



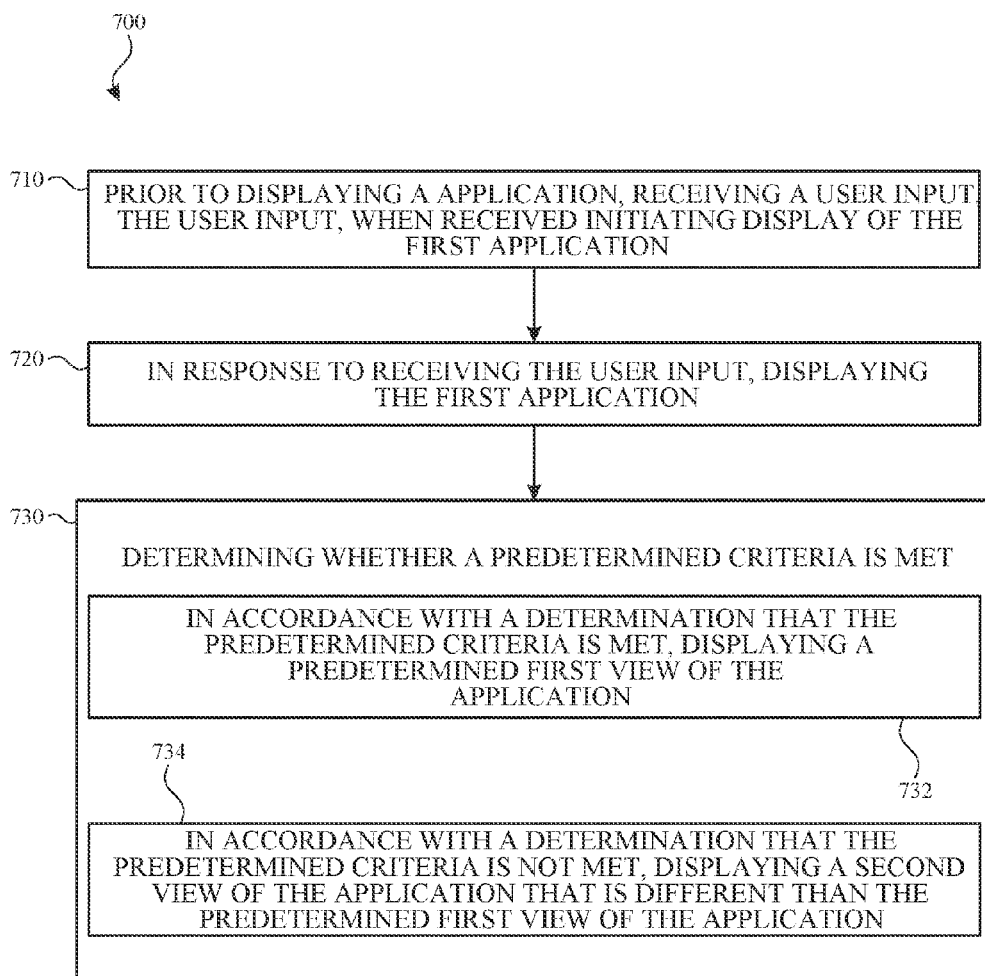
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(19) **United States**(12) **Patent Application Publication**  
**DE VRIES et al.**(10) **Pub. No.: US 2022/0121299 A1**(43) **Pub. Date: Apr. 21, 2022**(54) **DISPLAYING A PREDETERMINED VIEW OF  
AN APPLICATION***G06F 3/0362* (2006.01)*G06F 3/04883* (2006.01)*G06F 3/0485* (2006.01)(71) Applicant: **Apple Inc.**, Cupertino, CA (US)(52) **U.S. Cl.**(72) Inventors: **Nathan DE VRIES**, San Francisco, CA  
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Cupertino, CA (US)CPC ..... *G06F 3/044* (2013.01); *G06F 9/451*  
(2018.02); *G06F 3/0362* (2013.01); *G06F*  
*2203/04105* (2013.01); *G06F 3/0485*  
(2013.01); *G06F 2203/04808* (2013.01); *G06F*  
*3/04883* (2013.01)(21) Appl. No.: **17/566,521**

(57)

**ABSTRACT**(22) Filed: **Dec. 30, 2021****Related U.S. Application Data**(63) Continuation of application No. 15/608,848, filed on  
May 30, 2017, now Pat. No. 11,216,119.(60) Provisional application No. 62/348,977, filed on Jun.  
12, 2016.**Publication Classification**(51) **Int. Cl.***G06F 3/044* (2006.01)*G06F 9/451* (2006.01)

The present disclosure generally relates to managing user interfaces. In a method, at a device with one or more processors and memory, prior to displaying a first application, a user input is received, the user input, when received initiating display of the first application. In response to receiving the user input, the first application is displayed. It determined whether a predetermined criteria is met. In accordance with a determination that the predetermined criteria is met, a predetermined first view of the application is displayed. In accordance with a determination that the predetermined criteria is not met, a second view of the application is displayed that is different than the predetermined first view of the application.



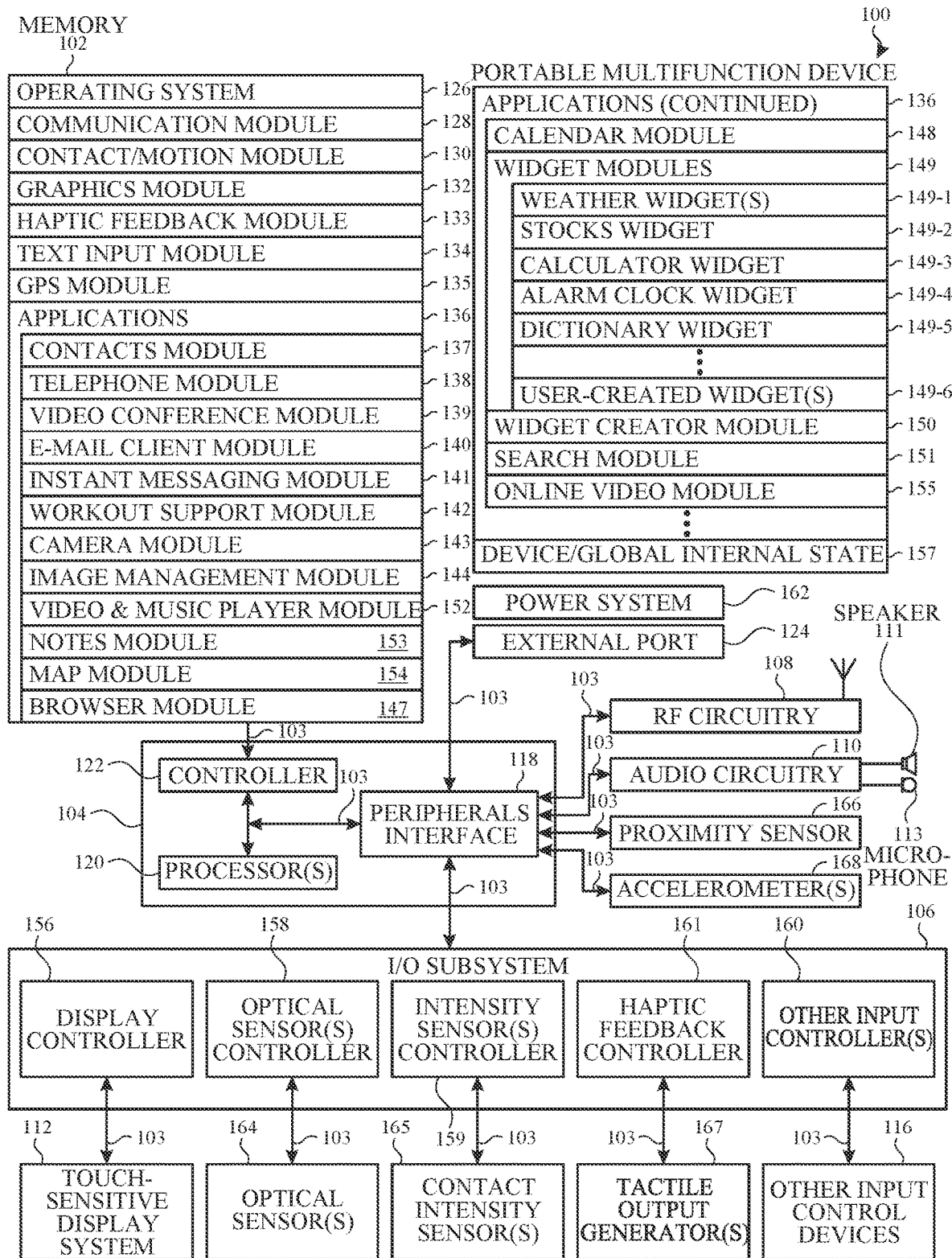


FIG. 1A

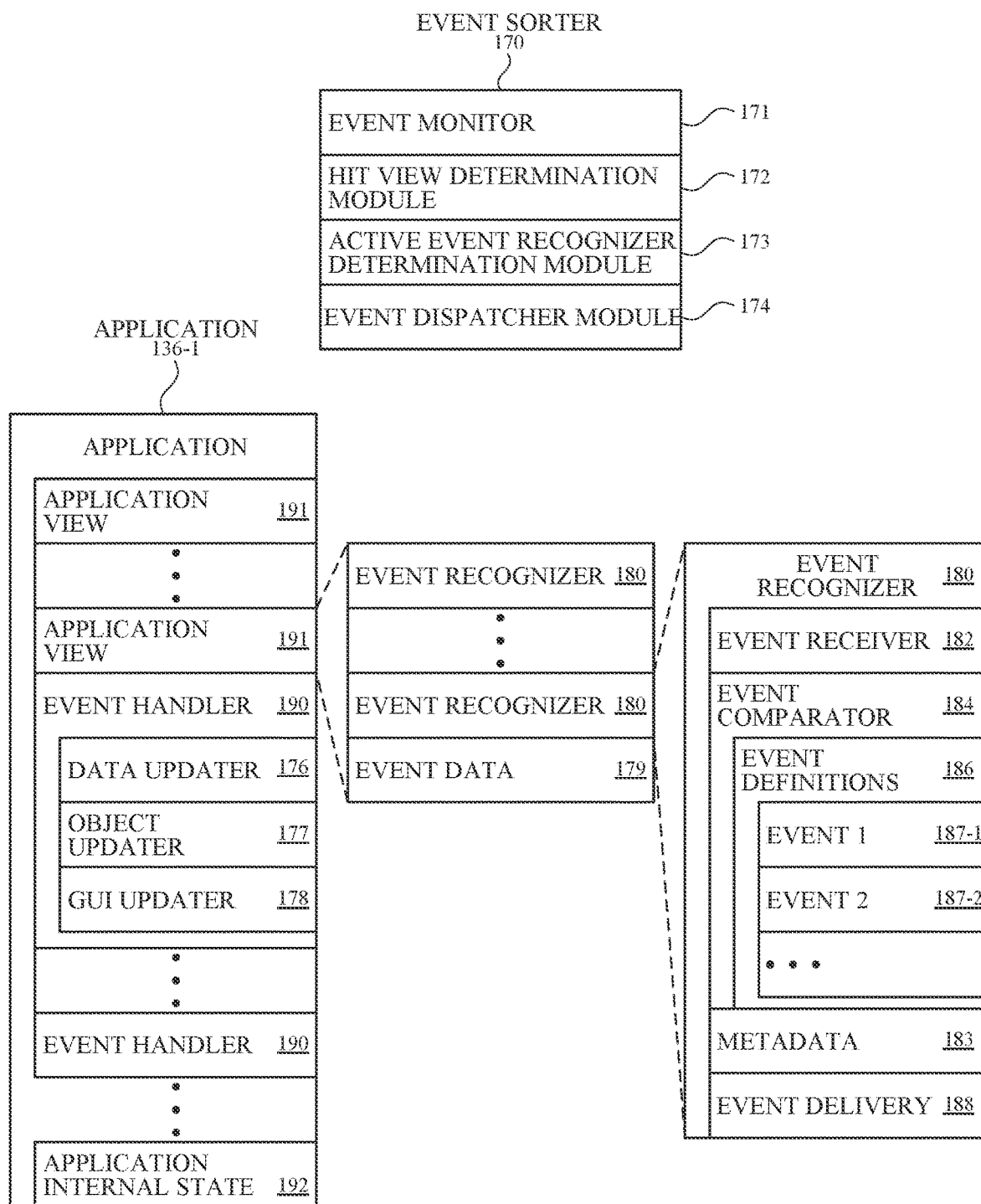


FIG. 1B

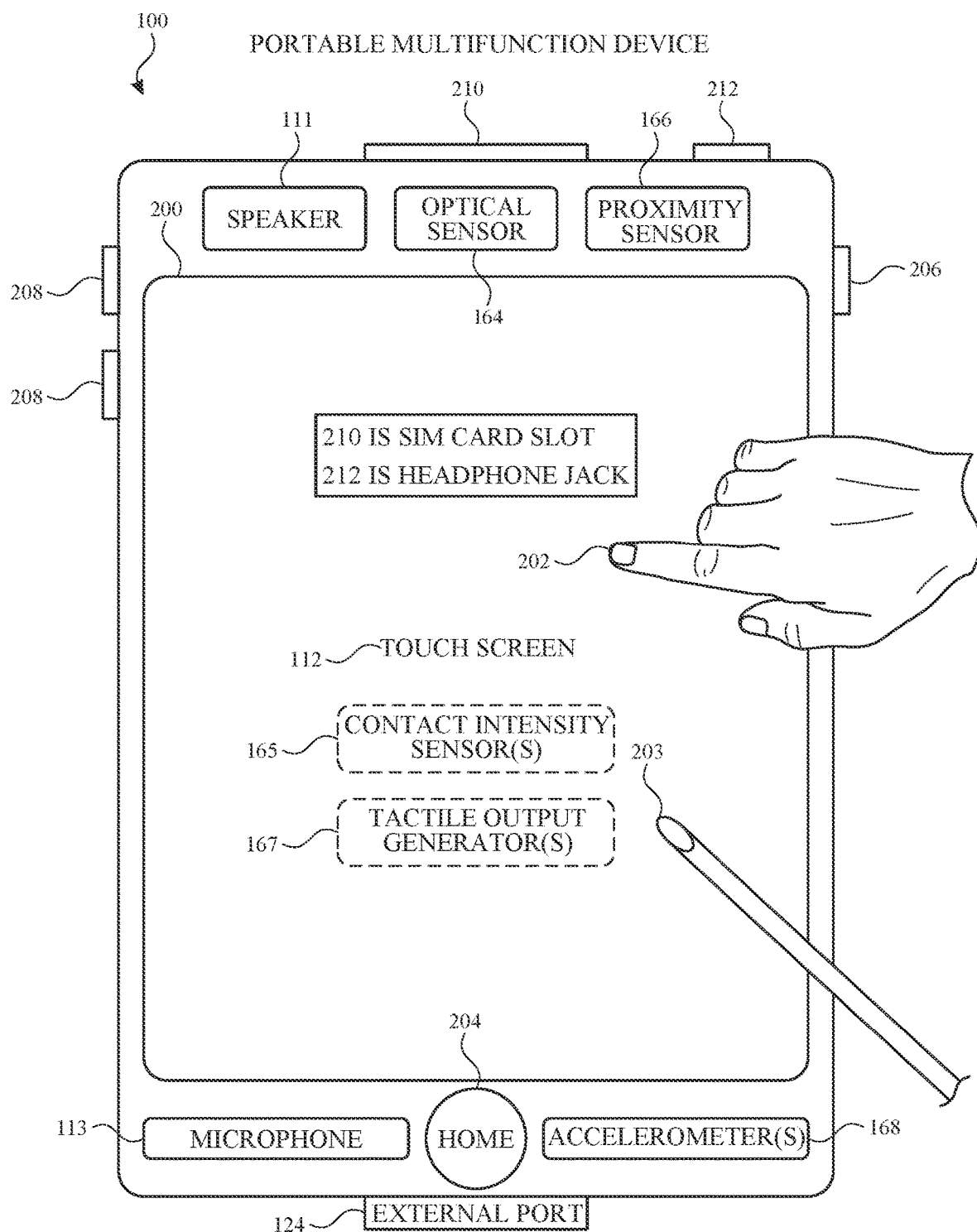


FIG. 2

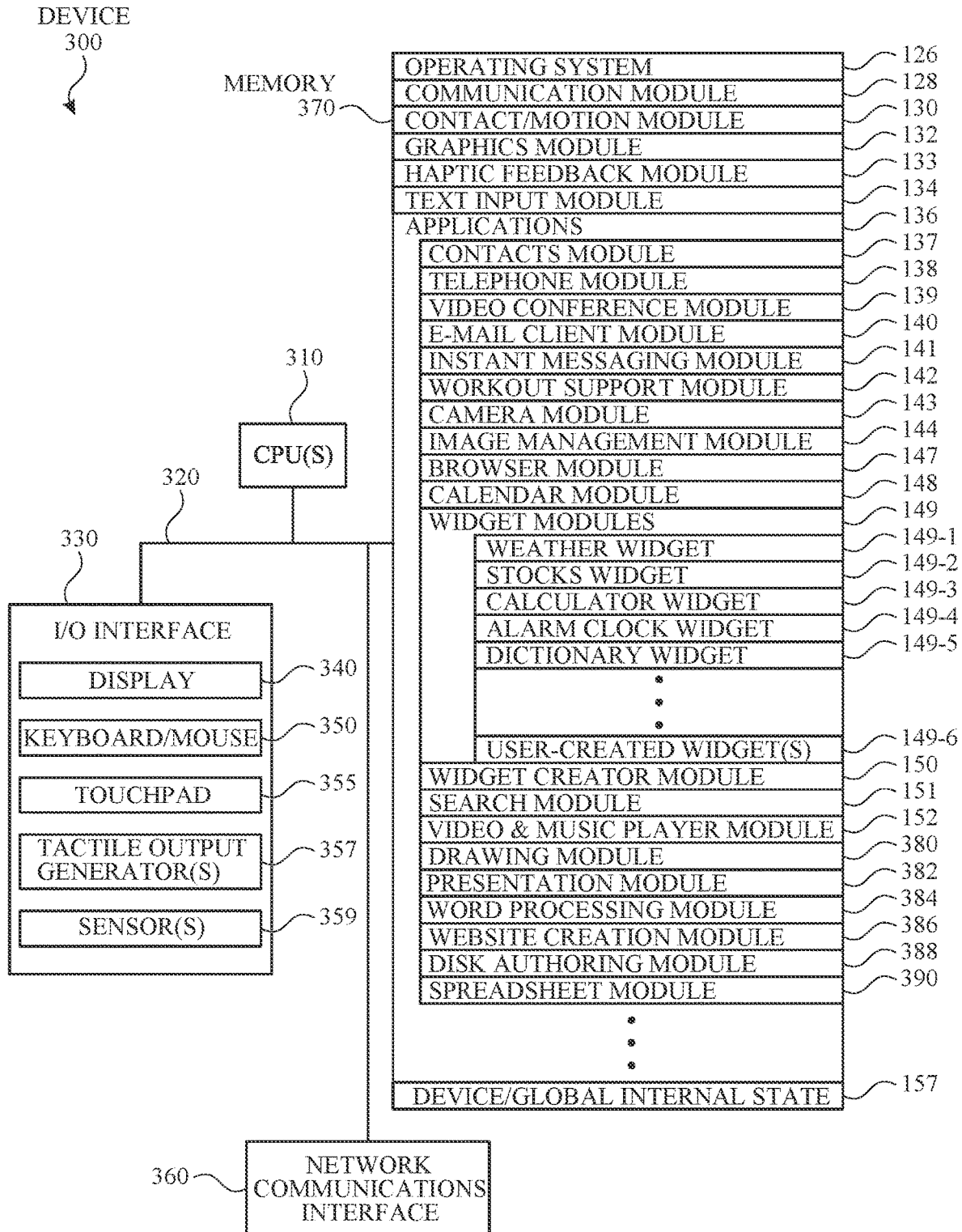


FIG. 3

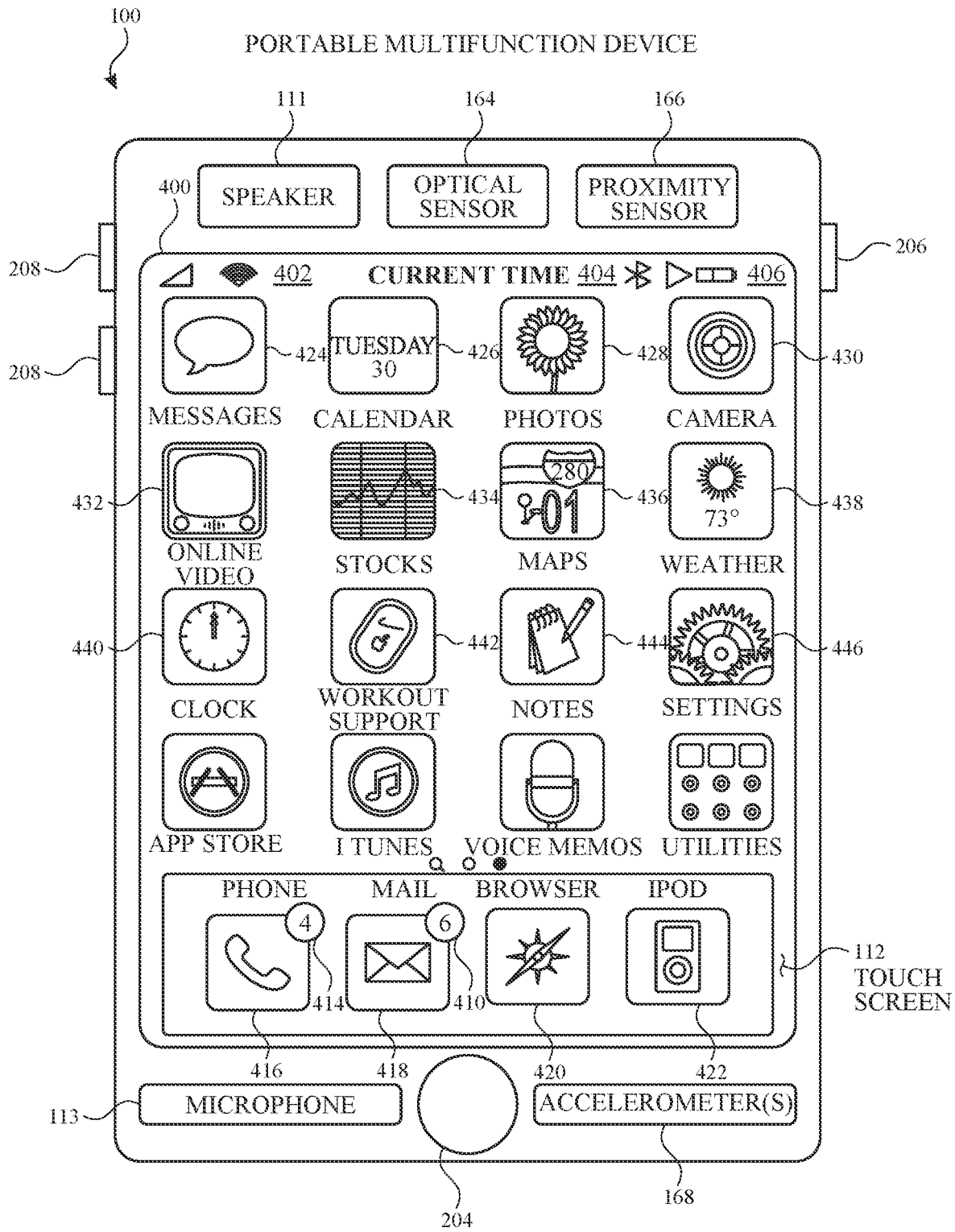


FIG. 4A

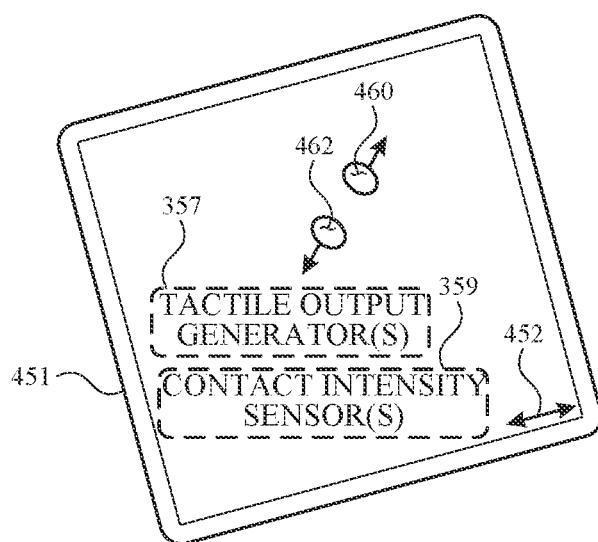
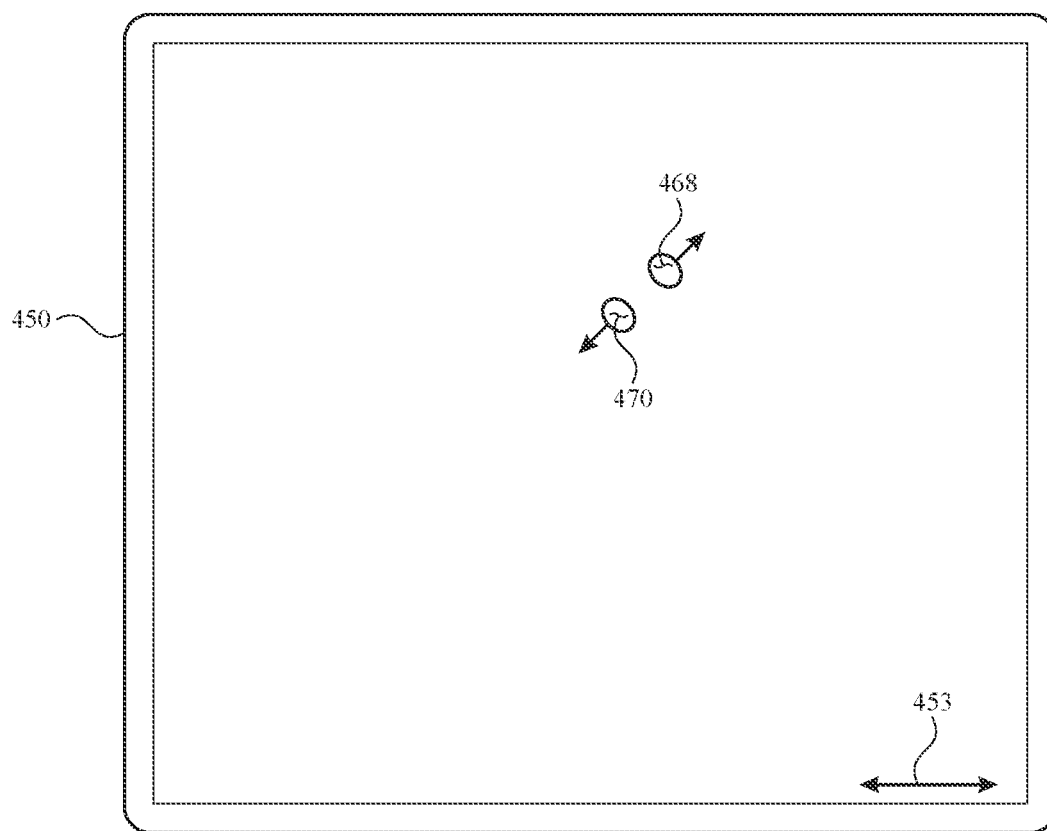


