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Window resizing and virtual object rearrangement in 3D environments

Abstract

Methods for counter-scaling windows and rearranging objects within those counter-scaled windows in a 3D computer-generated environment is disclosed. The windows can be counter-scaled in accordance with changes to their depth within the 3D computer-generated environment. Objects within the window can be presented at their actual size and with their correct scale relative to each other and with respect to the 3D computer-generated environment, and can maintain their actual size and scale relative to each other and the environment regardless of the depth of the window in the environment. Some embodiments of the disclosure rearrange the layout of the objects to present more or fewer objects in the window as the size of the window changes due to counter-scaling. Depth-dependent window resizing and object rearrangement while preserving actual object size and scale within the 3D computer-generated environment can provide a more authentic viewing experience and can encourage increased user interaction.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS (1) This application claims the benefit of U.S. Provisional Application No. 63/367,373, filed Jun. 30, 2022, the content of which is incorporated herein by reference in its entirety for all purposes.

FIELD OF THE DISCLOSURE
(1) This relates generally to methods for resizing windows and rearranging virtual object representations within those windows in a computer-generated environment.
BACKGROUND OF THE DISCLOSURE
(2) Computer-generated environments are environments where at least some windows and virtual object representations displayed for a user's viewing are generated using a computer. Users may interact with a computer-generated environment by displaying and utilizing windows and virtual object representations within the computer-generated environment.
SUMMARY OF THE DISCLOSURE
(3) Embodiments of the disclosure are directed to methods for resizing windows (e.g., browser windows) in a three-dimensional (3D) computer-generated environment, and rearranging virtual object representations (e.g., virtual 2D or 3D objects, models or images of products and text) within those windows. Some embodiments described in this disclosure are directed to moving the windows around and counter-scaling those windows in accordance with changes to their depth within the 3D computer-generated environment to provide an improved user experience. In some embodiments, object representations within the window can be presented at their actual size (their correct physical size within and with respect to the presented size of the 3D computer-generated environment) and at their actual scale relative to each other and with respect to the presented scale of the 3D computer-generated environment, and can maintain their actual size and scale relative to each other and the environment regardless of the depth of the window in the environment. Some embodiments of the disclosure rearrange the layout of the object representations to present more or fewer object representations in the window as the size of the window changes due to counter-scaling. Depth-dependent window resizing and object representation rearrangement while preserving actual object representation size and scale within the 3D computer-generated environment can provide a more authentic, accurate and easier viewing experience and can encourage increased user interaction. The full descriptions of the

embodiments are provided in the Drawings and the Detailed Description, and it is understood that this Summary does not limit the scope of the disclosure in any way.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) For a better understanding of the various described embodiments, reference should be made to the Detailed Description below, in conjunction with the following drawings in which like reference numerals refer to corresponding parts throughout the figures.

(2) FIG. **1** illustrates an example electronic device presenting a 3D computer-generated environment according to some embodiments of the disclosure.

(3) FIG. **2** illustrates an example block diagram of an exemplary architecture for a device in accordance with some embodiments of the disclosure.

(4) FIG. **3**A illustrates an example window presented in a 3D computer-generated environment according to some embodiments of the disclosure.

(5) FIG. **3**B illustrates example object representations and object text in a window being scrolled downward in a 3D computer-generated environment according to some embodiments of the disclosure.

(6) FIG. **3**C illustrates an example window being moved backwards from its previous location closer to the user (indicated by a dashed outline) to a new location farther from the user in a 3D computer generated environment according to some embodiments of the disclosure.

(7) FIG. **4**A illustrates utilizing an example control panel icon to call up a control panel to activate window counter-scaling and other features in a 3D computer-generated environment according to some embodiments of the disclosure.

(8) FIG. **4**B illustrates an example control panel to activate counter-scaling and other features in a 3D computer-generated environment according to some embodiments of the disclosure.

(9) FIG. **5**A illustrates an example window, object representation and text counter-scaling as the window is moved backwards from its previous location closer to the user (indicated by a dashed outline) to a new location farther from the user in a 3D computer generated environment according to some embodiments of the disclosure.

(10) FIG. **5**B illustrates example window counter-scaling as the window is moved backwards from its previous location closer to the user (indicated by a dashed outline) to a new location farther from the user in a 3D computer-generated environment according to some embodiments of the disclosure.

(11) FIG. **5**C illustrates window counter-scaling and object representation rearrangement as a window is moved to a new intermediate location farther from the user in a 3D computer generated environment according to some embodiments of the disclosure.

(12) FIG. **5**D illustrates window counter-scaling and object representation rearrangement as a window is moved to a new location farther from the user in a 3D computer generated environment according to some embodiments of the disclosure.

(13) FIG. **5**E illustrates window counter-scaling and delayed object representation rearrangement as a window is pulled forward in a 3D computer generated environment according to some embodiments of the disclosure.

(14) FIG. **5**F illustrates an example completion of the delayed rearrangement of object representations and object text in a window presented in a 3D computer generated environment at the conclusion of a repositioning operation according to some embodiments of the disclosure.

(15) FIG. **6**A illustrates window and object text counter-scaling and object representation rearrangement as a window is moved to a new location farther from the user in a 3D computer generated environment according to some embodiments of the disclosure.

(16) FIG. **6**B illustrates window and object text counter-scaling with limited object representation rearrangement as a window is moved to a new location farther from the user in a 3D computer generated environment according to some embodiments of the disclosure.

(17) FIG. **7** illustrates object representation rearrangement as a window is resized in a 3D computer generated environment according to some embodiments of the disclosure.

(18) FIG. **8** is an example flow diagram illustrating a method of counter-scaling windows, and rearranging and/or counter-scaling object representations within those windows in a 3D computer-generated environment according to some embodiments of the disclosure.

DETAILED DESCRIPTION

(19) In the following description of embodiments, reference is made to the accompanying drawings which form a part hereof, and in which it is shown by way of illustration specific embodiments that are optionally practiced. It is to be understood that other embodiments are optionally used and structural changes are optionally made without departing from the scope of the disclosed embodiments. Further, although the following description uses terms “first,” “second,” etc. to describe various elements, these elements should not be limited by the terms. These terms are only used to distinguish one element from another. For example, a respective selectable option (e.g., control element) could be referred to as a “first” or “second” selectable option, without implying that the respective selectable option has different characteristics based merely on the fact that the respective selectable option is referred to as a “first” or “second” selectable option. On the other hand, a selectable option referred to as a “first” selectable option and a selectable option referred to as a “second” selectable option are both selectable options, but are not the same selectable option, unless explicitly described as such.

(20) The terminology used in the description of the various described embodiments herein is for the purpose of describing particular embodiments only and is not intended to be limiting. As used in the description of the various described embodiments and the appended claims, the singular forms “a,” “an,” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will also be understood that the term “and/or” as used herein refers to and encompasses any and all possible combinations of one or more of the associated listed items. It will be further understood that the terms “includes,” “including,” “comprises,” and/or “comprising,” when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

(21) The term “if” is, optionally, construed to mean “when” or “upon” or “in response to determining” or “in response to detecting,” depending on the context. Similarly, the phrase “if it is determined” or “if [a stated condition or event] is detected” is, optionally, construed to mean “upon determining” or “in response to determining” or “upon detecting [the stated condition or event]” or “in

response to detecting [the stated condition or event],” depending on the context.

(22) Embodiments of electronic devices, user interfaces for such devices, and associated processes for using such devices are described. In some embodiments, the user may interact with the user interface or computer-generated environment (e.g., an extended reality environment) via eye focus (gaze) and/or eye movement and/or via position, orientation or movement of one or more fingers/hands (or a representation of one or more fingers/hands) in space relative to the user interface or computer-generated environment. In some embodiments, eye focus/movement and/or position/orientation/movement of fingers/hands can be captured by cameras and other sensors (e.g., motion sensors). In some embodiments audio/voice inputs can be used to interact with the user interface or computer-generated environment captured by one or more audio sensors (e.g., microphones). Further, as described above, it should be understood that the described electronic device, display and touch-sensitive surface and/or other input devices/sensors are optionally distributed amongst two or more devices.

(23) The electronic device typically supports a variety of applications that may be displayed in the computer-generated environment, such as one or more of the following: a drawing application, a presentation application, a word processing application, a website creation application, a disk authoring application, a spreadsheet application, a gaming application, a telephone application, a video conferencing application, an e-mail application, an instant messaging application, a workout support application, a content application (e.g., a photo/video management application), a digital camera application, a digital video camera application, a web browsing application, a digital music player application, a television channel browsing application, and/or a digital video player application.

(24) FIG. **1** illustrates an example electronic device **100** displaying a 3D computer-generated environment according to some embodiments of the disclosure. In some embodiments, electronic device **100** is a hand-held or mobile device, such as a tablet computer, laptop computer, smartphone, a wearable device, or head-mounted display. Examples of device **100** are described below with reference to the architecture block diagram of FIG. **2**. As shown in FIG. **1**, electronic device **100** and table **120** are located in the physical environment **110**. In some embodiments, electronic device **100** may be configured to capture areas of physical environment **110** including table **120** (illustrated in the field of view of electronic device **100**). In some embodiments, in response to a trigger, the electronic device **100** may be configured to display an object **130** in the computer-generated environment (e.g., represented by a cube illustrated in FIG. **1**) that is not present in the physical environment **110** (e.g., a virtual object), but is displayed in the computer-generated environment positioned on (e.g., anchored to) the top of a computer-generated representation **120′** of real-world table **120**. For example, object **130** can be displayed on the surface of the table **120′** in the computer-generated environment displayed via device **100** in response to detecting the planar surface of table **120** in the physical environment **110**. It should be understood that object **130** is a representative object and one or more different objects (e.g., of various dimensionality such as two-dimensional or three-dimensional objects) can be included and rendered in a three-dimensional computer-generated environment. For example, the object can represent an application or a user interface displayed in the computer-generated environment. In some examples, the application or user interface can include the display of selectable options for launching applications or for performing operations associated with applications. Additionally, it should be understood, that the three-dimensional (3D) environment (or 3D object) described herein may be a representation of a 3D environment (or three-dimensional object) displayed in a two dimensional (2D) context (e.g., displayed on a 2D screen).

