electronic device **460**. In an embodiment, the electronic device **101** may perform spatial movement of the virtual object and/or change the ownership, based on the information related to the virtual object being exchanged with the external electronic device **460**.

[0151] An electronic device (for example, the electronic device **101** of FIG. **1** or FIG. **2**) according to an embodiment may be configured to include a communication module (for example, the communication module **190** of FIG. **1** or **2**), a camera module (for example, the camera module **180** of FIG. **1** or **2**), a display module (for example, the display module **160** of FIG. **1** or **2**), memory (for example, the memory **130** of FIG. **1**) storing instructions, and at least one processor (for example, the processor **120** of FIG. **1** or **2**) operatively connected to the communication module **190**, the camera module **180**, the display module **160**, and the memory **130**. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to establish communication with an external electronic device **102**, **104**, or **460** through the communication module **190**. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to display a first image **420** and a first object **421** through the display module **160**, based on information obtained from the external electronic device **102**, **104**, or **460**. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to change information associated with the first object **421**, based on a user input. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to transmit the changed information associated with the first object **421** to the external electronic device **102**, **104**, or **460**. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to obtain the information associated with the first object **421** changed by the external electronic device **102**, **104**, or **460** from the external electronic device **102**, **104**, or **460**. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to display the first object **421** through the display module **160**, based on information changed by the external electronic device **102**, **104**, or **460**.

[0152] In an embodiment, the information obtained from the external electronic device **102**, **104**, or **460** may include spatial coordinates of the first image **420** and the information related to the first object **421**.

[0153] In an embodiment, the information associated with the first object **421** may include a location of the first object **421** in the spatial coordinates of the first image **420**, a rotation angle of the first object **421**, and attribute information of the first object **421**.

[0154] In an embodiment, the instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to identify the location of the first object **421** in the spatial coordinates of the first image **420**.

The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to detect an event for controlling the first object **421**, based on a user input to an area corresponding to the location of the first object **421**. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to, based on detecting the event, change the information associated with the first object **421**.

[0155] In an embodiment, the instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to identify a movement for controlling the first object **421** from an image obtained by the camera module **180**. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to detect an event for controlling the first object **421**, based on the movement.

[0156] In an embodiment, the instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to establish communication with a controller (for example, the electronic device **102** of FIG. **1**) through the communication module **190**. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to detect the event for controlling the first object **421**, based on sensing information obtained from the controller (for example, the electronic device **102** of FIG. **1**).

[0157] In an embodiment, the instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to detect the event for controlling the first object **421**, based on sensing information obtained by the display module **160**.

[0158] In an embodiment, the instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to display a second image **430** obtained by the camera module **180** through the display module **160**. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to display a second object **801** in at least a partial area of the display module **160** in which the second image **430** is displayed, based on a user input. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to transmit the second image **430** and information associated with the second object **801** to the external electronic device **102**, **104**, or **460**. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to obtain information associated with the second object **801** changed by the external electronic device **102**, **104**, or **460** from the external electronic device **102**, **104**, or **460**. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to display the second object **801** through the display module **160**, based on information changed by the external electronic device **102**, **104**, or **460**.

[0159] In an embodiment, the instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to transmit a spatial movement request for the first object **421** to the external electronic device **102**, **104**, or **460**, based on a user input. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to display the first object **421** in at least a partial area of an area in which the second image **430** is displayed, based on receiving, from the external electronic device **102**, **104**, or **460**, a spatial movement response generated based on the request. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to transmit spatial information of the second image **430** and the changed information associated with the first object **421** to the external electronic device **102**, **104**, or **460**.

[0160] In an embodiment, the instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to transmit a spatial movement request for the second object **801** to a server **108**, based on obtaining the spatial movement request for the second object **801** from the external electronic device **102**, **104**, or **460**. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to transmit a spatial movement response for the second object **801** to the external electronic device **102**, **104**, or **460**, based on receiving the spatial movement response generated based on the request from the server **108**. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to obtain information associated with the second object **801** changed by the external electronic device **102**, **104**, or **460** from the external electronic device **102**, **104**, or **460**. The instructions may cause, when executed by the at least one processor **120**, the electronic device **101** to display the second object **801** in at least a partial area of the display module **160** in which the first image **420** is displayed, based on information changed by the external electronic device **102**, **104**, or **460**.