FIG. 4B

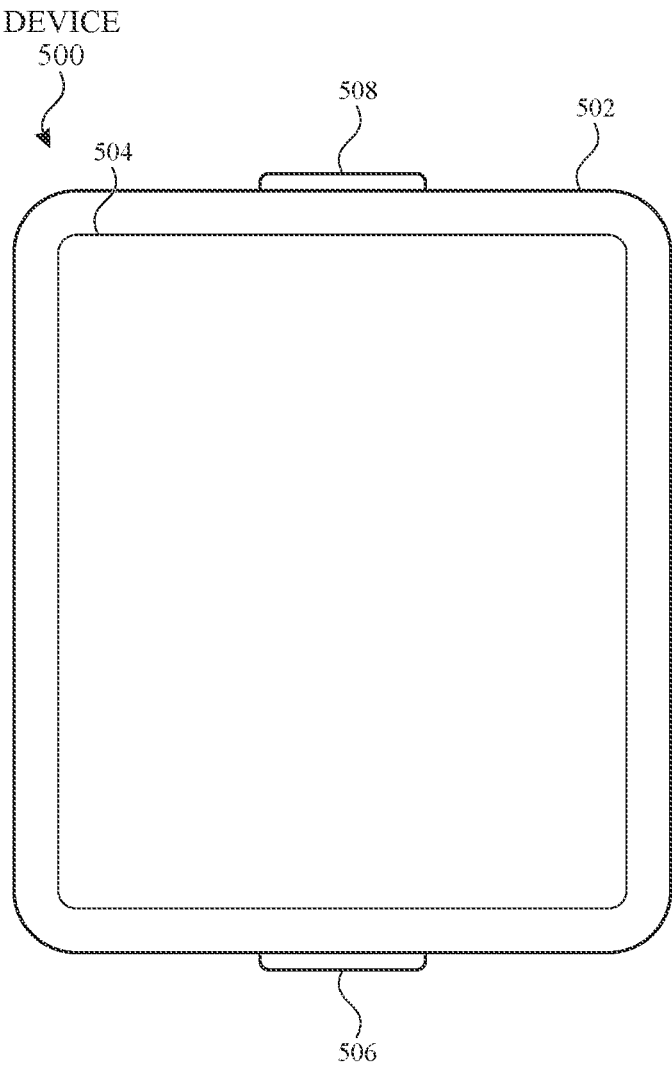


FIG. 5A

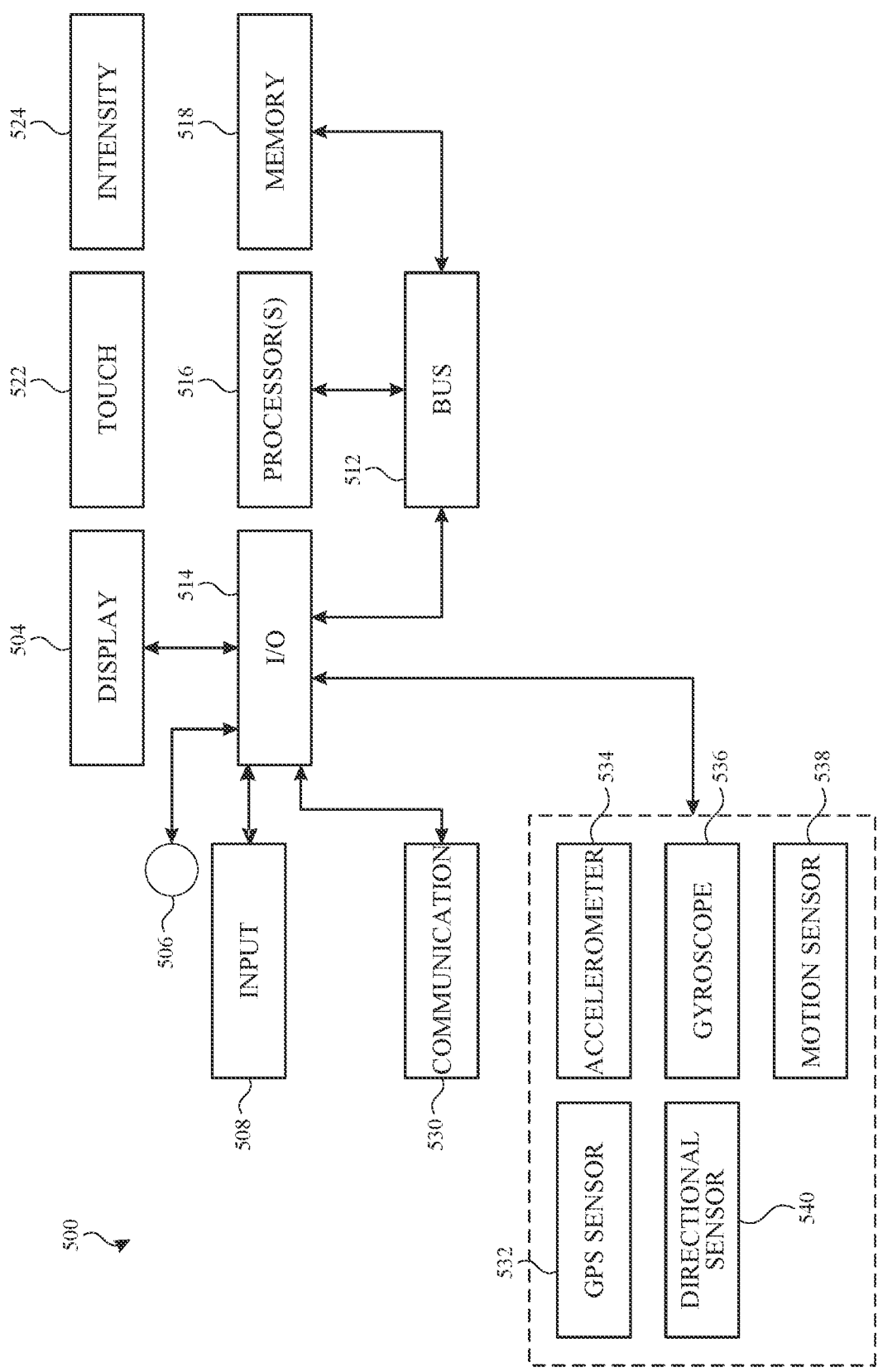


FIG. 5B

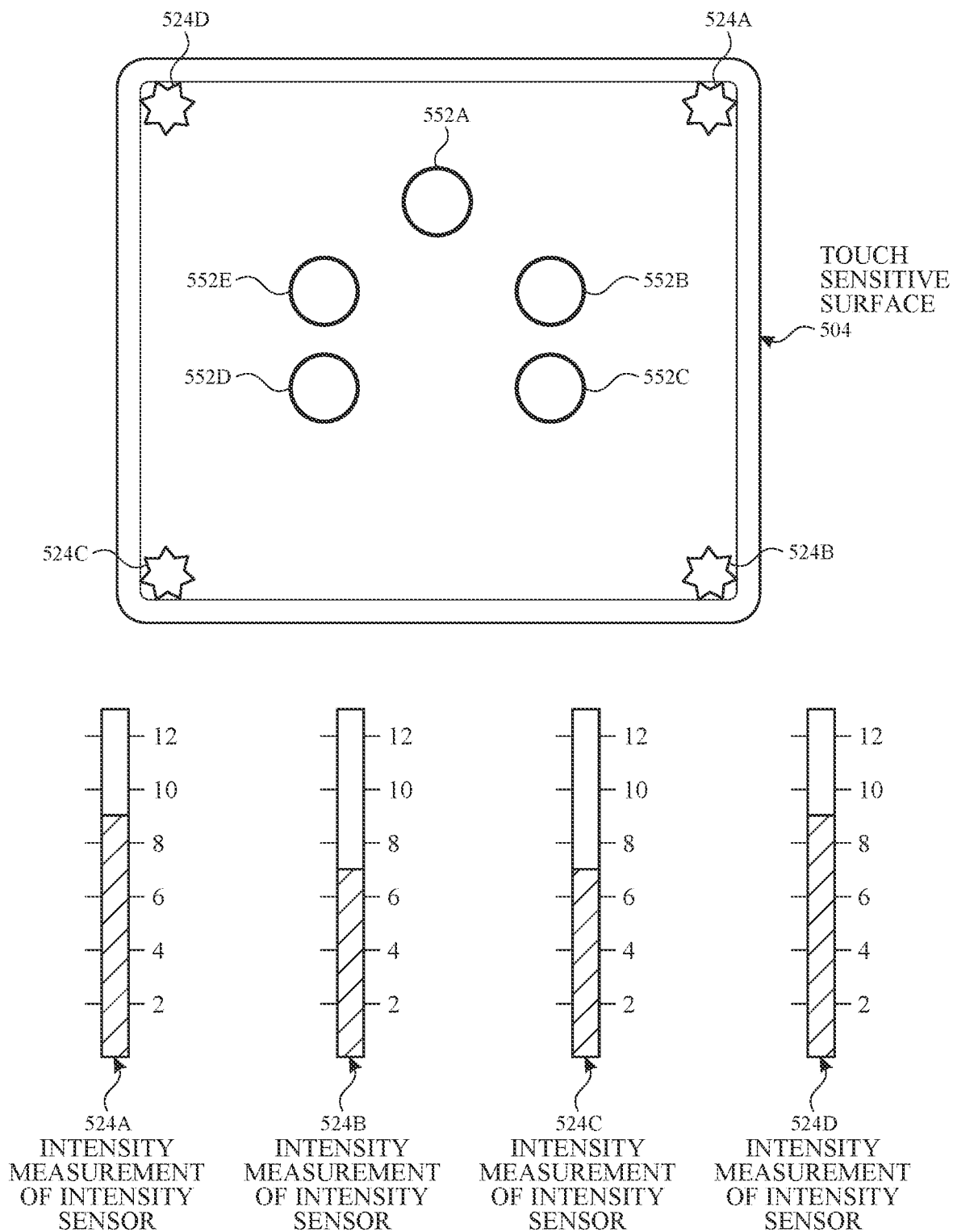


FIG. 5C

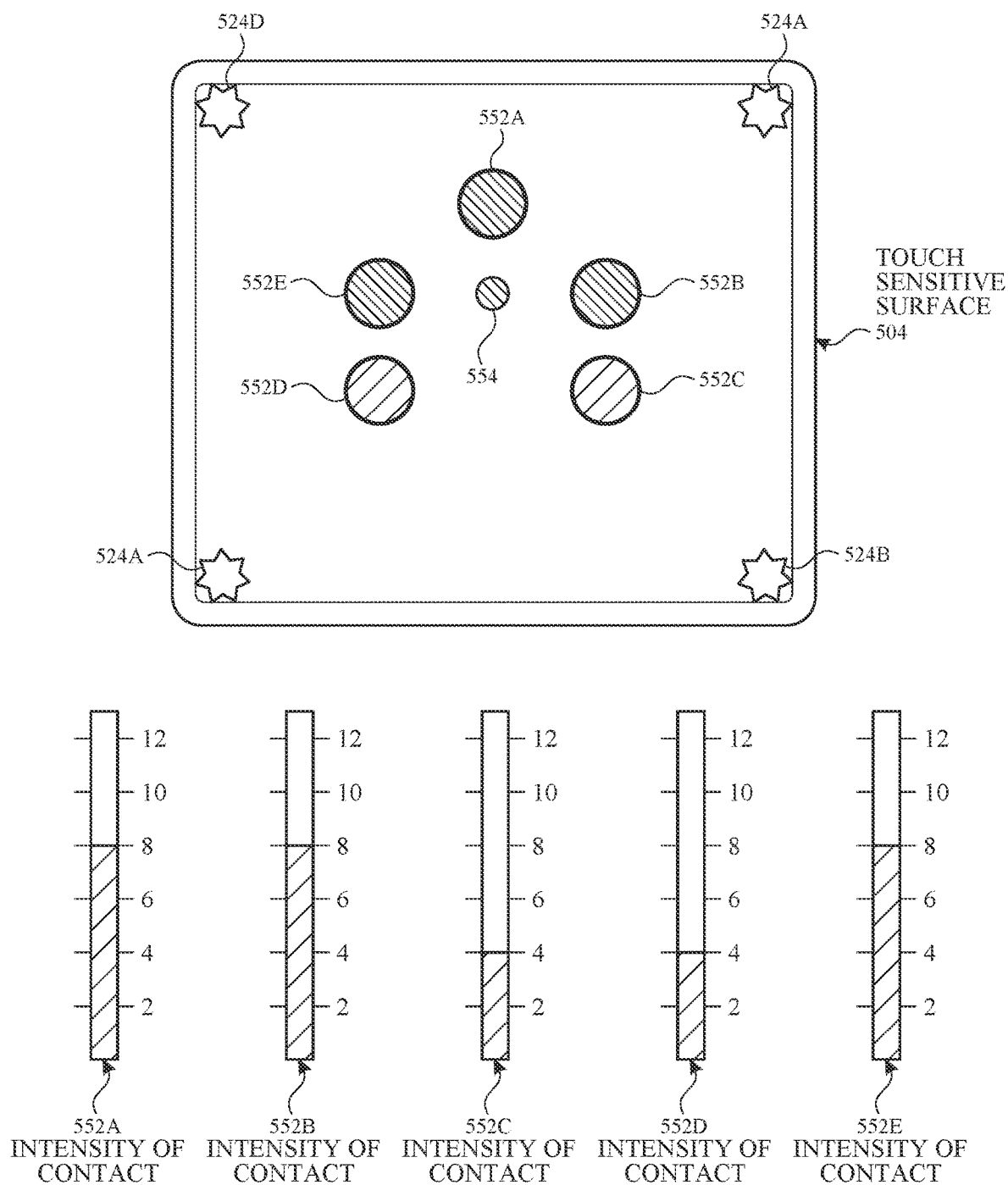


FIG. 5D

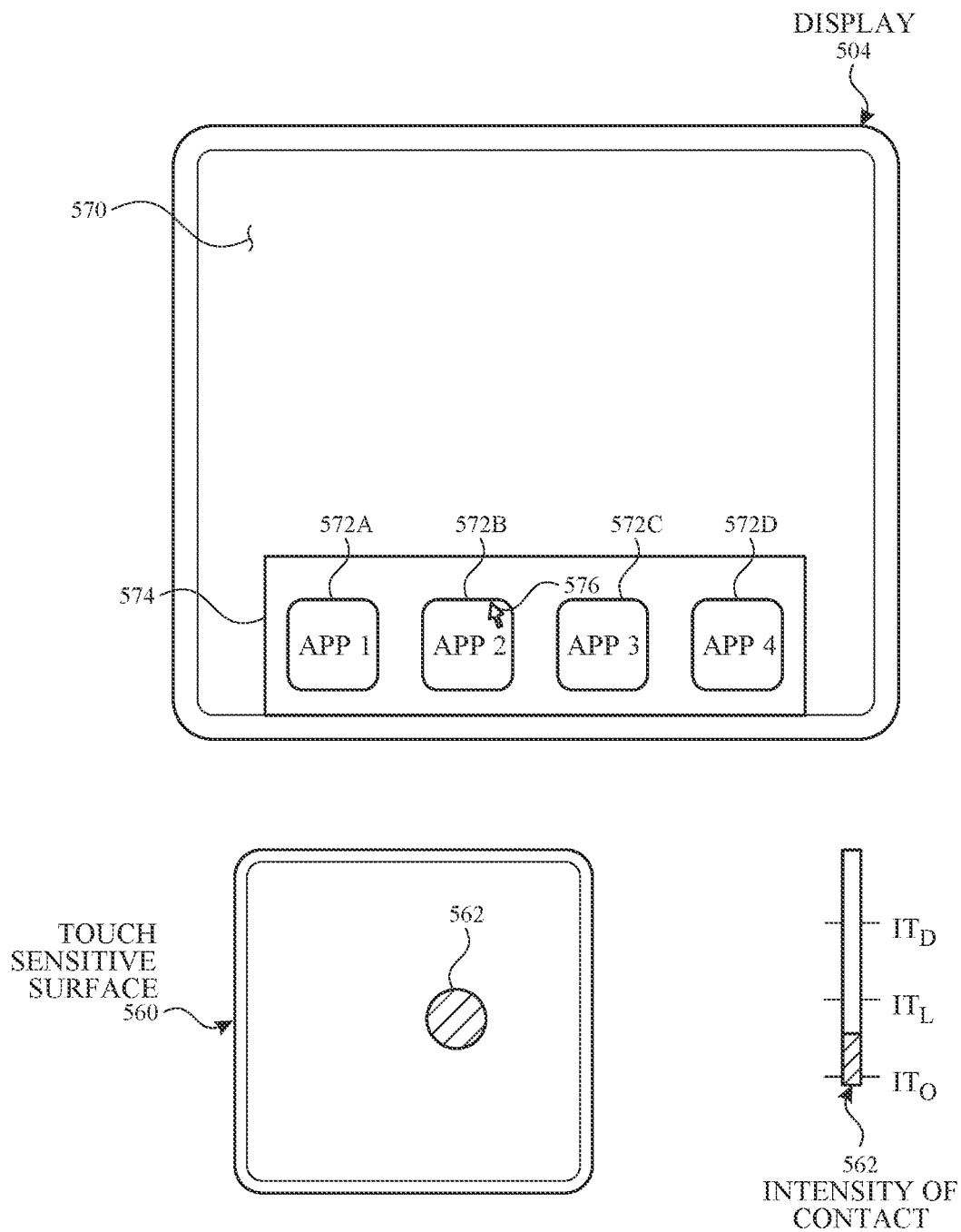


FIG. 5E

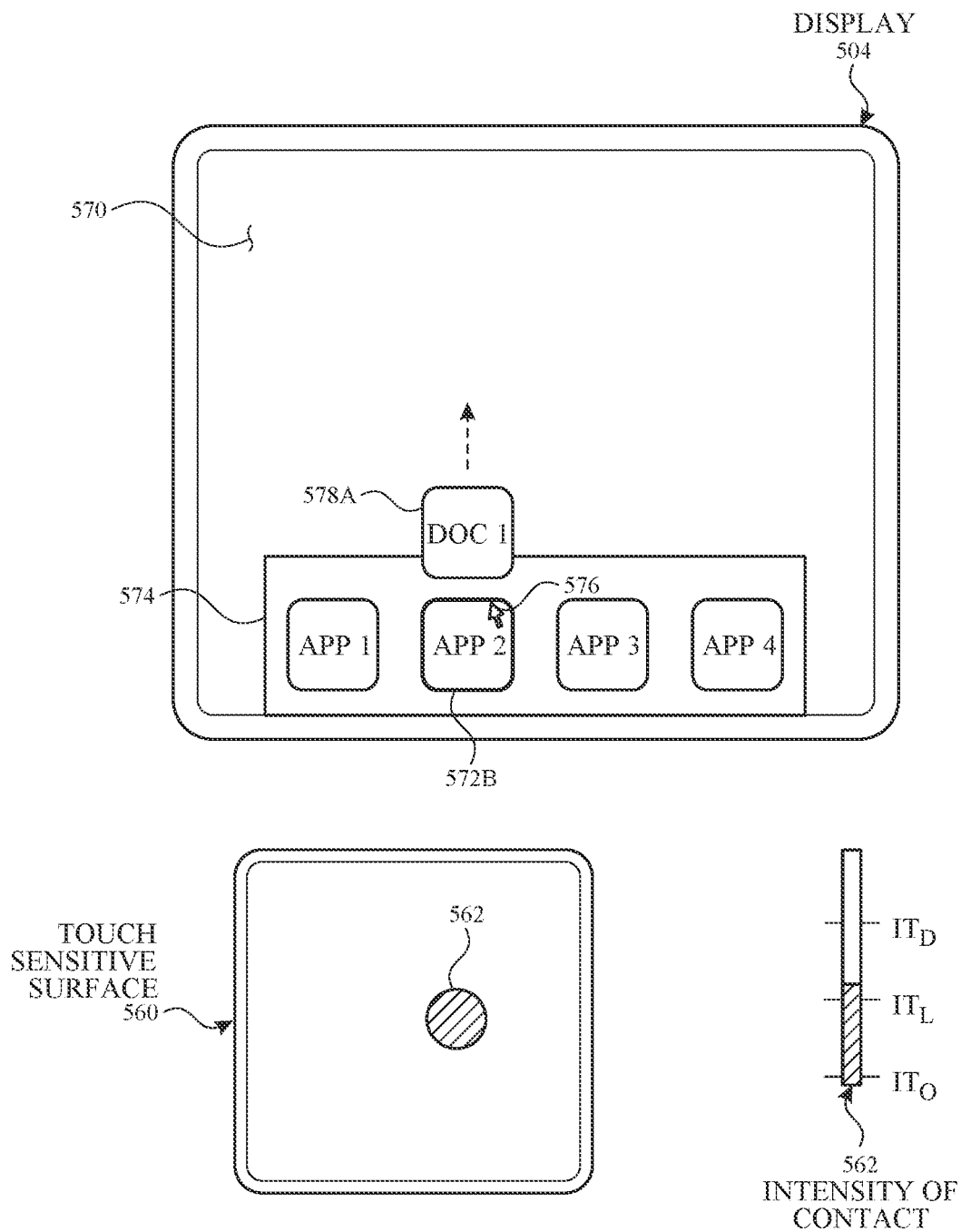


FIG. 5F

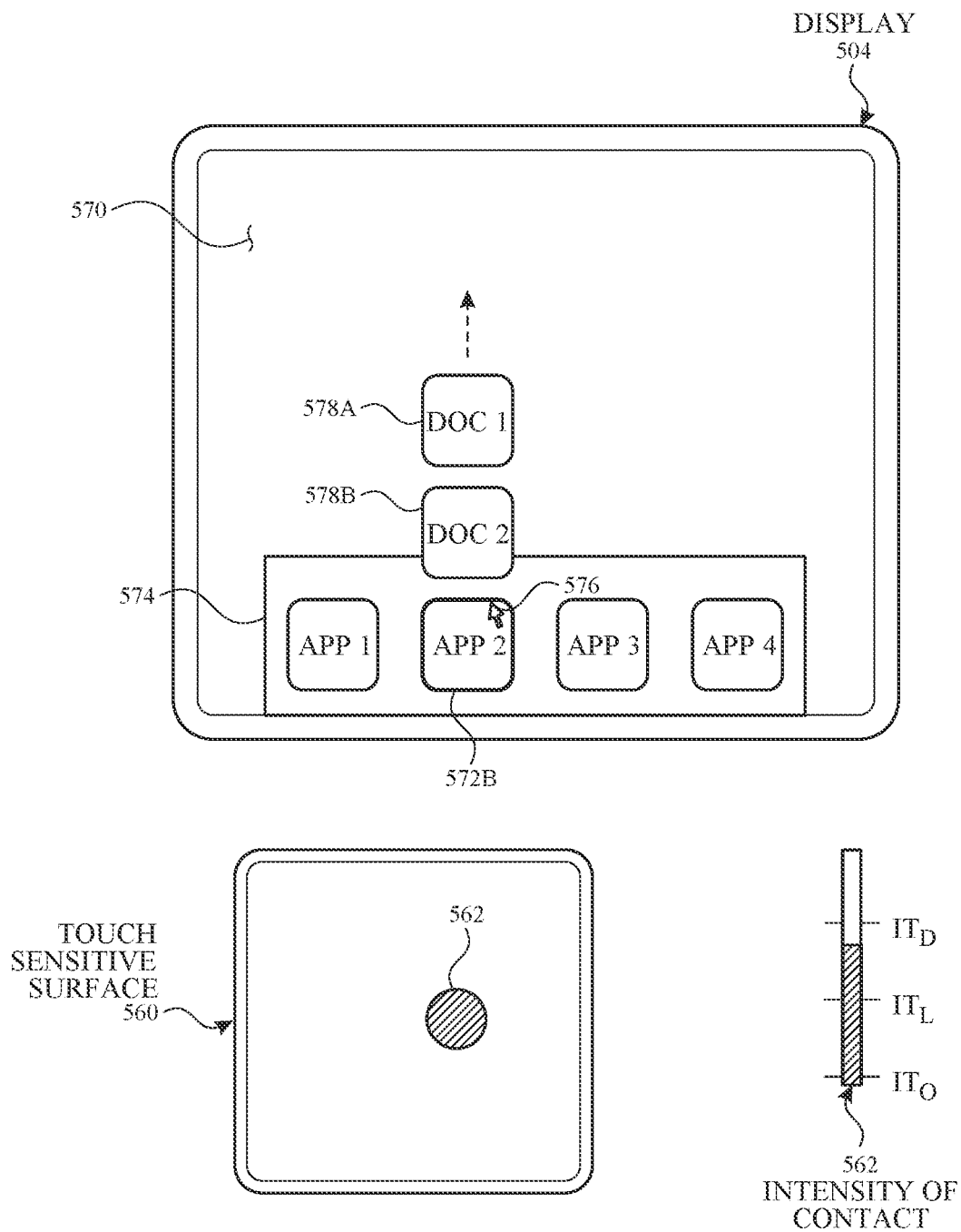


FIG. 5G

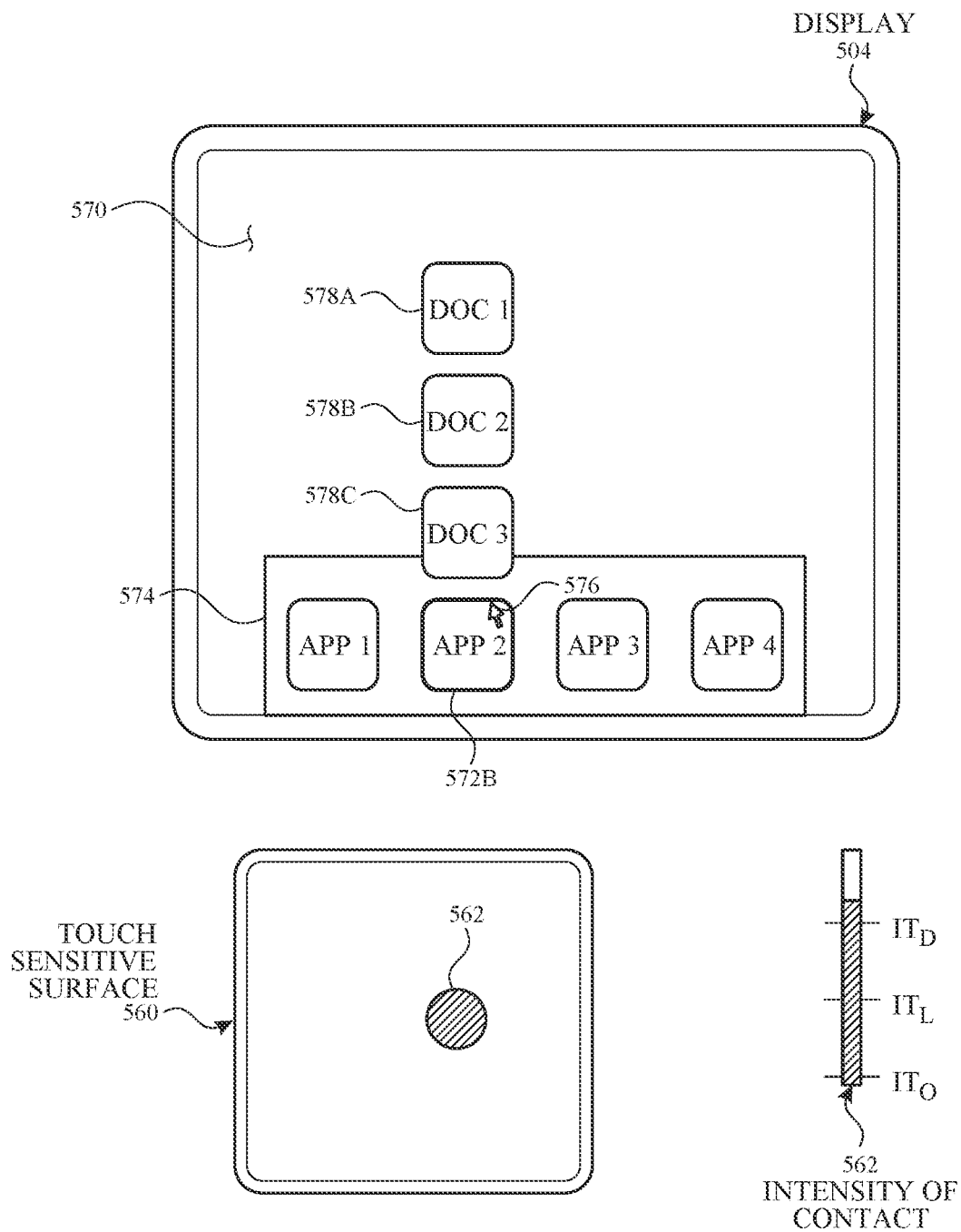


FIG. 5H

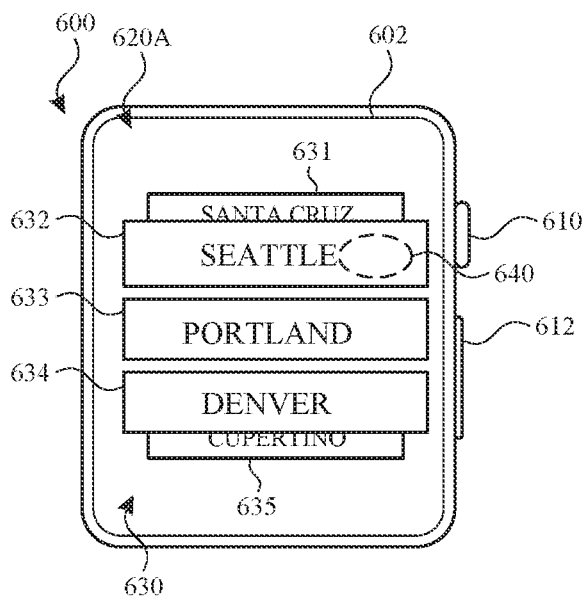


FIG. 6A

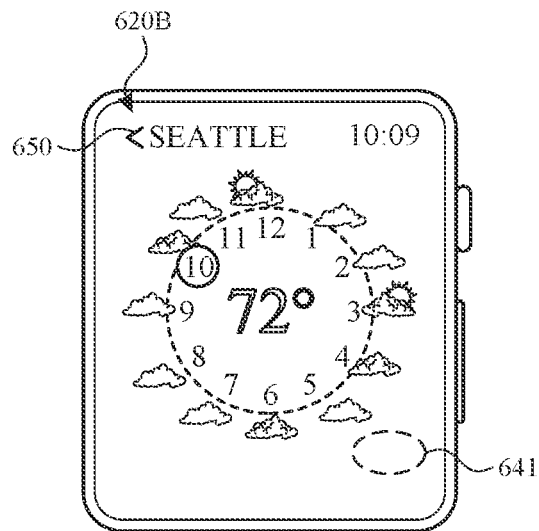


FIG. 6B

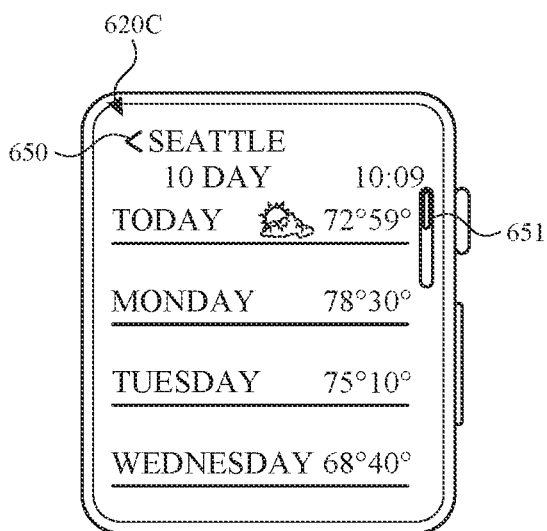


FIG. 6C

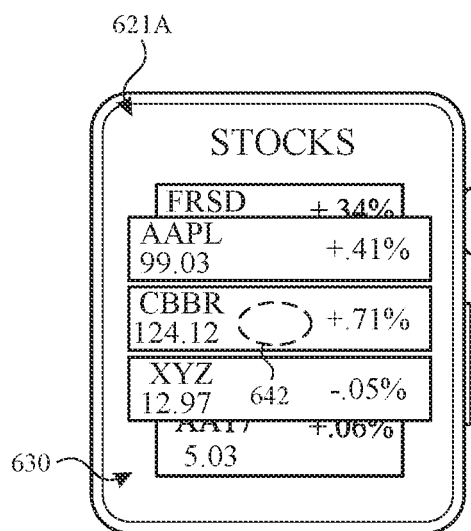


FIG. 6D

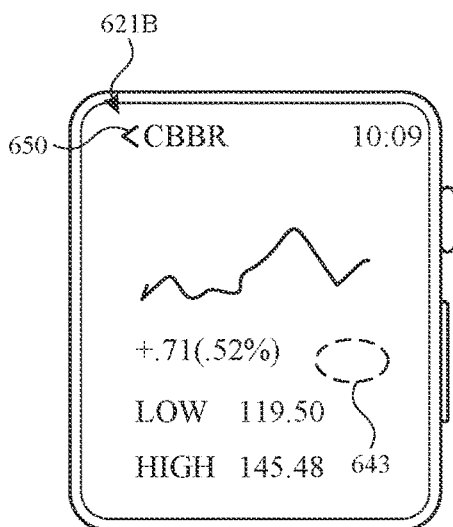


FIG. 6E

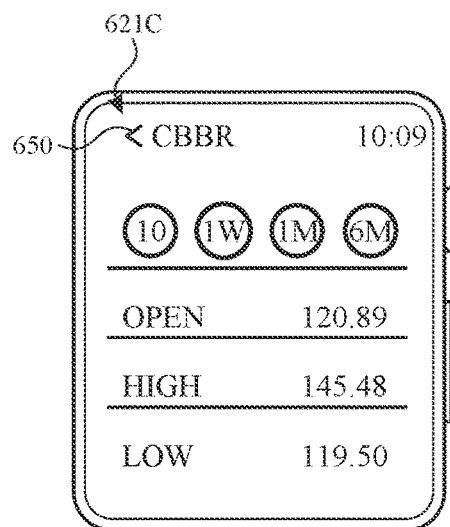


FIG. 6F

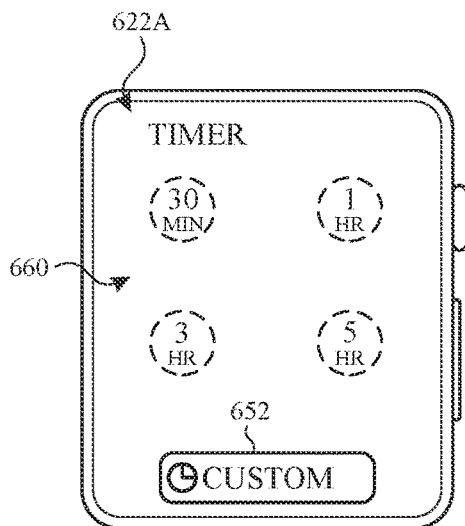


FIG. 6G

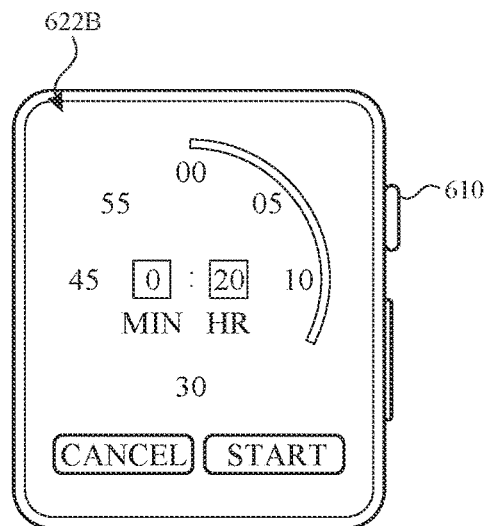


FIG. 6H

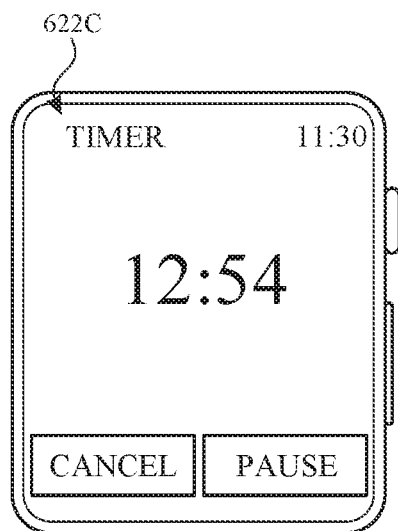


FIG. 6I

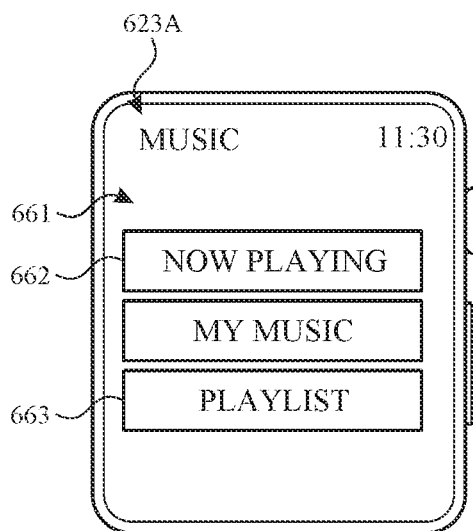


FIG. 6J

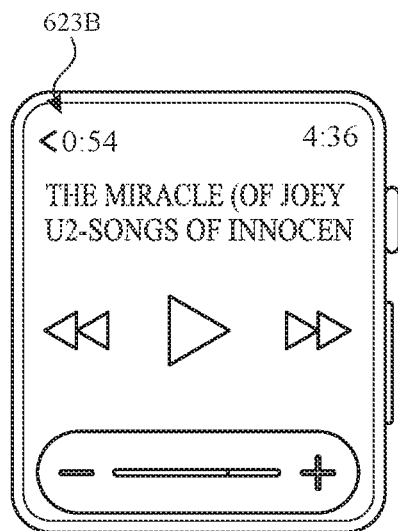


FIG. 6K

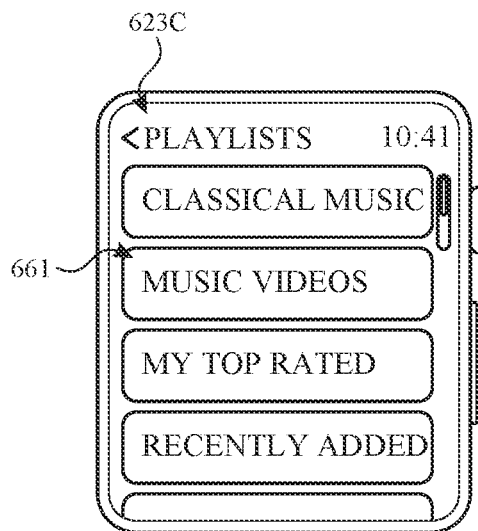


FIG. 6L

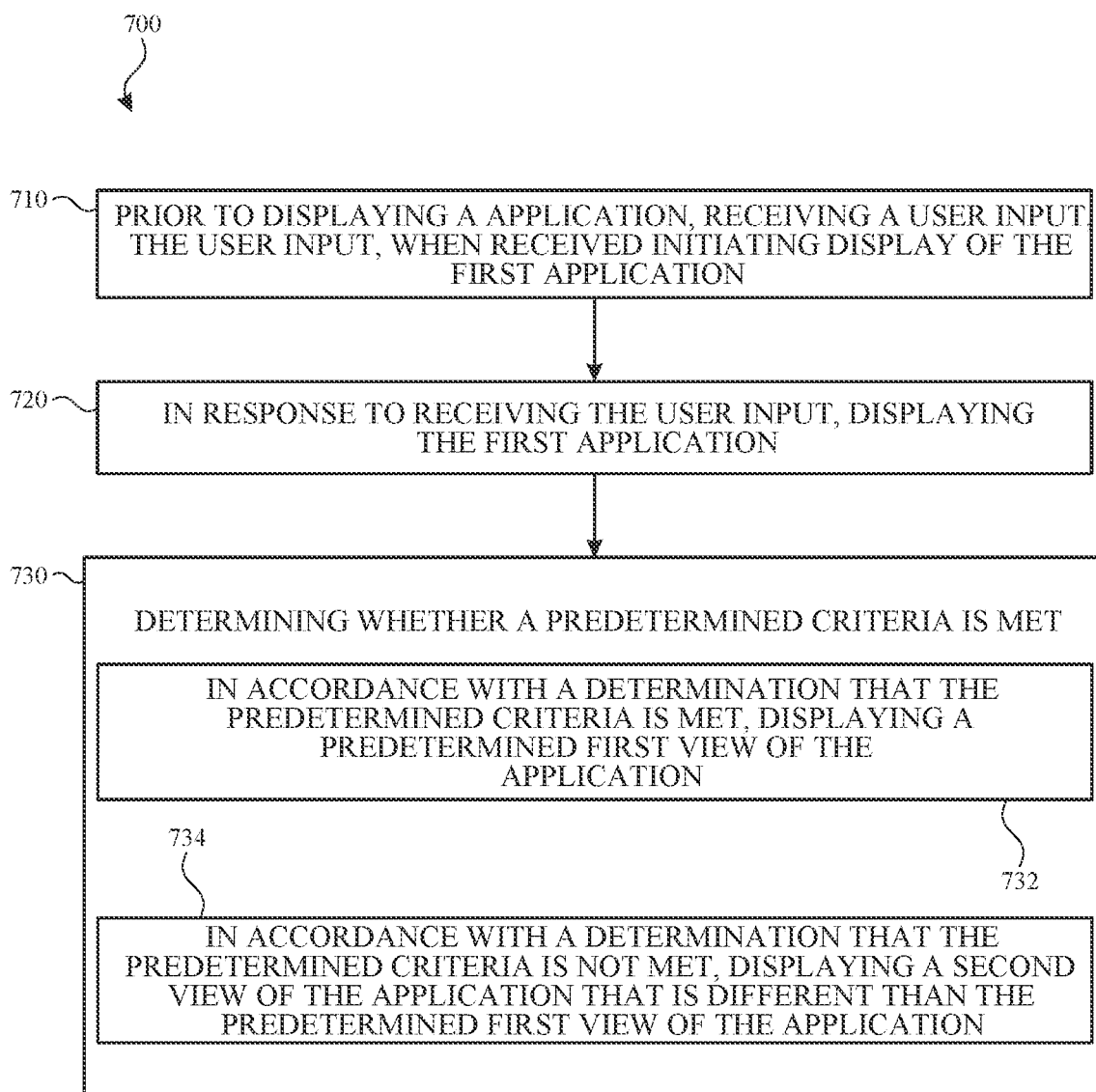


FIG. 7

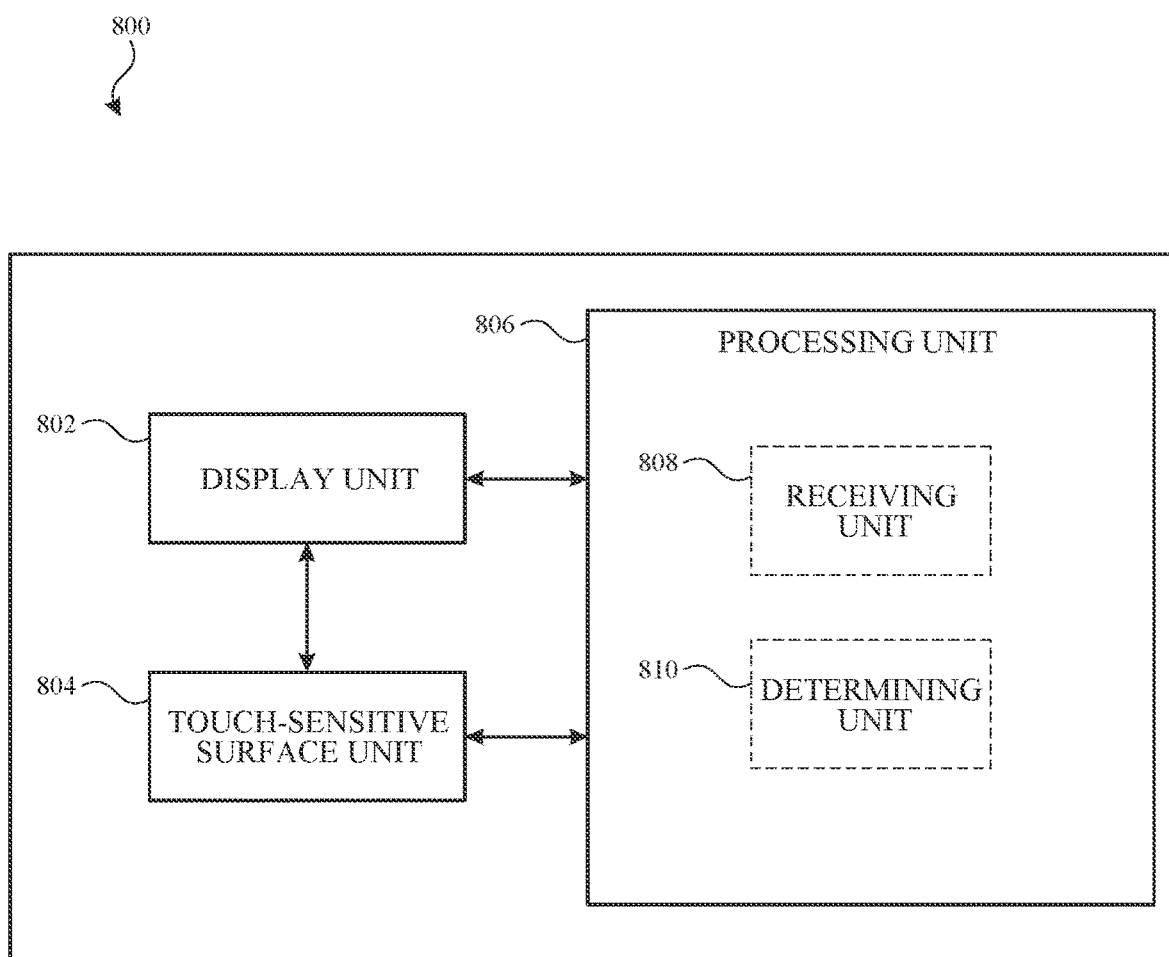


FIG. 8

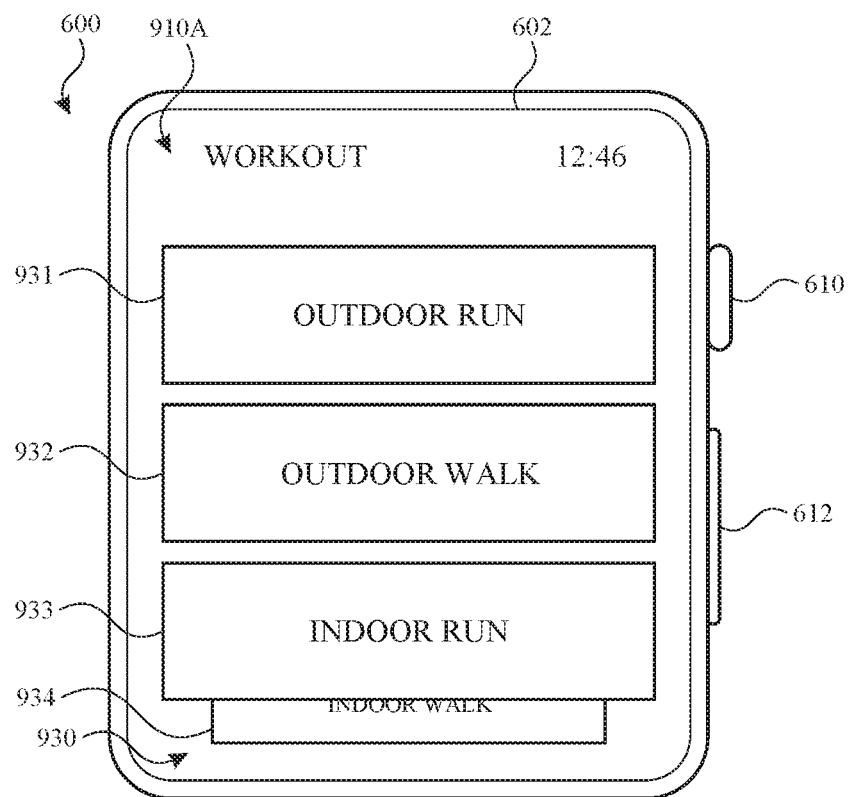


FIG. 9A

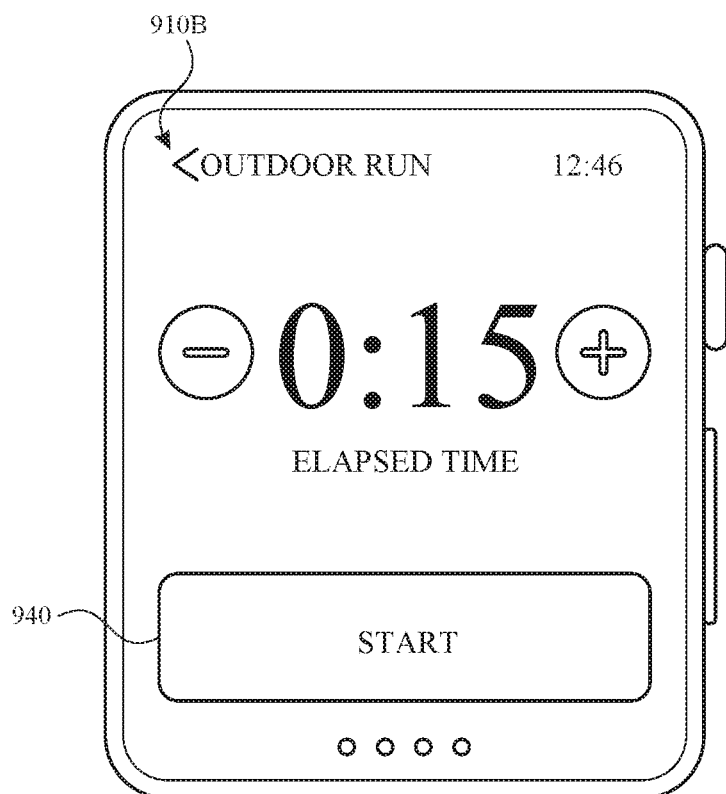


FIG. 9B

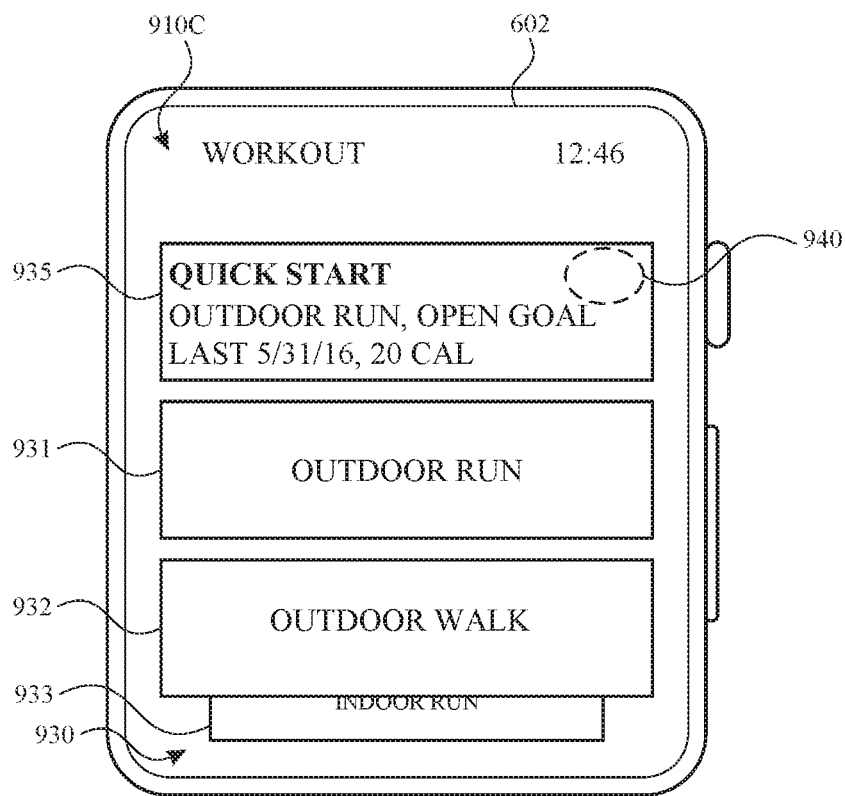


*FIG. 9C*



*FIG. 9D*

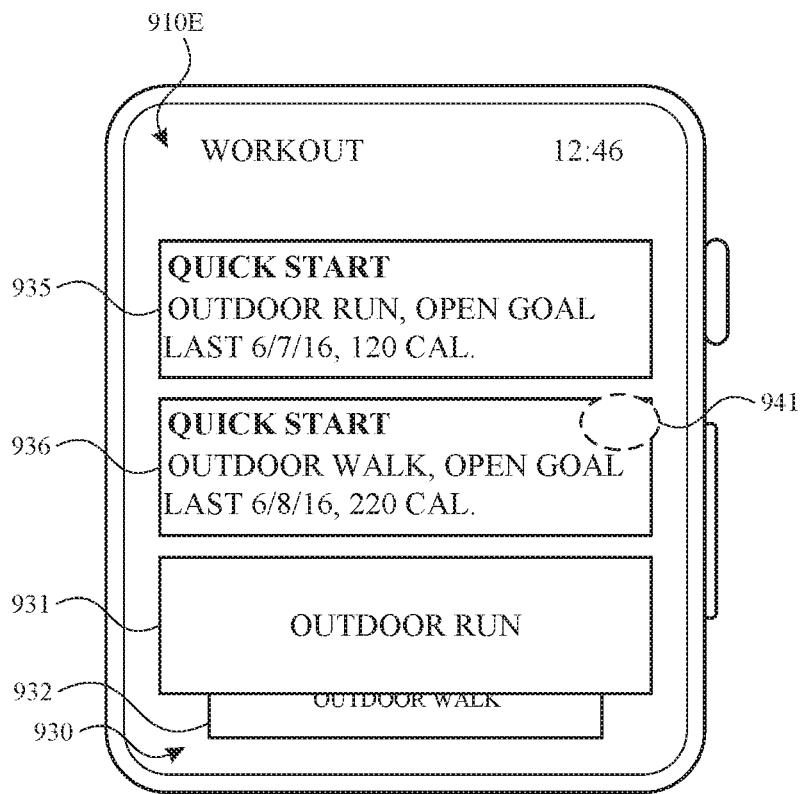


FIG. 9E



FIG. 9F

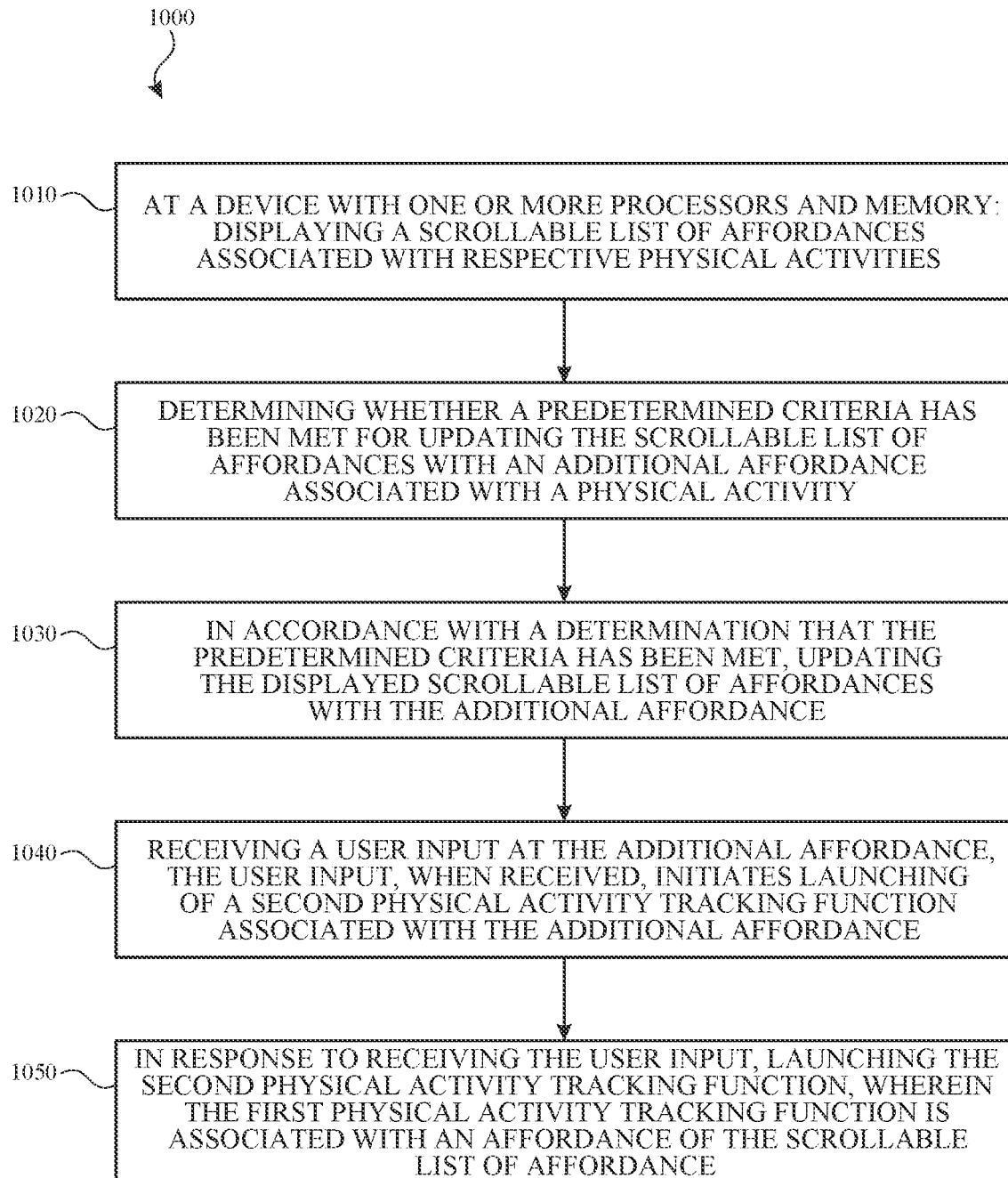


FIG. 10

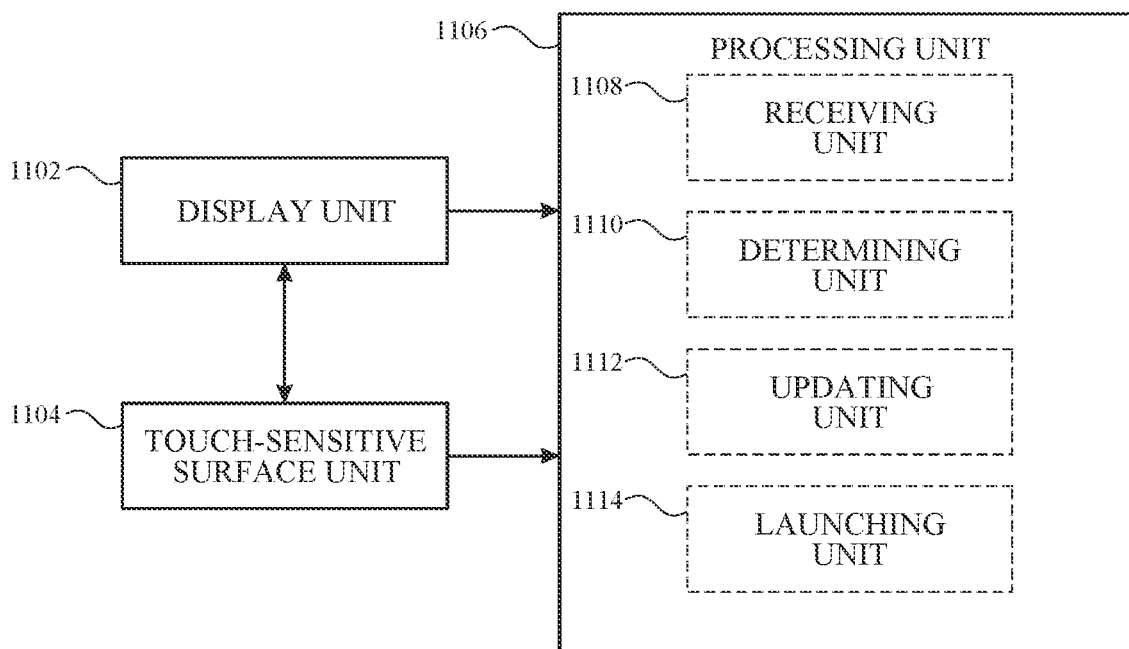


*FIG. 11*

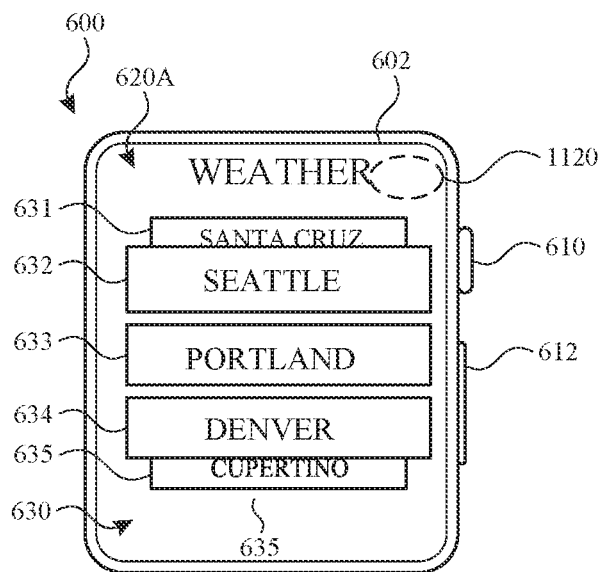


FIG. 12A

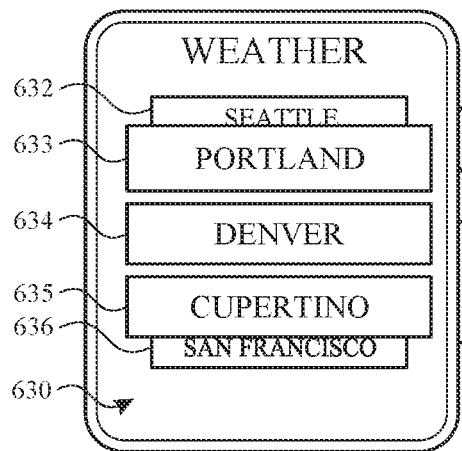


FIG. 12B

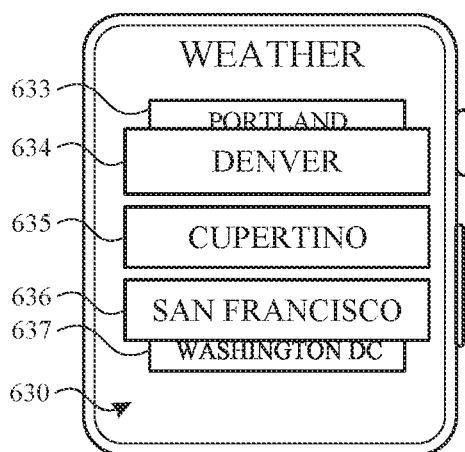


FIG. 12C

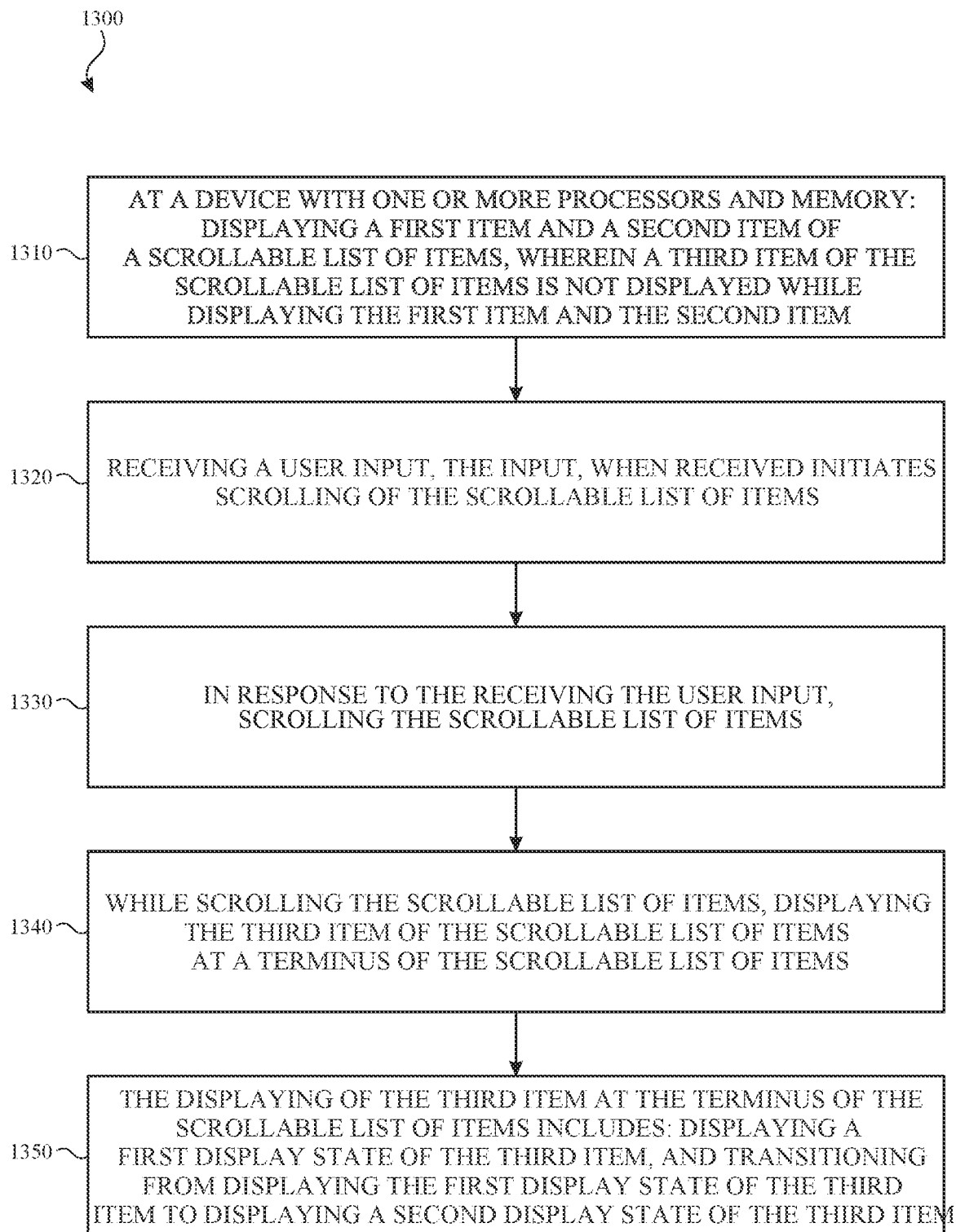


FIG. 13

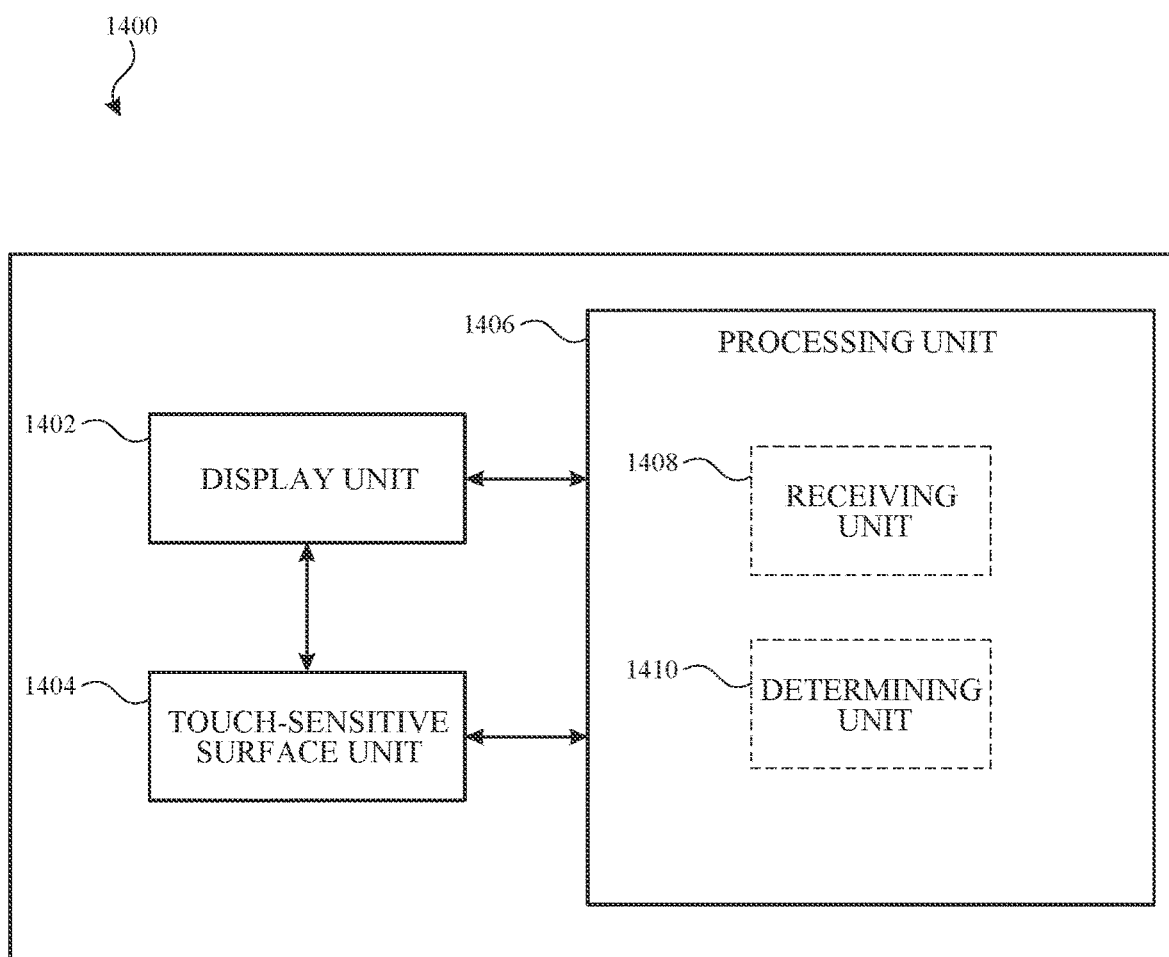


FIG. 14

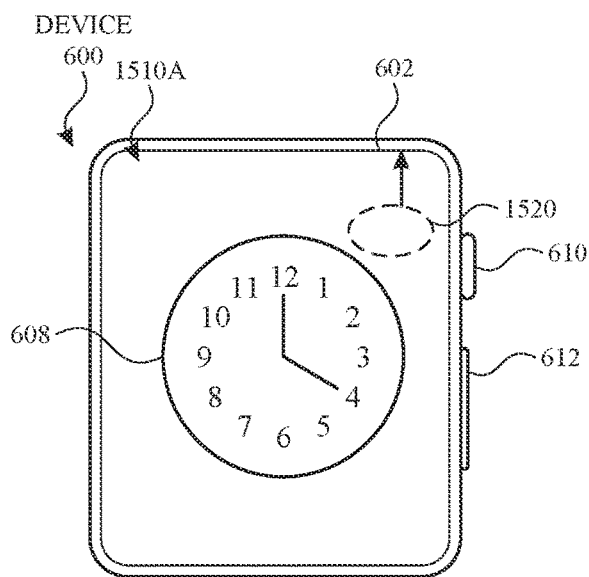


FIG. 15A

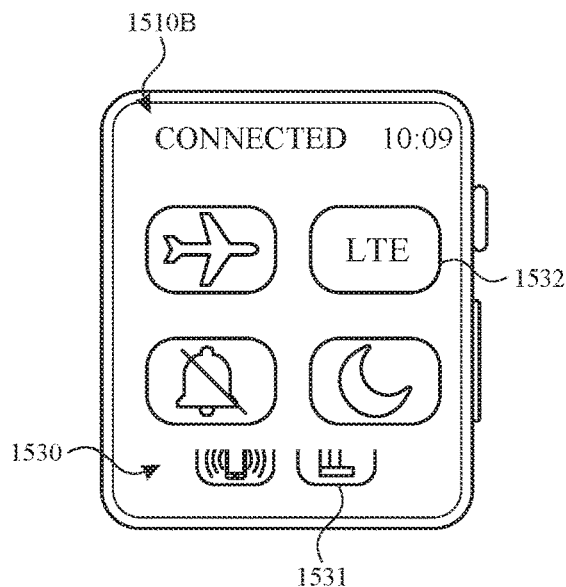


FIG. 15B

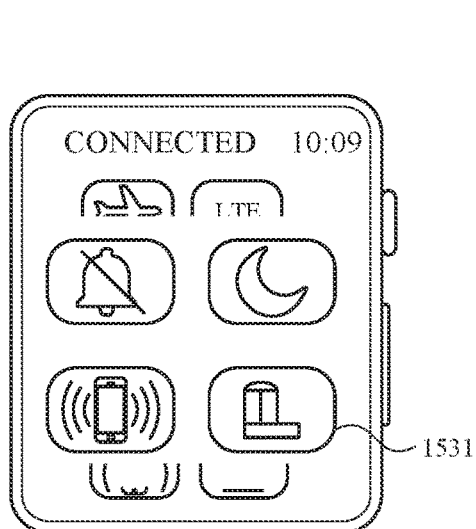


FIG. 15C

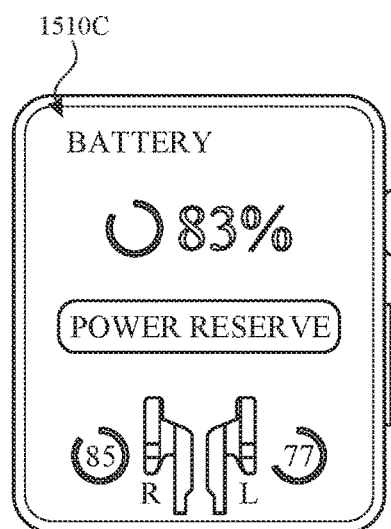


FIG. 15D

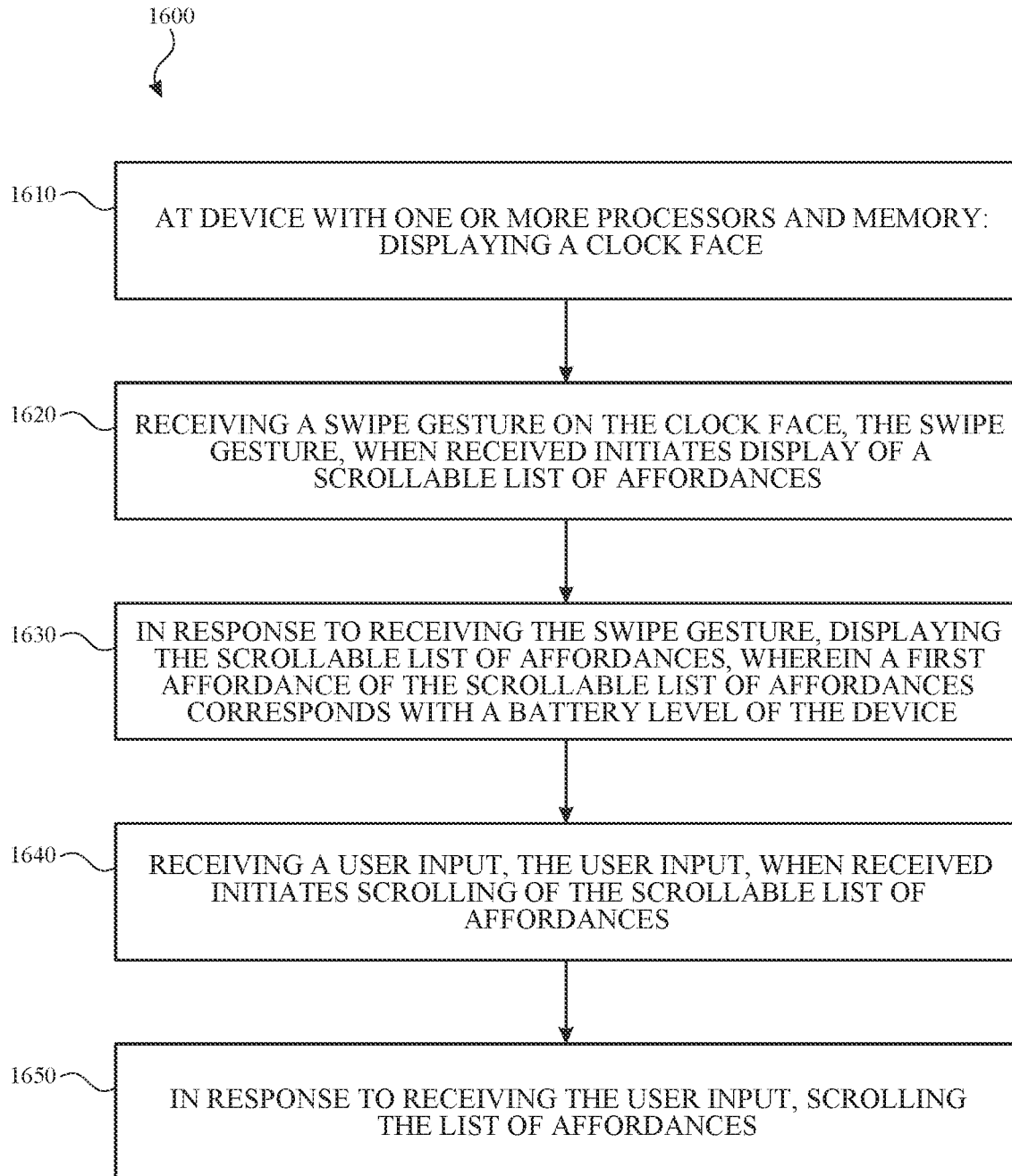


FIG. 16

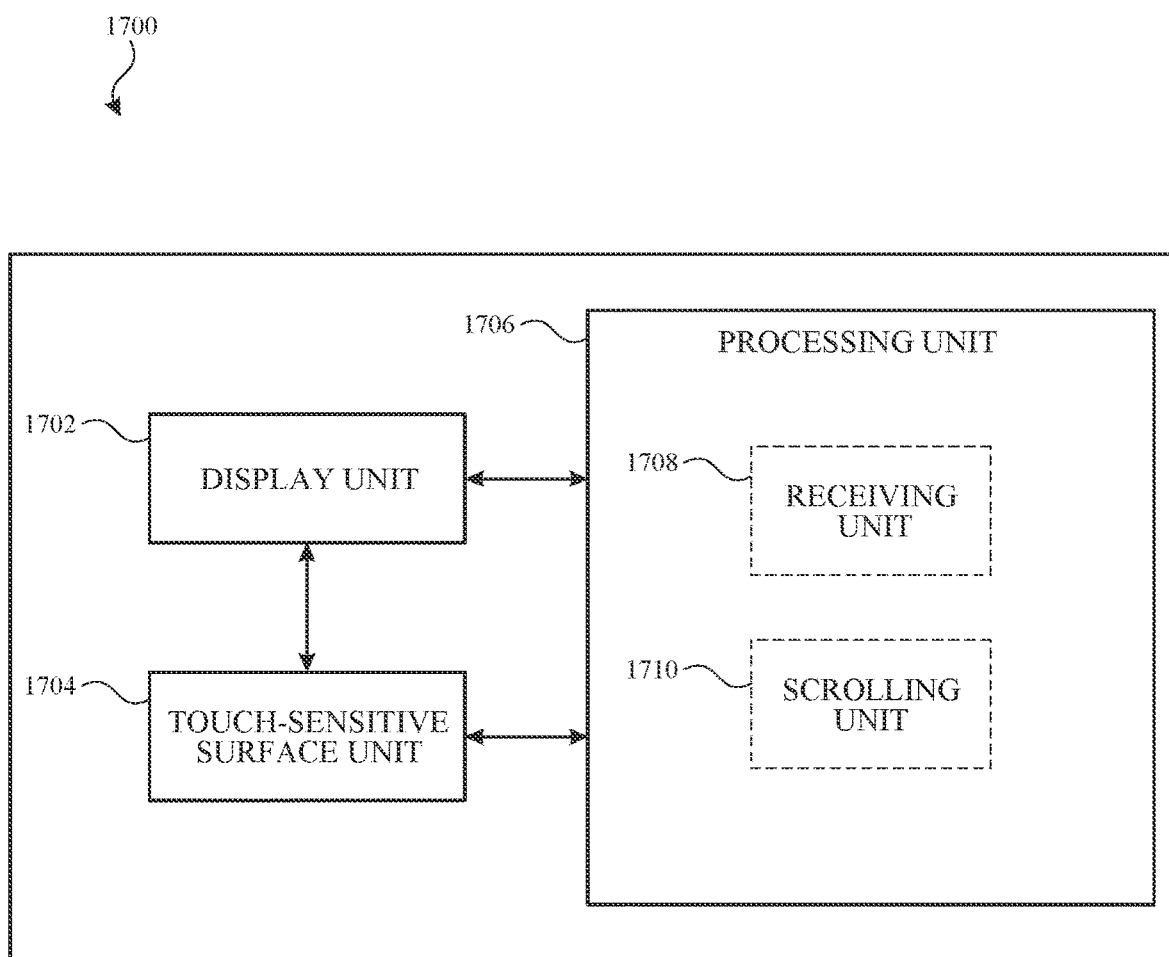


FIG. 17

## DISPLAYING A PREDETERMINED VIEW OF AN APPLICATION

### CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. patent application Ser. No. 15/608,848, entitled “DISPLAYING A PREDETERMINED VIEW OF AN APPLICATION”, filed on May 30, 2017, which claims priority to U.S. Provisional Patent Application 62/348,977, entitled “DISPLAYING A PREDETERMINED VIEW OF AN APPLICATION”, filed on Jun. 12, 2016, the contents of which are hereby incorporated by reference in their entirety.

### FIELD

[0002] The present disclosure relates generally to computer user interfaces, and more specifically to techniques for managing application views.

### BACKGROUND

[0003] Many modern electronic devices provide the capability of redisplay applications with an application view for accessing the content and functionality of the applications. Some techniques for redisplaying applications redisplay an undesired application view. These techniques can be cumbersome and inefficient.

### BRIEF SUMMARY

[0004] Some techniques for redisplaying an application using electronic devices, however, are generally cumbersome and inefficient. For example, some existing techniques use a complex and time-consuming user interface, which may include multiple key presses or keystrokes. In addition, existing techniques may result in displaying an undesired application view, requiring further user inputs to navigate to a desired view. Thus, existing techniques may require more time than necessary, wasting user time and device energy. This latter consideration is particularly important in battery-operated devices.

[0005] Accordingly, the present technique provides electronic devices with faster, more efficient methods and interfaces for displaying a predetermined application view. Such methods and interfaces optionally complement or replace other methods for displaying application views. Such methods and interfaces reduce the cognitive burden on a user and produce a more efficient human-machine interface. For battery-operated computing devices, such methods and interfaces conserve power and increase the time between battery charges.

[0006] In some embodiments, a method, includes, at a device with one or more processors and memory: prior to displaying a first application, receiving a user input, the user input, when received initiating display of the first application; in response to receiving the user input, displaying the first application; determining whether a predetermined criteria is met; in accordance with a determination that the predetermined criteria is met, displaying a predetermined first view of the application; and in accordance with a determination that the predetermined criteria is not met, displaying a second view of the application that is different than the predetermined first view of the application.

[0007] In some embodiments, an electronic device, comprising: a display; one or more processors; one or more input

devices; a memory; and one or more programs, wherein the one or more programs are stored in memory and configured to be executed by the one or more processors, the one or more programs including instructions for: receiving a user input, the user input, when received initiating display of the first application; in response to receiving the user input, displaying the first application; determining whether a predetermined criteria is met; in accordance with a determination that the predetermined criteria is met, displaying a predetermined first view of the application; and in accordance with a determination that the predetermined criteria is not met, displaying a second view of the application that is different than the predetermined first view of the application.

[0008] In some embodiments, 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 with a display and one or more input devices, cause the device to: receive a user input, the user input, when received initiating display of the first application; in response to receiving the user input, display the first application; determine whether a predetermined criteria is met; in accordance with a determination that the predetermined criteria is met, display a predetermined first view of the application; and in accordance with a determination that the predetermined criteria is not met, display a second view of the application that is different than the predetermined first view of the application.

[0009] In some embodiments, a 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 with a display and one or more input devices, cause the device to: receive a user input, the user input, when received initiating display of the first application; in response to receiving the user input, display the first application; determine whether a predetermined criteria is met; in accordance with a determination that the predetermined criteria is met, display a predetermined first view of the application; and in accordance with a determination that the predetermined criteria is not met, display a second view of the application that is different than the predetermined first view of the application.

[0010] In some embodiments, a method includes: at a device with one or more processors and memory: displaying a scrollable list of affordances associated with respective physical activities; determining whether a predetermined criteria has been met for updating the scrollable list of affordances with an additional affordance associated with a physical activity; in accordance with a determination that the predetermined criteria has been met, updating the displayed scrollable list of affordances with the additional affordance; receiving a user input at the additional affordance, the user input, when received, initiates launching of a second physical activity tracking function associated with the additional affordance; and in response to receiving the user input, launching the second physical activity tracking function that is based on a first physical activity tracking function, wherein the first physical activity tracking function is associated with an affordance of the scrollable list of affordances.

[0011] In some embodiments, an electronic device, comprising: a display; one or more processors; one or more input devices; a memory; and one or more programs, wherein the one or more programs are stored in memory and configured

to be executed by the one or more processors, the one or more programs including instructions for: displaying a scrollable list of affordances associated with respective physical activities; determining whether a predetermined criteria has been met for updating the scrollable list of affordances with an additional affordance associated with a physical activity; in accordance with a determination that the predetermined criteria has been met, updating the displayed scrollable list of affordances with the additional affordance; receiving a user input at the additional affordance, the user input, when received, initiates launching of a second physical activity tracking function associated with the additional affordance; and in response to receiving the user input, launching the second physical activity tracking function that is based on a first physical activity tracking function, wherein the first physical activity tracking function is associated with an affordance of the scrollable list of affordances.

**[0012]** In some embodiments, 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 with a display and one or more input devices, cause the device to: display a scrollable list of affordances associated with respective physical activities; determining whether a predetermined criteria has been met for updating the scrollable list of affordances with an additional affordance associated with a physical activity; in accordance with a determination that the predetermined criteria has been met, update the displayed scrollable list of affordances with the additional affordance; receive a user input at the additional affordance, the user input, when received, initiates launching of a second physical activity tracking function associated with the additional affordance; and in response to receiving the user input, launch the second physical activity tracking function that is based on a first physical activity tracking function, wherein the first physical activity tracking function is associated with an affordance of the scrollable list of affordances.

**[0013]** In some embodiments, a 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 with a display and one or more input devices, cause the device to: display a scrollable list of affordances associated with respective physical activities; determining whether a predetermined criteria has been met for updating the scrollable list of affordances with an additional affordance associated with a physical activity; in accordance with a determination that the predetermined criteria has been met, update the displayed scrollable list of affordances with the additional affordance; receive a user input at the additional affordance, the user input, when received, initiates launching of a second physical activity tracking function associated with the additional affordance; and in response to receiving the user input, launch the second physical activity tracking function that is based on a first physical activity tracking function, wherein the first physical activity tracking function is associated with an affordance of the scrollable list of affordances.

**[0014]** In some embodiments, a method, includes at a device with one or more processors and memory: displaying a first item and a second item of a scrollable list of items, wherein a third item of the scrollable list of items is not displayed while displaying the first item and the second

item; receiving a user input, the input, when received initiates scrolling of the scrollable list of items; in response to the receiving the user input, scrolling the scrollable list of items; and while scrolling the scrollable list of items, displaying the third item of the scrollable list of items at a terminus of the scrollable list of items, the displaying of the third item at the terminus of the scrollable list of items includes: displaying a first display state of the third item, and transitioning from displaying the first display state of the third item to displaying a second display state of the third item.