(25) FIG. **2** illustrates an example block diagram of an exemplary architecture for a device **200** in accordance with some embodiments of the disclosure. The blocks in FIG. **2** can represent an information processing apparatus for use in the device. In some embodiments, device **200** is a mobile device, such as a mobile phone (e.g., smart phone), a tablet computer, a laptop computer, a desktop computer, a wearable device, a head-mounted display, an auxiliary device in communication with another device, etc. In some embodiments, as illustrated in FIG. **2**, device **200** includes various components, such as communication circuitry **202**, processor(s) **204**, memory **206**, image sensor(s) **210**, location sensor(s) **214**, orientation sensor(s) **216**, microphone(s) **218**, touch-sensitive surface(s) **220**, speaker(s) **222**, display generation component(s) **224**, tracking sensor(s) **230**, and/or eye tracking sensor(s) **232**. These components optionally communicate over communication bus(es) **208** of device **200**.

(26) Device **200** includes communication circuitry **202**. Communication circuitry **202** optionally includes circuitry for communicating with electronic devices, networks, such as the Internet, intranets, a wired network and/or a wireless network, cellular networks and wireless local area networks (LANs). Communication circuitry **202** optionally includes circuitry for communicating using near-field communication (NFC) and/or short-range communication, such as Bluetooth®.

(27) Processor(s) **204** include one or more general processors, one or more graphics processors, and/or one or more digital signal processors. In some embodiments, memory **206** a non-transitory computer-readable storage medium (e.g., flash memory, random access memory, or other volatile or non-volatile memory or storage) that stores computer-readable instructions configured to be executed by processor(s) **204** to perform the techniques, processes, and/or methods described below. In some embodiments, memory **206** can including more than one non-transitory computer-readable storage medium. A non-transitory computer-readable storage medium can be any medium (e.g., excluding a signal) that can tangibly contain or store computer-executable instructions for use by or in connection with the instruction execution system, apparatus, or device. In some embodiments, the storage medium is a transitory computer-readable storage medium. In some embodiments, the storage medium is a non-transitory computer-readable storage medium. The non-transitory computer-readable storage medium can include, but is not limited to, magnetic, optical, and/or semiconductor storages. Examples of such storage include magnetic disks, optical discs based on CD, DVD, or Blu-ray technologies, as well as persistent solid-state memory such as flash, solid-state drives, and the like.

(28) Device **200** includes display generation component(s) **224**. In some embodiments, display generation component(s) **224** include a single display (e.g., a liquid-crystal display (LCD), organic light-emitting diode (OLED), or other types of display). In some embodiments, display generation component(s) **224** includes multiple displays. In some embodiments, display generation component(s) **224** can include a display with touch capability (e.g., a touch screen), a projector, a holographic projector, a retinal projector, etc. In some embodiments, device **200** includes touch-sensitive surface(s) **220** for receiving user inputs, such as tap inputs and swipe inputs or other gestures. In some embodiments, display generation component(s) **224** and touch-sensitive surface(s) **220** form touch-sensitive display(s) (e.g., a touch screen integrated with device **200** or external to device **200** that is in communication with device **200**).

(29) Device **200** optionally includes image sensor(s) **210**. Image sensors(s) **210** optionally include one or more visible light image sensor, such as charged coupled device (CCD) sensors, and/or complementary metal-oxide-semiconductor (CMOS) sensors operable to obtain images of physical objects from the real-world environment. Image sensor(s) **210** also optionally include one or more infrared (IR) sensors, such as a passive or an active IR sensor, for detecting infrared light from the real-world environment. For example, an

active IR sensor includes an IR emitter for emitting infrared light into the real-world environment. Image sensor(s) **210** also optionally include one or more cameras configured to capture movement of physical objects in the real-world environment. Image sensor(s) **210** also optionally include one or more depth sensors configured to detect the distance of physical objects from device **200**. In some embodiments, information from one or more depth sensors can allow the device to identify and differentiate objects in the real-world environment from other objects in the real-world environment. In some embodiments, one or more depth sensors can allow the device to determine the texture and/or topography of objects in the real-world environment.

(30) In some embodiments, device **200** uses CCD sensors, event cameras, and depth sensors in combination to detect the physical environment around device **200**. In some embodiments, image sensor(s) **220** include a first image sensor and a second image sensor. The first image sensor and the second image sensor work in tandem and are optionally configured to capture different information of physical objects in the real-world environment. In some embodiments, the first image sensor is a visible light image sensor and the second image sensor is a depth sensor. In some embodiments, device **200** uses image sensor(s) **210** to detect the position and orientation of device **200** and/or display generation component(s) **224** in the real-world environment. For example, device **200** uses image sensor(s) **210** to track the position and orientation of display generation component(s) **224** relative to one or more fixed objects in the real-world environment.

(31) In some embodiments, device **200** includes microphones(s) **218** or other audio sensors. Device **200** uses microphone(s) **218** to detect sound from the user and/or the real-world environment of the user. In some embodiments, microphone(s) **218** includes an array of microphones (a plurality of microphones) that optionally operate in tandem, such as to identify ambient noise or to locate the source of sound in space of the real-world environment.

(32) Device **200** includes location sensor(s) **214** for detecting a location of device **200** and/or display generation component(s) **224**. For example, location sensor(s) **214** can include a GPS receiver that receives data from one or more satellites and allows device **200** to determine the device's absolute position in the physical world.

(33) Device **200** includes orientation sensor(s) **216** for detecting orientation and/or movement of device **200** and/or display generation component(s) **224**. For example, device **200** uses orientation sensor(s) **216** to track changes in the position and/or orientation of device **200** and/or display generation component(s) **224**, such as with respect to physical objects in the real-world environment. Orientation sensor(s) **216** optionally include one or more gyroscopes and/or one or more accelerometers.

(34) Device **200** includes eye tracking sensor(s) **232** and/or other tracking sensor(s) **230**, in some embodiments. Tracking sensor(s) **230** include, but are not limited to, one or more of hand tracking sensors, body tracking sensors, and face tracking sensors, are configured to track the position/location of one or more portions of the user's hands, body or face, and/or motions of one or more portions of the user's hands, body or face with respect to the computer-generated environment, relative to the display generation component(s) **224**, and/or relative to another defined coordinate system. Eye tracking sensor(s) **232** are configured to track the position and movement of a user's gaze (eyes, face, or head, more generally) with respect to the real-world or computer-generated environment and/or relative to the display generation component(s) **224**. In some embodiments, tracking sensor(s) **230** and/or eye tracking sensor(s) **232** are implemented together with the display generation component(s) **224**.

(35) In some embodiments, the tracking sensor(s) **230** can use image sensor(s) **210** (e.g., one or more IR cameras, 3D cameras, depth cameras, etc.) that capture three-dimensional information from the real-world including one or more hands (e.g., of a human user). In some examples, the hands can be resolved with sufficient resolution to distinguish fingers and their respective positions. In some embodiments, one or more image sensor(s) **210** are positioned relative to the user to define a field of view of the image sensor(s) and an interaction space in which finger/hand position, orientation and/or movement captured by the image sensors are used as inputs (e.g., to distinguish from a user's resting hand or other hands of other persons in the real-world environment). Tracking the fingers/hands for input (e.g., gestures) can be advantageous in that it does not require the user to touch, hold or wear any sort of beacon, sensor, or other marker.

(36) In some embodiments, eye tracking sensor(s) **232** includes at least one eye tracking camera (e.g., infrared (IR) cameras) and/or illumination sources (e.g., IR light sources, such as LEDs) that emit light towards a user's eyes. The eye tracking cameras may be pointed towards a user's eyes to receive reflected IR light from the light sources directly or indirectly from the eyes. In some embodiments, both eyes are tracked separately by respective eye tracking cameras and illumination sources, and a focus/gaze can be determined from tracking both eyes. In some embodiments, one eye (e.g., a dominant eye) is tracked by a respective eye tracking camera/illumination source(s). In some embodiments, eye tracking sensor(s) **232** can use image sensor(s) **210** (e.g., one or more IR cameras, 3D cameras, depth cameras, etc.).

(37) Device **200** is not limited to the components and configuration of FIG. **2**, but can include fewer, other, or additional components in multiple configurations. A person using device **200**, is optionally referred to herein as a user of the device.

(38) As described herein, a computer-generated environment including various graphical user interfaces ("GUIs") may be displayed using an electronic device, such as electronic device **100** or device **200**, including one or more display generation components. The computer-generated environment can include one or more GUIs associated with an application or program. For example, a user can launch a web browser and cause a browser window to be presented in the computer-generated environment so that the user can access the Internet from within the 3D computer-generated environment.

(39) FIG. **3**A illustrates example window **326** presented in 3D computer-generated environment **312** according to some embodiments of the disclosure. In the example of FIG. **3**A, an electronic device (similar to electronic device **100** or **200** described above) can present 3D computer-generated environment **312** with a particular scale. For example, if 3D computer-generated environment **312** appears to be an actual size, life-like (e.g., full size) environment, the environment can be considered to be presented with a scale of 1:1.

(40) For purposes of this disclosure, 3D computer-generated environment **312** shown in FIG. **3**A (and other figures referred to in this disclosure) will be described in the context of a rectangular x-y-z coordinate system, with the origin of the rectangular coordinate system assigned to the back-left corner of the environment (hidden in FIG. **3**A). Accordingly, left-to-right movement can be referred to as movement in the +x direction, right-to-left movement can be referred to as movement in the −x direction, front-to-back movement can be referred to as movement in the −y direction, back-to-front movement can be referred to as movement in the +y direction, lower-to-higher movement can be referred to as movement in the +z direction, higher-to-lower movement can be referred to as movement in the −z direction.

