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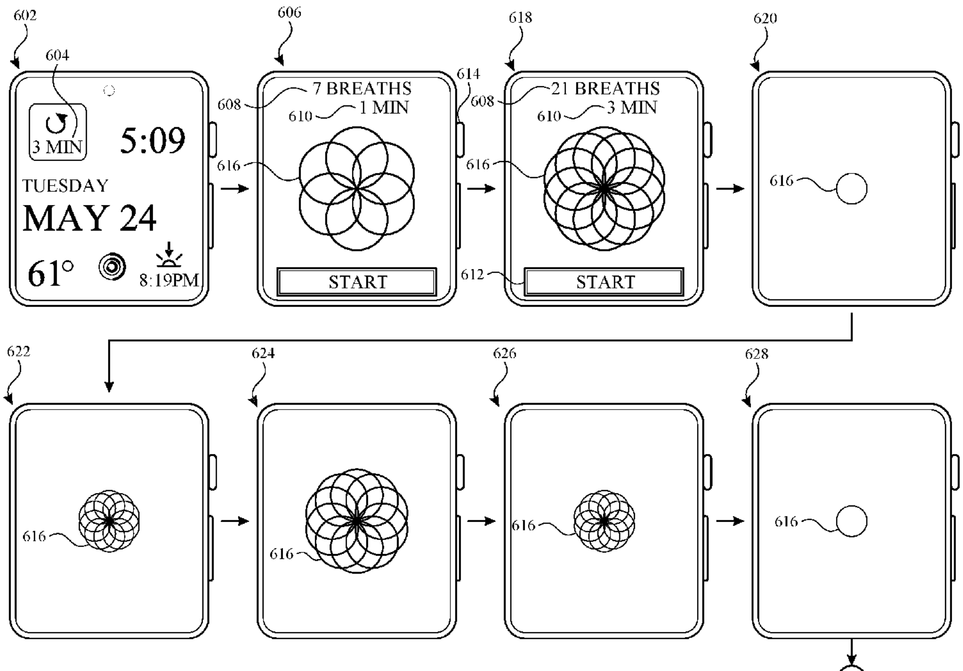

FIG. 6A

(57) Abstract: The present disclosure generally relates to user interfaces for breathing sequences. In some examples, a device displays a configuration user interface that comprises a prompt to select a number of cycles of a breathing sequence, adjusts the number of cycles of the breathing sequence to the selected number of cycles in response to selection, and initiates a breathing phase of the breathing sequence. In some examples, the device displays and fluctuates a progress indicator in accordance with the selected number of cycles. In some examples, a device detects a time associated with a first breathing sequence, generates a prompting criteria based on a predetermined prompting frequency and the detected time, determines if the prompting criteria has been met, displays a prompt to initiate a second breathing sequence, wherein the prompt comprises a first affordance, and displays a second breathing sequence user interface in response to selection of the first affordance.

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BREATHING SEQUENCE USER INTERFACE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application Serial No. 62/348,844, entitled "BREATHING SEQUENCE USER INTERFACE", filed on June 10, 2016, the content of which is hereby incorporated by reference in its entirety. This application claims priority to Denmark Patent Application No. PA 2017 70384, entitled "BREATHING SEQUENCE USER INTERFACE", filed on May 26, 2017, the content of which is hereby incorporated by reference in its entirety.

[0002] This application also relates to the following applications: U.S. Provisional Application Serial No. 62/348,804, entitled "Breathing Synchronization and Monitoring", filed on June 10, 2016; and U.S. Provisional Application Serial No. 62/348,808, entitled "Fluctuating Progress Indicator", filed on June 10, 2016. The content of these applications is hereby incorporated by reference in their entirety and are also appended hereto as Appendixes A and B, respectively.

FIELD

[0003] The present disclosure relates generally to computer user interfaces, and more specifically to user interfaces for conducting breathing sequences.

BACKGROUND

[0004] More people than ever are experiencing and reporting elevated levels of stress. Elevated levels of stress have been linked to an increase in risk factors for heart disease, heart attack, stroke, poor sleep, and unhealthy diet. It is estimated that over half of all health ailments derive from elevated levels of stress. Furthermore, studies have shown that individuals are working longer hours on average, compared to previous generations, and participate in lesser amounts of stress-reducing activities, such as physical exercise, leisure time, hobbies, and vacation. The entrenchment of poor habits and development of health ailments can serve to cause an individual to experience further stress and anxiety. Thus, the cycle of stress and its resulting effects can be difficult to manage well, though it is essential to do so. Recent studies have found that performing conscious breathing exercises can be effective against stress, and can lower blood pressure and heart rate, increase cardiovascular health, and make an individual feel more calm and relaxed. It is therefore desirable to facilitate the regular performance of breathing exercises and thereby reduce stress levels.

BRIEF SUMMARY

[0005] The present disclosure relates to systems and processes for conducting and generating notifications for breathing sequences on an electronic device, and for generating user interfaces for displaying the same. Some techniques for guiding a user breathing exercise are ineffective. For example, some existing techniques use a complex and time-consuming user interface, which may include multiple key presses or keystrokes. Existing techniques require more time than necessary, wasting user time and device energy. This latter consideration is particularly important in battery-operated devices. Furthermore, the use of complex and unintuitive user interfaces may frustrate the user, and thus create the undesirable effects of increasing a user's stress level or causing the user to forgo performing a breathing exercise due to time or frustration.

[0006] Accordingly, the present technique provides electronic devices with faster, more efficient methods and interfaces for conducting breathing sequences to guide and train a user's breathing while performing a breathing exercise. Such methods and interfaces optionally complement or replace other methods for conducting breathing sequences. 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. For example, intuitive interfaces for configuring and conducting breathing sequences reduces the number of unnecessary, extraneous, or repetitive inputs received by the device, resulting in reduced battery usage by the display and one or more processors.

[0007] In some embodiments, a computer-implemented method is performed, the method comprising: at a device with a display: displaying, on the display, a configuration user interface, wherein the configuration user interface comprises a prompt to select a number of cycles of a breathing sequence; receiving a first user input; in response to receiving the first user input, adjusting the number of cycles of the breathing sequence to the selected number of cycles; initiating a breathing phase of the breathing sequence; and during the breathing phase of the breathing sequence: displaying, on the display, a first version of a progress indicator; and fluctuating the first version of the progress indicator in accordance with the selected number of cycles.

[0008] In some embodiments, an electronic device comprises: a display; one or more processors; memory; and one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors, the one or more programs including instructions for: displaying, on the display, a configuration user interface, wherein the configuration user interface comprises a prompt to select a number of cycles of a breathing sequence; receiving a first user input; in response to receiving the first user input, adjusting the number of cycles of the breathing sequence to the selected number of cycles; initiating a breathing phase of the breathing sequence; and during the breathing phase of the breathing sequence: displaying, on the display, a first version of a progress indicator; and fluctuating the first version of the progress indicator in accordance with the selected number of cycles.

[0009] In some embodiments, a non-transitory computer-readable storage medium stores one or more programs, the one or more programs comprising instructions, which, when executed by an electronic device with a display, cause the device to: display, on the display, a configuration user interface, wherein the configuration user interface comprises a prompt to select a number of cycles of a breathing sequence; receive a first user input; in response to receiving the first user input, adjust the number of cycles of the breathing sequence to the selected number of cycles; initiate a breathing phase of the breathing sequence; and during the breathing phase of the breathing sequence: display, on the display, a first version of a progress indicator; and fluctuate the first version of the progress indicator in accordance with the selected number of cycles.

[0010] In some embodiments, a transitory computer-readable storage medium stores one or more programs, the one or more programs comprising instructions, which, when executed by an electronic device with a display, cause the device to: display, on the display, a configuration user interface, wherein the configuration user interface comprises a prompt to select a number of cycles of a breathing sequence; receive a first user input; in response to receiving the first user input, adjust the number of cycles of the breathing sequence to the selected number of cycles; initiate a breathing phase of the breathing sequence; and during the breathing phase of the breathing sequence: display, on the display, a first version of a progress indicator; and fluctuate the first version of the progress indicator in accordance with the selected number of cycles.

[0011] In some embodiments, a system comprises: a display; means for displaying, on the display, a configuration user interface, wherein the configuration user interface comprises a prompt to select a number of cycles of a breathing sequence; means for receiving a first user input; means, responsive to receiving the first user input, for adjusting the number of cycles of

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the breathing sequence to the selected number of cycles; means for initiating a breathing phase of the breathing sequence; and means for, during the breathing phase of the breathing sequence: displaying, on the display, a first version of a progress indicator; and fluctuating the first version of the progress indicator in accordance with the selected number of cycles.

[0012] In some embodiments, a device comprises: a display unit; and a processing unit coupled to the display unit, the processing unit comprising: a display enabling unit configured to enable display of, on the display unit, a configuration user interface, wherein the configuration user interface comprises a prompt to select a number of cycles of a breathing sequence; a receiving unit configured to receive a first user input; an adjusting unit configured to, in response to receiving the first user input, adjust the number of cycles of the breathing sequence to the selected number of cycles; an initiating unit configured to initiate a breathing phase of the breathing sequence; and during the breathing phase of the breathing sequence: wherein the display enabling unit is further configured to enable display of, on the display unit, a first version of a progress indicator; and a fluctuating unit configured to fluctuate the first version of the progress indicator in accordance with the selected number of cycles.

[0013] According to a first aspect of the invention there is provided a computer-implemented method comprising: at an electronic device with a display: detecting a time associated with a first breathing sequence; generating a prompting criteria based on a predetermined prompting frequency and the detected time associated with the first breathing sequence; determining if the prompting criteria has been met; in accordance with a determination that the prompting criteria has been met, displaying, on the display, a prompt to initiate a second breathing sequence, wherein the prompt comprises a first affordance, and wherein the prompting criteria include a criterion that is met when one or more of a device motion condition and a scheduled calendar event condition are met; receiving user input selection of the first affordance; in response to receiving the user input selection of the first affordance, displaying, on the display, a second breathing sequence user interface; and in accordance with a determination that the second breathing sequence reaches completion, displaying, on the display, a breathing sequence summary user interface corresponding to the second breathing sequence, wherein the breathing sequence summary user interface includes at least one of a pulse rate, a heart rate, a heart rate variability measure, temperature data, a number of steps, an amount of time standing and sitting, and a number of calories burned.

[0014] According to a second aspect of the invention there is provided an electronic device comprising: a display; one or more processors; memory; and one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors, the one or more programs including instructions for performing the method of the first aspect.

[0015] According to a third aspect of the invention there is provided a computer-readable storage medium storing one or more programs, the one or more programs comprising instructions, which, when executed by an electronic device with a display, cause the device to perform the method of the first aspect.

[0016] In some embodiments, a transitory computer-readable storage medium stores one or more programs, the one or more programs comprising instructions, which, when executed by an electronic device with a display, cause the device to: detect a time associated with a first breathing sequence; generate a prompting criteria based on a predetermined prompting frequency and the detected time associated with the first breathing sequence; determine if the prompting criteria has been met; in accordance with a determination that the prompting criteria has been met, display, on the display, a prompt to initiate a second breathing sequence, wherein the prompt comprises a first affordance; receive user input selection of the first affordance; and in response to receiving the user input selection of the first affordance, display, on the display, a second breathing sequence user interface.

[0017] In some embodiments, a system comprises: a display; means for detecting a time associated with a first breathing sequence; means for generating a prompting criteria based on a predetermined prompting frequency and the detected time associated with the first breathing sequence; means for determining if the prompting criteria has been met; means for, in accordance with a determination that the prompting criteria has been met, displaying, on the display, a prompt to initiate a second breathing sequence, wherein the prompt comprises a first affordance; means for receiving user input selection of the first affordance; and means, responsive to receiving the user input selection of the first affordance, for displaying, on the display, a second breathing sequence user interface.

[0018] In some embodiments, a device comprises: a display unit; and a processing unit coupled to the display unit, the processing unit comprising: a detecting unit configured to detect a time associated with a first breathing sequence; a generating unit configured to generate a prompting criteria based on a predetermined prompting frequency and the detected time associated with the first breathing sequence; a determining unit configured to determine if the prompting criteria has been met; a display enabling unit configured to, in accordance with a determination that the prompting criteria has been met, enable display of, on the display unit, a prompt to initiate a second breathing sequence, wherein the prompt comprises a first affordance; and a receiving unit configured to receive user input selection of the first affordance; and wherein the display enabling unit is further configured to, in response to receiving the user input selection of the first affordance, enable display of, on the display unit, a second breathing sequence user interface.

[0019] 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 storage medium or other computer program product configured for execution by one or more processors.

[0020] Thus, devices are provided with faster, more efficient methods and interfaces for conducting breathing sequences, thereby increasing the effectiveness, efficiency, and user satisfaction with such devices. Such methods and interfaces may complement or replace other methods for conducting breathing sequences.

DESCRIPTION OF THE FIGURES

[0021] 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.

[0022] FIG. 1A is a block diagram illustrating a portable multifunction device with a touch-sensitive display in accordance with some embodiments.

[0023] FIG. 1B is a block diagram illustrating exemplary components for event handling in accordance with some embodiments.

[0024] FIG. 2 illustrates a portable multifunction device having a touch screen in accordance with some embodiments.

[0025] FIG. 3 is a block diagram of an exemplary multifunction device with a display and a touch-sensitive surface in accordance with some embodiments.

[0026] FIG. 4A illustrates an exemplary user interface for a menu of applications on a portable multifunction device in accordance with some embodiments.

[0027] 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.

[0028] FIG. 5A illustrates a personal electronic device in accordance with some embodiments.

[0029] FIG. 5B is a block diagram illustrating a personal electronic device in accordance with some embodiments.

[0030] FIGS. 5C-5D illustrate exemplary components of a personal electronic device having a touch-sensitive display and intensity sensors in accordance with some embodiments.

[0031] FIGS. 5E-5H illustrate exemplary components and user interfaces of a personal electronic device in accordance with some embodiments.

[0032] FIGS. 6A-6F illustrate exemplary user interfaces for conducting breathing sequences in accordance with some embodiments.

[0033] FIGS. 7A-7L is a flow diagram illustrating an exemplary process for conducting breathing sequences.

[0034] FIG. 8 illustrates a functional block diagram of an electronic device in accordance with some embodiments.

[0035] FIGS. 9A-9B illustrate exemplary user interfaces for generating reminders to conduct a breathing sequence.

[0036] FIGS. 10A-10F is a flow diagram illustrating an exemplary process for generating reminders to conduct a breathing sequence.

[0037] FIG. 11 illustrates a functional block diagram of an electronic device in accordance with some embodiments.

DESCRIPTION OF EMBODIMENTS

[0038] 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.

[0039] There is a need for electronic devices that provide intuitive and efficient methods and interfaces for conducting breathing sequences. Such techniques can reduce the cognitive burden on a user who conducts breathing sequences, thereby enhancing the effectiveness of guided breathing exercises. Further, such techniques can reduce processor and battery power otherwise wasted on redundant user inputs.

[0040] Below, FIGS. 1A-1B, 2, 3, 4A-4B, and 5A-5H provide a description of exemplary devices for performing the techniques for managing event notifications. FIGS. 6A-6F illustrate exemplary user interfaces for conducting breathing sequences. FIGS. 7A-7L is a flow diagram illustrating methods of conducting breathing sequences in accordance with some embodiments. The user interfaces in FIGS. 6A-6F are used to illustrate the processes described below, including the processes in FIGS. 7A-7L. FIGS. 9A-9B illustrate exemplary user interfaces for generating reminders to conduct a breathing sequence. FIGS. 10A-10F is a flow diagram illustrating methods of accessing event notifications in accordance with some embodiments. The user interfaces in FIGS. 9A-9B are used to illustrate the processes described below, including the processes in FIGS. 10A-10F.

[0041] 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.

[0042] 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.

[0043] 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.

[0044] 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, California. 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).

[0045] 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.

[0046] 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 workout 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.

[0047] 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.

[0048] 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.

[0049] 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).

[0050] 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.

[0051] 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.

[0052] 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.

[0053] 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.

[0054] 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.

[0055] 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 circuitry 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).

[0056] 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).

[0057] 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 11/322,549, "Unlocking a Device by Performing Gestures on an Unlock Image," filed December 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.

[0058] 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.

[0059] 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.

[0060] 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, California.

[0061] 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. Patents: 6,323,846 (Westerman et al.), 6,570,557 (Westerman et al.), and/or 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.

[0062] A touch-sensitive display in some embodiments of touch screen 112 is described in the following applications: (1) U.S. Patent Application No. 11/381,313, "Multipoint Touch Surface Controller," filed May 2, 2006; (2) U.S. Patent Application No. 10/840,862, "Multipoint Touchscreen," filed May 6, 2004; (3) U.S. Patent Application No. 10/903,964, "Gestures For Touch Sensitive Input Devices," filed July 30, 2004; (4) U.S. Patent Application No. 11/048,264, "Gestures For Touch Sensitive Input Devices," filed January 31, 2005; (5) U.S. Patent Application No. 11/038,590, "Mode-Based Graphical User Interfaces For Touch Sensitive Input Devices," filed January 18, 2005; (6) U.S. Patent Application No. 11/228,758, "Virtual Input Device Placement On A Touch Screen User Interface," filed September 16, 2005; (7) U.S. Patent Application No. 11/228,700, "Operation Of A Computer With A Touch Screen Interface," filed September 16, 2005; (8) U.S. Patent Application No. 11/228,737, "Activating Virtual Keys Of A Touch-Screen Virtual Keyboard," filed September 16, 2005; and (9) U.S. Patent Application No. 11/367,749, "Multi-Functional Hand-Held Device," filed March 3, 2006. All of these applications are incorporated by reference herein in their entirety.

[0063] 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.

[0064] 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.

[0065] 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.

[0066] 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.

[0067] 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.

[0068] 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 Nos. 11/241,839, "Proximity Detector In Handheld Device"; 11/240,788, "Proximity Detector In Handheld Device"; 11/620,702, "Using Ambient Light Sensor To Augment Proximity Sensor Output"; 11/586,862, "Automated Response To And Sensing Of User Activity In Portable Devices"; and 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).

[0069] 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.

[0070] 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.

[0071] 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.

[0072] 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.

[0073] 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.

[0074] 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.

[0075] 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).

[0076] 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.

[0077] 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.

[0078] 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.

[0079] 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.

[0080] 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).

[0081] 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).

[0082] Applications 136 optionally include the following modules (or sets of instructions), or a subset or superset thereof:

- Contacts module 137 (sometimes called an address book or contact list);
- Telephone module 138;
- Video conference module 139;
- E-mail client module 140;
- Instant messaging (IM) module 141;
- Workout support module 142;
- Camera module 143 for still and/or video images;
- Image management module 144;
- Video player module;
- Music player module;
- Browser module 147;
- Calendar module 148;
- 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;
- Widget creator module 150 for making user-created widgets 149-6;
- Search module 151;

- Video and music player module 152, which merges video player module and music player module;
- Notes module 153;
- Map module 154; and/or
- Online video module 155.

[0083] 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.

[0084] 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.

[0085] 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.

[0086] 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.

[0087] 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.

[0088] 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).

[0089] 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.

[0090] 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.

[0091] 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.

[0092] 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.

[0093] 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.

[0094] 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).

[0095] 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).

[0096] 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.

[0097] 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.).

[0098] 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.

[0099] 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.

[0100] 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 June 20, 2007, and U.S. Patent Application No. 11/968,067, "Portable Multifunction Device, Method, and Graphical User Interface for Playing

Online Videos," filed December 31, 2007, the contents of which are hereby incorporated by reference in their entirety.

[0101] 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.

[0102] 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.

[0103] 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.

[0104] 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).

[0105] 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 internal state 192 is used by event sorter 170 to determine application views 191 to which to deliver event information.

[0106] 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.

[0107] 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.

[0108] 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).

[0109] In some embodiments, event sorter 170 also includes a hit view determination module 172 and/or an active event recognizer determination module 173.

[0110] 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.

[0111] 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.

[0112] 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.

[0113] 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.

[0114] 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.

[0115] 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.

[0116] 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.

[0117] 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).

[0118] 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.

[0119] 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.

[0120] 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.

[0121] 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.

[0122] 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.

[0123] In some embodiments, a respective event recognizer 180 includes metadata 183 with configurable properties, 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.

[0124] 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.

[0125] 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.

[0126] 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.

[0127] 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.

[0128] 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.

[0129] 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.

[0130] 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.

[0131] 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.

[0132] 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.

[0133] 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.

[0134] Attention is now directed towards embodiments of user interfaces that are, optionally, implemented on, for example, portable multifunction device 100.

[0135] 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:

- Signal strength indicator(s) 402 for wireless communication(s), such as cellular and Wi-Fi signals;
- Time 404;
- Bluetooth indicator 405;
- Battery status indicator 406;
- Tray 408 with icons for frequently used applications, such as:
  - Icon 416 for telephone module 138, labeled “Phone,” which optionally includes an indicator 414 of the number of missed calls or voicemail messages;
  - Icon 418 for e-mail client module 140, labeled “Mail,” which optionally includes an indicator 410 of the number of unread e-mails;
  - Icon 420 for browser module 147, labeled “Browser;” and
  - Icon 422 for video and music player module 152, also referred to as iPod (trademark of Apple Inc.) module 152, labeled “iPod;” and
- Icons for other applications, such as:
  - Icon 424 for IM module 141, labeled “Messages;”
  - Icon 426 for calendar module 148, labeled “Calendar;”
  - Icon 428 for image management module 144, labeled “Photos;”
  - Icon 430 for camera module 143, labeled “Camera;”
  - Icon 432 for online video module 155, labeled “Online Video;”

- Icon 434 for stocks widget 149-2, labeled "Stocks;"
- Icon 436 for map module 154, labeled "Maps;"
- Icon 438 for weather widget 149-1, labeled "Weather;"
- Icon 440 for alarm clock widget 149-4, labeled "Clock;"
- Icon 442 for workout support module 142, labeled "Workout Support;"
- Icon 444 for notes module 153, labeled "Notes;" and
- Icon 446 for a settings application or module, labeled "Settings," which provides access to settings for device 100 and its various applications 136.

[0136] 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.

[0137] 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.

[0138] 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.

[0139] 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.

[0140] 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.

[0141] 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 November 11, 2013, published as WIPO Publication No. WO/2014/105276, each of which is hereby incorporated by reference in their entirety.

[0142] 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.

[0143] 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.

[0144] 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.

[0145] 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 and 1000 (FIGS. 7 and 10). 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.

[0146] 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. 1, 3, and 5). For example, an image (e.g., icon), a button, and text (e.g., hyperlink) each optionally constitute an affordance.

[0147] 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).

[0148] 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.

[0149] 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 Ij that is a portion of the aggregate intensity, A, in accordance with a predefined mathematical function, $Ij = A\cdot(Dj/\Sigma Di)$, where Dj is the distance of the respective contact j to the center of force, and ΣDi 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.

[0150] 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.

[0151] 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.

[0152] 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.

[0153] 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).

[0154] 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_L") in FIG. 5E, to an intensity above a deep press intensity threshold (e.g., "IT_D") 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_D"). 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_D") 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.

[0155] 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_D"). 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.

[0156] 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).

[0157] 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.

[0158] The device is optionally configured with one or more sensors for collecting health data of a user. The health data can include any suitable data relating to the health of the user. In some examples, the device may be configured to capture health data from the user. Such health data may indicate, for the user, a pulse rate, a heart rate, a heart rate variability measure, temperature data, a number of steps, an amount of time standing and sitting, a number of calories burned, a number of minutes exercised, and/or any other suitable data. The device may also be configured with one or more input devices by which the user can interact with the device. The device may also be configured with one or more output devices to output any suitable output information. For example, the device may be configured to output visual information, audio information, and/or haptic information. In some examples, the output information can be presented to the user in a manner that directs the user to perform one or more actions relating to breathing. For example, the output information can include a progress indicator that fluctuates (e.g., a type of the visual information). The progress indicator can be presented on a graphical user interface of the device and configured to lead the user through a series of breathing exercises included in a breathing sequence, as further described herein. The output information may be presented by an application running on the device.

[0159] The device may be associated with a second device (e.g., a paired or host device). In some examples, this may include the device being paired with the second device in any suitable manner. Pairing of the two devices optionally enables the second device to function as a proxy for the device. The device, the second device, or any suitable combination of the device and the second device may generate the output information based, at least in part, on the health data.

[0160] In accordance with some embodiments, the device used to perform the processes described herein (e.g., electronic device similar or identical to device 100, 300, or 500) includes multiple electrodes that are located on or near external surfaces of the device. In the present example, the device includes a first electrode and a second electrode that are located on or proximate to a rear-facing surface of the device body. In this example, the first electrode and the second electrode are configured to make electrical contact with the skin of the user wearing the device. In some cases, the first and second electrodes are used to take an electrical measurement or receive an electrical signal from the body of the user. The device optionally includes a third electrode and a fourth electrode that are located on or proximate to a perimeter of the device's body. In the present example, the third and fourth electrodes are configured to be contacted by one or more fingers of the user who is wearing or interacting with the device. In some cases, the third and fourth electrodes are also used to take an electrical measurement or receive an electrical signal from the body of the user. In some examples, the first, second, third, and fourth electrodes are all used to take a measurement or series of measurements that can be used to compute another health metric of the user's body. Health metrics that may be computed using the electrodes include, without limitation, heart functions (ECG, EKG), water content, body-fat ratios, galvanic skin resistance, and combinations thereof.

[0161] In some examples, the electronic device includes one or more apertures in the device's body. A light source may be disposed in each aperture. In one embodiment, each light source is implemented as a light-emitting diode (LED). In the present example, four apertures (e.g., the three light sources and a single detector) are used to form one or more sensors. Other embodiments can include any number of light sources. For example, two light sources can be used in some embodiments.

[0162] The light sources may operate at the same light wavelength range, or the light sources can operate at different light wavelength ranges. As one example, with two light sources one light source may transmit light in the visible wavelength range while the other light source can emit light in the infrared wavelength range. With four light sources, two light sources may transmit light in the visible wavelength range while the other two light sources can emit light in the infrared wavelength range. For example, in one embodiment, at least one light source can emit light in the wavelength range associated with the color green while another light source transmits light in the infrared wavelength range. When a physiological parameter of the user is to be determined, the light sources emit light toward the user's skin and the optical sensor senses an amount of reflected light. In some cases, a modulation pattern or sequence may be used to turn the light sources on and off and sample or sense the reflected light.

[0163] In some embodiments, the electrodes, light sources, and sensors discussed above are those shown in FIG. 14, and described in the accompanying text, of U.S. Provisional Application Serial No. 62/348,804, entitled "Breathing Synchronization and Monitoring", filed on June 10, 2016; and U.S. Provisional Application Serial No. 62/348,808, entitled "Fluctuating Progress Indicator", filed on June 10, 2016. The content of these applications is hereby incorporated by reference in their entirety for all purposes.

[0164] 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.

[0165] Examples of the present disclosure are directed to, among other things, methods, systems, and computer-readable media for conducting breathing sequences using one or more electronic devices. Initially, this optionally includes collecting user health data using one or more sensors of an electronic device, and analyzing the user health data to identify or estimate an estimated breathing pattern. The estimated breathing pattern is optionally synchronized with a breathing sequence. In some examples, the breathing sequence begins with an initial presentation of one or more breathing cues (e.g., a progress indicator). The breathing cues guide a user through the breathing sequence and can include visual cues, audible cues, and/or haptic cues. The synchronization of the estimated breathing pattern and the breathing sequence is optionally done in a way that helps the user smoothly transition her estimated breathing pattern into the breathing sequence. For example, the initial presentation of the breathing cue can be synchronized with a user breath event such as a user inhale cycle or a user exhale cycle.

[0166] In some examples, the breathing cue discussed above can be a visual breathing cue. Such visual breathing cues can be represented by a user interface element in the form of a progress indicator that is generated and presented to the user at the electronic device. The progress indicator can be defined as having one or more variable visual characteristics (e.g., complexity, alignment, visibility, etc.) that can optionally change over the course of the breathing sequence, or be selected based on configuration information. Changes in complexity of the fluctuating progress indicator can inform the user of their progress through the breathing sequence. For example, at the beginning of the breathing sequence, the progress indicator optionally includes a number of graphical elements (e.g., circular rings, ovular rings, squares, etc.) arranged in a pattern. As the user progresses through the breathing sequence, the number of user interface elements can be reduced. Thus, at completion of the breathing sequence, the progress indicator may have changed in complexity (e.g., fewer graphical elements and/or a less complex arrangement of the graphical elements). Changes in alignment and visibility of the progress indicator optionally also take place during the breathing sequence and can function as visual breathing cues for the user. For example, the progress indicator is optionally configured to fluctuate and rotate—grow while rotating clockwise to signal the user to inhale, to shrink while rotating counterclockwise to signal the user to exhale. At the conclusion of the breathing exercise, information (e.g., quantitative and/or qualitative) may be presented.

[0167] Exemplary methods, non-transitory computer-readable storage media, systems, and electronic devices are set out in the following items:

1. A computer-implemented method, comprising:

at a device with a display:

displaying, on the display, a configuration user interface, wherein the configuration user interface comprises a prompt to select a number of cycles of a breathing sequence;

receiving a first user input;

in response to receiving the first user input, adjusting the number of cycles of the breathing sequence to the selected number of cycles;

initiating a breathing phase of the breathing sequence; and

during the breathing phase of the breathing sequence:

displaying, on the display, a first version of a progress indicator; and

fluctuating the first version of the progress indicator in accordance with the selected number of cycles.

2. The computer-implemented method of claim 1, wherein the device includes a rotatable input mechanism, and wherein the first user input is a rotation of the rotatable input mechanism.

3. The computer-implemented method of any of claims 1-2, further comprising:

prior to initiating the breathing phase of the breathing sequence:

receiving a second user input;

in response to receiving the second user input, progressing to the breathing phase of the breathing sequence.

4. The computer-implemented method of claim 3, wherein the first user input and the second user input are the same.

5. The computer-implemented method of any of claims 1-4, wherein each cycle of the selected number of cycles comprises a first period of time and a second period of time distinct from the first period, and wherein fluctuating the first version of the progress indicator comprises:

during each cycle of the selected number of cycles:

changing, at the start of the first period of time, a first variable visual characteristic of the progress indicator; and

changing, at the start of the second period of time, the first variable visual characteristic of the progress indicator.

6. The computer-implemented method of claim 5, wherein the first variable visual characteristic is the size of the displayed progress indicator,

wherein changing, at the start of the first period of time, the first variable visual characteristic comprises increasing the size of the displayed progress indicator, and wherein changing, at the start of the second period of time, the first variable visual characteristic comprises decreasing the size of the displayed progress indicator.

7. The computer-implemented method of claim 5, wherein the second period of time is greater than the first period of time.

8. The computer-implemented method of any of claims 1-7, wherein fluctuating the first version of the progress indicator comprises:

displaying, on the display, the first version of the progress indicator in a first state;

animatedly transitioning, during a first segment of time, the first version of the progress indicator from the first state to a second state; and

animatedly transitioning, during a second segment of time, the first version of the progress indicator from the second state to the first state.

9. The computer-implemented method of claim 8, wherein the second segment of time is greater than the first segment of time.

10. The computer-implemented method of any of claims 1-9, wherein the first version of the progress indicator fluctuates at a first cyclic rate.

11. The computer-implemented method of claim 10, further comprising:

receiving a value of the first cyclic rate;

in response to receiving the value of the first cyclic rate, setting the first cyclic rate to the received value.

12. The computer-implemented method of any of claims 10-11, wherein the first cyclic rate is a predetermined number of cycles per unit of time.

13. The computer-implemented method of any of claims 1-12, further comprising:

prior to displaying, on the display, the configuration user interface:

determining whether a prompting criteria has been met;

in accordance with a determination that the prompting criteria has been met, displaying, on the display, a prompt that comprises a first affordance;

receiving user input selection of the first affordance; and in response to receiving the user input selection of the first affordance, displaying, on the display, the configuration user interface.

14. The computer-implemented method of claim 13, wherein determining whether a prompting criteria has been met comprises determining whether a predetermined period of time has passed after a time associated with a previous breathing sequence.

15. The computer-implemented method of claim 14, wherein the time associated with the previous breathing sequence is a beginning time associated with the previous breathing sequence.

16. The computer-implemented method of claim 14, wherein the time associated with the previous breathing sequence is a completion time associated with the previous breathing sequence.

17. The computer-implemented method of any of claims 1-16, further comprising:
prior to initiating the breathing phase of the breathing sequence:
initiating a preliminary phase of the breathing sequence; and
during the preliminary phase of the breathing sequence:
displaying, on the display, a second version of the progress indicator; and
fluctuating the second version of the progress indicator in accordance with a preliminary number of cycles.

18. The computer-implemented method of claim 17, wherein the preliminary number of cycles is independent of the selected number of cycles.

19. The computer-implemented method of any of claims 17-18, wherein the first version of the progress indicator fluctuates at a first cyclic rate, wherein the second version of the progress indicator fluctuates at a second cyclic rate, and wherein the second cyclic rate is greater than the first cyclic rate.

20. The computer-implemented method of any of claims 1-19, wherein the first version of the progress indicator comprises a second variable visual characteristic, the method further comprising:

further in response to receiving the first user input, selecting an initial state of the second variable visual characteristic in accordance with the selected number of cycles.

21. The computer-implemented method of claim 20, further comprising:

during the breathing phase of the breathing sequence:

detecting completion of a portion of the selected number of cycles; and

in response to detecting completion of the portion of the selected number of cycles, changing the second variable visual characteristic of the progress indicator.

22. The computer-implemented method of claim 21, wherein detecting completion of the portion of the selected number of cycles comprises:

determining whether the progress indicator has fluctuated in accordance with a predetermined number of cycles.

23. The computer-implemented method of any of claims 21-22, wherein detecting completion of the portion of the selected number of cycles comprises:

detecting whether a predetermined amount of time has passed during the breathing phase of the breathing sequence.

24. The computer-implemented method of any of claims 21-23, wherein the first version of the progress indicator comprises a plurality of graphical elements, and wherein changing the second variable visual characteristic of the progress indicator comprises:

changing a number of the displayed graphical elements of the plurality of graphical elements.

25. The computer-implemented method of any of claims 5-24, wherein the device includes a haptic output device, the method further comprising:

during the breathing phase of the breathing sequence, outputting one or more haptic breathing cues according to a haptic profile.

26. The computer-implemented method of claim 25, wherein outputting the one or more haptic breathing cues according to the haptic profile comprises:

outputting a first plurality of haptic breathing cues at a first frequency between cues during the first period of time; and outputting a second plurality of haptic breathing cues at a second frequency between cues during the second period of time.

27. The computer-implemented method of claim 26, wherein the first frequency between cues is an increasing frequency, and wherein the second frequency between cues is a constant frequency.

28. The computer-implemented method of any of claims 25-27, wherein outputting the one or more haptic breathing cues according to the haptic profile comprises:

outputting, at the start of the first period of time, a first number of haptic breathing cues; and

outputting, at the start of the second period of time, a second number of haptic breathing cues, wherein the first number and the second number are different.

29. The computer-implemented method of any of claims 1-28, wherein the device includes a sensor, the method further comprising:

receiving a first signal from the sensor during the breathing phase of the breathing sequence;

determining an estimated heart rate based at least in part on the received first signal; and

displaying, on the display, an indication of the estimated heart rate.

30. The computer-implemented method of claim 29, wherein the indication of the estimated heart rate is displayed subsequent to completion of the breathing phase.

31. The computer-implemented method of any of claims 1-30, further comprising:

suppressing, during the breathing phase of the breathing sequence, the output of at least a subset of alerts that the device is configured to output.

32. The computer-implemented method of any of claims 1-31, further comprising:

during the breathing phase of the breathing sequence, receiving a third user input;

determining whether the third user input meets a breathing sequence interrupt criteria;

in accordance with a determination that the third user input meets the breathing sequence interrupt criteria, ending the breathing phase of the breathing sequence; and

subsequent to ending the breathing phase of the breathing sequence:

displaying, on the display, an indication of a completed number of cycles, wherein the completed number of cycles includes the number of cycles, of the selected number of cycles, that the progress indicator fluctuated in accordance with after the breathing phase was initiated and before the third user input was received.

33. The computer-implemented method of claim 32, further comprising:

subsequent to ending the breathing phase of the breathing sequence:

displaying, on the display, a second affordance;

receiving user input selection of the second affordance; and

in response to the user input selection of the second affordance, displaying, on the display, the configuration user interface.

34. The computer-implemented method of any of claims 1-33, further comprising:

determining an aggregate amount of time representing a completed number of cycles of the breathing sequence over a goal period;

in response to detecting completion of the breathing phase of the breathing sequence, displaying, on the display, a completion interface comprising:

an indication of the aggregate amount of time; and

a third affordance;

receiving user input selection of the third affordance; and

in response to receiving the user input selection of the third affordance, progressing to breathing phase of the breathing sequence.

35. The computer-implemented method of claim 34, wherein detecting completion of the breathing phase comprises detecting that a predetermined amount of time has elapsed.

36. The computer-implemented method of any of claims 34-35, wherein the completion interface further comprises an indication of an estimated heart rate.

37. The computer-implemented method of any of claims 34-36, wherein the goal period is the current day.

38. The computer-implemented method of any of claims 34-37, wherein the first version of the progress indicator fluctuates at a first cyclic rate, and wherein the aggregate amount of time is determined based at least in part on the first cyclic rate.

39. The computer-implemented method of any of claims 1-38, further comprising:

determining an aggregate amount of time representing a completed number of cycles of the breathing sequence over a goal period for each of a plurality of goal periods;

displaying, on the display, a summary interface comprising an indicator for each of the plurality of goal periods, wherein the indicator for each of the plurality of goal periods represents the determined aggregate amount of time for its respective goal period of the plurality of goal periods.

40. The computer-implemented method of claim 39, wherein the goal period is a day, and wherein the plurality of goal periods is seven days.

41. The computer-implemented method of any of claims 1-40, further comprising:

receiving a second signal during the breathing sequence;

determining an estimated breathing pattern based at least in part on the received second signal; and

synchronizing the initiation of the breathing phase of the breathing sequence and the display of the progress indicator during the breathing phase of the breathing sequence with the estimated breathing pattern.

42. The computer-implemented method of claim 41, wherein synchronizing the initiation of the breathing phase of the breathing sequence and the display of the progress indicator during the breathing phase of the breathing sequence with the estimated breathing pattern comprises:

determining a synchronization event that is a transition between an inhale period and an exhale period of the estimated breathing pattern; and

in accordance with a determination that the synchronization event has occurred:

initiating the breathing phase of the breathing sequence; and

displaying, on the display, the first version of the progress indicator.

43. The computer-implemented method of claim 41, wherein the device includes a sensor, and wherein receiving the second signal comprises:

receiving the second signal from the sensor during the breathing sequence.

44. The computer-implemented method of any of claims 1-43, further comprising:

prior to displaying the configuration user interface:

determining an aggregate amount of time representing a completed number of cycles of one or more breathing sequences over a goal period;

displaying, on the display, a fourth affordance comprising an indication of the aggregate amount of time; and

receiving user input selection of the fourth affordance,

wherein the configuration user interface is displayed in response to receiving the user input selection of the fourth affordance.

45. A computer-implemented method, comprising:

at an electronic device with a display:

detecting a time associated with a first breathing sequence;

generating a prompting criteria based on a predetermined prompting frequency and the detected time associated with the first breathing sequence;

determining if the prompting criteria has been met;

in accordance with a determination that the prompting criteria has been met, displaying, on the display, a prompt to initiate a second breathing sequence, wherein the prompt comprises a first affordance;

receiving user input selection of the first affordance; and

in response to receiving the user input selection of the first affordance, displaying, on the display, a second breathing sequence user interface.

46. The computer-implemented method of claim 45, wherein the predetermined prompting frequency is a predetermined length of time.

47. The computer-implemented method of claim 46,

wherein generating the prompting criteria comprises:

determining a prompting time that occurs the predetermined length of time after the time associated with the first breathing sequence; and

wherein determining if the prompting criteria has been met comprises:

determining if the prompting time has occurred.

48. The computer-implemented method of claim 47,

wherein generating the prompting criteria further comprises:

setting a timer in accordance with the predetermined length of time; and

starting the timer; and

wherein determining if the prompting time has occurred comprises:

determining whether the timer has expired.

49. The computer-implemented method of any of claims 45-48, wherein detecting the time associated with the first breathing sequence comprises:

detecting a time that occurred during the first breathing sequence.

50. The computer-implemented method of any of claims 45-49, wherein detecting the time associated with the first breathing sequence comprises:

detecting an initiation time of a breathing phase of the first breathing sequence.

51. The computer-implemented method of any of claims 45-49, wherein detecting the time associated with the first breathing sequence comprises:

detecting a completion time of a breathing phase of the first breathing sequence.

52. The computer-implemented method of any of claims 45-51, further comprising:

prior to a determination that the prompting criteria has been met:

detecting a time associated with a third breathing sequence; and

in accordance with a detection of the time associated with the third breathing sequence, updating the prompting criteria based on the predetermined prompting frequency and the detected time associated with the third breathing sequence.

53. The computer-implemented method of any of claims 45-52, further comprising:

receiving a first user input;

in response to receiving the first user input, progressing to a breathing phase of the second breathing sequence; and

during the breathing phase of the second breathing sequence:

displaying, on the display, a first version of a progress indicator; and

fluctuating the first version of the progress indicator in accordance with a selected number of cycles.

54. The computer-implemented method of claim 53, further comprising:

prior to progressing to the breathing phase of the second breathing sequence:

receiving a second user input; and

in response to receiving the second user input, adjusting a number of cycles of the second breathing sequence to the selected number of cycles.

55. The computer-implemented method of any of claims 45-54, wherein the prompt to initiate the second breathing sequence comprises a second affordance, the method further comprising:

receiving user input selection of the second affordance; and

in response to receiving the user input selection of the second affordance:

ceasing display, on the display, of the prompt; and

updating the prompting criteria.

56. The computer-implemented method of claim 55, wherein updating the prompting criteria comprises:

updating the prompting criteria based on the predetermined prompting frequency and the detected time associated with the first breathing sequence.

57. The computer-implemented method of claim 55, wherein updating the prompting criteria comprises:

detecting a time associated with the received user input selection of the second affordance; and

updating the prompting criteria based on the predetermined prompting frequency and the detected time associated with the received user input selection of the second affordance.

58. The computer-implemented method of claim 55, wherein updating the prompting criteria comprises:

updating the prompting criteria based on a snooze interval,

wherein the predetermined prompting frequency is a predetermined length of time, and

wherein the snooze interval is a length of time that is distinct from the predetermined prompting frequency.

59. The computer-implemented method of claim 55, further comprising:

further in response to receiving the user input selection of the second affordance:

forgoing display of all prompts to initiate a breathing sequence during the remainder of a current day.

60. The computer-implemented method of any of claims 55-59, further comprising:

determining if the updated prompting criteria has been met;

in accordance with a determination that the updated prompting criteria has been met, displaying, on the display, a prompt to initiate a fourth breathing sequence, wherein the prompt comprises a third affordance;

receiving user input selection of the third affordance; and

in response to receiving the user input selection of the third affordance, displaying, on the display, a fourth breathing sequence user interface.

61. An electronic device, comprising:

a display;

one or more processors;

memory; and

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

displaying, on the display, a configuration user interface, wherein the configuration user interface comprises a prompt to select a number of cycles of a breathing sequence;

receiving a first user input;

in response to receiving the first user input, adjusting the number of cycles of the breathing sequence to the selected number of cycles;

initiating a breathing phase of the breathing sequence; and

during the breathing phase of the breathing sequence:

displaying, on the display, a first version of a progress indicator; and

fluctuating the first version of the progress indicator in accordance with the selected number of cycles.

62. A non-transitory computer-readable storage medium storing one or more programs, the one or more programs comprising instructions, which, when executed by an electronic device with a display, cause the device to:

display, on the display, a configuration user interface, wherein the configuration user interface comprises a prompt to select a number of cycles of a breathing sequence;

receive a first user input;

in response to receiving the first user input, adjust the number of cycles of the breathing sequence to the selected number of cycles;

initiate a breathing phase of the breathing sequence; and

during the breathing phase of the breathing sequence:

display, on the display, a first version of a progress indicator; and

fluctuate the first version of the progress indicator in accordance with the selected number of cycles.

63. A system, comprising:

a display;

means for displaying, on the display, a configuration user interface, wherein the configuration user interface comprises a prompt to select a number of cycles of a breathing sequence;

means for receiving a first user input;

means, responsive to receiving the first user input, for adjusting the number of cycles of the breathing sequence to the selected number of cycles;

means for initiating a breathing phase of the breathing sequence; and

means for, during the breathing phase of the breathing sequence:

displaying, on the display, a first version of a progress indicator; and

fluctuating the first version of the progress indicator in accordance with the selected number of cycles.

64. An electronic device, comprising:

a display;

one or more processors;

memory; and

one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors, the one or more programs including instructions for performing the method of any of claims 1-44.

65. A non-transitory computer-readable storage medium storing one or more programs, the one or more programs comprising instructions, which, when executed by an electronic device with a display, cause the device to perform the method of any of claims 1-44.

66. A system comprising:

a display; and

means for performing the method of any of claims 1-44.

67. A device, comprising:

a display unit; and

a processing unit coupled to the display unit, the processing unit comprising:

a display enabling unit configured to enable display of, on the display unit, a configuration user interface, wherein the configuration user interface comprises a prompt to select a number of cycles of a breathing sequence;

a receiving unit configured to receive a first user input;

an adjusting unit configured to, in response to receiving the first user input, adjust the number of cycles of the breathing sequence to the selected number of cycles;

an initiating unit configured to initiate a breathing phase of the breathing sequence; and

during the breathing phase of the breathing sequence:

wherein the display enabling unit is further configured to enable display of, on the display unit, a first version of a progress indicator; and

a fluctuating unit configured to fluctuate the first version of the progress indicator in accordance with the selected number of cycles.

68. The device of claim 67, wherein the device includes a rotatable input mechanism unit, coupled to the display unit and the processing unit, and wherein the first user input is a rotation of the rotatable input mechanism unit.

69. The device of any of claims 67-68,

wherein the receiving unit is further configured to, prior to initiating the breathing phase of the breathing sequence, receive a second user input; and

the processing unit further comprising a progressing unit configured to, prior to initiating the breathing phase of the breathing sequence, and in response to receiving the second user input, progress to the breathing phase of the breathing sequence.

70. The device of claim 69, wherein the first user input and the second user input are the same.

71. The device of any of claims 67-70, wherein the processing unit further comprises a changing unit, wherein each cycle of the selected number of cycles comprises a first period of time and a second period of time distinct from the first period, and wherein fluctuating the first version of the progress indicator comprises:

wherein the changing unit is configured to, during each cycle of the selected number of cycles:

change, at the start of the first period of time, a first variable visual characteristic of the progress indicator; and

change, at the start of the second period of time, the first variable visual characteristic of the progress indicator.

72. The device of claim 71, wherein the first variable visual characteristic is the size of the displayed progress indicator,

wherein changing, at the start of the first period of time, the first variable visual characteristic comprises increasing the size of the displayed progress indicator, and

wherein changing, at the start of the second period of time, the first variable visual characteristic comprises decreasing the size of the displayed progress indicator.

73. The device of claim 71, wherein the second period of time is greater than the first period of time.

74. The device of any of claims 67-73, wherein fluctuating the first version of the progress indicator comprises:

wherein the display enabling unit is further configured to:

enable display of, on the display unit, the first version of the progress indicator in a first state;

animatedly transition, during a first segment of time, the first version of the progress indicator from the first state to a second state; and

animatedly transition, during a second segment of time, the first version of the progress indicator from the second state to the first state.

75. The device of claim 74, wherein the second segment of time is greater than the first segment of time.

76. The device of any of claims 67-75, wherein the first version of the progress indicator fluctuates at a first cyclic rate.

77. The device of claim 76,

wherein the receiving unit is further configured to receive a value of the first cyclic rate; and

the processing unit further comprising a setting unit configured to, in response to receiving the value of the first cyclic rate, set the first cyclic rate to the received value.

78. The device of any of claims 76 or 77, wherein the first cyclic rate is a predetermined number of cycles per unit of time.