**[0015]** In some embodiments, an electronic device, comprising: a display; one or more processors; one or more input devices; a memory; and one or more programs, wherein the one or more programs are stored in memory and configured to be executed by the one or more processors, the one or more programs including instructions for: displaying a first item and a second item of a scrollable list of items, wherein a third item of the scrollable list of items is not displayed while displaying the first item and the second item; receiving a user input, the input, when received initiates scrolling of the scrollable list of items; in response to the receiving the user input, scrolling the scrollable list of items; and while scrolling the scrollable list of items, displaying the third item of the scrollable list of items at a terminus of the scrollable list of items, the displaying of the third item at the terminus of the scrollable list of items includes: displaying a first display state of the third item, and transitioning from displaying the first display state of the third item to displaying a second display state of the third item.

**[0016]** In some embodiments, 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 with a display and one or more input devices, cause the device to: displaying a first item and a second item of a scrollable list of items, wherein a third item of the scrollable list of items is not displayed while displaying the first item and the second item; receiving a user input, the input, when received initiates scrolling of the scrollable list of items; in response to the receiving the user input, scrolling the scrollable list of items; and while scrolling the scrollable list of items, displaying the third item of the scrollable list of items at a terminus of the scrollable list of items, the displaying of the third item at the terminus of the scrollable list of items includes: displaying a first display state of the third item, and transitioning from displaying the first display state of the third item to displaying a second display state of the third item.

**[0017]** In some embodiments, a 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 with a display and one or more input devices, cause the device to: displaying a first item and a second item of a scrollable list of items, wherein a third item of the scrollable list of items is not displayed while displaying the first item and the second item; receiving a user input, the input, when received initiates scrolling of the scrollable list of items; in response to the receiving the user input, scrolling the scrollable list of items; and while scrolling the scrollable list of items, displaying the third item of the scrollable list of items at a terminus of the scrollable list of items, the displaying of the third item at the terminus of the scrollable list of items

includes: displaying a first display state of the third item, and transitioning from displaying the first display state of the third item to displaying a second display state of the third item.

**[0018]** In some embodiments, a method, includes at a device with one or more processors and memory: displaying a clock face; receiving a swipe gesture on the clock face, the swipe gesture, when received initiates display of a scrollable list of affordances; in response to receiving the swipe gesture, displaying the scrollable list of affordances, wherein a first affordance of the scrollable list of affordances corresponds with a battery level of the device; receiving a user input, the user input, when received initiates scrolling of the scrollable list of affordances; and in response to receiving the user input, scrolling the list of affordances.

**[0019]** In some embodiments, an electronic device, comprising: a display; one or more processors; one or more input devices; a memory; and one or more programs, wherein the one or more programs are stored in memory and configured to be executed by the one or more processors, the one or more programs including instructions for: displaying a clock face; receiving a swipe gesture on the clock face, the swipe gesture, when received initiates display of a scrollable list of affordances; in response to receiving the swipe gesture, displaying the scrollable list of affordances, wherein a first affordance of the scrollable list of affordances corresponds with a battery level of the device; receiving a user input, the user input, when received initiates scrolling of the scrollable list of affordances; and in response to receiving the user input, scrolling the list of affordances.

**[0020]** In some embodiments, 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 with a display and one or more input devices, cause the device to: display a clock face; receiving a swipe gesture on the clock face, the swipe gesture, when received initiates display of a scrollable list of affordances; in response to receiving the swipe gesture, display the scrollable list of affordances, wherein a first affordance of the scrollable list of affordances corresponds with a battery level of the device; receive a user input, the user input, when received initiates scrolling of the scrollable list of affordances; and in response to receiving the user input, scroll the list of affordances.

**[0021]** In some embodiments, a 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 with a display and one or more input devices, cause the device to: display a clock face; receiving a swipe gesture on the clock face, the swipe gesture, when received initiates display of a scrollable list of affordances; in response to receiving the swipe gesture, display the scrollable list of affordances, wherein a first affordance of the scrollable list of affordances corresponds with a battery level of the device; receive a user input, the user input, when received initiates scrolling of the scrollable list of affordances; and in response to receiving the user input, scroll the list of affordances.

**[0022]** Executable instructions for performing these functions are, optionally, included in a non-transitory computer-readable storage medium or other computer program product configured for execution by one or more processors. Executable instructions for performing these functions are, optionally, included in a transitory computer-readable stor-

age medium or other computer program product configured for execution by one or more processors.

**[0023]** Thus, devices are provided with faster, more efficient methods and interfaces for at least managing user interfaces, thereby increasing the effectiveness, efficiency, and user satisfaction with such devices. Such methods and interfaces may complement or replace other methods for managing user interfaces.

#### DESCRIPTION OF THE FIGURES

**[0024]** For a better understanding of the various described embodiments, reference should be made to the Description of Embodiments below, in conjunction with the following drawings in which like reference numerals refer to corresponding parts throughout the figures.

**[0025]** FIG. 1A is a block diagram illustrating a portable multifunction device with a touch-sensitive display in accordance with some embodiments.

**[0026]** FIG. 1B is a block diagram illustrating exemplary components for event handling in accordance with some embodiments.

**[0027]** FIG. 2 illustrates a portable multifunction device having a touch screen in accordance with some embodiments.

**[0028]** FIG. 3 is a block diagram of an exemplary multifunction device with a display and a touch-sensitive surface in accordance with some embodiments.

**[0029]** FIG. 4A illustrates an exemplary user interface for a menu of applications on a portable multifunction device in accordance with some embodiments.

**[0030]** FIG. 4B illustrates an exemplary user interface for a multifunction device with a touch-sensitive surface that is separate from the display in accordance with some embodiments.

**[0031]** FIG. 5A illustrates a personal electronic device in accordance with some embodiments.

**[0032]** FIG. 5B is a block diagram illustrating a personal electronic device in accordance with some embodiments.

**[0033]** FIGS. 5C-5D illustrate exemplary components of a personal electronic device having a touch-sensitive display and intensity sensors in accordance with some embodiments.

**[0034]** FIGS. 5E-5H illustrate exemplary components and user interfaces of a personal electronic device in accordance with some embodiments.

**[0035]** FIGS. 6A-6L illustrate exemplary user interfaces in accordance with some embodiments.

**[0036]** FIG. 7 is a flow diagram illustrating a method for operating an electronic device in accordance with some embodiments.

**[0037]** FIG. 8 shows an exemplary functional block diagram of an electronic device in accordance with some embodiments.

**[0038]** FIGS. 9A-9F illustrate exemplary user interfaces in accordance with some embodiments.

**[0039]** FIG. 10 is a flow diagram illustrating a method for operating an electronic device in accordance with some embodiments.

**[0040]** FIG. 11 shows an exemplary functional block diagram of an electronic device in accordance with some embodiments.

**[0041]** FIGS. 12A-12C illustrate exemplary user interfaces in accordance with some embodiments.

[0042] FIG. 13 is a flow diagram illustrating a method for operating an electronic device in accordance with some embodiments.

[0043] FIG. 14 shows an exemplary functional block diagram of an electronic device in accordance with some embodiments.

[0044] FIGS. 15A-15D illustrate exemplary user interfaces in accordance with some embodiments.

[0045] FIG. 16 is a flow diagram illustrating a method for operating an electronic device in accordance with some embodiments.

[0046] FIG. 17 shows an exemplary functional block diagram of an electronic device in accordance with some embodiments.

#### DESCRIPTION OF EMBODIMENTS

[0047] The following description sets forth exemplary methods, parameters, and the like. It should be recognized, however, that such description is not intended as a limitation on the scope of the present disclosure but is instead provided as a description of exemplary embodiments.