(41) 3D computer-generated environment **312** can include representations of objects that are in the physical environment around the electronic device (e.g., objects that are captured by one or more cameras of the electronic device or are viewable to the user via a

transparent or translucent display). In the embodiment of FIG. **3**A, table **328** is shown in 3D computer-generated environment **312** as a representative example of one or more objects in the physical world around the electronic device that have been captured by one or more capture devices of the electronic device and presented in 3D within the environment. For purposes of explaining the scale of objects as used herein, if table **328** appears to be an actual size, life-like (e.g., full size) table within and with respect to 3D computer-generated environment **312**, it can be considered to be presented with a 1:1 scale with respect to the scale of the 3D computer-generated environment, regardless of the presented scale of the environment. On the other hand, if the size of table **328** is modified to appear half of its actual size in 3D computer-generated environment **312**, it can be considered to be presented with a 0.5:1 scale with respect to the scale of the 3D computer-generated environment, regardless of the presented scale of the environment.

(42) In the example embodiment of FIG. **3**A, computer-generated environment **312** also includes representation **334** of a hand of a user of the electronic device that is present in the physical environment around the electronic device and has been captured by one or more capture devices of the electronic device. For example, the electronic device can capture an image of the hand of the user using one or more cameras of the electronic device, identify a pose of the hand, and assign and present a corresponding pose of the hand as representation **334** in 3D computer-generated environment **312**. In some examples, representation **334** can be a photorealistic depiction of the hand of the user or a caricature or outline of the hand of the user. In other examples, representation **334** can be an image of the actual hand of the user that is passively presented in computer-generated environment **312** by the electronic device via a transparent or translucent display. The electronic device can permit the image of the passively presented user's hand to be viewable, for example, by not actively displaying a virtual object that obscures the view of the hand. In other examples, representation **334** can be a representation of other real objects (e.g., a stylus, a wand, etc.) in the physical environment around the electronic device, or a representation of a virtual object that is not present in the physical environment, but nevertheless serves as a representation of a user input. Therefore, although representation **334** may be illustrated and described throughout this disclosure as a representation of a hand, it should be understood that representation **334** can refer to a representation of a hand or other object, and can refer to either a virtual representation of a physical object presented on a display, the physical object itself as passively provided by a transparent or translucent display, or a virtual object. Furthermore, although FIG. **3**A illustrates representation **334** as a right hand, in other embodiments the representation can be a left hand.

(43) In some examples, 3D computer-generated environment **312** can additionally or alternatively display one or more virtual object representations (e.g., object representations that are generated and displayed by the electronic device in the 3D computer-generated environment, but do not exist in the physical environment (e.g., real world environment) around the electronic device). Window **326** is shown in 3D computer-generated environment **312** as a representative example of a virtual object representation presented within the environment. In accordance with an instruction to open a window, such as the launching of a web browser, window **326** can be presented in 3D computer-generated environment **312**. The instruction can be generated using any number of input mechanisms available to the user while operating the electronic device, which includes, but is not limited to, touch, audio, hand or eye gaze tracking, or other sensor inputs. In the example of FIG. **3**A, window **326** is presented with an initial size that can be considered the default actual size and actual scale (1:1 scale) of the window within, and with respect to, the presented size and scale of 3D computer-generated environment **312**, and at a particular depth within the environment. Although window **326** is described and illustrated primarily as a rectangular web browser window, the term “window” as defined herein is inclusive of not only a web browser window, but also other bounded areas within the 3D computer-generated environment that are capable of presenting a layout of object representations. In some examples, a window can have any regular or irregular shape, and can be suspended in the 3D computer-generated environment, or superimposed or virtually projected onto virtual objects (e.g., virtual walls, ceilings or floors) or representations of physical objects, as long as the window is capable of being relocated and resized within the environment. In some examples, the window can present all or a portion of an image (e.g., all or a portion of a virtual computing device screen or monitor, virtual television or virtual video feed, all or a portion of a nested computer-generated environment, or all or a portion of a photo, drawing, handheld virtual frame or other static image, etc.) containing multiple object representations.

(44) In examples where window **326** is a web browser window, the user can operate the web browser from within 3D computer-generated environment **312** to visit various websites and perform activities that would otherwise be available to a user when accessing a conventional web browser through a conventional computing device. In the example of FIG. **3**A, a website within window **326** is presenting different images which, as defined herein, are inclusive of object representations **336** (e.g., representations of 2D or 3D objects, models or images of products available for inspection and/or purchase), and object text **338** (e.g., product information, descriptors, identifiers, etc.) associated with those object representations. In some embodiments, object representations **336** can be presented at their actual size (their correct physical size or full size within and with respect to the presented size of 3D computer-generated environment **312**) and at their actual scale (1:1 scale) relative to each other and with respect to the presented scale of the environment. Accordingly, object representations **336** can have a displayed size (e.g., the size of the object representations as they appear to the user) that is appropriate for their perceived distances from the user. As used herein, object representations **336** refer generally to all representations of 2D or 3D objects, models or images in window **326** (e.g., the representations of Product #1, Product #2, Product #3, and Product #4), and object text **338** refers generally to all text associated with all object representations in the window (e.g., the text “Product #1,” “Product #2,” “Product #3,” and “Product #4”). It should be understood that although the figures and disclosure may refer to an online shopping application with products available for inspection and purchase, embodiments of the disclosure are not so limited, and are inclusive of any window, image or user interface with multiple displayed object representations that can be viewed for any purpose. Accordingly, the term “object representations” as defined herein is inclusive of not only products available for purchase in an online shopping application viewed through a web browser window, but also other objects presented within any other type of window described above, including any type of inanimate object, animate object (e.g., humans, animals, plants, etc.) or other representations capable of being presented in a window with their actual size and at their actual scale relative to each other and with respect to the presented size and scale of the 3D computer-generated environment, and with a displayed size appropriate for their perceived distances from the user.

(45) FIG. **3**B illustrates example object representations **336** and object text **338** in window **326** being scrolled downward in 3D computer-generated environment **312** according to some embodiments of the disclosure. In the example of FIG. **3**B, which is a continuation of the example of FIG. **3**A, a user can perform a gesture in the physical environment that is recognizable by the electronic device, such as a thumb-index finger pinch (and hold) gesture performed within a certain perceived distance from window **326**. This gesture, when recognized, can be mimicked by gesture **340** from representation **334** in 3D computer generated environment **312**. While holding the pinch, the user's hand can then be moved downward in the −z direction in the physical environment, which can once again

be mimicked by representation **334** in 3D computer-generated environment **312** as shown at **342**. To recognize and perform this combined pinch-hold-swipe gesture, the electronic device may track changes to the pose of the physical object (e.g., the pinching of two fingers of the user's hand) and track movement of the physical object (e.g., downward movement of the hand) in the physical environment, and cause representation **334** to similarly change its pose and movement in 3D computer-generated environment **312**. Upon recognizing this pinch-hold-swipe gesture as satisfying the criteria for a window selection gesture or command, satisfying the criteria for selecting window **326**, and satisfying the criteria for a window scrolling gesture or command, the electronic device can perform a window scrolling operation and scroll object representations **336** and object text **338** in window **326** as shown at **344**. The amount, speed, and acceleration of the object representation scrolling can be a function of the detected distance, speed, and/or acceleration of downward swipe **342**.

(46) As a result of the scrolling, some object representations can begin to disappear from window **326**, while other object representations (e.g., Product #5) can begin to appear in the window. As further object representations appear in window **326** as a result of scrolling, they can be made available to the user for inspection, and in the case of an online store, for purchase. The presentation of object representations at their actual size and scale relative to each other and with respect to the size and scale of the presented 3D computer-generated environment **312**, and with a displayed size appropriate for their perceived distances from the user, can provide a more authentic, accurate and easier viewing experience and can encourage increased user interaction. For example, in online shopping, proper object scale and size can allow a user to make more informed decisions about the relative size, functionality and practicality of various products, and therefore make more informed purchasing decisions.

(47) Although FIG. **3**B shows a pinch-hold-swipe gesture, in other examples different interactions or gestures can also result in window selection and scrolling. For example, instead of a pinch, when representation **334** is determined to be within a threshold distance of window **326** (e.g., within 1 cm, 1 inch, etc. from the window (e.g., from an edge or centroid of the window)), the window can be selected, and an operation associated with the window can be initiated (e.g., a scrolling operation can be performed upon detection of subsequent movement of representation **334**). To accomplish this, the electronic device may track the pose of the physical object in the physical environment and map the location of the pose to a location in a coordinate system in 3D computer-generated environment **312**, such that a relative distance between representation **334** (corresponding to the physical object) and the virtual object representation (e.g., window **326**) can be determined.

(48) In another embodiment, a tap gesture can select window **326** for subsequent operations such as scrolling. To accomplish this, a fingertip of the user's hand in the physical environment can be detected and mapped to a location in a coordinate system in 3D computer-generated environment **312** within a predetermined distance from a virtual object representation (e.g., window **326**), followed by the detection of the absence of the fingertip (beyond the predetermined distance) within a time limit (e.g., detection of a tap gesture) to select the virtual object representation. In the context of a 3D computer-generated environment such as that shown in FIG. **3**B, window **326** can remain selected even after the selection input is no longer maintained (e.g., the fingertip (or other digit) of representation **334** is removed), and the tap gesture is completed. In other embodiments, instead of a gesture, a user can make a window selection request and a window scrolling request via other input methods and/or mechanisms, and upon recognition of these requests by the electronic device, the scrolling shown in FIG. **3**B can be performed.