79. The device of any of claims 67-78,

the processing unit further comprising a determining unit configured to, prior to enabling display of the configuration user interface, determine whether a prompting criteria has been met;

the display enabling unit further configured to, prior to enabling display of the configuration user interface, and in accordance with a determination that the prompting criteria has been met, enable display of, on the display unit, a prompt that comprises a first affordance;

the receiving unit further configured to, prior to enabling display of the configuration user interface, receive user input selection of the first affordance; and

the display enabling unit configured to, prior to enabling display of the configuration user interface, in response to receiving the user input selection of the first affordance, enable display of, on the display unit, the configuration user interface.

80. The device of claim 79, wherein determining whether a prompting criteria has been met comprises determining whether a predetermined period of time has passed after a time associated with a previous breathing sequence.

81. The device of claim 80, wherein the time associated with the previous breathing sequence is a beginning time associated with the previous breathing sequence.

82. The device of claim 80, wherein the time associated with the previous breathing sequence is a completion time associated with the previous breathing sequence.

83. The device of any of claims 67-82,

prior to initiating the breathing phase of the breathing sequence:

the initiating unit further configured to initiate a preliminary phase of the breathing sequence; and

during the preliminary phase of the breathing sequence:

the display enabling unit further configured to enable display of, on the display unit, a second version of the progress indicator; and

the fluctuating unit further configured to fluctuate the second version of the progress indicator in accordance with a preliminary number of cycles.

84. The device of claim 83, wherein the preliminary number of cycles is independent of the selected number of cycles.

85. The device of any of claims 83-84, wherein the first version of the progress indicator fluctuates at a first cyclic rate, wherein the second version of the progress indicator fluctuates at a second cyclic rate, and wherein the second cyclic rate is greater than the first cyclic rate.

86. The device of any of claims 67-85, wherein the first version of the progress indicator comprises a second variable visual characteristic, the processing unit further comprising:

a selecting unit configured to, further in response to receiving the first user input, select an initial state of the second variable visual characteristic in accordance with the selected number of cycles.

87. The device of claim 86, the processing unit further comprising:

during the breathing phase of the breathing sequence:

a detecting unit configured to detect completion of a portion of the selected number of cycles; and

a changing unit configured to, in response to detecting completion of the portion of the selected number of cycles, change the second variable visual characteristic of the progress indicator.

88. The device of claim 87, wherein detecting completion of the portion of the selected number of cycles comprises:

determining whether the progress indicator has fluctuated in accordance with a predetermined number of cycles.

89. The device of any of claims 87-88, wherein detecting completion of the portion of the selected number of cycles comprises:

detecting whether a predetermined amount of time has passed during the breathing phase of the breathing sequence.

90. The device of any of claims 87-89, wherein the first version of the progress indicator comprises a plurality of graphical elements, and wherein changing the second variable visual characteristic of the progress indicator comprises:

changing a number of the displayed graphical elements of the plurality of graphical elements.

91. The device of any of claims 71-90, wherein the device includes a haptic output device, the processing unit further comprising:

a breathing cue outputting unit configured to, during the breathing phase of the breathing sequence, output one or more haptic breathing cues according to a haptic profile.

92. The device of claim 91, wherein outputting the one or more haptic breathing cues according to the haptic profile comprises:

outputting a first plurality of haptic breathing cues at a first frequency between cues during the first period of time; and

outputting a second plurality of haptic breathing cues at a second frequency between cues during the second period of time.

93. The device of claim 92, wherein the first frequency between cues is an increasing frequency, and wherein the second frequency between cues is a constant frequency.

94. The device of any of claims 91-93, wherein outputting the one or more haptic breathing cues according to the haptic profile comprises:

outputting, at the start of the first period of time, a first number of haptic breathing cues; and

outputting, at the start of the second period of time, a second number of haptic breathing cues, wherein the first number and the second number are different.

95. The device of any of claims 67-94, wherein the device includes a sensor unit, coupled to the display unit and the processing unit;

wherein the receiving unit is further configured to receive a first signal from the sensor unit during the breathing phase of the breathing sequence;

wherein the processing unit further comprises a determining unit configured to determine an estimated heart rate based at least in part on the received first signal; and

wherein the display enabling unit is further configured to enable display of, on the display unit, an indication of the estimated heart rate.

96. The device of claim 95, wherein the indication of the estimated heart rate is displayed subsequent to completion of the breathing phase.

97. The device of any of claims 67-96, the processing unit further comprising:

a suppressing unit configured to suppress, during the breathing phase of the breathing sequence, the output of at least a subset of alerts that the device is configured to output.

98. The device of any of claims 67-97,

wherein the receiving unit is further configured to, during the breathing phase of the breathing sequence, receive a third user input;

wherein the processing unit further comprises a determining unit configured to determine whether the third user input meets a breathing sequence interrupt criteria;

wherein the processing unit further comprises an ending unit configured to, in accordance with a determination that the third user input meets the breathing sequence interrupt criteria, end the breathing phase of the breathing sequence; and

wherein, subsequent to ending the breathing phase of the breathing sequence:

the display enabling unit is further configured to enable display of, on the display unit, an indication of a completed number of cycles, wherein the completed number of cycles includes the number of cycles, of the selected number of cycles, that the progress indicator fluctuated in accordance with after the breathing phase was initiated and before the third user input was received.

99. The device of claim 98,

wherein, subsequent to ending the breathing phase of the breathing sequence:

the display enabling unit is further configured to enable display of, on the display unit, a second affordance;

the receiving unit is further configured to receive user input selection of the second affordance; and

the display enabling unit is further configured to, in response to the user input selection of the second affordance, enable display of, on the display unit, the configuration user interface.

100. The device of any of claims 67-99, the processing unit further comprising:

a determining unit configured to determine an aggregate amount of time representing a completed number of cycles of the breathing sequence over a goal period;

wherein the display enabling unit is further configured to, in response to detecting completion of the breathing phase of the breathing sequence, enable display of, on the display unit, a completion interface comprising:

an indication of the aggregate amount of time; and

a third affordance;

wherein the receiving unit is further configured to receive user input selection of the third affordance; and

wherein the initiating unit is further configured to, in response to receiving the user input selection of the third affordance, progress to the breathing phase of the breathing sequence.

101. The device of claim 100, wherein detecting completion of the breathing phase comprises detecting that a predetermined amount of time has elapsed.

102. The device of any of claims 100-101, wherein the completion interface further comprises an indication of an estimated heart rate.

103. The device of any of claims 100-102, wherein the goal period is the current day.

104. The device of any of claims 100-103, wherein the first version of the progress indicator fluctuates at a first cyclic rate, and wherein the aggregate amount of time is determined based at least in part on the first cyclic rate.

105. The device of any of claims 67-104, the processing unit further comprising:

a determining unit configured to determine an aggregate amount of time representing a completed number of cycles of the breathing sequence over a goal period for each of a plurality of goal periods; and wherein the display enabling unit is further configured to enable display of, on the display unit, a summary interface comprising an indicator for each of the plurality of goal periods, wherein the indicator for each of the plurality of goal periods represents the determined aggregate amount of time for its respective goal period of the plurality of goal periods.

106. The device of claim 105, wherein the goal period is a day, and wherein the plurality of goal periods is seven days.

107. The device of any of claims 67-106, the processing unit further comprising:

a receiving unit configured to receive a second signal during the breathing sequence;

a determining unit configured to determine an estimated breathing pattern based at least in part on the received second signal; and

a synchronizing unit configured to synchronize the initiation of the breathing phase of the breathing sequence and the display of the progress indicator during the breathing phase of the breathing sequence with the estimated breathing pattern.

108. The device of claim 107, wherein synchronizing the initiation of the breathing phase of the breathing sequence and the display of the progress indicator during the breathing phase of the breathing sequence with the estimated breathing pattern comprises:

wherein the determining unit is further configured to determine a synchronization event that is a transition between an inhale period and an exhale period of the estimated breathing pattern; and

in accordance with a determination that the synchronization event has occurred:

wherein the initiating unit is further configured to initiate the breathing phase of the breathing sequence; and

wherein the display enabling unit is further configured to enable display of, on the display unit, the first version of the progress indicator.

109. The device of claim 107, wherein the device includes a sensor unit, coupled to the display unit and the processing unit, and wherein receiving the second signal comprises:

wherein the receiving unit is further configured to receive the second signal from the sensor unit during the breathing sequence.

110. The device of any of claims 67-109,

prior to enabling display of the configuration user interface:

wherein the determining unit is further configured to determine an aggregate amount of time representing a completed number of cycles of one or more breathing sequences over a goal period;

wherein the display enabling unit is further configured to enable display of, on the display unit, a fourth affordance comprising an indication of the aggregate amount of time; and

wherein the receiving unit is further configured to receive user input selection of the fourth affordance,

wherein the configuration user interface is displayed in response to receiving the user input selection of the fourth affordance.

111. An electronic device, comprising:

a display;

one or more processors;

memory; and

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

detecting a time associated with a first breathing sequence;

generating a prompting criteria based on a predetermined prompting frequency and the detected time associated with the first breathing sequence;

determining if the prompting criteria has been met;

in accordance with a determination that the prompting criteria has been met, displaying, on the display, a prompt to initiate a second breathing sequence, wherein the prompt comprises a first affordance;

receiving user input selection of the first affordance; and

in response to receiving the user input selection of the first affordance, displaying, on the display, a second breathing sequence user interface.

112. A non-transitory computer-readable storage medium storing one or more programs, the one or more programs comprising instructions, which, when executed by an electronic device with a display, cause the device to:

detect a time associated with a first breathing sequence;

generate a prompting criteria based on a predetermined prompting frequency and the detected time associated with the first breathing sequence;

determine if the prompting criteria has been met;

in accordance with a determination that the prompting criteria has been met, display, on the display, a prompt to initiate a second breathing sequence, wherein the prompt comprises a first affordance;

receive user input selection of the first affordance; and

in response to receiving the user input selection of the first affordance, display, on the display, a second breathing sequence user interface.

113. A system, comprising:

a display;

means for detecting a time associated with a first breathing sequence;

means for generating a prompting criteria based on a predetermined prompting frequency and the detected time associated with the first breathing sequence;

means for determining if the prompting criteria has been met;

means for, in accordance with a determination that the prompting criteria has been met, displaying, on the display, a prompt to initiate a second breathing sequence, wherein the prompt comprises a first affordance;

means for receiving user input selection of the first affordance; and

means, responsive to receiving the user input selection of the first affordance, for displaying, on the display, a second breathing sequence user interface.

114. An electronic device, comprising:

a display;

one or more processors;

memory; and

one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors, the one or more programs including instructions for performing the method of any of claims 45-60.

115. A non-transitory computer-readable storage medium storing one or more programs, the one or more programs comprising instructions, which, when executed by an electronic device with a display, cause the device to perform the method of any of claims 45-60.

116. A system comprising:

a display; and

means for performing the method of any of claims 45-60.

117. A device, comprising:

a display unit; and

a processing unit coupled to the display unit, the processing unit comprising:

a detecting unit configured to detect a time associated with a first breathing sequence;

a generating unit configured to generate a prompting criteria based on a predetermined prompting frequency and the detected time associated with the first breathing sequence;

a determining unit configured to determine if the prompting criteria has been met;

a display enabling unit configured to, in accordance with a determination that the prompting criteria has been met, enable display of, on the display unit, a prompt to initiate a second breathing sequence, wherein the prompt comprises a first affordance; and

a receiving unit configured to receive user input selection of the first affordance; and

wherein the display enabling unit is further configured to, in response to receiving the user input selection of the first affordance, enable display of, on the display unit, a second breathing sequence user interface.

118. The device of claim 117, wherein the predetermined prompting frequency is a predetermined length of time.

119. The device of claim 118,

wherein generating the prompting criteria comprises:

wherein the determining unit is further configured to determine a prompting time that occurs the predetermined length of time after the time associated with the first breathing sequence; and

wherein determining if the prompting criteria has been met comprises:

wherein the determining unit is further configured to determine if the prompting time has occurred.

120. The device of claim 119, wherein the device further comprises a timing unit,

wherein generating the prompting criteria further comprises:

wherein the timing unit is configured to set a timer in accordance with the predetermined length of time; and wherein the timing unit is further configured to start the timer; and

wherein determining if the prompting time has occurred comprises:

wherein the determining unit is further configured to determine whether the timer has expired.

121. The device of any of claims 117-120, wherein detecting the time associated with the first breathing sequence comprises:

wherein the detecting unit is further configured to detect a time that occurred during the first breathing sequence.

122. The device of any of claims 117-121, wherein detecting the time associated with the first breathing sequence comprises:

wherein the detecting unit is further configured to detect an initiation time of a breathing phase of the first breathing sequence.

123. The device of any of claims 117-121, wherein detecting the time associated with the first breathing sequence comprises:

wherein the detecting unit is further configured to detect a completion time of a breathing phase of the first breathing sequence.

124. The device of any of claims 117-123, wherein the processing unit further comprises an updating unit,

prior to a determination that the prompting criteria has been met:

wherein the detecting unit is further configured to detect a time associated with a third breathing sequence; and

wherein the updating unit is configured to, in accordance with a detection of the time associated with the third breathing sequence, update the prompting criteria based on the predetermined prompting frequency and the detected time associated with the third breathing sequence.

125. The device of any of claims 117-124, wherein the processing unit further comprises an initiating unit and a fluctuating unit,

wherein the receiving unit is further configured to receive a first user input;

wherein initiating unit is configured to, in response to receiving the first user input, progress to a breathing phase of the second breathing sequence; and during the breathing phase of the second breathing sequence:

wherein the display enabling unit is further configured to enable display of, on the display unit, a first version of a progress indicator; and

wherein the fluctuating unit is configured to fluctuate the first version of the progress indicator in accordance with a selected number of cycles.

126. The device of claim 125, wherein the processing unit further comprises an adjusting unit, prior to progressing to the breathing phase of the second breathing sequence:

wherein the receiving unit is further configured to receive a second user input; and

wherein the adjusting unit configured to, in response to receiving the second user input, adjust a number of cycles of the second breathing sequence to the selected number of cycles.

127. The device of any of claims 117-126,

wherein the processing unit further comprises an adjusting unit,

wherein the prompt to initiate the second breathing sequence comprises a second affordance,

wherein the receiving unit is further configured to receive user input selection of the second affordance; and

in response to receiving the user input selection of the second affordance:

wherein the display enabling unit is further configured to cease display, on the display unit, of the prompt; and

wherein the updating unit is configured to update the prompting criteria.

128. The device of claim 127, wherein updating the prompting criteria comprises:

wherein the updating unit is further configured to update the prompting criteria based on the predetermined prompting frequency and the detected time associated with the first breathing sequence.

129. The device of claim 127, wherein the processing unit further comprises a detecting unit, wherein updating the prompting criteria comprises:

wherein the detecting unit is configured to detect a time associated with the received user input selection of the second affordance; and wherein the updating unit is further configured to update the prompting criteria based on the predetermined prompting frequency and the detected time associated with the received user input selection of the second affordance.

130. The device of claim 127, wherein updating the prompting criteria comprises:

wherein the updating unit is further configured to update the prompting criteria based on a snooze interval,

wherein the predetermined prompting frequency is a predetermined length of time, and

wherein the snooze interval is a length of time that is distinct from the predetermined prompting frequency.

131. The device of claim 127,

wherein, further in response to receiving the user input selection of the second affordance:

the display enabling unit is further configured to forgo display of all prompts to initiate a breathing sequence during the remainder of a current day.

132. The device of any of claims 127-131,

wherein the determining unit is further configured to determine if the updated prompting criteria has been met;

wherein the display enabling unit is further configured to, in accordance with a determination that the updated prompting criteria has been met, enable display of, on the display unit, a prompt to initiate a fourth breathing sequence, wherein the prompt comprises a third affordance;

wherein the receiving unit is further configured to receive user input selection of the third affordance; and

wherein the display enabling unit is further configured to, in response to receiving the user input selection of the third affordance, enable display of, on the display unit, a fourth breathing sequence user interface.

[0168] 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, or device 500. In some embodiments, the electronic device includes a display. In some embodiments, the display is a touch-sensitive display. In some embodiments, the electronic device includes a touch-sensitive surface. In some embodiments, the electronic device includes a rotatable input mechanism.

[0169] FIGS. 6A-6F illustrate exemplary user interfaces for conducting breathing sequences, 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.

[0170] FIG. 6A illustrates exemplary user interfaces for initiating and conducting a breathing sequence, in accordance with some embodiments. User interface screen 602 depicts a home screen of the electronic device (hereinafter referred to as “device”). General information such as the date, time of day, temperature, and the like, are optionally presented on user interface screen 602. In some examples, user interface screen 602 is optionally displayed following device startup, and optionally in response to a user exiting an application running on the device. User interface screen 602 includes selectable affordance 604 which, when selected, optionally causes the device to launch an application used to conduct a breathing sequence. In some examples, the device is a wearable electronic watch, and affordance 604 is presented as a watch face complication on the watch display. Affordance 604 is optionally depicted as a miniaturized version of a progress indicator (as described below, for example, with respect to user interface screens 606-628). In this example, affordance 604 is depicted to include an image of a stylized arrow, which is a symbol associated with an application used to conduct breathing sequences on the device. Thus, the affordance 604 conveys that it is associated with accessing breathing sequences. In other examples, an image included with affordance 604 is any suitable image.

[0171] In accordance with some embodiments, affordance 604 is associated with textual information. In some examples, the device determines an aggregate amount of time and displays it as the textual information. In the example depicted, affordance 604 includes the text “3 MIN”, representing that a user has conducted 3 minutes of breathing in one or more breathing sequences over a current period (e.g., today).

[0172] At user interface screen 602, the device receives user input corresponding to selection of affordance 604 and, in response, displays an exemplary configuration user interface as depicted in user interface screen 606.

[0173] User interface screen 606 illustrates an exemplary configuration user interface of a breathing sequence. In some embodiments, the configuration user interface is displayed during a configuration phase of the breathing sequence. In some examples, the configuration user interface is displayed after an application for conducting breathing sequences is started. The configuration user interface includes a prompt to select a number of cycles of the breathing sequence. For example, user interface screen 606 includes indicator 608, which represents a number of cycles of the breathing sequence that can be selected by the user. In this example, the number of cycles represents a number of breaths (e.g., comprised of an inhale period and an exhale period). In some examples, the breathing sequence will provide breathing cues to train the user during a user's breathing exercise, the exercise lasting for a number of breaths equal to the number of cycles. The number of breaths is important because it is an indication of the length of a breathing exercise to be performed by the user. By allowing the user to adjust the number of cycles (e.g., breaths), the user is given flexibility to customize their breathing exercises, increasing the likelihood that a user will perform breathing exercises, and thereby achieve the health benefits of conscious breathing. For example, if a user has a small amount of available time, they can opt to perform a short breathing exercise of only 7 breaths—that way, they can still achieve the health benefits while maintaining a busy schedule. The configuration user interface optionally includes an indication of a length of time of the breathing sequence (e.g., indicator 610) that is displayed in addition to, or in place of, the number of cycles of the breathing sequence (e.g., indicator 608). The configuration user interface optionally includes a progress indicator. For example, user interface screen 606 includes progress indicator 616, depicted as a plurality of graphical elements (e.g., overlapping circles). The progress indicator, discussed in more detail below, is a visual element that is optional and that provides visual cues to the user to guide their breathing throughout the breathing sequence.

[0174] In accordance with some embodiments, the device receives a first user input. For example, the first user input is received at the configuration user interface depicted in screen 606 and corresponds to a selection of the number of cycles of the breathing sequence.

[0175] User interface screen 618 illustrates an exemplary configuration user interface of a breathing sequence after the device has received user input corresponding to selection of the number of cycles. In the example depicted, the device receives user input at user interface screen 606 representing selection of the number of cycles of the breathing sequence. In response to the user input, the device adjusts the number of cycles. For example, at user interface screen 618, indicator 608 now reads "21 breaths", indicating that the number of cycles (e.g., breaths) has been increased to 21 from the previous number of 7 (e.g., indicator 608 reads "7 breaths" at screen 606). In some embodiments, the device receives the user input on a touch-sensitive surface or a touch-sensitive display. In some embodiments, the device includes a rotatable input mechanism and the user input is a rotation of the rotatable input mechanism. In the example depicted, the device received a rotation of rotatable input mechanism 614, which caused the device to adjust the number of cycles from 7 to 21. In some examples, because the number of cycles has been adjusted (e.g., increased by a factor of 3), the length of time of the breathing sequence is also adjusted (e.g., increased by a factor of 3). For example, indicator 610 at user interface screen 618 now reads “3 min” (e.g., indicating a length of three minutes). As will be appreciated by one of skill in the art, in the example depicted, the logical relationship between the number of cycles and the length of time of the breathing sequence is 7 cycles per minute. This logical relationship is also referred to hereinafter as a “cyclic rate”. In some examples, the cyclic rate is a value other than 7 cycles per minute (e.g., 5 cycles per minute).

[0176] The number of cycles (e.g., breaths) may be determined based at least in part on the time (e.g., duration of the breathing phase) and a breath ratio (e.g., a ratio of the time it takes to inhale compared to the time it takes to exhale) applicable to the breathing sequence. For example, for a duration of 1 minute (60 seconds) and for a breath ratio of 1:1.5 (e.g., ratio of inhale to exhale), each full breath (e.g., an inhale and an exhale) will take 8.5 seconds, with 3.4 seconds for each inhale (e.g., based on the “1” of the 1:1.5 breath ratio) and 5.1 second for each exhale (e.g., based on the “1.5” of the 1:1.5 breath ratio). In some embodiments, the duration of a full cycle (e.g., breath) includes an added duration of time that is optionally added between inhale and exhale periods, in order to account for the slight delay that it takes for a person to transition from an inhale to an exhale (and vice versa). For example, the time between points 656 and 658 on cycle 650 of FIG. 6C illustrates such a duration of time. In this example, the exhale and inhale periods would thus be slightly shorter than 5.1 and 3.4 seconds, respectively, in order to maintain a breath ratio of 1:1.5 if the added duration is included in the duration of a full breath. The added duration is, for example, 0.5 seconds. In some examples, an added duration inserted at a transition from an inhale to an exhale period is a different length of time than the added duration inserted at a transition from an exhale to an inhale period. In some embodiments, an added duration is not included in a cycle. In some embodiments, only one transition between the periods (during a cycle) has an added duration. In some embodiments, both transitions between the periods (during a cycle) have an added duration.

[0177] In some embodiments, adjusting the number of cycles causes the appearance of a displayed indicator to change. For example, as shown in screen 606 of FIG. 6A, indicator 616 is created from 6 graphical elements (e.g., overlapping circles) when the number of cycles is set to 7 breaths, but is created from 10 graphical elements (e.g., overlapping circles) when the number of cycles is set to 21 breaths, as shown in screen 618. Accordingly, the appearance of indicator

616 can be varied in accordance with the selected number of cycles to provide visual indication to the user of the selected number of cycles, thus creating a more intuitive human-machine interface for configuring a breathing sequence.

[0178] In accordance with some embodiments, at user interface screen 618, the device receives user input representing a request to initiate a breathing phase of the breathing sequence. For example, the user input can be user selection of start affordance 612 at user interface screen 618.

[0179] In accordance with some embodiments, in response to receiving the user input representing a request to progress to (e.g., initiate) the breathing phase of the breathing sequence, the device progresses to (e.g., initiates) the breathing phase of the breathing sequence. In accordance with some embodiments, during the breathing phase of the breathing sequence, the device displays a first version of a progress indicator. In the example depicted, the first version of the progress indicator is a version that is created from 10 overlapping circles (e.g., indicator 616 shown in user interface screen 618). In accordance with some embodiments, the device fluctuates the first version of the progress indicator in accordance with the selected number of cycles during the breathing phase of the breathing sequence.

[0180] In accordance with some embodiments, prior to initiating the breathing phase of the breathing sequence, the device receives a second user input and, in response to receiving the second user input, progresses to the breathing phase of the breathing sequence. In the example depicted, the received second user input is selection of start affordance 612 of user interface screen 618 and, in response, the device progresses to (e.g., initiates) the breathing phase and displays and fluctuates a progress indicator (e.g., as shown in screens 620-628).

[0181] In some embodiments, progressing to the breathing phase of the breathing sequence includes initiating the breathing phase of the breathing sequence in response to the second user input. In some embodiments, progressing to the breathing phase of the breathing sequence includes initiating a preliminary phase (described below with respect to screens 668A-668E of FIG. 6D) of the breathing sequence in response to the second user input, and initiating the breathing phase after completion of the preliminary phase of the breathing sequence.

[0182] In some embodiments, the first and second user inputs are distinct user inputs. For example, the first user input can be a rotation of a rotatable input mechanism 614 to select a number of cycles, and the second user input can be a touch input on start affordance 612. In some embodiments, the first user input and the second user input are the same. For example, the user may accept a default number of cycles that is presented on the display at user interface screen 606 by providing touch input on start affordance 612. In response, the device sets the selected number of cycles to the default number of cycles that are displayed (e.g., 7 cycles). Thus, the first and second user inputs would both be the same input on the start affordance 612 in this instance.

[0183] In accordance with some embodiments, during the breathing phase of the breathing sequence, a progress indicator fluctuates in accordance with a selected number of cycles. User interface screens 620-628 depict an exemplary fluctuation of a progress indicator 616 in accordance with one cycle. In this example, the cycle (of a breathing sequence) represents one complete inhale period and one complete exhale period, wherein the beginning of the inhale period coincides with the beginning of the cycle, and wherein the end of the cycle coincides with the end of the exhale period.

[0184] User interface screen 620 depicts progress indicator 616 at the beginning of the cycle. In this example, as shown in user interface 620, progress indicator 616 is displayed at its smallest size, relative to any other time during the cycle, at the beginning of the cycle. The progress indicator 616 being displayed at its smallest form signals the beginning of the inhale period to the user, and thus that the user should begin inhaling. In some examples, the progress indicator is a simple circle at its smallest size, as shown in screen 620. Thus, the user is provided a visual cue during the breathing phase that displays the appropriate breathing action that the user should be performing during the breathing sequence.

[0185] User interface screen 622 depicts progress indicator 616 halfway through the inhale period of the cycle. In some embodiments, the progress indicator changes in size during the inhale period of the cycle. For example, as shown in user interface screen 622, progress indicator 616 has grown in size during an inhale period, and will continue to do so throughout the inhale period. In some examples, the change is size is the result of the movement of graphical elements (e.g., circles), which began collapsed into one small circle (e.g., all circles perfectly overlapping each other), and expanded outward to form a partially-overlapping collection of graphical elements (e.g., circles), as seen in screen 622. The changing size of the progress indicator during an inhale period (e.g., by growing) provides an intuitive visual cue to the user that they should be inhaling (e.g., increasing the size of their lungs by drawing in air). Accordingly, the cognitive burden on the user when following breathing cues is reduced.

[0186] User interface screen 624 depicts progress indicator 616 at the transition between the inhale period and the exhale period. In the example depicted, progress indicator 616 is at its largest size, relative to any other time during the cycle, at the transition between the inhale and exhale periods of the cycle, as shown in user interface 624. The progress indicator 616 being at its largest signals the end of the inhale period and the beginning of the exhale period to the user, and thus that the user should begin exhaling.

[0187] In some examples, in order to complete fluctuation of the progress indicator in accordance with a cycle, the progress indicator returns to its original size. User interface screens 626 and 628 depict the progress indicator during an exemplary exhale period that follows the inhale period of the cycle. At user interface screen 626, progress indicator 616 is depicted halfway through the exhale period of the cycle, and it has shrunk in size (since the display at screen 624). At user interface 628, progress indicator 616 has returned to its smallest size at the end of the exhale period, which also corresponds to the end of the cycle and the beginning of an inhale period for the next cycle. As can be seen, the progress indicator in user interface screen 628 (end of cycle) is the same size as the progress indicator in user interface screen 620 (beginning of cycle). In some examples, the size of the progress indicator returns to the same size, signaling to the user that the cycle is over and that a new cycle may begin (e.g., and repeat fluctuating the progress indicator as shown in user interface screens 620-628).

[0188] The change from the progress indicator in screen 620 to the progress indicator in screen 624 may correspond to a first breath event (e.g., an inhale period), and the length of time it takes to change can correspond to a length time of the first breath event (e.g., 3.4 seconds for a 1:1.5 breath ratio at 7 breaths/minute). The change from the progress indicator of screen 624 to the progress indicator of screen 628 may correspond to a second breath event (e.g., an exhale period), and the length of time it takes to change can correspond to a length of time of the second breath event (e.g., 5.1 seconds for a 1:1.5 breath ratio at 7 breaths/minute). It is understood that the transition (e.g., fluctuation) of the progress indicator between screens 620-628 optionally includes many more displays (not depicted here) of the progress indicators in order to produce a smooth transition.

[0189] As mentioned above, fluctuating the progress indicator (e.g., as illustrated in screens 620-628) provides the user with intuitive visual cues to follow during a breathing phase. The user can utilize these visual cues to train their breathing during a breathing exercise when conducting a breathing sequence on the device. Fluctuating an indicator as described herein is an intuitive signal to the user, as it resembles the rhythmic nature of an individual's natural breathing pattern. Thus, these visual cues reduce the cognitive burden on the user when conducting breathing sequences, increase the effectiveness of the training provided by the breathing sequences, and reinforce healthy conscious breathing patterns for breathing exercises performed by the user.

[0190] In some examples, different versions of the progress indicator can each fluctuate in a distinct manner. For example, a first version of a progress indicator can fluctuate between a first size and a second size (e.g., between 50% and 100%), and second version can fluctuate between the second size and a third size (e.g., between 25% and 50%).

[0191] In some embodiments, a progress indicator is displayed, and if selected, causes the device to progress to a breathing phase, launch an application for conducting breathing sequences, or cause the device to display a configuration user interface. In some examples, the progress indicator 616 is displayed (as depicted in 606, however without other displayed elements such as indicator 608, start affordance 612) on the screen, in response to a user of the device performing certain actions with respect to the device (e.g., lifting the device, viewing the device, and the like), randomly, or according to some interval. In some examples, presentation of the progress indicator on the display functions as a reminder to the user to participate in a breathing exercise (e.g., to conduct a breathing sequence).

[0192] At the conclusion of the breathing phase of the breathing sequence, the display may present the user interface screen 630, shown in FIG. 6B. User interface screen 630 depicts an exemplary completion interface that includes an enlarged progress indicator 616 (e.g., larger than at any point during the breathing phase). After completion of the breathing phase, the progress indicator can also change colors, pulsate, rotate, animate, or the like, in order to signal to the user that the breathing phase is complete. In some examples, the visual behavior of a displayed progress indicator differs from the first or second version of the progress indicator displayed during a breathing or preliminary phase—that way, the progress indicator 616 can provide an extra visual cue to the user, specifically, that the breathing phase is complete. At user interface screen 630, the device may automatically progress to display another completion interface (e.g., user interface screen 632), or may do in response to user input. For example, the user input may be selection of the progress indicator 616, or any other user input. In some embodiments, the user interfaces screens 630 and 632 are displayed during a concluding phase of the breathing sequence.

[0193] User interface screen 632 depicts an exemplary completion interface, which is displayed after the completion of the breathing phase. The completion interface optionally includes information about the breathing sequence. In some examples, a completion interface indicates that the user completed the breathing sequence (e.g., user interface screen 630 includes the textual information “Well Done”). In some examples, a completion interface indicates a quantitative performance metric (“You hit 90% of your breaths”) and/or indicates a suggestion (“Try taking deeper breaths next time”), and/or any other suitable information. The information included in a completion interface may provide reinforcement of the benefits of taking time to breathe each day, thereby encouraging the user to continue and progress with conducting breathing sequences to guide their breathing. Similarly, the information included in a completion interface may encourage the user to work to improve her health metrics (e.g., heart rate).

[0194] In some examples, sensor data collected during the preliminary phase is compared to sensor data collected during the concluding phase to determine whether participating in the breathing sequence effected a change in any health metric. For example, heart rates of the user can be compared, heart rate variability measures can be compared, pulse rates of the user can be compared, any other metric that can be indicative of stress, anxiety, and the like. Providing these comparisons, or similar ones, to the user can serve to reinforce the benefits of conducting breathing sequences by providing the user feedback that allows the user to track long-term progress (e.g., reduce physiological indicators of chronic stress) and short-term progress (e.g., relax by lowering a heart rate).

[0195] In some examples, a completion interface is not displayed after completion of the breathing phase. For example, in response completion of the breathing phase of the breathing sequence, the display can display a configuration user interface, or may display a home screen of the device.

[0196] In accordance with some embodiments, the device determines an aggregate amount of time representing a completed number of cycles of the breathing sequence over a goal period. In accordance with some embodiments, the goal period is the current day. For example, the time representing a completed number of cycles represents a total breathing time completed today. In response to detecting completion of the breathing phase of the breathing sequence, the device displays, on the display, a completion interface comprising: an indication of the aggregate amount of time, and a third affordance. For example, user interface screen 632 depicts an exemplary completion interface, and includes indicator 634, which depicts an exemplary indication of the aggregate amount of time (e.g., 6 minutes). User interface screen 632 also depicts an exemplary third affordance, breathe again affordance 638.

[0197] The user may wish to conduct another breathing sequence after completion a first breathing sequence. For example, the user may wish to repeat the completed breathing sequence. In accordance with some embodiments, the device receives user input selection of the third affordance and, in response, progresses to the breathing phase of the breathing sequence. For example, as shown in FIG. 6B, the device progresses to display user interface 620 (reproduced from FIG. 6A and depicting the beginning of a breathing phase) in response to selection of the breathe again affordance 638. In some examples, the device uses the selected number of cycles of the completed breathing phase (e.g., restarts with the same settings).

[0198] In accordance with some embodiments, detecting completion of the breathing phase includes detecting that a predetermined amount of time has elapsed. For example, if three minutes elapses without an interruption, the user is assumed to have completed a breathing phase of 21 cycles at 7 cycles per minute.

[0199] In accordance with some embodiments, the completion interface further includes an indication of an estimated heart rate. For example, the exemplary completion interface shown in user interface screen 632 includes heart rate indicator 636, which is an exemplary indication of an estimated heart rate. In some examples, the heart rate indicator 636 pulsates on the display at a rate that corresponds to the estimated heart rate of the user.

[0200] In accordance with some embodiments, the device includes a sensor, and the device receives a first signal from the sensor during the breathing phase of the breathing sequence. The device determines the estimated heart rate based at least in part on the received first signal, and displays, on the display, an indication of the estimated heart rate. For example, the determined estimated heart rate is displayed as heart rate indicator 636 on user interface screen 632.

[0201] In accordance with some embodiments, the indication of the estimated heart rate is displayed subsequent to completion of the breathing phase. For example, user interface screen 632 of FIG. 6B, which includes heart rate indicator 636, is displayed subsequent to the completion of the breathing phase (e.g., after a progress indicator has fluctuated in accordance with the selected number of cycles as illustrated in user interface screens 620-628 of FIG. 6A).

[0202] Measuring the heart rate during the breathing exercise and displaying it afterward provides a high-fidelity reading of the user's resting heart rate, which can indicate the user's overall health or a current physiological state. If a user is breathing for relaxation, for example, providing an indication of an estimated heart rate increases the effectiveness of the breathing exercises by providing real-time (or nearly real-time) feedback of the user's physiological state, which can motivate the user to continue with another breathing exercise to achieve their relaxation goal.

[0203] In accordance with some embodiments, the first version of the progress indicator fluctuates at a first cyclic rate (e.g., 7 breaths per minute), and the aggregate amount of time is determined based at least in part on the first cyclic rate (e.g., 28 breaths completed divided by 7 breaths/minute is 4 minutes of breathing). For example, the aggregate amount of time is determined by dividing a completed number of cycles by the cyclic rate. For instance, if the first cyclic rate is 7 cycles per minute, and a completed number of cycles is 42, the aggregate amount of time is (42 cycles) ÷ (7 cycles per minute), which equals 6 minutes (depicted by indicator 634 in user interface screen 632). Cyclic rates are discussed in greater detail below, for example, with respect to user interface 640.

[0204] The device optionally displays a summary of an aggregate amount of time for each of a plurality of periods, for example, such as a weekly summary of the past 7 days. In accordance with some embodiments, the device determines an aggregate amount of time representing a completed number of cycles of the breathing sequence over a goal period for each of a plurality of goal periods. For example, the device determines a completed number of cycles for each day of the previous week (seven days). The device displays, on the display, a summary interface comprising an indicator for each of the plurality of goal periods, wherein the indicator for each of the plurality of goal periods represents the determined aggregate amount of time for its respective goal period of the plurality of goal periods. For example, user interface screen 642 of FIG. 6B depicts an exemplary summary interface, and includes an indicator for each goal period (e.g., indicators 646A and 646B), wherein each goal period is a day. Indicators 646A and 646B indicate the aggregate amount of time for the goal periods corresponding to Monday and Tuesday of the last week in the form of a bar chart. However, any visible representation suitable to indicate an aggregate amount of time can be used. A summary interface optionally includes an indicator of an aggregate amount of time for all periods of the plurality of goal periods. For example, indicator 644 indicates the total number of minutes of breathing performed over the last 7 days.

[0205] In accordance with some embodiments, the goal period is a day, and the plurality of goal periods is seven days.

[0206] As discussed briefly above, in accordance with some embodiments, the first version of the progress indicator fluctuates at a first cyclic rate. In some embodiments, a cyclic rate is a predetermined number of cycles per unit of time. In the example depicted at user interface screen 606, an exemplary first cyclic rate is 7 cycles per minute (e.g., breaths per minute). In some examples, the cyclic rate of a breathing sequence may be higher (e.g., which is generally less challenging for individuals) or lower (e.g., which is generally more challenging for individuals).

[0207] A user can optionally specify a cyclic rate of a breathing sequence. In accordance with some embodiments, the device receives a value of the first cyclic rate. For example, the device can receive the value via user input. In response to receiving the value of the first cyclic rate, the device sets the first cyclic rate to the received value. For example, user interface screen 640 of FIG. 6B depicts a configuration user interface similar to user interface screen 606 of FIG. 6A, but the cyclic rate value has been set to 5 cycles (e.g., breaths) per minute, as illustrated by indicators 608 and 610.

[0208] In accordance with some embodiments, the value of the first cyclic rate is set via user input received at the device. For example, the device can receive a touch input contact on a touch-sensitive surface or touch-sensitive display, the contact having a characteristic intensity that exceeds a threshold intensity and, in response, display a menu providing the user the ability to select a value. In this example, the device receives user selection of the value, and sets the value of the first cyclic rate to the selected value.

[0209] In some embodiments, the device is a first device, and the value of the first cyclic rate is received at the first device via transmission from a second device. The second device can be, for example, a smartphone paired to the device over one or more of a wired or wireless connection. For example, a user may select the value of the first cyclic rate using an application executed on a smartphone (e.g., the second device). In this example, the first device receives the value of the first cyclic rate via transmission from the smartphone over a wireless connection (e.g., via a Bluetooth connection, or any other suitable transmission protocol).

[0210] The cyclic rate (which can also be referred to as a breathing rate) associated with the breathing sequence can be a predetermined rate, a user-selected rate, or can be a rate associated with the breathing profile and/or health data associated with the user, as described above. For example, the device may access a user's breathing profile which, for example, indicates the user's baseline breathing rate, past breathing sequence settings, physiological signals, and the like. The device can use this information to select an appropriate cyclic rate for a breathing sequence. An appropriate cyclic rate, for example, can be the user's baseline breathing rate reduced by a predetermined amount (e.g., by a percentage).

[0211] In accordance with some embodiments, each cycle of the selected number of cycles includes a first period of time and a second period of time distinct from the first period. For example, FIG. 6C depicts an exemplary cycle 650 of user respiration, represented by a curve. In some examples, the curve represents the size of a progress indicator (e.g., as it fluctuates over time). The cycle 650 has a first period 664 (the time between points 652 and 656 of the respiration curve) and a second period 666 (the time between points 658 and 662 of the respiration curve). In this example, the first period 664 corresponds to an inhale period of the cycle, and second period 666 corresponds to an exhale period of the cycle. As shown, the first period 664 and the second period 666 of cycle 650 are distinct (e.g., they are unequal lengths of time). Points 656 and 658 are illustrated with a gap between them. As discussed above, this optional gap can be included in a cycle when determining the lengths of the inhale and exhale periods. This added duration of time represents the brief moment it takes for a person to switch between inhaling and exhaling. In some examples, there is no gap between points 656 and 658. In some examples, there is a gap between both transitions (e.g., between the transition from inhale to exhale, and between the transition from exhale to inhale).

[0212] In accordance with some embodiments, fluctuating the first version of the progress indicator includes: during each cycle of the selected number of cycles: changing, at the start of the first period of time, a first variable visual characteristic of the progress indicator; and changing, at the start of the second period of time, the first variable visual characteristic of the progress indicator.

[0213] In accordance with some embodiments, the first variable visual characteristic is the size of the displayed progress indicator, and wherein changing, at the start of the first period of time, the first variable visual characteristic includes increasing the size of the displayed progress indicator, and wherein changing, at the start of the second period of time, the first variable visual characteristic includes decreasing the size of the displayed progress indicator. As described above with respect to user interface screens 620-628, increasing and decreasing the size of a progress indicator provides a visual cue that coincides with a breathing pattern of the breathing sequence, and thus lowers the cognitive burden on the user to perform guided breathing exercises.

[0214] In accordance with some embodiments, the second period of time is greater than the first period of time. For example, period 666 is greater than period 664 in FIG. 6C. Thus, in this example, the exhale period is greater in length than the inhale period. A breathing pattern with unequal periods of inhale and exhale is important to the effectiveness of breathing exercises. The effectiveness of a breathing exercise is enhanced if the breathing pattern performed by the user is disruptive of the user's normal breathing pattern. For example, an individual's breathing pattern is typically composed of roughly equal inhale and exhale periods. However, for example, a breathing pattern that includes a longer exhale period than inhale period can increase the beneficial effects of to a user performing conscious breathing, such as increasing relaxation and decreasing anxiety. A ratio of the exhale period to the inhale period (also referred to as the "breath ratio") is preferably a value between 1:1.2 and 1:1.5, however the ratio can be lower or higher. In some embodiments, this ratio is configurable by user input. A higher ratio (exhale period relative to inhale period) is typically more difficult for an individual to learn and maintain. In some examples, the ratio value is set to 1:2.0. A user may specify the ratio of 1:2.0, for example, if they are an experienced conscious breather or desire to conduct a more challenging breathing sequence.

[0215] The breath ratio applicable to the breathing sequence may be included in a breathing profile. The breathing profile may be a default profile selected for all users, all new users, or defined for a particular user. For example, if the user has indicated via a setting, or otherwise, that she is a beginner breather a simpler ratio such as 1:1.2 or 1:1.5 may be the default. If the user has indicated that she is an advanced breather, a more difficult ratio such as 1:2 may be selected as the default. In some examples, the breathing profile may be particular to the user and may be configured via a setting or by collecting actual sensor data and estimating an appropriate breath ratio to be included in the user's breathing profile. For example, if the user participates in the preliminary phase of the breathing sequence (e.g., as discussed with respect to FIG. 6D below), the ratio may be determined based on the preliminary phase. In some examples, the user may participate in a practice breathing exercise to determine the breath ratio to be included in the breathing profile. The breathing profile may also include other information about the user. For example, the breathing profile may indicate metrics relating to breathing sequences completed by the user, breathing goals, and the like, any of which may be presented by an activity application running on the device and/or a second electronic device (e.g., a paired device). For example, the activity application may include a summary of activities performed and/or goals reached by the user during a time period (e.g., day, week, month, year, etc.). This summary can also include information about the breathing sequences completed by the user during the same time period.

In some examples, the breathing profile may be determined for the user based on health information relating to the user. For example, health information, whether collected by the device or otherwise, may indicate certain health statistics (e.g., pulse rate, blood pressure, body temperature, respiratory rate, perspiration, etc.), and the health statistics may be used to determine an appropriate breathing profile for the user. In this manner, the breathing profile may be particularized to the user's health conditions, and may therefore be used as part of a plan for improving and/or addressing the health conditions. For example, if the health information indicates that the user has a higher-than-average respiratory rate, a breathing profile may be determined that aims to reduce the user's respiratory rate.

[0216] In accordance with some embodiments, fluctuating the first version of the progress indicator includes: displaying, on the display, the first version of the progress indicator in a first state; animatedly transitioning, during a first segment of time, the first version of the progress indicator from the first state to a second state; and animatedly transitioning, during a second segment of time, the first version of the progress indicator from the second state to the first state. For example, user interface screen 620 depicts a progress indicator in a first state (e.g., 50% of its size) and user interface screen depicts a progress indicator in a second state (e.g., 100% of its size), as shown in FIG. 6C. During the first segment of time (e.g., the first period 664), the progress indicator animatedly transitions (e.g., as shown in screen 622, which depicts an intermediate state between first and second states) from the first state to the second state. During the second segment of time (e.g., the second period 664), the progress indicator animatedly transitions (e.g., as shown in screen 626, which depicts an intermediate state between second and first states) from the second state back to the first state.

[0217] In accordance with some embodiments, the second segment of time is greater than the first segment of time. For example, second period 666 is greater than first period 664. In some examples, the periods may be switched, such that the longer period is the first period, and the short period is the second period. In some examples, the exhale period occurs before the inhale period during a cycle.

[0218] In accordance with some embodiments, prior to displaying the configuration user interface, the device determines whether a prompting criteria has been met. In accordance with a determination that the prompting criteria has been met, the device displays a prompt that includes a first affordance. The device receives user input selection of the first affordance, and in response, displays the configuration user interface. For example, the device may display a notification reminding the user to breathe, the notification including an affordance for launching (e.g., opening) an application used to conduct breathing sequences. The concepts related to displaying a prompt in accordance with a prompting criteria are described greater detail in the description of FIGS. 9A-9B below, and thus are not discussed in detail here.

[0219] In accordance with some embodiments, the device determines whether a prompting criteria has been met by determining whether a predetermined period of time has passed after a time associated with a previous breathing sequence. In some examples, the device sets and starts a timer for ***n*** number hours from the time associated with the previous breathing sequence, wherein ***n*** number of hours is the predetermined period of time related to the prompting frequency (e.g., if the prompting frequency is once every two hours, ***n*** is 2). In some examples, the device determines a time that is ***n*** number of hours from the time associated with the previous breathing sequence. The previous breathing sequence can be any breathing sequence that was previously accessed or displayed, by the device or an associated device. In some embodiments, the prompting criteria is met when the timer expires. In some embodiments, the prompting criteria is met when the determined time occurs.

[0220] In accordance with some embodiments, the time associated with the previous breathing sequence is a beginning time associated with the previous breathing sequence. In some embodiments, the beginning time associated with the previous breathing sequence can be the time of: display of the configuration user interface during the previous breathing sequence, or initiation of the breathing phase of the previous breathing sequence.

[0221] In accordance with some embodiments, the time associated with the previous breathing sequence is a completion time associated with the previous breathing sequence. In some embodiments, the completion time associated with the previous breathing sequence can be the time of: completion of a breathing phase of the previous breathing sequence, the display of a completion summary after completion of the breathing phase of the previous breathing sequence, or an exit from an application used to conduct the previous breathing sequence.

[0222] In accordance with some embodiments, prior to initiating the breathing phase of the breathing sequence, the device initiates a preliminary phase of the breathing sequence. For example, FIG. 6D includes user interface screens 668A-668E that depict a series of screens displayed during the preliminary phase of a breathing sequence. In some examples, the preliminary phase may be initiated after the user selects a start affordance at the configuration screen, but before the device initiates the breathing phase and fluctuates the first version of the progress indicator in accordance with the selected number of cycles.

[0223] In according with some embodiments, during the preliminary phase of the breathing sequence, the device displays a second version of the progress indicator and fluctuates the second version of the progress indicator in accordance with a preliminary number of cycles.

[0224] In some examples, the cycles of the preliminary number of cycles represent “training breaths”. In some examples, the training breath cycles are in addition to the selected number of cycles (e.g., breaths) of the breathing phase. In some examples, the preliminary number of cycles is some small number of cycles, such as 2. By fluctuating a progress indicator for a few preliminary cycles before beginning a breathing phase, the preliminary phase provides the user with time to focus on and prepare their breathing in the moments before beginning a guided breathing exercise during the breathing phase. Furthermore, the preliminary phase provides visual cues (e.g., the fluctuation of the second version of the progress indicator) that the user can follow in order to gradually adjust (e.g., slow) their breathing in preparation for a breathing exercise, and use to synchronize their breathing to the breathing pattern of the breathing sequence. Thus, the full length of the breathing phase is utilized more effectively (e.g., the user is ready to breathe (e.g., is “warmed up”) when the breathing phase starts) and the cognitive and physical burden of the user trying quickly to determine the correct pace and timing and adjust their breathing accordingly (e.g., if the breathing phase were to start suddenly without being preceded by the preliminary phase) is reduced. Accordingly, the preliminary phase increases the benefits of breathing sequences conducted in accordance with the embodiments described herein.