[0048] There is a need for electronic devices that provide efficient methods and interfaces for displaying predetermined application views. For example, displaying a predetermined application view upon redisplaying the application. Such techniques can reduce the cognitive burden on a user who accesses access applications, thereby enhancing productivity. Further, such techniques can reduce processor and battery power otherwise wasted on redundant user inputs.

[0049] Below, FIGS. 1A-1B, 2, 3, 4A-4B, and 5A-5H provide a description of exemplary devices for performing the techniques for managing user interfaces. FIGS. 6A-6L illustrate exemplary user interfaces for displaying predetermined application views. FIG. 7 is a flow diagram illustrating methods of displaying predetermined application views in accordance with some embodiments. The user interfaces in FIGS. 6A-6L are used to illustrate the processes described below, including the processes in FIG. 7. FIGS. 9A-9F illustrate exemplary user interfaces for managing user interfaces. FIG. 10 is a flow diagram illustrating methods of accessing event notifications in accordance with some embodiments. The user interfaces in FIGS. 9A-9F are used to illustrate the processes described below, including the processes in FIG. 10. FIGS. 12A-12C illustrate exemplary user interfaces for managing user interfaces. FIG. 13 is a flow diagram illustrating methods of accessing event notifications in accordance with some embodiments. The user interfaces in FIGS. 12A-12C are used to illustrate the processes described below, including the processes in FIG. 13. FIGS. 15A-15D illustrate exemplary user interfaces for managing user interfaces. FIG. 16 is a flow diagram illustrating methods of accessing event notifications in accordance with some embodiments. The user interfaces in FIGS. 15A-15D are used to illustrate the processes described below, including the processes in FIG. 16.

[0050] 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 first touch could be termed a second touch, and, similarly, a second touch could be termed a first touch, without departing from the scope of the various described embodiments. The first touch and the second touch are both touches, but they are not the same touch.

[0051] 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.

[0052] 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.

[0053] Embodiments of electronic devices, user interfaces for such devices, and associated processes for using such devices are described. In some embodiments, the device is a portable communications device, such as a mobile telephone, that also contains other functions, such as PDA and/or music player functions. Exemplary embodiments of portable multifunction devices include, without limitation, the iPhone®, iPod Touch®, and iPad® devices from Apple Inc. of Cupertino, Calif. Other portable electronic devices, such as laptops or tablet computers with touch-sensitive surfaces (e.g., touch screen displays and/or touchpads), are, optionally, used. It should also be understood that, in some embodiments, the device is not a portable communications device, but is a desktop computer with a touch-sensitive surface (e.g., a touch screen display and/or a touchpad).

[0054] In the discussion that follows, an electronic device that includes a display and a touch-sensitive surface is described. It should be understood, however, that the electronic device optionally includes one or more other physical user-interface devices, such as a physical keyboard, a mouse, and/or a joystick.

[0055] The device typically supports a variety of applications, 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 work-out support application, a photo management application, a digital camera application, a digital video camera application, a web browsing application, a digital music player application, and/or a digital video player application.

[0056] The various applications that are executed on the device optionally use at least one common physical user-interface device, such as the touch-sensitive surface. One or more functions of the touch-sensitive surface as well as corresponding information displayed on the device are, optionally, adjusted and/or varied from one application to

the next and/or within a respective application. In this way, a common physical architecture (such as the touch-sensitive surface) of the device optionally supports the variety of applications with user interfaces that are intuitive and transparent to the user.

**[0057]** Attention is now directed toward embodiments of portable devices with touch-sensitive displays. FIG. 1A is a block diagram illustrating portable multifunction device **100** with touch-sensitive display system **112** in accordance with some embodiments. Touch-sensitive display **112** is sometimes called a “touch screen” for convenience and is sometimes known as or called a “touch-sensitive display system.” Device **100** includes memory **102** (which optionally includes one or more computer-readable storage mediums), memory controller **122**, one or more processing units (CPUs) **120**, peripherals interface **118**, RF circuitry **108**, audio circuitry **110**, speaker **111**, microphone **113**, input/output (I/O) subsystem **106**, other input control devices **116**, and external port **124**. Device **100** optionally includes one or more optical sensors **164**. Device **100** optionally includes one or more contact intensity sensors **165** for detecting intensity of contacts on device **100** (e.g., a touch-sensitive surface such as touch-sensitive display system **112** of device **100**). Device **100** optionally includes one or more tactile output generators **167** for generating tactile outputs on device **100** (e.g., generating tactile outputs on a touch-sensitive surface such as touch-sensitive display system **112** of device **100** or touchpad **355** of device **300**). These components optionally communicate over one or more communication buses or signal lines **103**.

**[0058]** As used in the specification and claims, the term “intensity” of a contact on a touch-sensitive surface refers to the force or pressure (force per unit area) of a contact (e.g., a finger contact) on the touch-sensitive surface, or to a substitute (proxy) for the force or pressure of a contact on the touch-sensitive surface. The intensity of a contact has a range of values that includes at least four distinct values and more typically includes hundreds of distinct values (e.g., at least 256). Intensity of a contact is, optionally, determined (or measured) using various approaches and various sensors or combinations of sensors. For example, one or more force sensors underneath or adjacent to the touch-sensitive surface are, optionally, used to measure force at various points on the touch-sensitive surface. In some implementations, force measurements from multiple force sensors are combined (e.g., a weighted average) to determine an estimated force of a contact. Similarly, a pressure-sensitive tip of a stylus is, optionally, used to determine a pressure of the stylus on the touch-sensitive surface. Alternatively, the size of the contact area detected on the touch-sensitive surface and/or changes thereto, the capacitance of the touch-sensitive surface proximate to the contact and/or changes thereto, and/or the resistance of the touch-sensitive surface proximate to the contact and/or changes thereto are, optionally, used as a substitute for the force or pressure of the contact on the touch-sensitive surface. In some implementations, the substitute measurements for contact force or pressure are used directly to determine whether an intensity threshold has been exceeded (e.g., the intensity threshold is described in units corresponding to the substitute measurements). In some implementations, the substitute measurements for contact force or pressure are converted to an estimated force or pressure, and the estimated force or pressure is used to determine whether an intensity threshold has been exceeded

(e.g., the intensity threshold is a pressure threshold measured in units of pressure). Using the intensity of a contact as an attribute of a user input allows for user access to additional device functionality that may otherwise not be accessible by the user on a reduced-size device with limited real estate for displaying affordances (e.g., on a touch-sensitive display) and/or receiving user input (e.g., via a touch-sensitive display, a touch-sensitive surface, or a physical/mechanical control such as a knob or a button).

**[0059]** As used in the specification and claims, the term “tactile output” refers to physical displacement of a device relative to a previous position of the device, physical displacement of a component (e.g., a touch-sensitive surface) of a device relative to another component (e.g., housing) of the device, or displacement of the component relative to a center of mass of the device that will be detected by a user with the user’s sense of touch. For example, in situations where the device or the component of the device is in contact with a surface of a user that is sensitive to touch (e.g., a finger, palm, or other part of a user’s hand), the tactile output generated by the physical displacement will be interpreted by the user as a tactile sensation corresponding to a perceived change in physical characteristics of the device or the component of the device. For example, movement of a touch-sensitive surface (e.g., a touch-sensitive display or trackpad) is, optionally, interpreted by the user as a “down click” or “up click” of a physical actuator button. In some cases, a user will feel a tactile sensation such as an “down click” or “up click” even when there is no movement of a physical actuator button associated with the touch-sensitive surface that is physically pressed (e.g., displaced) by the user’s movements. As another example, movement of the touch-sensitive surface is, optionally, interpreted or sensed by the user as “roughness” of the touch-sensitive surface, even when there is no change in smoothness of the touch-sensitive surface. While such interpretations of touch by a user will be subject to the individualized sensory perceptions of the user, there are many sensory perceptions of touch that are common to a large majority of users. Thus, when a tactile output is described as corresponding to a particular sensory perception of a user (e.g., an “up click,” a “down click,” “roughness”), unless otherwise stated, the generated tactile output corresponds to physical displacement of the device or a component thereof that will generate the described sensory perception for a typical (or average) user.

**[0060]** It should be appreciated that device **100** is only one example of a portable multifunction device, and that device **100** optionally has more or fewer components than shown, optionally combines two or more components, or optionally has a different configuration or arrangement of the components. The various components shown in FIG. 1A are implemented in hardware, software, or a combination of both hardware and software, including one or more signal processing and/or application-specific integrated circuits.

**[0061]** Memory **102** optionally includes high-speed random access memory and optionally also includes non-volatile memory, such as one or more magnetic disk storage devices, flash memory devices, or other non-volatile solid-state memory devices. Memory controller **122** optionally controls access to memory **102** by other components of device **100**.