(49) FIG. **3**C illustrates an example window **326** being moved backwards as indicated by arrow **350** from its previous location closer to the user (indicated by a dashed outline) to a new location farther from the user in 3D computer generated environment **312** according to some embodiments of the disclosure. The depth of window **326** is indicated by marker **360**, which shows the plane of window **326** being located towards the back of table **328**. In the example of FIG. **3**C, which is a continuation of the example of FIG. **3**A, a user can perform a gesture in the physical environment that is recognizable by the electronic device, such as a thumb-index finger pinch (and hold) gesture **340** performed within a certain perceived distance from window **326** (at its pre-translation location indicated by the dashed lines in FIG. **3**C). This selection gesture, when recognized, can be mimicked by representation **334** in 3D computer generated environment **312**. While holding the pinch, the user's hand can then be moved away (in the −y direction) from the user in the physical environment, which can once again be mimicked by movement **348** of representation **334** in 3D computer generated environment **312**. The detected hand movement, as indicated by movement **348** of representation **334**, can cause window **326** to move backward within 3D computer-generated environment **312** as shown at **350**. The amount of translation of window **326** can be a linear or nonlinear function of the detected distance of movement **348**.

(50) To recognize this combined pinch-hold-translate gesture and perform a window relocation operation, the electronic device may track changes to the pose of the user's hand (e.g., the pinching of two fingers of the user's hand) and track movement of the hand (e.g., away from the user) in the physical environment, and cause representation **334** to similarly change its pose and movement in 3D computer-generated environment **312**. Upon recognizing this pinch-hold-translate gesture as satisfying the criteria for a window selection gesture or command, satisfying the criteria for selecting window **326**, and satisfying the criteria for a window relocation gesture or command, the electronic device can perform a window relocation operation and relocate window **326** to a location farther away from the user in 3D computer-generated environment **312** as shown in FIG. **3**C. The amount of backward translation of window **326** can be a function of the detected distance of movement **348** in the −y direction. However, it should be understood that this pinch-hold-translate gesture is just one example, and that other inputs and/or gestures such as hand proximity, a finger tap, or a gaze followed by translation can also be employed to perform a window relocation operation. For example, instead of a gesture, a user can make a window selection request and a window relocation request via other input methods and/or mechanisms, and upon recognition of these requests by the electronic device, the translation shown in FIG. **3**C can be performed.

(51) In the embodiment of FIG. **3**C, window **326**, and object representations **336** and object text **338** within the window, can be presented with their actual size and at their actual scale relative to each other and with respect to the presented size and scale of 3D computer-generated environment **312**, and can have a displayed size appropriate for their perceived distances from the user. As a result of movement **350** away from the user, window **326**, and object representations **336** and object text **338** in the window, appropriately shrink in displayed size while maintaining the same actual size and scale within and with respect to the presented size and scale of 3D computer-generated environment **312**. However, as can be seen in FIG. **3**C, window **326**, and object representations **336** and object text **338** within the window, can become so small that object features can become difficult to see, and words can become difficult to read. Although shrinking object representations **336** and object text **338** as window **326** moves backwards in 3D computer-generated environment **312** so that their actual size and scale within and with respect to the environment is preserved can provide a more authentic and accurate user experience, the decreased observability and readability of the object representations and text can be detrimental to the

overall experience and lead to decreased user interaction (e.g., fewer purchases in an online shopping context).
(52) To avoid the problem of decreased observability and readability shown in FIG. **3**C, some embodiments of the disclosure are directed to performing counter-scaling to compensate for the changing depth of windows in 3D computer-generated environment **312** and preserve the readability and usability of the windows. Counter-scaling, as defined herein, is the adjusting of the scale (and therefore the size) of an element (e.g., a window, object representation and/or text) with respect to the presented scale of 3D computer-generated environment **312** in a manner that is contrary to (e.g., inversely related or proportional to) the forward or backward (y-direction) movement of the element in the environment. For example, as window **326** is moved backward in 3D computer-generated environment **312** in the −y direction so that its perceived distance from the user (e.g., its depth) increases, its displayed size (the size of the window as it appears to the user) is expected to gradually decrease, even though its actual size in the environment has not changed. To compensate for this, counter-scaling can cause the scale (and therefore the size) of window **326** within and with respect to the presented scale and size of 3D computer-generated environment **312** to gradually increase (e.g., the scale of the window changes from a 1:1 actual scale to a 1.2:1 scale with respect to the presented scale of the environment) as the window is moved backward in the environment, even though the displayed size of the window may gradually decrease as it moves farther away from the user. Thus, even though the displayed size of window **326** may still appear smaller as it is moved backward, counter-scaling can prevent the window from appearing as small as it would have appeared without counter-scaling. In some examples, counter-scaling can be selected to match the expected decrease in size of the window so that no apparent change in the displayed size of the window occurs. The changing of the scale of window **326** due to counter-scaling can be a linear or non-linear function of the distance of movement **348** of representation **334** in FIG. **3**C.
(53) FIG. **4**A illustrates utilizing an example control panel icon **452** to call up a control panel to activate window counter-scaling and other features in 3D computer-generated environment **412** according to some embodiments of the disclosure. In the example of FIG. **4**A, the user can direct gaze **454** at control panel icon **452**, and when the gaze location is determined to be within an “element lock distance threshold” of icon **452** (e.g., within 1 cm, 1 inch, etc. from the icon (e.g., from an edge or centroid of the icon)), optionally for a certain period of time (e.g., an “element lock dwell time”), that icon is identified for potential selection. These aforementioned criteria are referred to herein as gaze location criteria. The user can then perform a pinch/release gesture **456** as indicated by representation **434** of the user's hand. To accomplish this, the electronic device may track changes to the pose of the physical object (e.g., the pinching and releasing of two fingers of the user's hand), and cause representation **434** to similarly change its pose and movement in 3D computer-generated environment **412**. Upon recognizing this pinch/release gesture as a command to open a control panel, the electronic device can present the control panel. Note that control panel icon **452**, gaze **454**, and pinch/release gesture **456** are merely exemplary, and other methods of calling up and presenting a control panel can also be employed. For example, instead of a gesture, a user can make a control panel selection request via other input methods and/or mechanisms, and upon recognition of this request by the electronic device, a control panel can be presented.
(54) FIG. **4**B illustrates an example control panel to activate counter-scaling and other features in 3D computer-generated environment **412** according to some embodiments of the disclosure. FIG. **4**B is a continuation of FIG. **4**A, in which a control panel icon was selected to bring up control panel **458** shown in FIG. **4**B. In the example of FIG. **4**B, the user can direct gaze **454** at a counter-scaling button or other affordance on control panel **458**, and while holding the gaze on the button or affordance, perform a pinch/release gesture **456** as indicated by representation **434** of the user's hand. Upon recognizing this pinch/release gesture as a command to toggle the counter-scaling button or affordance, the electronic device can activate counter-scaling in 3D computer-generated environment **412**. In various embodiments, one or more of window counter-scaling, text counter-scaling, and object representation counter-scaling can be activated or deactivated using control panel **458**. Note that control panel **458**, gaze **454**, and pinch/release gesture **456** are merely exemplary, and other methods of activating or deactivating counter-scaling can also be employed. For example, instead of a gesture, a user can make a counter-scaling request via other input methods and/or mechanisms, and upon recognition of this request by the electronic device, counter-scaling can be performed.
(55) In some embodiments, the amount of counter-scaling of the window **426**, object representations and/or object text can be a linear or nonlinear function of the movement of a window relocation gesture or command. In some embodiments the parameters of this function can be adjusted using control panel **458**. In one embodiment, a user's gaze **454** can be located over a slider or other affordance, and a pinch/release gesture followed by a translation of representation **434** can adjust the counter-scaling function of the window, object representations and/or object text. Note, however, that control panel **458**, gaze **454**, and pinch/release gesture **456** are merely exemplary, and other methods of adjusting the counter-scaling function can also be employed. For example, instead of a gesture, a user can make a parameter adjustment request via other input methods and/or mechanisms, and upon recognition of this request by the electronic device, and the recognition of a subsequent adjustment input, parameter adjustment can be performed.
(56) FIG. **5**A illustrates example window, object representation and text counter-scaling as window **526** is moved backwards as indicated by arrow **550** from its previous location closer to the user (indicated by a dashed outline) to a new location farther from the user in 3D computer generated environment **512** according to some embodiments of the disclosure. The depth of window **526** (relative to the viewpoint of the user) is indicated by marker **560**, which shows the plane of window **526** being located towards the back of table **528**. In the example of FIG. **5**A, a user can perform a gesture in the physical environment that is recognizable by the electronic device, such as a thumb-index finger pinch (and hold) gesture **540** performed within a certain distance from window **526** (at its pre-translation location indicated by the dashed lines in FIG. **5**A). This gesture, when recognized, can be mimicked by representation **534** in 3D computer generated environment **512**. While holding the pinch, the user's hand can then be moved away from the user in the physical environment, which can once again be mimicked by movement **548** of representation **534** in 3D computer generated environment **512**. The detected hand movement, as indicated by movement **548** of representation **534**, can cause window **526** to move backward within 3D computer-generated environment **512** as shown at **550**. The amount of translation of window **526** can be a linear or nonlinear function of the detected distance of movement **548**.
(57) To recognize this combined pinch-hold-translate gesture and perform a window relocation operation, the electronic device may track changes to the pose of the user's hand (e.g., the pinching of two fingers of the user's hand) and track movement of the hand (e.g., away from the user) in the physical environment, and cause representation **534** to similarly change its pose and movement in 3D computer-generated environment **512**. Upon recognizing this pinch-hold-translate gesture as satisfying the criteria for a window selection gesture or command, satisfying the criteria for selecting window **526**, and satisfying the criteria for a window relocation gesture or command, the electronic device can perform a window relocation operation and relocate window **526** to a location farther

away from the user in 3D computer-generated environment **512** as shown in FIG. **5**A. The amount of backward translation of window **526** can be a function of the detected distance of movement **548**. However, it should be understood that this pinch-hold-translate gesture is just one example, and that other inputs and/or gestures such as hand proximity, a finger tap, or a gaze followed by translation can also be employed to perform a window relocation operation. For example, instead of a gesture, a user can make a window selection request and a window relocation request via other input methods and/or mechanisms, and upon recognition of these requests by the electronic device, the translation shown in FIG. **5**A can be performed.