[0161] A method of controlling an object by an electronic device **101** according to an embodiment may include an operation of establishing communication with an external electronic device **102**, **104**, or **460** through a communication module **190**. The method may include an operation of displaying a first image **420** and a first object **421** through a display module **160**, based on information obtained from an external electronic device **102**, **104**, or **460**. The method may include an operation of changing information associated with the first object **421**, based on a user input. The method may include an operation of transmitting the changed information associated with the first object **421** to the external electronic device **102**, **104**, or **460**. The method may include an operation of obtaining the information associated with the first object **421** changed by the external electronic device **102**, **104**, or **460** from the external electronic device **102**, **104**, or **460**. The method may include an operation of displaying the first object **421** through the display module **160**, based on information changed by the external electronic device **102**, **104**, or **460**.

[0162] In an embodiment, in the method, the information obtained from the external electronic device **102**, **104**, or **460** may include spatial coordinates of the first image **420** and the information associated with the first object **421**.

[0163] In an embodiment, in the method, the information associated with the first object **421** may include a location of the first object **421** in the spatial coordinates of the first image **420**, a rotation angle of the first object **421**, and attribute information of the first object **421**.

[0164] In an embodiment, in the method, the operation of changing the information associated with the first object **421** may include an operation of identifying the location of the first object **421** in the spatial coordinates of the first image **420**. The method may include an operation of detecting an event for controlling the first object **421**, based on a user input to an area corresponding to the location of the first

object **421**. The method may include, based on detecting the event, changing the information associated with the first object **421**.

[0165] In an embodiment, in the method, the operation of detecting the event for controlling the first object **421** may include an operation of identifying a movement for controlling the first object **421** from an image obtained by the camera module **180**. The method may include an operation of detecting the event for controlling the first object **421**, based on the movement.

[0166] In an embodiment, in the method, the operation of detecting the event for controlling the first object **421** may include an operation of establishing communication with a controller (for example, the electronic device **102** of FIG. **1**) through the communication module **190**. The method may include an operation of detecting the event for controlling the first object **421**, based on sensing information obtained from controller (for example, the electronic device **102** of FIG. **1**).

[0167] In an embodiment, in the method, the operation of detecting the event for controlling the first object **421** may include an operation of detecting the event for controlling the first object **421**, based on sensing information obtained by the display module **160**.

[0168] In an embodiment, the method may further include an operation of displaying the second image **430** obtained by the camera module **180** through the display module **160**. The method may further include an operation of displaying a second object **801** in at least a partial area of the display module **160** in which the second image **430** is displayed based on a user input. The method may further include an operation of transmitting the second image **430** and information associated with the second object **801** to the external electronic device **102**, **104**, or **460**. The method may further include an operation of obtaining information associated with the second object **801** changed by the external electronic device **102**, **104**, or **460** from the external electronic device **102**, **104**, or **460**. The method may further include an operation of displaying the second object **801** through the display module **160**, based on information changed by the external electronic device **102**, **104**, or **460**.

[0169] In an embodiment, the method may further include an operation of transmitting a spatial movement request for the first object **421** to the external electronic device **102**, **104**, or **460**, based on a user input. The method may further include an operation of displaying the first object **421** in at least a partial area of an area in which the second image **430** is displayed, based on receiving a spatial movement response generated based on the request from the external electronic device **102**, **104**, or **460**. The method may further include an operation of transmitting spatial information of the second image **430** and the changed information associated with the first object **421** to the external electronic device **102**, **104**, or **460**.

[0170] In an embodiment, the method may further include an operation of transmitting a spatial movement request for the second object **801** to a server **108**, based on obtaining the spatial movement request for the second object **801** from the external electronic device **102**, **104**, or **460**. The method may further include an operation of transmitting a spatial movement response for the second object **801** to the external electronic device **102**, **104**, or **460**, based on receiving the spatial movement response generated based on the request from the server **108**. The method may further include an operation of obtaining information associated with the second object **801** changed by the external electronic device **102**, **104**, or **460** from the external electronic device **102**, **104**, or **460**. The method may further include an operation of displaying the second object **801** in at least a partial area of the display module **160** in which the first image **420** is displayed, based on information changed by the external electronic device **102**, **104**, or **460**.

[0171] A computer-readable storage medium storing instructions is provided. The instructions may cause an electronic device **101**, when executed by at least one processor **120** of the electronic device **101**, to perform operations. The operations may include an operation of establishing communication with an external electronic device **102**, **104**, or **460** through a communication module **190** of the electronic device **101**. The operations may include an operation of displaying a first image **420** and a first object **421** through a display module **160** of the electronic device **101**, based on information obtained from an external electronic device **102**, **104**, or **460**. The operations may include an operation of changing information associated with the first object **421**, based on a user input. The operations may include an operation of transmitting the changed information associated with the first object **421** to the external electronic device **102**, **104**, or **460**. The operations may include an operation of obtaining the information associated with the first object **421** changed by the external electronic device **102**, **104**, or **460** from the external electronic device **102**, **104**, or **460**. The operations may include an operation of displaying the first object **421** through the display module **160**, based on information changed by the external electronic device **102**, **104**, or **460**.