**[0062]** Peripherals interface **118** can be used to couple input and output peripherals of the device to CPU **120** and memory **102**. The one or more processors **120** run or execute

various software programs and/or sets of instructions stored in memory **102** to perform various functions for device **100** and to process data. In some embodiments, peripherals interface **118**, CPU **120**, and memory controller **122** are, optionally, implemented on a single chip, such as chip **104**. In some other embodiments, they are, optionally, implemented on separate chips.

**[0063]** RF (radio frequency) circuitry **108** receives and sends RF signals, also called electromagnetic signals. RF circuitry **108** converts electrical signals to/from electromagnetic signals and communicates with communications networks and other communications devices via the electromagnetic signals. RF circuitry **108** optionally includes well-known circuitry for performing these functions, including but not limited to an antenna system, an RF transceiver, one or more amplifiers, a tuner, one or more oscillators, a digital signal processor, a CODEC chipset, a subscriber identity module (SIM) card, memory, and so forth. RF circuitry **108** optionally communicates with networks, such as the Internet, also referred to as the World Wide Web (WWW), an intranet and/or a wireless network, such as a cellular telephone network, a wireless local area network (LAN) and/or a metropolitan area network (MAN), and other devices by wireless communication. The RF circuitry **108** optionally includes well-known circuitry for detecting near field communication (NFC) fields, such as by a short-range communication radio. The wireless communication optionally uses any of a plurality of communications standards, protocols, and technologies, including but not limited to Global System for Mobile Communications (GSM), Enhanced Data GSM Environment (EDGE), high-speed downlink packet access (HSDPA), high-speed uplink packet access (HSUPA), Evolution, Data-Only (EV-DO), HSPA, HSPA+, Dual-Cell HSPA (DC-HSPDA), long term evolution (LTE), near field communication (NFC), wideband code division multiple access (W-CDMA), code division multiple access (CDMA), time division multiple access (TDMA), Bluetooth, Bluetooth Low Energy (BTLE), Wireless Fidelity (Wi-Fi) (e.g., IEEE 802.11a, IEEE 802.11b, IEEE 802.11g, IEEE 802.11n, and/or IEEE 802.11ac), voice over Internet Protocol (VoIP), Wi-MAX, a protocol for e-mail (e.g., Internet message access protocol (IMAP) and/or post office protocol (POP)), instant messaging (e.g., extensible messaging and presence protocol (XMPP), Session Initiation Protocol for Instant Messaging and Presence Leveraging Extensions (SIMPLE), Instant Messaging and Presence Service (IMPS)), and/or Short Message Service (SMS), or any other suitable communication protocol, including communication protocols not yet developed as of the filing date of this document.

**[0064]** Audio circuitry **110**, speaker **111**, and microphone **113** provide an audio interface between a user and device **100**. Audio circuitry **110** receives audio data from peripherals interface **118**, converts the audio data to an electrical signal, and transmits the electrical signal to speaker **111**. Speaker **111** converts the electrical signal to human-audible sound waves. Audio circuitry **110** also receives electrical signals converted by microphone **113** from sound waves. Audio circuitry **110** converts the electrical signal to audio data and transmits the audio data to peripherals interface **118** for processing. Audio data is, optionally, retrieved from and/or transmitted to memory **102** and/or RF circuitry **108** by peripherals interface **118**. In some embodiments, audio circuitry **110** also includes a headset jack (e.g., **212**, FIG. 2). The headset jack provides an interface between audio cir-

cuitry **110** and removable audio input/output peripherals, such as output-only headphones or a headset with both output (e.g., a headphone for one or both ears) and input (e.g., a microphone).

**[0065]** I/O subsystem **106** couples input/output peripherals on device **100**, such as touch screen **112** and other input control devices **116**, to peripherals interface **118**. I/O subsystem **106** optionally includes display controller **156**, optical sensor controller **158**, intensity sensor controller **159**, haptic feedback controller **161**, and one or more input controllers **160** for other input or control devices. The one or more input controllers **160** receive/send electrical signals from/to other input control devices **116**. The other input control devices **116** optionally include physical buttons (e.g., push buttons, rocker buttons, etc.), dials, slider switches, joysticks, click wheels, and so forth. In some alternate embodiments, input controller(s) **160** are, optionally, coupled to any (or none) of the following: a keyboard, an infrared port, a USB port, and a pointer device such as a mouse. The one or more buttons (e.g., **208**, FIG. 2) optionally include an up/down button for volume control of speaker **111** and/or microphone **113**. The one or more buttons optionally include a push button (e.g., **206**, FIG. 2).

**[0066]** A quick press of the push button optionally disengages a lock of touch screen **112** or optionally begins a process that uses gestures on the touch screen to unlock the device, as described in U.S. patent application Ser. No. 11/322,549, "Unlocking a Device by Performing Gestures on an Unlock Image," filed Dec. 23, 2005, U.S. Pat. No. 7,657,849, which is hereby incorporated by reference in its entirety. A longer press of the push button (e.g., **206**) optionally turns power to device **100** on or off. The functionality of one or more of the buttons are, optionally, user-customizable. Touch screen **112** is used to implement virtual or soft buttons and one or more soft keyboards.

**[0067]** Touch-sensitive display **112** provides an input interface and an output interface between the device and a user. Display controller **156** receives and/or sends electrical signals from/to touch screen **112**. Touch screen **112** displays visual output to the user. The visual output optionally includes graphics, text, icons, video, and any combination thereof (collectively termed "graphics"). In some embodiments, some or all of the visual output optionally corresponds to user-interface objects.

**[0068]** Touch screen **112** has a touch-sensitive surface, sensor, or set of sensors that accepts input from the user based on haptic and/or tactile contact. Touch screen **112** and display controller **156** (along with any associated modules and/or sets of instructions in memory **102**) detect contact (and any movement or breaking of the contact) on touch screen **112** and convert the detected contact into interaction with user-interface objects (e.g., one or more soft keys, icons, web pages, or images) that are displayed on touch screen **112**. In an exemplary embodiment, a point of contact between touch screen **112** and the user corresponds to a finger of the user.

**[0069]** Touch screen **112** optionally uses LCD (liquid crystal display) technology, LPD (light emitting polymer display) technology, or LED (light emitting diode) technology, although other display technologies are used in other embodiments. Touch screen **112** and display controller **156** optionally detect contact and any movement or breaking thereof using any of a plurality of touch sensing technologies now known or later developed, including but not limited

to capacitive, resistive, infrared, and surface acoustic wave technologies, as well as other proximity sensor arrays or other elements for determining one or more points of contact with touch screen 112. In an exemplary embodiment, projected mutual capacitance sensing technology is used, such as that found in the iPhone® and iPod Touch® from Apple Inc. of Cupertino, Calif.

**[0070]** A touch-sensitive display in some embodiments of touch screen 112 is, optionally, analogous to the multi-touch sensitive touchpads described in the following U.S. Pat. No. 6,323,846 (Westerman et al.), U.S. Pat. No. 6,570,557 (Westerman et al.), and/or U.S. Pat. No. 6,677,932 (Westerman), and/or U.S. Patent Publication 2002/0015024A1, each of which is hereby incorporated by reference in its entirety. However, touch screen 112 displays visual output from device 100, whereas touch-sensitive touchpads do not provide visual output.

**[0071]** A touch-sensitive display in some embodiments of touch screen 112 is described in the following applications: (1) U.S. patent application Ser. No. 11/381,313, “Multipoint Touch Surface Controller,” filed May 2, 2006; (2) U.S. patent application Ser. No. 10/840,862, “Multipoint Touchscreen,” filed May 6, 2004; (3) U.S. patent application Ser. No. 10/903,964, “Gestures For Touch Sensitive Input Devices,” filed Jul. 30, 2004; (4) U.S. patent application Ser. No. 11/048,264, “Gestures For Touch Sensitive Input Devices,” filed Jan. 31, 2005; (5) U.S. patent application Ser. No. 11/038,590, “Mode-Based Graphical User Interfaces For Touch Sensitive Input Devices,” filed Jan. 18, 2005; (6) U.S. patent application Ser. No. 11/228,758, “Virtual Input Device Placement On A Touch Screen User Interface,” filed Sep. 16, 2005; (7) U.S. patent application Ser. No. 11/228,700, “Operation Of A Computer With A Touch Screen Interface,” filed Sep. 16, 2005; (8) U.S. patent application Ser. No. 11/228,737, “Activating Virtual Keys Of A Touch-Screen Virtual Keyboard,” filed Sep. 16, 2005; and (9) U.S. patent application Ser. No. 11/367,749, “Multi-Functional Hand-Held Device,” filed Mar. 3, 2006. All of these applications are incorporated by reference herein in their entirety.

**[0072]** Touch screen 112 optionally has a video resolution in excess of 100 dpi. In some embodiments, the touch screen has a video resolution of approximately 160 dpi. The user optionally makes contact with touch screen 112 using any suitable object or appendage, such as a stylus, a finger, and so forth. In some embodiments, the user interface is designed to work primarily with finger-based contacts and gestures, which can be less precise than stylus-based input due to the larger area of contact of a finger on the touch screen. In some embodiments, the device translates the rough finger-based input into a precise pointer/cursor position or command for performing the actions desired by the user.

**[0073]** In some embodiments, in addition to the touch screen, device 100 optionally includes a touchpad (not shown) for activating or deactivating particular functions. In some embodiments, the touchpad is a touch-sensitive area of the device that, unlike the touch screen, does not display visual output. The touchpad is, optionally, a touch-sensitive surface that is separate from touch screen 112 or an extension of the touch-sensitive surface formed by the touch screen.

**[0074]** Device 100 also includes power system 162 for powering the various components. Power system 162 optionally includes a power management system, one or

more power sources (e.g., battery, alternating current (AC)), a recharging system, a power failure detection circuit, a power converter or inverter, a power status indicator (e.g., a light-emitting diode (LED)) and any other components associated with the generation, management and distribution of power in portable devices.

**[0075]** Device 100 optionally also includes one or more optical sensors 164. FIG. 1A shows an optical sensor coupled to optical sensor controller 158 in I/O subsystem 106. Optical sensor 164 optionally includes charge-coupled device (CCD) or complementary metal-oxide semiconductor (CMOS) phototransistors. Optical sensor 164 receives light from the environment, projected through one or more lenses, and converts the light to data representing an image. In conjunction with imaging module 143 (also called a camera module), optical sensor 164 optionally captures still images or video. In some embodiments, an optical sensor is located on the back of device 100, opposite touch screen display 112 on the front of the device so that the touch screen display is enabled for use as a viewfinder for still and/or video image acquisition. In some embodiments, an optical sensor is located on the front of the device so that the user's image is, optionally, obtained for video conferencing while the user views the other video conference participants on the touch screen display. In some embodiments, the position of optical sensor 164 can be changed by the user (e.g., by rotating the lens and the sensor in the device housing) so that a single optical sensor 164 is used along with the touch screen display for both video conferencing and still and/or video image acquisition.

**[0076]** Device 100 optionally also includes one or more contact intensity sensors 165. FIG. 1A shows a contact intensity sensor coupled to intensity sensor controller 159 in I/O subsystem 106. Contact intensity sensor 165 optionally includes one or more piezoresistive strain gauges, capacitive force sensors, electric force sensors, piezoelectric force sensors, optical force sensors, capacitive touch-sensitive surfaces, or other intensity sensors (e.g., sensors used to measure the force (or pressure) of a contact on a touch-sensitive surface). Contact intensity sensor 165 receives contact intensity information (e.g., pressure information or a proxy for pressure information) from the environment. In some embodiments, at least one contact intensity sensor is collocated with, or proximate to, a touch-sensitive surface (e.g., touch-sensitive display system 112). In some embodiments, at least one contact intensity sensor is located on the back of device 100, opposite touch screen display 112, which is located on the front of device 100.

**[0077]** Device 100 optionally also includes one or more proximity sensors 166. FIG. 1A shows proximity sensor 166 coupled to peripherals interface 118. Alternately, proximity sensor 166 is, optionally, coupled to input controller 160 in I/O subsystem 106. Proximity sensor 166 optionally performs as described in U.S. patent application Ser. No. 11/241,839, “Proximity Detector In Handheld Device”; Ser. No. 11/240,788, “Proximity Detector In Handheld Device”; Ser. No. 11/620,702, “Using Ambient Light Sensor To Augment Proximity Sensor Output”; Ser. No. 11/586,862, “Automated Response To And Sensing Of User Activity In Portable Devices”; and Ser. No. 11/638,251, “Methods And Systems For Automatic Configuration Of Peripherals,” which are hereby incorporated by reference in their entirety. In some embodiments, the proximity sensor turns off and

disables touch screen **112** when the multifunction device is placed near the user's ear (e.g., when the user is making a phone call).

**[0078]** Device **100** optionally also includes one or more tactile output generators **167**. FIG. 1A shows a tactile output generator coupled to haptic feedback controller **161** in I/O subsystem **106**. Tactile output generator **167** optionally includes one or more electroacoustic devices such as speakers or other audio components and/or electromechanical devices that convert energy into linear motion such as a motor, solenoid, electroactive polymer, piezoelectric actuator, electrostatic actuator, or other tactile output generating component (e.g., a component that converts electrical signals into tactile outputs on the device). Contact intensity sensor **165** receives tactile feedback generation instructions from haptic feedback module **133** and generates tactile outputs on device **100** that are capable of being sensed by a user of device **100**. In some embodiments, at least one tactile output generator is collocated with, or proximate to, a touch-sensitive surface (e.g., touch-sensitive display system **112**) and, optionally, generates a tactile output by moving the touch-sensitive surface vertically (e.g., in/out of a surface of device **100**) or laterally (e.g., back and forth in the same plane as a surface of device **100**). In some embodiments, at least one tactile output generator sensor is located on the back of device **100**, opposite touch screen display **112**, which is located on the front of device **100**.

**[0079]** Device **100** optionally also includes one or more accelerometers **168**. FIG. 1A shows accelerometer **168** coupled to peripherals interface **118**. Alternately, accelerometer **168** is, optionally, coupled to an input controller **160** in I/O subsystem **106**. Accelerometer **168** optionally performs as described in U.S. Patent Publication No. 20050190059, "Acceleration-based Theft Detection System for Portable Electronic Devices," and U.S. Patent Publication No. 20060017692, "Methods And Apparatuses For Operating A Portable Device Based On An Accelerometer," both of which are incorporated by reference herein in their entirety. In some embodiments, information is displayed on the touch screen display in a portrait view or a landscape view based on an analysis of data received from the one or more accelerometers. Device **100** optionally includes, in addition to accelerometer(s) **168**, a magnetometer (not shown) and a GPS (or GLONASS or other global navigation system) receiver (not shown) for obtaining information concerning the location and orientation (e.g., portrait or landscape) of device **100**.

**[0080]** In some embodiments, the software components stored in memory **102** include operating system **126**, communication module (or set of instructions) **128**, contact/motion module (or set of instructions) **130**, graphics module (or set of instructions) **132**, text input module (or set of instructions) **134**, Global Positioning System (GPS) module (or set of instructions) **135**, and applications (or sets of instructions) **136**. Furthermore, in some embodiments, memory **102** (FIG. 1A) or **370** (FIG. 3) stores device/global internal state **157**, as shown in FIGS. 1A and 3. Device/global internal state **157** includes one or more of: active application state, indicating which applications, if any, are currently active; display state, indicating what applications, views or other information occupy various regions of touch screen display **112**; sensor state, including information obtained from the device's various sensors and input control

devices **116**; and location information concerning the device's location and/or attitude.

**[0081]** Operating system **126** (e.g., Darwin, RTXC, LINUX, UNIX, OS X, iOS, WINDOWS, or an embedded operating system such as VxWorks) includes various software components and/or drivers for controlling and managing general system tasks (e.g., memory management, storage device control, power management, etc.) and facilitates communication between various hardware and software components.

**[0082]** Communication module **128** facilitates communication with other devices over one or more external ports **124** and also includes various software components for handling data received by RF circuitry **108** and/or external port **124**. External port **124** (e.g., Universal Serial Bus (USB), FIREWIRE, etc.) is adapted for coupling directly to other devices or indirectly over a network (e.g., the Internet, wireless LAN, etc.). In some embodiments, the external port is a multi-pin (e.g., 30-pin) connector that is the same as, or similar to and/or compatible with, the 30-pin connector used on iPod® (trademark of Apple Inc.) devices.

**[0083]** Contact/motion module **130** optionally detects contact with touch screen **112** (in conjunction with display controller **156**) and other touch-sensitive devices (e.g., a touchpad or physical click wheel). Contact/motion module **130** includes various software components for performing various operations related to detection of contact, such as determining if contact has occurred (e.g., detecting a finger-down event), determining an intensity of the contact (e.g., the force or pressure of the contact or a substitute for the force or pressure of the contact), determining if there is movement of the contact and tracking the movement across the touch-sensitive surface (e.g., detecting one or more finger-dragging events), and determining if the contact has ceased (e.g., detecting a finger-up event or a break in contact). Contact/motion module **130** receives contact data from the touch-sensitive surface. Determining movement of the point of contact, which is represented by a series of contact data, optionally includes determining speed (magnitude), velocity (magnitude and direction), and/or an acceleration (a change in magnitude and/or direction) of the point of contact. These operations are, optionally, applied to single contacts (e.g., one finger contacts) or to multiple simultaneous contacts (e.g., "multitouch"/multiple finger contacts). In some embodiments, contact/motion module **130** and display controller **156** detect contact on a touchpad.

**[0084]** In some embodiments, contact/motion module **130** uses a set of one or more intensity thresholds to determine whether an operation has been performed by a user (e.g., to determine whether a user has "clicked" on an icon). In some embodiments, at least a subset of the intensity thresholds are determined in accordance with software parameters (e.g., the intensity thresholds are not determined by the activation thresholds of particular physical actuators and can be adjusted without changing the physical hardware of device **100**). For example, a mouse "click" threshold of a trackpad or touch screen display can be set to any of a large range of predefined threshold values without changing the trackpad or touch screen display hardware. Additionally, in some implementations, a user of the device is provided with software settings for adjusting one or more of the set of intensity thresholds (e.g., by adjusting individual intensity thresholds and/or by adjusting a plurality of intensity thresholds at once with a system-level click "intensity" parameter).

[0085] Contact/motion module 130 optionally detects a gesture input by a user. Different gestures on the touch-sensitive surface have different contact patterns (e.g., different motions, timings, and/or intensities of detected contacts). Thus, a gesture is, optionally, detected by detecting a particular contact pattern. For example, detecting a finger tap gesture includes detecting a finger-down event followed by detecting a finger-up (liftoff) event at the same position (or substantially the same position) as the finger-down event (e.g., at the position of an icon). As another example, detecting a finger swipe gesture on the touch-sensitive surface includes detecting a finger-down event followed by detecting one or more finger-dragging events, and subsequently followed by detecting a finger-up (liftoff) event.

[0086] Graphics module 132 includes various known software components for rendering and displaying graphics on touch screen 112 or other display, including components for changing the visual impact (e.g., brightness, transparency, saturation, contrast, or other visual property) of graphics that are displayed. As used herein, the term “graphics” includes any object that can be displayed to a user, including, without limitation, text, web pages, icons (such as user-interface objects including soft keys), digital images, videos, animations, and the like.

[0087] In some embodiments, graphics module 132 stores data representing graphics to be used. Each graphic is, optionally, assigned a corresponding code. Graphics module 132 receives, from applications etc., one or more codes specifying graphics to be displayed along with, if necessary, coordinate data and other graphic property data, and then generates screen image data to output to display controller 156.

[0088] Haptic feedback module 133 includes various software components for generating instructions used by tactile output generator(s) 167 to produce tactile outputs at one or more locations on device 100 in response to user interactions with device 100.

[0089] Text input module 134, which is, optionally, a component of graphics module 132, provides soft keyboards for entering text in various applications (e.g., contacts 137, e-mail 140, IM 141, browser 147, and any other application that needs text input).

[0090] GPS module 135 determines the location of the device and provides this information for use in various applications (e.g., to telephone 138 for use in location-based dialing; to camera 143 as picture/video metadata; and to applications that provide location-based services such as weather widgets, local yellow page widgets, and map/navigation widgets).

[0091] Applications 136 optionally include the following modules (or sets of instructions), or a subset or superset thereof:

- [0092] Contacts module 137 (sometimes called an address book or contact list);
- [0093] Telephone module 138;
- [0094] Video conference module 139;
- [0095] E-mail client module 140;
- [0096] Instant messaging (IM) module 141;
- [0097] Workout support module 142;
- [0098] Camera module 143 for still and/or video images;
- [0099] Image management module 144;
- [0100] Video player module;
- [0101] Music player module;

[0102] Browser module 147;

[0103] Calendar module 148;

[0104] Widget modules 149, which optionally include one or more of: weather widget 149-1, stocks widget 149-2, calculator widget 149-3, alarm clock widget 149-4, dictionary widget 149-5, and other widgets obtained by the user, as well as user-created widgets 149-6;

[0105] Widget creator module 150 for making user-created widgets 149-6;

[0106] Search module 151;

[0107] Video and music player module 152, which merges video player module and music player module;

[0108] Notes module 153;

[0109] Map module 154; and/or

[0110] Online video module 155.

[0111] Examples of other applications 136 that are, optionally, stored in memory 102 include other word processing applications, other image editing applications, drawing applications, presentation applications, JAVA-enabled applications, encryption, digital rights management, voice recognition, and voice replication.

[0112] In conjunction with touch screen 112, display controller 156, contact/motion module 130, graphics module 132, and text input module 134, contacts module 137 are, optionally, used to manage an address book or contact list (e.g., stored in application internal state 192 of contacts module 137 in memory 102 or memory 370), including: adding name(s) to the address book; deleting name(s) from the address book; associating telephone number(s), e-mail address(es), physical address(es) or other information with a name; associating an image with a name; categorizing and sorting names; providing telephone numbers or e-mail addresses to initiate and/or facilitate communications by telephone 138, video conference module 139, e-mail 140, or IM 141; and so forth.

[0113] In conjunction with RF circuitry 108, audio circuitry 110, speaker 111, microphone 113, touch screen 112, display controller 156, contact/motion module 130, graphics module 132, and text input module 134, telephone module 138 are optionally, used to enter a sequence of characters corresponding to a telephone number, access one or more telephone numbers in contacts module 137, modify a telephone number that has been entered, dial a respective telephone number, conduct a conversation, and disconnect or hang up when the conversation is completed. As noted above, the wireless communication optionally uses any of a plurality of communications standards, protocols, and technologies.

[0114] In conjunction with RF circuitry 108, audio circuitry 110, speaker 111, microphone 113, touch screen 112, display controller 156, optical sensor 164, optical sensor controller 158, contact/motion module 130, graphics module 132, text input module 134, contacts module 137, and telephone module 138, video conference module 139 includes executable instructions to initiate, conduct, and terminate a video conference between a user and one or more other participants in accordance with user instructions.

[0115] In conjunction with RF circuitry 108, touch screen 112, display controller 156, contact/motion module 130, graphics module 132, and text input module 134, e-mail client module 140 includes executable instructions to create, send, receive, and manage e-mail in response to user instructions. In conjunction with image management module 144,

e-mail client module 140 makes it very easy to create and send e-mails with still or video images taken with camera module 143.

[0116] In conjunction with RF circuitry 108, touch screen 112, display controller 156, contact/motion module 130, graphics module 132, and text input module 134, the instant messaging module 141 includes executable instructions to enter a sequence of characters corresponding to an instant message, to modify previously entered characters, to transmit a respective instant message (for example, using a Short Message Service (SMS) or Multimedia Message Service (MMS) protocol for telephony-based instant messages or using XMPP, SIMPLE, or IMPS for Internet-based instant messages), to receive instant messages, and to view received instant messages. In some embodiments, transmitted and/or received instant messages optionally include graphics, photos, audio files, video files and/or other attachments as are supported in an MMS and/or an Enhanced Messaging Service (EMS). As used herein, “instant messaging” refers to both telephony-based messages (e.g., messages sent using SMS or MMS) and Internet-based messages (e.g., messages sent using XMPP, SIMPLE, or IMPS).

[0117] In conjunction with RF circuitry 108, touch screen 112, display controller 156, contact/motion module 130, graphics module 132, text input module 134, GPS module 135, map module 154, and music player module, workout support module 142 includes executable instructions to create workouts (e.g., with time, distance, and/or calorie burning goals); communicate with workout sensors (sports devices); receive workout sensor data; calibrate sensors used to monitor a workout; select and play music for a workout; and display, store, and transmit workout data.

[0118] In conjunction with touch screen 112, display controller 156, optical sensor(s) 164, optical sensor controller 158, contact/motion module 130, graphics module 132, and image management module 144, camera module 143 includes executable instructions to capture still images or video (including a video stream) and store them into memory 102, modify characteristics of a still image or video, or delete a still image or video from memory 102.

[0119] In conjunction with touch screen 112, display controller 156, contact/motion module 130, graphics module 132, text input module 134, and camera module 143, image management module 144 includes executable instructions to arrange, modify (e.g., edit), or otherwise manipulate, label, delete, present (e.g., in a digital slide show or album), and store still and/or video images.

[0120] In conjunction with RF circuitry 108, touch screen 112, display controller 156, contact/motion module 130, graphics module 132, and text input module 134, browser module 147 includes executable instructions to browse the Internet in accordance with user instructions, including searching, linking to, receiving, and displaying web pages or portions thereof, as well as attachments and other files linked to web pages.

[0121] In conjunction with RF circuitry 108, touch screen 112, display controller 156, contact/motion module 130, graphics module 132, text input module 134, e-mail client module 140, and browser module 147, calendar module 148 includes executable instructions to create, display, modify, and store calendars and data associated with calendars (e.g., calendar entries, to-do lists, etc.) in accordance with user instructions.

[0122] In conjunction with RF circuitry 108, touch screen 112, display controller 156, contact/motion module 130, graphics module 132, text input module 134, and browser module 147, widget modules 149 are mini-applications that are, optionally, downloaded and used by a user (e.g., weather widget 149-1, stocks widget 149-2, calculator widget 149-3, alarm clock widget 149-4, and dictionary widget 149-5) or created by the user (e.g., user-created widget 149-6). In some embodiments, a widget includes an HTML (Hypertext Markup Language) file, a CSS (Cascading Style Sheets) file, and a JavaScript file. In some embodiments, a widget includes an XML (Extensible Markup Language) file and a JavaScript file (e.g., Yahoo! Widgets).

[0123] In conjunction with RF circuitry 108, touch screen 112, display controller 156, contact/motion module 130, graphics module 132, text input module 134, and browser module 147, the widget creator module 150 are, optionally, used by a user to create widgets (e.g., turning a user-specified portion of a web page into a widget).

[0124] In conjunction with touch screen 112, display controller 156, contact/motion module 130, graphics module 132, and text input module 134, search module 151 includes executable instructions to search for text, music, sound, image, video, and/or other files in memory 102 that match one or more search criteria (e.g., one or more user-specified search terms) in accordance with user instructions.

[0125] In conjunction with touch screen 112, display controller 156, contact/motion module 130, graphics module 132, audio circuitry 110, speaker 111, RF circuitry 108, and browser module 147, video and music player module 152 includes executable instructions that allow the user to download and play back recorded music and other sound files stored in one or more file formats, such as MP3 or AAC files, and executable instructions to display, present, or otherwise play back videos (e.g., on touch screen 112 or on an external, connected display via external port 124). In some embodiments, device 100 optionally includes the functionality of an MP3 player, such as an iPod (trademark of Apple Inc.).

[0126] In conjunction with touch screen 112, display controller 156, contact/motion module 130, graphics module 132, and text input module 134, notes module 153 includes executable instructions to create and manage notes, to-do lists, and the like in accordance with user instructions.

[0127] In conjunction with RF circuitry 108, touch screen 112, display controller 156, contact/motion module 130, graphics module 132, text input module 134, GPS module 135, and browser module 147, map module 154 are, optionally, used to receive, display, modify, and store maps and data associated with maps (e.g., driving directions, data on stores and other points of interest at or near a particular location, and other location-based data) in accordance with user instructions.

[0128] In conjunction with touch screen 112, display controller 156, contact/motion module 130, graphics module 132, audio circuitry 110, speaker 111, RF circuitry 108, text input module 134, e-mail client module 140, and browser module 147, online video module 155 includes instructions that allow the user to access, browse, receive (e.g., by streaming and/or download), play back (e.g., on the touch screen or on an external, connected display via external port 124), send an e-mail with a link to a particular online video, and otherwise manage online videos in one or more file formats, such as H.264. In some embodiments, instant messaging module 141, rather than e-mail client module

140, is used to send a link to a particular online video. Additional description of the online video application can be found in U.S. Provisional Patent Application No. 60/936,562, “Portable Multifunction Device, Method, and Graphical User Interface for Playing Online Videos,” filed Jun. 20, 2007, and U.S. patent application Ser. No. 11/968,067, “Portable Multifunction Device, Method, and Graphical User Interface for Playing Online Videos,” filed Dec. 31, 2007, the contents of which are hereby incorporated by reference in their entirety.

[0129] Each of the above-identified modules and applications corresponds to a set of executable instructions for performing one or more functions described above and the methods described in this application (e.g., the computer-implemented methods and other information processing methods described herein). These modules (e.g., sets of instructions) need not be implemented as separate software programs, procedures, or modules, and thus various subsets of these modules are, optionally, combined or otherwise rearranged in various embodiments. For example, video player module is, optionally, combined with music player module into a single module (e.g., video and music player module 152, FIG. 1A). In some embodiments, memory 102 optionally stores a subset of the modules and data structures identified above. Furthermore, memory 102 optionally stores additional modules and data structures not described above.

[0130] In some embodiments, device 100 is a device where operation of a predefined set of functions on the device is performed exclusively through a touch screen and/or a touchpad. By using a touch screen and/or a touchpad as the primary input control device for operation of device 100, the number of physical input control devices (such as push buttons, dials, and the like) on device 100 is, optionally, reduced.

[0131] The predefined set of functions that are performed exclusively through a touch screen and/or a touchpad optionally include navigation between user interfaces. In some embodiments, the touchpad, when touched by the user, navigates device 100 to a main, home, or root menu from any user interface that is displayed on device 100. In such embodiments, a “menu button” is implemented using a touchpad. In some other embodiments, the menu button is a physical push button or other physical input control device instead of a touchpad.

[0132] FIG. 1B is a block diagram illustrating exemplary components for event handling in accordance with some embodiments. In some embodiments, memory 102 (FIG. 1A) or 370 (FIG. 3) includes event sorter 170 (e.g., in operating system 126) and a respective application 136-1 (e.g., any of the aforementioned applications 137-151, 155, 380-390).

[0133] Event sorter 170 receives event information and determines the application 136-1 and application view 191 of application 136-1 to which to deliver the event information. Event sorter 170 includes event monitor 171 and event dispatcher module 174. In some embodiments, application 136-1 includes application internal state 192, which indicates the current application view(s) displayed on touch-sensitive display 112 when the application is active or executing. In some embodiments, device/global internal state 157 is used by event sorter 170 to determine which application(s) is (are) currently active, and application inter-

nal state 192 is used by event sorter 170 to determine application views 191 to which to deliver event information.

[0134] In some embodiments, application internal state 192 includes additional information, such as one or more of: resume information to be used when application 136-1 resumes execution, user interface state information that indicates information being displayed or that is ready for display by application 136-1, a state queue for enabling the user to go back to a prior state or view of application 136-1, and a redo/undo queue of previous actions taken by the user.

[0135] Event monitor 171 receives event information from peripherals interface 118. Event information includes information about a sub-event (e.g., a user touch on touch-sensitive display 112, as part of a multi-touch gesture). Peripherals interface 118 transmits information it receives from I/O subsystem 106 or a sensor, such as proximity sensor 166, accelerometer(s) 168, and/or microphone 113 (through audio circuitry 110). Information that peripherals interface 118 receives from I/O subsystem 106 includes information from touch-sensitive display 112 or a touch-sensitive surface.

[0136] In some embodiments, event monitor 171 sends requests to the peripherals interface 118 at predetermined intervals. In response, peripherals interface 118 transmits event information. In other embodiments, peripherals interface 118 transmits event information only when there is a significant event (e.g., receiving an input above a predetermined noise threshold and/or for more than a predetermined duration).

[0137] In some embodiments, event sorter 170 also includes a hit view determination module 172 and/or an active event recognizer determination module 173.

[0138] Hit view determination module 172 provides software procedures for determining where a sub-event has taken place within one or more views when touch-sensitive display 112 displays more than one view. Views are made up of controls and other elements that a user can see on the display.

[0139] Another aspect of the user interface associated with an application is a set of views, sometimes herein called application views or user interface windows, in which information is displayed and touch-based gestures occur. The application views (of a respective application) in which a touch is detected optionally correspond to programmatic levels within a programmatic or view hierarchy of the application. For example, the lowest level view in which a touch is detected is, optionally, called the hit view, and the set of events that are recognized as proper inputs are, optionally, determined based, at least in part, on the hit view of the initial touch that begins a touch-based gesture.