(58) In the embodiment of FIG. **5**A, because window, object representation and object text counter-scaling have all been activated, window **526**, object representations **536** and object text **538** are presented at a larger size and scale relative to their actual size and actual scale (e.g., 1:1 scale) within and with respect to the presented size and scale of 3D computer-generated environment **512**, but with their correct scale relative to each other. To illustrate the effect of counter-scaling, although window **326** in FIG. **3**C and window **526** in FIG. **5**A are the same depth within 3D computer-generated environments **312** and **512**, respectively, as indicated by markers **360** and **560**, respectively, window **526** is larger in size than window **326** due to the effect of counter-scaling. Similarly, object representations **536** and object text **538** in FIG. **5**A are larger in size than object representations **336** and object text **338** in FIG. **3**C due to counter-scaling. The changing of the scale of window **526**, object representations **536** and object text **538** due to counter-scaling can be a linear or nonlinear function of the detected distance of movement **548**. In other embodiments, the amount of counter-scaling can be set or selected to completely offset the decreased field of view caused by the change in depth. In other words, the size of window **526** before the window relocation operation will be the same as the size of the window after the relocation.

(59) Because window **526**, object representations **536** and object text **538** in FIG. **5**A are larger than their actual size counterparts in FIG. **3**C, they can be more easily observed and read. On the one hand, increased observability and readability of object representations **536** and object text **538** can lead to increased user interaction (e.g., more purchases in an online shopping context). On the other hand, the larger than actual size of object representations **536** can leave a user with false impressions of the size, functionality and impracticality of an object, which can lead to decreased user interaction (e.g., fewer purchases in an online shopping context). This is less of a concern with two-dimensional (2D) object representations, where the user is more likely to understand that object representations are unrealistic and not accurate life-like representations of the objects. However, with the increased realism of 3D object representations, increased object size is more likely to leave the user with false negative impressions.

(60) To avoid the problem of false impressions of object size shown in FIG. **5**A, some embodiments of the disclosure are directed to preserving and protecting the actual size and scale of object representations and/or text as windows are moved backward or forward and counter-scaled in the 3D computer-generated environment.

(61) FIG. **5**B illustrates example window counter-scaling as window **526** is moved backwards as indicated by arrow **550** from its previous location closer to the user (indicated by a dashed outline) to a new location farther from the user in 3D computer-generated environment **512** according to some embodiments of the disclosure. This relocating of window **526** farther away from the user in 3D computer-generated environment **512** can be performed in response to a pinch-hold-translate gesture or other gesture recognized as a window relocation gesture or command as described above in FIG. **5**A. The amount of backward translation of window **526** and the counter-scaling of the window can be a linear or nonlinear function of the detected distance of movement **548**. The example of FIG. **5**B is similar to the example of FIG. **5**A, except that in the embodiment of FIG. **5**B only window counter-scaling has been activated, so the size and scale of window **526** has increased relative to its actual size and scale within and with respect to the presented size and scale of 3D computer-generated environment **512**, while object representations **536** and object text **538** within the window are presented at their actual size and scale relative to each other and with respect to the environment. To illustrate the effect of counter-scaling, although window **326** in FIG. **3**C and window **526** in FIG. **5**B are at the same depth within 3D computer-generated environments **312** and **512**, respectively, as indicated by markers **360** and **560**, respectively, window **526** is presented at a larger scale and therefore is larger in size than window **326** due to the effect of counter-scaling. In some embodiments, window counter-scaling can occur incrementally and continuously as window **526** is being relocated to its new location farther from the user in FIG. **5**B, such that the size and scale of window **526** gradually increases relative to its actual size and scale within and with respect to the presented size and scale of 3D computer-generated environment **512**. In other embodiments, window counter-scaling can be delayed, then occur abruptly as window **526** completes relocation to its new location farther from the user in FIG. **5**B, as indicated by a detected window relocation completion gesture, such as the releasing of pinched fingers.

(62) Because object representations **536** and object text **538** continue to be presented at their actual size and scale relative to each other within and with respect to the presented size and scale of 3D computer-generated environment **512**, and with a display size that is appropriate for their perceived distances from the user within the environment, a more authentic, accurate, and easier viewing experience can be provided. However, like FIG. **3**C, object representations **536** and object text **538** can become so small that features can become difficult to see, and words can become difficult to read, and the decreased observability and readability of the object representations and text can be detrimental to the overall experience and lead to decreased user interaction (e.g., fewer purchases in an online shopping context). Furthermore, because window **526** has been counter-scaled to a larger scale and has become larger in size while object representations **536** and object text **538** have remained at their actual size and scale, the object representations and object text do not fill up the blank spaces in the window due to the increased window size, leaving unused blank space within the window.

(63) To avoid the problem of unused blank space in window **526** as shown in FIG. **5**B, some embodiments of the disclosure are directed to rearranging object representations **536** in the window as counter-scaling changes the window size. Object representation rearrangement can be a user-configurable setting that can be activated or deactivated by the user using control panel **458** as shown in FIG. **4**B, or via any other user input. In some examples, virtual buttons or other affordances on control panel **458** can toggle object representation rearrangement on or off, and virtual sliders or other affordances can adjust other parameters of object representation rearrangement (e.g., the percentage of blank space required before object representation rearrangement is actually performed).

(64) FIG. **5**C illustrates window counter-scaling and object representation rearrangement as window **526** is moved to a new intermediate location farther from the user in 3D computer generated environment **512** according to some embodiments of the disclosure. This repositioning of window **526** farther away from the user in 3D computer-generated environment **512** can be performed in response to a pinch-hold-translate gesture or other gesture recognized as a window relocation gesture or command as described above in FIG. **5**A. In the example of FIG. **5**C, window **526** is moved backwards (from the perspective of the user) as indicated by arrow **550** from its original location closer to the user (indicated by a dashed outline) to a new intermediate location indicated by marker **560** in front of table **528**. The amount of translation of window **526** and the counter-scaling of the window can be a linear or nonlinear function of the detected −y

direction distance of movement **548**. In FIG. **5**C, window counter-scaling has been activated, so window **526** is larger relative to its actual size and scale within and with respect to the presented size and scale of 3D computer-generated environment **512**, while object representations **536** and object text **538** within the window continue to be presented at their actual size and scale relative to each other and with respect to the environment.

(65) Because window **526** has increased in size while object representations **536** and object text **538** have remained at their actual size, the object representations and object text originally appearing in window (see FIG. **3**A) do not fill up the increased size of the window. However, because object representation rearrangement has been activated in the example of FIG. **5**C, previously unseen object representations (e.g., object representations **562**, **564** and **566**) can begin to appear and fill in the otherwise unused blank space within window **526** to create a revised layout. As can be seen in FIG. **5**C, object representations **536**, **562**, **564** and **566** and object text **538** are presented at their actual size and scale relative to each other within and with respect to the presented size and scale of 3D computer-generated environment **512**, and with a display size that is appropriate for their perceived distances from the user. The amount of object representation rearrangement within window **526** can be a linear or nonlinear function of the increased window size, which is a function of the detected distance of movement **548**.

(66) FIG. **5**D illustrates window counter-scaling and object representation rearrangement as window **526** is moved to a new location farther from the user in 3D computer generated environment **512** according to some embodiments of the disclosure. This relocation of window **526** farther away from the user in 3D computer-generated environment **512** can be performed in response to a pinch-hold-translate gesture or other gesture recognized as a window relocation gesture or command as described above in FIG. **5**A. In the example of FIG. **5**D, window **526** is moved backwards with even more depth (from the perspective of the user) than in FIG. **5**C as indicated by arrow **550** from its original location closer to the user (indicated by a dashed outline) to a new location in 3D computer-generated environment **512**. In FIG. **5**D, window **526** has now been moved backwards in 3D computer-generated environment **512** as much as in FIG. **5**A, as indicated by marker **560**, which shows the plane of the window being located towards the back of table **528**. Because window counter-scaling has been activated, window **526** has increased in size (even more so than in FIG. **5**C) relative to its actual size within 3D computer-generated environment **512**, while object representations **536** and object text **538** within the window are presented at their actual size and scale relative to each other within and with respect to the environment, and with a display size appropriate for their perceived distances from the user.

(67) Because window **526** has been counter-scaled while object representations **536** and object text **538** have remained at their actual size and scale, the object representations and object text originally appearing in window (see FIG. **3**A) do not fill up the increased window size. However, because object representation rearrangement has been activated in the example of FIG. **5**D, previously unseen object representations (e.g., object representations **562**, **564** and **566**) now fully appear (as compared to FIG. **5**C, where they partially appear) and fill in the otherwise unused blank space within window **526** to create a further revised layout. As can be seen in FIG. **5**D, object representations **536**, **562**, **564** and **566** and object text **538** are presented at their actual size and scale relative to each other within and with respect to the presented size and scale of 3D computer-generated environment **512**, and with a display size that is appropriate for their perceived distances from the user, and can therefore provide a more authentic, accurate and easier user experience. Although FIGS. **5**C and **5**D illustrate an example of backward window relocation and object representation and object text rearrangement, it should be noted that embodiments of the disclosure encompass both forward and backward window relocation and corresponding object representation and object text rearrangement.

(68) As illustrated in FIGS. **5**C and **5**D, a user is able to move window **526** backward (or forward) by any variable amount within 3D computer-generated environment **512**. Counter-scaling can change the scale (and therefore the size) of window **526** in accordance with its depth within and with respect to the presented size and scale of 3D computer-generated environment **512**, such that window size increases or decreases (as compared to its actual size) as the depth of the window increases or decreases. Regardless of the depth of window **526** in 3D computer-generated environment **512**, object representations and object text within that window can be presented at their actual size and scale relative to each other within and with respect to the environment, with their displayed size appropriate for their perceived distances from the user. In addition, as the size of window **526** changes due to counter-scaling, object representations and object text can be rearranged (while maintaining their actual size) such that more or fewer object representations and object text appear in the window. Thus, a user can move window **526** backward or forward in 3D computer-generated environment **512** to present the window at a depth such that the displayed size and number of object representations and object text within the window are optimal for readability and user interaction, while preserving their proper scale and actual size within and with respect to the environment.