[0225] In the example depicted in user interface screens 668A-668E, an exemplary second version of the progress indicator (e.g., progress indicator 669) is shown. In this example, the second version of the progress indicator, progress indicator 669, is a version that fluctuates between 25% in size and 50% in size (e.g., relative to the size of the first version). Recall that in the example described in FIG. 6A, the first version of the progress indicator (e.g., progress indicator 616) fluctuates between 50% of its size and 100% of its size (e.g., in user interface screens 620-628). The difference in displayed appearance of the second version as compared to the first version provides a visual cue to the user that the device is currently in the preliminary phase. This visual cue improves the human-machine interface between the user and the device by intuitively notifying the user that they should be breathing along with the progress indicator, but that the actual breathing phase has not yet begun.

[0226] User interface screens 668A-668E are similar to user interface screens 620-628, in that they show fluctuation of a progress indicator over the course of one cycle. However the cycle of user interface screens 668-668E is a preliminary cycle, and the progress indicator displayed is a second version. In some examples, a preliminary cycle is shorter in length than a cycle used during the breathing phase (e.g., and thus can be more similar to normal breathing cycle). In some examples, a preliminary cycle has a different breath ratio as the cycles of the breathing phase (e.g., and thus can be more similar to a normal breathing ratio). The second version, as described above, is a reduced-size version of the first version of the progress indicator, yet fluctuates in a similar manner: the indicator is at its smallest at the beginning of a first period of the preliminary cycle (e.g., an inhale period), and is at its largest at the beginning of a second period of the preliminary cycle (e.g., an exhale period). Note that progress indicator 669 in user interface screen 668C is about 50% of the size of progress indicator 616 of user interface screen 624, though they are at the same relative point in their respective cycles (e.g., beginning of an exhale period). Thus, during the preliminary phase, the user is provided with a familiar visual cue (e.g., fluctuation of a progress indicator) that they can utilize to train their breathing, and additional visual indication that the device is in a training period (e.g., a second version that is a reduced size).

[0227] The second version of the progress indicator need not be a reduced size version of the first version. In some examples, the second version of a progress indicator can optionally pulsate, rotate, oscillate, disappear and reappear, or perform any other suitable graphical change during the preliminary phase. The aforementioned behavior is optionally different than the behavior of the first version of the progress indicator. In some examples, the first version of the progress indicator optionally exhibits one these aforementioned behaviors, in addition to, or in place of fluctuating. In some examples, a second version of a progress indicator fluctuates at a cyclic rate corresponding to an estimated breathing pattern (e.g., predefined, or measured from user health data).

[0228] Textual information is optionally provided during the preliminary phase. For example, textual information is displayed with the user interface screens 668A and 668B. User interface screen 668A includes textual information instructing the user to “Be still, and bring your attention to your breath”. User interface screen 668B contains text instructing the user to “Now breathe along with the animation”. In some examples, the textual information is displayed the first time that a user conducts a breathing sequence. The display of textual information provides the user with further visual cues which, when coupled with the other visual cues, functions to further reduce the cognitive burden on the user (especially new users) when conducting breathing sequences in accordance with the embodiments described herein.

[0229] In accordance with some embodiments, the device uses the preliminary phase to detect the user's breathing so that the device can synchronize the initiation of the breathing phase with the user's estimated breathing pattern. Synchronizing the initiation of the breathing phase is described in more detail below in the description of estimated breathing pattern 690 of FIG. 6F. For instance, in some examples, sensor data is collected during the preliminary phase that corresponds to heart measures and/or respiratory measures of the user. This sensor data can be used to determine an estimated breathing pattern of the user (e.g., a model of the user's breathing pattern during the preliminary phase or otherwise).

[0230] In accordance with some embodiments, the preliminary number of cycles is independent of the selected number of cycles. For example, the preliminary number of cycles is optionally a predetermined number of cycles. In accordance with some embodiments, the user can select the preliminary (e.g., predetermined) number of cycles.

[0231] In accordance with some embodiments, the first version of the progress indicator fluctuates at a first cyclic rate, and the second version of the progress indicator fluctuates at a second cyclic rate, which is greater than the first cyclic rate. For example, fluctuating a progress indicator at a cyclic rate which is closer to an individual's normal breath rate during the preliminary phase further increases the effectiveness of the preliminary phase by providing a transition between normal breathing and more challenging breathing (e.g., during the breathing phase). In some examples, a second cyclic rate is 12 cycles (e.g., breaths) per minute (closer to normal breathing), and greater than a first cyclic rate, which is 7 cycles per minute. These values are not intended to be limiting, and in other examples the first and second cyclic rates are any suitable values.

[0232] In accordance with some embodiments, the first version of the progress indicator includes a second variable visual characteristic. Examples of variable visual characteristics include the complexity, the color, the opacity of the displayed progress indicator, a number of displayed visual elements, and the like. Further in response to receiving the first user input, the device selects an initial state of the second variable visual characteristic in accordance with the selected number of cycles. For example, the visual complexity of the indicator may be dependent on (and thus selected in accordance with) the selected number of cycles. User interface screens 670A-670C of FIG. 6D depict an exemplary progress indicator 671 with a second variable visual characteristic (e.g., visual complexity level) selected based on the selected number of cycles. For instance, user interface screen 670A depicts progress indicator 671 created from six graphical elements (e.g., overlapping circles) when the selected number of cycles is set to seven. Screen 670B depicts progress indicator 671 created from eight graphical elements (e.g., overlapping circles) when the number of cycles is set to fourteen, and appears more visually complex. Screen 670C depicts progress indicator 671 created from ten graphical elements (e.g., overlapping circles) when the number of cycles is set to twenty-one, and appears more visually complex still.

[0233] In some examples, the variable visual characteristic is a variable visual element. Variable visual elements may take any form and be configured in any suitable manner. In some examples, the variable visual elements may be circular shapes (e.g., overlapping circles) aligned around a center point of the progress indicator 671 and may have at least some overlapping areas. In some examples, the variable visual elements may have any other suitable shape. In some examples, the variable visual elements may be partially transparent such that areas where the variable visual elements overlap may be darker than other areas. For example, an area with no overlap may be the most transparent, followed by areas with more overlap having increasingly less transparency. In this manner, the center of the progress indicator 671 may appear darker than the outer edges (e.g., due to circles overlapping).

[0234] In accordance with some embodiments, during the breathing phase of the breathing sequence, the device detects completion of a portion of the selected number of cycles and, in response, changes the second variable visual characteristic of the progress indicator. In some examples, changing the second variable visual characteristic includes reducing the complexity of the progress indicator. For example, if a user selected a number of cycles equal to 21, the first version of the progress indicator initially displayed after initiation of the breathing phase can resemble the ten graphical element progress indicator 671 of user interface screen 670C. Upon detecting completion of a portion of the selected number of cycles (e.g., detecting that 7 cycles have been completed), the complexity of the displayed progress indicator may be reduced. In some examples, the reduced complexity first version of the progress indicator can resemble the eight graphical element progress indicator 671 of user interface screen 670B after detecting completion of 7 cycles, thus matching the appearance of the progress indicator corresponding to 14 cycles (e.g., the initial complexity of a progress indicator when 14 cycles is selected initially).

[0235] In accordance with some embodiments, the device detects completion of the portion of the selected number of cycles by determining whether the progress indicator has fluctuated in accordance with a predetermined number of cycles. In some examples, the device detects completion of a particular number of cycles. For instance, as in the example above, the device determines that the progress indicator has fluctuated in accordance with 7 cycles, and thus changes the second variable visual characteristic (e.g., reduces the complexity) of progress indicator 671 from ten graphical elements to eight graphical elements.

[0236] In accordance with some embodiments, the device detects completion of the portion of the selected number of cycles by detecting whether a predetermined amount of time has passed during the breathing phase of the breathing sequence. For instance, using the example above, the device determines (e.g., detects) that the progress indicator has fluctuated for an amount of time equal to one minute, and in response, changes the second variable visual characteristic. As should be apparent, in the example described, because the cyclic rate is set to 7 cycles per minute, the effect would be the same (e.g., the second variable visual characteristic is changed after one minute, which is equivalent to 7 cycles in this example).

[0237] In some embodiments, detecting whether a predetermined amount of time has passed during the breathing phase includes setting a timer equal to the predetermined amount of time, and detecting whether the timer has expired. For example, the device can set and start a timer equal to one minute in response to initiation of the breathing phase, and change the second variable visual characteristic in response to the timer expiring. In some embodiments, detecting whether a predetermined amount of time has passed during the breathing phase includes determining a second time that is the predetermined amount of time after a first time, and detecting whether the second time has occurred. For example, if the breathing phase is started at 8:00 AM, the device can determine that the second variable visual characteristic will be changed at 8:01 AM, and do so when it detects that this latter time has occurred.

[0238] In accordance with some embodiments, the first version of the progress indicator includes a plurality of graphical elements, and wherein to change the second variable visual characteristic of the progress indicator, the device changes a number of the displayed graphical elements of the plurality of graphical elements. For example, referring back to the example described above describe with respect to 670A-670C, the device may reduce the number of graphical elements displayed from 10 (e.g., as in screen 670C) to 6 (e.g., as in screen 670A) during the breathing phase.

[0239] In accordance with some embodiments, the device includes a haptic output device and, during the breathing phase of the breathing sequence, the device outputs one or more haptic breathing cues according to a haptic profile. An exemplary haptic breathing cue is a discrete haptic output (e.g., a vibration) for a short duration (e.g., less than one second). These cues can serve as signals (to a user) of the current period and progress of a cycle of the breathing sequence, such as beginning or end of inhale or exhale periods during the breathing sequence. In some examples, a haptic breathing cue is continuous and for a longer duration.

[0240] A haptic breathing profile refers to the pattern and/or timing of haptic breathing cues during a breathing sequence. In some examples, depending on the active haptic breathing profile, the device outputs haptic breathing cues at one or more of: the initiation of a breathing phase inhale period, during the inhale period, at the initiation of the breathing phase exhale period, and during the exhale period. This list is not exhaustive, and other cues are contemplated by this disclosure.

[0241] The output of haptic breathing cues by the device improves the human-machine interface between a user and the device, because the user can perceive breathing cues corresponding to the breathing sequence by touch (e.g., by vibrations), which provides strong non-visual reinforcement of the pattern of a breathing sequence. In this way, the haptic breathing cues can increase the effectiveness of breathing exercises conducted in accordance with a breathing sequence as describe herein. For example, if a user is conducting a breathing sequence in order to relax, the user can following along with the breathing sequence using the haptic breathing cues while keeping their eyes closed, further increasing their relaxation. In some examples, the output of haptic breathing cues allows a user to follow along with a breathing sequence when they cannot see the display (e.g., in bright sunlight, or if the user is visually impaired), or when illumination from the display is distracting or undesired (e.g., during a meeting, or in a dark theater), or when the user cannot safely view the display to follow along with a displayed progress indicator (e.g., while driving). In some examples, the device is a wearable device, such as an electronic watch, and during the output of haptic breathing cue (e.g., a vibration) the user would feel a buzzing sensation on their wrist.

[0242] In accordance with some embodiments, to output the one or more haptic breathing cues according to the haptic profile, the device outputs a first plurality of haptic breathing cues at a first frequency between cues during a first period of time (e.g., the inhale period), and the device outputs a second plurality of haptic breathing cues at a second frequency between cues during a second period of time (e.g., the exhale period). For example, the frequency between cues refers to the time between the output of discrete haptic breathing cues.

[0243] In accordance with some embodiments, the first frequency between cues is an increasing frequency, and the second frequency between cues is a constant frequency. This is referred to as a “crescendo” haptic profile and is illustrated graphically at haptic profile diagram

674 of FIG. 6E, which depicts one cycle. User interface screens 620-628 are reproduced in FIG. 6E, and are aligned with haptic profile diagram 674. Haptic profile diagram 674 has an axis ***t*** representing time, and a plurality of vertical lines along the axis, each representing the time of an output of a discrete haptic cue. Haptic profile diagram 674 is shown under the user interface screens 620-628. Each screen 620-628 is positioned along the axis ***t*** and aligns with the respective time during the cycle at which each screen would be displayed by the device during a breathing phase of a breathing sequence. During the first period 676A, which can represent the inhale period of a cycle (e.g., breath), the device outputs haptic breathing cues 674A, wherein each cue is represented by a vertical mark on axis ***t*** of diagram 674. As can be seen, the spacing between each of haptic breathing cues 674A gets smaller as the time during the first (e.g., inhale) period 676A progresses—thus, the frequency between cues is increasing. Accordingly, the haptic breathing cues 674A are output at an increasing frequency between cues. At the end of the first period (corresponding to the time on axis ***t*** aligned with screen 624), the second period 676B begins. During the second period (e.g., the exhale period), the device outputs haptic breathing cues 674B at a constant frequency—that is, the period of time between the output of each of haptic breathing cues 674B is the same. The distinction in frequency between haptic breathing cues during the inhale and exhale periods provides a non-visual cue to the user, indicating the position and progress of the breathing sequence during a cycle. For example, as the frequency between cues gets higher, the user knows that the inhale period is coming to an end and that they should prepare to exhale.

[0244] In accordance with some embodiments, to output the one or more haptic breathing cues according to the haptic profile, the device outputs, at the start of the first period of time, a first number of haptic breathing cues, and outputs, at the start of the second period of time, a second number of haptic breathing cues. In accordance with some embodiments, the first number and the second number are different. This is referred to as the "one tap, two tap" haptic profile and is illustrated graphically at haptic profile diagram 672. Haptic profile diagram 672 has an axis ***t*** representing time, and a plurality of vertical lines along the axis, each representing the time of an output of a discrete haptic cue. Haptic profile diagram 672 is shown under user interface screens 620-628, and depicts one cycle. Similar to haptic profile diagram 674 described above, each screen 620-628 is positioned along the axis ***t*** and aligns with the respective time during the cycle at which each screen would be displayed by the device during a breathing sequence. At the beginning of the first period 676A, which can represent the inhale period of the cycle (e.g., breath), the device outputs one haptic breathing cue 672A, wherein the cue is represented by a vertical mark on axis ***t*** of diagram 672. At the end of the first period (corresponding to the time on axis ***t*** aligned with screen 624), the second period 676B begins. At the beginning of the second period (e.g., the exhale period), the device outputs two haptic breathing cues 672B. Haptic breathing cue 672C, similar to 672A, and represents the beginning of a new period. Thus, the one tap, two tap haptic profile can provide a minimal number of haptic outputs yet still signal to a user the transition between inhale and exhale periods. Accordingly, the benefits of the non-visual breathing training provided by the haptic breathing cues is still achieved, while potentially reducing power consumption of the device.

[0245] In accordance with some embodiments, the device suppresses, during the breathing phase of the breathing sequence, the output of at least a subset of alerts that the device is configured to output. For example, during the breathing phase, the device may suppress some or all audible, visible, or haptic alerts not associated the breathing sequence. For example, these alerts are generated by the device receiving a phone call, the device receiving an electronic message (e.g., SMS, email, or iMessage), a scheduled alarm, a reminder, a calendar event, a notification (e.g., from a news application on the device), or the like. Suppressing some or all alerts that the device is configured to generate, prevents potential interruptions to a user conducting a breathing sequence, and allows the user to focus on the breathing sequence and not be disturbed, thereby increasing the benefits of conducting breathing sequences in accordance with the embodiments described herein.

[0246] While conducting a breathing sequence, a user may cause the breathing sequence to be interrupted. In accordance with some embodiments, during the breathing phase of the breathing sequence, the device receives a user input (e.g., representing an interruption), and the device determines whether the user input meets a breathing sequence interrupt criteria. For example, the device can detect that a user has navigated away from a breathing application (e.g., exited, switched applications) being used to conduct a breathing sequence, that a user started physical activity (e.g., walking), that the user has answered a phone call on the device or on a coupled device, or any other condition that indicates that the user is not performing a breathing exercise in accordance with the breathing sequence.

[0247] User interface screen 678 of FIG. 6F depicts a progress indicator displayed during a breathing phase of a breathing sequence. In this example, the device receives user input while displaying user interface screen 678, wherein the user input represents a request to display a home screen of the device. In response to the input, for example, the device displays user interface screen 680, which depicts an exemplary home screen of the device that includes affordance 682.

[0248] In accordance with a determination that the user input meets the breathing sequence interrupt criteria, the device ends the breathing phase of the breathing sequence. For example, even though a program being used to conduct the breathing sequence may be still be open as a background application after the interrupting user input is received (e.g., causing the home screen to be displayed), the device ends the breathing sequence. In this way, the breathing phase does not continue when the device detects a condition indicating that the user is likely not following along with the breathing sequence.

[0249] Subsequent to ending the breathing phase of the breathing sequence, the device displays, on the display, an indication of a completed number of cycles. In some examples, the completed number of cycles includes the number of cycles, of the selected number of cycles, that the progress indicator fluctuated in accordance with after the breathing phase was initiated and before the user input (e.g., causing the breathing phase to end) was received. For example, if a user causes the device to re-display the application (used for conducting breathing sequences) for the first time subsequent to receiving the user input (e.g., representing the interruption), the device displays the amount of breathing that the user completed before the interruption.

[0250] The amount of breathing can be displayed, for example, on an interrupted session user interface. An exemplary interrupted session user interface is depicted in user interface screen 684 of FIG. 6F. User interface screen 684 includes textual information informing the user that the previous breathing sequence (e.g., session) was interrupted, as well as the amount of breathing (e.g., “SO FAR TODAY 5 MIN”).

[0251] In some examples, the amount of breathing is the total breathing for the current day. Alternatively, in some examples the amount of breathing is the total breathing completed during the interrupted breathing sequence. In some examples, if the user interrupts the breathing phase after 7 cycles, and the selected number of cycles is 21 at a cyclic rate of 7 cycles per minute, the indication of the completed number of cycles includes the 7 cycles (e.g., breaths), or alternatively one minute (e.g., (7 cycles) ÷ (7 cycles per minute)), which the user completed before the breathing sequence was interrupted. In some examples, the completed number of cycles can also include the total number of completed cycles for a period of time, such as today. For example, if the user previously completed 28 cycles in the current day, in addition to the 7 cycles during the interrupted breathing phase, the indication of the completed number of cycles can include 35 cycles, five minutes (e.g., (35 cycles) ÷ (7 cycles per minute)), or both. This example is illustrated at user interface screen 684, which depicts an indication of the number of completed cycles (“SO FAR TODAY 5 MINS”). As discussed above, the indication of the completed number can also be a number of cycles (not depicted) (e.g., "SO FAR TODAY 35 BREATHS").

[0252] In accordance with some embodiments, subsequent to ending the breathing phase of the breathing sequence, the device displays, on the display, a second affordance (e.g., for conducting another breathing sequence). For example, user interface screen 684 includes an exemplary second affordance, breathe again affordance 686. The device receives user input selection of the second affordance and, in response, displays, on the display, the configuration user interface. For example, in response to receiving selection of breathe again affordance 686, the device displays user interface screen 688, depicting an exemplary configuration screen. At the configuration user interface, the user can select a new number of cycles and cause the device to progress to a new breathing phase.

[0253] By returning the user to the configuration user interface after selection of a breathe again affordance, the user is provided several options for resuming a breathing exercise after an interruption. The user can, for example, select the number of cycles for the new sequence to be equal to the number of cycles remaining in the previous sequence before it was interrupted. For instance, if the user had completed 7 cycles of a 21 cycle breathing phase, the user can set the number of cycles for a new breathing phase to 14 cycles, in order to complete the original goal of 21 cycles (e.g., 7 cycles + 14 cycles). Alternatively, the user may elect to conduct a breathing sequence with the full 21 cycles again. In accordance with some embodiments, in response to receiving user input selection of the second affordance, the device can automatically progress to a new breathing sequence. For example, during the new breathing phase, the device can fluctuate the progress indicator in accordance with the previously-selected number of cycles (of the interrupted breathing phase). Allowing the user to bypass the configuration user interface, and automatically progress to a new breathing sequence, reduces the number of user interfaces displayed, thereby reducing cognitive burden on the user, and saving time and device resources.

[0254] In accordance with some embodiments, the device receives a second signal during the breathing sequence. For example, the second signal can represent health data or measurements usable to determine a user's estimated breathing pattern. The device determines an estimated breathing pattern based at least in part on the received second signal, and synchronizes the initiation of the breathing phase of the breathing sequence and the display of the progress indicator during the breathing phase of the breathing sequence with the estimated breathing pattern. For example, the device determines the user's estimated breathing pattern based on a signal representing the user's respiration (or usable to calculate the user's respiration), and then synchronizes the beginning of the breathing phase with the appropriate time during the user's estimated breathing pattern.

[0255] In accordance with some embodiments, the device includes a sensor, and receives the second signal from the sensor during the breathing sequence. Exemplary techniques for measuring user respiration and determining a breathing pattern are found, for example, in the related applications U.S. Provisional Application Serial No. 62/348,804, entitled "Breathing Synchronization and Monitoring", filed on June 10, 2016; and U.S. Provisional Application Serial No. 62/348,808, entitled "Fluctuating Progress Indicator", filed on June 10, 2016. The content of these applications is hereby incorporated by reference in their entirety for all purposes.

[0256] In some examples, the device collects health data. The health data is optionally collected using one or more sensors of the device. In some examples, the device determines respiratory measures based at least in part on the health data. The respiratory measures include, for example, a breathing pattern (e.g., a cyclic pattern of inhale breaths and exhale breaths), a breathing rate (e.g., a number of full breaths taken during a time period), a breath ratio (e.g., a comparison of time allocated to inhale breaths compared to exhale breaths), and any other related measure. In some examples, using the respiratory measures, the device generates breathing cues. For example, the device presents a breathing element (e.g., a progress indicator) to lead a breathing sequence in accordance with the breathing cues, and as discussed throughout this specification. For example, the breathing element is optionally a fluctuating progress indicator, various versions of which can be presented on a display of the device to lead the user in the breathing sequence.

[0257] FIG. 6F depicts exemplary estimated breathing pattern 690, represented by a curve. Exemplary estimated breathing pattern 690 represents an approximation of the respiration of a user over time. In some examples, the curve represents the size of a progress indicator (e.g., as it fluctuates over time). Point 690A of estimated breathing pattern 690 represents a transition between the end of an exhale period (sloping down and to the right) and the beginning of the inhale period (sloping up and to the right). Using estimated breathing pattern 690, the device can determine the occurrence of the transition event in order to synchronize the breathing phase such that it is initiated to match the user's estimated breathing pattern. For example, if a breathing phase begins with an inhale period (e.g., the progress indicator growing in size), the device will initiate the breathing phase at the point 690A in the estimated breathing pattern 690, representing an estimate of when the user is beginning their inhale. In some examples, the point 690B representing the transition between the end of the inhale period and the beginning of the exhale period can be used. For instance, if a breathing phase begins with an exhale period (e.g., the progress indicator shrinking in size), the device will initiate the breathing phase at the point 690B in the estimated breathing pattern 690, representing an estimate of when the user is beginning their exhale. User interface screens 620 and 624 (representing the progress indicator at its smallest and largest relative sizes, respectively, for the breathing phase fluctuations illustrated in FIG. 6A) are included for reference to illustrate examples of what is displayed by the device at each of the respective points 690A and 690B.

[0258] In some examples, the device determines the estimated breathing pattern during the preliminary phase. During the preliminary phase the device can be receiving signal data from the one or more sensors. Based at least in part on the signal data, the device can estimate an estimated breathing pattern corresponding to the user of the device. As described throughout, the breathing pattern may be a cyclic pattern of breath events (e.g., inhale, exhale) and times corresponding to the breath events. For example, the cyclic pattern may include a series of inhale breath events and a series of exhale breath events. In some examples, the preliminary phase may continue at least until the device is able to estimate a breathing pattern (e.g., to determine an estimated breathing pattern) or may continue for a fixed time or until a fixed number of breaths have been identified (e.g., for a preliminary number of cycles).

[0259] In accordance with some embodiments, to synchronize the initiation of the breathing phase of the breathing sequence and the display of the progress indicator during the breathing phase of the breathing sequence with the estimated breathing pattern, the device determines a synchronization event that is a transition between an inhale period and an exhale period of the estimated breathing pattern. An exemplary synchronization event is a transition between an inhale period and an exhale period. For example, the device can determine either of points 690A and 690B as an exemplary synchronization event. In accordance with a determination that the synchronization event has occurred, the device initiates the breathing phase of the breathing sequence, and displays, on the display, the first version of the progress indicator. For example, as illustrated in FIG. 6F, the device may display user interface screen 620, depicting an exemplary first version of a progress indicator, at point 690A, and proceed to fluctuate the progress indicator in accordance with the operations described with respect to screens 620-628 of FIG. 6A.

[0260] In accordance with some embodiments, prior to displaying the configuration user interface, the device determines an aggregate amount of time representing a completed number of cycles of one or more breathing sequences over a goal period. For example, the device determines the total breathing time completed for today. The device displays, on the display, a fourth affordance comprising an indication of the aggregate amount of time. For example, if the device is an electronic watch, the fourth affordance can be a selectable watch face complication that includes the number of minutes of breathing completed today. The device receives user input selection of the fourth affordance and, in response to receiving the user input selection of the fourth affordance, displays the configuration user interface. For example, in response to selection of the watch face complication, the device launches a breathing application for conducting breathing sequences and displays the configuration user interface (e.g., for selecting a number of cycles and progressing to a breathing phase). Referring back to FIG. 6A, user interface 602 depicts an exemplary watch face complication, affordance 604. In response to the selection of 604, the device displays an exemplary configuration user interface, user interface screen 606.

[0261] FIG. 7 is a flow diagram illustrating a method for conducting a breathing sequence using an electronic device in accordance with some embodiments. Method 700 is performed at a device (e.g., 100, 300, 500) with a display. Some operations in method 700 are, optionally, combined, the order of some operations are, optionally, changed, and some operations are, optionally, omitted.

[0262] As described below, method 700 provides an intuitive way for conducting a breathing sequence. The method reduces the cognitive burden on a user for using an electronic device for breathing training, thereby creating a more efficient human-machine interface. For battery-operated computing devices, enabling a user to configure a breathing sequence faster and more efficiently conserves power and increases the time between battery charges.

[0263] At block 702, the device displays, on the display, a configuration user interface (e.g., user interface screen 606 of FIG. 6A), wherein the configuration user interface includes a prompt to select a number of cycles of a breathing sequence.

[0264] At block 704, the devices receives a first user input (e.g., selection of start affordance 612 of FIG. 6A). In accordance with some embodiments, the device includes a rotatable input mechanism (e.g., rotatable input mechanism 614), and wherein the first user input is a rotation of the rotatable input mechanism (block 706).

[0265] At block 708, in response to receiving the first user input, the device adjusts the number of cycles of the breathing sequence to the selected number of cycles. For example, in

FIG. 6A, the device has adjusted the number of cycles (e.g., breaths), as represented by indicator 608, from 7 cycles to 21 cycles.

[0266] At block 710, the device initiates a breathing phase of the breathing sequence. For example, user interface screen 620 depicts the beginning of an exemplary breathing phase.

[0267] At block 712, during the breathing phase of the breathing sequence: the device displays, on the display, a first version of a progress indicator (block 714), and fluctuates the first version of the progress indicator in accordance with the selected number of cycles (block 716). For example, in user interface screen 620, the device displays a progress indicator 616 at the initiation of an exemplary breathing phase. In this example, the device fluctuates the progress indicator 616 (in accordance with a single exemplary cycle) as illustrated in user interface screens 620-628.

[0268] In accordance with some embodiments, at block 718, prior to initiating the breathing phase of the breathing sequence, the device: receives a second user input (block 720). In accordance with some embodiments, the first user input and the second user input are the same (block 722). In response to receiving the second user input, the device progresses to the breathing phase of the breathing sequence (block 724).

[0269] In accordance with some embodiments, at block 726, each cycle of the selected number of cycles includes a first period of time (e.g., period 664 of FIG. 6C) and a second period of time (e.g., period 666 of FIG. 6C) distinct from the first period, and wherein fluctuating the first version of the progress indicator includes: during each cycle of the selected number of cycles, the device: changes, at the start of the first period of time, a first variable visual characteristic of the progress indicator (block 728), and changes, at the start of the second period of time, the first variable visual characteristic of the progress indicator (block 730). For example, as shown in FIG. 6C, the progress indicator in user interfaces screens 620-628 changes in size (an exemplary first visual characteristic) throughout the cycle (e.g., as visually smooth animation). Thus, the size of the progress indicator changes at the start of period 664 (e.g. begins growing) and the start of period 666 (e.g., begins shrinking). In accordance with some embodiments, the second period of time is greater than the first period of time (block 732).

[0270] In accordance with some embodiments, the first variable visual characteristic is the size of the displayed progress indicator (block 734), and wherein changing, at the start of the first period of time, the first variable visual characteristic includes increasing the size of the displayed progress indicator (block 736), and wherein changing, at the start of the second period of time, the first variable visual characteristic includes decreasing the size of the displayed progress indicator (block 738).

[0271] In accordance with some embodiments, at block 740, fluctuating the first version of the progress indicator includes: the device displays, on the display, the first version of the progress indicator in a first state (block 742), the device animatedly transitions, during a first segment of time, the first version of the progress indicator from the first state to a second state (block 744), and the device animatedly transitions, during a second segment of time, the first version of the progress indicator from the second state to the first state (block 746). In accordance with some embodiments, the second segment of time is greater than the first segment of time (block 748). For example, screen 620 depicts a first state of a progress indicator, and screen 624 depicts a second state of a progress indicator. In this example, period 664 represents an exemplary first segment of time and period 666 represents an exemplary second segment of time. During the first period 664, the device animatedly transitions the progress indictor from the first state to the second state (e.g., intermediate screen 622 shows the progress indicator at a point during this transition). During the second period 666, the device animatedly transitions the progress indictor from the second state to the first state (e.g., intermediate screen 626 shows the progress indicator at a point during this transition).

[0272] In accordance with some embodiments, the first version of the progress indicator fluctuates at a first cyclic rate (block 750). In accordance with some embodiments, at block 752, the device receives a value of the first cyclic rate. At block 754, in response to receiving the value of the first cyclic rate, the device sets the first cyclic rate to the received value. In accordance with some embodiments the first cyclic rate is a predetermined number of cycles per unit of time (block 756). For example, the first cyclic rate is a number of cycles (e.g., breaths) per minute.

[0273] In accordance with some embodiments, at block 758, prior to displaying, on the display, the configuration user interface, the device determines whether a prompting criteria has been met (block 760). In accordance with a determination that the prompting criteria has been met, the device displays, on the display, a prompt that includes a first affordance (block 768). The device receives user input selection of the first affordance (block 770). In response to receiving the user input selection of the first affordance, the device displays, on the display, the configuration user interface (block 772).

[0274] In accordance with some embodiments, at block 762, determining whether a prompting criteria has been met includes determining whether a predetermined period of time has passed after a time associated with a previous breathing sequence. In accordance with some embodiments, the time associated with the previous breathing sequence is a beginning time associated with the previous breathing sequence (block 764). In accordance with some embodiments, the time associated with the previous breathing sequence is a completion time associated with the previous breathing sequence (block 766).

[0275] In accordance with some embodiments, at block 774, prior to initiating the breathing phase of the breathing sequence, the device initiates a preliminary phase of the breathing sequence (block 776). During the preliminary phase of the breathing sequence (block 778), the device displays, on the display, a second version of the progress indicator (block 780) and fluctuates the second version of the progress indicator in accordance with a preliminary number of cycles (block 782). In accordance with some embodiments, the preliminary number of cycles is independent of the selected number of cycles (block 784). The first version of the progress indicator fluctuates at a first cyclic rate, the second version of the progress indicator fluctuates at a second cyclic rate, and the second cyclic rate is greater than the first cyclic rate (block 786).

[0276] In accordance with some embodiments, at block 788, the first version of the progress indicator includes a second variable visual characteristic. At block 790, the device, further in response to receiving the first user input, selects an initial state of the second variable visual characteristic in accordance with the selected number of cycles.

[0277] At block 792, during the breathing phase of the breathing sequence, the device detects completion of a portion of the selected number of cycles (block 794), and, in response to detecting completion of the portion of the selected number of cycles, changes the second variable visual characteristic of the progress indicator (block 7100). In accordance with some embodiments, detecting completion of the portion of the selected number of cycles includes: determining whether the progress indicator has fluctuated in accordance with a predetermined number of cycles (block 796). In accordance with some embodiments, detecting completion of the portion of the selected number of cycles includes: detecting whether a predetermined amount of time has passed during the breathing phase of the breathing sequence (block 798). In accordance with some embodiments, the first version of the progress indicator includes a plurality of graphical elements, and changing the second variable visual characteristic of the progress indicator includes: changing a number of the displayed graphical elements of the plurality of graphical elements (block 7102).

[0278] In accordance with some embodiments, at block 7104, the device includes a haptic output device and, during the breathing phase of the breathing sequence, the device outputs one or more haptic breathing cues according to a haptic profile.

[0279] In accordance with some embodiments, at block 7112, outputting the one or more haptic breathing cues according to the haptic profile includes: outputting a first plurality of haptic breathing cues at a first frequency between cues during the first period of time (block 7114), and outputting a second plurality of haptic breathing cues at a second frequency between cues during the second period of time (block 7116). In accordance with some embodiments, the first frequency between cues is an increasing frequency, and wherein the second frequency between cues is a constant frequency (block 7118).

[0280] In accordance with some embodiments, at block 7106, outputting the one or more haptic breathing cues according to the haptic profile includes: outputting, at the start of the first period of time, a first number of haptic breathing cues (block 7108), and outputting, at the start of the second period of time, a second number of haptic breathing cues, wherein the first number and the second number are different (block 7110).

[0281] In accordance with some embodiments, at block 7120, the device includes a sensor. At block 7122, the device receives a first signal from the sensor during the breathing phase of the breathing sequence. At block 7124, the device determines an estimated heart rate based at least in part on the received first signal. At block 7126, the device displays, on the display, an indication of the estimated heart rate. In accordance with some embodiments, the indication of the estimated heart rate is displayed subsequent to completion of the breathing phase (block 7128). For example, an exemplary indication 636 of an estimated heart rate is displayed on the completion interface illustrated in user interface 632 in FIG. 6B.

[0282] In accordance with some embodiments, at block 7130, the device suppresses, during the breathing phase of the breathing sequence, the output of at least a subset of alerts that the device is configured to output.

[0283] In accordance with some embodiments, at block 7132, during the breathing phase of the breathing sequence, the device receives a third user input. At block 7134, the device determines whether the third user input meets a breathing sequence interrupt criteria. At block 7136, in accordance with a determination that the third user input meets the breathing sequence interrupt criteria, the device ends the breathing phase of the breathing sequence. At block 7138, subsequent to ending the breathing phase of the breathing sequence, the device: displays, on the display, an indication of a completed number of cycles, wherein the completed number of cycles includes the number of cycles, of the selected number of cycles, that the progress indicator fluctuated in accordance with after the breathing phase was initiated and before the third user input was received (block 7140). For example, the device displays interrupted session user interface 684, which includes an indication of the completed number of cycles (e.g., in the form of a total breathing time completed today ("SO FAR TODAY 5 MIN"), which includes the number of cycles of the interrupted session).

[0284] In accordance with some embodiments, at block 7142, subsequent to ending the breathing phase of the breathing sequence, the device: displays, on the display, a second affordance. For example, breathe again affordance 686 is an exemplary second affordance. At block 7144, the device receives user input selection of the second affordance. At block 7146, in response to the user input selection of the second affordance, the device displays, on the display, the configuration user interface. For example, user interface 688 depicts an exemplary configuration user interface displayed after breathe again affordance 686 is selected.

[0285] In accordance with some embodiments, at block 7148, the device the device determines an aggregate amount of time representing a completed number of cycles of the breathing sequence over a goal period. In accordance with some embodiments, the first version of the progress indicator fluctuates at a first cyclic rate, and the aggregate amount of time is determined based at least in part on the first cyclic rate (block 7150). In accordance with some embodiments, the goal period is the current day (block 7152). At block 7154, in response to detecting completion of the breathing phase of the breathing sequence, the device displays, on the display, a completion interface comprising: an indication of the aggregate amount of time, and a third affordance. For example, the device displays exemplary completion interface shown in user interface screen 632, which includes an indication of the aggregate amount of time (e.g., the form of a total breathing time completed today ("SO FAR TODAY 6 MIN") and a breathe again affordance 638. At block 7160, the device receives user input selection of the third affordance. For example, the device receives selection of breathe again affordance 638. At block 7162, in response to receiving the user input selection of the third affordance, the device progresses to the breathing phase of the breathing sequence. For example, the device initiates a preliminary phase (e.g., as illustrated in screens 668A-668E), a breathing phase (e.g., as illustrated in screens 620-628), or a preliminary phase followed by a breathing phase.

[0286] In accordance with some embodiments, at block 7156, detecting completion of the breathing phase includes detecting that a predetermined amount of time has elapsed.

[0287] In accordance with some embodiments, at block 7158, the completion interface further includes an indication of an estimated heart rate. For example, user interface screen includes indicator 636, indicating an estimated heart rate.

[0288] In accordance with some embodiments, at block 7164, the device determines an aggregate amount of time representing a completed number of cycles of the breathing sequence over a goal period for each of a plurality of goal periods. In accordance with some embodiments, the goal period is a day, and the plurality of goal periods is seven days (block 7166). At block 7168, the device displays, on the display, a summary interface comprising an indicator for each of the plurality of goal periods, wherein the indicator for each of the plurality of goal periods represents the determined aggregate amount of time for its respective goal period of the plurality of goal periods. For example, the device displays the exemplary summary interface shown in user interface 642, depicting a daily summary for the last week, of completed (e.g., aggregate) amount of breathing time for each day. In this example, the goal period is a day, and the plurality of goal periods is seven days.

[0289] In accordance with some embodiments, at block 7170, the device receives a second signal during the breathing sequence. At block 7174, the device determines an estimated breathing pattern based at least in part on the received second signal. At block 7176, the device synchronizes the initiation of the breathing phase of the breathing sequence and the display of the progress indicator during the breathing phase of the breathing sequence with the estimated breathing pattern. For example, the device may synchronize the beginning of a breathing phase (e.g., as depicted in screen 620) with the appropriate point (point 690A of estimated breathing pattern 690 in FIG. 6F) of the estimated breathing pattern. That is, the device starts the breathing phase (e.g., beginning with an inhale period) at an appropriate time based on the estimated pattern (e.g., when the estimated pattern signals that the user is about to begin inhaling).

[0290] In accordance with some embodiments, at block 7178, synchronizing the initiation of the breathing phase of the breathing sequence and the display of the progress indicator during the breathing phase of the breathing sequence with the estimated breathing pattern includes: determining a synchronization event that is a transition between an inhale period and an exhale period of the estimated breathing pattern (block 7180), and, in accordance with a determination that the synchronization event has occurred (block 7182): initiating the breathing phase of the breathing sequence (7184) and displaying, on the display, the first version of the progress indicator (block 7186). For example, points 690A and 690B show transition events between exemplary inhale and exhale periods of an estimated breathing pattern.

[0291] In accordance with some embodiments, at block 7172, the device includes a sensor, and wherein receiving the second signal includes receiving the second signal from the sensor during the breathing sequence.

[0292] In accordance with some embodiments, at block 7188, prior to displaying the configuration user interface: the device determines an aggregate amount of time representing a completed number of cycles of one or more breathing sequences over a goal period (block 7190), displays, on the display, a fourth affordance comprising an indication of the aggregate amount of time (block 7192), and receives user input selection of the fourth affordance, wherein the configuration user interface is displayed in response to receiving the user input selection of the fourth affordance (block 7194). For example, user interface screen 602 of FIG. 6A depicts an exemplary fourth affordance, affordance 604. When the device receives selection of affordance 604, the configuration user interface depicted in user interface screen 606 is displayed.

[0293] 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 1000 optionally includes one or more of the characteristics of the various methods described above with reference to method 700. For example, the exemplary configuration user interface depicted in user interface screen 606 can be displayed in response to receiving selection of an affordance 906 at the display of user interface 904 shown in FIG. 9A, depicting an exemplary displayed prompt. As another example, user interface 632 can correspond to user interface 902, and user interface 618 can correspond to user interface 910. For brevity, these details are not repeated below.

[0294] 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.

[0295] As shown in FIG. 8, an electronic device 800 includes a display unit 802 configured to display a graphic user interface, and optionally, a rotatable input mechanism unit 804, and optionally, a sensor unit 806, and a processing unit 808 coupled to the display unit 802 and, optionally, the rotatable input mechanism unit 804 and the sensor unit 806. In some embodiments, the processing unit 808 includes a display enabling unit 810, a receiving unit 812, an adjusting unit 814, an initiating unit 816, and a fluctuating unit 818. In some embodiments, the processing unit 808 includes one or more of a progressing unit 820, a changing unit 822, a setting unit 824, a determining unit 826, a selecting unit 828, a detecting unit 830, a breathing cue outputting unit 832, a suppressing unit 834, an ending unit 836, and a synchronizing unit 838.

[0296] The processing unit 808 is configured to: enable display (e.g., with display enabling unit 810) of, on the display unit 802, a configuration user interface, wherein the configuration user interface includes a prompt to select a number of cycles of a breathing sequence; receive (e.g., with receiving unit 812) a first user input; in response to receiving the first user input, adjust (e.g., with adjusting unit 814) the number of cycles of the breathing sequence to the selected number of cycles; initiate (e.g., with initiating unit 816) a breathing phase of the breathing sequence; and during the breathing phase of the breathing sequence: enable display (e.g., with display enabling unit 810) of, on the display unit 802, a first version of a progress indicator; and fluctuate (e.g., with fluctuating unit 818) the first version of the progress indicator in accordance with the selected number of cycles.

[0297] In some embodiments, the device includes a rotatable input mechanism unit 804, coupled to the display unit 802 and the processing unit 808, and wherein the first user input is a rotation of the rotatable input mechanism unit 804.

[0298] In some embodiments, the processing unit 808 is further configured to: prior to initiating the breathing phase of the breathing sequence: receive (e.g., with receiving unit 812) a second user input; in response to receiving the second user input, progress (e.g., with progressing unit 820) to the breathing phase of the breathing sequence.

[0299] In some embodiments, wherein the first user input and the second user input are the same.

[0300] In some embodiments, the processing unit 808 is further configured to: wherein each cycle of the selected number of cycles includes a first period of time and a second period of time distinct from the first period, and wherein fluctuating the first version of the progress indicator includes: during each cycle of the selected number of cycles: change (e.g., with changing unit 822), at the start of the first period of time, a first variable visual characteristic of the progress indicator; and change (e.g., with changing unit 822), at the start of the second period of time, the first variable visual characteristic of the progress indicator.

[0301] In some embodiments, the first variable visual characteristic is the size of the displayed progress indicator, wherein changing, at the start of the first period of time, the first variable visual characteristic includes increasing the size of the displayed progress indicator, and wherein changing, at the start of the second period of time, the first variable visual characteristic includes decreasing the size of the displayed progress indicator.

[0302] In some embodiments, the second period of time is greater than the first period of time.

[0303] In some embodiments, fluctuating the first version of the progress indicator includes: enabling display (e.g., with display enabling unit 810) of, on the display unit 802, the first version of the progress indicator in a first state; animatedly transitioning (e.g., with display enabling unit 810), during a first segment of time, the first version of the progress indicator from the first state to a second state; and animatedly transitioning (e.g., with display enabling unit 810), during a second segment of time, the first version of the progress indicator from the second state to the first state.

[0304] In some embodiments, the second segment of time is greater than the first segment of time.

[0305] In some embodiments, the first version of the progress indicator fluctuates at a first cyclic rate.

[0306] In some embodiments, the processing unit 808 is further configured to: receive (e.g., with receiving unit 812) a value of the first cyclic rate; and in response to receiving the value of the first cyclic rate, set (e.g., with setting unit 824) the first cyclic rate to the received value.

[0307] In some embodiments, the first cyclic rate is a predetermined number of cycles per unit of time.

[0308] In some embodiments, the processing unit 808 is further configured to: prior to enabling display of, on the display unit 802, the configuration user interface: determine (e.g., with determining unit 826) whether a prompting criteria has been met; in accordance with a determination that the prompting criteria has been met, enable display (e.g., with display enabling unit 810) of, on the display unit 802, a prompt that includes a first affordance; receive (e.g., with receiving unit 812) user input selection of the first affordance; and in response to receiving the user input selection of the first affordance, enable display (e.g., with display enabling unit 810) of, on the display unit 802, the configuration user interface.

[0309] In some embodiments, determining whether a prompting criteria has been met includes determining whether a predetermined period of time has passed after a time associated with a previous breathing sequence.

[0310] In some embodiments, the time associated with the previous breathing sequence is a beginning time associated with the previous breathing sequence.

[0311] In some embodiments, the time associated with the previous breathing sequence is a completion time associated with the previous breathing sequence.

[0312] In some embodiments, the processing unit 808 is further configured to: prior to initiating the breathing phase of the breathing sequence: initiate (e.g., with initiating unit 816) a preliminary phase of the breathing sequence; and during the preliminary phase of the breathing sequence: enable display (e.g., with display enabling unit 810) of, on the display unit 802, a second version of the progress indicator; and fluctuate (e.g., with fluctuating unit 818) the second version of the progress indicator in accordance with a preliminary number of cycles.

[0313] In some embodiments, the preliminary number of cycles is independent of the selected number of cycles.

[0314] In some embodiments, the first version of the progress indicator fluctuates at a first cyclic rate, wherein the second version of the progress indicator fluctuates at a second cyclic rate, and wherein the second cyclic rate is greater than the first cyclic rate.

[0315] In some embodiments, the first version of the progress indicator includes a second variable visual characteristic, the processing unit 808 is further configured to: further in response to receiving the first user input, select (e.g., with selecting unit 828) an initial state of the second variable visual characteristic in accordance with the selected number of cycles.

[0316] In some embodiments, the processing unit 808 is further configured to: during the breathing phase of the breathing sequence: detect (e.g., with detecting unit 830) completion of a portion of the selected number of cycles; and in response to detecting completion of the portion of the selected number of cycles, change (e.g., with changing unit 822) the second variable visual characteristic of the progress indicator.

[0317] In some embodiments, detecting completion of the portion of the selected number of cycles includes: determining whether the progress indicator has fluctuated in accordance with a predetermined number of cycles.

[0318] In some embodiments, detecting completion of the portion of the selected number of cycles includes: detecting whether a predetermined amount of time has passed during the breathing phase of the breathing sequence.

[0319] In some embodiments, the first version of the progress indicator includes a plurality of graphical elements, and wherein changing the second variable visual characteristic of the progress indicator includes: changing a number of the displayed graphical elements of the plurality of graphical elements.

[0320] In some embodiments, the device includes a haptic output device, the processing unit 808 is further configured to: during the breathing phase of the breathing sequence, output (e.g., with breathing cue outputting unit 832) one or more haptic breathing cues according to a haptic profile.

[0321] In some embodiments, outputting the one or more haptic breathing cues according to the haptic profile includes: outputting a first plurality of haptic breathing cues at a first frequency between cues during the first period of time; and outputting a second plurality of haptic breathing cues at a second frequency between cues during the second period of time.

[0322] In some embodiments, the first frequency between cues is an increasing frequency, and wherein the second frequency between cues is a constant frequency.

[0323] In some embodiments, outputting the one or more haptic breathing cues according to the haptic profile includes: outputting, at the start of the first period of time, a first number of haptic breathing cues; and outputting, at the start of the second period of time, a second number of haptic breathing cues, wherein the first number and the second number are different.

[0324] In some embodiments, the device includes a sensor unit 806, coupled to the display unit 802 and the processing unit 808, the processing unit 808 is further configured to: receive (e.g., with receiving unit 812) a first signal from the sensor unit 806 during the breathing phase of the breathing sequence; determine (e.g., with determining unit 826) an estimated heart rate based at least in part on the received first signal; and enable display (e.g., with display enabling unit 810) of, on the display unit 802, an indication of the estimated heart rate. For example, user interface screen 632 of FIG. 6B depicts heart rate indicator 636, which is an exemplary indication of an estimated heart rate. As discussed in the example above, user interface screen 632, is an exemplary completion interface that is displayed after completion of a breathing phase of a breathing sequence. Accordingly, heart rate indicator 636 can represent an estimated heart rate that was determined using a signal from a sensor received during the breathing phase.