[0140] Hit view determination module 172 receives information related to sub-events of a touch-based gesture. When an application has multiple views organized in a hierarchy, hit view determination module 172 identifies a hit view as the lowest view in the hierarchy which should handle the sub-event. In most circumstances, the hit view is the lowest level view in which an initiating sub-event occurs (e.g., the first sub-event in the sequence of sub-events that form an event or potential event). Once the hit view is identified by the hit view determination module 172, the hit view typically receives all sub-events related to the same touch or input source for which it was identified as the hit view.

[0141] Active event recognizer determination module 173 determines which view or views within a view hierarchy

should receive a particular sequence of sub-events. In some embodiments, active event recognizer determination module 173 determines that only the hit view should receive a particular sequence of sub-events. In other embodiments, active event recognizer determination module 173 determines that all views that include the physical location of a sub-event are actively involved views, and therefore determines that all actively involved views should receive a particular sequence of sub-events. In other embodiments, even if touch sub-events were entirely confined to the area associated with one particular view, views higher in the hierarchy would still remain as actively involved views.

[0142] Event dispatcher module 174 dispatches the event information to an event recognizer (e.g., event recognizer 180). In embodiments including active event recognizer determination module 173, event dispatcher module 174 delivers the event information to an event recognizer determined by active event recognizer determination module 173. In some embodiments, event dispatcher module 174 stores in an event queue the event information, which is retrieved by a respective event receiver 182.

[0143] In some embodiments, operating system 126 includes event sorter 170. Alternatively, application 136-1 includes event sorter 170. In yet other embodiments, event sorter 170 is a stand-alone module, or a part of another module stored in memory 102, such as contact/motion module 130.

[0144] In some embodiments, application 136-1 includes a plurality of event handlers 190 and one or more application views 191, each of which includes instructions for handling touch events that occur within a respective view of the application's user interface. Each application view 191 of the application 136-1 includes one or more event recognizers 180. Typically, a respective application view 191 includes a plurality of event recognizers 180. In other embodiments, one or more of event recognizers 180 are part of a separate module, such as a user interface kit (not shown) or a higher level object from which application 136-1 inherits methods and other properties. In some embodiments, a respective event handler 190 includes one or more of: data updater 176, object updater 177, GUI updater 178, and/or event data 179 received from event sorter 170. Event handler 190 optionally utilizes or calls data updater 176, object updater 177, or GUI updater 178 to update the application internal state 192. Alternatively, one or more of the application views 191 include one or more respective event handlers 190. Also, in some embodiments, one or more of data updater 176, object updater 177, and GUI updater 178 are included in a respective application view 191.

[0145] A respective event recognizer 180 receives event information (e.g., event data 179) from event sorter 170 and identifies an event from the event information. Event recognizer 180 includes event receiver 182 and event comparator 184. In some embodiments, event recognizer 180 also includes at least a subset of: metadata 183, and event delivery instructions 188 (which optionally include sub-event delivery instructions).

[0146] Event receiver 182 receives event information from event sorter 170. The event information includes information about a sub-event, for example, a touch or a touch movement. Depending on the sub-event, the event information also includes additional information, such as location of the sub-event. When the sub-event concerns

motion of a touch, the event information optionally also includes speed and direction of the sub-event. In some embodiments, events include rotation of the device from one orientation to another (e.g., from a portrait orientation to a landscape orientation, or vice versa), and the event information includes corresponding information about the current orientation (also called device attitude) of the device.

[0147] Event comparator 184 compares the event information to predefined event or sub-event definitions and, based on the comparison, determines an event or sub-event, or determines or updates the state of an event or sub-event. In some embodiments, event comparator 184 includes event definitions 186. Event definitions 186 contain definitions of events (e.g., predefined sequences of sub-events), for example, event 1 (187-1), event 2 (187-2), and others. In some embodiments, sub-events in an event (187) include, for example, touch begin, touch end, touch movement, touch cancellation, and multiple touching. In one example, the definition for event 1 (187-1) is a double tap on a displayed object. The double tap, for example, comprises a first touch (touch begin) on the displayed object for a predetermined phase, a first liftoff (touch end) for a predetermined phase, a second touch (touch begin) on the displayed object for a predetermined phase, and a second liftoff (touch end) for a predetermined phase. In another example, the definition for event 2 (187-2) is a dragging on a displayed object. The dragging, for example, comprises a touch (or contact) on the displayed object for a predetermined phase, a movement of the touch across touch-sensitive display 112, and liftoff of the touch (touch end). In some embodiments, the event also includes information for one or more associated event handlers 190.

[0148] In some embodiments, event definition 187 includes a definition of an event for a respective user-interface object. In some embodiments, event comparator 184 performs a hit test to determine which user-interface object is associated with a sub-event. For example, in an application view in which three user-interface objects are displayed on touch-sensitive display 112, when a touch is detected on touch-sensitive display 112, event comparator 184 performs a hit test to determine which of the three user-interface objects is associated with the touch (sub-event). If each displayed object is associated with a respective event handler 190, the event comparator uses the result of the hit test to determine which event handler 190 should be activated. For example, event comparator 184 selects an event handler associated with the sub-event and the object triggering the hit test.

[0149] In some embodiments, the definition for a respective event (187) also includes delayed actions that delay delivery of the event information until after it has been determined whether the sequence of sub-events does or does not correspond to the event recognizer's event type.

[0150] When a respective event recognizer 180 determines that the series of sub-events do not match any of the events in event definitions 186, the respective event recognizer 180 enters an event impossible, event failed, or event ended state, after which it disregards subsequent sub-events of the touch-based gesture. In this situation, other event recognizers, if any, that remain active for the hit view continue to track and process sub-events of an ongoing touch-based gesture.

[0151] In some embodiments, a respective event recognizer 180 includes metadata 183 with configurable proper-

ties, flags, and/or lists that indicate how the event delivery system should perform sub-event delivery to actively involved event recognizers. In some embodiments, metadata **183** includes configurable properties, flags, and/or lists that indicate how event recognizers interact, or are enabled to interact, with one another. In some embodiments, metadata **183** includes configurable properties, flags, and/or lists that indicate whether sub-events are delivered to varying levels in the view or programmatic hierarchy.

**[0152]** In some embodiments, a respective event recognizer **180** activates event handler **190** associated with an event when one or more particular sub-events of an event are recognized. In some embodiments, a respective event recognizer **180** delivers event information associated with the event to event handler **190**. Activating an event handler **190** is distinct from sending (and deferred sending) sub-events to a respective hit view. In some embodiments, event recognizer **180** throws a flag associated with the recognized event, and event handler **190** associated with the flag catches the flag and performs a predefined process.

**[0153]** In some embodiments, event delivery instructions **188** include sub-event delivery instructions that deliver event information about a sub-event without activating an event handler. Instead, the sub-event delivery instructions deliver event information to event handlers associated with the series of sub-events or to actively involved views. Event handlers associated with the series of sub-events or with actively involved views receive the event information and perform a predetermined process.

**[0154]** In some embodiments, data updater **176** creates and updates data used in application **136-1**. For example, data updater **176** updates the telephone number used in contacts module **137**, or stores a video file used in video player module. In some embodiments, object updater **177** creates and updates objects used in application **136-1**. For example, object updater **177** creates a new user-interface object or updates the position of a user-interface object. GUI updater **178** updates the GUI. For example, GUI updater **178** prepares display information and sends it to graphics module **132** for display on a touch-sensitive display.

**[0155]** In some embodiments, event handler(s) **190** includes or has access to data updater **176**, object updater **177**, and GUI updater **178**. In some embodiments, data updater **176**, object updater **177**, and GUI updater **178** are included in a single module of a respective application **136-1** or application view **191**. In other embodiments, they are included in two or more software modules.

**[0156]** It shall be understood that the foregoing discussion regarding event handling of user touches on touch-sensitive displays also applies to other forms of user inputs to operate multifunction devices **100** with input devices, not all of which are initiated on touch screens. For example, mouse movement and mouse button presses, optionally coordinated with single or multiple keyboard presses or holds; contact movements such as taps, drags, scrolls, etc. on touchpads; pen stylus inputs; movement of the device; oral instructions; detected eye movements; biometric inputs; and/or any combination thereof are optionally utilized as inputs corresponding to sub-events which define an event to be recognized.

**[0157]** FIG. 2 illustrates a portable multifunction device **100** having a touch screen **112** in accordance with some embodiments. The touch screen optionally displays one or more graphics within user interface (UI) **200**. In this embodiment, as well as others described below, a user is

enabled to select one or more of the graphics by making a gesture on the graphics, for example, with one or more fingers **202** (not drawn to scale in the figure) or one or more styluses **203** (not drawn to scale in the figure). In some embodiments, selection of one or more graphics occurs when the user breaks contact with the one or more graphics. In some embodiments, the gesture optionally includes one or more taps, one or more swipes (from left to right, right to left, upward and/or downward), and/or a rolling of a finger (from right to left, left to right, upward and/or downward) that has made contact with device **100**. In some implementations or circumstances, inadvertent contact with a graphic does not select the graphic. For example, a swipe gesture that sweeps over an application icon optionally does not select the corresponding application when the gesture corresponding to selection is a tap.

**[0158]** Device **100** optionally also include one or more physical buttons, such as “home” or menu button **204**. As described previously, menu button **204** is, optionally, used to navigate to any application **136** in a set of applications that are, optionally, executed on device **100**. Alternatively, in some embodiments, the menu button is implemented as a soft key in a GUI displayed on touch screen **112**.

**[0159]** In some embodiments, device **100** includes touch screen **112**, menu button **204**, push button **206** for powering the device on/off and locking the device, volume adjustment button(s) **208**, subscriber identity module (SIM) card slot **210**, headset jack **212**, and docking/charging external port **124**. Push button **206** is, optionally, used to turn the power on/off on the device by depressing the button and holding the button in the depressed state for a predefined time interval; to lock the device by depressing the button and releasing the button before the predefined time interval has elapsed; and/or to unlock the device or initiate an unlock process. In an alternative embodiment, device **100** also accepts verbal input for activation or deactivation of some functions through microphone **113**. Device **100** also, optionally, includes one or more contact intensity sensors **165** for detecting intensity of contacts on touch screen **112** and/or one or more tactile output generators **167** for generating tactile outputs for a user of device **100**.

**[0160]** FIG. 3 is a block diagram of an exemplary multifunction device with a display and a touch-sensitive surface in accordance with some embodiments. Device **300** need not be portable. In some embodiments, device **300** is a laptop computer, a desktop computer, a tablet computer, a multimedia player device, a navigation device, an educational device (such as a child’s learning toy), a gaming system, or a control device (e.g., a home or industrial controller). Device **300** typically includes one or more processing units (CPUs) **310**, one or more network or other communications interfaces **360**, memory **370**, and one or more communication buses **320** for interconnecting these components. Communication buses **320** optionally include circuitry (sometimes called a chipset) that interconnects and controls communications between system components. Device **300** includes input/output (I/O) interface **330** comprising display **340**, which is typically a touch screen display. I/O interface **330** also optionally includes a keyboard and/or mouse (or other pointing device) **350** and touchpad **355**, tactile output generator **357** for generating tactile outputs on device **300** (e.g., similar to tactile output generator(s) **167** described above with reference to FIG. 1A), sensors **359** (e.g., optical, acceleration, proximity, touch-sensitive, and/or contact

intensity sensors similar to contact intensity sensor(s) 165 described above with reference to FIG. 1A). Memory 370 includes high-speed random access memory, such as DRAM, SRAM, DDR RAM, or other random access solid state memory devices; and optionally includes non-volatile memory, such as one or more magnetic disk storage devices, optical disk storage devices, flash memory devices, or other non-volatile solid state storage devices. Memory 370 optionally includes one or more storage devices remotely located from CPU(s) 310. In some embodiments, memory 370 stores programs, modules, and data structures analogous to the programs, modules, and data structures stored in memory 102 of portable multifunction device 100 (FIG. 1A), or a subset thereof. Furthermore, memory 370 optionally stores additional programs, modules, and data structures not present in memory 102 of portable multifunction device 100. For example, memory 370 of device 300 optionally stores drawing module 380, presentation module 382, word processing module 384, website creation module 386, disk authoring module 388, and/or spreadsheet module 390, while memory 102 of portable multifunction device 100 (FIG. 1A) optionally does not store these modules.

[0161] Each of the above-identified elements in FIG. 3 is, optionally, stored in one or more of the previously mentioned memory devices. Each of the above-identified modules corresponds to a set of instructions for performing a function described above. The above-identified modules or programs (e.g., sets of instructions) need not be implemented as separate software programs, procedures, or modules, and thus various subsets of these modules are, optionally, combined or otherwise rearranged in various embodiments. In some embodiments, memory 370 optionally stores a subset of the modules and data structures identified above. Furthermore, memory 370 optionally stores additional modules and data structures not described above.

[0162] Attention is now directed towards embodiments of user interfaces that are, optionally, implemented on, for example, portable multifunction device 100.

[0163] FIG. 4A illustrates an exemplary user interface for a menu of applications on portable multifunction device 100 in accordance with some embodiments. Similar user interfaces are, optionally, implemented on device 300. In some embodiments, user interface 400 includes the following elements, or a subset or superset thereof:

[0164] Signal strength indicator(s) 402 for wireless communication(s), such as cellular and Wi-Fi signals;

[0165] Time 404;

[0166] Bluetooth indicator 405;

[0167] Battery status indicator 406;

[0168] Tray 408 with icons for frequently used applications, such as:

[0169] Icon 416 for telephone module 138, labeled "Phone," which optionally includes an indicator 414 of the number of missed calls or voicemail messages;

[0170] Icon 418 for e-mail client module 140, labeled "Mail," which optionally includes an indicator 410 of the number of unread e-mails;

[0171] Icon 420 for browser module 147, labeled "Browser;" and

[0172] Icon 422 for video and music player module 152, also referred to as iPod (trademark of Apple Inc.) module 152, labeled "iPod;" and

[0173] Icons for other applications, such as:

[0174] Icon 424 for IM module 141, labeled "Messages;"

[0175] Icon 426 for calendar module 148, labeled "Calendar;"

[0176] Icon 428 for image management module 144, labeled "Photos;"

[0177] Icon 430 for camera module 143, labeled "Camera;"

[0178] Icon 432 for online video module 155, labeled "Online Video;"

[0179] Icon 434 for stocks widget 149-2, labeled "Stocks;"

[0180] Icon 436 for map module 154, labeled "Maps;"

[0181] Icon 438 for weather widget 149-1, labeled "Weather;"

[0182] Icon 440 for alarm clock widget 149-4, labeled "Clock;"

[0183] Icon 442 for workout support module 142, labeled "Workout Support;"

[0184] Icon 444 for notes module 153, labeled "Notes;" and

[0185] Icon 446 for a settings application or module, labeled "Settings," which provides access to settings for device 100 and its various applications 136.

[0186] It should be noted that the icon labels illustrated in FIG. 4A are merely exemplary. For example, icon 422 for video and music player module 152 is labeled "Music" or "Music Player." Other labels are, optionally, used for various application icons. In some embodiments, a label for a respective application icon includes a name of an application corresponding to the respective application icon. In some embodiments, a label for a particular application icon is distinct from a name of an application corresponding to the particular application icon.

[0187] FIG. 4B illustrates an exemplary user interface on a device (e.g., device 300, FIG. 3) with a touch-sensitive surface 451 (e.g., a tablet or touchpad 355, FIG. 3) that is separate from the display 450 (e.g., touch screen display 112). Device 300 also, optionally, includes one or more contact intensity sensors (e.g., one or more of sensors 359) for detecting intensity of contacts on touch-sensitive surface 451 and/or one or more tactile output generators 357 for generating tactile outputs for a user of device 300.

[0188] Although some of the examples that follow will be given with reference to inputs on touch screen display 112 (where the touch-sensitive surface and the display are combined), in some embodiments, the device detects inputs on a touch-sensitive surface that is separate from the display, as shown in FIG. 4B. In some embodiments, the touch-sensitive surface (e.g., 451 in FIG. 4B) has a primary axis (e.g., 452 in FIG. 4B) that corresponds to a primary axis (e.g., 453 in FIG. 4B) on the display (e.g., 450). In accordance with these embodiments, the device detects contacts (e.g., 460 and 462 in FIG. 4B) with the touch-sensitive surface 451 at locations that correspond to respective locations on the display (e.g., in FIG. 4B, 460 corresponds to 468 and 462 corresponds to 470). In this way, user inputs (e.g., contacts 460 and 462, and movements thereof) detected by the device on the touch-sensitive surface (e.g., 451 in FIG. 4B) are used by the device to manipulate the user interface on the display (e.g., 450 in FIG. 4B) of the multifunction device when the touch-sensitive surface is separate from the display. It should

be understood that similar methods are, optionally, used for other user interfaces described herein.

[0189] Additionally, while the following examples are given primarily with reference to finger inputs (e.g., finger contacts, finger tap gestures, finger swipe gestures), it should be understood that, in some embodiments, one or more of the finger inputs are replaced with input from another input device (e.g., a mouse-based input or stylus input). For example, a swipe gesture is, optionally, replaced with a mouse click (e.g., instead of a contact) followed by movement of the cursor along the path of the swipe (e.g., instead of movement of the contact). As another example, a tap gesture is, optionally, replaced with a mouse click while the cursor is located over the location of the tap gesture (e.g., instead of detection of the contact followed by ceasing to detect the contact). Similarly, when multiple user inputs are simultaneously detected, it should be understood that multiple computer mice are, optionally, used simultaneously, or a mouse and finger contacts are, optionally, used simultaneously.

[0190] FIG. 5A illustrates exemplary personal electronic device 500. Device 500 includes body 502. In some embodiments, device 500 can include some or all of the features described with respect to devices 100 and 300 (e.g., FIGS. 1A-4B). In some embodiments, device 500 has touch-sensitive display screen 504, hereafter touch screen 504. Alternatively, or in addition to touch screen 504, device 500 has a display and a touch-sensitive surface. As with devices 100 and 300, in some embodiments, touch screen 504 (or the touch-sensitive surface) optionally includes one or more intensity sensors for detecting intensity of contacts (e.g., touches) being applied. The one or more intensity sensors of touch screen 504 (or the touch-sensitive surface) can provide output data that represents the intensity of touches. The user interface of device 500 can respond to touches based on their intensity, meaning that touches of different intensities can invoke different user interface operations on device 500.

[0191] Exemplary techniques for detecting and processing touch intensity are found, for example, in related applications: International Patent Application Serial No. PCT/US2013/040061, titled “Device, Method, and Graphical User Interface for Displaying User Interface Objects Corresponding to an Application,” filed May 8, 2013, published as WIPO Publication No. WO/2013/169849, and International Patent Application Serial No. PCT/US2013/069483, titled “Device, Method, and Graphical User Interface for Transitioning Between Touch Input to Display Output Relationships,” filed Nov. 11, 2013, published as WIPO Publication No. WO/2014/105276, each of which is hereby incorporated by reference in their entirety.

[0192] In some embodiments, device 500 has one or more input mechanisms 506 and 508. Input mechanisms 506 and 508, if included, can be physical. Examples of physical input mechanisms include push buttons and rotatable mechanisms. In some embodiments, device 500 has one or more attachment mechanisms. Such attachment mechanisms, if included, can permit attachment of device 500 with, for example, hats, eyewear, earrings, necklaces, shirts, jackets, bracelets, watch straps, chains, trousers, belts, shoes, purses, backpacks, and so forth. These attachment mechanisms permit device 500 to be worn by a user.

[0193] FIG. 5B depicts exemplary personal electronic device 500. In some embodiments, device 500 can include some or all of the components described with respect to

FIGS. 1A, 1B, and 3. Device 500 has bus 512 that operatively couples I/O section 514 with one or more computer processors 516 and memory 518. I/O section 514 can be connected to display 504, which can have touch-sensitive component 522 and, optionally, intensity sensor 524 (e.g., contact intensity sensor). In addition, I/O section 514 can be connected with communication unit 530 for receiving application and operating system data, using Wi-Fi, Bluetooth, near field communication (NFC), cellular, and/or other wireless communication techniques. Device 500 can include input mechanisms 506 and/or 508. Input mechanism 506 is, optionally, a rotatable input device or a depressible and rotatable input device, for example. Input mechanism 508 is, optionally, a button, in some examples.

[0194] Input mechanism 508 is, optionally, a microphone, in some examples. Personal electronic device 500 optionally includes various sensors, such as GPS sensor 532, accelerometer 534, directional sensor 540 (e.g., compass), gyroscope 536, motion sensor 538, and/or a combination thereof, all of which can be operatively connected to I/O section 514.

[0195] Memory 518 of personal electronic device 500 can include one or more non-transitory computer-readable storage mediums, for storing computer-executable instructions, which, when executed by one or more computer processors 516, for example, can cause the computer processors to perform the techniques described below, including processes 700, 1000, 1300 and 1600 (FIGS. 7, 10, 13 and 16). A computer-readable storage medium can be any medium 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 examples, the storage medium is a transitory computer-readable storage medium. In some examples, 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. Personal electronic device 500 is not limited to the components and configuration of FIG. 5B, but can include other or additional components in multiple configurations.

[0196] As used here, the term “affordance” refers to a user-interactive graphical user interface object that is, optionally, displayed on the display screen of devices 100, 300, and/or 500 (FIGS. 1A-1B, 3, and 5). For example, an image (e.g., icon), a button, and text (e.g., hyperlink) each optionally constitute an affordance.

[0197] As used herein, the term “focus selector” refers to an input element that indicates a current part of a user interface with which a user is interacting. In some implementations that include a cursor or other location marker, the cursor acts as a “focus selector” so that when an input (e.g., a press input) is detected on a touch-sensitive surface (e.g., touchpad 355 in FIG. 3 or touch-sensitive surface 451 in FIG. 4B) while the cursor is over a particular user interface element (e.g., a button, window, slider, or other user interface element), the particular user interface element is adjusted in accordance with the detected input. In some implementations that include a touch screen display (e.g., touch-sensitive display system 112 in FIG. 1A or touch screen 112 in FIG. 4A) that enables direct interaction with user interface elements on the touch screen display, a

detected contact on the touch screen acts as a “focus selector” so that when an input (e.g., a press input by the contact) is detected on the touch screen display at a location of a particular user interface element (e.g., a button, window, slider, or other user interface element), the particular user interface element is adjusted in accordance with the detected input. In some implementations, focus is moved from one region of a user interface to another region of the user interface without corresponding movement of a cursor or movement of a contact on a touch screen display (e.g., by using a tab key or arrow keys to move focus from one button to another button); in these implementations, the focus selector moves in accordance with movement of focus between different regions of the user interface. Without regard to the specific form taken by the focus selector, the focus selector is generally the user interface element (or contact on a touch screen display) that is controlled by the user so as to communicate the user’s intended interaction with the user interface (e.g., by indicating, to the device, the element of the user interface with which the user is intending to interact). For example, the location of a focus selector (e.g., a cursor, a contact, or a selection box) over a respective button while a press input is detected on the touch-sensitive surface (e.g., a touchpad or touch screen) will indicate that the user is intending to activate the respective button (as opposed to other user interface elements shown on a display of the device).

[0198] As used in the specification and claims, the term “characteristic intensity” of a contact refers to a characteristic of the contact based on one or more intensities of the contact. In some embodiments, the characteristic intensity is based on multiple intensity samples. The characteristic intensity is, optionally, based on a predefined number of intensity samples, or a set of intensity samples collected during a predetermined time period (e.g., 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10 seconds) relative to a predefined event (e.g., after detecting the contact, prior to detecting liftoff of the contact, before or after detecting a start of movement of the contact, prior to detecting an end of the contact, before or after detecting an increase in intensity of the contact, and/or before or after detecting a decrease in intensity of the contact). A characteristic intensity of a contact is, optionally, based on one or more of: a maximum value of the intensities of the contact, a mean value of the intensities of the contact, an average value of the intensities of the contact, a top 10 percentile value of the intensities of the contact, a value at the half maximum of the intensities of the contact, a value at the 90 percent maximum of the intensities of the contact, or the like. In some embodiments, the duration of the contact is used in determining the characteristic intensity (e.g., when the characteristic intensity is an average of the intensity of the contact over time). In some embodiments, the characteristic intensity is compared to a set of one or more intensity thresholds to determine whether an operation has been performed by a user. For example, the set of one or more intensity thresholds optionally includes a first intensity threshold and a second intensity threshold. In this example, a contact with a characteristic intensity that does not exceed the first threshold results in a first operation, a contact with a characteristic intensity that exceeds the first intensity threshold and does not exceed the second intensity threshold results in a second operation, and a contact with a characteristic intensity that exceeds the second threshold results in a third operation. In some embodiments, a comparison

between the characteristic intensity and one or more thresholds is used to determine whether or not to perform one or more operations (e.g., whether to perform a respective operation or forgo performing the respective operation), rather than being used to determine whether to perform a first operation or a second operation.

[0199] FIG. 5C illustrates detecting a plurality of contacts 552A-552E on touch-sensitive display screen 504 with a plurality of intensity sensors 524A-524D. FIG. 5C additionally includes intensity diagrams that show the current intensity measurements of the intensity sensors 524A-524D relative to units of intensity. In this example, the intensity measurements of intensity sensors 524A and 524D are each 9 units of intensity, and the intensity measurements of intensity sensors 524B and 524C are each 7 units of intensity. In some implementations, an aggregate intensity is the sum of the intensity measurements of the plurality of intensity sensors 524A-524D, which in this example is 32 intensity units. In some embodiments, each contact is assigned a respective intensity that is a portion of the aggregate intensity. FIG. 5D illustrates assigning the aggregate intensity to contacts 552A-552E based on their distance from the center of force 554. In this example, each of contacts 552A, 552B, and 552E are assigned an intensity of contact of 8 intensity units of the aggregate intensity, and each of contacts 552C and 552D are assigned an intensity of contact of 4 intensity units of the aggregate intensity. More generally, in some implementations, each contact  $j$  is assigned a respective intensity  $I_j$  that is a portion of the aggregate intensity,  $A$ , in accordance with a predefined mathematical function,  $I_j = A \cdot (D_j / \sum D_i)$ , where  $D_j$  is the distance of the respective contact  $j$  to the center of force, and  $\sum D_i$  is the sum of the distances of all the respective contacts (e.g.,  $i=1$  to last) to the center of force. The operations described with reference to FIGS. 5C-5D can be performed using an electronic device similar or identical to device 100, 300, or 500. In some embodiments, a characteristic intensity of a contact is based on one or more intensities of the contact. In some embodiments, the intensity sensors are used to determine a single characteristic intensity (e.g., a single characteristic intensity of a single contact). It should be noted that the intensity diagrams are not part of a displayed user interface, but are included in FIGS. 5C-5D to aid the reader.

[0200] In some embodiments, a portion of a gesture is identified for purposes of determining a characteristic intensity. For example, a touch-sensitive surface optionally receives a continuous swipe contact transitioning from a start location and reaching an end location, at which point the intensity of the contact increases. In this example, the characteristic intensity of the contact at the end location is, optionally, based on only a portion of the continuous swipe contact, and not the entire swipe contact (e.g., only the portion of the swipe contact at the end location). In some embodiments, a smoothing algorithm is, optionally, applied to the intensities of the swipe contact prior to determining the characteristic intensity of the contact. For example, the smoothing algorithm optionally includes one or more of: an unweighted sliding-average smoothing algorithm, a triangular smoothing algorithm, a median filter smoothing algorithm, and/or an exponential smoothing algorithm. In some circumstances, these smoothing algorithms eliminate narrow spikes or dips in the intensities of the swipe contact for purposes of determining a characteristic intensity.

[0201] The intensity of a contact on the touch-sensitive surface is, optionally, characterized relative to one or more intensity thresholds, such as a contact-detection intensity threshold, a light press intensity threshold, a deep press intensity threshold, and/or one or more other intensity thresholds. In some embodiments, the light press intensity threshold corresponds to an intensity at which the device will perform operations typically associated with clicking a button of a physical mouse or a trackpad. In some embodiments, the deep press intensity threshold corresponds to an intensity at which the device will perform operations that are different from operations typically associated with clicking a button of a physical mouse or a trackpad. In some embodiments, when a contact is detected with a characteristic intensity below the light press intensity threshold (e.g., and above a nominal contact-detection intensity threshold below which the contact is no longer detected), the device will move a focus selector in accordance with movement of the contact on the touch-sensitive surface without performing an operation associated with the light press intensity threshold or the deep press intensity threshold. Generally, unless otherwise stated, these intensity thresholds are consistent between different sets of user interface figures.

[0202] An increase of characteristic intensity of the contact from an intensity below the light press intensity threshold to an intensity between the light press intensity threshold and the deep press intensity threshold is sometimes referred to as a “light press” input. An increase of characteristic intensity of the contact from an intensity below the deep press intensity threshold to an intensity above the deep press intensity threshold is sometimes referred to as a “deep press” input. An increase of characteristic intensity of the contact from an intensity below the contact-detection intensity threshold to an intensity between the contact-detection intensity threshold and the light press intensity threshold is sometimes referred to as detecting the contact on the touch-surface. A decrease of characteristic intensity of the contact from an intensity above the contact-detection intensity threshold to an intensity below the contact-detection intensity threshold is sometimes referred to as detecting liftoff of the contact from the touch-surface. In some embodiments, the contact-detection intensity threshold is zero. In some embodiments, the contact-detection intensity threshold is greater than zero.

[0203] In some embodiments described herein, one or more operations are performed in response to detecting a gesture that includes a respective press input or in response to detecting the respective press input performed with a respective contact (or a plurality of contacts), where the respective press input is detected based at least in part on detecting an increase in intensity of the contact (or plurality of contacts) above a press-input intensity threshold. In some embodiments, the respective operation is performed in response to detecting the increase in intensity of the respective contact above the press-input intensity threshold (e.g., a “down stroke” of the respective press input). In some embodiments, the press input includes an increase in intensity of the respective contact above the press-input intensity threshold and a subsequent decrease in intensity of the contact below the press-input intensity threshold, and the respective operation is performed in response to detecting the subsequent decrease in intensity of the respective contact below the press-input threshold (e.g., an “up stroke” of the respective press input).

[0204] FIGS. 5E-5H illustrate detection of a gesture that includes a press input that corresponds to an increase in intensity of a contact 562 from an intensity below a light press intensity threshold (e.g., “IT<sub>L</sub>”) in FIG. 5E, to an intensity above a deep press intensity threshold (e.g., “IT<sub>D</sub>”) in FIG. 5H. The gesture performed with contact 562 is detected on touch-sensitive surface 560 while cursor 576 is displayed over application icon 572B corresponding to App 2, on a displayed user interface 570 that includes application icons 572A-572D displayed in predefined region 574. In some embodiments, the gesture is detected on touch-sensitive display 504. The intensity sensors detect the intensity of contacts on touch-sensitive surface 560. The device determines that the intensity of contact 562 peaked above the deep press intensity threshold (e.g., “IT<sub>D</sub>”). Contact 562 is maintained on touch-sensitive surface 560. In response to the detection of the gesture, and in accordance with contact 562 having an intensity that goes above the deep press intensity threshold (e.g., “IT<sub>D</sub>”) during the gesture, reduced-scale representations 578A-578C (e.g., thumbnails) of recently opened documents for App 2 are displayed, as shown in FIGS. 5F-5H. In some embodiments, the intensity, which is compared to the one or more intensity thresholds, is the characteristic intensity of a contact. It should be noted that the intensity diagram for contact 562 is not part of a displayed user interface, but is included in FIGS. 5E-5H to aid the reader.

[0205] In some embodiments, the display of representations 578A-578C includes an animation. For example, representation 578A is initially displayed in proximity of application icon 572B, as shown in FIG. 5F. As the animation proceeds, representation 578A moves upward and representation 578B is displayed in proximity of application icon 572B, as shown in FIG. 5G. Then, representations 578A moves upward, 578B moves upward toward representation 578A, and representation 578C is displayed in proximity of application icon 572B, as shown in FIG. 5H. Representations 578A-578C form an array above icon 572B. In some embodiments, the animation progresses in accordance with an intensity of contact 562, as shown in FIGS. 5F-5G, where the representations 578A-578C appear and move upwards as the intensity of contact 562 increases toward the deep press intensity threshold (e.g., “IT<sub>D</sub>”). In some embodiments, the intensity, on which the progress of the animation is based, is the characteristic intensity of the contact. The operations described with reference to FIGS. 5E-5H can be performed using an electronic device similar or identical to device 100, 300, or 500.

[0206] In some embodiments, the device employs intensity hysteresis to avoid accidental inputs sometimes termed “jitter,” where the device defines or selects a hysteresis intensity threshold with a predefined relationship to the press-input intensity threshold (e.g., the hysteresis intensity threshold is X intensity units lower than the press-input intensity threshold or the hysteresis intensity threshold is 75%, 90%, or some reasonable proportion of the press-input intensity threshold). Thus, in some embodiments, the press input includes an increase in intensity of the respective contact above the press-input intensity threshold and a subsequent decrease in intensity of the contact below the hysteresis intensity threshold that corresponds to the press-input intensity threshold, and the respective operation is performed in response to detecting the subsequent decrease in intensity of the respective contact below the hysteresis

intensity threshold (e.g., an “up stroke” of the respective press input). Similarly, in some embodiments, the press input is detected only when the device detects an increase in intensity of the contact from an intensity at or below the hysteresis intensity threshold to an intensity at or above the press-input intensity threshold and, optionally, a subsequent decrease in intensity of the contact to an intensity at or below the hysteresis intensity, and the respective operation is performed in response to detecting the press input (e.g., the increase in intensity of the contact or the decrease in intensity of the contact, depending on the circumstances).