(69) In some embodiments of the disclosure, object representation rearrangement as shown in FIGS. **5**C and **5**D can occur gradually and continuously, as movement **548** is incrementally detected. However, in other embodiments of the disclosure, object representation rearrangement can be delayed until the end of window translation. Delayed object representation rearrangement can be a user-configurable setting that can be activated or deactivated by the user using control panel **458** as shown in FIG. **4**B, or via any other user input. In some examples, virtual buttons or other affordances on control panel **458** can toggle delayed object representation rearrangement on or off, and virtual sliders or other affordances can adjust other parameters of delayed object representation rearrangement.

(70) FIG. **5**E illustrates window counter-scaling and delayed object representation rearrangement as window **526** is pulled forward in 3D computer generated environment **512** according to some embodiments of the disclosure. This repositioning of window **526** closer to the user in 3D computer-generated environment **512** can be performed in response to a pinch-hold-translate gesture or other gesture recognized as a window relocation gesture or command as described above in FIG. **5**A (except in the reverse direction). The example of FIG. **5**E is a continuation of the example of FIG. **5**D, where window **526** (presenting object representations **536**, **562**, **564** and **566** and object text **538**) is now brought forward as indicated by arrow **550** from its previous location far from the user (indicated by a dashed outline) to a new location close to the user in 3D computer generated environment **512**, in accordance with detected motion (e.g., hand motion) toward the user and corresponding movement **548** of representation **534**. The amount of forward translation of window **526** can be a linear or nonlinear function of the detected distance of movement **548**. In FIG. **5**E, window counter-scaling has been activated, so the size of the window at its previous location (indicated in dashed lines) was larger relative to its actual size in 3D computer-generated environment **512**, while object representations and object text within the window were presented with their actual size and correct scale relative to each other within and with respect to the environment. As window **526** moves closer to the user, counter-scaling causes the size of the window in 3D computer-generated environment **512** to become smaller, eventually returning to its original actual size at its original location **526** in the example of FIG. **5**E, even though the displayed size of the window has increased because it has moved

closer to the user.

(71) In FIG. **5**E, delayed object representation rearrangement has been activated. Because counter-scaling has caused window **526** to shrink back down to its actual size within 3D computer-generated environment **512** after being moved forward in FIG. **5**E (though its displayed size has increased), object representations **536**, **562**, **564** and **566** and object text **538** also become smaller to maintain their present arrangement within the window. As a result, the object representations and object text are now temporarily presented with a size that is smaller than their actual size in 3D computer-generated environment **512**. The preservation of the previous arrangement of object representations and object text may be held as long as the pose of the forward translation gesture (e.g., pinched fingers on representation **534**) remains in place.

(72) FIG. **5**F illustrates an example completion of the delayed object representation rearrangement of object representations **336** and object text **338** in window **526** presented in 3D computer generated environment **512** at the conclusion of a repositioning operation according to some embodiments of the disclosure. The example of FIG. **5**F is a continuation of the example of FIG. **5**E, where object representation rearrangement was not yet completed, so object representations **536**, **562**, **564** and **566** and object text **538** were presented in their previous arrangement with a size that is smaller than their actual size in 3D computer-generated environment **512** (see, e.g., dashed object outlines in FIG. **5**F). In FIG. **5**F, a user has completed a pinch-hold-translate gesture by releasing previously pinched fingers, and this releasing gesture has been detected by the electronic device and mimicked by movement **568** of representation **534** in 3D computer-generated environment **512**. Upon detecting the releasing gesture as a window relocation completion gesture, the electronic device rearranges object representations **336** and object text **338** back to their original layout (see solid object outlines in FIG. **5**F). As object representations **336** and object text **338** are returned to their original layout, their sizes also return to their actual sizes.

(73) The examples illustrated in FIGS. **5**B-**5**F and described above show object text **538** maintaining their actual size regardless of their depth in 3D computer-generated environment **512**. However, when window **526** is located towards the back of 3D computer-generated environment **512**, the displayed size of object text **538** can be so small that it becomes difficult or impossible to read, and therefore becomes of little or no use to the user. To address this issue, some embodiments of the disclosure provide for object text counter-scaling in a manner similar to window counter-scaling.

(74) FIG. **6**A illustrates window and object text counter-scaling and object representation rearrangement as window **626** is moved to a new location farther from the user in 3D computer generated environment **612** according to some embodiments of the disclosure. The example of FIG. **6**A is similar to the example of FIG. **5**D, except that object text counter-scaling has been activated. The amount of counter-scaling of object text **638** can be a linear or nonlinear function of the detected distance of movement **548**. As described above, object text counter-scaling can be a user-configurable setting that can be activated or deactivated by the user using control panel **458** as shown in FIG. **4**B, or via any other user input. In FIG. **6**A, window **626** has been moved backwards in 3D computer-generated environment **612** as indicated by marker **660**, which shows the plane of the window being located towards the back of table **628**. Because window counter-scaling has been activated, window **626** has increased in size relative to its actual size (e.g., without window counter-scaling) at that back location, while object representations **636** within the window are presented at their actual size and correct scale relative to each other within and with respect to the presented size and scale of 3D computer-generated environment **612**, with their displayed size appropriate for their perceived distances from the user. Because object text counter-scaling has also been activated, object text **638** has increased in size relative to its actual size (e.g., its size without object text counter-scaling) and actual scale. In some embodiments, the amount of object text counter-scaling can follow the amount of window counter-scaling (e.g., the text scales with the window). In other embodiments, the amount of object text counter-scaling can be different from the amount of window counter-scaling. As shown in FIG. **6**A, object text counter-scaling can allow text descriptors or other information in window **626** to be larger, more readable, and therefore more useful even though the window, object representations **636** and object text **638** may become very small.

(75) FIG. **6**B illustrates window and object text counter-scaling with limited object representation rearrangement as window **626** is moved to a new location farther from the user in 3D computer generated environment **612** according to some embodiments of the disclosure. The example of FIG. **6**B is similar to the example of FIG. **6**A, except that limited object representation rearrangement has been activated along with object text counter-scaling. Because object text counter-scaling has been activated, object text **638** has increased in size relative to its actual size (e.g., its size without text counter-scaling). However, if object representation rearrangement is based only on the size of object representations **636**, as shown in the example of FIG. **6**A, it is possible that the increased size of object text **638** (due to text counter-scaling) can cause the object text to extend beyond the size of window **612**, or overlap with other elements within the window, and be partially obscured. Therefore, in some embodiments of the disclosure shown in FIG. **6**B, object text counter-scaling can be employed with limited object representation rearrangement that takes into account the increased size of object text **638**. In the example of FIG. **6**B, limited object representation rearrangement has caused the layout to be more spread out than in the example of FIG. **6**A to account for the increased size of object text **638** within window **626**. As a result, the object representation rearrangement is more limited and fewer object representations are fully presented in window **626**, but in general limited object representation rearrangement can result in the layout being less cluttered, with less chance of overlapping object text, and can be easier to peruse.

(76) FIG. **7** illustrates object representation rearrangement as window **726** is resized in 3D computer generated environment **712** according to some embodiments of the disclosure. The example of FIG. **7** can be a continuation of the example of FIG. **3**C, where window **326** was moved to a location towards the back of 3D computer generated environment **312**. As a result, window **326**, object representations **336** and object text **338** in the window were small and difficult to see. In the example of FIG. **7**, object representation rearrangement has been activated as discussed above. A user can perform a gesture in the physical environment that is recognizable by the electronic device, such as a thumb-index finger pinch (and hold) gesture **740** performed within a certain distance from a corner of the window (at the window's pre-resizing location indicated by the dashed lines in FIG. **7**). This gesture, when recognized, can be mimicked by representation **734** in 3D computer generated environment **712**. While holding the pinch, the user's hand can then be moved laterally and roughly diagonally away from the corner in approximately the same plane as the window, as shown at **748**, which can once again be mimicked by representation **734** in 3D computer generated environment **712**. To recognize this combined pinch-and-lateral translation gesture, the electronic device may track changes to the pose of the user's hand (e.g., the pinching of two fingers of the user's hand) and track movement of the hand (e.g., diagonal movement away from the corner of a window) in the physical environment, and cause representation **734** to similarly change its pose and movement in 3D computer-generated environment **712**.

(77) Upon recognizing this pinch-and-lateral translation gesture as a window resizing gesture or command, the electronic device can resize the window from its previous size (indicated by dashes) to a larger size as illustrated by window **726** in FIG. **7**. The amount of resizing of window **726** can be a function of the detected distance of movement **748**. However, it should be understood that this pinch-

and-translate gesture to perform a window resizing gesture or command is just one example, and that other inputs, requests and/or gestures such as hand proximity or a finger tap followed by a lateral translation can also be employed. Because object representation rearrangement has been activated in the example of FIG. **7**, the previous object representation layout (see dashed object outlines in FIG. **7**) has been rearranged, and new object representations have now come into view to fill up the larger window **726** as shown by the solid object representation outlines (see, e.g., object representation **736**). In this manner, more object representations can be presented within that window, all while maintaining their actual size and scale with respect to each other within and with respect to the presented size and scale of 3D computer-generated environment **712**, to enhance the user experience and encourage user interaction.