[0325] In some embodiments, the indication of the estimated heart rate is displayed subsequent to completion of the breathing phase.

[0326] In some embodiments, the processing unit 808 is further configured to: suppress (e.g., with suppressing unit 834), during the breathing phase of the breathing sequence, the output of at least a subset of alerts that the device is configured to output.

[0327] In some embodiments, the processing unit 808 is further configured to: during the breathing phase of the breathing sequence, receive (e.g., with receiving unit 812) a third user input; determine (e.g., with determining unit 826) whether the third user input meets a breathing sequence interrupt criteria; in accordance with a determination that the third user input meets the breathing sequence interrupt criteria, end (e.g., with ending unit 836) the breathing phase of the breathing sequence; and subsequent to ending the breathing phase of the breathing sequence: enable display (e.g., with display enabling unit 810) of, on the display unit 802, an indication of a completed number of cycles, wherein the completed number of cycles includes the number of cycles, of the selected number of cycles, that the progress indicator fluctuated in accordance with after the breathing phase was initiated and before the third user input was received.

[0328] In some embodiments, the processing unit 808 is further configured to: subsequent to ending the breathing phase of the breathing sequence: enable display (e.g., with display enabling unit 810) of, on the display unit 802, a second affordance; receive (e.g., with receiving unit 812) user input selection of the second affordance; and in response to the user input selection of the second affordance, enable display (e.g., with display enabling unit 810) of, on the display unit 802, the configuration user interface.

[0329] In some embodiments, the processing unit 808 is further configured to: determine (e.g., with determining unit 826) an aggregate amount of time representing a completed number of cycles of the breathing sequence over a goal period; in response to detecting completion of the breathing phase of the breathing sequence, enable display (e.g., with display enabling unit 810) of, on the display unit 802, a completion interface comprising: an indication of the aggregate amount of time; and a third affordance; receive (e.g., with receiving unit 812) user input selection of the third affordance; and in response to receiving the user input selection of the third affordance, initiate (e.g., with initiating unit 816) the breathing phase of the breathing sequence.

[0330] In some embodiments, detecting completion of the breathing phase includes detecting that a predetermined amount of time has elapsed.

[0331] In some embodiments, the completion interface further includes an indication of an estimated heart rate.

[0332] In some embodiments, the goal period is the current day.

[0333] In some embodiments, the first version of the progress indicator fluctuates at a first cyclic rate, and wherein the aggregate amount of time is determined based at least in part on the first cyclic rate.

[0334] In some embodiments, the processing unit 808 is further configured to: determine (e.g., with determining unit 826) an aggregate amount of time representing a completed number of cycles of the breathing sequence over a goal period for each of a plurality of goal periods; enable display (e.g., with display enabling unit 810) of, on the display unit 802, a summary interface comprising an indicator for each of the plurality of goal periods, wherein the indicator for each of the plurality of goal periods represents the determined aggregate amount of time for its respective goal period of the plurality of goal periods.

[0335] In some embodiments, the goal period is a day, and wherein the plurality of goal periods is seven days.

[0336] In some embodiments, the processing unit 808 is further configured to: receive (e.g., with receiving unit 812) a second signal during the breathing sequence; determine (e.g., with determining unit 826) an estimated breathing pattern based at least in part on the received second signal; and synchronize (e.g., with synchronizing unit 838) the initiation of the breathing phase of the breathing sequence and the display of the progress indicator during the breathing phase of the breathing sequence with the estimated breathing pattern.

[0337] In some embodiments, synchronizing the initiation of the breathing phase of the breathing sequence and the display of the progress indicator during the breathing phase of the breathing sequence with the estimated breathing pattern includes: determining a synchronization event that is a transition between an inhale period and an exhale period of the estimated breathing pattern; and in accordance with a determination that the synchronization event has occurred: initiating the breathing phase of the breathing sequence; and enabling display of, on the display unit 802, the first version of the progress indicator.

[0338] In some embodiments, the device includes a sensor unit 806, coupled to the display unit 802 and the processing unit 808, and wherein receiving the second signal includes: receiving the second signal from the sensor unit 806 during the breathing sequence.

[0339] In some embodiments, the processing unit 808 is further configured to: prior to enabling display of the configuration user interface: determine (e.g., with determining unit 826) an aggregate amount of time representing a completed number of cycles of one or more breathing sequences over a goal period; enable display (e.g., with display enabling unit 810) of, on the display unit 802, a fourth affordance comprising an indication of the aggregate amount of time; and receive (e.g., with receiving unit 812) user input selection of the fourth affordance, wherein the configuration user interface is displayed in response to receiving the user input selection of the fourth affordance.

[0340] The operations described above with reference to FIG. 7A-7L are, optionally, implemented by components depicted in FIGS. 1A-1B or FIG. 8. For example, displaying operation 702, receiving operation 704, and adjusting operation 708 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.

[0341] FIG. 9A illustrates exemplary user interfaces for prompting a user to conduct breathing sequences, in accordance with some embodiments. The user interfaces in these figures are used to illustrate the processes described below, including the processes in FIG. 10. FIG 9B illustrates an exemplary list of times for displaying reminders, in accordance with some embodiments.

[0342] In accordance with some embodiments, an electronic device detects a time associated with a first breathing sequence. For example, the time associated with the first breathing sequence is a beginning or an ending time of the first breathing sequence. In some examples, the detected time can be associated with a first detected activity performed by the user in the current day. For example, the first time can be the time that user activity was first performed today. That is, when the user wakes up for the day, they will not have conducted a previous breathing sequence that day. Accordingly, they can be prompted based on the user's activity (e.g., when they first wake up, or otherwise start physical activity). The first detected activity can be detected, for example, by detecting physical activity or determined based on user interaction with the device (or a second device paired, connected, or otherwise in communication with the device).

[0343] User interface screen 902 of FIG. 9A depicts a completion interface displayed after completion of the breathing phase of an example first breathing sequence. In this example, the breathing phase of the first breathing sequence (e.g., a previous breathing sequence) ended at 8:00 AM, as depicted by time indicator 903 on the completion interface 902. In this example, the time associated with the first breathing sequence is an ending time (e.g., the ending of the breathing phase) associated with the first breathing sequence. In some examples, the time is a beginning time (e.g., the beginning of the breathing phase), which in this example would be 7:57 AM if the breathing phase lasted for 3 minutes.

[0344] In accordance with some embodiments, the device generates a prompting criteria based on a predetermined prompting frequency and the detected time associated with the first breathing sequence. For example, the prompting criteria can be: the occurrence of a particular time, or the expiration of a timer. The predetermined prompting frequency can be a frequency with which the device outputs (e.g., displays) a prompt. In this example, the predetermined prompting frequency is every 2 hours, or simply, 2 hours. A prompt can be a visual, textual, audible, and/or haptic output which, for example, reminds or encourages a user to conduct a breathing sequence. For example, a prompt can include textual information encouraging a user to conduct a breathing sequence (e.g., "Take time to breathe", as shown in user interface 904). A prompt may take the form of a notification on the display of the device (e.g., as shown in user interface 904).

[0345] The device determines if the prompting criteria has been met. In accordance with a determination that the prompting criteria has been met, the device displays, on the display, a prompt to initiate a second breathing sequence. For example, an exemplary prompt is shown at user interface screen 904 of FIG 9A. In this example, the prompting frequency is every two hours and the time associated with the first (e.g., previous) breathing sequence is the end of the breathing phase, as discussed above. Thus, the device displays user interface screen 904 two hours after the completion of the breathing phase of the first breathing sequence. In this example, because the prompting frequency is every two hours, the prompting criteria can be the occurrence of 10:00 AM (e.g., two hours after 8:00 AM) or the expiration of a two hour timer (e.g., started at 8:00 AM). In either case, user interface screen 904 is displayed at 10:00 AM, as shown by time indicator 905, and thus the prompt is displayed in response to the prompting criteria being met.

[0346] In some examples, the prompt includes a first affordance. For example, user interface screen 904 includes start affordance 906. The device receives user input selection of the first affordance and, in response, displays, on the display, a second breathing sequence user interface. For example, if the device receives user input selection of start affordance 906, it can display exemplary configuration user interface user interface screen 910. At user interface screen 910, the user may set the number of cycles, and cause the device to progress to a breathing phase of a breathing sequence (e.g., by pressing start affordance 911) as described above with respect to FIG. 6A. For example, after receiving selection of start affordance 911 at user interface screen 910, user interface screen 912 is displayed (which corresponds to user interface screen 620 of FIG. 6A), which depicts an exemplary a progress indicator at the beginning of a breathing phase, during which it will fluctuate in accordance with a selected number of cycles.

[0347] In accordance with some embodiments, the predetermined prompting frequency is a predetermined length of time. For example, the predetermine prompting frequency may be two hours (e.g., representing a prompt every two hours).

[0348] In accordance with some embodiments, to generate the prompting criteria, the device determines a prompting time that occurs the predetermined length of time after the time associated with the first breathing sequence. In some embodiments, the prompting time is a particular time after the time associated with the first breathing sequence. For example, if the predetermined length of time is two hours and the time associated with the first breathing sequence is 10:00 AM, the prompting time is 12:00 PM, two hours after the time associated with the first breathing sequence. To determine if the prompting criteria has been met, the device determines if the prompting time has occurred. For example, the device determines that the prompting time has occurred when the current time is 12:00 PM.

[0349] In accordance with some embodiments, to generate the prompting criteria, the device sets a timer in accordance with the predetermined length of time. For example, if the predetermined length of time is two hours, the device sets a two hour timer. The device starts the timer. To determine if the prompting time has occurred, the device determines whether the timer has expired. For example, the timer expires if it counts down to a value of zero from a set value, or up to the set value from zero.

[0350] In accordance with some embodiments, to detect the time associated with the first breathing sequence, the device detects a time that occurred during the first breathing sequence. In some embodiments, the time associated with the first breathing sequence (e.g., a previous breathing sequence) can be any time during which an application used to conduct the breathing sequence was open. In some embodiments, the time associated with the previous breathing sequence is any time during which any user interface of the previous breathing sequence was displayed.

[0351] In some embodiments, the time associated with a previous breathing sequence is an initiation time associated with the previous breathing sequence, for example, that is determined based on the time of: display of a configuration user interface of the previous breathing sequence, or initiation of a breathing or preliminary phase of the previous breathing sequence.

[0352] In some embodiments, the time associated with a previous breathing sequence is a completion time associated with the previous breathing sequence, for example, that is determined based on the time of: ending of a breathing phase of the previous breathing sequence, display of a completion summary of the previous breathing sequence, or the exiting of a breathing application used to conduct the previous breathing sequence.

[0353] In accordance with some embodiments, to detect the time associated with the first breathing sequence, the device detects an initiation time of a breathing phase of the first breathing sequence. For example, the detected time associated with the first breathing sequence is the time at which a breathing phase of the first (e.g., previous) breathing sequence was initiated, representing the beginning of a user participating in a breathing exercise.

[0354] In accordance with some embodiments, to detect the time associated with the first breathing sequence, the device detects a completion time of a breathing phase of the first breathing sequence. For example, the detected time associated with the first breathing sequence is the time at which a breathing phase of the first (e.g., previous) breathing sequence ended, which represents the completion of a user participating in a breathing exercise.

[0355] In some examples, the user may conduct a breathing sequence before the prompt is scheduled to be displayed. In accordance with some embodiments, prior to a determination that the prompting criteria has been met, the device detects a time associated with a third breathing sequence. For example, before the user is prompted at the regularly-scheduled prompting time, the device detects that the user has conducted an intervening breathing sequence without being prompted. In accordance with a detection of the time associated with the third breathing sequence, the device updates the prompting criteria based on the predetermined prompting frequency and the detected time associated with the third breathing sequence. For example, if the prompting frequency is every two hours, the device can set the new prompting criteria such that it will be satisfied two hours after the time associated with the third breathing sequence (e.g., a time during the third breathing sequence). For example, the time associated with the third breathing sequence is 9:20 AM. This time occurs between the previous breathing sequence (e.g., 8:00 AM as shown in screen 902) and a previously-scheduled prompting time (e.g., 10:00 AM as shown in screen 904). Thus, in this example, the new prompting criteria is set to be the occurrence of the time 11:20 AM (or the expiration of a timer at that time), which is two hours after the time associated with the intervening (third) breathing sequence. Accordingly, if a user decides to conduct a breathing exercise early (e.g., without being prompted), a scheduled prompt can automatically be adjusted in order to maintain the prompting frequency (e.g., every two hours) instead of again prompting the user at 10:00 AM, only forty minutes after conducting an intervening breathing sequence (e.g., the third breathing sequence).

[0356] In accordance with some embodiments, the device receives a first user input. For example, at user interface screen 910, the device receives user input corresponding to a selection of start affordance 911. In response to receiving the first user input, the device progresses to a breathing phase of the second breathing sequence. During the breathing phase of the second breathing sequence, the device displays, on the display, a first version of a progress indicator and fluctuates the first version of the progress indicator in accordance with a selected number of cycles. For example, the device progresses to the breathing phase and displays fluctuation of a progress indicator, as illustrated in screen 912, which corresponds to screen 920 of FIG. 6A. The device optionally fluctuates a first version of a progress indicator in accordance with the operations described above, for example, with respect to user interface screens 920-928 of FIG. 6A.

[0357] In accordance with some embodiments, prior to initiating the breathing phase of the second breathing sequence, the device receives a second user input. In response to receiving the second user input, the device adjusts a number of cycles of the second breathing sequence to the selected number of cycles. For example, the device receives a rotation of a rotatable input mechanism, as described above with respect to user interface 606 of FIG. 6A, and, in response, adjusts the number of cycles as shown in user interface screen 618, which corresponds to user interface screen 910 of FIG. 9A.

[0358] In accordance with some embodiments, the prompt to initiate the second breathing sequence includes a second affordance. In some examples, the second affordance is a "snooze" or "dismiss" affordance, or the like. For example, user interface screen 904 includes snooze affordance 908. The device receives user input selection of the second affordance and, in response, ceases display, on the display, of the prompt and updates the prompting criteria. For example, in response to receiving user selection of snooze affordance 906, the device ceases display of user interface 904 representing a prompt, and displays the exemplary home screen depicted in user interface screen 916. Also in response to the user selection in this example, the device updates the prompting criteria, which is explained in more detail below.

[0359] In accordance with some embodiments, to update the prompting criteria, the device updates the prompting criteria based on the predetermined prompting frequency and the detected time associated with the first breathing sequence. For example, the prompting criteria can be the occurrence of a particular time, or the expiration of a timer, and updating can include determining a new time, or setting a new timer (or resetting an existing timer).

[0360] In some embodiments, the updated prompting criteria can be based on the first breathing sequence. For example, if the device receives user input selection of the second affordance (e.g., snooze affordance 908), the device can update the prompting criteria to be the occurrence of a time that will occur after a length of time equal to an integer multiple of the predetermined length of time (the predetermined prompting frequency) since the time associated with the first breathing sequence. For instance, if the predetermined prompting frequency is every two hours, the prompting criteria can be the occurrence of a prompting time four hours after the time associated with the first breathing sequence—that is, the prompting time occurs two integer multiples of the predetermined prompting frequency after the time associated with the first breathing sequence. In some examples, the multiple is not an integer.

[0361] In accordance with some embodiments, to update the prompting criteria, the device detects a time associated with the received user input selection of the second affordance and updates the prompting criteria based on the predetermined prompting frequency and the detected time associated with the received user input selection of the second affordance. In some examples, the updated prompting criteria is based on a time associated with the received user input selection of the second affordance. For example, if the device receives selection of snooze affordance 908 at 10:00 AM, the device can set the prompting criteria to be the expiration of a timer equal to the length of the predetermined prompting frequency, wherein the device starts the timer at the time associated with the received user input selection snooze affordance 908 (10:00 AM), or soon thereafter. If the predetermined prompting frequency is every two hours, for example, the prompting criteria is the expiration of a timer that is two hours long and that starts after the time associated with the received user input selection of the second affordance. In this example, the updated prompting criteria would be satisfied at 12:00 PM, or two hours after the snooze affordance 904 was selected. In some examples, after receiving selection of the snooze affordance 904, the device ceases display of the prompt and displays exemplary home screen 916. When the updated prompting criteria is met at 12:00 PM, the device displays user interface screen 920. User interface screen 920 is similar to user interface screen 904, but is displayed at the 12:00 PM, as shown by time indicator 922.

[0362] In some examples, the prompt can optionally be dismissed for a period of time less than the predetermined prompting frequency. In accordance with some embodiments, to update the prompting criteria, the device updates the prompting criteria based on a snooze interval, wherein the predetermined prompting frequency is a predetermined length of time, and wherein the snooze interval is a length of time that is distinct from the predetermined prompting frequency. For example, if the predetermined prompting frequency is every two hours, the snooze interval can be fifteen minutes (a quarter of an hour). This alternative way to dismiss a prompt can be desirable if a user is presently unable to conduct a breathing sequence, but would like to be reminded earlier than the normal prompting frequency. In some examples, after receiving selection of the snooze affordance 904, the device ceases display of the prompt and displays exemplary home screen 916. When the updated prompting criteria is met (e.g., after the snooze interval, at 10:15 AM), the device displays user interface screen 924. User interface screen 924 is similar to user interface screen 904, but is displayed at the 10:15 AM, as shown by time indicator 926.

[0363] In accordance with some embodiments, further in response to receiving the user input selection of the second affordance, the device forgoes display of all prompts to initiate a breathing sequence during the remainder of a current day. For example, in response to receiving user selection of snooze affordance 908 at user interface 904, the device can dismiss the current prompt and prevent the display of further prompts for the rest of the current day. In this example, the next prompt (e.g., breathe reminder) would be displayed on the next day. For example, user interface screens 920 and/or 924 would not be displayed.

[0364] In accordance with some embodiments, the device determines if the updated prompting criteria has been met. In accordance with a determination that the updated prompting criteria has been met, the device displays, on the display, a prompt to initiate a fourth breathing sequence, wherein the prompt includes a third affordance. For example, after the user has snoozed/dismissed a breathe reminder (as described above), the device displays another prompt (e.g., user interface screens 920 or 924) that contains a third affordance (e.g., start affordance 921 or 925). The device receives user input selection of the third affordance and, in response, displays, on the display, a fourth breathing sequence user interface. In some examples, the fourth breathing sequence user interface is a configuration user interface. For example, the device displays a configuration user interface for selecting a number of cycles for the breathing sequence, as shown in user interface screen 910 (which corresponds to user interface screen 606 and 618 in FIG. 6A). In some examples, in response to selection of the third affordance, the device displays any other user interface screen as described herein with respect to a breathing sequence. For example, the device may automatically initiate a breathing sequence and display the user interface screens 620-628 of FIG. 6A, depicting the fluctuation of a progress indicator during a breathing phase.

[0365] In some examples, the device displays a prompt in response to any suitable input, information, or event. For example, the device optionally accesses calendar information associated with the user of the device in order to determine an appropriate time (e.g., a “free time”) that may be good for breathing (e.g., a block of time with no scheduled events). The calendar information can optionally indicate a scheduled event related to breathing (event entitled “Time to Breathe”)—in this case, the graphical user interface 904 may be presented in accordance with the time and date of the scheduled event. The device optionally accesses the calendar information to determine details about upcoming events in order to determine whether a breathing sequence could be helpful before the events. For example, user interface screen 904 is optionally presented a few minutes before meetings in order to help the user calm and prepare for the upcoming meetings. The determination of which meetings and when to present user interface screen 904 are optionally based on predefined configuration information (e.g., if the user has indicated that they want to breathe before all meetings, that they want to breathe before all meetings with more than five participants, that they want to breathe before all meetings with a particular person, and/or based at least in part on information learned from behaviors (e.g., the user regularly, occasionally, or always goes through a breathing sequence before certain meetings or at certain times).

[0366] The device optionally receives sensor data from one or more sensor, which may be used to infer an appropriate time to present user interface screen 904. For example, the sensor data can include motion information that indicates whether the device (and a user) is moving. If the device is moving at a pace similar to walking, then perhaps the user would not be interested in conducting in a breathing sequence, and thus user interface screen 904 is not displayed. However, if the device is moving at a quicker pace, then perhaps the user is driving and may be interested in conducting in a breathing sequence. The sensor data may also include user health data that indicates one or more health metrics of the user. For example, if the user health data indicates an elevated heart rate, user interface screen 904 is optionally presented. Participating in the breathing sequence may assist the user in reducing her heart rate. The user health data may also be used to infer aspects of user breath events, and user interface screen 904 is optionally presented in response to detection of a sequence of particular breath events. For example, if the user takes three deep breaths, the device may determine and/or infer that the user desires to conduct in a breathing sequence, and thus optionally presents user interface screen 904.

[0367] FIG. 9B illustrates table 930 including exemplary times for displaying prompts, in accordance with some embodiments. FIG. 9B is included to illustrate an example of the results of generating prompting criteria in accordance with different prompting frequencies.

[0368] Column 930A depicts an initiation time associated with the first breathing sequence. In this example, the initiation time is the time that the breathing phase of the first breathing sequence was initiated. For ease of comparison, the initiation time is the same for each example (e.g., row).

[0369] Column 930B depicts a completion time associated with the first breathing sequence. In this example, the initiation time is the time that the breathing phase of the first breathing sequence ended. For ease of comparison, the completion time is the same for each example (e.g., row).

[0370] Column 930C depicts a prompting frequency associated with each example (e.g., row). The prompting frequencies range from a value of 2 (e.g., prompting once every 2 hours) to a value of 12 (e.g., prompting once every 12 hours).

[0371] Column 930D depicts the ranges of time that the device can display a prompt, in accordance with some embodiments. For example, in the example with a prompting frequency of 2, the device can optionally prompt at any time between 9:57 AM to 10:00 AM, which represents a range of time during the first breathing sequence (and in particular, the breathing phase). The particular time within this range at which the device displays a prompt depends on the time associated with the first breathing sequence on which the device is configured to base its determination. For example, if the device is configured to prompt 2 hours from the initiation time of the previous breathing phase, the prompt is displayed at 9:57 AM. If the device is configured to prompt 2 hours from the completion time of the previous breathing phase, the prompt is displayed at 10:00 AM.

[0372] FIG. 10 is a flow diagram illustrating a method for prompting a user to conduct a breathing sequence using an electronic device in accordance with some embodiments. Method 1000 is performed at a device (e.g., 100, 300, 500) 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.

[0373] As described below, method 1000 provides an intuitive way for prompting a user to conduct a breathing sequence. The method reduces the cognitive burden on a user for setting up breathing reminder prompts and interacting with a prompt—for example, to dismiss it or to access an application for conducting a breathing sequence—thereby creating a more efficient human-machine interface. For battery-operated computing devices, enabling a user to configure and dispose of prompts faster and more efficiently conserves power and increases the time between battery charges.

[0374] At block 1002, the device detects a time associated with a first breathing sequence. For example, the device detects that a first (e.g., previous) breathing sequence was completed at 8:00 AM, as shown in user interface screen 902 of FIG. 9A.

[0375] At block 1010, the device generates a prompting criteria based on a predetermined prompting frequency and the detected time associated with the first breathing sequence. For example, if the predetermined prompting frequency is every 2 hours, and the detected time is 8:00 AM, the device generates a prompting criteria based on these values. For example, the prompting criteria may be the occurrence of 10:00 AM, or the expiration of a 2 hour timer started at 8:00 AM (and thus, expiring at 10:00 AM).

[0376] At block 1014, the device determines if the prompting criteria has been met. For example, the device determines if a timer has expired, or whether the current time is 10:00 AM.

[0377] At block 1028, in accordance with a determination that the prompting criteria has been met, the device displays, on the display, a prompt to initiate a second breathing sequence, wherein the prompt includes a first affordance. For example, the device can display user interface screen 904 which includes start affordance 906.

[0378] At block 1030, the device receives user input selection of the first affordance.

[0379] At block 1032, in response to receiving the user input selection of the first affordance, the device displays, on the display, a second breathing sequence user interface. For example, in response to receiving user input selection of start affordance 906, the device displays user interface 910, depicting an exemplary configuration user interface.

[0380] In accordance with some embodiments, at block 1012, the predetermined prompting frequency is a predetermined length of time. For example, the predetermined prompting frequency is 2 hours, 4, hours, 8, hours, or the like.

[0381] In accordance with some embodiments, at block 1016, generating the prompting criteria includes: determining a prompting time that occurs the predetermined length of time after the time associated with the first breathing sequence. At block 1018, determining if the prompting criteria has been met includes: determining if the prompting time has occurred.

[0382] In accordance with some embodiments, at block 1020, generating the prompting criteria further includes: setting a timer in accordance with the predetermined length of time (block 1022), and starting the timer (block 1024), wherein determining if the prompting time has occurred includes: determining whether the timer has expired (block 1026).

[0383] In accordance with some embodiments, at block 1004, detecting the time associated with the first breathing sequence includes: detecting a time that occurred during the first breathing sequence.

[0384] In accordance with some embodiments, at block 1006, detecting the time associated with the first breathing sequence includes: detecting an initiation time of a breathing phase of the first breathing sequence.

[0385] In accordance with some embodiments, at block 1008, detecting the time associated with the first breathing sequence includes: detecting a completion time of a breathing phase of the first breathing sequence.

[0386] In accordance with some embodiments, at block 1034, prior to a determination that the prompting criteria has been met, the device: detects a time associated with a third breathing sequence (block 1036) , and, in accordance with a detection of the time associated with the third breathing sequence, updates the prompting criteria based on the predetermined prompting frequency and the detected time associated with the third breathing sequence (block 1038).

[0387] In accordance with some embodiments, at block 1040, the device receives a first user input. At block 1042, in response to receiving the first user input, the device progresses to a breathing phase of the second breathing sequence. At block 1050, during the breathing phase of the second breathing sequence, the device: displays, on the display, a first version of a progress indicator (block 1052), and fluctuates the first version of the progress indicator in accordance with a selected number of cycles (block 1054).

[0388] In accordance with some embodiments, at block 1044, prior to initiating the breathing phase of the second breathing sequence, the device: receives a second user input (block 1046), and, in response to receiving the second user input, adjusts a number of cycles of the second breathing sequence to the selected number of cycles (block 1048).

[0389] In accordance with some embodiments, at block 1056, the prompt to initiate the second breathing sequence includes a second affordance. At block 1058, the device receives user input selection of the second affordance. At block 1060, in response to receiving the user input selection of the second affordance, the device: ceases display, on the display, of the prompt (block 1062), and updates the prompting criteria (block 1064).

[0390] In accordance with some embodiments, at block 1066, updating the prompting criteria includes: updating the prompting criteria based on the predetermined prompting frequency and the detected time associated with the first breathing sequence.

[0391] In accordance with some embodiments, at block 1068, updating the prompting criteria includes: detecting a time associated with the received user input selection of the second affordance; and updating the prompting criteria based on the predetermined prompting frequency and the detected time associated with the received user input selection of the second affordance.

[0392] In accordance with some embodiments, at block 1070, updating the prompting criteria includes: updating the prompting criteria based on a snooze interval, wherein the predetermined prompting frequency is a predetermined length of time, and wherein the snooze interval is a length of time that is distinct from the predetermined prompting frequency.

[0393] In accordance with some embodiments, at block 1072, further in response to receiving the user input selection of the second affordance, the device forgoes display of all prompts to initiate a breathing sequence during the remainder of a current day.

[0394] In accordance with some embodiments, at block 1074, the device determines if the updated prompting criteria has been met. At block 1076, in accordance with a determination that the updated prompting criteria has been met, the device displays, on the display, a prompt to initiate a fourth breathing sequence, wherein the prompt includes a third affordance. At block 1078, the device receives user input selection of the third affordance. At block 1080, in response to receiving the user input selection of the third affordance, the device displays, on the display, a fourth breathing sequence user interface.

[0395] 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 above. For example, method 700 optionally includes one or more of the characteristics of the various methods described above with reference to method 1000. For example, the exemplary configuration user interface depicted in user interface screen 606 can be displayed in response to receiving selection of an affordance 906 at the display of user interface 904, depicting an exemplary displayed prompt. As another example, user interface 632 can correspond to user interface 902, and user interface 618 can correspond to user interface 910. For brevity, these details are not repeated below.

[0396] 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 1100 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.

[0397] As shown in FIG. 11, an electronic device 1100 includes a display unit 1102 configured to display a graphic user interface, and a processing unit 1108 coupled to the display unit 1102. In some embodiments, the processing unit 1108 includes a detecting unit 1110, a generating unit 1112, a determining unit 1114, a display enabling unit 1116, and a receiving unit 1118. In some embodiments, processing unit 1108 also includes one or more of an updating unit 1120, an initiating unit 1122, a fluctuating unit 1124, and an adjusting unit 1126.

[0398] The processing unit 1108 is configured to: detect (e.g., with detecting unit 1110) a time associated with a first breathing sequence; generate (e.g., with generating unit 1112) a prompting criteria based on a predetermined prompting frequency and the detected time associated with the first breathing sequence; determine (e.g., with determining unit 1114) if the prompting criteria has been met; in accordance with a determination that the prompting criteria has been met, enable display (e.g., with display enabling unit 1116) of, on the display unit 1102, a prompt to initiate a second breathing sequence, wherein the prompt includes a first affordance; receive (e.g., with receiving unit 1118) user input selection of the first affordance; and in response to receiving the user input selection of the first affordance, enable display (e.g., with display enabling unit 1116) of, on the display unit 1102, a second breathing sequence user interface.

[0399] In some embodiments, the predetermined prompting frequency is a predetermined length of time.

[0400] In some embodiments, generating the prompting criteria includes: determining a prompting time that occurs the predetermined length of time after the time associated with the first breathing sequence; and wherein determining if the prompting criteria has been met includes: determining if the prompting time has occurred.

[0401] In some embodiments, generating the prompting criteria further includes: setting a timer in accordance with the predetermined length of time; and starting the timer; and wherein determining if the prompting time has occurred includes: determining whether the timer has expired.

[0402] In some embodiments, detecting the time associated with the first breathing sequence includes: detecting a time that occurred during the first breathing sequence.

[0403] In some embodiments, detecting the time associated with the first breathing sequence includes: detecting an initiation time of a breathing phase of the first breathing sequence.

[0404] In some embodiments, detecting the time associated with the first breathing sequence includes: detecting a completion time of a breathing phase of the first breathing sequence.

[0405] In some embodiments, the processing unit 1108 is further configured to: prior to a determination that the prompting criteria has been met: detect (e.g., with detecting unit 1110) a time associated with a third breathing sequence; and in accordance with a detection of the time associated with the third breathing sequence, update (e.g., with updating unit 1120) the prompting criteria based on the predetermined prompting frequency and the detected time associated with the third breathing sequence.

[0406] In some embodiments, the processing unit 1108 is further configured to: receive (e.g., with receiving unit 1118) a first user input; in response to receiving the first user input, initiate (e.g., with initiating unit 1122) a breathing phase of the second breathing sequence; and during the breathing phase of the second breathing sequence: enable display (e.g., with display enabling unit 1116) of, on the display unit 1102, a first version of a progress indicator; and fluctuate (e.g., with fluctuating unit 1124) the first version of the progress indicator in accordance with a selected number of cycles.

[0407] In some embodiments, the processing unit 1108 is further configured to: prior to initiating the breathing phase of the second breathing sequence: receive (e.g., with receiving unit 1118) a second user input; and in response to receiving the second user input, adjust (e.g., with adjusting unit 1126) a number of cycles of the second breathing sequence to the selected number of cycles.

[0408] In some embodiments, the processing unit 1108 is further configured to: wherein the prompt to initiate the second breathing sequence includes a second affordance, receive (e.g., with receiving unit 1118) user input selection of the second affordance; and in response to receiving the user input selection of the second affordance: cease display (e.g., with display enabling unit 1116), on the display unit 1102, of the prompt; and update (e.g., with updating unit 1120) the prompting criteria.

[0409] In some embodiments, updating the prompting criteria includes: updating the prompting criteria based on the predetermined prompting frequency and the detected time associated with the first breathing sequence.

[0410] In some embodiments, updating the prompting criteria includes: detecting a time associated with the received user input selection of the second affordance; and updating the prompting criteria based on the predetermined prompting frequency and the detected time associated with the received user input selection of the second affordance.

[0411] In some embodiments, updating the prompting criteria includes: updating the prompting criteria based on a snooze interval, wherein the predetermined prompting frequency is a predetermined length of time, and wherein the snooze interval is a length of time that is distinct from the predetermined prompting frequency.

[0412] In some embodiments, the processing unit 1108 is further configured to: further in response to receiving the user input selection of the second affordance: forgo display (e.g., with display enabling unit 1116) of all prompts to initiate a breathing sequence during the remainder of a current day.

[0413] In some embodiments, the processing unit 1108 is further configured to: determine (e.g., with determining unit 1114) if the updated prompting criteria has been met; in accordance with a determination that the updated prompting criteria has been met, enable display (e.g., with display enabling unit 1116) of, on the display unit 1102, a prompt to initiate a fourth breathing sequence, wherein the prompt includes a third affordance; receive (e.g., with receiving unit 1118) user input selection of the third affordance; and in response to receiving the user input selection of the third affordance, enable display (e.g., with display enabling unit 1116) of, on the display unit 1102, a fourth breathing sequence user interface.

[0414] The operations described above with reference to FIG. 10 are, optionally, implemented by components depicted in FIGS. 1A-1B or FIG. 11. For example, detecting operation 1002, generating operation 1010, determining operation 1014, and displaying operation 1028 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.

[0415] 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.

[0416] 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.

[0417] 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, health data, or any other identifying information.

[0418] 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.

[0419] 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 policies 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.

[0420] 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.

[0421] 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.

APPENDIX A

BREATHING SYNCHRONIZATION AND MONITORING

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] This application is related to and incorporates by reference for all purposes the full disclosure of co-pending U.S. Provisional Application Serial No. ________ entitled "Fluctuating Progress Indicator" (Attorney Docket No. 090911-P28954US2-1002661) and U.S. Provisional Application Serial No. ________ entitled "Breathing Sequence User Interface" (Attorney Docket No. 77000-3000800 (P30535USP1)), both of which are filed concurrently herewith.

BACKGROUND

[0002] Breathing is a characteristic that all people share, and recently more and more information is becoming available about the positive impacts that sustained and thoughtful breathing can have on one's health. Additionally, a variety of electronic devices are now available for tracking aspects of a person's physical activity throughout the day. One way that sustained and thoughtful breathing can be achieved is by conducting periodic breathing exercises, perhaps with a breathing coach. Most people, however, do not have access to a breathing coach, or are otherwise untrained and/or unfamiliar with the proper breathing techniques for conducting breathing exercises. This can lead to frustration, ineffective use of breathing time, and ultimate abandonment of the breathing exercises.

BRIEF SUMMARY

[0003] Embodiments of the present disclosure can provide systems, methods, and computer-readable medium for initiating a breathing sequence. According to one embodiment, a method may be implemented by a computer system to at least receive a signal from one or more sensors of a user device. The signal may be representative of a user health metric. The method may also include estimating, based at least in part on the signal, an initial breathing pattern that includes a cyclic pattern. The method may also include initiating a breathing sequence to begin a first period of the breathing sequence by generating a breathing sequence element that identifies a suggested breathing pattern based at least in part on a synchronization between the breathing sequence and the cyclic pattern. The method may also include causing the breathing sequence element to fluctuate during a second period of the breathing sequence in accordance with a breathing profile to at least indicate the suggested breathing pattern.

[0004] According to one embodiment, a computer system may include a memory configured to store computer-executable instructions, and a processor in communication with the memory configured to execute the computer-executable instructions. In some examples, execution of the computer-executable instructions by the processor may cause the processor to perform operations include receiving an indication to initiate a breathing sequence. The operations may also include, in response to receiving the indication, estimating an initial cyclic breathing pattern while a user is wearing a user device. The operations may also include initiating a first period of the breathing sequence by generating, based at least in part on a synchronization of the breathing sequence and the initial cyclic breathing pattern, a fluctuating progress indicator that identifies the breathing sequence. The operations may also include providing one or more breathing cues during a second period of the breathing sequence by at least changing the fluctuating progress indicator in accordance with a breathing profile associated with the breathing sequence.

[0005] According to one embodiment, one or more computer-readable medium storing computer-executable instructions that, when executed by a processor, configure the processor to perform operations including receiving a signal from one or more sensors of a user device. The operations may also include estimating, based at least in part on the signal, an initial breathing pattern that comprises a cyclic pattern. The operations may also include executing a breathing sequence that includes a suggested breathing pattern by at least: generating, based at least in part on a synchronization of a first suggested breath of the breathing sequence and the cyclic pattern, a breathing sequence element that initiates a first period of the breathing sequence, and causing the breathing sequence element to fluctuate during a second period of the breathing sequence in accordance with the suggested breathing pattern.

[0006] Embodiments of the present disclosure can provide systems, methods, and computer-readable medium for conducting a breathing sequence. According to one embodiment, a method may be implemented by a computer system to at least receive a first input at a user interface of a device to initiate a breathing sequence. The method may also include, during a configuration phase of the breathing sequence, receiving a second input at the user interface including configuration information corresponding to the breathing sequence. In some examples, at least a part of the configuration information may define a variable time period for the breathing sequence. The method may also include, during a preliminary phase of the breathing sequence, presenting a first version of a fluctuating progress indicator on the user interface. In some examples, the fluctuating progress indicator may include a plurality of variable visual characteristics. The fluctuating progress indicator may be configured to fluctuate at a first cyclic rate that is determined by an estimated breathing pattern. The method may also include, during a breathing phase of the breathing sequence occurring subsequent to the preliminary phase, presenting a second version of the fluctuating progress indicator on the user interface. In some examples, the second version of the fluctuating progress indicator may fluctuate at a second cyclic rate different than the first cyclic rate. The second cyclic rate may be determined by the defined variable time period.

[0007] According to one embodiment, a system for enabling a breathing exercise including a breathing sequence may be provided. The system may include a memory configured to store computer-executable instructions, an input component, a processor in communication with the memory configured to execute the computer-executable instructions, and a display. The display may be configured to present a first graphical user interface during a configuration phase of the breathing sequence in response to an input received at the input component. In some examples, the graphical user interface may include configuration information corresponding to the breathing sequence. In some examples, at least a part of the configuration information may define a variable time period for the breathing sequence. The display also may be configured to present a second graphical user interface during a preliminary phase of the breathing sequence. In some examples, the second graphical user interface may present a first version of a fluctuating progress indicator on the second graphical user interface. In some examples, the fluctuating progress indicator may include a plurality of variable visual characteristics. The fluctuating progress indicator may fluctuate at a first cyclic rate. The first cyclic rate that may be determined by an estimated breathing pattern. The display also may be configured to present a third graphical user interface during a breathing phase of the breathing sequence occurring subsequent to the preliminary phase. The third graphical user interface may present a second version of the fluctuating progress indicator on the third graphical user interface. In some examples, the second version of the fluctuating progress indicator may fluctuate at a second cyclic rate different than the first cyclic rate. The second cyclic rate may be determined by the defined variable time period.

[0008] According to one embodiment, one or more computer-readable medium storing computer-executable instructions that, when executed by a processor, configure the processor to perform operations including receiving a request to begin a breathing sequence. In some examples, the breathing sequence may be configured to occur for a variable time period. The operations also may include presenting, during a configuration phase of the breathing sequence, a fluctuating progress indicator that represents a suggested breathing pattern for the user for the breathing sequence. In some examples, the fluctuating progress indicator may include a set of variable visual elements and may be configured to change from an initial version to a final version as time progresses during the variable time period. The operations also may include presenting the initial version of the fluctuating progress indicator corresponding to an initial period of the variable time period of the breathing sequence. In some examples, the initial version of the fluctuating progress indicator may have an initial subset of variable visible elements of the set of variable visible elements. The operations also may include presenting, in accordance with a suggested breathing rate, one or more additional versions of the fluctuating progress indicator corresponding to one or more additional periods of the variable time period. In some examples, the one or more additional versions of the fluctuating progress indicator may have progressively fewer variable visible elements than included in the initial subset of variable visible elements. The operations also may include presenting the final version of the fluctuating progress indicator corresponding to a final period of the breathing sequence. In some examples, the final version of the fluctuating progress indicator may have a final subset of variable visible elements of the set of variable visible elements.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 illustrates a simplified block diagram depicting an example flow for conducting breathing sequences as described herein, according to at least one example.

[0010] FIG. 2 illustrates a user device that includes example graphical user interfaces depicting user interface elements for implementing techniques relating to conducting breathing sequences as described herein, according to at least one example.

[0011] FIG. 3 illustrates a simplified block diagram depicting an example flow and example graphical user interfaces depicting user interface elements for implementing techniques relating to conducting breathing sequences as described herein, according to at least one example.

[0012] FIG. 4 illustrates a simplified block diagram depicting an example flow and example graphical user interfaces depicting user interface elements for implementing techniques relating to conducting breathing sequences as described herein, according to at least one example.

[0013] FIG. 5 illustrates a plurality of graphs depicting user health data relating to conducting breathing sequences as described herein, according to at least one example.

[0014] FIG. 6 illustrates a simplified block diagram including an example architecture for conducting breathing sequences as described herein, according to at least one example.

[0015] FIG. 7 illustrates a flowchart of a method of conducting a breathing sequence as described herein, according to at least one example.

[0016] FIG. 8 illustrates another flowchart of a method of conducting a breathing sequence as described herein, according to at least one example.

[0017] FIG. 9 illustrates another flowchart of a method of conducting a breathing sequence as described herein, according to at least one example.

[0018] FIG. 10 illustrates another flowchart of a method of conducting a breathing sequence as described herein, according to at least one example.

[0019] FIG. 11 illustrates an electronic device for conducting breathing sequences as described herein, according to at least one example.

[0020] FIG. 12 illustrates a simplified block diagram including components of an example electronic device for conducting breathing sequences as described herein, according to at least one example.

[0021] FIG. 13 illustrates a simplified diagram including example electronic devices for conducting breathing sequences as described herein, according to at least one example.

[0022] FIG. 14 illustrates an electronic device for conducting breathing sequences as described herein, according to at least one example.

DETAILED DESCRIPTION OF THE INVENTION

[0023] In the following description, various examples will be described. For purposes of explanation, specific configurations and details are set forth in order to provide a thorough understanding of the examples. However, it will also be apparent to one skilled in the art that the examples may be practiced without the specific details. Furthermore, well-known features may be omitted or simplified in order not to obscure the example being described.

[0024] Examples of the present disclosure are directed to, among other things, methods, systems, and computer-readable media for conducting breathing sequences using electronic devices. Initially, this can include collecting user health data using one or more sensors of an electronic device, and analyzing the user health data to identify an initial breathing pattern. The initial breathing pattern can be synchronized with a breathing sequence. The breathing sequence can begin with an initial presentation of a breathing cue. The breathing cue (and other breathing cues) can function to guide a user through the breathing sequence and can include visual cues, audible cues, and/or haptic cues. The synchronization of the initial breathing pattern and the breathing sequence may be done in a way that helps the user smoothly transition her initial breathing pattern into the breathing sequence. For example, the initial presentation of the breathing cue can be synchronized with a user breath event such as a user inhale cycle or a user exhale cycle.

[0025] In some examples, the breathing cue discussed above can be a visual breathing cue. Such visual breathing cues can be represented by a user interface element in the form of a fluctuating progress indicator that is generated and presented to the user at the electronic device. The fluctuating progress indicator can be defined as having one or more variable visual characteristics (e.g., complexity, alignment, visibility, etc.) that can change over the course of the breathing sequence. Changes in complexity of the fluctuating progress indicator can inform the user of her progress through the breathing sequence. For example, at the beginning of the breathing sequence, the fluctuating progress indicator can include a number of user interface elements (e.g., circular rings, ovular rings, squares, etc.) arranged in a pattern. As the user progresses through the breathing sequence, the number of user interface elements can be reduced. Thus, at completion of the breathing sequence, the fluctuating progress indicator may have changed in complexity (e.g., fewer user interface elements and/or a less complex arrangement of user interface elements). Changes in alignment and visibility of the fluctuating progress indicator can also take place during the breathing sequence and can function as visual breathing cues for the user. For example, the fluctuating progress indicator can be configured to grow while rotating clockwise to signal the user to inhale. The fluctuating progress indicator also can be configured to shrink while rotating counterclockwise to signal the user to exhale. At the conclusion of the breathing exercise, summary information (e.g., quantitative and/or qualitative) may be presented.

[0026] FIG. 1 illustrates a simplified flow diagram depicting process 100 for conducting breathing sequences, in accordance with at least one example. The process 100 depicts a wearable device 102 configured with one or more sensors for collecting health data 104 of a user 106. The health data 104 can include any suitable data relating to the health of the user 106. In some examples, the wearable device 102 may be configured to capture health data 104 from the user 106. Such health data may indicate, for the user 106, a pulse rate, a heart rate, a heart rate variability measure, temperature data, a number of steps, an amount of time standing and sitting, a number of calories burned, a number of minutes exercised, and/or any other suitable data. The wearable device 102 may also be configured with one or more input devices by which the user 106 can interact with the wearable device 102. The wearable device 102 may also be configured with one or more output devices to output any suitable output information 108. For example, as illustrated in FIG. 1, the wearable device 102 may be configured to output visual information 108a, audio information 108b, and/or haptic information 108c. In some examples, the output information 108 can be presented to the user 106 in a manner that directs the user 106 to perform one or more actions relating to breathing. For example, the output information 108 can include a fluctuating progress indicator (e.g., a type of the visual information 108a). The fluctuating progress indicator can be presented on a graphical user interface of the wearable device 102 and configured to lead the user 106 through a series of breathing exercises included in a breathing sequence, as further described herein. The output information 108 may be presented by an application running on the wearable device 102.

[0027] The wearable device 102 may be associated with an electronic device 110 (e.g., a host device). In some examples, this may include the wearable device 102 being paired with the electronic device 110 in any suitable manner. Pairing of the two devices 102 and 110 may enable the electronic device 110 to function as a proxy for the wearable device 102. The wearable device 102, the electronic device 110, or any suitable combination of the wearable device 102 and the electronic device 110 may generate the output information 108 based, at least in part, on the health data 104.

[0028] The process 100 may begin at 112 by the wearable device 102 collecting the health data 104. As introduced herein, the health data 104 may be collected using one or more sensors of the wearable device 102. At 114, the electronic device 110 determines respiratory measures based at least in part on the health data 104. The respiratory measures can include, for the user 106, a breathing pattern (e.g., a cyclic pattern of inhale breaths and exhale breaths), a breathing rate (e.g., a number of full breaths taken during a time period), a breath ratio (e.g., a comparison of time allocated to inhale breaths compared to exhale breaths), and any other related measure. Using the respiratory measures, the electronic device 110 can generate a breathing element. The breathing element is an example of the output information 108. At 118, the wearable device 102 can present the breathing element to lead a breathing sequence. For example, the breathing element can be a fluctuating progress indicator, various versions of which can be presented on a graphical user interface of the wearable device 102 to lead the user 106 in the breathing sequence. In some examples, any of the process 100 may be performed on the wearable device 102 and/or in combination a service provider which can be in communication with the electronic device 110 and/or the wearable device 102 via one or more networks. For example, the service provider may perform acts 114 and 116.

[0029] FIG. 2 illustrates the wearable device 102 that includes graphical user interfaces 202-214 depicting user interface elements relating to conducting breathing sequences as described herein, according to at least one example. Specifically, the graphical user interfaces 202-206 are examples of user interfaces that may be presented on a display of the wearable device 102 and/or on a display of the electronic device 110 as part of initiating a breathing sequence. While, the graphical user interfaces 208-214 are examples of user interfaces that may be more suitable for presentation on the display of the wearable device 102 as part of conducting a breathing sequence. As described herein, the display of the wearable device 102 can be touch sensitive and/or pressure sensitive. In this manner, the display can function as an input component for receiving user input.