[0207] For ease of explanation, the descriptions of operations performed in response to a press input associated with a press-input intensity threshold or in response to a gesture including the press input are, optionally, triggered in response to detecting either: an increase in intensity of a contact above the press-input intensity threshold, an increase in intensity of a contact from an intensity below the hysteresis intensity threshold to an intensity above the press-input intensity threshold, a decrease in intensity of the contact below the press-input intensity threshold, and/or a decrease in intensity of the contact below the hysteresis intensity threshold corresponding to the press-input intensity threshold. Additionally, in examples where an operation is described as being performed in response to detecting a decrease in intensity of a contact below the press-input intensity threshold, the operation is, optionally, performed in response to detecting a decrease in intensity of the contact below a hysteresis intensity threshold corresponding to, and lower than, the press-input intensity threshold.

[0208] As used herein, an “installed application” refers to a software application that has been downloaded onto an electronic device (e.g., devices 100, 300, and/or 500) and is ready to be launched (e.g., become opened) on the device. In some embodiments, a downloaded application becomes an installed application by way of an installation program that extracts program portions from a downloaded package and integrates the extracted portions with the operating system of the computer system.

[0209] As used herein, the terms “open application” or “executing application” refer to a software application with retained state information (e.g., as part of device/global internal state 157 and/or application internal state 192). An open or executing application is, optionally, any one of the following types of applications:

[0210] an active application, which is currently displayed on a display screen of the device that the application is being used on;

[0211] a background application (or background processes), which is not currently displayed, but one or more processes for the application are being processed by one or more processors; and

[0212] a suspended or hibernated application, which is not running, but has state information that is stored in memory (volatile and non-volatile, respectively) and that can be used to resume execution of the application.

[0213] As used herein, the term “closed application” refers to software applications without retained state information (e.g., state information for closed applications is not stored in a memory of the device). Accordingly, closing an application includes stopping and/or removing application processes for the application and removing state information for the application from the memory of the device. Generally, opening a second application while in a first application does

not close the first application. When the second application is displayed and the first application ceases to be displayed, the first application becomes a background application.

[0214] Attention is now directed towards embodiments of user interfaces (“UI”) and associated processes that are implemented on an electronic device, such as portable multifunction device 100, device 300, device 500, or device 600.

[0215] FIGS. 6A-6G illustrate exemplary user interfaces in a hierarchy of user interfaces in an application, in accordance with some embodiments. The user interfaces in these figures are used to illustrate the processes described below, including the processes in FIG. 7.

[0216] FIG. 6A illustrates device 600 with touch sensitive display 602. User interface 620A of a weather application is displayed on touch-sensitive display 602. Device 600 includes various input mechanisms that receives user input, such as, rotatable input mechanism 610, that is able to receive a rotatable input (and may also receive a push input), and input mechanism 612 that is able to receive a push user input. In some embodiments, device 600 includes some or all of the features of device 100, device 300, or device 500.

[0217] FIGS. 6A-6C illustrates a hierarchy of user interfaces of a weather application. For example, FIG. 6A illustrates user interface 620A that is a first view (also referred to as a top level, a first level, or a root level) in the hierarchy of user interfaces of the weather application. FIG. 6B illustrates user interface 620B that is a second view in the hierarchy of user interfaces of the weather application. FIG. 6C illustrates user interface 620C that is a third view in the hierarchy of user interfaces of the weather application.

[0218] User interface 620A includes a list of scrollable items 630, wherein each item corresponds to a city. For example, item 631 corresponds to Santa Cruz weather, item 632 corresponds to Seattle weather, item 633 corresponds to Portland weather, item 634 corresponds to Denver weather, and item 635 corresponds to Cupertino weather. It is noted that items 630 includes additional items corresponding to other cities that are not currently displayed but can be displayed in response to a scrolling input (e.g., rotation of rotational mechanism 610) of the list of scrollable items 630. In some embodiments, items in the list of scrollable items 630 are an affordance, that when selected, device 600 displays user interface 620B. For example, as shown in FIGS. 6A-6B, device 600 displays user interface 620B, in response to input 640 (e.g., tap gesture) at item 632, that corresponds to Seattle weather.

[0219] As shown in FIG. 6B, user interface 620B includes the current temperature of a respective city (e.g., Seattle) and the weather associated with different hours of the day (e.g., sunny and partly cloudy at noon and 3 PM). In some embodiments, user interface 620B can include the percentage chance of precipitation, and predicted temperature for each hour of the day. Additionally, as shown in FIG. 6B, user interface 620B includes affordance 650 (e.g., a back button) for returning to user interface 620A. In some embodiments, as shown in FIGS. 6B-6C, device 600 displays user interface 620C in response to user input 641 (e.g., tap gesture) on user interface 620B.

[0220] FIG. 6C shows, user interface 620C that includes the 10-day forecast for the respective city, affordance 650 (e.g., a back button) for returning to user interface 620B, and a scroll bar 651. In some embodiments, device 600 scrolls

through the 10-day weather forecast displayed in user interface 620C in response to rotation of rotational mechanism 610.

[0221] As will be described in further detail below, in some embodiments, when a user returns to an application (that was previously opened), such as a weather application, the initially displayed view or user interface (upon returning to the application) in the available set of user interfaces (e.g., a hierarchy of user interfaces for the application) is dependent on a predetermined criteria.

[0222] In some embodiments, prior to displaying an application, a user input is received, the user input, when received initiates display of the application. For example, a user selects an affordance (not shown) that launches an application, such as a weather application. In response to receiving the user input, device 600 displays the application. For example, referring to FIG. 6A, device 600 displays user interface 620A of the weather application.

[0223] In some embodiments, device 600 determines whether a predetermined criteria is met. In some embodiments, the predetermined criteria can be, but is not limited to, a predetermined time having elapsed (e.g., 5 minutes has elapsed), whether an audio application is playing audio content, whether a time is currently running, at a last time the application was displayed, or a predetermined user interface of the application was displayed.

[0224] In some embodiments, in accordance with a determination that the predetermined criteria are met, device 600 displays a predetermined first view of the application. In some embodiments, the predetermined first view is a top user interface level of the user interface hierarchy.

[0225] Referring to FIGS. 6A-6C, in some embodiments, device 600 displays the weather application and subsequently, while displaying user interface 620C, ceases to display the weather application at time,  $T_1$ . In response to a subsequent user request, device 600 redisplay the weather application at time,  $T_2$ . Device 600 determines that the predetermined criteria is met (e.g., 5 minutes has elapsed) because the weather application was redisplayed more than 5 minutes after it was previously ceased to be displayed (e.g.,  $T_2 - T_1 > 5$  minutes). Accordingly, upon returning to the weather application, device 600 initially displays to the user a predetermined first view, such as user interface 620A, rather than the user interface 620C, which was displayed at time  $T_1$ .

[0226] In some embodiments, in accordance with a determination that the predetermined criteria is not met, a second view of the application that is different than the predetermined first view of the application is displayed. In some embodiments, the second view of the application is a most recently viewed screen in the application.

[0227] As shown in FIGS. 6A-6C, in some embodiments, device 600 displays the weather application and subsequently ceases to display the weather application at time,  $T_1$ . For example, the last displayed view is user interface 620C, at time,  $T_1$ . Device 600 redisplay the weather application at time,  $T_2$ . Device 600 determines that the predetermined criteria is not met (e.g., 5 minutes has not elapsed) because the weather application was redisplayed, at time,  $T_2$ , less than 5 minutes after it was previously ceased to be displayed, at time,  $T_1$  (e.g.,  $T_2 - T_1 < 5$  minutes). Accordingly, upon redisplaying weather application, device 600 initially displays the most recently displayed view (e.g., user interface 620C), wherein the user interface 620C is a different

user interface than user interface 620A. In another example, if the most recently displayed view of the weather application was user interface 620B (at time  $T_1$ ), then upon returning to the weather application (at time  $T_2$ , wherein  $T_2 - T_1 < 5$  minutes) device 600 initially displays the most recently displayed view user interface 620B.

[0228] In some embodiments, the application is a calendar application, and the last viewed screen prior to ceasing display of the calendar application is a user interface including a day view. Upon returning to the calendar application, device 600 initially displays to the user a top level user interface that includes a month view based on the predetermined criteria being met (e.g., the calendar application was redisplayed more than 5 minutes after it was previously ceased to be displayed). In some embodiments, upon returning to the calendar application, device 600 initially displays to the user the most recently viewed day view screen based on the predetermined criteria not being met (e.g., the calendar application was redisplayed less than 5 minutes after it was previously ceased to be displayed).

[0229] FIGS. 6D-6F illustrates a hierarchy of user interfaces of a stocks application. For example, FIG. 6D includes user interface 621A that is a first view in the hierarchy of user interfaces of the stocks application. FIG. 6E includes user interface 621B that is a second view in the hierarchy of user interfaces of the stocks application. FIG. 6F includes user interface 621C that is a third view in the hierarchy of user interfaces of the stocks application.

[0230] User interface 621A, in some embodiments, includes a list of scrollable items 630, wherein each item corresponds to an individual stock, as shown in FIG. 6D. For example, item 631 corresponds to a first stock (e.g., listed as FRSD), item 632 corresponds to a second stock (e.g., listed as AAPL), item 633 corresponds to a third stock (e.g., listed as CBBR), item 634 corresponds to fourth stock (e.g., listed as XYZ), and item 635 corresponds to fifth stock (e.g., listed as AATY). It is noted that items 630 includes additional items corresponding to other stocks that are not currently displayed but can be displayed in response to a scrolling input (e.g., rotation of rotational mechanism 610) of the list of scrollable items 630. Additionally, each item includes textual description of the respective stock (e.g., stock listing, current price and percentage change). In some embodiments, items in list of scrollable items 630 are an affordance, that when selected, device 600 displays user interface 621B. For example, device 600 displays user interface 621B in response to input 642 (e.g., tap gesture) at item 633, that corresponds to the CBBR stock.

[0231] In some embodiments, user interface 621B includes general information of the respective stock. For example, user interface 621B includes, but is not limited to, a graph of the stock price, the change in price, percentage of the change of price, high price for the day, and low price for the day. Additionally, in some embodiments, user interface 621B includes affordance 650 (e.g., a back button) for returning to user interface 621A. As shown in FIGS. 6E-6F, device 600 displays user interface 621C in response to user input 643 (e.g., tap gesture) on user interface 621B.

[0232] User interface 621C, in some embodiments, includes additional detailed information of the respective stock. The additional detailed information can include, but is not limited to, opening price, current high price of the day, current low price of the day, and price to earnings ratio. Moreover, the additional detailed information can be viewed

based on different time periods such as one day, one week, one month, and six months, as shown in FIG. 6F. In some embodiments, device 600 scrolls through the additional detailed information displayed in user interface 620C in response to rotation of rotational mechanism 610.

[0233] In some embodiments, the predetermined criteria, for the stocks application, is at a last time the application was displayed, a predetermined user interface of the application was displayed. That is, the most recently viewed user interface of the stocks application (prior to ceasing display of the application) is used to determine which user interface is initially displayed when redisplaying the stocks application.

[0234] In some embodiments, in accordance with a determination that the most recent screen visited in the stock application corresponds to a second user interface level below a first user interface level in the user interface hierarchy, the predetermined view corresponding to the first user interface level is displayed, wherein the first user interface level displays a listing of a plurality of stocks and the second user interface level displays details of a first selected stock without displaying details of any other stocks of the list of stocks. For example, if user interface 621B is the most recently displayed user interface (prior to ceasing display of the application), then upon redisplaying the stocks application device 600 initially displays user interface 621A, as shown in FIG. 6D.

[0235] Additionally, in some embodiments, in accordance with a determination that the most recent screen visited in the stock application corresponds to a third user interface level below the second user interface level in the user interface hierarchy, displaying the predetermined view corresponding to the second user interface level, wherein the third user interface level displays additional details of the first selected stock. For example, if user interface 621C is the most recently displayed user interface (prior to ceasing display of the application), then upon redisplaying the stocks application device 600 initially displays user interface 621B.

[0236] FIGS. 6G-6I illustrates user interfaces of a timer application. As shown in FIG. 6G, user interface 622A includes a scrollable list of predefined timers 660 (e.g., 30 min timer, 1 hour timer, 3 hour timer and 5 hour timer). In some embodiments, the scrollable list of predefined timers 660 includes additional predefined timers that are not currently displayed but can be displayed in response to a scrolling input (e.g., rotation of rotational mechanism 610). In some embodiments, the predefined timers are an affordance, that when selected, device 600 displays a corresponding predefined timer interface. For example, device 600 displays a timer interface for the 30 minute timer in response to user input on the 30 minute timer affordance. In some embodiments, device 600 initiates starting the predefined timer in response to selection of the corresponding affordance on user interface 622A.

[0237] As shown in FIG. 6G, user interface 622A includes affordance 652 corresponding to a custom timer. For example, in response to user input, at affordance 652, device 600 displays user interface 622B that corresponds to a custom timer.

[0238] As shown in FIG. 6H, user interface 622B includes a custom timer. In some embodiments, the duration of the timer can be adjusted via rotation of rotational mechanism 610. As depicted in FIG. 6H, the custom timer is set to 20 minutes, for example, by rotation of rotational mechanism

610. In some embodiments, device 600 starts the custom timer in response to user input at the start button. In some embodiments, device 600 cancels running of the custom timer in response to user input at the cancel button.

[0239] As shown in FIG. 6I, user interface 622C includes a running timer. In some embodiments, device 600 cancels the running timer in response to user input at the cancel button. In some embodiments, device 600 pauses the running of the timer in response to user input at the pause button.

[0240] In some embodiments, the predetermined criteria, for the timer application, is the existence of a running timer.

[0241] In some embodiments, in accordance with a determination that the predetermined criteria is met for the timer application, a first predetermined view of the timer application is displayed. For example, if a timer is currently running, then upon returning to the timer application, device 600 initially displays a user interface that includes the running timer (e.g., user interface 622C), as shown in FIG. 6I.

[0242] In some embodiments, in accordance with a determination that the predetermined criteria is not met for the timer application, a second view of the timer application is displayed that is different than the predetermined first view of the timer application. For example, if a timer is not currently running, then upon returning to the timer application, device 600 initially displays user interface 622A, as shown in FIG. 6G.

[0243] FIGS. 6J-6L illustrates a hierarchy of user interfaces of an audio application. As shown in FIG. 6J, user interface 623A includes a list of affordances 661 (e.g., now playing affordance, my music affordance and my play list affordance).

[0244] In some embodiments, device 600 displays user interface 623B in response to selection of affordance 662. As shown in FIG. 6K, user interface 623B, that corresponds to audio content that is currently playing, includes audio play back controls (e.g., play, fast forward, rewind), volume control (e.g., increase/decrease volume), song description (e.g., song/album title), and playback time.

[0245] In some embodiments, device 600 displays user interface 623C in response to selection of affordance 663. As shown in FIG. 6L, user interface 623B includes a scrollable list of items (e.g., classical music, music videos, my top rated, and recently added) that corresponds to playlists of music.

[0246] In some embodiments, the predetermined criteria, for the audio application, is currently playing audio content (e.g., currently playing song).

[0247] In some embodiments, in accordance with a determination that the predetermined criteria is met for the audio content application, a first predetermined view of the audio application is displayed. For example, if audio content is currently playing, then upon returning to the audio application, device 600 initially displays user interface 623B, as shown in FIG. 6K.

[0248] In some embodiments, in accordance with a determination that the predetermined criteria is not met for the timer application, a second view of the audio application is displayed that is different than the predetermined first view of the audio application. For example, upon returning to the audio application and audio content is not currently playing, device 600 displays a second view (e.g., user interface 623C,

as shown in FIG. 6L, or user interface 623A, as shown in FIG. 6J), which will be described in further detail below.

[0249] In some embodiments, in accordance with a determination that a predetermined timeout has not expired (e.g., 5 minutes has not expired), a most recently viewed screen of the audio application is displayed. For example, if user interface 623C is the most recently displayed user interface (prior to ceasing display of the audio application, at time,  $T_1$ ), then upon redisplaying the audio application, at time  $T_2$  (wherein  $T_2 - T_1 < 5$  minutes) device 600 initially displays user interface 623C, as shown in FIG. 6L.

[0250] Alternatively, in some embodiments, in accordance with a determination that a predetermined timeout has expired (e.g., 5 minutes has expired), a top level view of the audio content application is displayed. For example, audio application ceases to be displayed at time  $T_1$ , and is subsequently redisplayed at time  $T_2$ . Upon redisplaying the application at time  $T_2$  (wherein  $T_2 - T_1 > 5$  minutes) device 600 displays user interface 623A, as shown in FIG. 6J.

[0251] FIG. 7 is a flow diagram illustrating a method for displaying a predetermined view of an application using an electronic device in accordance with some embodiments. Method 700 is performed at a device (e.g., 100, 300, 500, and 600) with a display. Some operations in method 700 are, optionally, combined, the order of some operations is, optionally, changed, and some operations are, optionally, omitted.

[0252] As described below, method 700 provides an intuitive way for displaying a predetermined view of an application. The method reduces the cognitive burden on a user for interacting with an application upon redisplay of the application, thereby creating a more efficient human-machine interface. For battery-operated computing devices, enabling a user to interact with an application upon redisplay of the application faster and more efficiently conserves power and increases the time between battery charges.

[0253] In some embodiments, prior to displaying an application, device 600 receives a user input, the user input, when received initiating display of the first application (710). As shown in FIG. 6A, in response to receiving the user input, displaying the first application (720). Determining whether a predetermined criteria is met (730), for example by device 600. In accordance with a determination that the predetermined criteria is met, displaying a predetermined first view of the application (732), for example, as shown in FIG. 6A. In accordance with a determination that the predetermined criteria is not met, displaying a second view of the application that is different than the predetermined first view of the application (734), for example, as shown in FIG. 6B.

[0254] In some embodiments, the predetermined criteria includes a predetermined time period has elapsed. In some embodiments, predetermined criteria includes an audio application is playing audio content. In some embodiments, the predetermined criteria includes a timer is running. In some embodiments, the predetermined criteria includes, at a last time the application was displayed, a predetermined user interface of the application was displayed.

[0255] In some embodiments, the first application includes a user interface hierarchy, and the predetermined first view of the application is a top user interface level of the user interface hierarchy, for example, as shown in FIGS. 6A-6C.

[0256] In some embodiments, the first application is an audio application, and the predetermined first view of the

audio application is associated with currently playing audio content, as shown in FIGS. 6J-6L.

[0257] In some embodiments, as shown in FIGS. 6D-6F, the first application is a stock application that includes a user interface hierarchy. In accordance with a determination that the most recent screen visited in the stock application corresponds to a second user interface level below a first user interface level in the user interface hierarchy, displaying the predetermined view corresponding to the first user interface level, wherein the first user interface level displays a listing of a plurality of stocks and the second user interface level displays details of a first selected stock without displaying details of any other stocks of the list of stocks. In accordance with a determination that the most recent screen visited in the stock application corresponds to a third user interface level below the second user interface level in the user interface hierarchy, displaying the predetermined view corresponding to the second user interface level, wherein the third user interface level displays additional details of the first selected stock.

[0258] In some embodiments, as shown in FIGS. 6G-6I, the first application is a timer application, and the predetermined first view of the timer application is a currently running timer view.

[0259] In some embodiments, the second view of the application is a most recently viewed screen of the application, for example, as shown in FIG. 6L.

[0260] In some embodiments, as shown in FIGS. 6J-6L, the audio application includes a user interface hierarchy, and displaying the second view of the audio application includes in accordance with a determination that a predetermined timeout has not expired, displaying a most recently viewed screen of the audio application, and in accordance with a determination that a predetermined timeout has expired, displaying a top level screen of the user interface hierarchy, wherein the top level screen displays details of a currently playing or last played audio content.

[0261] Note that details of the processes described above with respect to method 700 (e.g., FIG. 7) are also applicable in an analogous manner to the methods described below. For example, method 700 optionally includes one or more of the characteristics of the various methods described below with reference to methods 1000, 1300 or 1600. For example, the displaying of predetermined application views can be implemented in the respective methods. For brevity, these details are not repeated below.

[0262] In accordance with some embodiments, FIG. 8 shows an exemplary functional block diagram of an electronic device 800 configured in accordance with the principles of the various described embodiments. In accordance with some embodiments, the functional blocks of electronic device 800 are configured to perform the techniques described above. The functional blocks of the device 800 are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described examples. It is understood by persons of skill in the art that the functional blocks described in FIG. 8 are, optionally, combined or separated into sub-blocks to implement the principles of the various described examples. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0263] As shown in FIG. 8, an electronic device 800 includes a display unit 802 configured to display a graphic user interface, optionally, a touch-sensitive surface unit 804 configured to receive contacts, and a processing unit 806 coupled to the display unit 802 and, optionally, the touch-sensitive surface unit 804. In some embodiments, the processing unit 806 includes a receiving unit 808, and a determining unit 810.

[0264] The processing unit 806 is configured to: prior to displaying an application, receive (e.g., with receiving unit 808) a user input, the user input, when received initiating display of the first application. In response to receiving the user input, display (e.g., with display unit 802) the first application. Determining (e.g., with determining unit 810) whether a predetermined criteria is met. In accordance with a determination that the predetermined criteria is met, display (e.g., with display unit 802) a predetermined first view of the application. In accordance with a determination that the predetermined criteria is not met, display (e.g., with display unit 802) a second view of the application that is different than the predetermined first view of the application

[0265] In some embodiments, the predetermined criteria includes a predetermined time period has elapsed. In some embodiments, predetermined criteria includes an audio application is playing audio content. In some embodiments, the predetermined criteria includes a timer is running. In some embodiments, the predetermined criteria includes, at a last time the application was displayed, a predetermined user interface of the application was displayed.

[0266] In some embodiments, the first application includes a user interface hierarchy, and the predetermined first view of the application is a top user interface level of the user interface hierarchy.

[0267] In some embodiments, the first application is an audio application, and the predetermined first view of the audio application is associated with currently playing audio content.

[0268] In some embodiments, the first application is a stock application that includes a user interface hierarchy. In accordance with a determination (e.g., with determining unit 810) that the most recent screen visited in the stock application corresponds to a second user interface level below a first user interface level in the user interface hierarchy, displaying (e.g., with display unit 802) the predetermined view corresponding to the first user interface level, wherein the first user interface level displays a listing of a plurality of stocks and the second user interface level displays details of a first selected stock without displaying details of any other stocks of the list of stocks. In accordance with a determination (e.g., with determining unit 810) that the most recent screen visited in the stock application corresponds to a third user interface level below the second user interface level in the user interface hierarchy, displaying (e.g., with display unit 802) the predetermined view corresponding to the second user interface level, wherein the third user interface level displays additional details of the first selected stock.

[0269] In some embodiments, the first application is a timer application, and the predetermined first view of the timer application is a currently running timer view.

[0270] In some embodiments, the second view of the application is a most recently viewed screen of the application.

[0271] In some embodiments, the audio application includes a user interface hierarchy, and displaying the second view of the audio application includes in accordance with a determination that a predetermined timeout has not expired, displaying (e.g., with display unit 802) a most recently viewed screen of the audio application, and in accordance with a determination that a predetermined timeout has expired, displaying (e.g., with display unit 802) a top level screen of the user interface hierarchy, wherein the top level screen displays details of a currently playing or last played audio content.

[0272] The operations described above with reference to FIG. 7 are, optionally, implemented by components depicted in FIGS. 1A-1B or FIG. 8. For example, receiving operation 710, displaying operations 720, 732 and 733, and determining operation 730 are, optionally, implemented by event sorter 170, event recognizer 180, and event handler 190. Event monitor 171 in event sorter 170 detects a contact on touch-sensitive display 112, and event dispatcher module 174 delivers the event information to application 136-1. A respective event recognizer 180 of application 136-1 compares the event information to respective event definitions 186, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub event, such as activation of an affordance on a user interface. When a respective predefined event or sub-event is detected, event recognizer 180 activates an event handler 190 associated with the detection of the event or sub-event. Event handler 190 optionally utilizes or calls data updater 176 or object updater 177 to update the application internal state 192. In some embodiments, event handler 190 accesses a respective GUI updater 178 to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. 1A-1B.

[0273] FIGS. 9A-9F illustrates a hierarchy of user interfaces of a physical activity application. As shown in FIG. 9A, user interface 910A includes a scrollable list of affordances 930 that are associated with respective physical activity tracking functions for a physical activity. For example, the list of affordances 930 includes affordance 931 that corresponds to a physical activity tracking function for an outdoor run, affordance 932 that corresponds to a physical activity tracking function for an outdoor walk, affordance 933 that corresponds to a physical activity tracking function for an indoor run, and affordance 934 that corresponds to a physical activity tracking function for an indoor walk. It is noted that items 930 includes additional items corresponding to other physical activity tracking functions that are not currently displayed but can be displayed in response to a scrolling input (e.g., rotation of rotational mechanism 610) of the list of scrollable items 930.

[0274] In some embodiments, referring to FIGS. 9A-9B, in response to selection of an affordance, such as affordance 931, device displays user interface 910B. User interface 910B is a start view for the outdoor run tracking function. User interface 910B includes a time set up feature that enables a user to select the time duration of the outdoor run (e.g., 15 seconds). For example, by selecting the "+" button the timer of the outdoor run is increased. Alternatively, by selecting the "-" button the timer of the outdoor run is decreased. In response to selection of start button 940 (e.g., single tap gesture), the outdoor run tracking function initi-

ates tracking (e.g., start of the timer) of an outdoor run. In some embodiments, other information is tracked corresponding to the outdoor run (e.g., calories, distance, or heart rate).

[0275] In some embodiments, it is determined whether a predetermined criteria has been met for updating the scrollable list of affordances with an additional affordance associated with a physical activity. In some embodiments, the predetermined criteria is a predetermined frequency of use of a physical activity tracking function (e.g., affordance is selected 80% of the time or 20% of the time), or the most recently selected physical activity tracking function. In some embodiments, the predetermined criteria includes a criterion based on execution of the first physical activity tracking function (e.g., execution of a physical activity tracking function corresponding to a selected affordance).

[0276] As shown in FIGS. 9A and 9C, device 600 determines that the predetermined criteria has been met based on affordance 931 (corresponding with a tracking function for an outdoor run) is selected at 80% of the time. Furthermore (or alternatively), device 600 determines that the predetermined criteria has been met based on affordance 932 (corresponding to a tracking function of an outdoor walk) is the last selected affordance in the scrollable list of affordances 930.

[0277] In some embodiments, in accordance with a determination that the predetermined criteria has been met, the displayed scrollable list of affordances is updated with the additional affordance, wherein the additional affordance corresponds to a second physical activity tracking function. As shown in FIG. 9C, device 600 updates the scrollable list of affordances 930 with affordance 935 that corresponds to a second outdoor run tracking function. It is noted that the second outdoor tracking function is based on the first outdoor run tracking function (that corresponds to affordance 931) because a previous selection of affordance 931 met the predetermined criteria.

[0278] In some embodiments, a user input is received at the additional affordance, the user input, when received, initiates launching of a second physical activity tracking function associated with the additional affordance. Referring to FIG. 9C, device 600 receives user input 940 (e.g., tap gesture) on affordance 935 (that corresponds to the second outdoor run tracking function).

[0279] In some embodiments, in response to receiving the user input, the second physical activity tracking function that is based on a first physical activity tracking function is launched, wherein the first physical activity tracking function is associated with an affordance of the scrollable list of affordances. Referring to FIG. 9D, device 600 launches the second outdoor run tracking function in response to user input 940. As described above, the second outdoor run tracking function is based on the first outdoor run tracking function (that corresponds to affordance 931).

[0280] In some embodiments, the additional affordance is displayed at a terminus of the displayed scrollable list of affordances. As shown in FIG. 9C, device 600 displays affordance 935 at a terminus (e.g., beginning) of the scrollable list of affordances 930.

[0281] In some embodiments, the additional affordance includes a textual representation of a type of physical activity tracking function associated with the additional affordance. As shown in FIG. 9C, affordance 935 includes,

among other things, “Outdoor Run” that describes the type of physical activity tracking function that is associated with affordance 935.

[0282] In some embodiments, the additional affordance includes a textual representation of goals associated with the physical activity tracking function. As shown in FIG. 9C, affordance 935 includes, among other things, “20 Cal” that indicates a goal of burning 20 calories during the outdoor run.

[0283] In some embodiments, a user input is received on the additional affordance corresponding to initiating tracking associated with the second physical activity tracking function that is based on the first physical activity tracking function. Referring to FIG. 9C, device 600 receives user input 940 (e.g., tap gesture) on affordance 935 (that corresponds to the second outdoor run tracking function). As described above, the second outdoor run tracking function is based on the first outdoor run tracking function (that corresponds to affordance 931).

[0284] In some embodiments, the tracking is performed by one or more tracking sensors of the device. For example, device 600 tracks the physical activity via tracking sensors (or workout sensors) that communicate with workout support module 142 (as shown in FIG. 3).

[0285] In some embodiments, in response to receiving the user input on the additional affordance (e.g., a “quick start” button), the second physical activity tracking function that is based on the first physical activity tracking function is initiated. Referring to FIG. 9D, the second outdoor run tracking function immediately begins to track an outdoor run. For example, in response to selection of affordance 935 (a “quick start” button), via user input 940 (e.g., single tap gesture), device 600 immediately begins to run the timer for the selected outdoor run, as shown in FIG. 9D. Additionally, in some embodiments, in response to selection of affordance 935 (a “quick start” button), device 600 immediately tracks other information (e.g., calories, distance, heart rate) associated with the tracking function.

[0286] In some embodiments, more than one additional affordance is added to the list of scrollable affordances 930 based on the predetermined criteria being met. Referring to FIG. 9E, device 600 adds a second additional affordance 936 to the list of scrollable affordances 930 (in addition to first additional affordance 935) because the selection of affordance 932 (that corresponds to an outdoor walk physical activity tracking function) meets the predetermined criteria (e.g., a predetermined frequency of use of a physical activity tracking function, or the most recently selected physical activity tracking function). Device 600 adds affordance 936 to the list of scrollable affordances in the same manner as adding affordance 935, as described above.

[0287] In some embodiments, in response to receiving the user input on the second additional affordance (e.g., a “quick start” button), the second outdoor walk tracking function that is based on the first outdoor walk tracking function (corresponding to affordance 931) is initiated. Referring to FIG. 9F, the second outdoor walk tracking function immediately begins to track an outdoor walk. For example, in response to selection of affordance 936 (a “quick start” button), via input 941, device 600 immediately begins to run the timer for the selected outdoor walk, as shown in FIG. 9F. Additionally, in some embodiments, in response to selection of affordance 936 (a “quick start” button), device 600

immediately tracks other information (e.g., calories, distance, heart rate) associated with the tracking function.

[0288] FIG. 10 is a flow diagram illustrating a method for adding an affordance to a scrollable list of affordances using an electronic device in accordance with some embodiments. Method 1000 is performed at a device (e.g., 100, 300, 500, and 600) with a display. Some operations in method 1000 are, optionally, combined, the order of some operations are, optionally, changed, and some operations are, optionally, omitted.

[0289] As described below, method 1000 provides an intuitive way for adding an affordance to a scrollable list of affordances. The method reduces the cognitive burden on a user for interacting with the scrollable list of affordances, thereby creating a more efficient human-machine interface. For battery-operated computing devices, enabling a user to interact with a list of affordances faster and more efficiently conserves power and increases the time between battery charges.

[0290] In some embodiments, as shown in FIGS. 9A-9D, at a device with one or more processors and memory: displaying a scrollable list of affordances associated with respective physical activities (1010). Determining whether a predetermined criteria has been met for updating the scrollable list of affordances with an additional affordance associated with a physical activity (1020). In accordance with a determination that the predetermined criteria has been met, updating the displayed scrollable list of affordances with the additional affordance (1030). Receiving a user input at the additional affordance, the user input, when received, initiates launching of a second physical activity tracking function associated with the additional affordance (1040). In response to receiving the user input, launching the second physical activity tracking function that is based on a first physical activity tracking function, wherein the first physical activity tracking function is associated with an affordance of the scrollable list of affordances (1050).

[0291] In some embodiments, the predetermined criteria includes a criterion based on execution of the first physical activity tracking function. In some embodiments, the predetermined criteria is a predetermined frequency of execution of a physical activity tracking function or execution of a most recently selected physical activity tracking function.

[0292] In some embodiments, the additional affordance is associated with a physical activity tracking function that is selected at a predetermined frequency, or a most recently selected physical activity tracking function, as shown in FIG. 9E. In some embodiments, the additional affordance is displayed at a terminus of the displayed scrollable list of affordances, as shown in FIG. 9C. In some embodiments, the additional affordance includes a textual representation of a type of physical activity tracking function associated with the additional affordance, as shown in FIG. 9C. In some embodiments, the additional affordance includes a textual representation of goals associated with the physical activity tracking function, as shown in FIG. 9C.