(78) FIG. **8** is an example flow diagram illustrating method **870** of counter-scaling windows, and rearranging and/or counter-scaling object representations within those windows in a 3D computer-generated environment according to some embodiments of the disclosure. Method **870** can be performed at an electronic device such as device **100**, and device **200** when presenting, counter-scaling and rearranging object representations described above with reference to FIGS. **3**A-**3**C, **4**A, **4**B, **5**A-**5**F, **6**A, **6**B, and **7**. In some embodiments, some operations in method **870** are optional and/or may be combined (as indicated by dashed lines), and/or the order of some operations may be changed. As described below, method **870** provides methods of counter-scaling windows, and rearranging and/or counter-scaling object representations within those windows in a 3D computer-generated environment according to some embodiments of the disclosure.

(79) In FIG. **8**, at **872**, a window including a plurality of object representations can be presented in a 3D computer-generated environment. At **874**, an amount of y-direction movement of a window relocation gesture or request can be detected. At **876**, the window can be relocated to a different depth and the window can be counter-scaled in accordance with the amount of y-direction movement of the window relocation gesture or request. In some embodiments, at **878**, the layout of object representations within the counter-scaled window can be rearranged. In some embodiments, at **880**, the rearrangement of object representations within the counter-scaled window can be delayed until the window relocation gesture or request is completed.

(80) Therefore, according to the above, some examples of the disclosure are directed to a method comprising, at an electronic device in communication with a display, presenting, via the display, a window and a first plurality of object representations within the window at a first depth in a three-dimensional (3D) computer-generated environment, the window having a first window scale and the first plurality of object representations having a first object scale with respect to the 3D computer-generated environment, in accordance with the presenting of the window at the first depth, detecting a request to relocate the window to a second depth different from the first depth, and in accordance with the detection of the request to relocate the window to the second depth, presenting the window and the first plurality of object representations within the window at the second depth in the 3D computer-generated environment, the window having a second window scale and the first plurality of object representations having a second object scale. Alternatively or additionally to one or more of the examples disclosed above, in some examples, the detection of the request to relocate the window to the second depth comprises detecting a window relocation gesture, and in accordance with the detection of the window relocation gesture, detecting a y-direction movement component of the window relocation gesture, and in accordance with the detection of the y-direction movement component of the window relocation gesture, presenting the window and the first plurality of object representations at the second depth, the second depth based on the detected y-direction movement component, and with a second window scale in the 3D computer-generated environment, the second window scale different from the first window scale. Alternatively or additionally to one or more of the examples disclosed above, in some examples the second window scale is equal to the first window scale. Alternatively or additionally to one or more of the examples disclosed above, in some examples the second object scale is different from the first object scale. Alternatively or additionally to one or more of the examples disclosed above, in some examples, in accordance with the presenting of the first plurality of object representations within the window at the first depth, presenting the window with a first window size and presenting the first plurality of object representations with a first layout in the 3D computer-generated environment, and in accordance with the presenting of the window at the second depth with the second window scale in the 3D computer-generated environment, presenting a second plurality of object representations within the window of a second window size at the second depth and with a second layout, the second layout different from the first layout. Alternatively or additionally to one or more of the examples disclosed above, in some examples the second layout is based on the second window size. Alternatively or additionally to one or more of the examples disclosed above, in some examples in accordance with the presenting of the first plurality of object representations within the window at the first depth, presenting a first plurality of object text with a first object text scale at the first depth, and in accordance with the presenting of the second plurality of object representations within the window at the second depth, presenting a second plurality of object text with a second object text scale different from the first object text scale at the second depth. Alternatively or additionally to one or more of the examples disclosed above, in some examples the presenting of the second plurality of object representations within the window at the second depth with the second layout is performed in accordance with a size of the second plurality of object text with the second object text scale. Alternatively or additionally to one or more of the examples disclosed above, in some examples the second window scale and the second object text scale are the same. Alternatively or additionally to one or more of the examples disclosed above, in some examples the second window scale is a non-linear function of a difference between the first and second depths. Alternatively or additionally to one or more of the examples disclosed above, in some examples in accordance with the detection of the y-direction movement component of the window relocation gesture, presenting the window with a different scale in accordance with a difference between the first and second depths. Alternatively or additionally to one or more of the examples disclosed above, in some examples in accordance with the detection of the y-direction movement component of the window relocation gesture, the presenting of the window at the first window scale is maintained, in accordance with detecting a relocation of the window from the first depth to the second depth in the 3D computer-generated environment, detecting a window relocation completion gesture, and in accordance with the detection of the window relocation completion gesture, presenting the window with the second window scale. Alternatively or additionally to one or more of the examples disclosed above, in some examples the first object scale of the first plurality of object representations presented in the window at the first depth is an actual scale of the object representations with respect to the 3D computer-generated environment, and the first object scale is maintained as the window is relocated from the first depth to the second depth. Alternatively or additionally to one or more of the examples disclosed above, in some examples in accordance with the presenting of the first plurality of object representations within the window at the first depth, presenting the first plurality of object representations within the window with a first layout in the 3D computer-generated environment, and in accordance with the detection of the y-direction movement component of the window relocation gesture, changing a layout of the first plurality of object representations in accordance with an amount of the y-direction movement component as the window relocates from the first depth to

the second depth. Alternatively or additionally to one or more of the examples disclosed above, in some examples in accordance with the presenting of the first plurality of object representations within the window at the first depth, presenting the first plurality of object representations within the window with a first layout in the 3D computer-generated environment, in accordance with the presenting of the window with the second window scale at the second depth in the 3D computer-generated environment, presenting the first plurality of object representations within the window at the second depth with the first layout, while presenting the first plurality of object representations within the window at the second depth with the first layout, detecting a window relocation completion gesture, and in accordance with the detection of the window relocation completion gesture, presenting the first plurality of object representations within the window with a second layout, the second layout different from the first layout. Alternatively or additionally to one or more of the examples disclosed above, in some examples in accordance with the presenting of the window at the second depth with the second window scale in the 3D computer-generated environment, determining that the window has been selected and a window resizing gesture has been detected, and in accordance with the detection of the window resizing gesture, detecting an amount of x-direction and z-direction movement components of the window resizing gesture, and in accordance with the detected amount of the x-direction and the z-direction movement components of the window resizing gesture, resizing the window to a third window scale at the second depth. Alternatively or additionally to one or more of the examples disclosed above, in some examples in accordance with the presenting of the first plurality of object representations within the window at the first depth, presenting the window with a first window size and presenting the first plurality of object representations with a first layout in the 3D computer-generated environment, and in accordance with the presenting of the window with the third window scale at the second depth in the 3D computer-generated environment, presenting a second plurality of object representations with a second layout within the window at the third window scale at the second depth, the second layout different from the first layout.

(81) Some examples of the disclosure are directed to an electronic device, comprising one or more processors, memory, and one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors, the one or more programs including instructions for: presenting, via the display, a window and a first plurality of object representations within the window at a first depth in a three-dimensional (3D) computer-generated environment, the window having a first window scale and the first plurality of object representations having a first object scale with respect to the 3D computer-generated environment, in accordance with the presenting of the window at the first depth, detecting a request to relocate the window to a second depth different from the first depth, and in accordance with the detection of the request to relocate the window to the second depth, presenting the window and the first plurality of object representations within the window at the second depth in the 3D computer-generated environment, the window having a second window scale and the first plurality of object representations having a second object scale. Alternatively or additionally to one or more of the examples disclosed above, in some examples the detection of the request to relocate the window to the second depth comprises detecting a window relocation gesture, and the one or more programs include instructions for, in accordance with the detection of the window relocation gesture, detecting a y-direction movement component of the window relocation gesture, and in accordance with the detection of the y-direction movement component of the window relocation gesture, presenting the window and the first plurality of object representations at the second depth, the second depth based on the detected y-direction movement component, and with a second window scale in the 3D computer-generated environment, the second window scale different from the first window scale. Alternatively or additionally to one or more of the examples disclosed above, in some examples the second window scale is equal to the first window scale. Alternatively or additionally to one or more of the examples disclosed above, in some examples the second object scale is different from the first object scale.

(82) Some examples of the disclosure are directed to a non-transitory computer readable storage medium storing one or more programs, the one or more programs comprising instructions, which when executed by one or more processors of an electronic device, cause the electronic device to: present, via the display, a window and a first plurality of object representations within the window at a first depth in a three-dimensional (3D) computer-generated environment, the window having a first window scale and the first plurality of object representations having a first object scale with respect to the 3D computer-generated environment, in accordance with the presenting of the window at the first depth, detect a request to relocate the window to a second depth different from the first depth, and in accordance with the detection of the request to relocate the window to the second depth, present the window and the first plurality of object representations within the window at the second depth in the 3D computer-generated environment, the window having a second window scale and the first plurality of object representations having a second object scale. Alternatively or additionally to one or more of the examples disclosed above, in some examples the detection of the request to relocate the window to the second depth comprises detecting a window relocation gesture, and the one or more programs comprising instructions, which when executed by the one or more processors of the electronic device, cause the electronic device to: in accordance with the detection of the window relocation gesture, detect a y-direction movement component of the window relocation gesture, and in accordance with the detection of the y-direction movement component of the window relocation gesture, present the window and the first plurality of object representations at the second depth, the second depth based on the detected y-direction movement component, and with a second window scale in the 3D computer-generated environment, the second window scale different from the first window scale. Alternatively or additionally to one or more of the examples disclosed above, in some examples the second window scale is equal to the first window scale. Alternatively or additionally to one or more of the examples disclosed above, in some examples the second object scale is different from the first object scale.

(83) Some examples of the disclosure are directed to an electronic device, comprising one or more processors, memory, means for presenting, via the display, a window and a first plurality of object representations within the window at a first depth in a three-dimensional (3D) computer-generated environment, the window having a first window scale and the first plurality of object representations having a first object scale with respect to the 3D computer-generated environment, in accordance with the presenting of the window at the first depth, means for detecting a request to relocate the window to a second depth different from the first depth, and in accordance with the detection of the request to relocate the window to the second depth, means for presenting the window and the first plurality of object representations within the window at the second depth in the 3D computer-generated environment, the window having a second window scale and the first plurality of object representations having a second object scale.