[0030] The graphical user interface 202 may represent a home screen of the wearable device 102. Thus, general information such as the date, time of day, temperature, and other such general information on the graphical user interface 202 may be presented. Additionally, other information such as calendar items (e.g., "Health Team Meeting") and/or miniaturized versions of a fluctuating progress indicator 218 may be presented on the graphical user interface 202. In some examples, selection of the miniaturized version of the fluctuating progress indicator 218 may cause the wearable device 102 to initiate a breathing sequence. In some examples, the selection is received as user input at the display of the wearable device 102.

[0031] The graphical user interface 204 may represent a notification that can be generated locally on the wearable device 102, or may be provided to the wearable device 102 from some other device (e.g., the electronic device 110 and/or a service provider). The notification, in this example, requests whether a user of the wearable device 102 would like to participate in a breathing sequence (e.g., "Can you take a moment to breathe?"). If the user selects user interface element 220 ("Yes"), the breathing sequence may begin and the graphical user interface 208 may be presented on the wearable device 102. If the user selects user interface element 222 ("Remind in 15 Min"), the notification may be dismissed for a period of time and then a second notification may be sent after the period of time has passed. If the user selects user interface element 224 ("Dismiss"), the notification may be dismissed and the breathing sequence will not begin at this point in time. Even though the user may "dismiss" the notification, other notifications may be sent on the same day based on other inputs that prompt other notifications.

[0032] The graphical user interface 204 including the notification can be presented in response to any suitable input, information, or event. For example, the wearable device 102 may access calendar information associated with the user of the wearable device 102 in order to determine an appropriate time (e.g., a “free time”) that may be good for breathing (e.g., a block of time with no scheduled events). The calendar information may also indicate a scheduled event related to breathing (event entitled “Time to Breath”). In which case, the graphical user interface 204 may be presented in accordance with the time and date of the scheduled event. The wearable device 102 may also access the calendar information to determine details about upcoming events in order to determine whether a breathing sequence could be helpful before the events. For example, the graphical user interface 204 may be presented a few minutes before meetings in order to help the user calm and prepare for the upcoming meetings. The determination of which meetings and when to present the graphical user interface 204 may be based on configuration information (e.g., if the user has indicated that they want to breath before all meetings, that they want to breath before all meetings with more than five participants, that they want to breath before all meetings with a particular person, and/or based at least in part on information learned from behaviors (e.g., the user regularly, occasionally, or always goes through a breathing sequence before certain meetings or at certain times).

[0033] The wearable device 102 may also receive sensor data from one or more sensors of the wearable device 102, which may be used to infer an appropriate time to present the graphical user interface 204. For example, the sensor data can include motion information that indicates whether the wearable device 102 (and a user) is moving. If the wearable device 102 is moving at a pace similar to walking, then perhaps the user would not be interested in participating in a breathing sequence. However, if the wearable device 102 is moving at a quicker pace, then perhaps the user is driving and may be interested in participating in the breathing sequence. The sensor data may also include user health data that indicates one or more health metrics of the user. For example, if the user health data indicates an elevated heart rate, the graphical user interface 204 may be presented. Participating in the breathing sequence may assist the user in reducing her heart rate. The user health data may also be used to infer aspects of user breath events, and the graphical user interface 204 may be presented in response to detection of a sequence of particular breath events. For example, if the user takes three deep breaths, the wearable device 102 may determine and/or infer that the user desires to participate in a breathing sequence, and may therefore present the graphical user interface 204.

[0034] The graphical user interface 206 may include a fluctuating progress indicator 226. The fluctuating progress indicator 226 may be presented on the display as part of the graphical user interface 206, and if selected, may initiate a breathing sequence. In some examples, the fluctuating progress indicator 226 may be presented on the display as part of the graphical user interface 206 in response to a user of the wearable device 102 performing certain actions with respect to the wearable device 102 (e.g., lifting the wearable device 102, viewing the wearable device 102, and the like), randomly, or according to some interval. In some examples, presentation of the fluctuating progress indicator 226 on the graphical user interface 206 may function as a subtle reminder to the user to participate in a breathing sequence.

[0035] In some examples, the graphical user interface 208 may be presented on the display in response to input received after presentation of one of the graphical user interfaces 202-206. The input may indicate initiation of a breathing sequence. In this manner, the graphical user interface 208 may be the first graphical user interface presented as part of conducting the breathing sequence. In some examples, during a preliminary phase of the breathing sequence, the graphical user interface 208 may be presented on the display. The graphical user interface 208 may include a heart user interface element 228a and a heart metric 230a. The heart user interface element 228a may pulsate on the display during the preliminary phase. In some examples, the heart user interface element 228a may pulsate in a manner that corresponds to a heartrate of the user of the wearable device 102. For example, one or more sensors may collect heartrate data, and the wearable device 102 may cause the heart user interface element 228a to pulsate in accordance with the heartrate data. Similarly, the heart metric 230a may correspond to the heartrate of the user. Other user interface elements and metrics may also be presented.

[0036] During the preliminary phase and while the display includes the graphical user interface 208, the wearable device 102 may also be receiving signal data from the one or more sensors of the wearable device 102. Based at least in part on the signal data, the wearable device 102 may estimate an initial breathing pattern corresponding to the user of the wearable device 102. The initial breathing pattern may be a cyclic pattern of breath events and times corresponding to the breath events. For example, the cyclic pattern may include a series of inhale breath events and a series of exhale breath events. In some examples, the preliminary phase may continue at least until the wearable device 102 is able to estimate the initial breathing pattern or may continue for a fixed time or until a fixed number of breaths have been identified.

[0037] Estimating the initial breathing pattern may be useful to determining when to present the graphical user interface 210, including the fluctuating progress indicator 226, on the display. For example, as the fluctuating progress indicator 226 may, among other things, fluctuate during the breathing sequence to correspond to a suggested breathing pattern, it may be beneficial to provide the initial presentation of the fluctuating progress indicator 226 (or a version of the fluctuating progress indicator 226) when the initial breathing pattern indicates that the user is at a beginning of an inhale cycle, beginning of an exhale cycle, end of an inhale cycle, or end of an exhale cycle. Such a synchronization between the initial breathing pattern and the breathing sequence may enable the user to follow the breathing sequence with greater success because the first suggested breath of the breathing sequence was synchronized with the initial breathing pattern.

[0038] Presenting the fluctuating progress indicator 226 may function to begin a breathing phase of the breathing sequence. During the breathing phase, the fluctuating progress indicator 226 may fluctuate by growing and shrinking, rotating, changing elements, and the like. Fluctuations of the fluctuating progress indicator 226 may function as breathing cues to guide the user through the breathing sequence. For example, the fluctuations may inform the user when and for how long to inhale, when and for how long to exhale, and a number of times to repeat the process of inhaling and exhaling.

[0039] At the conclusion of the breathing phase of the breathing sequence, the display may present the graphical user interface 212. Like the graphical user interface 208, the graphical user interface 212 may include a heart user interface element 228b and a heart metric 230b. The heart user interface element 228b may pulsate on the display during a concluding phase of the breathing sequence. In some examples, the heart user interface element 228b may pulsate in a manner that corresponds to a heartrate of the user of the wearable device 102. For example, one or more sensors may collect heartrate data, and the wearable device 102 may cause the heart user interface element 228b to pulsate in accordance with the heartrate data. Similarly, the heart metric 230b may correspond to the heartrate of the user. In some examples, the heart user interface element 228b and the heart metric 230b are different from the heart user interface element 228a and the heart metric 230b at least because the user has performed the breathing phase of the breathing sequence. For example, the heart metric 230b indicates that the user's heartrate has dropped by 10 beats per minute compared to the heart metric 230a.

[0040] At the conclusion of the concluding phase of the breathing sequence, the display may present the graphical user interface 214. The graphical user interface 214 may include information about the breathing sequence. For example, the graphical user interface 214 may indicate that the user completed the breathing sequence ("Well Done"), indicate a quantitative performance metric ("You hit 90% of your breaths"), indicate a suggestion ("Try taking deeper breaths next time"), and any other suitable information. The information included in the graphical user interface 214 may provide reinforcement of the benefits of taking time to breath each day. Similarly, the information included in the graphical user interface 214 may encourage the user to work to improve her metrics.

[0041] In some examples, sensor data collected during the preliminary phase corresponding to the graphical user interface 208 may be compared to sensor data collected during the concluding phase to determine whether participating in the breathing sequence effected a change in any metric. For example, heart rates of the user may be compared, heart rate variability measures may be compared, pulse rates of the user may be compared, any other metric that may be indicative of stress, anxiety, and the like.

[0042] In some examples, the graphical user interface 208 and the graphical user interface 212 may be excluded from the flow of the breathing sequence illustrated in FIG. 2. For example, in response to input to begin a breathing sequence, the display may present the graphical user interface 210. After completion of the breathing portion of the breathing sequence, the display may present the graphical user interface 214.

[0043] FIG. 3 illustrates an example flow depicting process 300 and graphical user interfaces 302-310 depicting user interface elements relating to conducting breathing sequences as describe herein. The graphical user interfaces 302-310 are examples of user interfaces that may be presented on a display of the wearable device 102 as part of conducting a breathing sequence. The graphical user interfaces 302-310 may be generated by the wearable device 102, by the electronic device 110, and/or by a service provider.

[0044] At 312, the process 300 configures a breathing sequence. This may take place during a configuration phase of the breathing sequence. The graphical user interfaces 302, 304 may correspond to configuring the breathing sequence. For example, the graphical user interface 302 may include a first version of a fluctuating progress indicator 318a, a start button, and textual information (e.g., "7 breaths" and "1 min"), and the graphical user interface 304 may include a second version of the fluctuating progress indicator 318b, the start button, and different textual information (e.g., "14 breaths" and "2 min"). The fluctuating progress indicator 318 (and the various versions described herein) is an example of the fluctuating progress indicator 226. The variable visual elements 320 may take any form and be configured in any suitable manner. In some examples, the variable visual elements 320 may be circular shapes aligned around a center point of the fluctuating progress indicator 318 and may have at least some overlapping areas. In some examples, the variable visual elements 320 may have any other suitable shape. In some examples, the variable visual elements 320 may be partially transparent such that areas where the variable visual elements 320 overlap may be darker than other areas. For example, an area with no overlap may be the most transparent, followed by areas with more overlap having increasingly less transparency (e.g., where two variable visual elements 320 overlap, followed by areas where three variable visual elements 320 overlap, and so forth). In this manner, the center of the fluctuating progress indicator 318 may appear darker than the outer edges.

[0045] The first version of the fluctuating progress indicator 318a may include a first number of variable visual elements 320a-320n. For example, the fluctuating progress indicator 318a may include six variable visual elements 320. The number of variable visual elements 320 included in the fluctuating progress indicator 318a may correspond to the number of breaths ("7") and the time ("1 min"). The time may indicate a duration of a time period corresponding to a breathing phase of the breathing sequence. The number of breaths indicates a rate of breaths according to the time. The number of breaths may be determined based at least in part on the time (e.g., duration of the breathing phase) and a breath ratio (e.g., a ratio of the time it takes to inhale compared to the time it takes to exhale) applicable to the breathing sequence. For example, for a duration of 1 minute (60 seconds) and for a breath ratio of 1:1.5 (e.g., ratio of inhale to exhale), each full breath (e.g., an inhale and an exhale) will take 8.5 seconds, with 3.4 seconds for each inhale (e.g., based on the "1" of the 1:1.5 breath ratio) and 5.1 second for each exhale (e.g., based on the "1.5" of the 1:1.5 breath ratio).

[0046] The breath ratio applicable to the breathing sequence may be included in a breathing profile. The breathing profile may be a default profile selected for all users, all new users, or defined for a particular user. For example, if the user has indicated via a setting, or otherwise, that she is a beginner breather a simpler ratio such as 1:1.2 or 1:1.5 may be the default. If the user has indicated that she is an advanced breather, a more difficult ratio such as 1:2 may be selected as the default. In some examples, the breathing profile may be particular to the user and may be configured via a setting or by collecting actual sensor data and estimating an appropriate breath ratio to be included in the user's breathing profile. For example, if the user participates in the preliminary phase of the breathing sequence discussed with reference to the graphical user interface 208, the ratio may be determined based on the preliminary phase. In some examples, the user may participate in a practice breathing exercise to determine the breath ratio to be included in the breathing profile. The breathing profile may also include other information about the user. For example, the breathing profile may indicate metrics relating to breathing sequences completed by the user, breathing goals, and the like, any of which may be presented by an activity application running on the wearable device 102 and/or the electronic device 110. For example, the activity application may include a summary of activities performed and/or goals reached by the user during a time period (e.g., day, week, month, year, etc.). This summary can also include information about the breathing sequences completed by the user during the same time period. In some examples, the breathing profile may be determined for the user based on health information relating to the user. For example, health information, whether collected by the wearable device 102 or otherwise, may indicate certain health statistics (e.g., pulse rate, blood pressure, body temperature, respiratory rate, perspiration, etc.), and the health statistics may be used to determine an appropriate breathing profile for the user. In this manner, the breathing profile may be particularized to the user's health conditions, and may therefore be used as part of a plan for improving and/or addressing the health conditions. For example, if the health information indicates that the user has a high-than-average respiratory rate, a breathing profile may be determined that aims to reduce the user's respiratory rate.

[0047] The first version of the fluctuating progress indicator 318a may be changed to a second version of the fluctuating progress indicator 318b in response to user input at the wearable device 102. For example, as described herein, the wearable device 102 may include an electro-mechanical input component 322. The electro-mechanical input component 322 may include a rotatable dial. Rotating the rotatable dial may function to configure the breathing sequence. For example, first input at the electro-mechanical input component 322 (e.g., rotating the dial in a first direction) may cause the number of breaths, the time, and the number of variable visual elements 320 to decrease. Conversely, second input at the electro-mechanical input component 322 (e.g., rotating the dial in a second, opposite direction) may cause the number of breaths, the time, and the number of variable visual elements 320 to increase. Thus, the graphical user interface 304 may include a second version of the fluctuating progress indicator 318b that includes a greater number of variable visual elements 320a-320n (e.g., eight variable visual elements 320) than the first version of the fluctuating progress indicator 318a. Similarly, the time has changed to 2 minutes and the number of breaths has increased to 14. In some examples, the second version of the fluctuating progress indicator 318b may be considered a more complex version of the fluctuating progress indicator 318 as compared to the first version of the fluctuating progress indicator 318a. Other input at the electro-mechanical input component 322 (e.g., additional rotation of the dial in the second direction) may cause the number of breaths, the time, and the number of variable visual elements 320 to continue to increase (e.g., 21 breaths and 3 minutes, 28 breaths and 4 minutes, and so forth).

[0048] At 314, the process 300 conducts a preliminary phase of the breathing sequence. The graphical user interface 306 may correspond to conducting the preliminary phase of the breathing sequence. The graphical user interface 306 may include a third version of the fluctuating progress indicator 318c that fluctuates in some manner during the preliminary phase. For example, the third version of the fluctuating progress indicator 318c may pulsate, rotate, oscillate, disappear and reappear, and perform any other suitable graphical change during the preliminary phase. In some examples, the fluctuating progress indicator 318c may fluctuate at a cyclic rate corresponding to an estimated breathing pattern. The preliminary phase may be a phase in which the user prepares to begin the breathing phase of the breathing sequence. For example, textual information may be provided on the graphical user interface 306 that instructs the user to take a few deep breaths. In some examples, sensor data may be collected during the preliminary phase that corresponds to heart measures and/or respiratory measures of the user. This sensor data can be used to determine an initial breathing pattern of the user (e.g., a model of the user's breathing pattern during the preliminary phase or otherwise).

[0049] At 316, the process 300 conducts a breathing phase of the breathing sequence beginning with presentation of the graphical user interface 308 and ending with presentation of the graphical user interface 310. Thus, the graphical user interface s 308, 310 are depicted as an initial graphical user interface and a final graphical user interface, respectively of the breathing phase. The graphical user interface 308 may include a fourth version of the fluctuating progress indicator 318c that may be presented on the graphical user interface 308 to initiate the breathing phase. For example, presentation of the fourth version of the fluctuating progress indicator 318c may be synchronized with an initial breathing pattern determined in connection with 314. The breathing phase may conclude with the presentation of the graphical user interface 310. Between presentation of the graphical user interface 308 and the graphical user interface 310 the fluctuating progress indicator 318 may fluctuate. A detailed discussion of such fluctuations along with the progression of the breathing phase from the graphical user interface 308 to the graphical user interface 310 is presented in connection with FIG. 4.

[0050] As introduced previously, FIG. 4 illustrates an example flow depicting process 400 and graphical user interfaces 402-420 depicting user interface elements relating to conducting breathing sequences as describe herein. The graphical user interfaces 402-420 are examples of user interfaces that may be presented on a display of the wearable device 102 as part of conducting a breathing sequence. The graphical user interface 402 is an example of the graphical user interface 308, and the graphical user interface 420 is an example of the graphical user interface 310. Thus, the process 400 may correspond to a detailed progression of the breathing phase between the graphical user interface 308 and the graphical user interface 310. The graphical user interfaces 402-420 may be generated by the wearable device 102, by the electronic device 110, and/or by a service provider. The graphical user interface s 402-420 may include fluctuating progress indicators that fluctuate in accordance with a cyclic pattern corresponding to a time period of the breathing sequence, in accordance with a breathing rate of the breathing sequence, and in any other suitable manner.

[0051] At 422, the process 400 generates a first sequence of versions of a fluctuating progress indicator. The first sequence of versions may correspond to first fluctuating progress indicators 424a-424e included in the graphical user interfaces 402-410. For example, the first fluctuating progress indicator 424a may represent a smallest version of the fluctuating progress indicator

424, and one in which the plurality of variable visual elements are not visible. Thus, the first fluctuating progress indicator 424a may correspond to a simple circle. The first fluctuating progress indicator 424a may grow in size to become the first fluctuating progress indicator 424b. As the first fluctuating progress indicator 424a grows in size, it may also rotate in a first direction (e.g., in a counterclockwise direction as depicted by rotational arrow). The first fluctuating progress indicator 424b may continue to grow in size to become the first fluctuating progress indicator 424c. As the first fluctuating progress indicator 424b grows in size, it may also rotate in the first direction. The first fluctuating progress indicator 424c may represent a largest version, and most complex version of the first fluctuating progress indicators 424. The first fluctuating progress indicator 424c may shrink in size to become the first fluctuating progress indicator 424d. As the first fluctuating progress indicator 424c continues to shrink in size, it may also rotate in a second direction (e.g., in a clockwise direction depicted by rotational arrow). The first fluctuating progress indicator 424d may shrink in size to become the first fluctuating progress indicator 424e. As the first fluctuating progress indicator 424d shrinks in size, it may also rotate in the second direction. The change from the first fluctuating progress indicator 424a to the first fluctuating progress indicator 424c may correspond to a first breath event (e.g., an inhale cycle), and the time of presenting may correspond to a time for the first breath event (e.g., 3.4 seconds for a 1:1.5 breath ratio at 7 breaths/minute). The change from the first fluctuating progress indicator 424c to the first fluctuating progress indicator 424e may correspond to a second breath event (e.g., an exhale cycle), and the time of presenting may correspond a time for the second breath event (e.g., 5.1 seconds for a 1:1.5 breath ratio at 7 breaths/minute). In some examples, the first fluctuating progress indicators 424a and 424e may be similar, and the first fluctuating progress indicators 424b and 424d may also be similar. It is understood that the transition of the first fluctuating progress indicator 424 between 424a and 424e may include many more presentations of the first fluctuating progress indicators in order to produce a smooth transition.

[0052] At 426, the process 400 generates a second sequence of versions of the fluctuating progress indicator. The second sequence of versions may correspond to second fluctuating progress indicators 428a-428d included in the graphical user interfaces 412-418. The second fluctuating progress indicators 428 may be less complex than the first fluctuating progress indicators 424 at least because the second fluctuating progress indicators 428 include fewer variable visual elements. For example, as noted herein, the first fluctuating progress indicators

424 may include eight variable visual elements. The second fluctuating progress indicators 428 may include only six variable visual elements. In this manner, the fluctuating progress indicators 424, 428 may become less complex in accordance with a duration of the breathing sequence.

[0053] In some examples, the first fluctuating progress indicator 424e may function as a transition fluctuating progress indicator between the first fluctuating progress indicators 424 and the second fluctuating progress indicators 428. For example, between the first fluctuating progress indicator 424d and the first fluctuating progress indicator 424e (e.g., as the first fluctuating progress indicator 424 shrinks), the first fluctuating progress indicator 424 may rotate clockwise, and between the first fluctuating progress indicator 424e and the second fluctuating progress indicator 428a (e.g., as the second fluctuating progress indicator 428 grows), the rotation may be counterclockwise. The transition from the second fluctuating progress indicator 428a to the second fluctuating progress indicator 428d may be performed in a manner similar to the transition from the first fluctuating progress indicator 424a to the first fluctuating progress indicator 424e. In particular, the second fluctuating progress indicator 428 may rotate in one or more directions and/or grow and shrink between the second fluctuating progress indicator 428a and the second fluctuating progress indicator 428d. The size change and the rotation may correspond to a breathing rate associated with the breathing sequence, or associated with a breathing profile used during the breathing sequence.

[0054] At 430, the process 400 generates summary information. The summary information may correspond to the information may be presented on the graphical user interface 310. In some examples, the summary information presented on the graphical user interface 420 and may include a heartrate metric (e.g., "68 BPM"), a miniaturized version of the fluctuating progress indicator 432, a comparison to a daily breathing goal (e.g., "2 of 3"), and a duration of time the variable time period of the breathing phase (e.g., 2 mins).

[0055] FIG. 5 illustrates a series of example graphs 500-506 relating to measuring respiration of a user using cardiovascular function data. The graph 500 may represent data collected from a respiratory belt. Thus, the graph 500 may be the best approximation of respiration of the user. The graphs 502 and 504 may represent filtered signal data collected from the user using one or more sensors on the wearable device 102. For example, the one or more sensors may include one or more light sources and a photodetector 1154 to form a photoplethysmography (PPG) sensor.

The graph 502 may represent a baseline modulation of the signal data. The baseline modulation may correspond to pressure changes in the user's chest that result in venous blood flowing from the user's extremities to the user's chest and back. The graph 504 may represent an amplitude modulation of the signal data. The amplitude modulation may correspond to changes in pressure gradients relating to blood pressure. The graph 506 may represent a frequency modulation of the signal data. The frequency modulation may correspond to any instantaneous measurement of heart beats, which may be considered a beat-to-beat measurement. In some examples, the signal data described herein may be filtered and/or processed in any suitable manner to determine the measurements shown in the graphs 502-506.

[0056] Using any one of the measurements (e.g., the graphs 502-506) or a combination of one or more of them may enable determination of a suitable estimate of a respiration measure of the user. The respiration measure may correspond to a cyclic breathing pattern of the user. In some examples, the sensor data may be collected by the wearable device 102 when the wearable device 102 is being worn on the user's wrist. In some examples, other devices may collect the sensor data and share it with the wearable device 102. For example, earbuds may include sensors to detect cardiovascular function data, which can be shared with the wearable device 102. In some examples, other sensors in other devices collect other information that may be helpful to determine respiration measures of the user. For example, an optical sensor like a camera on a user device or in a laptop can be used to analyze color differences of one's face and/or neck as they breath, nose dilation, and the like. This can be representative of blood flow. Similarly, the user may place her finger over the optical sensor in order to detect other information that may be representative of blood flow.

[0057] FIG. 6 illustrates an example architecture or environment 600 configured to implement sharing of updatable graphical fitness user interface elements, according to at least one example. In some examples, the example architecture 600 may further be configured to manage or otherwise interact with the wearable device 102, the electronic device 110, and/or service provider computers 602. In some examples, the devices may be connected via one or more networks 604 and/or 606 (e.g., via Bluetooth, WiFi, the Internet, or the like). In the architecture 600, one or more users (e.g., the user 106) may utilize the electronic device 110 to manage, control, or otherwise utilize the wearable device 102, via the one or more networks 606.

Additionally, in some examples, the wearable device 102, the service provider computers 602, and electronic device 110 may be configured or otherwise built as a single device. For example, the wearable device 102 and/or the electronic device 110 may be configured to implement the embodiments described herein as a single computing unit, exercising the examples described above and below without the need for the other devices described.

[0058] In some examples, the networks 604, 606 may include any one or a combination of many different types of networks, such as cable networks, the Internet, wireless networks, cellular networks, satellite networks, other private and/or public networks, or any combination thereof. While the illustrated example represents the electronic device 110 accessing the service provider computers 602 via the networks 604, the described techniques may equally apply in instances where the electronic device 110 interacts with the service provider computers 602 over a landline phone, via a kiosk, or in any other manner. It is also noted that the described techniques may apply in other client/server arrangements (e.g., set-top boxes, etc.), as well as in non-client/server arrangements (e.g., locally stored applications, peer to peer configurations, etc.).

[0059] As noted above, the electronic device 110 may be configured to collect and/or manage user activity data potentially received from the wearable device 102. In some examples, the wearable device 102 may be configured to provide health, fitness, activity, and/or medical data of the user to a third- or first-party application (e.g., the service provider 602). In turn, this data may be used by the electronic device 110 to conduct the breathing sequences as described herein. The electronic device 110 may be any type of computing device such as, but not limited to, a mobile phone, a smartphone, a personal digital assistant (PDA), a laptop computer, a desktop computer, a thin-client device, a tablet computer, a wearable device, or the like. In some examples, the electronic device 110 may be in communication with the service provider computers 602 and/or the wearable device 102 via the networks 604, 606, or via other network connections.

[0060] In one illustrative configuration, the electronic device 110 may include at least one memory 614 and one or more processing units (or processor(s)) 616. The processor(s) 616 may be implemented as appropriate in hardware, computer-executable instructions, firmware, or combinations thereof. Computer-executable instruction or firmware implementations of the processor(s) 616 may include computer-executable or machine-executable instructions written in any suitable programming language to perform the various functions described. The electronic device 110 may also include geo-location devices (e.g., a global positioning system (GPS) device or the like) for providing and/or recording geographic location information associated with the electronic device 110.

[0061] The memory 614 may store program instructions that are loadable and executable on the processor(s) 616, as well as data generated during the execution of these programs. Depending on the configuration and type of the electronic device 110, the memory 614 may be volatile (such as random access memory (RAM)) and/or non-volatile (such as read-only memory (ROM), flash memory, etc.). The electronic device 110 may also include additional removable storage and/or non-removable storage 626 including, but not limited to, magnetic storage, optical disks, and/or tape storage. The disk drives and their associated non-transitory computer-readable media may provide non-volatile storage of computer-readable instructions, data structures, program modules, and other data for the computing devices. In some implementations, the memory 614 may include multiple different types of memory, such as static random access memory (SRAM), dynamic random access memory (DRAM), or ROM. While the volatile memory described herein may be referred to as RAM, any volatile memory that would not maintain data stored therein once unplugged from a host and/or power would be appropriate.

[0062] The memory 614 and the additional storage 626, both removable and non-removable, are all examples of non-transitory computer-readable storage media. For example, non-transitory computer readable storage media may include volatile or non-volatile, removable or non-removable media implemented in any method or technology for storage of information such as computer-readable instructions, data structures, program modules, or other data. The memory 614 and the additional storage 626 are both examples of non-transitory computer storage media. Additional types of computer storage media that may be present in the electronic device 110 may include, but are not limited to, phase-change RAM (PRAM), SRAM, DRAM, RAM, ROM, electrically erasable programmable read-only memory (EEPROM), flash memory or other memory technology, compact disc read-only memory (CD-ROM), digital video disc (DVD) or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium that can be used to store the desired information and that can be accessed by the electronic device 110. Combinations of any of the above should also be included within the scope of non-transitory computer-readable storage media. Alternatively, computer-readable communication media may include computer-readable instructions, program modules, or other data transmitted within a data signal, such as a carrier wave, or other transmission. However, as used herein, computer-readable storage media does not include computer-readable communication media.

[0063] The electronic device 110 may also contain communications connection(s) 628 that allow the electronic device 110 to communicate with a data store, another computing device or server, user terminals, and/or other devices via the networks 604, 606. The electronic device 110 may also include I/O device(s) 630, such as a keyboard, a mouse, a pen, a voice input device, a touch input device, a display, speakers, a printer, etc.

[0064] Turning to the contents of the memory 614 in more detail, the memory 614 may include an operating system 632 and/or one or more application programs or services for implementing the features disclosed herein including an breathing module 608a. In some examples, the breathing module 608a may be configured to manage activity data collected by the wearable device 102 and conduct the breathing sequences as described herein. As described in detail with reference to later figures, the wearable device 102 may include a memory that includes a similar breathing module 608, which may be accessible by one or more processors of the wearable device 102. In this manner, the techniques described herein may be implemented by any one, or a combination of more than one, of the computing devices (e.g., the wearable device 102, the electronic device 110, or the service provider 602).

[0065] The service provider computers 602 may also be any type of computing device such as, but not limited to, a mobile phone, a smartphone, a PDA, a laptop computer, a desktop computer, a thin-client device, a tablet computer, a wearable device, etc. In some examples, the service provider computers 602 may be in communication with the electronic device 110 and/or wearable device 102 via the networks 604, 606, or via other network connections.

[0066] In one illustrative configuration, the service provider computers 602 may include at least one memory 642 and one or more processing units (or processor(s)) 644. The processor(s) 644 may be implemented as appropriate in hardware, computer-executable instructions, firmware, or combinations thereof. Computer-executable instruction or firmware implementations of the processor(s) 644 may include computer-executable or machine-executable instructions written in any suitable programming language to perform the various functions described.

[0067] The memory 642 may store program instructions that are loadable and executable on the processor(s) 644, as well as data generated during the execution of these programs. Depending on the configuration and type of service provider computer 602, the memory 642 may be volatile (such as RAM) and/or non-volatile (such as ROM, flash memory, etc.). The service provider computer 602 may also include additional removable storage and/or non-removable storage 646 including, but not limited to, magnetic storage, optical disks, and/or tape storage. The disk drives and their associated non-transitory computer-readable media may provide non-volatile storage of computer-readable instructions, data structures, program modules, and other data for the computing devices. In some implementations, the memory 642 may include multiple different types of memory, such as SRAM, DRAM, or ROM. While the volatile memory described herein may be referred to as RAM, any volatile memory that would not maintain data stored therein once unplugged from a host and/or power would be appropriate. The memory 642 and the additional storage 646, both removable and non-removable, are both additional examples of non-transitory computer-readable storage media.

[0068] The service provider computer 602 may also contain communications connection(s) 648 that allow the service provider computer 602 to communicate with a data store, another computing device or server, user terminals and/or other devices via the networks 604, 606. The service provider computer 602 may also include I/O device(s) 650, such as a keyboard, a mouse, a pen, a voice input device, a touch input device, a display, speakers, a printer, etc.

[0069] Turning to the contents of the memory 642 in more detail, the memory 642 may include an operating system 652 and/or one or more application programs or services for implementing the features disclosed herein including the breathing module 608b. In some examples, the breathing module 608b may be configured to manage activity data collected by the wearable device 102 and conduct the breathing sequences as described herein.

[0070] FIGS. 7, 8, 9, and 10 illustrate example flow diagrams showing processes 700, 800, 900, and 1000 for conducting breathing sequences, according to at least a few examples. These processes, and any other processes described herein, are illustrated as logical flow diagrams, each operation of which represents a sequence of operations that can be implemented in hardware, computer instructions, or a combination thereof. In the context of computer instructions, the operations may represent computer-executable instructions stored on one or more non-transitory computer-readable storage media that, when executed by one or more processors, perform the recited operations. Generally, computer-executable instructions include routines, programs, objects, components, data structures and the like that perform particular functions or implement particular data types. The order in which the operations are described is not intended to be construed as a limitation, and any number of the described operations can be combined in any order and/or in parallel to implement the processes.

[0071] Additionally, some, any, or all of the processes described herein may be performed under the control of one or more computer systems configured with specific executable instructions and may be implemented as code (e.g., executable instructions, one or more computer programs, or one or more applications) executing collectively on one or more processors, by hardware, or combinations thereof. As noted above, the code may be stored on a non-transitory computer-readable storage medium, for example, in the form of a computer program including a plurality of instructions executable by one or more processors.

[0072] FIG. 7 depicts the process 700 including example acts or techniques relating to conducting breathing sequences, according to at least one example. The breathing module 608, whether embodied in the service provider 602, the wearable device 102, the electronic device 110, or any suitable combination of the foregoing may perform the process 700 of FIG. 7. The process 700 begins at 702 by receiving sensor data from one or more sensors of a user device. The sensor data maybe representative of one or more health metrics. The health metrics may include a heart rate of the user, a heart rate variability measure of the user, or a pulse rate of the user. In some examples, the sensor data may be filtered, analyzed, or otherwise processed to infer one or more respiratory measures corresponding to a user of the user device.

[0073] At 704, the process 700 estimates an initial breathing pattern based at least in part on the signal data. In some examples, the initial breathing pattern may include a cyclic breathing pattern that is made up of an inhale cycle and an exhale cycle. In some examples, initial breathing pattern may be estimated during a preliminary phase of a breathing sequence.

[0074] At 706, the process 700 synchronizes the initial breathing pattern and a breathing sequence. In some examples, the synchronization may be between the cyclic pattern of the initial breathing pattern and the breathing sequence. In some examples, the synchronization may include identifying, based at least in part on the initial breathing pattern, a beginning of an inhale cycle of a first breath event or a beginning of exhale cycle of the first breath event.

[0075] At 708, the process 700 initiates a first period of the breathing sequence by generating, based at least in part on the synchronization, a breathing element. In some examples, the first period may correspond to a breathing phase of the breathing sequence. Generating the breathing element based on the synchronization may include generating and presenting the breathing element when the user it a beginning of an inhale cycle of a second breath event or at a beginning of an exhale cycle of the second breath event. In this manner, the breathing phase of the breathing sequence can begin by being synced with the user's breath events. In some examples the breathing element is a graphical user interface element, a sound, or a haptic. When the breathing element is the graphical user interface element it can be a fluctuating progress indicator. As described herein, the fluctuating progress indicator can be fined as having a plurality of variable visual characteristics and a plurality of variable visual elements. The variable visual characteristics may include a complexity characteristic relating to the complexity of the variable visual elements, an alignment characteristic relating to the alignment of the variable visual elements with respect to a center of the fluctuating progress indicator, a visibility characteristic relating to the size and visibility of the variable visual elements.

[0076] At 710, the process 700 causes the breathing element to fluctuate during the breathing sequence. In some examples, this can include causing the breathing element to fluctuate during a second period of the breathing sequence which may also correspond to the breathing phase of the breathing sequence. In some examples, this can include causing the fluctuating progress indicator to fluctuate during the second period. The fluctuating progress indicator can be configured to fluctuate in accordance with a breathing profile to at least indicate a suggested breathing pattern. The breathing profile may include a breathing rate to perform the suggested breathing pattern for a duration that is associated with the breathing sequence. In some examples, the duration may be a configurable parameter selectable by a user. Causing the fluctuating progress indicator to fluctuate can include causing a first variable visual characteristic to change with respect to the duration of the breathing sequence. This can include changing the complexity of the fluctuating progress indicator to go from more complex to less complex as the breathing sequence progresses. Causing the fluctuating progress indicator to fluctuate can include causing a second variable visual characteristic to change with respect to a breathing rate associated with the breathing profile. This can include changing the visibility and/or the alignment of the fluctuating progress indicator with respect to the breathing rate. For example, the fluctuating progress indicator can pulsate and rotate in accordance with the breathing rate. In some examples, the breathing profile may be generated based at least in part on user health data and/or user activity data as descried herein.

[0077] FIG. 8 depicts the process 800 including example acts or techniques relating to conducting breathing sequences, according to at least one example. The breathing module 608, whether embodied in the service provider 602, the wearable device 102, the electronic device 110, or any suitable combination of the foregoing may perform the process 800 of FIG. 8. In an illustrative example, the process 800 may be performed by one or more sensors 1212 and 1222 and the wearable device 102. The process 800 begins at 802 by sensing first health data. This may be performed by one or more sensors 1212 and 1222. The first health data may include activity data, heartrate data, and any other health data associated with a user.

[0078] At 804, the process 800 determines a cyclic breathing pattern based on the first health data. This may be performed by the wearable device 102. Determining the cyclic breathing pattern may include processing the first health data to infer a cyclic breathing pattern. For example, the first health data may include heartrate data and/or other data relating to the circulatory system, and determining the cyclic pattern may include processing the data to infer respiratory measures. The respiratory measures can include a breathing rate, time attributable to inhale cycles and exhale cycles, breathing irregularities, and the like. In some examples, the cyclic breathing pattern can be determined as part of a preliminary phase a breathing sequence. The preliminary phase may function as a warm-up phase in which the user takes a number of breaths to prepare for the breathing sequence. Invisible to the user, the process 800 may be collecting the first heath data and modeling the user’s breathing during the warm-up phase. This model can include the cyclic breathing pattern.

[0079] At 806, the process 800 generates a fluctuating progress indicator (FPI). This may be performed by the wearable device 102. The fluctuating progress indicator is an example of a user interface element that fluctuates during a breathing sequence and also indicates progress of the breathing sequence. For example, the fluctuating progress indicator can indicate progress by changing its form as the breathing sequence progresses. Such changes in form can include removing and/or changing visual elements of the fluctuating progress indicator during the breathing sequence such that the fluctuating progress indicator presented at the end of the breathing sequence is less complex or has less definable shapes than the fluctuating progress indicator presented at the beginning of the breathing sequence.

[0080] At 808, the process 800 synchronizes the cyclic breathing pattern with an initial presentation of the fluctuating progress indicator to begin a breathing phase of a breathing sequence. This may be performed by the wearable device 102. Synchronizing the presentation of the fluctuating progress indicator may include causing a particular version of the fluctuating progress indicator to appear on a display of the wearable device 102 at a convenient moment in the user's cyclic breathing pattern. In some examples, the convenient moment may be when the user is at the bottom of a breath (or just about to inhale) or at a top of a breath (or just about to exhale). For example, a version of the fluctuating progress indicator can be a small circular user interface element, and it may be initially presented on the display when the user is at the bottom of a breath. The fluctuating progress indicator may then be changed from the small circular user interface element to a different user interface element (e.g., a larger version of the fluctuating progress indicator) as the user inhales.

[0081] At 810, the process 800 causes the fluctuating progress indicator to fluctuate. This may be performed by the wearable device 102. Causing the fluctuating progress indicator to fluctuate can include causing the fluctuating progress indicator to rotate, to spin, to oscillate, to pulsate, to change form, to change color, to change size, and do any other changes in appearance. In some examples, causing the fluctuating progress indicator to fluctuate includes presenting the changes to the fluctuating progress indicator on a display.

[0082] At 812, the process 800 senses second health data. This may be performed by the one or more sensors 1212 and 1222. The second health data may include activity data, heartrate data, and any other health data associated with the user. In some examples, the second health data may be sensed at time while the user is participating in the breathing phase of the breathing sequence. Thus, the second health data may include health data collected in about real-time from the user and may represent one or more health conditions of the user during the breathing sequence. Such data may be used to determine how well the user performed the breathing sequence based on one or more metrics. Information about the user's performance may associated with the user and stored in a data store, which may be local to the wearable device 102 and or remote to the wearable device 102. In this manner, summaries based on historical information about the user's performance, improvements, and the like may be determined and surfaced to the wearable device 102 and/or the electronic device 110.

[0083] At 814, the process 800 determines whether to adjust the fluctuating progress indicator. This may be performed by the wearable device 102. Determining whether to adjust the fluctuating progress indicator may be based at least in part on the second health data.

[0084] If the answer at 814 is YES, the process 800 proceeds to 818 to determine an adjustment for the fluctuating progress indicator. This may be performed by the wearable device 102. For example, if the second health data, or an analysis of the second health data, reveals that the user is not participating in the breathing sequence or is struggling to keep up with a suggested breathing pattern, the sequence may end and/or the suggested breathing pattern may be altered, which may result in the presentation of the fluctuating progress indicator changing. Such changes may encourage the user to continue with the current breathing sequence and/or to try again with a different breathing sequence. Information about any changes may be stored as configuration settings and referenced when the user next begins a breathing sequence.

[0085] If the answer at 814 is NO, the process 800 proceeds to 818 to cause the fluctuating progress indicator to continue to fluctuate. This may be performed by the wearable device 102. Causing the fluctuating progress indicator to continue to fluctuate can include causing the fluctuating progress indicator to rotate, to spin, to oscillate, to pulsate, to change form, to change color, to change size, and do any other changes in appearance. In some examples, causing the fluctuating progress indicator to continue to fluctuate includes presenting the changes to the fluctuating progress indicator on a display.

[0086] At 820, the process 800 senses third health data. This may be performed by the one or more sensors 1212 and 1222. The third health data may include activity data, heartrate data, and any other health data associated with the user. In some examples, the third health data may be sensed at time after the user has completed the breathing phase of the breathing sequence. Thus, the third health data may include health data collected in about real-time from the user and represent one or more health conditions of the user after the breathing sequence.

[0087] At 822, the process 800 presents information about the breathing sequence. This may be performed by the wearable device 102. Presenting information may include generating the information prior to presenting it. The information may indicate one or more quantitative assessments of the breathing sequence, one or more qualitative assessments (which may or may not be based on quantitative measures), one or more suggestions, one or more options to share information about the breathing sequence with others, and the like.

[0088] FIG. 9 depicts the process 900 including example acts or techniques relating to conducting breathing sequences, according to at least one example. The breathing module 608, whether embodied in the service provider 602, the wearable device 102, the electronic device 110, or any suitable combination of the foregoing may perform the process 900 of FIG. 9. The process 900 begins at 902 by receiving a first input to initiate a breathing sequence. The first input may be received at a user interface of a device (e.g., the wearable device 102 or the electronic device 110). The first input may be user input or may be an automated input generated in response to certain conditions (e.g., calendar information that indicates the sequence should begin, sensor data that indicates that the sequence should begin, and the like).

[0089] At 904, the process 900, during a configuration phase of the breathing sequence, receives a second input including configuration information. In some examples, the configuration phase may be a phase in which configuration information is received. The configuration information may define one or more parameters of the breathing sequence. For example, the configuration information may define a variable time period for the breathing sequence. In some examples, the time period is variable at least because a duration of the time period may be varied. The second input may be received at the user interface or via some other component of the device. For example, the second input may be received via an electro-mechanical input device attached to the device. In some examples, the electro-mechanical device may include a rotatable dial, and rotating of the dial may input the configuration information. For example, rotation of the rotatable dial in a first direction may increase the duration of the variable time period, and rotation of the rotatable dial in a second, opposite direction may decrease the duration of the variable time period. Other parameters that may be defined by the configuration information can include, for example, a number of breaths to be performed during the breathing sequence, a breath ratio, a number and/or complexity of the fluctuating progress indicator to be presented during a breathing phase, types of breathing cues to use during the breathing sequence (e.g., visual using the fluctuating progress indicator, audible using a speaker on the device, or haptic using a haptic device of the device), and the like. In some examples, at least some of the parameters may be stored in association with a breathing profile. The breathing profile may be customized to a user, may be default for all users, or may be default for a set of users.

[0090] At 906, the process 900, during a preliminary phase of the breathing sequence, presents a first version of a fluctuating progress indicator. Presenting the first version of the fluctuating progress indicator may include presenting the first version of the fluctuating progress indicator on the user interface. The preliminary phase may follow the configuration phase. The first version of the fluctuating progress indicator may be presented in a manner that indicates to the user to prepare to breathing. For example, the first version of the fluctuating progress indicator may be presented in a manner that is different from later versions of the fluctuating progress indicator. In some examples, the first version of the fluctuating progress indicator rotates with a trailing portion of the fluctuating progress indicator being less visible than a leading portion of the fluctuating progress indicator. In some examples, the first version of the fluctuating progress indicator may fluctuate during the preliminary phase at a first cyclic rate. The first cyclic rate may be determined by an estimated breathing pattern. The estimated breathing pattern may be specific to the user and inferred based on health data of the user or may be a default estimated breathing pattern. As described herein, the fluctuating progress indicator may include a plurality of variable visual elements, and may be defined by a plurality of variable visual characteristics.

[0091] At 908, the process 900, during a breathing phase of the breathing sequence, presents a second version of the fluctuating progress indicator. Presenting the second version of the fluctuating progress indicator may include presenting the second version of the fluctuating progress indicator on the user interface. The breathing phase may follow the preliminary phase and may be the phase in which a suggested breathing pattern is presented to the user to follow. In some examples, the second version of the fluctuating progress indicator may fluctuate at a second cyclic rate different than the first cyclic rate. The second cyclic rate may be determined based at least in part on the variable time period. For example, if the variable time period has been defined as two minutes and the breathing rate is seven breaths per minute (e.g., as indicated in a breathing profile), the second version of the fluctuating progress indicator may fluctuate fourteen times during the variable time period. In some examples, other aspects of the fluctuation may depend on other aspects of the configuration information and/or the variable time period. For example, the time devoted to an inhale fluctuation and the time devoted to an exhale fluctuation of the second version of the fluctuating progress indicator may depend on a breath ratio identified in a breathing profile and/or otherwise associated with the breathing sequence.

[0092] FIG. 10 depicts the process 1000 including example acts or techniques relating to conducting breathing sequences, according to at least one example. The breathing module 608, whether embodied in the service provider 602, the wearable device 102, the electronic device 110, or any suitable combination of the foregoing may perform the process 1000 of FIG. 10. The process 1000 begins at 1002 by initiating a breathing sequence. Initiating the breathing sequence may be based at least in part on a request to initiate the breathing sequence.

[0093] At 1004, the process 1000 receives configuration information during a first phase of the breathing sequence. In some examples, the configuration information may be used to configure the breathing sequence.

[0094] At 1006, the process 1000 generates a first version of a fluctuating progress indicator for presentation during the first phase of the breathing sequence. In some examples, the first version of the fluctuating progress indicator may be modifiable based at least in part on the configuration information. For example, the first version of the fluctuating progress indicator may include variable visual elements, a number of which may be increased and/or decreased.

[0095] At 1008, the process 1000 generates a second version of the fluctuating progress indicator for presentation during a second phase of the breathing sequence. The second version of the fluctuating progress indicator may be based on the first version of the fluctuating progress indicator, and in some examples, may be similar to the first version of the fluctuating progress indicator. In some examples, the second version of the fluctuating progress indicator may be presented for a period of time corresponding to the second phase.

[0096] At 1010, the process 1000 generates a third version of the fluctuating progress indicator for presentation during a third phase of the breathing sequence. The third version of the fluctuating progress indicator may be based on the first version of the fluctuating progress indicator and/or the second version of the fluctuating progress indicator. In some examples, the third version of the fluctuating progress indicator may be presented and changed during the third phase.

[0097] At 1012, the process 1000 causes the third version of the fluctuating progress indicator to fluctuate during the third phase of the breathing sequence. In some examples, causing the third version of the fluctuating progress indicator to fluctuate during the third phase of the breathing sequence may include, at 1014, causing a first variable visual characteristic of the fluctuating progress indicator to change with respect to a duration of a time period. In some examples, the duration of the time period may correspond to a length of the third phase of the breathing sequence. In some examples, the duration may be set by the configuration information. The first variable visual characteristic of the fluctuating progress indicator may be a complexity characteristic of third version of the fluctuating progress indicator or a complexity characteristic of a plurality of variable visual elements that make up the third version of the fluctuating progress indicator. And causing the first variable visual characteristic of the fluctuating progress indicator to change may include causing the complexity of third version of the fluctuating progress indicator and/or the complexity of the plurality of variable visual elements to decrease or increase. In some examples, this can include removing variable visual elements from the plurality of variable visual elements.

[0098] In some examples, causing the third version of the fluctuating progress indicator to fluctuate during the third phase of the breathing sequence may include, at 1016, causing a second variable visual characteristic of the fluctuating progress indicator to change with respect to a breathing rate associated with the breathing sequence. The second variable visual characteristic may be a visibility characteristic. The visibility characteristic may include visibility as it relates to size (e.g., a smaller element being less visible than a larger element) and as it relates to transparency (e.g., a more transparent element being less visible than a less transparent element). Thus, causing the second variable visual characteristic of the fluctuating progress indicator to change may include causing the third version of the fluctuating progress indicator to become larger and smaller and/or more transparent and less transparent. In some examples, changing with respect to the breathing rate may include becoming larger and smaller and/or more transparent and less transparent in synchronization with the breathing rate which may correspond to a suggested breathing pattern.