[0293] In some embodiments, a user input is received on the additional affordance corresponding to initiating tracking associated with the second physical activity tracking function that is based on the first physical activity tracking function, wherein the tracking is performed by one or more tracking sensors of the device, and in response to receiving the user input on the additional affordance, initiating the

second physical activity tracking function that is based on the first physical activity tracking function, as shown in FIGS. 9C-9D.

[0294] Note that details of the processes described above with respect to method 1000 (e.g., FIG. 10) are also applicable in an analogous manner to the methods described herein. For example, method 1000 optionally includes one or more of the characteristics of the various methods described above with reference to method 700. For example, method 1000, in various embodiments, could implement the viewing of predetermined application view, as described with respect to method 700. For brevity, these details are not repeated below.

[0295] In accordance with some embodiments, FIG. 11 shows an exemplary functional block diagram of an electronic device 1100 configured in accordance with the principles of the various described embodiments. In accordance with some embodiments, the functional blocks of electronic device 1100 are configured to perform the techniques described above. The functional blocks of the device 100 are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described examples. It is understood by persons of skill in the art that the functional blocks described in FIG. 11 are, optionally, combined or separated into sub-blocks to implement the principles of the various described examples. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0296] As shown in FIG. 11, an electronic device 1100 includes a display unit 1102 configured to display a graphic user interface, optionally, a touch-sensitive surface unit 1104 configured to receive contacts, and a processing unit 1106 coupled to the display unit 1102 and, optionally, the touch-sensitive surface unit 1104. In some embodiments, the processing unit 1106 includes a receiving unit 1108, determining unit 1110, updating unit 1112, and launching unit 1114.

[0297] The processing unit 1106 is configured to: display (e.g., with display unit 1102), a scrollable list of affordances associated with respective physical activities. Determine (e.g., with determining unit 1110), whether a predetermined criteria has been met for updating the scrollable list of affordances with an additional affordance associated with a physical activity. In accordance with a determination that the predetermined criteria has been met, update (e.g., with the updating unit 1112) the displayed scrollable list of affordances with the additional affordance. Receive (e.g., with receiving unit 1108) a user input at the additional affordance, the user input, when received, initiates launching of a second physical activity tracking function associated with the additional affordance. In response to receiving the user input, launch (e.g., with launching unit 1114) the second physical activity tracking function that is based on a first physical activity tracking function, wherein the first physical activity tracking function is associated with an affordance of the scrollable list of affordances.

[0298] In some embodiments, the predetermined criteria includes a criterion based on execution of the first physical activity tracking function. In some embodiments, the predetermined criteria is a predetermined frequency of execution of a physical activity tracking function or execution of a most recently selected physical activity tracking function.

**[0299]** In some embodiments, the additional affordance is associated with a physical activity tracking function that is selected at a predetermined frequency, or a most recently selected physical activity tracking function. In some embodiments, the additional affordance is displayed at a terminus of the displayed scrollable list of affordances. In some embodiments, the additional affordance includes a textual representation of a type of physical activity tracking function associated with the additional affordance. In some embodiments, the additional affordance includes a textual representation of goals associated with the physical activity tracking function.

**[0300]** In some embodiments, a user input is received on the additional affordance corresponding to initiating tracking associated with the second physical activity tracking function that is based on the first physical activity tracking function, wherein the tracking is performed by one or more tracking sensors of the device, and in response to receiving the user input on the additional affordance, initiating the second physical activity tracking function that is based on the first physical activity tracking function.

**[0301]** The operations described above with reference to FIG. 11 are, optionally, implemented by components depicted in FIGS. 1A-1B or FIG. 8. For example, displaying operation 1010, determining operation 1020, updating operation 1030, receiving operation 1040, and launching operation 1050 are, optionally, implemented by event sorter 170, event recognizer 180, and event handler 190. Event monitor 171 in event sorter 170 detects a contact on touch-sensitive display 112, and event dispatcher module 174 delivers the event information to application 136-1. A respective event recognizer 180 of application 136-1 compares the event information to respective event definitions 186, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub event, such as activation of an affordance on a user interface. When a respective predefined event or sub-event is detected, event recognizer 180 activates an event handler 190 associated with the detection of the event or sub-event. Event handler 190 optionally utilizes or calls data updater 176 or object updater 177 to update the application internal state 192. In some embodiments, event handler 190 accesses a respective GUI updater 178 to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. 1A-1B.

**[0302]** FIGS. 12A-12C illustrate an exemplary user interface in a hierarchy of user interfaces in an application, in accordance with some embodiments. The user interface in these figures is used to illustrate the processes described below, including the processes in FIG. 13.

**[0303]** FIG. 12A illustrates device 600 with touch sensitive display 602. User interface 620A of a weather application is displayed on touch-sensitive display 602. Device 600 includes various input mechanisms that receives user input, such as, rotatable input mechanism 610, that is able to receive a rotatable input (and may also receive a push input), and input mechanism 612 that is able to receive a push user input.

**[0304]** FIGS. 12A-12C illustrates user interface 620A of a weather application. For example, FIG. 12A illustrates user interface 620A that is a first view (also referred to as a top level, a first level, or a root level) in a hierarchy of user

interfaces of the weather application. FIGS. 12A-12C illustrates scrolling through a scrollable list of items 630 that is described in further detail below.

**[0305]** In some embodiments, user interface 620A includes a list of scrollable items 630, wherein each item corresponds to a city. For example, item 631 corresponds to Santa Cruz weather, item 632 corresponds to Seattle weather, item 633 corresponds to Portland weather, item 634 corresponds to Denver weather, and item 635 corresponds to Cupertino weather. It is noted that items 630 includes additional items corresponding to other cities that are not currently displayed but can be displayed in response to a scrolling input (e.g., rotation of rotational mechanism 610 or a swipe gesture on touch-sensitive display 602) of the list of scrollable items 630. In some embodiments, items in the list of scrollable items 630 are an affordance, that when selected, device 600 displays user interface 620B, as shown in FIG. 6B. For example, device 600 displays user interface 620B, in response to input 640 (e.g., tap gesture) at item 632, that corresponds to Seattle weather, as shown in FIG. 6B.

**[0306]** In some embodiments, a first item and a second item of a scrollable list of items, wherein a third item of the scrollable list of items is not displayed while displaying the first item and the second item. As shown in FIG. 12A, device 600 displays items 631-635 in the list of scrollable items 630, while not displaying item 636 (shown in FIG. 12B but not in FIG. 12A).

**[0307]** In some embodiments, a user input is received, the input, when received initiates scrolling of the scrollable list of items. As shown in FIG. 12A, device 600 receives a user input (e.g., rotational input at rotational mechanism 610, or up or down swipe gesture 1220 on touch-sensitive display 602).

**[0308]** In some embodiments, in response to receiving the user input, the scrollable list of items is scrolled. As shown in FIGS. 12A-12C, device 600 scrolls the scrollable list of items in an upward direction in response to a rotational input at rotational mechanism 610 or an upward swipe gesture 1220. Alternatively, device 600 may scroll the scrollable list of items in a downward direction in response to an opposite rotational input at rotational mechanism 610 or a downward swipe gesture 1220.

**[0309]** In some embodiments, while scrolling the scrollable list of items, the third item of the scrollable list of items is displayed at a terminus of the scrollable list of items. As shown in FIG. 12B, device 600 displays item 636 (e.g., an affordance corresponding to San Francisco weather) at a terminus (e.g., bottom) of the scrollable list of items 630, while scrolling the scrollable list of items in an upward direction.

**[0310]** In some embodiments, the displaying of the third item at the terminus of the scrollable list of items includes displaying a first display state of the third item. As shown in FIGS. 12A-12B, device 600 initially displays item 636 in the first display state. In some embodiments, device 600 animates the transition of item 636 from not displayed to initially displayed.

**[0311]** Further, in some embodiments, the displaying of the third item at the terminus of the scrollable list of items includes transitioning from displaying the first display state of the third item to displaying a second display state of the third item. As shown in FIGS. 12B-12C, device 600 displays

the transition of item **636** from initially or partially displayed (e.g., first display state) to fully displayed (e.g., second display state).

[0312] In some embodiments, the transitioning from displaying the first display state of the third item to displaying the second display state of the third item includes animating the transition, wherein the animated transition includes expanding the third item horizontally and vertically until fully displayed in the second display state. As shown in FIGS. 12B-12C, device **600** animates the transition of item **636** from initially or partially displayed (e.g., first display state) to fully displayed (e.g., second display state). Additionally, device **600** expands item **636** in the horizontally and vertically until item **636** is fully displayed in the second state.

[0313] In some embodiments, while scrolling the scrollable list of items, the first item of the scrollable list of items is removed from the scrollable list of items at a terminus of the scrollable list of items. As shown in FIGS. 12A-12B, device **600** initiates removal of item **631** (e.g., an affordance corresponding to Santa Cruz weather) at a terminus (e.g., top) of the scrollable list of items **630**, while scrolling the scrollable list of items in an upward direction.

[0314] In some embodiments, the removing of the first item at the terminus of the scrollable list of items includes displaying a first display state of the first item. As shown in FIG. 12A, device **600** displays item **631** in a partially displayed and contracted state (e.g., first display state).

[0315] Further, in some embodiments, the removing of the first item at the terminus of the scrollable list of items includes transitioning from displaying the first display state of the first item to displaying a second display state of the first item. As shown in FIGS. 12A-12B, device **600** displays the transition of item **636** from initially or partially displayed (e.g., first display state) to fully removed (e.g., second display state).

[0316] In some embodiments, the transitioning from displaying the first display state of the first item to displaying the second display state of the first item includes animating the transition, wherein the animated transition includes contracting the first item horizontally and vertically until fully removed in the second display state. As shown in FIGS. 12A-12B, device **600** animates the transition of item **631** from partially displayed (e.g., first display state) to fully removed (e.g., second display state). Additionally, device **600** contracts item **631** horizontally and vertically until item **631** is fully removed in the second state.

[0317] In some embodiments, the animated transition of the third item at the terminus of the scrollable list of items further includes in accordance to displaying the third item in the first display state, expanding the third item horizontally and vertically at a first rate. As shown in FIGS. 12A-12B, device **600** displays the transition of item **636** from not being displayed to being partially displayed at a first velocity,  $V_1$ .

[0318] Further, in some embodiments, in accordance to displaying the third item in the second display state, expanding the third item horizontally and vertically at a second rate until fully displayed, wherein the second rate is faster than the first rate. As shown in FIGS. 12B-12C, device **600** displays the transition of item **636** from initially or partially displayed (e.g., first display state) to fully displayed (e.g., second display state) at a second velocity,  $V_2$  (wherein  $V_2$  is greater than  $V_1$ ).

[0319] FIG. 13 is a flow diagram illustrating a method for adding an affordance to a scrollable list of affordances in response to scrolling using an electronic device in accordance with some embodiments. Method **1300** is performed at a device (e.g., **100**, **300**, **500**, and **600**) with a display. Some operations in method **1300** are, optionally, combined, the order of some operations is, optionally, changed, and some operations are, optionally, omitted.

[0320] As described below, method **1300** provides an intuitive way for adding an affordance to a scrollable list of affordances in response to scrolling. The method reduces the cognitive burden on a user for interacting with the scrollable list of affordances, thereby creating a more efficient human-machine interface. For battery-operated computing devices, enabling a user to interact with a list of affordances faster and more efficiently conserves power and increases the time between battery charges.

[0321] In some embodiments, as shown in FIGS. 12A-12C, a method, includes at a device with one or more processors and memory: displaying a first item and a second item of a scrollable list of items, wherein a third item of the scrollable list of items is not displayed while displaying the first item and the second item (**1310**); receiving a user input, the input, when received initiates scrolling of the scrollable list of items (**1320**); in response to the receiving the user input, scrolling the scrollable list of items (**1330**); and while scrolling the scrollable list of items, displaying the third item of the scrollable list of items at a terminus of the scrollable list of items (**1340**), the displaying of the third item at the terminus of the scrollable list of items includes: displaying a first display state of the third item, and transitioning from displaying the first display state of the third item to displaying a second display state of the third item (**1350**).

[0322] In some embodiments, as shown in FIGS. 12A-12C, the transitioning from displaying the first display state of the third item to displaying the second display state of the third item includes: animating the transition, wherein the animated transition includes expanding the third item horizontally and vertically until fully displayed in the second display state.

[0323] In some embodiments, as shown in FIGS. 12A-12B, while scrolling the scrollable list of items, removing the first item of the scrollable list of items at a terminus of the scrollable list of items includes: displaying a first display state of the first item, and transitioning from displaying the first display state of the third item to displaying a second display state of the third item.

[0324] In some embodiments, as shown in FIGS. 12A-12B, the transitioning from displaying the first display state of the third item to displaying the second display state of the third item includes: animating the transition, wherein the animated transition includes contracting the first item horizontally and vertically until fully removed from the list of items in the second display state.

[0325] In some embodiments, as shown in FIGS. 12B-12C, the animated transition of the third item at the terminus of the scrollable list of items further includes: in accordance to displaying the third item in the first display state, expanding the third item horizontally and vertically at a first rate; and in accordance to displaying the third item in the second display state, expanding the third item horizontally and vertically at a second rate until fully displayed, wherein the second rate is faster than the first rate.

[0326] In some embodiments, as shown in FIG. 12A, the device further includes a rotatable input mechanism and the user input is received at the rotatable input mechanism.

[0327] Note that details of the processes described above with respect to method 1300 (e.g., FIG. 13) are also applicable in an analogous manner to the methods described herein. For example, method 1300 optionally includes one or more of the characteristics of the various methods described above with reference to methods 700 and 1000. For example, method 1300, in various embodiments, could be implemented in the viewing of predetermined application view in method 700 and the displaying affordances in method 1000. For brevity, these details are not repeated below.

[0328] In accordance with some embodiments, FIG. 14 shows an exemplary functional block diagram of an electronic device 1400 configured in accordance with the principles of the various described embodiments. In accordance with some embodiments, the functional blocks of electronic device 1400 are configured to perform the techniques described above. The functional blocks of the device 1400 are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described examples. It is understood by persons of skill in the art that the functional blocks described in FIG. 13 are, optionally, combined or separated into sub-blocks to implement the principles of the various described examples. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0329] As shown in FIG. 14, an electronic device 1400 includes a display unit 1402 configured to display a graphic user interface, optionally, a touch-sensitive surface unit 1404 configured to receive contacts, and a processing unit 1406 coupled to the display unit 1402 and, optionally, the touch-sensitive surface unit 1104. In some embodiments, the processing unit 1106 includes a receiving unit 1408, and scrolling unit 1410.

[0330] The processing unit 1406 is configured to: display (e.g., with display unit 1402) a first item and a second item of a scrollable list of items, wherein a third item of the scrollable list of items is not displayed while displaying the first item and the second item. Receive (e.g., with receiving unit 1408) a user input, the input, when received initiates scrolling of the scrollable list of items. In response to the receiving the user input, scroll (e.g., with scrolling unit 141) the scrollable list of items. While scrolling the scrollable list of items, display (e.g., with display unit 1402) the third item of the scrollable list of items at a terminus of the scrollable list of items, the displaying of the third item at the terminus of the scrollable list of items includes: display (e.g., with display unit 1402) a first display state of the third item, and transitioning from displaying the first display state of the third item to displaying a second display state of the third item.

[0331] In some embodiments, the processing unit 1406 is configured to: the transitioning from displaying the first display state of the third item to displaying the second display state of the third item includes: animate the transition, wherein the animated transition includes expanding the third item horizontally and vertically until fully displayed in the second display state.

[0332] In some embodiments, the processing unit 1406 is configured to: while scrolling the scrollable list of items, removing the first item of the scrollable list of items at a terminus of the scrollable list of items, the removing of the first item at the terminus of the scrollable list of items includes: displaying a first display state of the first item, and transitioning from displaying the first display state of the third item to displaying a second display state of the third item.

[0333] In some embodiments, the transitioning from displaying the first display state of the third item to displaying the second display state of the third item includes: animating the transition, wherein the animated transition includes contracting the first item horizontally and vertically until fully removed from the list of items in the second display state.

[0334] In some embodiments, the animated transition of the third item at the terminus of the scrollable list of items further includes: in accordance to displaying the third item in the first display state, expanding the third item horizontally and vertically at a first rate; and in accordance to displaying the third item in the second display state, expanding the third item horizontally and vertically at a second rate until fully displayed, wherein the second rate is faster than the first rate.

[0335] In some embodiments, the device further includes a rotatable input mechanism and the user input is received at the rotatable input mechanism.

[0336] The operations described above with reference to FIG. 13 are, optionally, implemented by components depicted in FIGS. 1A-1B or FIG. 14. For example, displaying operations 1310, 1340, and 1350, receiving operation 1320, scrolling operation 1330 are, optionally, implemented by event sorter 170, event recognizer 180, and event handler 190. Event monitor 171 in event sorter 170 detects a contact on touch-sensitive display 112, and event dispatcher module 174 delivers the event information to application 136-1. A respective event recognizer 180 of application 136-1 compares the event information to respective event definitions 186, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub event, such as activation of an affordance on a user interface. When a respective predefined event or sub-event is detected, event recognizer 180 activates an event handler 190 associated with the detection of the event or sub-event. Event handler 190 optionally utilizes or calls data updater 176 or object updater 177 to update the application internal state 192. In some embodiments, event handler 190 accesses a respective GUI updater 178 to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. 1A-1B.

[0337] FIGS. 15A-15D illustrate exemplary user interfaces for displaying a scrollable list of affordances, in accordance with some embodiments. The user interfaces in these figures are used to illustrate the processes described below, including the processes in FIG. 16.

[0338] FIG. 15A illustrates device 600 with touch sensitive display 602. Device 600 may be device 100, 300, or 500 in some embodiments. User interface 1510A is displayed on touch-sensitive display 602. User interface 1510A, as illustrated in FIG. 15A, includes watch face 608 of a watch application.

[0339] In some embodiments, a swipe gesture is on the clock face, the swipe gesture, when received initiates display of a scrollable list of affordances. As shown in FIG. 15A, device 600 receives swipe gesture 1520 in an upward direction.

[0340] In some embodiments, in response to receiving the swipe gesture, the scrollable list of affordances is displayed, wherein a first affordance of the scrollable list of affordances corresponds with a battery level of the device. As shown in FIG. 15B, device 600 displays a scrollable list of affordances 1530. Affordance 1531 in the scrollable list of affordances corresponds with a battery level of device 600. Affordance 1532 corresponds to wireless connectivity of device 600 (e.g., LTE, Bluetooth). The scrollable list of affordances can include, but is not limited to affordances corresponding to airplane mode, do not disturb mode, and silence mode. As shown in FIG. 15B, it is noted that the scrollable list of affordances 1530 displayed in user interface 1510B includes additional affordances corresponding to other control functions of device 600 that are not currently displayed but can be displayed in response to a scrolling input (e.g., rotation of rotational mechanism 610) of the list of scrollable affordances 1530.

[0341] In some embodiments, a user input is received, the user input, when received initiates scrolling of the scrollable list of affordances, and in response to receiving the user input, scrolling the list of affordances. As shown in FIGS. 15B-15C, device 600 receives user input (e.g., upward swipe or rotation of rotational input mechanism) for scrolling through the list of scrollable affordances 1530, and device 600 scrolls through the scrollable affordances in response to the user input.

[0342] In some embodiments, an input is received on a third affordance of the scrollable list of affordances, the input, when received initiating display of a scrollable list of items associated with the selected affordance, and in response to receiving the input on the affordance, displaying the scrollable list of items associated with the selected affordance. As shown in FIGS. 15C-15D, device 600 receives an input on affordance 1531 corresponding to battery level of device 600. In response to selection of affordance 1531, device 600 displays user interface 1510D that includes a list of items corresponding to the battery level of device 600. In some embodiments, as shown in FIG. 15D, the list of items can include, current battery level, an affordance corresponding to power reserve of the battery, and headphone icons.

[0343] In some embodiments, displaying a first display state of an affordance, and transitioning from display the affordance from the first display state to displaying a second display state. As shown in FIGS. 15B-15C, device 600 displays a transition of affordance 1531 from a first display state to a second display state in the same manner as described above with respect to FIGS. 12A-12C.

[0344] In some embodiments, the transitioning from display of the affordance from the first display state to the second display state includes animating the transition, wherein the animated transition includes expanding the affordance horizontally and vertically until fully displayed in the second display state. As shown in FIGS. 15B-15C, device 600 affordance expands affordance 1531 horizontally and vertically during the animated transition of affordance 1531 in the same manner as described above with respect to FIGS. 12A-12C.

[0345] FIG. 16 is a flow diagram illustrating a method for displaying a scrollable list of affordances using an electronic device in accordance with some embodiments. Method 1600 is performed at a device (e.g., 100, 300, 500, and 600) with a display. Some operations in method 1600 are, optionally, combined, the order of some operations is, optionally, changed, and some operations are, optionally, omitted.

[0346] As described below, method 1600 provides an intuitive way for displaying a scrollable list of affordances. The method reduces the cognitive burden on a user for interacting with the scrollable list of affordances, thereby creating a more efficient human-machine interface. For battery-operated computing devices, enabling a user to interact with a list of affordances faster and more efficiently conserves power and increases the time between battery charges.

[0347] In some embodiments, as shown in FIGS. 12A-12C, a method, includes at a device with one or more processors and memory: displaying a clock face; receiving a swipe gesture on the clock face (1610), the swipe gesture, when received initiates display of a scrollable list of affordances (1620); in response to receiving the swipe gesture, displaying the scrollable list of affordances, wherein a first affordance of the scrollable list of affordances corresponds with a battery level of the device (1630); receiving a user input, the user input, when received initiates scrolling of the scrollable list of affordances (1640); and in response to receiving the user input, scrolling the list of affordances (1650).

[0348] In some embodiments, as shown in FIG. 15A, the swipe gesture is an upward swipe gesture.

[0349] In some embodiments, as shown in FIG. 15B, a second affordance of the scrollable list of affordances is associated with wireless connectivity of the device.

[0350] In some embodiments, as shown in FIGS. 15B-15D, an input is received on a third affordance of the scrollable list of affordances, the input, when received initiating display of a scrollable list of items associated with the selected affordance; and in response to receiving the input on the affordance, display the scrollable list of items associated with the selected affordance.

[0351] In some embodiments, as shown in FIGS. 15B-15C, the displaying the scrollable list of affordances includes displaying a first display state of an affordance, and transitioning from display the affordance from the first display state to displaying a second display state.

[0352] In some embodiments, as shown in FIGS. 15B-15C, the transitioning from display of the affordance from the first display state to the second display state includes animating the transition, wherein the animated transition includes expanding the affordance horizontally and vertically until fully displayed in the second display state.

[0353] Note that details of the processes described above with respect to method 1600 (e.g., FIG. 16) are also applicable in an analogous manner to the methods described herein. For example, method 1600 optionally includes one or more of the characteristics of the various methods described above with reference to methods 700, 1000, and 1300. For example, various features of method 1600, in some embodiments, could be implemented in the viewing of predetermined application view in method 700 and the displaying affordances in method 1000. For brevity, these details are not repeated below.

[0354] In accordance with some embodiments, FIG. 17 shows an exemplary functional block diagram of an electronic device 1700 configured in accordance with the principles of the various described embodiments. In accordance with some embodiments, the functional blocks of electronic device 1700 are configured to perform the techniques described above. The functional blocks of the device 1700 are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described examples. It is understood by persons of skill in the art that the functional blocks described in FIG. 17 are, optionally, combined or separated into sub-blocks to implement the principles of the various described examples. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0355] As shown in FIG. 17, an electronic device 1700 includes a display unit 1702 configured to display a graphic user interface, optionally, a touch-sensitive surface unit 1704 configured to receive contacts, and a processing unit 1706 coupled to the display unit 1702 and, optionally, the touch-sensitive surface unit 1704. In some embodiments, the processing unit 1706 includes a receiving unit 1708, and scrolling unit 1710.

[0356] The processing unit 1706 is configured to: display (e.g., with display unit 1702) a clock face; receive (e.g., with receiving unit 1708) swipe gesture on the clock face, the swipe gesture, when received initiates display of a scrollable list of affordances; in response to receiving the swipe gesture, display (e.g., with display unit 1702) the scrollable list of affordances, wherein a first affordance of the scrollable list of affordances corresponds with a battery level of the device; receive (e.g., with receiving unit 1708) a user input, the user input, when received initiates scrolling of the scrollable list of affordances; and in response to receiving the user input, scroll (e.g., with scrolling unit 1710) the list of affordances.

[0357] In some embodiments, the swipe gesture is an upward swipe gesture.

[0358] In some embodiments, a second affordance of the scrollable list of affordances is associated with wireless connectivity of the device.

[0359] In some embodiments, the processing unit is further configured to: receive an input on a third affordance of the scrollable list of affordances, the input, when received initiating display of a scrollable list of items associated with the selected affordance; and in response to receiving the input on the affordance, display the scrollable list of items associated with the selected affordance.

[0360] In some embodiments, the displaying the scrollable list of affordances includes: displaying a first display state of an affordance, and transitioning from display the affordance from the first display state to displaying a second display state.

[0361] In some embodiments, wherein the transitioning from display of the affordance from the first display state to the second display state includes animating the transition, wherein the animated transition includes expanding the affordance horizontally and vertically until fully displayed in the second display state.

[0362] The operations described above with reference to FIG. 17 are, optionally, implemented by components depicted in FIGS. 1A-1B or FIG. 16. For example, display-

ing operations 1610, 1630, receiving operation 1620, and scrolling operation 1650 are, optionally, implemented by event sorter 170, event recognizer 180, and event handler 190. Event monitor 171 in event sorter 170 detects a contact on touch-sensitive display 112, and event dispatcher module 174 delivers the event information to application 136-1. A respective event recognizer 180 of application 136-1 compares the event information to respective event definitions 186, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub event, such as activation of an affordance on a user interface. When a respective predefined event or sub-event is detected, event recognizer 180 activates an event handler 190 associated with the detection of the event or sub-event. Event handler 190 optionally utilizes or calls data updater 176 or object updater 177 to update the application internal state 192. In some embodiments, event handler 190 accesses a respective GUI updater 178 to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. 1A-1B.

[0363] The foregoing description, for purpose of explanation, has been described with reference to specific embodiments. However, the illustrative discussions above are not intended to be exhaustive or to limit 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 techniques and their practical applications. Others skilled in the art are thereby enabled to best utilize the techniques and various embodiments with various modifications as are suited to the particular use contemplated.

[0364] Although the disclosure and examples have been fully described with reference to the accompanying drawings, it is to be noted that various changes and modifications will become apparent to those skilled in the art. Such changes and modifications are to be understood as being included within the scope of the disclosure and examples as defined by the claims.

[0365] As described above, one aspect of the present technology is the gathering and use of data available from various sources to improve the delivery to users of invitational content or any other content that may be of interest to them. The present disclosure contemplates that in some instances, this gathered data may include personal information data that uniquely identifies or can be used to contact or locate a specific person. Such personal information data can include demographic data, location-based data, telephone numbers, email addresses, home addresses, or any other identifying information.

[0366] The present disclosure recognizes that the use of such personal information data, in the present technology, can be used to the benefit of users. For example, the personal information data can be used to deliver targeted content that is of greater interest to the user. Accordingly, use of such personal information data enables calculated control of the delivered content. Further, other uses for personal information data that benefit the user are also contemplated by the present disclosure.

[0367] The present disclosure further contemplates that the entities responsible for the collection, analysis, disclosure, transfer, storage, or other use of such personal information data will comply with well-established privacy poli-

cies and/or privacy practices. In particular, such entities should implement and consistently use privacy policies and practices that are generally recognized as meeting or exceeding industry or governmental requirements for maintaining personal information data private and secure. For example, personal information from users should be collected for legitimate and reasonable uses of the entity and not shared or sold outside of those legitimate uses. Further, such collection should occur only after receiving the informed consent of the users. Additionally, such entities would take any needed steps for safeguarding and securing access to such personal information data and ensuring that others with access to the personal information data adhere to their privacy policies and procedures. Further, such entities can subject themselves to evaluation by third parties to certify their adherence to widely accepted privacy policies and practices.

**[0368]** Despite the foregoing, the present disclosure also contemplates embodiments in which users selectively block the use of, or access to, personal information data. That is, the present disclosure contemplates that hardware and/or software elements can be provided to prevent or block access to such personal information data. For example, in the case of advertisement delivery services, the present technology can be configured to allow users to select to “opt in” or “opt out” of participation in the collection of personal information data during registration for services. In another example, users can select not to provide location information for targeted content delivery services. In yet another example, users can select to not provide precise location information, but permit the transfer of location zone information.

**[0369]** Therefore, although the present disclosure broadly covers use of personal information data to implement one or more various disclosed embodiments, the present disclosure also contemplates that the various embodiments can also be implemented without the need for accessing such personal information data. That is, the various embodiments of the present technology are not rendered inoperable due to the lack of all or a portion of such personal information data. For example, content can be selected and delivered to users by inferring preferences based on non-personal information data or a bare minimum amount of personal information, such as the content being requested by the device associated with a user, other non-personal information available to the content delivery services, or publically available information.

What is claimed is:

1. An electronic device, comprising:

a display;

one or more processors;

one or more input devices;

a memory; and

one or more programs, wherein the one or more programs are stored in memory and configured to be executed by the one or more processors, the one or more programs including instructions for:

displaying, on the display, a first set of items of a scrollable list of items, wherein the first set of items of the scrollable list of items includes a first item and a second item, and wherein the first item is displayed at a first size and the second item is displayed at a second size different from the first size;

receiving a scroll input;

in response to receiving the scroll input, scrolling display of the scrollable list of items, wherein scrolling display of the scrollable list of items includes:

transitioning display of the first set of items to a second set of items of the scrollable list of items different from the first set of items, wherein the second set of items includes a third item displayed at the first size; and

transitioning display of the second item of the scrollable list of items from the second size to the first size.

2. The electronic device of claim 1, wherein transitioning display of the first set of items to the second set of items of the scrollable list of items corresponds to an animated transition that reduces the first item horizontally and vertically until the first item ceases to be displayed.

3. The electronic device of claim 1, wherein transitioning display of the second item of the scrollable list of items from the second size to the first size corresponds to an animated transition that reduces the second item horizontally and vertically until the second item is displayed at the first size.

4. The electronic device of claim 1, wherein transitioning display of the first set of items to the second set of items of the scrollable list of items corresponds to an animated transition that expands the third item horizontally and vertically until the third item is displayed at the first size.

5. The electronic device of claim 1, the one or more programs including instructions for:

receiving a second scroll input;

in response to receiving the second scroll input, scrolling display of the scrollable list of items, wherein scrolling display of the scrollable list of items includes:

transitioning display of the second set of items to a third set of items of the scrollable list of items different from the first set of items and the second set of item; and

transitioning display of the third item of the scrollable list of items from the first size to the second size.

6. The electronic device of claim 5, wherein transitioning display of the third item of the scrollable list of items from the first size to the second size corresponds to an animated transition that expands the third item horizontally and vertically until displayed at the second size.

7. The electronic device of claim 5, wherein transitioning display of the first set of items to the second set of items of the scrollable list of items corresponds to an animated transition that expands the third item horizontally and vertically at a first rate until the third item is displayed at the first size, and

wherein transitioning display of the third item of the scrollable list of items from the first size to the second size corresponds to an animated transition that expands the third item horizontally and vertically at a second rate different from the first rate until the third item is displayed at the second size.

8. The electronic device of claim 1, wherein the device further includes a rotatable input mechanism and the scroll input is a rotation of the rotatable input mechanism.

9. A non-transitory computer-readable storage medium storing one or more programs configured to be executed by

one or more processors of an electronic device with a display and one or more input devices, the one or more programs including instructions for:

- displaying, on the display, a first set of items of a scrollable list of items, the first set of items of the scrollable list of items includes a first item and a second item, wherein the first item is displayed at a first size and the second item is displayed at a second size different from the first size;

- receiving a scroll input;

- in response to receiving the scroll input, scrolling display of the scrollable list of items, wherein scrolling display of the scrollable list of items includes:

  - transitioning display of the first set of items to a second set of items of the scrollable list of items different from the first set of items, wherein the second set of items includes a third item displayed at the first size; and

  - transitioning display of the second item of the scrollable list of items from the second size to the first size.

**10.** A method, comprising:

- at a device with one or more processors and memory:

  - displaying, on the display, a first set of items of a scrollable list of items, the first set of items of the scrollable list of items includes a first item and a second item, wherein the first item is displayed at a first size and the second item is displayed at a second size different from the first size;

  - receiving a scroll input;

  - in response to receiving the scroll input, scrolling display of the scrollable list of items, wherein scrolling display of the scrollable list of items includes:

    - transitioning display of the first set of items to a second set of items of the scrollable list of items different from the first set of items, wherein the second set of items includes a third item displayed at the first size; and

    - transitioning display of the second item of the scrollable list of items from the second size to the first size.

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