[0172] The electronic device according to various embodiments may be one of various types of electronic devices. The electronic devices may include, for example, a portable communication device (e.g., a smartphone), a computer device, a portable multimedia device, a portable medical device, a camera, a wearable device, or a home appliance. According to an embodiment of the disclosure, the electronic devices are not limited to those described above.

[0173] 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 any one of, or all possible combinations of the items enumerated together in a corresponding one of the phrases. As used herein, such terms as "1st" and "2nd," or "first" and "second" may be used to simply distinguish a corresponding component from another, and does not limit the components in other aspect (e.g., importance or order). It is to be understood that if an element (e.g., a first element) is referred to, with or without the term "operatively" or "communicatively", as "coupled with," "coupled to," "connected with," or "connected to" another element (e.g., a second element), it means that the element may be coupled with the other element directly (e.g., wiredly), wirelessly, or via a third element.

[0174] As used in connection with various embodiments of the disclosure, 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).

[0175] 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 machine-readable storage medium 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.

[0176] According to an embodiment, a method according to various embodiments of the disclosure may be included and provided in a computer program product. The computer program product may be traded as a product between a seller and a buyer. The computer program product may be distributed in the form of a machine-readable storage medium (e.g., compact disc read only memory (CD-ROM)), or be distributed (e.g., downloaded or uploaded) online via an application store (e.g., PlayStore™), or between two user devices (e.g., smart phones) directly. If distributed online, at least part of the computer program product may be temporarily generated or at least temporarily stored in the machine-readable storage medium, such as memory of the manufacturer's server, a server of the application store, or a relay server.

[0177] According to various embodiments, each component (e.g., a module or a program) of the above-described components may include a single entity or multiple entities, and some of the multiple entities may be separately disposed in different components. According to various embodiments, one or more of the above-described components may be omitted, or one or more other components may be added. Alternatively or additionally, a plurality of components (e.g., modules or programs) may be integrated into a single component. In such a case, according to various embodiments, the integrated component may still perform one or more functions of each of the plurality of components in the same or similar manner as they are performed by a corresponding one of the plurality of components before the integration. According to various embodiments, operations performed by the module, the program, or another component may be carried out sequentially, in parallel, repeatedly, or heuristically, or one or more of the operations may be executed in a different order or omitted, or one or more other operations may be added.

[0178] Further, the structures of data used in the embodiments described above may be recorded through various means in a computer-readable recording medium. The computer-readable recording medium includes recording media, such as a magnetic recording medium (for example, ROM, floppy disc, hard disc, etc.), an optical reading medium (for example, CD-ROM, digital versatile disc (DVD), etc.).

[0179] 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.

[0180] 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.

[0181] 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.

[0182] 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.

What is claimed is:

1. An electronic device comprising:

a communication module;

a camera module;

a display module;

memory, comprising one or more storage media, storing instructions; and

at least one processor communicatively coupled to the communication module, the camera module, the display module, and the memory,

wherein the instructions, when executed by the at least one processor individually or collectively, cause the electronic device to:

establish, through the communication module, communication with an external electronic device,

display, through the display module, a first image and a first object, based on information obtained from the external electronic device,

change information associated with the first object, based on a user input,

transmit, to the external electronic device, the changed information associated with the first object,

obtain, from the external electronic device, information associated with the first object changed by the external electronic device, and

display, through the display module, the first object, based on the information changed by the external electronic device.

2. The electronic device of claim **1**, wherein the information obtained from the external electronic device comprises spatial coordinates of the first image and the information associated with the first object.

3. The electronic device of claim **2**, wherein the information associated with the first object comprises:

a location of the first object in the spatial coordinates of the first image,

a rotation angle of the first object, and

attribute information of the first object.

4. The electronic device of claim **3**, wherein the instructions, when executed by the at least one processor individually or collectively, further cause the electronic device to:

identify the location of the first object in the spatial coordinates of the first image,

detect an event for controlling the first object, based on a user input to an area corresponding to the location of the first object, and

based on detecting the event, change the information associated with the first object.

5. The electronic device of claim **1**, wherein the instructions, when executed by the at least one processor individually or collectively, further cause the electronic device to:

identify a movement for controlling the first object from an image obtained by the camera module, and

detect an event for controlling the first object, based on the movement.