[0099] In some examples, causing the third version of the fluctuating progress indicator to fluctuate during the third phase of the breathing sequence may include, at 1018, causing a third variable visual characteristic of the fluctuating progress indicator to change with respect to the breathing rate associated with the breathing sequence. The second variable visual characteristic may be an alignment characteristic. The alignment characteristic may include alignment as it relates to the third version of the fluctuating progress indicator with respect to locations on a user interface (e.g., center, edges boundaries, etc.) or with respect to other elements on the user interface. The alignment characteristic may also include alignment as it relates to the plurality of variable visual elements with respect to a location of the third version of the fluctuating progress indicator. For example, the alignments and/or orientations of the plurality of variable visual alignments with respect to a center of the third version of the fluctuating progress indicator may rotate with respect to the breathing rate.

[0100] Embodiments described herein may take the form of, be incorporated in, or operate with a suitable electronic device. One example of such a device is shown in FIG. 11 and takes the form of a wearable mechanism. As shown, the mechanism may be worn on a user's wrist and secured thereto by a band. The mechanism may have a variety of functions including, but not limited to: keeping time; monitoring a user's physiological signals and providing health-related information based on those signals; communicating (in a wired or wireless fashion) with other electronic devices, which may be different types of devices having different functionalities; providing alerts to a user, which may include audio, haptic, visual and/or other sensory output, any or all of which may be synchronized with one another; visually depicting data on a display; gather data form one or more sensors that may be used to initiate, control, or modify operations of the device; determine a location of a touch on a surface of the device and/or an amount of force exerted on the device, and use either or both as input; accepting voice input to control one or more functions; accepting tactile input to control one or more functions; and so on.

[0101] Alternative embodiments of suitable electronic devices include a phone; a tablet computing device; a portable media player; and so on. Still other suitable electronic devices may include laptop/notebook computers, personal digital assistants, touch screens, input-sensitive pads or surfaces, and so on.

[0102] FIG. 12 depicts an example schematic diagram of a wearable electronic device 1200. The wearable electronic device 1200 is an example of the wearable device 102. As shown in FIG. 12, the device 1200 includes one or more processing units 1202 that are configured to access a memory 1204 having instructions stored thereon. The instructions or computer programs may be configured to perform one or more of the operations or functions described with respect to the device 1200. For example, the instructions may be configured to control or coordinate the operation of the various components of the device. Such components include, but are not limited to, display 1206, one or more input/output components 1208, one or more communication channels 1210, one or more sensors 1212, a speaker 1214, microphone 1216, a battery 1218, wireless power 1220, bio sensors 1222, and/or one or more haptic feedback devices 1224. In some embodiments the speaker and microphone may be combined into a single unit and/or may share a common port through a housing of the device.

[0103] The processing units 1202 of FIG. 12 may be implemented as any electronic device capable of processing, receiving, or transmitting data or instructions. For example, the processing units 1202 may include one or more of: a microprocessor, a central processing unit (CPU), an application-specific integrated circuit (ASIC), a digital signal processor (DSP), or combinations of such devices. As described herein, the term "processor" is meant to encompass a single processor or processing unit, multiple processors, multiple processing units, or other suitably configured computing element or elements.

[0104] In some embodiments the electronic device may accept a variety of bands, straps, or other retention mechanisms (collectively, "bands"). These bands may be removably connected to the electronic device by a lug that is accepted in a recess or other aperture within the device and locks thereto. The lug may be part of the band or may be separable (and/or separate) from the band. Generally, the lug may lock into the electronic device's recess and thereby maintain connection between the band and device. The user may release a locking mechanism to permit the lug to slide or otherwise move out of the recess. In some embodiments, the recess may be formed in the band and the lug may be affixed or incorporated into the device.

[0105] A user may change combinations of bands and electronic devices, thereby permitting mixing and matching of the two categories. It should be appreciated that devices having other forms and/or functions may include similar recesses and may releasably mate with a lug and/or band incorporating a lug. In this fashion, an ecosystem of bands and devices may be envisioned, each of which is compatible with another. A single band may be used to connect to devices, as one further example; in such embodiments the band may include electrical interconnections that permit the two devices to transmit signals to one another and thereby interact with one another.

[0106] In many embodiments, the electronic device may keep and display time, essentially functioning as a wristwatch among other things. Time may be displayed in an analog or digital format, depending on the device, its settings, and (in some cases) a user's preferences. Typically, time is displayed on a digital display stack forming part of the exterior of the device.

[0107] The display stack may include a cover element, such as a cover glass, overlying a display. The cover glass need not necessarily be formed from glass, although that is an option; it may be formed from sapphire, zirconia, alumina, chemically strengthened glass, hardened plastic and so on. Likewise, the display may be a liquid crystal display, an organic light-emitting diode display, or any other suitable display technology. Among other elements, the display stack may include a backlight in some embodiments.

[0108] The device may also comprise one or more touch sensors to determine a location of a touch on the cover glass. A touch sensor may be incorporated into or on the display stack in order to determine a location of a touch. The touch sensor may be self-capacitive in certain embodiments, mutual-capacitive in others, or a combination thereof.

[0109] Similarly, the device may include a force sensor to determine an amount of force applied to the cover glass. The force sensor may be a capacitive sensor in some embodiments and a strain sensor in other embodiments. In either embodiment, the force sensor is generally transparent and made from transparent materials, or is located beneath or away from the display in order not to interfere with the view of the display. The force sensor may, for example, take the form of two capacitive plates separated by silicone or another deformable material. As the capacitive plates move closer together under an external force, the change in capacitance may be measured and a value of the external force correlated from the capacitance change. Further, by comparing relative capacitance changes from multiple points on the force sensor, or from multiple force sensors, a location or locations at which force is exerted may be determined. In one embodiment the force sensor may take the form of a gasket extending beneath the periphery of the display. The gasket may be segmented or unitary, depending on the embodiment.

[0110] The electronic device may also provide alerts to a user. An alert may be generated in response to: a change in status of the device (one example of which is power running low); receipt of information by the device (such as receiving a message); communications between the device and another mechanism/device (such as a second type of device informing the device that a message is waiting or communication is in progress); an operational state of an application (such as, as part of a game, or when a calendar appointment is imminent) or the operating system (such as when the device powers on or shuts down); and so on. The number and types of triggers for an alert are various and far-ranging.

[0111] The alert may be auditory, visual, haptic, or a combination thereof. A haptic actuator may be housed within the device and may move linearly to generate haptic output (although in alternative embodiments the haptic actuator may be rotary or any other type). A speaker may provide auditory components of an alert and the aforementioned display may provide visual alert components. In some embodiments a dedicated light, display, or other visual output component may be used as part of an alert.

[0112] The auditory, haptic, and/or visual components of the alert may be synchronized to provide an overall experience to a user. One or more components may be delayed relative to other components to create a desired synchronization among them. The components may be synchronized so that they are perceived substantially simultaneously; as one example, a haptic output may be initiated slightly before an auditory output since the haptic output may take longer to be perceived than the audio. As another example, a haptic output (or portion thereof) may be initiated substantially before the auditory output, but at a weak or even subliminal level, thereby priming the wearer to receive the auditory output.

[0113] The example electronic device may communicate with other electronic devices either through a wired connection or wirelessly. Data may be passed between devices, permitting one device to relay information to another; control another; employ another's sensors, outputs, and/or inputs; and so on. FIG. 13 depicts a user 1300 wearing a first electronic device 1302 with a second electronic device 1304 in his pocket. Data may be wirelessly transmitted between the electronic devices 1302, 1304, thereby permitting the user 1300 to receive, view, and interact with data from the second device 1304 by means of the first electronic device 1302. Thus, the user 1300 may have access to part or all of the second device's functionality through the first electronic device 1302 without actually needing to interact directly with the second device 1304. In some examples, the second electronic device 1304 may be an example of the electronic device 110.

[0114] Further, the electronic devices 1302, 1304 may cooperate not only to share data, but to share functionality as well. For example, one of the two devices may incorporate a sensor, application, or function that the other lacks. The electronic device lacking such capabilities may request them from the other device, which may share wirelessly with the requesting device. Thus, multiple devices may operate together to provide expanded functions, software, access, and the like between the two and ultimately to a user. As one non-limiting example, the electronic device 1302 may be unable to place or receive telephone calls while the second device 1304 may be able to do so. A user may nonetheless make and/or receive calls through the first device 1302, which may employ the second device 1304 to actually place or accept a call.

[0115] As another non-limiting example, an electronic device 1302 may wirelessly communicate with a sales terminal nearby, thus permitting a user to quickly and efficiently conduct a transaction such as selling, buying, or returning a good. The electronic device may use near field communications technology to perform these and other functions.

[0116] As mentioned above, a band may be connected to two electronic devices and may serve as a wired communication path between the two. As another example, the devices may communicate wirelessly, thereby permitting one device to relay information from a second to a user. This latter example may be particularly useful when the second is inaccessible.

[0117] Certain embodiments may incorporate one or more biometric sensors to measure certain physiological characteristics of a user. The device may include a photoplesymogram sensor to determine a user's heart rate or blood oxygenation levels, for example. The device may also or instead include electrodes to measure the body impedance of a user, which may permit the device to estimate body fat percentages, the body's electrical activity, body impedance, and so on. Also include blood pressure, ultraviolet exposure, etc. Depending on the sensors incorporated into or associated with the electronic device, a variety of user characteristics may be measured and/or estimated, thereby permitting different health data to be provided to a user. In some examples, the sensed biometric data may be used, in part, to determine the historic, current, and/or predicted activity data of the user.

[0118] Certain embodiments may be wirelessly charged. For example, an inductive charging base may transmit power to an inductive receiver within the device in order to charge a battery of the device. Further, by varying the inductive field between the device and base, data may be communicated between the two. As one simple non-limiting example, this may be used to wake the base from a low-power sleep state to an active charging state when the device is placed on the base. Other wireless charging systems may also be used (e.g., near field magnetic resonance and radio frequency). Alternatively, the device may also employ wired charging through electrodes.

[0119] In certain embodiments, the device may include a rotary input, which may take the form of a crown with a stem. The crown and stem may be rotated to provide the rotary input. Rotation of the stem and/or crown may be sensed optically, electrically, magnetically, or mechanically. Further, in some embodiments the crown and stem may also move laterally, thereby providing a second type of input to the device.

[0120] The electronic device may likewise include one or more buttons. The button(s) may be depressed to provide yet another input to the device. In various embodiments, the button may be a dome switch, rocker switch, electrical contact, magnetic switch, and so on. In some embodiments the button may be waterproof or otherwise sealed against the environment.

[0121] Various embodiments may include or otherwise incorporate one or more motion sensors. A motion sensor may detect motion of the device and provide, modify, cease, or otherwise affect a state, output, or input of the device or associated applications based on the motion. As non-limiting examples, a motion may be used to silence the device or acknowledge an alert generated by the device. Sample motion sensors include accelerometers, gyroscopic sensors, magnetometers, GPS sensors, distance sensors, and so on. Some embodiments may use a GPS sensor to facilitate or enable location and/or navigation assistance.

[0122] As shown in FIG. 12, the device 1200 may also include one or more acoustic elements, including a speaker 1214 and/or a microphone 1216. The speaker 1214 may include drive electronics or circuitry and may be configured to produce an audible sound or acoustic signal in response to a command or input. Similarly, the microphone 1216 may also include drive electronics or circuitry and is configured to receive an audible sound or acoustic signal in response to a command or input. The speaker 1214 and the microphone 1216 may be acoustically coupled to port or opening in the case that allows acoustic energy to pass, but may prevent the ingress of liquid and other debris.

[0123] Certain embodiments may incorporate an ambient light sensor. The ambient light sensor may permit the device to sense a brightness of its environment and adjust certain operational parameters accordingly. For example, the electronic device may modify a brightness of a display in response to the sensed ambient light. As another example, the electronic device may turn the display off if little or no light is sensed for a period of time.

[0124] These and other functions, operations, and abilities of the electronic device will be apparent upon reading the specification in its entirety.

[0125] Certain embodiments of a wearable electronic device may include one or more sensors that can be used to calculate a health metric or other health-related information. As one example, a wearable electronic device may function as a wearable health assistant that provides health-related information (whether real-time or not) to the user, authorized third parties, and/or an associated monitoring device.

[0126] FIG. 14 depicts an example electronic device 1400 having one or more biometric sensors. The electronic device 1400 is an example of the wearable device 102. As shown in FIG. 14, an array of light sources and a photodetector 1451-1454 may be disposed on the rear surface of the device 1400. In one example, the light sources 1451-1453 are formed from light emitting diode (LED) elements that are configured to emit light into a portion of the wearer's body (e.g., wrist). The photodetector 1454 is shared between the multiple light sources 1451-1453 and is configured to receive light reflected from the body. The photodetector may be formed from a photodiode material that is configured to produce a signal based on the received light. In one implementation, the signal produced by the photodetector 1454 is used to compute a health metric associated with the wearer. In some cases, the light sources 1451-1453 and the photodetector 1454 form a photoplethysmography (PPG) sensor. The first light source 1451 may include, for example, a green LED, which may be adapted for detecting blood perfusion in the body of the wearer. The second light source 1452 may include, for example, an infrared LED, which may be adapted to detect changes in water content or other properties of the body. The third 1453 light source may be a similar type or different types of LED element, depending on the sensing configuration. The optical (e.g., PPG) sensor or sensors may be used to compute various health metrics, including, without limitation, a heart rate, a respiration rate, blood oxygenation level, a blood volume estimate, blood pressure, or a combination thereof. One or more of the light sources 1451-1453 and the photodetector 1454 may also be used for optical data transfer with a base or other device. While FIG. 14 depicts one example embodiment, the number of light sources and/or photodetectors may vary in different embodiments. For example, another embodiment may use more than one photodetector. Another embodiment may also use fewer or more light sources than are depicted in the example of FIG. 14.

[0127] Also as shown in FIG. 14, the device 1400 includes multiple electrodes 1431, 1432, 1433, 1434 that are located on or near external surfaces of the device 1400. In the present example, the device 1400 includes a first electrode 1431 and a second electrode 1432 that are located on or proximate to a rear-facing surface of the device body 1410. In this example, the first electrode 1431 and the second electrode 1432 are configured to make electrical contact with the skin of the user wearing the device 1400. In some cases, the first 1431 and second 1432 electrodes are used to take an electrical measurement or receive an electrical signal from the body of the user. As also shown in FIG. 14, the device 1400 may include a third electrode 1433 and a fourth electrode 1434 that are located on or proximate to a perimeter of the case of the device body 1410. In the present example, the third 1433 and fourth 1434 electrodes are configured to be contacted by one or more fingers of the user who is wearing or interacting with the device 1400. In some cases, the third 1433 and fourth 1434 electrodes are also used to take an electrical measurement or receive an electrical signal from the body of the user. In some cases, the first 1431, second 1432, third 1433, and fourth 1434 electrodes are all used to take a measurement or series of measurements that can be used to compute another health metric of the user's body. Health metrics that may be computed using the electrodes include, without limitation, heart functions (ECG, EKG), water content, body-fat ratios, galvanic skin resistance, and combinations thereof.

[0128] In the configuration depicted in FIG. 14, the electronic device 1400 includes one or more apertures in the case 1410. A light source 1451-1454 may be disposed in each aperture. In one embodiment, each light source 1451-1453 is implemented as a light-emitting diode (LED). In the present example, the four apertures, three light sources 1451-1453, and a single detector 1454 are used to form one or more sensors. Other embodiments can include any number of light sources. For example, two light sources can be used in some embodiments.

[0129] The light sources may operate at the same light wavelength range, or the light sources can operate at different light wavelength ranges. As one example, with two light sources one light source may transmit light in the visible wavelength range while the other light source can emit light in the infrared wavelength range. With four light sources, two light sources may transmit light in the visible wavelength range while the other two light sources can emit light in the infrared wavelength range. For example, in one embodiment, at least one light source can emit light in the wavelength range associated with the color green while another light source transmits light in the infrared wavelength range. When a physiological parameter of the user is to be determined, the light sources emit light toward the user's skin and the optical sensor senses an amount of reflected light. In some cases, a modulation pattern or sequence may be used to turn the light sources on and off and sample or sense the reflected light.

[0130] Illustrative methods and systems for managing user device connections are described above. Some or all of these systems and methods may, but need not, be implemented at least partially by architectures such as those shown at least in FIGS. 1-14 above. While many of the embodiments are described above with reference to personal, activity, and/or health-related information, it should be understood that any type of user information or non-user information (e.g., data of any type) may be managed using these techniques. Further, in the foregoing description, various non-limiting examples were described. For purposes of explanation, specific configurations and details are set forth in order to provide a thorough understanding of the examples. However, it should also be apparent to one skilled in the art that the examples may be practiced without the specific details. Furthermore, well-known features were sometimes omitted or simplified in order not to obscure the example being described.

[0131] The various embodiments further can be implemented in a wide variety of operating environments, which in some cases can include one or more user computers, computing devices or processing devices which can be used to operate any of a number of applications. User or client devices can include any of a number of general purpose personal computers, such as desktop or laptop computers running a standard operating system, as well as cellular, wireless and handheld devices running mobile software and capable of supporting a number of networking and messaging protocols. Such a system also can include a number of workstations running any of a variety of commercially-available operating systems and other known applications for purposes such as development and database management. These devices also can include other electronic devices, such as dummy terminals, thin-clients, gaming systems, and other devices capable of communicating via a network.

[0132] Most embodiments utilize at least one network that would be familiar to those skilled in the art for supporting communications using any of a variety of commercially-available protocols, such as TCP/IP, OSI, FTP, UPnP, NFS, CIFS, and AppleTalk. The network can be, for example, a local area network, a wide-area network, a virtual private network, the Internet, an intranet, an extranet, a public switched telephone network, an infrared network, a wireless network, and any combination thereof.

[0133] In embodiments utilizing a network server, the network server can run any of a variety of server or mid-tier applications, including HTTP servers, FTP servers, CGI servers, data servers, Java servers, and business application servers. The server(s) may also be capable of executing programs or scripts in response to requests from user devices, such as by executing one or more applications that may be implemented as one or more scripts or programs written in any programming language, such as Java®, C, C# or C++, or any scripting language, such as Perl, Python or TCL, as well as combinations thereof. The server(s) may also include database servers, including without limitation those commercially available from Oracle®, Microsoft®, Sybase® and IBM®.

[0134] The environment can include a variety of data stores and other memory and storage media as discussed above. These can reside in a variety of locations, such as on a storage medium local to (and/or resident in) one or more of the computers or remote from any or all of the computers across the network. In a particular set of embodiments, the information may reside in a storage-area network (SAN) familiar to those skilled in the art. Similarly, any necessary files for performing the functions attributed to the computers, servers or other network devices may be stored locally and/or remotely, as appropriate. Where a system includes computerized devices, each such device can include hardware elements that may be electrically coupled via a bus, the elements including, for example, at least one central processing unit (CPU), at least one input device (e.g., a mouse, keyboard, controller, touch screen, or keypad), and at least one output device (e.g., a display device, printer, or speaker). Such a system may also include one or more storage devices, such as disk drives, optical storage devices, and solid-state storage devices such as RAM or ROM, as well as removable media devices, memory cards, flash cards, etc.

[0135] Such devices also can include a computer-readable storage media reader, a communications device (e.g., a modem, a network card (wireless or wired), an infrared communication device, etc.), and working memory as described above. The computer-readable storage media reader can be connected with, or configured to receive, a non-transitory computer-readable storage medium, representing remote, local, fixed, and/or removable storage devices as well as storage media for temporarily and/or more permanently containing, storing, transmitting, and retrieving computer-readable information. The system and various devices also typically will include a number of software applications, modules, services, or other elements located within at least one working memory device, including an operating system and application programs, such as a client application or browser. It should be appreciated that alternate embodiments may have numerous variations from that described above. For example, customized hardware might also be used and/or particular elements might be implemented in hardware, software (including portable software, such as applets) or both. Further, connection to other computing devices such as network input/output devices may be employed.

[0136] Non-transitory storage media and computer-readable media for containing code, or portions of code, can include any appropriate media known or used in the art, including storage media, such as, but not limited to, volatile and non-volatile, removable and non-removable media implemented in any method or technology for storage of information such as computer-readable instructions, data structures, program modules, or other data, including RAM, ROM, Electrically Erasable Programmable Read-Only Memory (EEPROM), flash memory or other memory technology, CD-ROM, DVD or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the desired information and which can be accessed by a system device. Based on the disclosure and teachings provided herein, a person of ordinary skill in the art will appreciate other ways and/or methods to implement the various embodiments.

[0137] The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense. It will, however, be evident that various modifications and changes may be made thereunto without departing from the broader spirit and scope of the disclosure as set forth in the claims.

[0138] Other variations are within the spirit of the present disclosure. Thus, while the disclosed techniques are susceptible to various modifications and alternative constructions, certain illustrated embodiments thereof are shown in the drawings and have been described above in detail. It should be understood, however, that there is no intention to limit the disclosure to the specific form or forms disclosed, but on the contrary, the intention is to cover all modifications, alternative constructions and equivalents falling within the spirit and scope of the disclosure, as defined in the appended claims.

[0139] The use of the terms "a" and "an" and "the" and similar referents in the context of describing the disclosed embodiments (especially in the context of the following claims) are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The terms "comprising," "having," "including," and "containing" are to be construed as open-ended terms (e.g., meaning "including, but not limited to,") unless otherwise noted. The term "connected" is to be construed as partly or wholly contained within, attached to, or joined together, even if there is something intervening. Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (e.g., "such as") provided herein, is intended merely to better illuminate embodiments of the disclosure and does not pose a limitation on the scope of the disclosure unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the disclosure.

[0140] Disjunctive language such as the phrase "at least one of X, Y, or Z," unless specifically stated otherwise, is otherwise understood within the context as used in general to present that an item, term, etc., may be either X, Y, or Z, or any combination thereof (e.g., X, Y, and/or Z). Thus, such disjunctive language is not generally intended to, and should not, imply that certain embodiments require at least one of X, at least one of Y, or at least one of Z to each be present.

[0141] Preferred embodiments of this disclosure are described herein, including the best mode known to the inventors for carrying out the disclosure. Variations of those preferred embodiments may become apparent to those of ordinary skill in the art upon reading the foregoing description. The inventors expect skilled artisans to employ such variations as appropriate, and the inventors intend for the disclosure to be practiced otherwise than as specifically described herein. Accordingly, this disclosure includes all modifications and equivalents of the subject matter recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the disclosure unless otherwise indicated herein or otherwise clearly contradicted by context.

[0142] All references, including publications, patent applications, and patents, cited herein are hereby incorporated by reference to the same extent as if each reference were individually and specifically indicated to be incorporated by reference and were set forth in its entirety herein.

WHAT IS CLAIMED IS:

1. A computer-implemented method, comprising:

receiving a signal from one or more sensors of a user device, the signal representative of a user health metric;

estimating, based at least in part on the signal, an initial breathing pattern, the initial breathing pattern comprising a cyclic pattern;

initiating a breathing sequence to begin a first period of the breathing sequence by generating, based at least in part on a synchronization between the breathing sequence and the cyclic pattern, a breathing sequence element that identifies a suggested breathing pattern; and

causing the breathing sequence element to fluctuate during a second period of the breathing sequence in accordance with a breathing profile to at least indicate the suggested breathing pattern.

2. The computer-implemented method of claim 1, wherein the synchronization between the breathing sequence and the cyclic pattern comprises synchronizing an initial presentation of the breathing sequence element to a user breath event by at least:

identifying, based at least in part on the initial breathing pattern, at least one of a beginning of an inhale cycle of a first breath event or a beginning of an exhale cycle of the first breath event; and

presenting the breathing sequence element when the user is at a beginning of an inhale cycle of a second breath event or at a beginning of an exhale cycle of the second breath event.

3. The computer-implemented method of claim 1, wherein the breathing sequence element comprises a fluctuating progress indicator that comprises one or more visual characteristics, and wherein causing the breathing sequence element to fluctuate during the second period comprises:

causing a first visual characteristic of the one or more visual characteristics of the fluctuating progress indicator to change with respect to a duration of the breathing sequence; and causing a second visual characteristic of the one or more visual characteristics of the fluctuating progress indicator to change with respect to a breathing rate associated with the breathing profile.

4. The computer-implemented method of claim 3, wherein the fluctuating progress indicator comprises a plurality of visual elements, the first visual characteristic comprising a complexity of the plurality of visual elements, and the second visual characteristic comprising one or more of a visibility characteristic of the plurality of visual elements or an alignment characteristic of the plurality of visual elements with respect to a relative center of the fluctuating progress indicator.

5. The computer-implemented method of claim 1, wherein the breathing sequence comprises a duration of the suggested breathing pattern, and the breathing profile comprises a breathing rate to perform the suggested breathing pattern during the breathing sequence.

6. The computer-implemented method of claim 5, wherein the breathing profile is generated based at least in part on user health data, at least a portion of the user health data received via the user device.

7. The computer-implemented method of claim 1, wherein the health metric comprises at least one of: a heart rate of the user, a heart rate variability measure of the user, or a pulse rate of the user, the method further comprising:

prior to initiating the first period of the breathing sequence, generating, based at least in part on information about the health metric, a user interface element; and

causing the user interface element to pulsate in accordance with the information about the health metric.

8. The computer-implemented method of claim 7, wherein generating the user interface element comprises presenting the user interface element together with a first heart beat metric, the method further comprising presenting the user interface element together with a second heart beat metric after the second period of the breathing sequence.

9. The computer-implemented method of claim 1, wherein the signal is a first signal, the method further comprising:

receiving, during one or more of the first period or the second period, a second signal from the one or more sensors of the user device;

determining, based at least in part on the second signal, a breathing score, the breathing score representative of user respiration relative to the suggested breathing pattern during the breathing sequence; and

generating a message based at least in part on the breathing score.

10. The computer-implemented method of claim 9, wherein the message comprises one or more of a message indicating completion of the breathing sequence, a message indicating the breathing score, a message indicating a metric corresponding to the breathing score, or a suggestion to improve the breathing score.

11. A system, comprising:

a memory configured to store computer-executable instructions; and

a processor in communication with the memory configured to execute the computer-executable instructions to at least:

receive an indication to initiate a breathing sequence;

in response to receiving the indication, estimate an initial cyclic breathing pattern while a user is wearing a user device;

initiate a first period of the breathing sequence by generating, based at least in part on a synchronization of the breathing sequence and the initial cyclic breathing pattern, a fluctuating progress indicator that identifies the breathing sequence; and

provide one or more breathing cues during a second period of the breathing sequence by at least changing the fluctuating progress indicator in accordance with a breathing profile associated with the breathing sequence.

12. The system of claim 11, wherein estimating the initial cyclic breathing pattern while the user is wearing the user device comprises:

receiving sensor data from one or more sensors of the user device; and determining, based at least in part on the sensor data, a breathing rate during an initial time period prior to the first period of the breathing sequence.

13. The system of claim 11, wherein the breathing sequence comprises a duration of a suggested breathing pattern, and wherein the breathing profile comprises a breathing rate to perform the suggested breathing pattern during the breathing sequence.

14. The system of claim 11, wherein the one or more breathing cues indicate when the user is to breath in and when the user is to breath out during at least the second period of the breathing sequence.

15. The system of claim 11, wherein providing the one or more breathing cues by at least changing the fluctuating progress indicator comprises causing a size of the fluctuating progress indicator to increase or decrease during the second period of the breathing sequence in accordance with the breathing profile.

16. The system of claim 11, wherein the one or more breathing cues comprise one or more visual breathing cues, and wherein the processor is further configured to execute the computer-executable instructions to at least provide, in accordance with the breathing profile, one or more audio breathing cues, one or more haptic breathing cues, or a combination of the one or more audio breathing cues and the one or more haptic breathing cues.

17. The system of claim 11, wherein the indication to initiate the breathing sequence comprises one or more of:

a first user input received at the user device in response to presentation of a miniaturized version of the fluctuating progress indicator at the user device;

a second user input received at the user device in response to a notification presented at the user device;

first sensor data received from first one or more sensors of the user device that indicates that the user has taken one or more breaths corresponding to a predetermined breathing initiation sequence;

second sensor data received from second one or more sensors of the user device that indicates whether the user device is stationary or moving;

interaction information that indicates whether the user is interacting with the user device; or

calendar information that indicates a schedule of the user.

18. One or more computer-readable storage media storing computer-executable instructions that, when executed by a processor, configure the processor to perform operations comprising:

receiving a signal from one or more sensors of a user device;

estimating, based at least in part on the signal, an initial breathing pattern that comprises a cyclic pattern; and

executing a breathing sequence that includes a suggested breathing pattern by at least:

generating, based at least in part on a synchronization of a first suggested breath of the breathing sequence and the cyclic pattern, a breathing sequence element that initiates a first period of the breathing sequence; and

causing the breathing sequence element to fluctuate during a second period of the breathing sequence in accordance with the suggested breathing pattern.

19. The one or more computer-readable storage media of claim 18, wherein the computer-executable instructions, when executed by the processor, further configure the processor to perform operations comprising:

receiving activity data collected by the one or more sensors; and

generating, based at least in part on the activity data, a breathing profile associated with a user of the user device, the breathing profile used to determine the suggested breathing pattern.

20. The one or more computer-readable storage media of claim 18, wherein causing the breathing sequence element to fluctuate comprises causing one or more visual elements of the breathing sequence element to expand and contract in accordance with the suggested breathing pattern.

ABSTRACT OF THE DISCLOSURE

A breathing sequence may define a suggested breathing pattern. Based on signal data collected by a user device, an initial breathing pattern that includes a cyclic pattern may be estimated. A first period of the breathing sequence may be initiated by generating a breathing sequence element based on a synchronization of the cyclic pattern with the breathing sequence. The breathing sequence element may fluctuate during a second period of the breathing sequence in accordance with a breathing profile associated with the suggested breathing pattern.

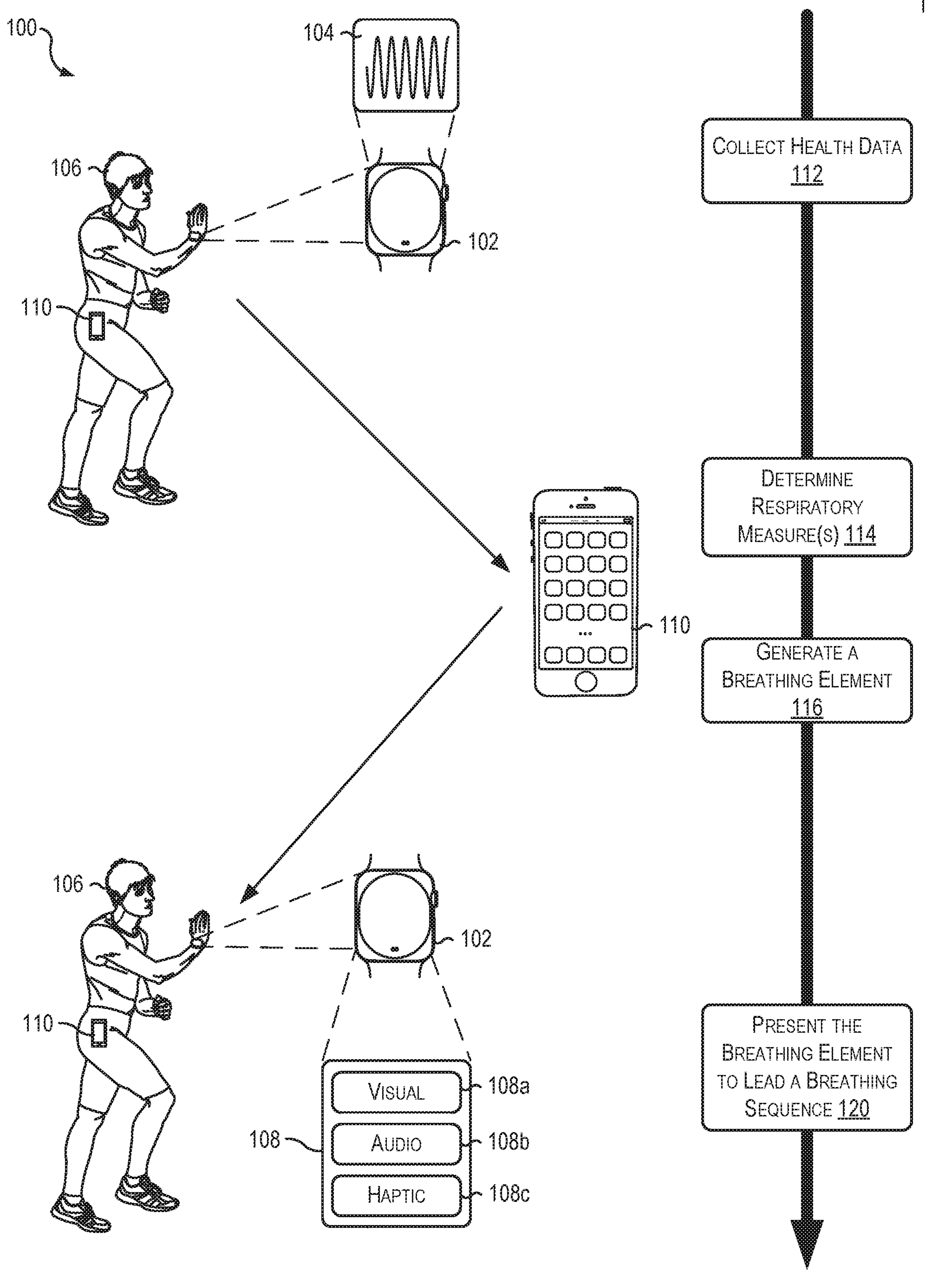
100
104
106
102
110
Collect Health Data 112
Determine Respiratory Measure(s) 114
110
Generate a Breathing Element 116
106
102
110
Visual
108a
108
Audio
108b
Haptic
108c
Present the Breathing Element to Lead a Breathing Sequence 120

FIG. 1

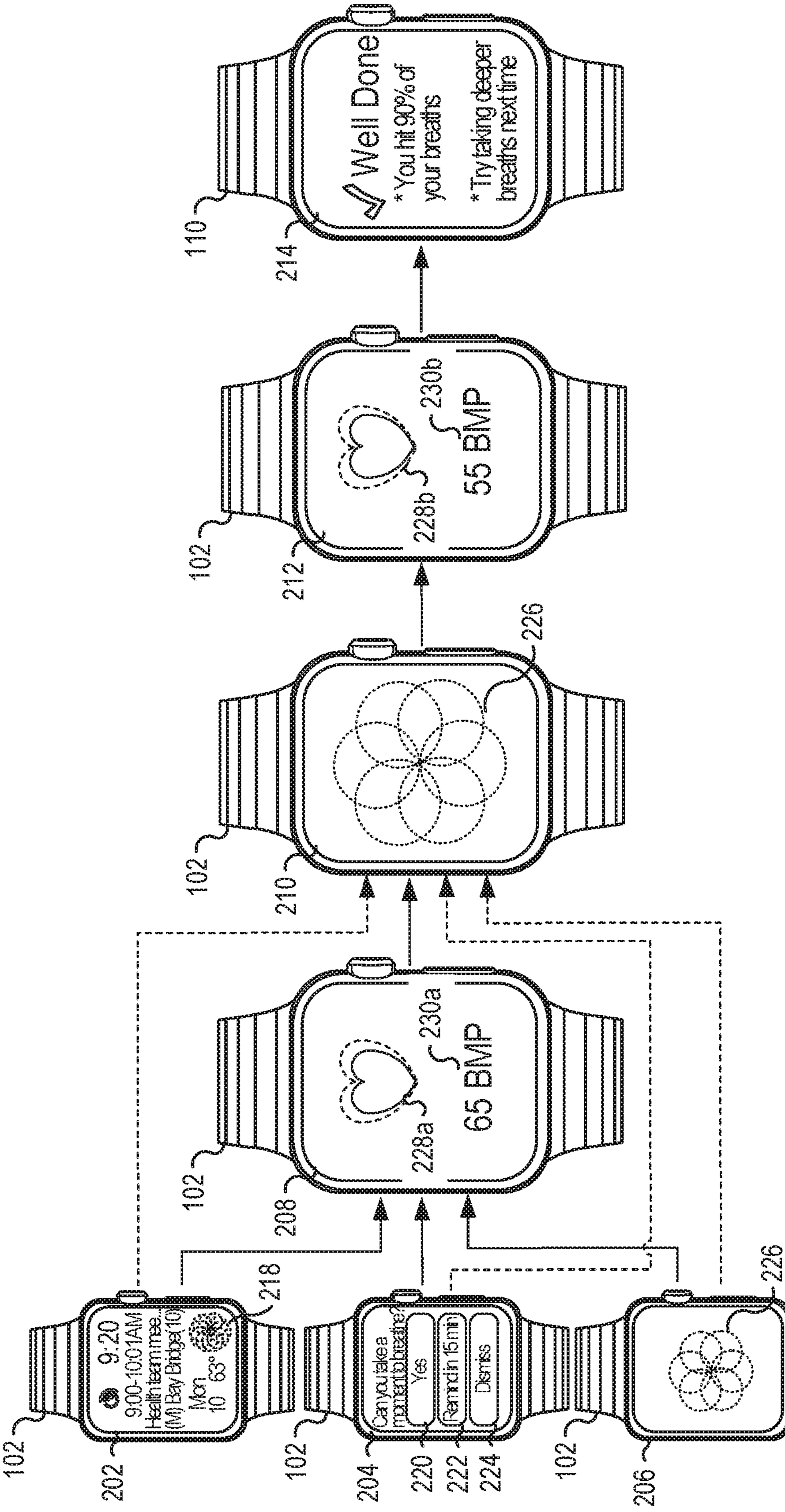
Well Done
* You hit 90% of your breaths
* Try taking deeper breaths next time
55 BMP
65 BMP
9:20
9:00-10:01AM
Health team mee...
(M) Bay Bridge(10)
Mon
10
63°
Can you take a moment to breathe?
Yes
Remind in 15 min
Dismiss
102
110
202
204
206
208
210
212
214
218
220
222
224
226
228a
228b
230a
230b

FIG. 2

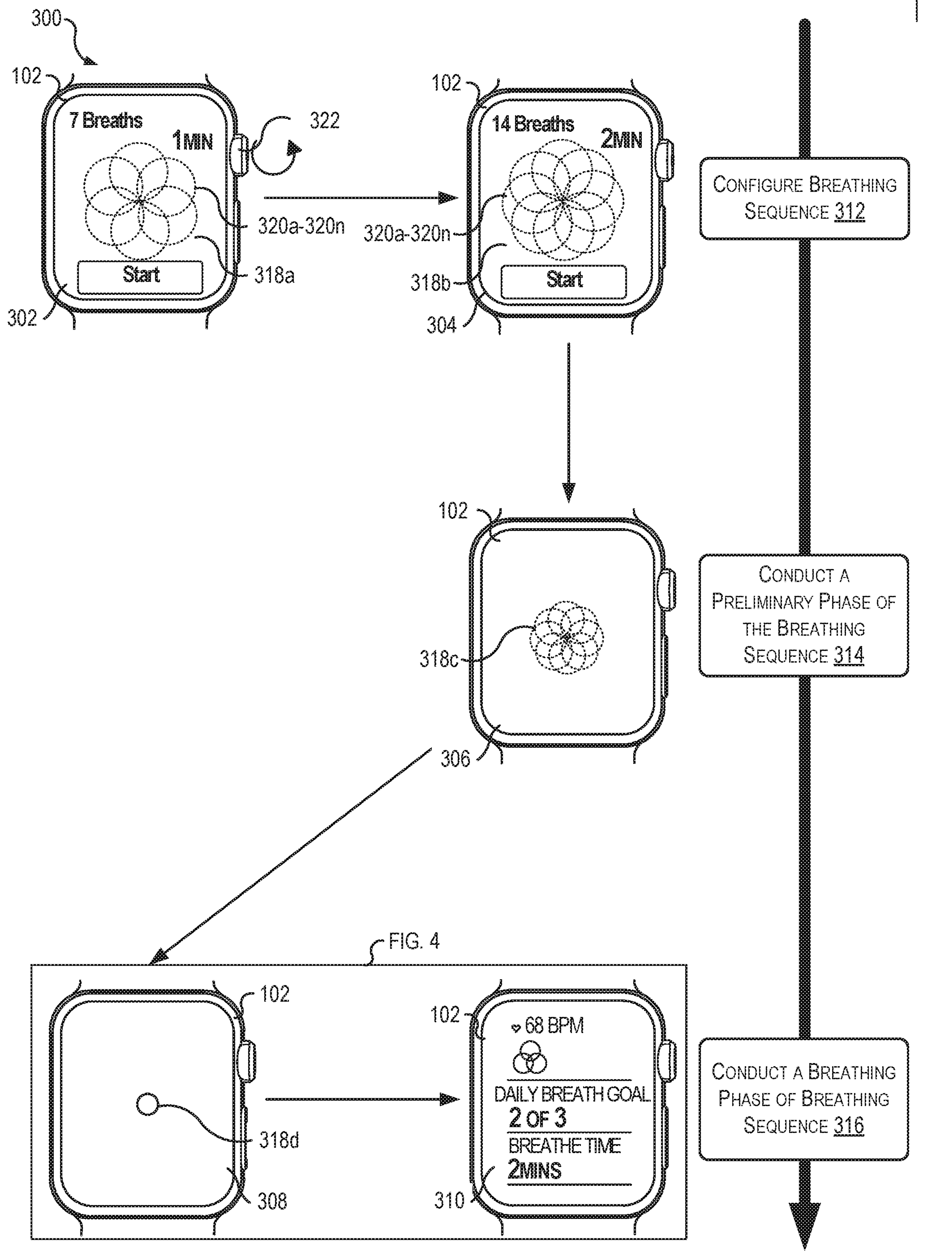
300
102
7 Breaths
1MIN
322
320a-320n
318a
Start
302
102
14 Breaths
2MIN
320a-320n
318b
Start
304
Configure Breathing Sequence 312
102
318c
306
Conduct a Preliminary Phase of the Breathing Sequence 314
FIG. 4
102
318d
308
102
68 BPM
DAILY BREATH GOAL
2 OF 3
BREATHE TIME
2MINS
310
Conduct a Breathing Phase of Breathing Sequence 316

FIG. 3

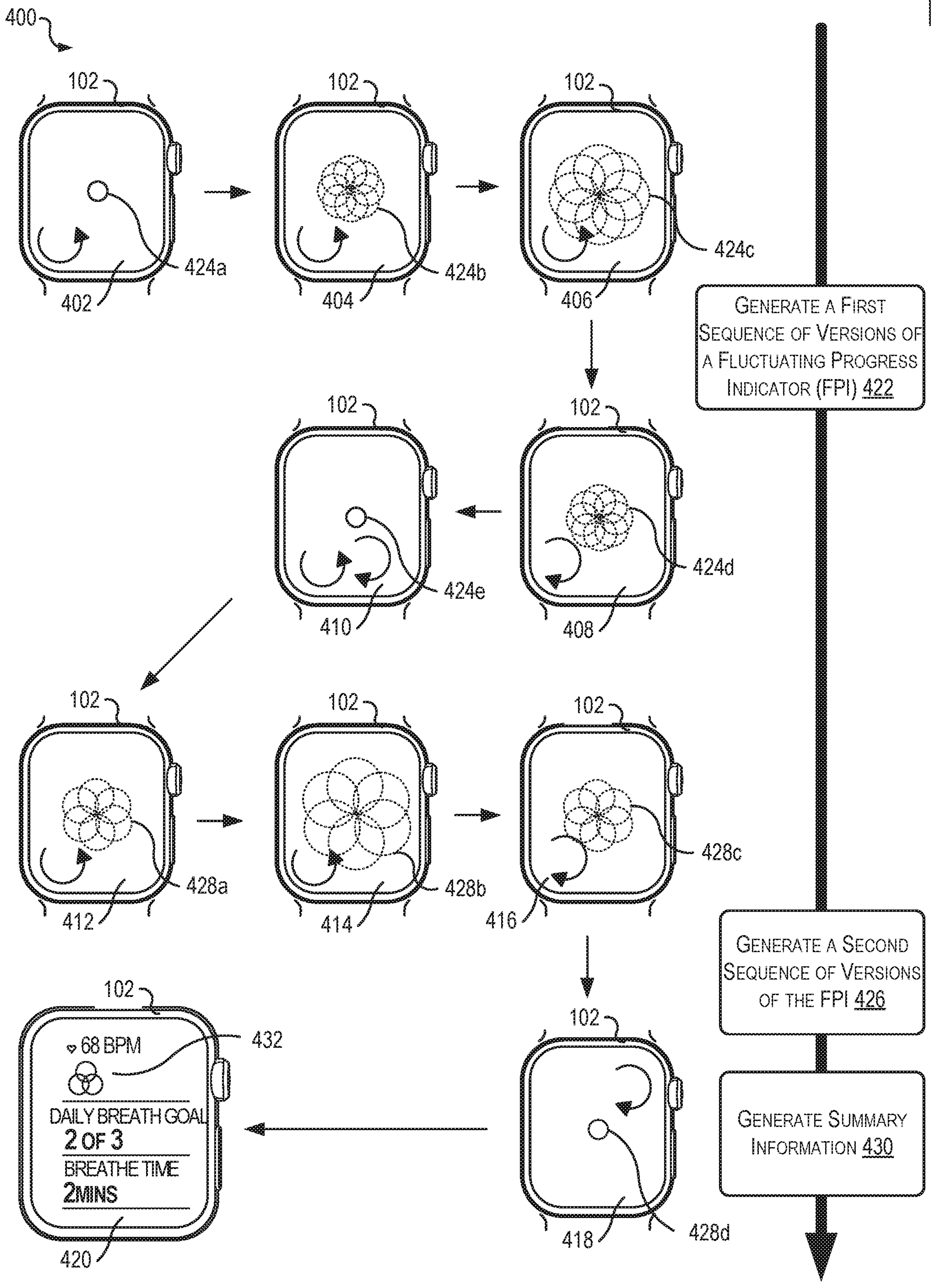
400
102
424a
402
424b
404
424c
406
Generate a First Sequence of Versions of a Fluctuating Progress Indicator (FPI) 422
424e
410
424d
408
428a
412
428b
414
428c
416
Generate a Second Sequence of Versions of the FPI 426
68 BPM
432
Daily Breath Goal
2 of 3
Breathe Time
2mins
420
Generate Summary Information 430
418
428d