(84) Some examples of the disclosure are directed to an information processing apparatus for use in an electronic device, the information processing apparatus comprising means for presenting, via the display, a window and a first plurality of object representations within the window at a first depth in a three-dimensional (3D) computer-generated environment, the window having a first window scale and the first plurality of object representations having a first object scale with respect to the 3D computer-generated

environment, in accordance with the presenting of the window at the first depth, detect a request to relocate the window to a second depth different from the first depth, and in accordance with the detection of the request to relocate the window to the second depth, present the window and the first plurality of object representations within the window at the second depth in the 3D computer-generated environment, the window having a second window scale and the first plurality of object representations having a second object scale.
(85) Some examples of the disclosure are directed to an electronic device, comprising one or more processors, memory, and one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors, the one or more programs including instructions for performing any of the methods described above.
(86) Some examples of the disclosure are directed to a non-transitory computer readable storage medium storing one or more programs, the one or more programs comprising instructions, which when executed by one or more processors of an electronic device, cause the electronic device to perform any of the methods described above.
(87) Some examples of the disclosure are directed to electronic device, comprising one or more processors, memory, and means for performing any of the methods described above.
(88) Some examples of the disclosure are directed to an information processing apparatus for use in an electronic device, the information processing apparatus comprising means for performing any of the methods described above.
(89) The foregoing description, for purposes of explanation, has been described with reference to specific embodiments. However, the illustrative discussions above are not intended to be exhaustive or to limit embodiments of the invention to the precise forms disclosed. Many modifications and variations are possible in view of the above teachings. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, to thereby enable others skilled in the art to best use the invention and various described embodiments with various modifications as are suited to the particular use contemplated.

Claims

1. A method comprising: at an electronic device in communication with a display: presenting, via the display, a window and a first plurality of object representations within the window at a first depth in a three-dimensional (3D) computer-generated environment, the window having a first window scale and the first plurality of object representations having a first object scale, wherein the first window scale causes the window to be presented at a first window size with respect to the 3D computer-generated environment and the first object scale causes the first plurality of object representations to be presented at a first object size with respect to the 3D computer-generated environment; detecting a request to relocate the window to a second depth different from the first depth; and in accordance with the detection of the request to relocate the window to the second depth, presenting the window and the first plurality of object representations within the window at the second depth in the 3D computer-generated environment, the window having a second window scale and the first plurality of object representations having a second object scale.
2. The method of claim 1, wherein the detection of the request to relocate the window to the second depth comprises detecting a window relocation gesture; and in accordance with the detection of the window relocation gesture, detecting a y-direction movement component of the window relocation gesture, and in accordance with the detection of the y-direction movement component of the window relocation gesture, presenting the window and the first plurality of object representations at the second depth, the second depth based on the detected y-direction movement component, and with a second window scale in the 3D computer-generated environment, the second window scale different from the first window scale.
3. The method of claim 1, wherein the second window scale is equal to the first window scale.
4. The method of claim 1, wherein the second object scale is different from the first object scale.
5. The method of claim 1, wherein in accordance with the presenting of the first plurality of object representations within the window at the first depth, presenting the window with a first window size and presenting the first plurality of object representations with a first layout in the 3D computer-generated environment; and in accordance with the presenting of the window at the second depth with the second window scale in the 3D computer-generated environment, presenting a second plurality of object representations within the window of a second window size at the second depth and with a second layout, the second layout different from the first layout.
6. The method of claim 5, wherein the second layout is based on the second window size.
7. The method of claim 5, wherein in accordance with the presenting of the first plurality of object representations within the window at the first depth, presenting a first plurality of object text with a first object text scale at the first depth; and in accordance with the presenting of the second plurality of object representations within the window at the second depth, presenting a second plurality of object text with a second object text scale different from the first object text scale at the second depth.
8. The method of claim 7, wherein the presenting of the second plurality of object representations within the window at the second depth with the second layout is performed in accordance with a size of the second plurality of object text with the second object text scale.
9. The method of claim 7, wherein the second window scale and the second object text scale are the same.
10. The method of claim 1, wherein the second window scale is a non-linear function of a difference between the first and second depths.
11. The method of claim 2, wherein in accordance with the detection of the y-direction movement component of the window relocation gesture, presenting the window with a different scale in accordance with a difference between the first and second depths.
12. The method of claim 2, wherein in accordance with the detection of the y-direction movement component of the window relocation gesture, the presenting of the window at the first window scale is maintained; in accordance with detecting a relocation of the window from the first depth to the second depth in the 3D computer-generated environment, detecting a window relocation completion gesture; and in accordance with the detection of the window relocation completion gesture, presenting the window with the second window scale.
13. The method of claim 2, wherein the first object scale of the first plurality of object representations presented in the window at the first depth is an actual scale of the object representations with respect to the 3D computer-generated environment, and the first object scale is maintained as the window is relocated from the first depth to the second depth.
14. The method of claim 2, wherein in accordance with the presenting of the first plurality of object representations within the window at the first depth, presenting the first plurality of object representations within the window with a first layout in the 3D computer-generated environment; and in accordance with the detection of the y-direction movement component of the window relocation gesture,

changing a layout of the first plurality of object representations in accordance with an amount of the y-direction movement component as the window relocates from the first depth to the second depth.
15. The method of claim 2, wherein in accordance with the presenting of the first plurality of object representations within the window at the first depth, presenting the first plurality of object representations within the window with a first layout in the 3D computer-generated environment; in accordance with the presenting of the window with the second window scale at the second depth in the 3D computer-generated environment, presenting the first plurality of object representations within the window at the second depth with the first layout; while presenting the first plurality of object representations within the window at the second depth with the first layout, detecting a window relocation completion gesture; and in accordance with the detection of the window relocation completion gesture, presenting the first plurality of object representations within the window with a second layout, the second layout different from the first layout.
16. The method of claim 1, wherein in accordance with the presenting of the window at the second depth with the second window scale in the 3D computer-generated environment, determining that the window has been selected and a window resizing gesture has been detected; and in accordance with the detection of the window resizing gesture, detecting an amount of x-direction and z-direction movement components of the window resizing gesture, and in accordance with the detected amount of the x-direction and the z-direction movement components of the window resizing gesture, resizing the window to a third window scale at the second depth.
17. The method of claim 16, wherein in accordance with the presenting of the first plurality of object representations within the window at the first depth, presenting the window with a first window size and presenting the first plurality of object representations with a first layout in the 3D computer-generated environment; and in accordance with the presenting of the window with the third window scale at the second depth in the 3D computer-generated environment, presenting a second plurality of object representations with a second layout within the window at the third window scale at the second depth, the second layout different from the first layout.
18. An electronic device, comprising: one or more processors; memory; and one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors, the one or more programs including instructions for: presenting, via a display, a window and a first plurality of object representations within the window at a first depth in a three-dimensional (3D) computer-generated environment, the window having a first window scale and the first plurality of object representations having a first object scale, wherein the first window scale causes the window to be presented at a first window size with respect to the 3D computer-generated environment and the first object scale causes the first plurality of object representations to be presented at a first object size with respect to the 3D computer-generated environment detecting a request to relocate the window to a second depth different from the first depth; and in accordance with the detection of the request to relocate the window to the second depth, presenting the window and the first plurality of object representations within the window at the second depth in the 3D computer-generated environment, the window having a second window scale and the first plurality of object representations having a second object scale.
19. The electronic device of claim 18, wherein the detection of the request to relocate the window to the second depth comprises detecting a window relocation gesture, and the one or more programs including instructions for: in accordance with the detection of the window relocation gesture, detecting a y-direction movement component of the window relocation gesture, and in accordance with the detection of the y-direction movement component of the window relocation gesture, presenting the window and the first plurality of object representations at the second depth, the second depth based on the detected y-direction movement component, and with a second window scale in the 3D computer-generated environment, the second window scale different from the first window scale.
20. The electronic device of claim 18, wherein the second window scale is equal to the first window scale.
21. The electronic device of claim 18, wherein the second object scale is different from the first object scale.
22. A non-transitory computer readable storage medium storing one or more programs, the one or more programs comprising instructions, which when executed by one or more processors of an electronic device, cause the electronic device to: present, via a display, a window and a first plurality of object representations within the window at a first depth in a three-dimensional (3D) computer-generated environment, the window having a first window scale and the first plurality of object representations having a first object scale, wherein the first window scale causes the window to be presented at a first window size with respect to the 3D computer-generated environment and the first object scale causes the first plurality of object representations to be presented at a first object size with respect to the 3D computer-generated environment; detect a request to relocate the window to a second depth different from the first depth; and in accordance with the detection of the request to relocate the window to the second depth, present the window and the first plurality of object representations within the window at the second depth in the 3D computer-generated environment, the window having a second window scale and the first plurality of object representations having a second object scale.
23. The non-transitory computer readable storage medium of claim 22, wherein the detection of the request to relocate the window to the second depth comprises detecting a window relocation gesture, and the one or more programs comprising instructions, which when executed by the one or more processors of the electronic device, cause the electronic device to: in accordance with the detection of the window relocation gesture, detect a y-direction movement component of the window relocation gesture, and in accordance with the detection of the y-direction movement component of the window relocation gesture, present the window and the first plurality of object representations at the second depth, the second depth based on the detected y-direction movement component, and with a second window scale in the 3D computer-generated environment, the second window scale different from the first window scale.
24. The non-transitory computer readable storage medium of claim 22, wherein the second window scale is equal to the first window scale.
25. The non-transitory computer readable storage medium of claim 22, wherein the second object scale is different from the first object scale.
26. The method of claim 1, wherein the first object scale is equal to the second object scale.
27. The electronic device of claim 18, wherein the first object scale is equal to the second object scale.
28. The non-transitory computer readable storage medium of claim 22, wherein the first object scale is equal to the second object scale.