6. The electronic device of claim **5**, wherein the instructions, when executed by the at least one processor individually or collectively, further cause the electronic device to:

establish, through the communication module, communication with a controller, and

detect the event for controlling the first object, based on sensing information obtained from the controller.

7. The electronic device of claim **6**, wherein the instructions, when executed by the at least one processor individually or collectively, further cause the electronic device to:

detect the event for controlling the first object, based on sensing information obtained by the display module.

8. The electronic device of claim **1**, wherein the instructions, when executed by the at least one processor individually or collectively, further cause the electronic device to:

display, through the display module, a second image obtained by the camera module,

display a second object in at least a partial area of the display module in which the second image is displayed, based on a user input,

transmit, to the external electronic device, the second image and information associated with the second object,

obtain, from the external electronic device, information associated with the second object changed by the external electronic device, and

display, through the display module, the second object based on the information changed by the external electronic device.

9. The electronic device of claim **8**, wherein the instructions, when executed by the at least one processor individually or collectively, further cause the electronic device to:

transmit, to the external electronic device, a spatial movement request for the first object, based on a user input,

display the first object in at least a part of an area in which the second image is displayed, based on receiving a spatial movement response generated based on the spatial movement request from the external electronic device, and

transmit, to the external electronic device, spatial information of the second image and the changed information associated with the first object.

10. The electronic device of claim **9**, wherein the instructions, when executed by the at least one processor individually or collectively, further cause the electronic device to:

transmit, to a server, a spatial movement request for the second object, based on obtaining the spatial movement request for the second object from the external electronic device,

transmit a spatial movement response for the second object to the external electronic device, based on receiving the spatial movement response generated based on the spatial movement request from the server,

obtain, from the external electronic device, information associated with the second object changed by the external electronic device, and

display the second object in at least a partial area of the display module in which the first image is displayed, based on the information changed by the external electronic device.

11. A method of controlling an object by an electronic device, the method comprising:

establishing, through a communication module, communication with an external electronic device;

displaying, through a display module, a first image and a first object, based on information obtained from the external electronic device;

changing information associated with the first object, based on a user input;

transmitting, to the external electronic device, the changed information associated with the first object;

obtaining, from the external electronic device, information associated with the first object changed by the external electronic device; and

displaying, through the display module, the first object, based on the information changed by the external electronic device.

12. The method of claim **11**, wherein the information obtained from the external electronic device comprises spatial coordinates of the first image and the information associated with the first object.

13. The method of claim **12**, wherein the information associated with the first object comprises:

a location of the first object in the spatial coordinates of the first image,

a rotation angle of the first object, and

attribute information of the first object.

14. The method of claim **13**, wherein the changing of the information related to the first object comprises:

identifying the location of the first object in the spatial coordinates of the first image;

detecting an event for controlling the first object, based on a user input to an area corresponding to the location of the first object; and

based on detecting the event, changing the information associated with the first object.

15. The method of claim **11**, further comprising:

identifying a movement for controlling the first object from an image obtained by a camera module; and

detecting an event for controlling the first object, based on the movement.

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

establishing, through the communication module, communication with a controller; and

detecting the event for controlling the first object, based on sensing information obtained from the controller.

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

detecting the event for controlling the first object, based on sensing information obtained by the display module.

18. The method of claim **11**, further comprising:

displaying, through the display module, a second image obtained by a camera module;

displaying a second object in at least a partial area of the display module in which the second image is displayed, based on a user input;

transmitting, to the external electronic device, the second image and information associated with the second object;

obtaining, from the external electronic device, information associated with the second object changed by the external electronic device; and

displaying, through the display module, the second object based on the information changed by the external electronic device.

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 an electronic device to perform operations, the operations comprising:

establishing, through a communication module of the electronic device, communication with an external electronic device;

displaying, through a display module of the electronic device, a first image and a first object, based on information obtained from an external electronic device;

changing information associated with the first object, based on a user input,

transmitting, to the external electronic device, the changed information associated with the first object;

obtaining, from the external electronic device, information associated with the first object changed by the external electronic device; and

displaying, through the display module, the first object, based on the information changed by the external electronic device.

20. The one or more non-transitory computer-readable storage media of claim **19**, the operations further comprising:

displaying, through the display module, a second image obtained by a camera module;

displaying a second object in at least a partial area of the display module in which the second image is displayed, based on a user input;

transmitting, to the external electronic device, the second image and information associated with the second object;

obtaining, from the external electronic device, information associated with the second object changed by the external electronic device; and

displaying, through the display module, the second object based on the information changed by the external electronic device.

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