FIG. 4

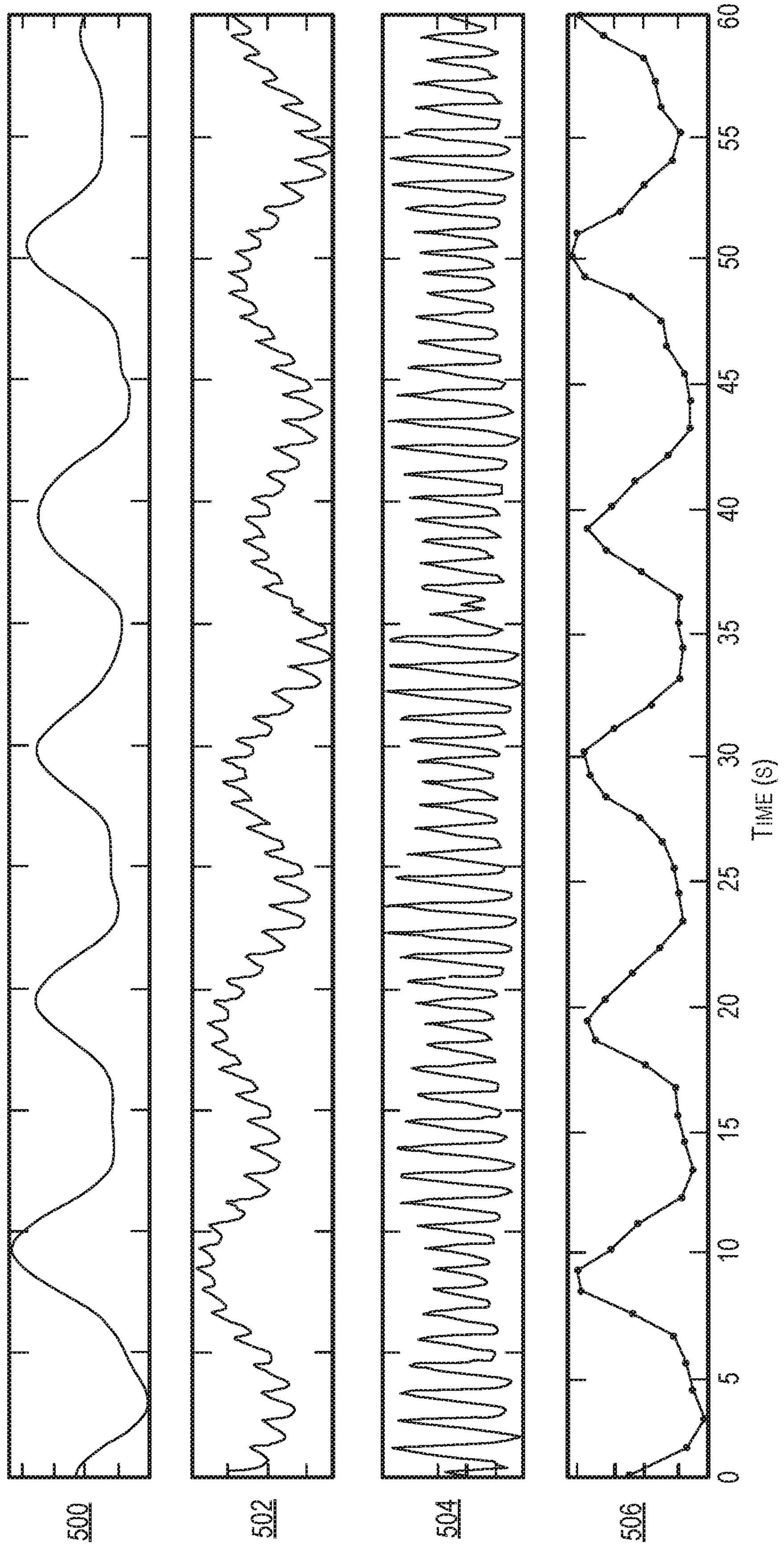

FIG. 5

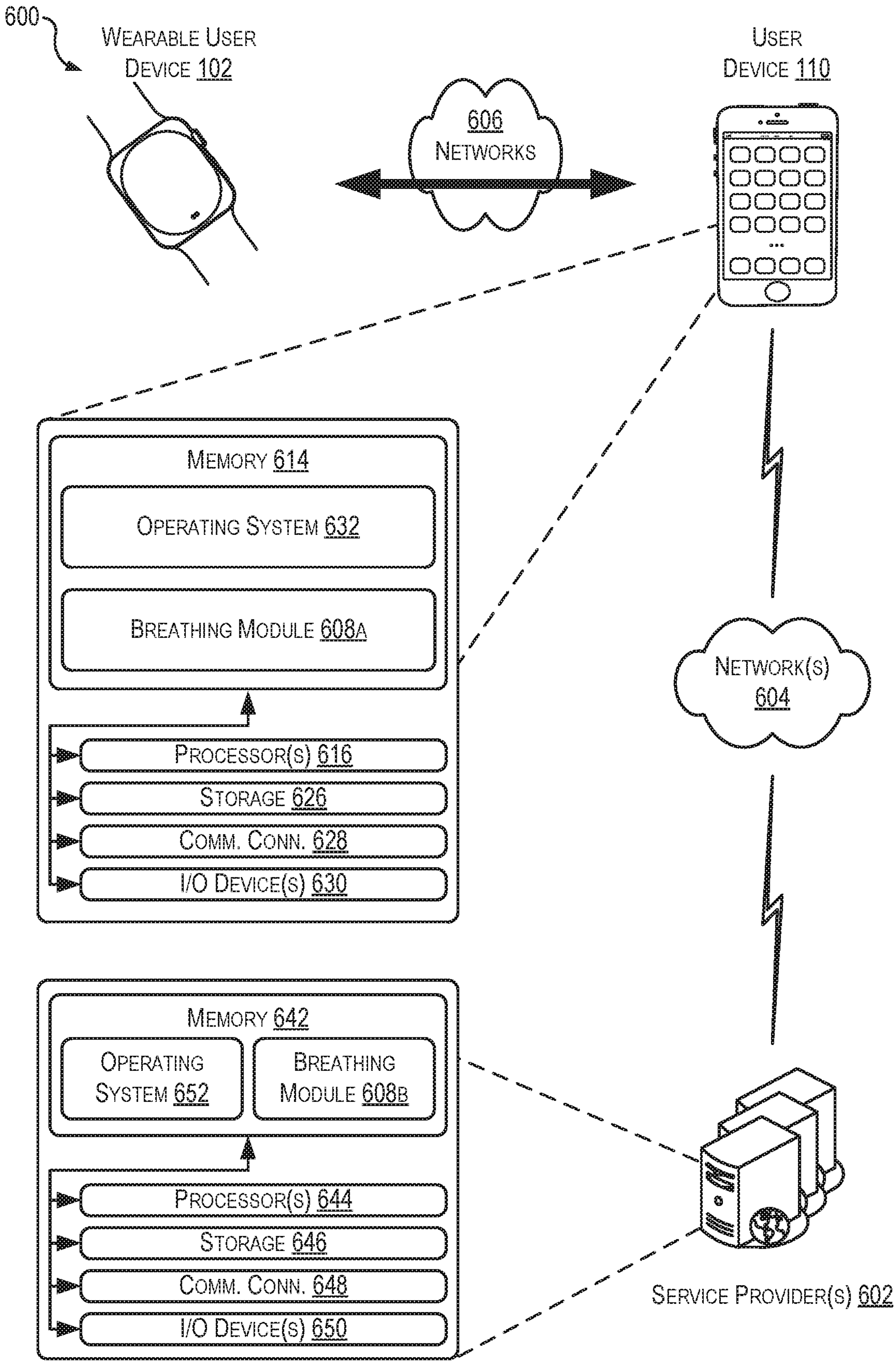
600
WEARABLE USER DEVICE 102
606 NETWORKS
USER DEVICE 110
MEMORY 614
OPERATING SYSTEM 632
BREATHING MODULE 608A
PROCESSOR(S) 616
STORAGE 626
COMM. CONN. 628
I/O DEVICE(S) 630
NETWORK(S) 604
MEMORY 642
OPERATING SYSTEM 652
BREATHING MODULE 608B
PROCESSOR(S) 644
STORAGE 646
COMM. CONN. 648
I/O DEVICE(S) 650
SERVICE PROVIDER(S) 602

FIG. 6

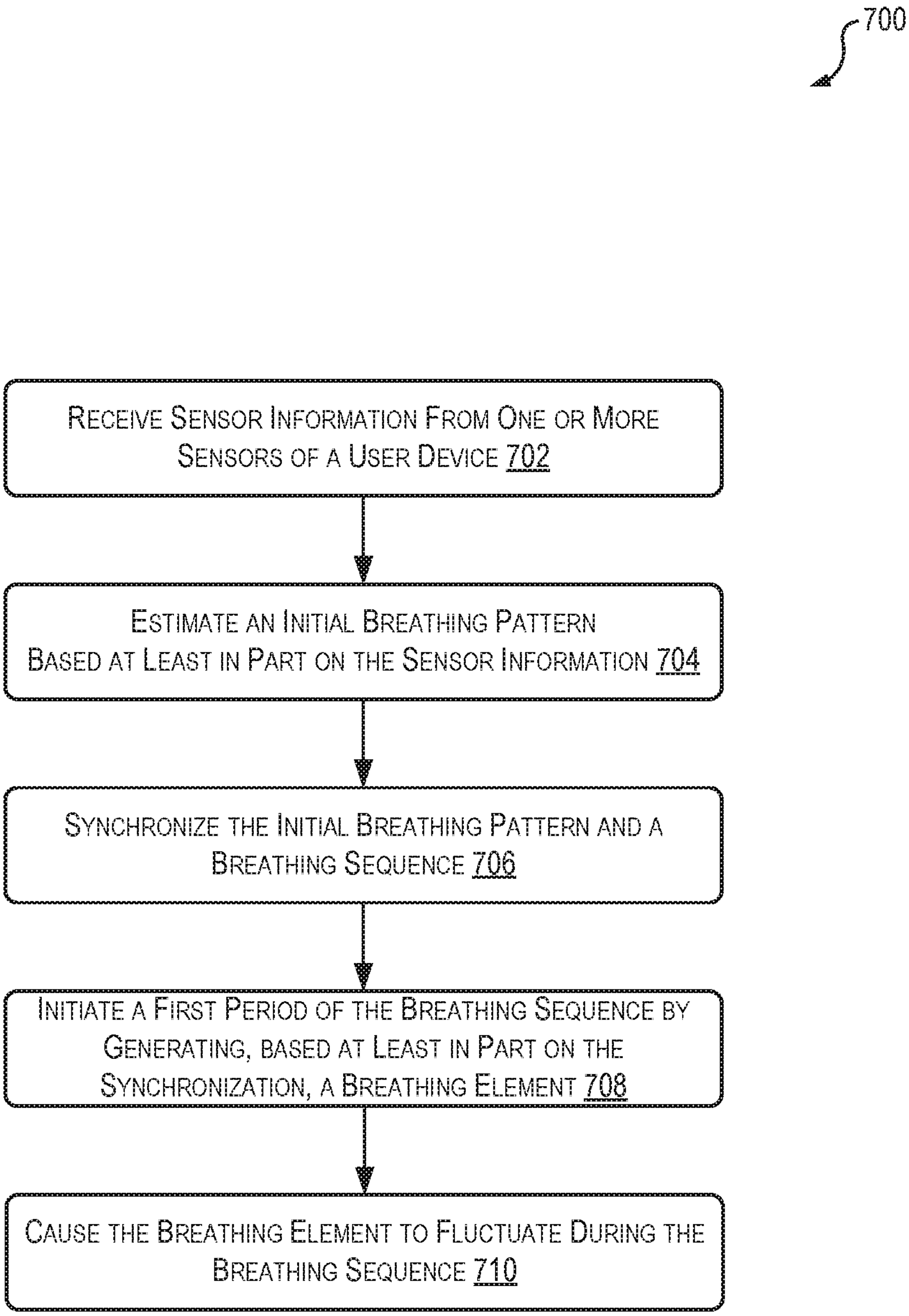
700
RECEIVE SENSOR INFORMATION FROM ONE OR MORE SENSORS OF A USER DEVICE 702
ESTIMATE AN INITIAL BREATHING PATTERN BASED AT LEAST IN PART ON THE SENSOR INFORMATION 704
SYNCHRONIZE THE INITIAL BREATHING PATTERN AND A BREATHING SEQUENCE 706
INITIATE A FIRST PERIOD OF THE BREATHING SEQUENCE BY GENERATING, BASED AT LEAST IN PART ON THE SYNCHRONIZATION, A BREATHING ELEMENT 708
CAUSE THE BREATHING ELEMENT TO FLUCTUATE DURING THE BREATHING SEQUENCE 710

FIG. 7

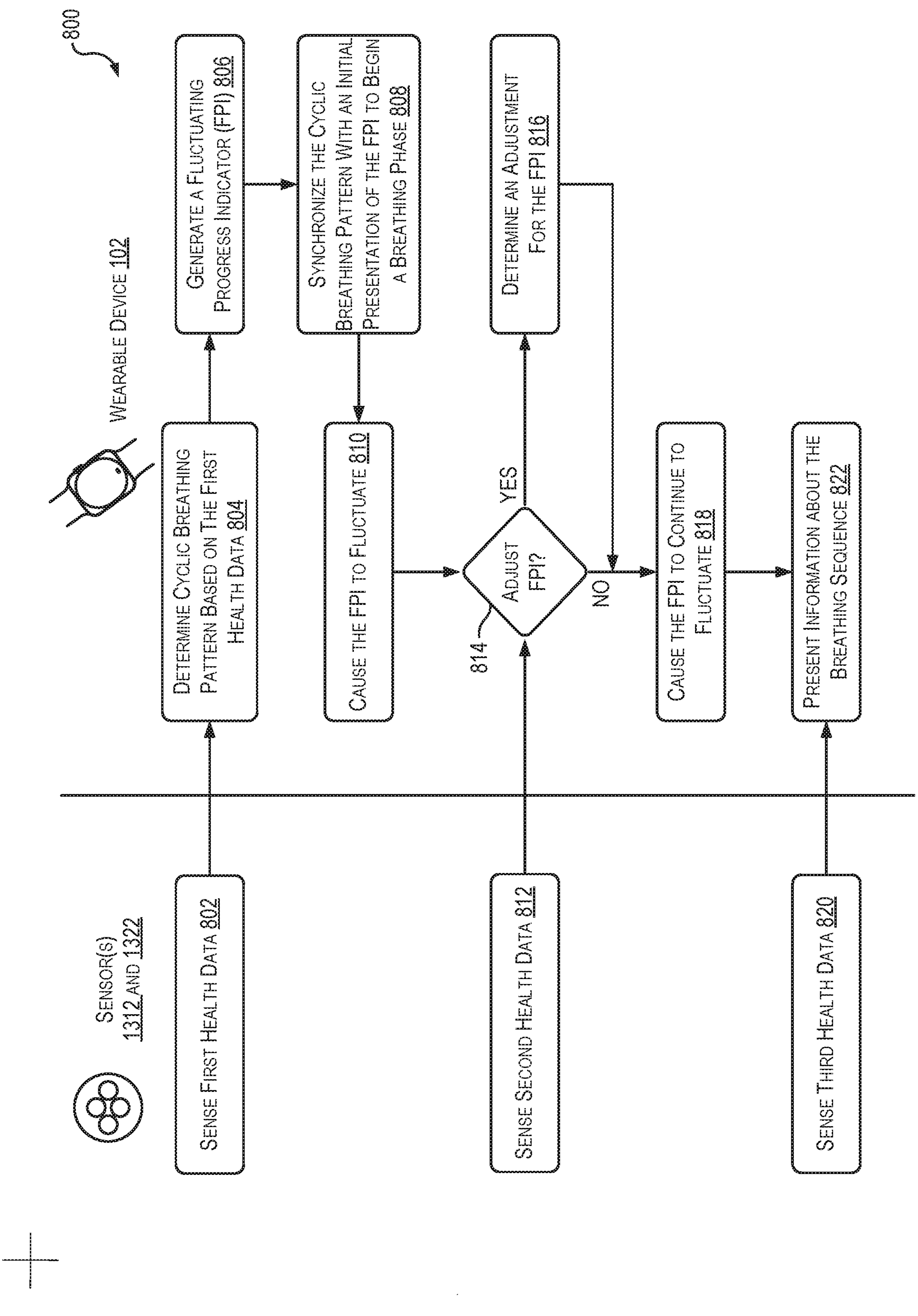
800
Wearable Device 102
Sensor(s)
1312 and 1322
Sense First Health Data 802
Determine Cyclic Breathing Pattern Based on The First Health Data 804
Generate a Fluctuating Progress Indicator (FPI) 806
Synchronize the Cyclic Breathing Pattern With an Initial Presentation of the FPI to Begin a Breathing Phase 808
Cause the FPI to Fluctuate 810
Sense Second Health Data 812
Adjust FPI?
814
YES
NO
Determine an Adjustment For the FPI 816
Cause the FPI to Continue to Fluctuate 818
Sense Third Health Data 820
Present Information About the Breathing Sequence 822

FIG. 8

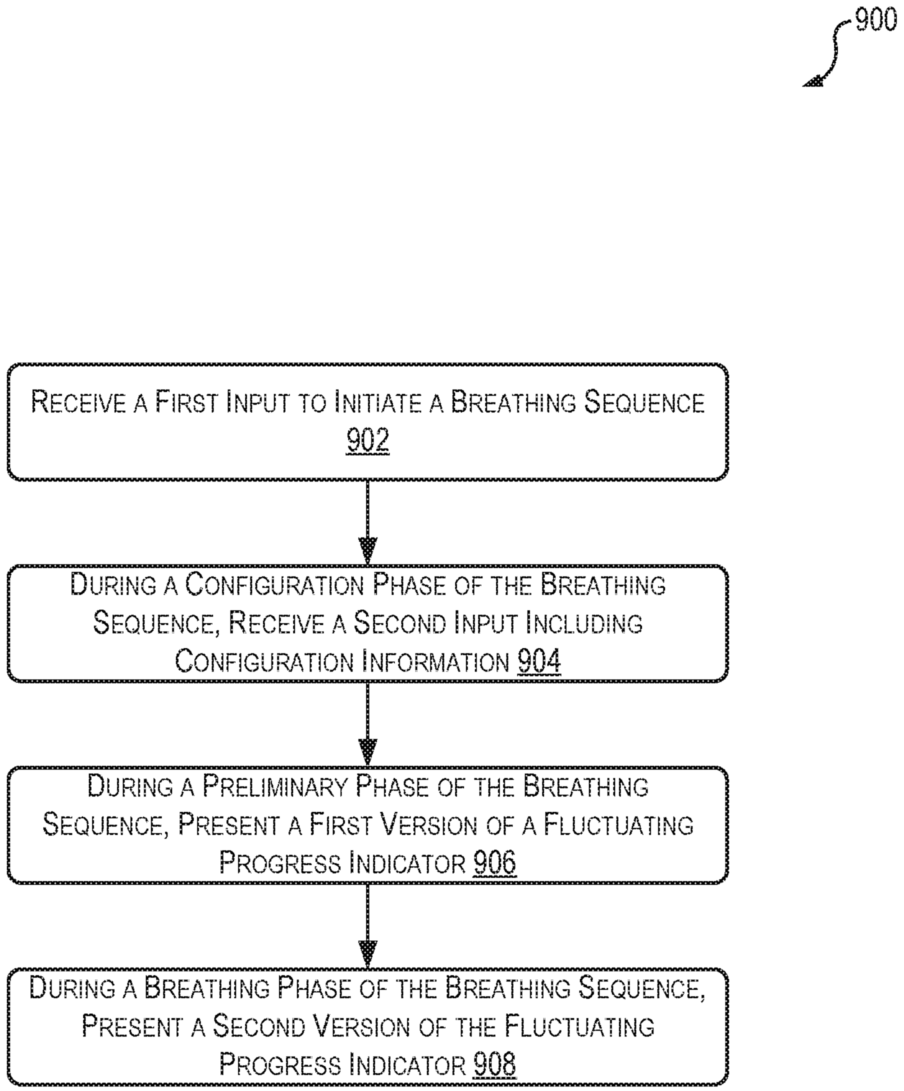
900
Receive a First Input to Initiate a Breathing Sequence 902
During a Configuration Phase of the Breathing Sequence, Receive a Second Input Including Configuration Information 904
During a Preliminary Phase of the Breathing Sequence, Present a First Version of a Fluctuating Progress Indicator 906
During a Breathing Phase of the Breathing Sequence, Present a Second Version of the Fluctuating Progress Indicator 908

FIG. 9

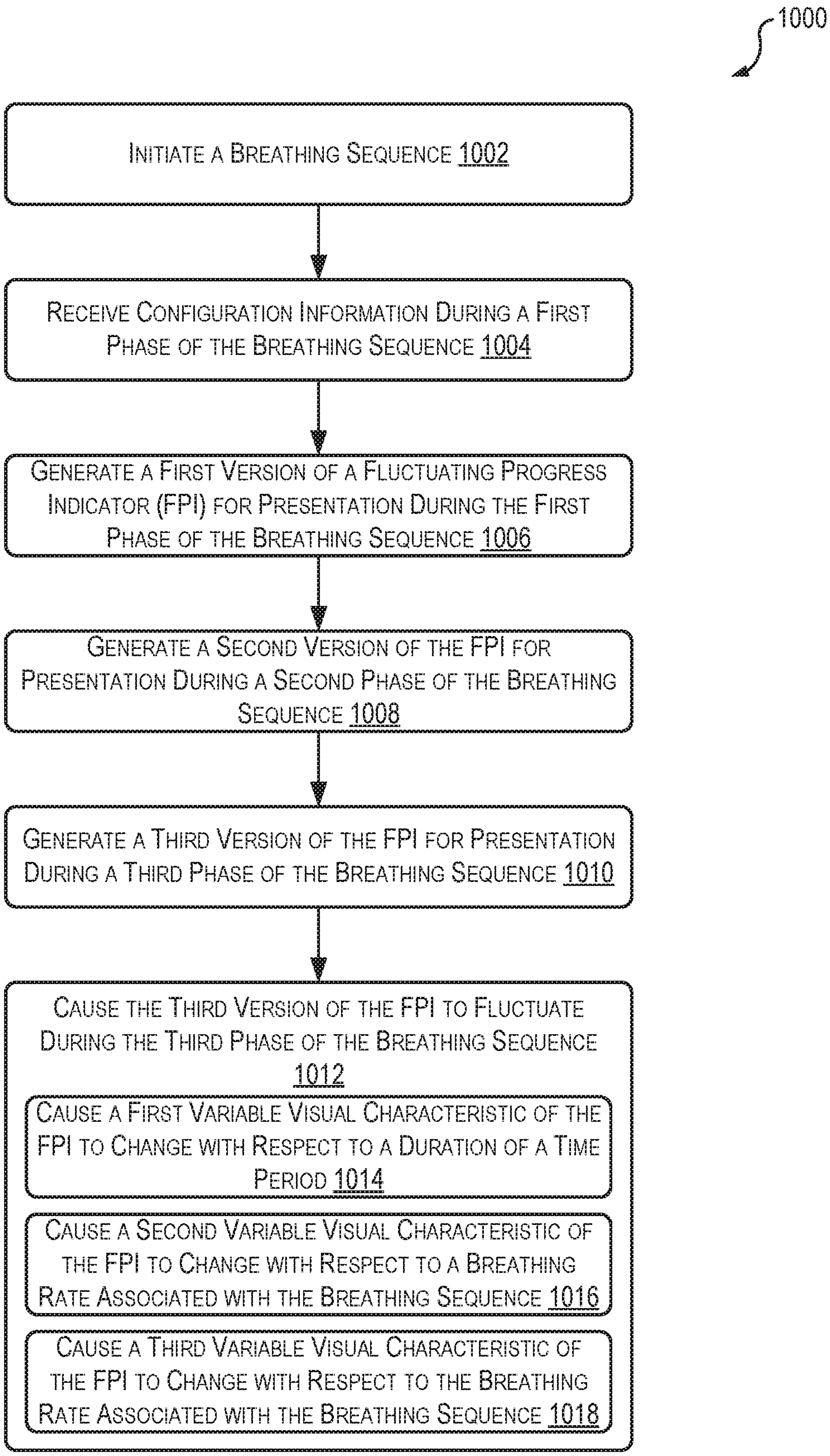
1000
INITIATE A BREATHING SEQUENCE 1002
RECEIVE CONFIGURATION INFORMATION DURING A FIRST PHASE OF THE BREATHING SEQUENCE 1004
GENERATE A FIRST VERSION OF A FLUCTUATING PROGRESS INDICATOR (FPI) FOR PRESENTATION DURING THE FIRST PHASE OF THE BREATHING SEQUENCE 1006
GENERATE A SECOND VERSION OF THE FPI FOR PRESENTATION DURING A SECOND PHASE OF THE BREATHING SEQUENCE 1008
GENERATE A THIRD VERSION OF THE FPI FOR PRESENTATION DURING A THIRD PHASE OF THE BREATHING SEQUENCE 1010
CAUSE THE THIRD VERSION OF THE FPI TO FLUCTUATE DURING THE THIRD PHASE OF THE BREATHING SEQUENCE 1012
CAUSE A FIRST VARIABLE VISUAL CHARACTERISTIC OF THE FPI TO CHANGE WITH RESPECT TO A DURATION OF A TIME PERIOD 1014
CAUSE A SECOND VARIABLE VISUAL CHARACTERISTIC OF THE FPI TO CHANGE WITH RESPECT TO A BREATHING RATE ASSOCIATED WITH THE BREATHING SEQUENCE 1016
CAUSE A THIRD VARIABLE VISUAL CHARACTERISTIC OF THE FPI TO CHANGE WITH RESPECT TO THE BREATHING RATE ASSOCIATED WITH THE BREATHING SEQUENCE 1018

FIG. 10

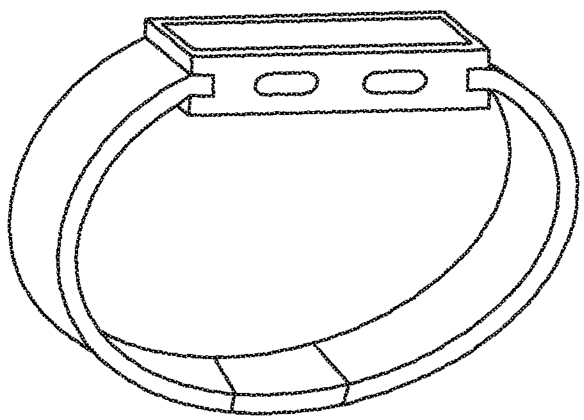

FIG. 11

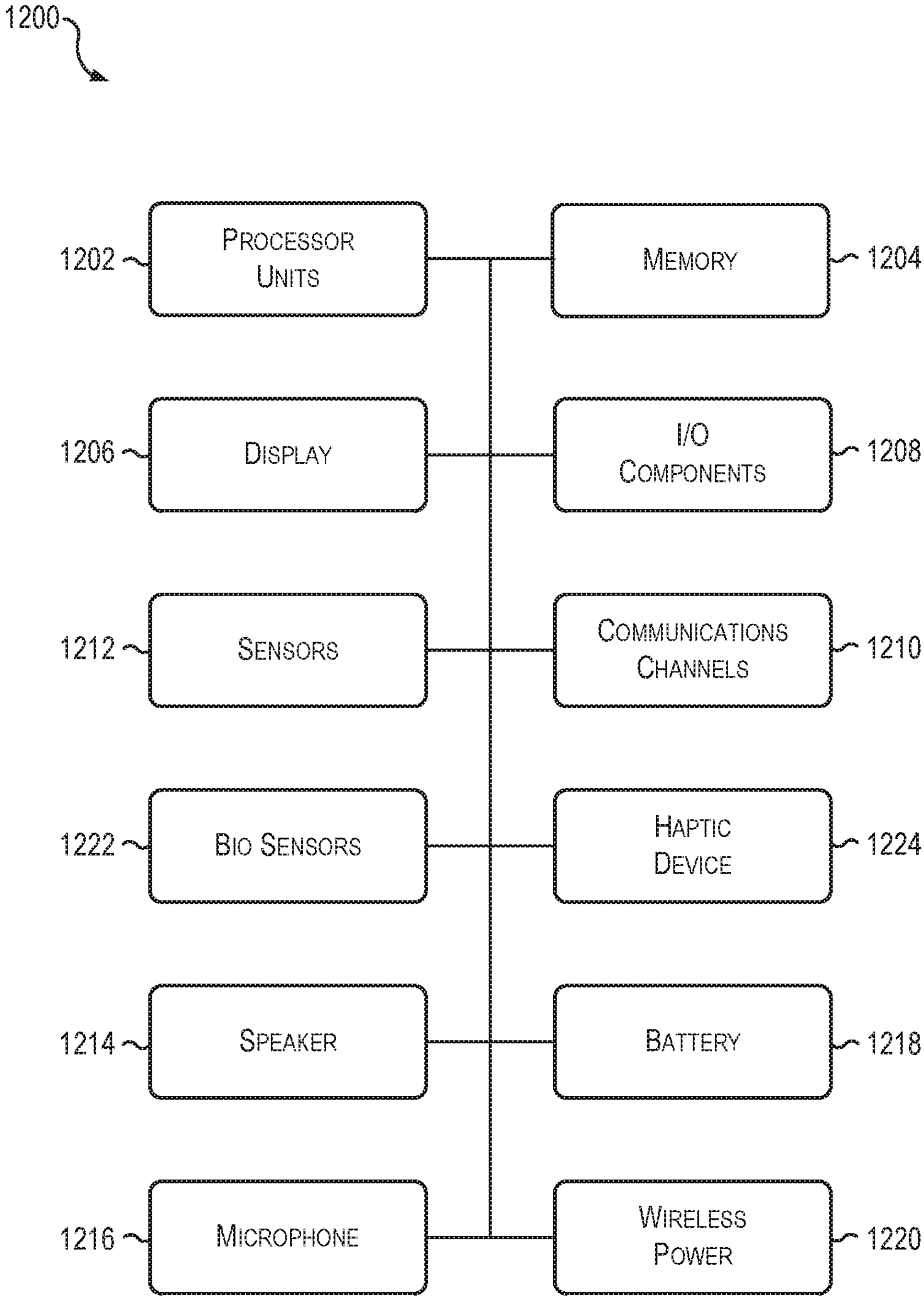
1200
1202
PROCESSOR UNITS
MEMORY
1204
1206
DISPLAY
I/O COMPONENTS
1208
1212
SENSORS
COMMUNICATIONS CHANNELS
1210
1222
BIO SENSORS
HAPTIC DEVICE
1224
1214
SPEAKER
BATTERY
1218
1216
MICROPHONE
WIRELESS POWER
1220

FIG. 12

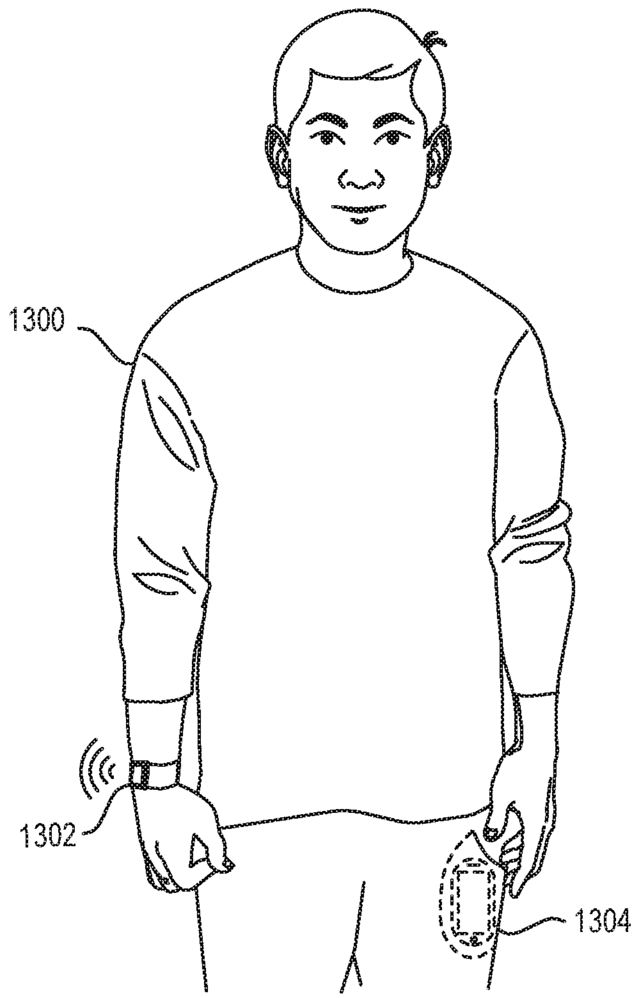

FIG. 13

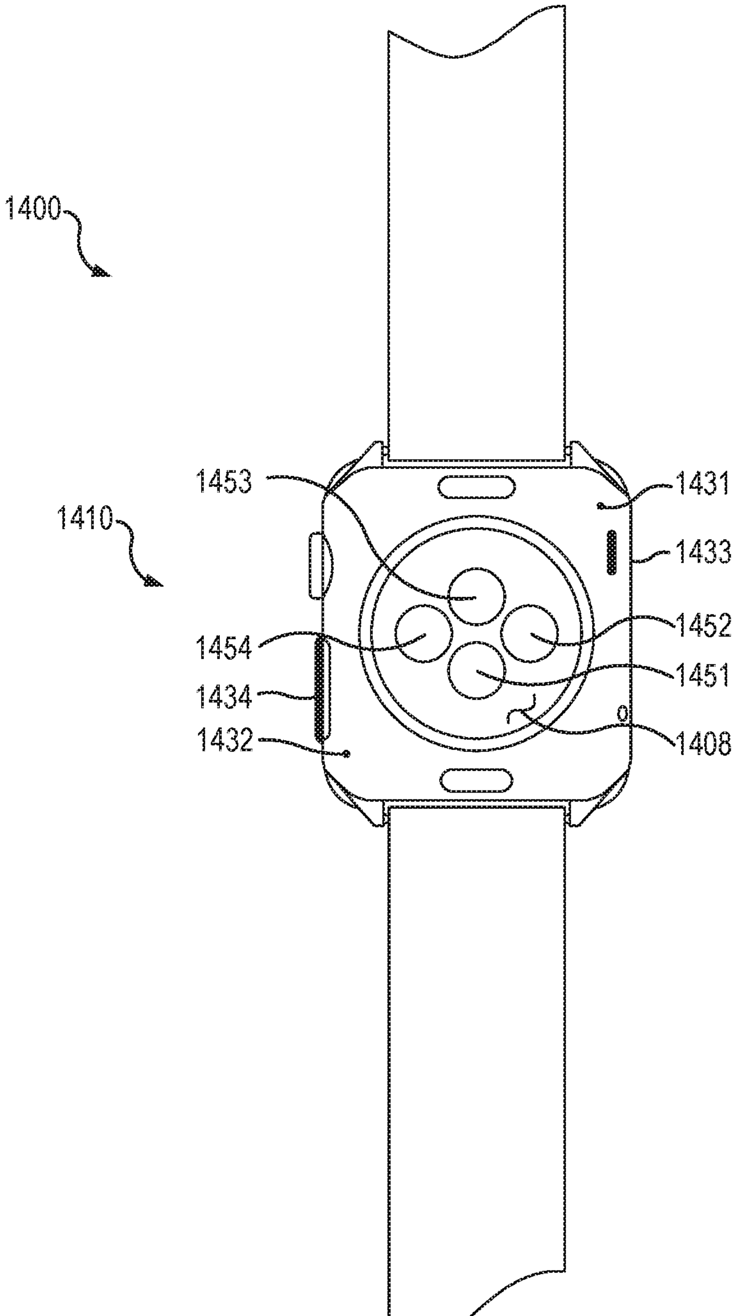

FIG. 14

FLUCTUATING PROGRESS INDICATOR

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] This application is related to and incorporates by reference for all purposes the full disclosure of co-pending U.S. Provisional Application Serial No. _________ entitled “Breathing Synchronization and Monitoring” (Attorney Docket No. 090911-P28954USP1-0958083) and U.S. Provisional Application Serial No. ________ entitled “Breathing Sequence User Interface” (Attorney Docket No. 77000-3000800 (P30535USP1)), both of which are filed concurrently herewith.

BACKGROUND

[0002] Breathing is a characteristic that all people share, and recently more and more information is becoming available about the positive impacts that sustained and thoughtful breathing can have on one’s health. Additionally, a variety of electronic devices are now available for tracking aspects of a person’s physical activity throughout the day. One way that sustained and thoughtful breathing can be achieved is by conducting periodic breathing exercises, perhaps with a breathing coach. Most people, however, do not have access to a breathing coach, or are otherwise untrained and/or unfamiliar with the proper breathing techniques for conducting breathing exercises. This can lead to frustration, ineffective use of breathing time, and ultimate abandonment of the breathing exercises.

BRIEF SUMMARY

[0003] Embodiments of the present disclosure can provide systems, methods, and computer-readable medium for initiating a breathing sequence. According to one embodiment, a method may be implemented by a computer system to at least receive a signal from one or more sensors of a user device. The signal may be representative of a user health metric. The method may also include estimating, based at least in part on the signal, an initial breathing pattern that includes a cyclic pattern. The method may also include initiating a breathing sequence to begin a first period of the breathing sequence by generating a breathing sequence element that identifies a suggested breathing pattern based at least in part on a synchronization between the breathing sequence and the cyclic pattern. The method may also include causing the breathing sequence element to fluctuate during a second period of the breathing sequence in accordance with a breathing profile to at least indicate the suggested breathing pattern.

[0004] According to one embodiment, a computer system may include a memory configured to store computer-executable instructions, and a processor in communication with the memory configured to execute the computer-executable instructions. In some examples, execution of the computer-executable instructions by the processor may cause the processor to perform operations include receiving an indication to initiate a breathing sequence. The operations may also include, in response to receiving the indication, estimating an initial cyclic breathing pattern while a user is wearing a user device. The operations may also include initiating a first period of the breathing sequence by generating, based at least in part on a synchronization of the breathing sequence and the initial cyclic breathing pattern, a fluctuating progress indicator that identifies the breathing sequence. The operations may also include providing one or more breathing cues during a second period of the breathing sequence by at least changing the fluctuating progress indicator in accordance with a breathing profile associated with the breathing sequence.

[0005] According to one embodiment, one or more computer-readable medium storing computer-executable instructions that, when executed by a processor, configure the processor to perform operations including receiving a signal from one or more sensors of a user device. The operations may also include estimating, based at least in part on the signal, an initial breathing pattern that comprises a cyclic pattern. The operations may also include executing a breathing sequence that includes a suggested breathing pattern by at least: generating, based at least in part on a synchronization of a first suggested breath of the breathing sequence and the cyclic pattern, a breathing sequence element that initiates a first period of the breathing sequence, and causing the breathing sequence element to fluctuate during a second period of the breathing sequence in accordance with the suggested breathing pattern.

[0006] Embodiments of the present disclosure can provide systems, methods, and computer-readable medium for conducting a breathing sequence. According to one embodiment, a method may be implemented by a computer system to at least receive a first input at a user interface of a device to initiate a breathing sequence. The method may also include, during a configuration phase of the breathing sequence, receiving a second input at the user interface including configuration information corresponding to the breathing sequence. In some examples, at least a part of the configuration information may define a variable time period for the breathing sequence. The method may also include, during a preliminary phase of the breathing sequence, presenting a first version of a fluctuating progress indicator on the user interface. In some examples, the fluctuating progress indicator may include a plurality of variable visual characteristics. The fluctuating progress indicator may be configured to fluctuate at a first cyclic rate that is determined by an estimated breathing pattern. The method may also include, during a breathing phase of the breathing sequence occurring subsequent to the preliminary phase, presenting a second version of the fluctuating progress indicator on the user interface. In some examples, the second version of the fluctuating progress indicator may fluctuate at a second cyclic rate different than the first cyclic rate. The second cyclic rate may be determined by the defined variable time period.

[0007] According to one embodiment, a system for enabling a breathing exercise including a breathing sequence may be provided. The system may include a memory configured to store computer-executable instructions, an input component, a processor in communication with the memory configured to execute the computer-executable instructions, and a display. The display may be configured to present a first graphical user interface during a configuration phase of the breathing sequence in response to an input received at the input component. In some examples, the graphical user interface may include configuration information corresponding to the breathing sequence. In some examples, at least a part of the configuration information may define a variable time period for the breathing sequence. The display also may be configured to present a second graphical user interface during a preliminary phase of the breathing sequence. In some examples, the second graphical user interface may present a first version of a fluctuating progress indicator on the second graphical user interface. In some examples, the fluctuating progress indicator may include a plurality of variable visual characteristics. The fluctuating progress indicator may fluctuate at a first cyclic rate. The first cyclic rate that may be determined by an estimated breathing pattern. The display also may be configured to present a third graphical user interface during a breathing phase of the breathing sequence occurring subsequent to the preliminary phase. The third graphical user interface may present a second version of the fluctuating progress indicator on the third graphical user interface. In some examples, the second version of the fluctuating progress indicator may fluctuate at a second cyclic rate different than the first cyclic rate. The second cyclic rate may be determined by the defined variable time period.

[0008] According to one embodiment, one or more computer-readable medium storing computer-executable instructions that, when executed by a processor, configure the processor to perform operations including receiving a request to begin a breathing sequence. In some examples, the breathing sequence may be configured to occur for a variable time period. The operations also may include presenting, during a configuration phase of the breathing sequence, a fluctuating progress indicator that represents a suggested breathing pattern for the user for the breathing sequence. In some examples, the fluctuating progress indicator may include a set of variable visual elements and may be configured to change from an initial version to a final version as time progresses during the variable time period. The operations also may include presenting the initial version of the fluctuating progress indicator corresponding to an initial period of the variable time period of the breathing sequence. In some examples, the initial version of the fluctuating progress indicator may have an initial subset of variable visible elements of the set of variable visible elements. The operations also may include presenting, in accordance with a suggested breathing rate, one or more additional versions of the fluctuating progress indicator corresponding to one or more additional periods of the variable time period. In some examples, the one or more additional versions of the fluctuating progress indicator may have progressively fewer variable visible elements than included in the initial subset of variable visible elements. The operations also may include presenting the final version of the fluctuating progress indicator corresponding to a final period of the breathing sequence. In some examples, the final version of the fluctuating progress indicator may have a final subset of variable visible elements of the set of variable visible elements.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 illustrates a simplified block diagram depicting an example flow for conducting breathing sequences as described herein, according to at least one example.

[0010] FIG. 2 illustrates a user device that includes example graphical user interfaces depicting user interface elements for implementing techniques relating to conducting breathing sequences as described herein, according to at least one example.

[0011] FIG. 3 illustrates a simplified block diagram depicting an example flow and example graphical user interfaces depicting user interface elements for implementing techniques relating to conducting breathing sequences as described herein, according to at least one example.

[0012] FIG. 4 illustrates a simplified block diagram depicting an example flow and example graphical user interfaces depicting user interface elements for implementing techniques relating to conducting breathing sequences as described herein, according to at least one example.

[0013] FIG. 5 illustrates a plurality of graphs depicting user health data relating to conducting breathing sequences as described herein, according to at least one example.

[0014] FIG. 6 illustrates a simplified block diagram including an example architecture for conducting breathing sequences as described herein, according to at least one example.

[0015] FIG. 7 illustrates a flowchart of a method of conducting a breathing sequence as described herein, according to at least one example.

[0016] FIG. 8 illustrates another flowchart of a method of conducting a breathing sequence as described herein, according to at least one example.

[0017] FIG. 9 illustrates another flowchart of a method of conducting a breathing sequence as described herein, according to at least one example.

[0018] FIG. 10 illustrates another flowchart of a method of conducting a breathing sequence as described herein, according to at least one example.

[0019] FIG. 11 illustrates an electronic device for conducting breathing sequences as described herein, according to at least one example.

[0020] FIG. 12 illustrates a simplified block diagram including components of an example electronic device for conducting breathing sequences as described herein, according to at least one example.

[0021] FIG. 13 illustrates a simplified diagram including example electronic devices for conducting breathing sequences as described herein, according to at least one example.

[0022] FIG. 14 illustrates an electronic device for conducting breathing sequences as described herein, according to at least one example.

DETAILED DESCRIPTION OF THE INVENTION

[0023] In the following description, various examples will be described. For purposes of explanation, specific configurations and details are set forth in order to provide a thorough understanding of the examples. However, it will also be apparent to one skilled in the art that the examples may be practiced without the specific details. Furthermore, well-known features may be omitted or simplified in order not to obscure the example being described.

[0024] Examples of the present disclosure are directed to, among other things, methods, systems, and computer-readable media for conducting breathing sequences using electronic devices. Initially, this can include collecting user health data using one or more sensors of an electronic device, and analyzing the user health data to identify an initial breathing pattern. The initial breathing pattern can be synchronized with a breathing sequence. The breathing sequence can begin with an initial presentation of a breathing cue. The breathing cue (and other breathing cues) can function to guide a user through the breathing sequence and can include visual cues, audible cues, and/or haptic cues. The synchronization of the initial breathing pattern and the breathing sequence may be done in a way that helps the user smoothly transition her initial breathing pattern into the breathing sequence. For example, the initial presentation of the breathing cue can be synchronized with a user breath event such as a user inhale cycle or a user exhale cycle.

[0025] In some examples, the breathing cue discussed above can be a visual breathing cue. Such visual breathing cues can be represented by a user interface element in the form of a fluctuating progress indicator that is generated and presented to the user at the electronic device. The fluctuating progress indicator can be defined as having one or more variable visual characteristics (e.g., complexity, alignment, visibility, etc.) that can change over the course of the breathing sequence. Changes in complexity of the fluctuating progress indicator can inform the user of her progress through the breathing sequence. For example, at the beginning of the breathing sequence, the fluctuating progress indicator can include a number of user interface elements (e.g., circular rings, ovular rings, squares, etc.) arranged in a pattern. As the user progresses through the breathing sequence, the number of user interface elements can be reduced. Thus, at completion of the breathing sequence, the fluctuating progress indicator may have changed in complexity (e.g., fewer user interface elements and/or a less complex arrangement of user interface elements). Changes in alignment and visibility of the fluctuating progress indicator can also take place during the breathing sequence and can function as visual breathing cues for the user. For example, the fluctuating progress indicator can be configured to grow while rotating clockwise to signal the user to inhale. The fluctuating progress indicator also can be configured to shrink while rotating counterclockwise to signal the user to exhale. At the conclusion of the breathing exercise, summary information (e.g., quantitative and/or qualitative) may be presented.

[0026] FIG. 1 illustrates a simplified flow diagram depicting process 100 for conducting breathing sequences, in accordance with at least one example. The process 100 depicts a wearable device 102 configured with one or more sensors for collecting health data 104 of a user 106. The health data 104 can include any suitable data relating to the health of the user 106. In some examples, the wearable device 102 may be configured to capture health data 104 from the user 106. Such health data may indicate, for the user 106, a pulse rate, a heart rate, a heart rate variability measure, temperature data, a number of steps, an amount of time standing and sitting, a number of calories burned, a number of minutes exercised, and/or any other suitable data. The wearable device 102 may also be configured with one or more input devices by which the user 106 can interact with the wearable device 102. The wearable device 102 may also be configured with one or more output devices to output any suitable output information 108. For example, as illustrated in FIG. 1, the wearable device 102 may be configured to output visual information 108a, audio information 108b, and/or haptic information 108c. In some examples, the output information 108 can be presented to the user 106 in a manner that directs the user 106 to perform one or more actions relating to breathing. For example, the output information 108 can include a fluctuating progress indicator (e.g., a type of the visual information 108a). The fluctuating progress indicator can be presented on a graphical user interface of the wearable device 102 and configured to lead the user 106 through a series of breathing exercises included in a breathing sequence, as further described herein. The output information 108 may be presented by an application running on the wearable device 102.

[0027] The wearable device 102 may be associated with an electronic device 110 (e.g., a host device). In some examples, this may include the wearable device 102 being paired with the electronic device 110 in any suitable manner. Pairing of the two devices 102 and 110 may enable the electronic device 110 to function as a proxy for the wearable device 102. The wearable device 102, the electronic device 110, or any suitable combination of the wearable device 102 and the electronic device 110 may generate the output information 108 based, at least in part, on the health data 104.

[0028] The process 100 may begin at 112 by the wearable device 102 collecting the health data 104. As introduced herein, the health data 104 may be collected using one or more sensors of the wearable device 102. At 114, the electronic device 110 determines respiratory measures based at least in part on the health data 104. The respiratory measures can include, for the user 106, a breathing pattern (e.g., a cyclic pattern of inhale breaths and exhale breaths), a breathing rate (e.g., a number of full breaths taken during a time period), a breath ratio (e.g., a comparison of time allocated to inhale breaths compared to exhale breaths), and any other related measure. Using the respiratory measures, the electronic device 110 can generate a breathing element. The breathing element is an example of the output information 108. At 118, the wearable device 102 can present the breathing element to lead a breathing sequence. For example, the breathing element can be a fluctuating progress indicator, various versions of which can be presented on a graphical user interface of the wearable device 102 to lead the user 106 in the breathing sequence. In some examples, any of the process 100 may be performed on the wearable device 102 and/or in combination a service provider which can be in communication with the electronic device 110 and/or the wearable device 102 via one or more networks. For example, the service provider may perform acts 114 and 116.

[0029] FIG. 2 illustrates the wearable device 102 that includes graphical user interfaces 202-214 depicting user interface elements relating to conducting breathing sequences as described herein, according to at least one example. Specifically, the graphical user interfaces 202-206 are examples of user interfaces that may be presented on a display of the wearable device 102 and/or on a display of the electronic device 110 as part of initiating a breathing sequence. While, the graphical user interfaces 208-214 are examples of user interfaces that may be more suitable for presentation on the display of the wearable device 102 as part of conducting a breathing sequence. As described herein, the display of the wearable device 102 can be touch sensitive and/or pressure sensitive. In this manner, the display can function as an input component for receiving user input.

[0030] The graphical user interface 202 may represent a home screen of the wearable device 102. Thus, general information such as the date, time of day, temperature, and other such general information on the graphical user interface 202 may be presented. Additionally, other information such as calendar items (e.g., "Health Team Meeting") and/or miniaturized versions of a fluctuating progress indicator 218 may be presented on the graphical user interface 202. In some examples, selection of the miniaturized version of the fluctuating progress indicator 218 may cause the wearable device 102 to initiate a breathing sequence. In some examples, the selection is received as user input at the display of the wearable device 102.

[0031] The graphical user interface 204 may represent a notification that can be generated locally on the wearable device 102, or may be provided to the wearable device 102 from some other device (e.g., the electronic device 110 and/or a service provider). The notification, in this example, requests whether a user of the wearable device 102 would like to participate in a breathing sequence (e.g., "Can you take a moment to breathe?"). If the user selects user interface element 220 ("Yes"), the breathing sequence may begin and the graphical user interface 208 may be presented on the wearable device 102. If the user selects user interface element 222 ("Remind in 15 Min"), the notification may be dismissed for a period of time and then a second notification may be sent after the period of time has passed. If the user selects user interface element 224 ("Dismiss"), the notification may be dismissed and the breathing sequence will not begin at this point in time. Even though the user may "dismiss" the notification, other notifications may be sent on the same day based on other inputs that prompt other notifications.

[0032] The graphical user interface 204 including the notification can be presented in response to any suitable input, information, or event. For example, the wearable device 102 may access calendar information associated with the user of the wearable device 102 in order to determine an appropriate time (e.g., a "free time") that may be good for breathing (e.g., a block of time with no scheduled events). The calendar information may also indicate a scheduled event related to breathing (event entitled "Time to Breath"). In which case, the graphical user interface 204 may be presented in accordance with the time and date of the scheduled event. The wearable device 102 may also access the calendar information to determine details about upcoming events in order to determine whether a breathing sequence could be helpful before the events. For example, the graphical user interface 204 may be presented a few minutes before meetings in order to help the user calm and prepare for the upcoming meetings. The determination of which meetings and when to present the graphical user interface 204 may be based on configuration information (e.g., if the user has indicated that they want to breath before all meetings, that they want to breath before all meetings with more than five participants, that they want to breath before all meetings with a particular person, and/or based at least in part on information learned from behaviors (e.g., the user regularly, occasionally, or always goes through a breathing sequence before certain meetings or at certain times).

[0033] The wearable device 102 may also receive sensor data from one or more sensors of the wearable device 102, which may be used to infer an appropriate time to present the graphical user interface 204. For example, the sensor data can include motion information that indicates whether the wearable device 102 (and a user) is moving. If the wearable device 102 is moving at a pace similar to walking, then perhaps the user would not be interested in participating in a breathing sequence. However, if the wearable device 102 is moving at a quicker pace, then perhaps the user is driving and may be interested in participating in the breathing sequence. The sensor data may also include user health data that indicates one or more health metrics of the user. For example, if the user health data indicates an elevated heart rate, the graphical user interface 204 may be presented. Participating in the breathing sequence may assist the user in reducing her heart rate. The user health data may also be used to infer aspects of user breath events, and the graphical user interface 204 may be presented in response to detection of a sequence of particular breath events. For example, if the user takes three deep breaths, the wearable device 102 may determine and/or infer that the user desires to participate in a breathing sequence, and may therefore present the graphical user interface 204.

[0034] The graphical user interface 206 may include a fluctuating progress indicator 226. The fluctuating progress indicator 226 may be presented on the display as part of the graphical user interface 206, and if selected, may initiate a breathing sequence. In some examples, the fluctuating progress indicator 226 may be presented on the display as part of the graphical user interface 206 in response to a user of the wearable device 102 performing certain actions with respect to the wearable device 102 (e.g., lifting the wearable device 102, viewing the wearable device 102, and the like), randomly, or according to some interval. In some examples, presentation of the fluctuating progress indicator 226 on the graphical user interface 206 may function as a subtle reminder to the user to participate in a breathing sequence.

[0035] In some examples, the graphical user interface 208 may be presented on the display in response to input received after presentation of one of the graphical user interfaces 202-206. The input may indicate initiation of a breathing sequence. In this manner, the graphical user interface 208 may be the first graphical user interface presented as part of conducting the breathing sequence. In some examples, during a preliminary phase of the breathing sequence, the graphical user interface 208 may be presented on the display. The graphical user interface 208 may include a heart user interface element 228a and a heart metric 230a. The heart user interface element 228a may pulsate on the display during the preliminary phase. In some examples, the heart user interface element 228a may pulsate in a manner that corresponds to a heartrate of the user of the wearable device 102. For example, one or more sensors may collect heartrate data, and the wearable device 102 may cause the heart user interface element 228a to pulsate in accordance with the heartrate data. Similarly, the heart metric 230a may correspond to the heartrate of the user. Other user interface elements and metrics may also be presented.

[0036] During the preliminary phase and while the display includes the graphical user interface 208, the wearable device 102 may also be receiving signal data from the one or more sensors of the wearable device 102. Based at least in part on the signal data, the wearable device 102 may estimate an initial breathing pattern corresponding to the user of the wearable device 102. The initial breathing pattern may be a cyclic pattern of breath events and times corresponding to the breath events. For example, the cyclic pattern may include a series of inhale breath events and a series of exhale breath events. In some examples, the preliminary phase may continue at least until the wearable device 102 is able to estimate the initial breathing pattern or may continue for a fixed time or until a fixed number of breaths have been identified.

[0037] Estimating the initial breathing pattern may be useful to determining when to present the graphical user interface 210, including the fluctuating progress indicator 226, on the display. For example, as the fluctuating progress indicator 226 may, among other things, fluctuate during the breathing sequence to correspond to a suggested breathing pattern, it may be beneficial to provide the initial presentation of the fluctuating progress indicator 226 (or a version of the fluctuating progress indicator 226) when the initial breathing pattern indicates that the user is at a beginning of an inhale cycle, beginning of an exhale cycle, end of an inhale cycle, or end of an exhale cycle. Such a synchronization between the initial breathing pattern and the breathing sequence may enable the user to follow the breathing sequence with greater success because the first suggested breath of the breathing sequence was synchronized with the initial breathing pattern.

[0038] Presenting the fluctuating progress indicator 226 may function to begin a breathing phase of the breathing sequence. During the breathing phase, the fluctuating progress indicator 226 may fluctuate by growing and shrinking, rotating, changing elements, and the like. Fluctuations of the fluctuating progress indicator 226 may function as breathing cues to guide the user through the breathing sequence. For example, the fluctuations may inform the user when and for how long to inhale, when and for how long to exhale, and a number of times to repeat the process of inhaling and exhaling.

[0039] At the conclusion of the breathing phase of the breathing sequence, the display may present the graphical user interface 212. Like the graphical user interface 208, the graphical user interface 212 may include a heart user interface element 228b and a heart metric 230b. The heart user interface element 228b may pulsate on the display during a concluding phase of the breathing sequence. In some examples, the heart user interface element 228b may pulsate in a manner that corresponds to a heartrate of the user of the wearable device 102. For example, one or more sensors may collect heartrate data, and the wearable device 102 may cause the heart user interface element 228b to pulsate in accordance with the heartrate data. Similarly, the heart metric 230b may correspond to the heartrate of the user. In some examples, the heart user interface element 228b and the heart metric 230b are different from the heart user interface element 228a and the heart metric 230b at least because the user has performed the breathing phase of the breathing sequence. For example, the heart metric 230b indicates that the user's heartrate has dropped by 10 beats per minute compared to the heart metric 230a.

[0040] At the conclusion of the concluding phase of the breathing sequence, the display may present the graphical user interface 214. The graphical user interface 214 may include information about the breathing sequence. For example, the graphical user interface 214 may indicate that the user completed the breathing sequence ("Well Done"), indicate a quantitative performance metric ("You hit 90% of your breaths"), indicate a suggestion ("Try taking deeper breaths next time"), and any other suitable information. The information included in the graphical user interface 214 may provide reinforcement of the benefits of taking time to breath each day. Similarly, the information included in the graphical user interface 214 may encourage the user to work to improve her metrics.

[0041] In some examples, sensor data collected during the preliminary phase corresponding to the graphical user interface 208 may be compared to sensor data collected during the concluding phase to determine whether participating in the breathing sequence effected a change in any metric. For example, heart rates of the user may be compared, heart rate variability measures may be compared, pulse rates of the user may be compared, any other metric that may be indicative of stress, anxiety, and the like.

[0042] In some examples, the graphical user interface 208 and the graphical user interface 212 may be excluded from the flow of the breathing sequence illustrated in FIG. 2. For example, in response to input to begin a breathing sequence, the display may present the graphical user interface 210. After completion of the breathing portion of the breathing sequence, the display may present the graphical user interface 214.

[0043] FIG. 3 illustrates an example flow depicting process 300 and graphical user interfaces 302-310 depicting user interface elements relating to conducting breathing sequences as describe herein. The graphical user interfaces 302-310 are examples of user interfaces that may be presented on a display of the wearable device 102 as part of conducting a breathing sequence. The graphical user interfaces 302-310 may be generated by the wearable device 102, by the electronic device 110, and/or by a service provider.

[0044] At 312, the process 300 configures a breathing sequence. This may take place during a configuration phase of the breathing sequence. The graphical user interfaces 302, 304 may correspond to configuring the breathing sequence. For example, the graphical user interface 302 may include a first version of a fluctuating progress indicator 318a, a start button, and textual information (e.g., "7 breaths" and "1 min"), and the graphical user interface 304 may include a second version of the fluctuating progress indicator 318b, the start button, and different textual information (e.g., "14 breaths" and "2 min"). The fluctuating progress indicator 318 (and the various versions described herein) is an example of the fluctuating progress indicator 226. The variable visual elements 320 may take any form and be configured in any suitable manner. In some examples, the variable visual elements 320 may be circular shapes aligned around a center point of the fluctuating progress indicator 318 and may have at least some overlapping areas. In some examples, the variable visual elements 320 may have any other suitable shape. In some examples, the variable visual elements 320 may be partially transparent such that areas where the variable visual elements 320 overlap may be darker than other areas. For example, an area with no overlap may be the most transparent, followed by areas with more overlap having increasingly less transparency (e.g., where two variable visual elements 320 overlap, followed by areas where three variable visual elements 320 overlap, and so forth). In this manner, the center of the fluctuating progress indicator 318 may appear darker than the outer edges.

[0045] The first version of the fluctuating progress indicator 318a may include a first number of variable visual elements 320a-320n. For example, the fluctuating progress indicator 318a may include six variable visual elements 320. The number of variable visual elements 320 included in the fluctuating progress indicator 318a may correspond to the number of breaths ("7") and the time ("1 min"). The time may indicate a duration of a time period corresponding to a breathing phase of the breathing sequence. The number of breaths indicates a rate of breaths according to the time. The number of breaths may be determined based at least in part on the time (e.g., duration of the breathing phase) and a breath ratio (e.g., a ratio of the time it takes to inhale compared to the time it takes to exhale) applicable to the breathing sequence. For example, for a duration of 1 minute (60 seconds) and for a breath ratio of 1:1.5 (e.g., ratio of inhale to exhale), each full breath (e.g., an inhale and an exhale) will take 8.5 seconds, with 3.4 seconds for each inhale (e.g., based on the "1" of the 1:1.5 breath ratio) and 5.1 second for each exhale (e.g., based on the "1.5" of the 1:1.5 breath ratio).

[0046] The breath ratio applicable to the breathing sequence may be included in a breathing profile. The breathing profile may be a default profile selected for all users, all new users, or defined for a particular user. For example, if the user has indicated via a setting, or otherwise, that she is a beginner breather a simpler ratio such as 1:1.2 or 1:1.5 may be the default. If the user has indicated that she is an advanced breather, a more difficult ratio such as 1:2 may be selected as the default. In some examples, the breathing profile may be particular to the user and may be configured via a setting or by collecting actual sensor data and estimating an appropriate breath ratio to be included in the user's breathing profile. For example, if the user participates in the preliminary phase of the breathing sequence discussed with reference to the graphical user interface 208, the ratio may be determined based on the preliminary phase. In some examples, the user may participate in a practice breathing exercise to determine the breath ratio to be included in the breathing profile. The breathing profile may also include other information about the user. For example, the breathing profile may indicate metrics relating to breathing sequences completed by the user, breathing goals, and the like, any of which may be presented by an activity application running on the wearable device 102 and/or the electronic device 110. For example, the activity application may include a summary of activities performed and/or goals reached by the user during a time period (e.g., day, week, month, year, etc.). This summary can also include information about the breathing sequences completed by the user during the same time period. In some examples, the breathing profile may be determined for the user based on health information relating to the user. For example, health information, whether collected by the wearable device 102 or otherwise, may indicate certain health statistics (e.g., pulse rate, blood pressure, body temperature, respiratory rate, perspiration, etc.), and the health statistics may be used to determine an appropriate breathing profile for the user. In this manner, the breathing profile may be particularized to the user's health conditions, and may therefore be used as part of a plan for improving and/or addressing the health conditions. For example, if the health information indicates that the user has a high-than-average respiratory rate, a breathing profile may be determined that aims to reduce the user's respiratory rate.

[0047] The first version of the fluctuating progress indicator 318a may be changed to a second version of the fluctuating progress indicator 318b in response to user input at the wearable device 102. For example, as described herein, the wearable device 102 may include an electro-mechanical input component 322. The electro-mechanical input component 322 may include a rotatable dial. Rotating the rotatable dial may function to configure the breathing sequence. For example, first input at the electro-mechanical input component 322 (e.g., rotating the dial in a first direction) may cause the number of breaths, the time, and the number of variable visual elements 320 to decrease. Conversely, second input at the electro-mechanical input component 322 (e.g., rotating the dial in a second, opposite direction) may cause the number of breaths, the time, and the number of variable visual elements 320 to increase. Thus, the graphical user interface 304 may include a second version of the fluctuating progress indicator 318b that includes a greater number of variable visual elements 320a-320n (e.g., eight variable visual elements 320) than the first version of the fluctuating progress indicator 318a. Similarly, the time has changed to 2 minutes and the number of breaths has increased to 14. In some examples, the second version of the fluctuating progress indicator 318b may be considered a more complex version of the fluctuating progress indicator 318 as compared to the first version of the fluctuating progress indicator 318a. Other input at the electro-mechanical input component 322 (e.g., additional rotation of the dial in the second direction) may cause the number of breaths, the time, and the number of variable visual elements 320 to continue to increase (e.g., 21 breaths and 3 minutes, 28 breaths and 4 minutes, and so forth).

[0048] At 314, the process 300 conducts a preliminary phase of the breathing sequence. The graphical user interface 306 may correspond to conducting the preliminary phase of the breathing sequence. The graphical user interface 306 may include a third version of the fluctuating progress indicator 318c that fluctuates in some manner during the preliminary phase. For example, the third version of the fluctuating progress indicator 318c may pulsate, rotate, oscillate, disappear and reappear, and perform any other suitable graphical change during the preliminary phase. In some examples, the fluctuating progress indicator 318c may fluctuate at a cyclic rate corresponding to an estimated breathing pattern. The preliminary phase may be a phase in which the user prepares to begin the breathing phase of the breathing sequence. For example, textual information may be provided on the graphical user interface 306 that instructs the user to take a few deep breaths. In some examples, sensor data may be collected during the preliminary phase that corresponds to heart measures and/or respiratory measures of the user. This sensor data can be used to determine an initial breathing pattern of the user (e.g., a model of the user's breathing pattern during the preliminary phase or otherwise).

[0049] At 316, the process 300 conducts a breathing phase of the breathing sequence beginning with presentation of the graphical user interface 308 and ending with presentation of the graphical user interface 310. Thus, the graphical user interface s 308, 310 are depicted as an initial graphical user interface and a final graphical user interface, respectively of the breathing phase. The graphical user interface 308 may include a fourth version of the fluctuating progress indicator 318c that may be presented on the graphical user interface 308 to initiate the breathing phase. For example, presentation of the fourth version of the fluctuating progress indicator 318c may be synchronized with an initial breathing pattern determined in connection with 314. The breathing phase may conclude with the presentation of the graphical user interface 310. Between presentation of the graphical user interface 308 and the graphical user interface 310 the fluctuating progress indicator 318 may fluctuate. A detailed discussion of such fluctuations along with the progression of the breathing phase from the graphical user interface 308 to the graphical user interface 310 is presented in connection with FIG. 4.

[0050] As introduced previously, FIG. 4 illustrates an example flow depicting process 400 and graphical user interfaces 402-420 depicting user interface elements relating to conducting breathing sequences as describe herein. The graphical user interfaces 402-420 are examples of user interfaces that may be presented on a display of the wearable device 102 as part of conducting a breathing sequence. The graphical user interface 402 is an example of the graphical user interface 308, and the graphical user interface 420 is an example of the graphical user interface 310. Thus, the process 400 may correspond to a detailed progression of the breathing phase between the graphical user interface 308 and the graphical user interface 310. The graphical user interfaces 402-420 may be generated by the wearable device 102, by the electronic device 110, and/or by a service provider. The graphical user interface s 402-420 may include fluctuating progress indicators that fluctuate in accordance with a cyclic pattern corresponding to a time period of the breathing sequence, in accordance with a breathing rate of the breathing sequence, and in any other suitable manner.

[0051] At 422, the process 400 generates a first sequence of versions of a fluctuating progress indicator. The first sequence of versions may correspond to first fluctuating progress indicators 424a-424e included in the graphical user interfaces 402-410. For example, the first fluctuating progress indicator 424a may represent a smallest version of the fluctuating progress indicator

424, and one in which the plurality of variable visual elements are not visible. Thus, the first fluctuating progress indicator 424a may correspond to a simple circle. The first fluctuating progress indicator 424a may grow in size to become the first fluctuating progress indicator 424b. As the first fluctuating progress indicator 424a grows in size, it may also rotate in a first direction (e.g., in a counterclockwise direction as depicted by rotational arrow). The first fluctuating progress indicator 424b may continue to grow in size to become the first fluctuating progress indicator 424c. As the first fluctuating progress indicator 424b grows in size, it may also rotate in the first direction. The first fluctuating progress indicator 424c may represent a largest version, and most complex version of the first fluctuating progress indicators 424. The first fluctuating progress indicator 424c may shrink in size to become the first fluctuating progress indicator 424d. As the first fluctuating progress indicator 424c continues to shrink in size, it may also rotate in a second direction (e.g., in a clockwise direction depicted by rotational arrow). The first fluctuating progress indicator 424d may shrink in size to become the first fluctuating progress indicator 424e. As the first fluctuating progress indicator 424d shrinks in size, it may also rotate in the second direction. The change from the first fluctuating progress indicator 424a to the first fluctuating progress indicator 424c may correspond to a first breath event (e.g., an inhale cycle), and the time of presenting may correspond to a time for the first breath event (e.g., 3.4 seconds for a 1:1.5 breath ratio at 7 breaths/minute). The change from the first fluctuating progress indicator 424c to the first fluctuating progress indicator 424e may correspond to a second breath event (e.g., an exhale cycle), and the time of presenting may correspond a time for the second breath event (e.g., 5.1 seconds for a 1:1.5 breath ratio at 7 breaths/minute). In some examples, the first fluctuating progress indicators 424a and 424e may be similar, and the first fluctuating progress indicators 424b and 424d may also be similar. It is understood that the transition of the first fluctuating progress indicator 424 between 424a and 424e may include many more presentations of the first fluctuating progress indicators in order to produce a smooth transition.

[0052] At 426, the process 400 generates a second sequence of versions of the fluctuating progress indicator. The second sequence of versions may correspond to second fluctuating progress indicators 428a-428d included in the graphical user interfaces 412-418. The second fluctuating progress indicators 428 may be less complex than the first fluctuating progress indicators 424 at least because the second fluctuating progress indicators 428 include fewer variable visual elements. For example, as noted herein, the first fluctuating progress indicators

424 may include eight variable visual elements. The second fluctuating progress indicators 428 may include only six variable visual elements. In this manner, the fluctuating progress indicators 424, 428 may become less complex in accordance with a duration of the breathing sequence.

[0053] In some examples, the first fluctuating progress indicator 424e may function as a transition fluctuating progress indicator between the first fluctuating progress indicators 424 and the second fluctuating progress indicators 428. For example, between the first fluctuating progress indicator 424d and the first fluctuating progress indicator 424e (e.g., as the first fluctuating progress indicator 424 shrinks), the first fluctuating progress indicator 424 may rotate clockwise, and between the first fluctuating progress indicator 424e and the second fluctuating progress indicator 428a (e.g., as the second fluctuating progress indicator 428 grows), the rotation may be counterclockwise. The transition from the second fluctuating progress indicator 428a to the second fluctuating progress indicator 428d may be performed in a manner similar to the transition from the first fluctuating progress indicator 424a to the first fluctuating progress indicator 424e. In particular, the second fluctuating progress indicator 428 may rotate in one or more directions and/or grow and shrink between the second fluctuating progress indicator 428a and the second fluctuating progress indicator 428d. The size change and the rotation may correspond to a breathing rate associated with the breathing sequence, or associated with a breathing profile used during the breathing sequence.

[0054] At 430, the process 400 generates summary information. The summary information may correspond to the information may be presented on the graphical user interface 310. In some examples, the summary information presented on the graphical user interface 420 and may include a heartrate metric (e.g., “68 BPM”), a miniaturized version of the fluctuating progress indicator 432, a comparison to a daily breathing goal (e.g., “2 of 3”), and a duration of time the variable time period of the breathing phase (e.g., 2 mins).

[0055] FIG. 5 illustrates a series of example graphs 500-506 relating to measuring respiration of a user using cardiovascular function data. The graph 500 may represent data collected from a respiratory belt. Thus, the graph 500 may be the best approximation of respiration of the user. The graphs 502 and 504 may represent filtered signal data collected from the user using one or more sensors on the wearable device 102. For example, the one or more sensors may include one or more light sources and a photodetector 1154 to form a photoplethysmography (PPG) sensor.

The graph 502 may represent a baseline modulation of the signal data. The baseline modulation may correspond to pressure changes in the user's chest that result in venous blood flowing from the user's extremities to the user's chest and back. The graph 504 may represent an amplitude modulation of the signal data. The amplitude modulation may correspond to changes in pressure gradients relating to blood pressure. The graph 506 may represent a frequency modulation of the signal data. The frequency modulation may correspond to any instantaneous measurement of heart beats, which may be considered a beat-to-beat measurement. In some examples, the signal data described herein may be filtered and/or processed in any suitable manner to determine the measurements shown in the graphs 502-506.

[0056] Using any one of the measurements (e.g., the graphs 502-506) or a combination of one or more of them may enable determination of a suitable estimate of a respiration measure of the user. The respiration measure may correspond to a cyclic breathing pattern of the user. In some examples, the sensor data may be collected by the wearable device 102 when the wearable device 102 is being worn on the user's wrist. In some examples, other devices may collect the sensor data and share it with the wearable device 102. For example, earbuds may include sensors to detect cardiovascular function data, which can be shared with the wearable device 102. In some examples, other sensors in other devices collect other information that may be helpful to determine respiration measures of the user. For example, an optical sensor like a camera on a user device or in a laptop can be used to analyze color differences of one's face and/or neck as they breath, nose dilation, and the like. This can be representative of blood flow. Similarly, the user may place her finger over the optical sensor in order to detect other information that may be representative of blood flow.

[0057] FIG. 6 illustrates an example architecture or environment 600 configured to implement sharing of updatable graphical fitness user interface elements, according to at least one example. In some examples, the example architecture 600 may further be configured to manage or otherwise interact with the wearable device 102, the electronic device 110, and/or service provider computers 602. In some examples, the devices may be connected via one or more networks 604 and/or 606 (e.g., via Bluetooth, WiFi, the Internet, or the like). In the architecture 600, one or more users (e.g., the user 106) may utilize the electronic device 110 to manage, control, or otherwise utilize the wearable device 102, via the one or more networks 606.

Additionally, in some examples, the wearable device 102, the service provider computers 602, and electronic device 110 may be configured or otherwise built as a single device. For example, the wearable device 102 and/or the electronic device 110 may be configured to implement the embodiments described herein as a single computing unit, exercising the examples described above and below without the need for the other devices described.

[0058] In some examples, the networks 604, 606 may include any one or a combination of many different types of networks, such as cable networks, the Internet, wireless networks, cellular networks, satellite networks, other private and/or public networks, or any combination thereof. While the illustrated example represents the electronic device 110 accessing the service provider computers 602 via the networks 604, the described techniques may equally apply in instances where the electronic device 110 interacts with the service provider computers 602 over a landline phone, via a kiosk, or in any other manner. It is also noted that the described techniques may apply in other client/server arrangements (e.g., set-top boxes, etc.), as well as in non-client/server arrangements (e.g., locally stored applications, peer to peer configurations, etc.).

[0059] As noted above, the electronic device 110 may be configured to collect and/or manage user activity data potentially received from the wearable device 102. In some examples, the wearable device 102 may be configured to provide health, fitness, activity, and/or medical data of the user to a third- or first-party application (e.g., the service provider 602). In turn, this data may be used by the electronic device 110 to conduct the breathing sequences as described herein. The electronic device 110 may be any type of computing device such as, but not limited to, a mobile phone, a smartphone, a personal digital assistant (PDA), a laptop computer, a desktop computer, a thin-client device, a tablet computer, a wearable device, or the like. In some examples, the electronic device 110 may be in communication with the service provider computers 602 and/or the wearable device 102 via the networks 604, 606, or via other network connections.

[0060] In one illustrative configuration, the electronic device 110 may include at least one memory 614 and one or more processing units (or processor(s)) 616. The processor(s) 616 may be implemented as appropriate in hardware, computer-executable instructions, firmware, or combinations thereof. Computer-executable instruction or firmware implementations of the processor(s) 616 may include computer-executable or machine-executable instructions written in any suitable programming language to perform the various functions described. The electronic device 110 may also include geo-location devices (e.g., a global positioning system (GPS) device or the like) for providing and/or recording geographic location information associated with the electronic device 110.

[0061] The memory 614 may store program instructions that are loadable and executable on the processor(s) 616, as well as data generated during the execution of these programs. Depending on the configuration and type of the electronic device 110, the memory 614 may be volatile (such as random access memory (RAM)) and/or non-volatile (such as read-only memory (ROM), flash memory, etc.). The electronic device 110 may also include additional removable storage and/or non-removable storage 626 including, but not limited to, magnetic storage, optical disks, and/or tape storage. The disk drives and their associated non-transitory computer-readable media may provide non-volatile storage of computer-readable instructions, data structures, program modules, and other data for the computing devices. In some implementations, the memory 614 may include multiple different types of memory, such as static random access memory (SRAM), dynamic random access memory (DRAM), or ROM. While the volatile memory described herein may be referred to as RAM, any volatile memory that would not maintain data stored therein once unplugged from a host and/or power would be appropriate.

[0062] The memory 614 and the additional storage 626, both removable and non-removable, are all examples of non-transitory computer-readable storage media. For example, non-transitory computer readable storage media may include volatile or non-volatile, removable or non-removable media implemented in any method or technology for storage of information such as computer-readable instructions, data structures, program modules, or other data. The memory 614 and the additional storage 626 are both examples of non-transitory computer storage media. Additional types of computer storage media that may be present in the electronic device 110 may include, but are not limited to, phase-change RAM (PRAM), SRAM, DRAM, RAM, ROM, electrically erasable programmable read-only memory (EEPROM), flash memory or other memory technology, compact disc read-only memory (CD-ROM), digital video disc (DVD) or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium that can be used to store the desired information and that can be accessed by the electronic device 110. Combinations of any of the above should also be included within the scope of non-transitory computer-readable storage media. Alternatively, computer-readable communication media may include computer-readable instructions, program modules, or other data transmitted within a data signal, such as a carrier wave, or other transmission. However, as used herein, computer-readable storage media does not include computer-readable communication media.

[0063] The electronic device 110 may also contain communications connection(s) 628 that allow the electronic device 110 to communicate with a data store, another computing device or server, user terminals, and/or other devices via the networks 604, 606. The electronic device 110 may also include I/O device(s) 630, such as a keyboard, a mouse, a pen, a voice input device, a touch input device, a display, speakers, a printer, etc.

[0064] Turning to the contents of the memory 614 in more detail, the memory 614 may include an operating system 632 and/or one or more application programs or services for implementing the features disclosed herein including an breathing module 608a. In some examples, the breathing module 608a may be configured to manage activity data collected by the wearable device 102 and conduct the breathing sequences as described herein. As described in detail with reference to later figures, the wearable device 102 may include a memory that includes a similar breathing module 608, which may be accessible by one or more processors of the wearable device 102. In this manner, the techniques described herein may be implemented by any one, or a combination of more than one, of the computing devices (e.g., the wearable device 102, the electronic device 110, or the service provider 602).

[0065] The service provider computers 602 may also be any type of computing device such as, but not limited to, a mobile phone, a smartphone, a PDA, a laptop computer, a desktop computer, a thin-client device, a tablet computer, a wearable device, etc. In some examples, the service provider computers 602 may be in communication with the electronic device 110 and/or wearable device 102 via the networks 604, 606, or via other network connections.

[0066] In one illustrative configuration, the service provider computers 602 may include at least one memory 642 and one or more processing units (or processor(s)) 644. The processor(s) 644 may be implemented as appropriate in hardware, computer-executable instructions, firmware, or combinations thereof. Computer-executable instruction or firmware implementations of the processor(s) 644 may include computer-executable or machine-executable instructions written in any suitable programming language to perform the various functions described.

[0067] The memory 642 may store program instructions that are loadable and executable on the processor(s) 644, as well as data generated during the execution of these programs. Depending on the configuration and type of service provider computer 602, the memory 642 may be volatile (such as RAM) and/or non-volatile (such as ROM, flash memory, etc.). The service provider computer 602 may also include additional removable storage and/or non-removable storage 646 including, but not limited to, magnetic storage, optical disks, and/or tape storage. The disk drives and their associated non-transitory computer-readable media may provide non-volatile storage of computer-readable instructions, data structures, program modules, and other data for the computing devices. In some implementations, the memory 642 may include multiple different types of memory, such as SRAM, DRAM, or ROM. While the volatile memory described herein may be referred to as RAM, any volatile memory that would not maintain data stored therein once unplugged from a host and/or power would be appropriate. The memory 642 and the additional storage 646, both removable and non-removable, are both additional examples of non-transitory computer-readable storage media.

[0068] The service provider computer 602 may also contain communications connection(s) 648 that allow the service provider computer 602 to communicate with a data store, another computing device or server, user terminals and/or other devices via the networks 604, 606. The service provider computer 602 may also include I/O device(s) 650, such as a keyboard, a mouse, a pen, a voice input device, a touch input device, a display, speakers, a printer, etc.

[0069] Turning to the contents of the memory 642 in more detail, the memory 642 may include an operating system 652 and/or one or more application programs or services for implementing the features disclosed herein including the breathing module 608b. In some examples, the breathing module 608b may be configured to manage activity data collected by the wearable device 102 and conduct the breathing sequences as described herein.

[0070] FIGS. 7, 8, 9, and 10 illustrate example flow diagrams showing processes 700, 800, 900, and 1000 for conducting breathing sequences, according to at least a few examples. These processes, and any other processes described herein, are illustrated as logical flow diagrams, each operation of which represents a sequence of operations that can be implemented in hardware, computer instructions, or a combination thereof. In the context of computer instructions, the operations may represent computer-executable instructions stored on one or more non-transitory computer-readable storage media that, when executed by one or more processors, perform the recited operations. Generally, computer-executable instructions include routines, programs, objects, components, data structures and the like that perform particular functions or implement particular data types. The order in which the operations are described is not intended to be construed as a limitation, and any number of the described operations can be combined in any order and/or in parallel to implement the processes.

[0071] Additionally, some, any, or all of the processes described herein may be performed under the control of one or more computer systems configured with specific executable instructions and may be implemented as code (e.g., executable instructions, one or more computer programs, or one or more applications) executing collectively on one or more processors, by hardware, or combinations thereof. As noted above, the code may be stored on a non-transitory computer-readable storage medium, for example, in the form of a computer program including a plurality of instructions executable by one or more processors.

[0072] FIG. 7 depicts the process 700 including example acts or techniques relating to conducting breathing sequences, according to at least one example. The breathing module 608, whether embodied in the service provider 602, the wearable device 102, the electronic device 110, or any suitable combination of the foregoing may perform the process 700 of FIG. 7. The process 700 begins at 702 by receiving sensor data from one or more sensors of a user device. The sensor data maybe representative of one or more health metrics. The health metrics may include a heart rate of the user, a heart rate variability measure of the user, or a pulse rate of the user. In some examples, the sensor data may be filtered, analyzed, or otherwise processed to infer one or more respiratory measures corresponding to a user of the user device.

[0073] At 704, the process 700 estimates an initial breathing pattern based at least in part on the signal data. In some examples, the initial breathing pattern may include a cyclic breathing pattern that is made up of an inhale cycle and an exhale cycle. In some examples, initial breathing pattern may be estimated during a preliminary phase of a breathing sequence.

[0074] At 706, the process 700 synchronizes the initial breathing pattern and a breathing sequence. In some examples, the synchronization may be between the cyclic pattern of the initial breathing pattern and the breathing sequence. In some examples, the synchronization may include identifying, based at least in part on the initial breathing pattern, a beginning of an inhale cycle of a first breath event or a beginning of exhale cycle of the first breath event.

[0075] At 708, the process 700 initiates a first period of the breathing sequence by generating, based at least in part on the synchronization, a breathing element. In some examples, the first period may correspond to a breathing phase of the breathing sequence. Generating the breathing element based on the synchronization may include generating and presenting the breathing element when the user it a beginning of an inhale cycle of a second breath event or at a beginning of an exhale cycle of the second breath event. In this manner, the breathing phase of the breathing sequence can begin by being synced with the user's breath events. In some examples the breathing element is a graphical user interface element, a sound, or a haptic. When the breathing element is the graphical user interface element it can be a fluctuating progress indicator. As described herein, the fluctuating progress indicator can be fined as having a plurality of variable visual characteristics and a plurality of variable visual elements. The variable visual characteristics may include a complexity characteristic relating to the complexity of the variable visual elements, an alignment characteristic relating to the alignment of the variable visual elements with respect to a center of the fluctuating progress indicator, a visibility characteristic relating to the size and visibility of the variable visual elements.

[0076] At 710, the process 700 causes the breathing element to fluctuate during the breathing sequence. In some examples, this can include causing the breathing element to fluctuate during a second period of the breathing sequence which may also correspond to the breathing phase of the breathing sequence. In some examples, this can include causing the fluctuating progress indicator to fluctuate during the second period. The fluctuating progress indicator can be configured to fluctuate in accordance with a breathing profile to at least indicate a suggested breathing pattern. The breathing profile may include a breathing rate to perform the suggested breathing pattern for a duration that is associated with the breathing sequence. In some examples, the duration may be a configurable parameter selectable by a user. Causing the fluctuating progress indicator to fluctuate can include causing a first variable visual characteristic to change with respect to the duration of the breathing sequence. This can include changing the complexity of the fluctuating progress indicator to go from more complex to less complex as the breathing sequence progresses. Causing the fluctuating progress indicator to fluctuate can include causing a second variable visual characteristic to change with respect to a breathing rate associated with the breathing profile. This can include changing the visibility and/or the alignment of the fluctuating progress indicator with respect to the breathing rate. For example, the fluctuating progress indicator can pulsate and rotate in accordance with the breathing rate. In some examples, the breathing profile may be generated based at least in part on user health data and/or user activity data as descried herein.

[0077] FIG. 8 depicts the process 800 including example acts or techniques relating to conducting breathing sequences, according to at least one example. The breathing module 608, whether embodied in the service provider 602, the wearable device 102, the electronic device 110, or any suitable combination of the foregoing may perform the process 800 of FIG. 8. In an illustrative example, the process 800 may be performed by one or more sensors 1212 and 1222 and the wearable device 102. The process 800 begins at 802 by sensing first health data. This may be performed by one or more sensors 1212 and 1222. The first health data may include activity data, heartrate data, and any other health data associated with a user.

[0078] At 804, the process 800 determines a cyclic breathing pattern based on the first health data. This may be performed by the wearable device 102. Determining the cyclic breathing pattern may include processing the first health data to infer a cyclic breathing pattern. For example, the first health data may include heartrate data and/or other data relating to the circulatory system, and determining the cyclic pattern may include processing the data to infer respiratory measures. The respiratory measures can include a breathing rate, time attributable to inhale cycles and exhale cycles, breathing irregularities, and the like. In some examples, the cyclic breathing pattern can be determined as part of a preliminary phase a breathing sequence. The preliminary phase may function as a warm-up phase in which the user takes a number of breaths to prepare for the breathing sequence. Invisible to the user, the process 800 may be collecting the first heath data and modeling the user's breathing during the warm-up phase. This model can include the cyclic breathing pattern.

[0079] At 806, the process 800 generates a fluctuating progress indicator (FPI). This may be performed by the wearable device 102. The fluctuating progress indicator is an example of a user interface element that fluctuates during a breathing sequence and also indicates progress of the breathing sequence. For example, the fluctuating progress indicator can indicate progress by changing its form as the breathing sequence progresses. Such changes in form can include removing and/or changing visual elements of the fluctuating progress indicator during the breathing sequence such that the fluctuating progress indicator presented at the end of the breathing sequence is less complex or has less definable shapes than the fluctuating progress indicator presented at the beginning of the breathing sequence.

[0080] At 808, the process 800 synchronizes the cyclic breathing pattern with an initial presentation of the fluctuating progress indicator to begin a breathing phase of a breathing sequence. This may be performed by the wearable device 102. Synchronizing the presentation of the fluctuating progress indicator may include causing a particular version of the fluctuating progress indicator to appear on a display of the wearable device 102 at a convenient moment in the user's cyclic breathing pattern. In some examples, the convenient moment may be when the user is at the bottom of a breath (or just about to inhale) or at a top of a breath (or just about to exhale). For example, a version of the fluctuating progress indicator can be a small circular user interface element, and it may be initially presented on the display when the user is at the bottom of a breath. The fluctuating progress indicator may then be changed from the small circular user interface element to a different user interface element (e.g., a larger version of the fluctuating progress indicator) as the user inhales.

[0081] At 810, the process 800 causes the fluctuating progress indicator to fluctuate. This may be performed by the wearable device 102. Causing the fluctuating progress indicator to fluctuate can include causing the fluctuating progress indicator to rotate, to spin, to oscillate, to pulsate, to change form, to change color, to change size, and do any other changes in appearance. In some examples, causing the fluctuating progress indicator to fluctuate includes presenting the changes to the fluctuating progress indicator on a display.

[0082] At 812, the process 800 senses second health data. This may be performed by the one or more sensors 1212 and 1222. The second health data may include activity data, heartrate data, and any other health data associated with the user. In some examples, the second health data may be sensed at time while the user is participating in the breathing phase of the breathing sequence. Thus, the second health data may include health data collected in about real-time from the user and may represent one or more health conditions of the user during the breathing sequence. Such data may be used to determine how well the user performed the breathing sequence based on one or more metrics. Information about the user's performance may associated with the user and stored in a data store, which may be local to the wearable device 102 and or remote to the wearable device 102. In this manner, summaries based on historical information about the user's performance, improvements, and the like may be determined and surfaced to the wearable device 102 and/or the electronic device 110.

[0083] At 814, the process 800 determines whether to adjust the fluctuating progress indicator. This may be performed by the wearable device 102. Determining whether to adjust the fluctuating progress indicator may be based at least in part on the second health data.

[0084] If the answer at 814 is YES, the process 800 proceeds to 818 to determine an adjustment for the fluctuating progress indicator. This may be performed by the wearable device 102. For example, if the second health data, or an analysis of the second health data, reveals that the user is not participating in the breathing sequence or is struggling to keep up with a suggested breathing pattern, the sequence may end and/or the suggested breathing pattern may be altered, which may result in the presentation of the fluctuating progress indicator changing. Such changes may encourage the user to continue with the current breathing sequence and/or to try again with a different breathing sequence. Information about any changes may be stored as configuration settings and referenced when the user next begins a breathing sequence.

[0085] If the answer at 814 is NO, the process 800 proceeds to 818 to cause the fluctuating progress indicator to continue to fluctuate. This may be performed by the wearable device 102. Causing the fluctuating progress indicator to continue to fluctuate can include causing the fluctuating progress indicator to rotate, to spin, to oscillate, to pulsate, to change form, to change color, to change size, and do any other changes in appearance. In some examples, causing the fluctuating progress indicator to continue to fluctuate includes presenting the changes to the fluctuating progress indicator on a display.

[0086] At 820, the process 800 senses third health data. This may be performed by the one or more sensors 1212 and 1222. The third health data may include activity data, heartrate data, and any other health data associated with the user. In some examples, the third health data may be sensed at time after the user has completed the breathing phase of the breathing sequence. Thus, the third health data may include health data collected in about real-time from the user and represent one or more health conditions of the user after the breathing sequence.

[0087] At 822, the process 800 presents information about the breathing sequence. This may be performed by the wearable device 102. Presenting information may include generating the information prior to presenting it. The information may indicate one or more quantitative assessments of the breathing sequence, one or more qualitative assessments (which may or may not be based on quantitative measures), one or more suggestions, one or more options to share information about the breathing sequence with others, and the like.

[0088] FIG. 9 depicts the process 900 including example acts or techniques relating to conducting breathing sequences, according to at least one example. The breathing module 608, whether embodied in the service provider 602, the wearable device 102, the electronic device 110, or any suitable combination of the foregoing may perform the process 900 of FIG. 9. The process 900 begins at 902 by receiving a first input to initiate a breathing sequence. The first input may be received at a user interface of a device (e.g., the wearable device 102 or the electronic device 110). The first input may be user input or may be an automated input generated in response to certain conditions (e.g., calendar information that indicates the sequence should begin, sensor data that indicates that the sequence should begin, and the like).

[0089] At 904, the process 900, during a configuration phase of the breathing sequence, receives a second input including configuration information. In some examples, the configuration phase may be a phase in which configuration information is received. The configuration information may define one or more parameters of the breathing sequence. For example, the configuration information may define a variable time period for the breathing sequence. In some examples, the time period is variable at least because a duration of the time period may be varied. The second input may be received at the user interface or via some other component of the device. For example, the second input may be received via an electro-mechanical input device attached to the device. In some examples, the electro-mechanical device may include a rotatable dial, and rotating of the dial may input the configuration information. For example, rotation of the rotatable dial in a first direction may increase the duration of the variable time period, and rotation of the rotatable dial in a second, opposite direction may decrease the duration of the variable time period. Other parameters that may be defined by the configuration information can include, for example, a number of breaths to be performed during the breathing sequence, a breath ratio, a number and/or complexity of the fluctuating progress indicator to be presented during a breathing phase, types of breathing cues to use during the breathing sequence (e.g., visual using the fluctuating progress indicator, audible using a speaker on the device, or haptic using a haptic device of the device), and the like. In some examples, at least some of the parameters may be stored in association with a breathing profile. The breathing profile may be customized to a user, may be default for all users, or may be default for a set of users.

[0090] At 906, the process 900, during a preliminary phase of the breathing sequence, presents a first version of a fluctuating progress indicator. Presenting the first version of the fluctuating progress indicator may include presenting the first version of the fluctuating progress indicator on the user interface. The preliminary phase may follow the configuration phase. The first version of the fluctuating progress indicator may be presented in a manner that indicates to the user to prepare to breathing. For example, the first version of the fluctuating progress indicator may be presented in a manner that is different from later versions of the fluctuating progress indicator. In some examples, the first version of the fluctuating progress indicator rotates with a trailing portion of the fluctuating progress indicator being less visible than a leading portion of the fluctuating progress indicator. In some examples, the first version of the fluctuating progress indicator may fluctuate during the preliminary phase at a first cyclic rate. The first cyclic rate may be determined by an estimated breathing pattern. The estimated breathing pattern may be specific to the user and inferred based on health data of the user or may be a default estimated breathing pattern. As described herein, the fluctuating progress indicator may include a plurality of variable visual elements, and may be defined by a plurality of variable visual characteristics.

[0091] At 908, the process 900, during a breathing phase of the breathing sequence, presents a second version of the fluctuating progress indicator. Presenting the second version of the fluctuating progress indicator may include presenting the second version of the fluctuating progress indicator on the user interface. The breathing phase may follow the preliminary phase and may be the phase in which a suggested breathing pattern is presented to the user to follow. In some examples, the second version of the fluctuating progress indicator may fluctuate at a second cyclic rate different than the first cyclic rate. The second cyclic rate may be determined based at least in part on the variable time period. For example, if the variable time period has been defined as two minutes and the breathing rate is seven breaths per minute (e.g., as indicated in a breathing profile), the second version of the fluctuating progress indicator may fluctuate fourteen times during the variable time period. In some examples, other aspects of the fluctuation may depend on other aspects of the configuration information and/or the variable time period. For example, the time devoted to an inhale fluctuation and the time devoted to an exhale fluctuation of the second version of the fluctuating progress indicator may depend on a breath ratio identified in a breathing profile and/or otherwise associated with the breathing sequence.

[0092] FIG. 10 depicts the process 1000 including example acts or techniques relating to conducting breathing sequences, according to at least one example. The breathing module 608, whether embodied in the service provider 602, the wearable device 102, the electronic device 110, or any suitable combination of the foregoing may perform the process 1000 of FIG. 10. The process 1000 begins at 1002 by initiating a breathing sequence. Initiating the breathing sequence may be based at least in part on a request to initiate the breathing sequence.

[0093] At 1004, the process 1000 receives configuration information during a first phase of the breathing sequence. In some examples, the configuration information may be used to configure the breathing sequence.

[0094] At 1006, the process 1000 generates a first version of a fluctuating progress indicator for presentation during the first phase of the breathing sequence. In some examples, the first version of the fluctuating progress indicator may be modifiable based at least in part on the configuration information. For example, the first version of the fluctuating progress indicator may include variable visual elements, a number of which may be increased and/or decreased.

[0095] At 1008, the process 1000 generates a second version of the fluctuating progress indicator for presentation during a second phase of the breathing sequence. The second version of the fluctuating progress indicator may be based on the first version of the fluctuating progress indicator, and in some examples, may be similar to the first version of the fluctuating progress indicator. In some examples, the second version of the fluctuating progress indicator may be presented for a period of time corresponding to the second phase.

[0096] At 1010, the process 1000 generates a third version of the fluctuating progress indicator for presentation during a third phase of the breathing sequence. The third version of the fluctuating progress indicator may be based on the first version of the fluctuating progress indicator and/or the second version of the fluctuating progress indicator. In some examples, the third version of the fluctuating progress indicator may be presented and changed during the third phase.

[0097] At 1012, the process 1000 causes the third version of the fluctuating progress indicator to fluctuate during the third phase of the breathing sequence. In some examples, causing the third version of the fluctuating progress indicator to fluctuate during the third phase of the breathing sequence may include, at 1014, causing a first variable visual characteristic of the fluctuating progress indicator to change with respect to a duration of a time period. In some examples, the duration of the time period may correspond to a length of the third phase of the breathing sequence. In some examples, the duration may be set by the configuration information. The first variable visual characteristic of the fluctuating progress indicator may be a complexity characteristic of third version of the fluctuating progress indicator or a complexity characteristic of a plurality of variable visual elements that make up the third version of the fluctuating progress indicator. And causing the first variable visual characteristic of the fluctuating progress indicator to change may include causing the complexity of third version of the fluctuating progress indicator and/or the complexity of the plurality of variable visual elements to decrease or increase. In some examples, this can include removing variable visual elements from the plurality of variable visual elements.

[0098] In some examples, causing the third version of the fluctuating progress indicator to fluctuate during the third phase of the breathing sequence may include, at 1016, causing a second variable visual characteristic of the fluctuating progress indicator to change with respect to a breathing rate associated with the breathing sequence. The second variable visual characteristic may be a visibility characteristic. The visibility characteristic may include visibility as it relates to size (e.g., a smaller element being less visible than a larger element) and as it relates to transparency (e.g., a more transparent element being less visible than a less transparent element). Thus, causing the second variable visual characteristic of the fluctuating progress indicator to change may include causing the third version of the fluctuating progress indicator to become larger and smaller and/or more transparent and less transparent. In some examples, changing with respect to the breathing rate may include becoming larger and smaller and/or more transparent and less transparent in synchronization with the breathing rate which may correspond to a suggested breathing pattern.

[0099] In some examples, causing the third version of the fluctuating progress indicator to fluctuate during the third phase of the breathing sequence may include, at 1018, causing a third variable visual characteristic of the fluctuating progress indicator to change with respect to the breathing rate associated with the breathing sequence. The second variable visual characteristic may be an alignment characteristic. The alignment characteristic may include alignment as it relates to the third version of the fluctuating progress indicator with respect to locations on a user interface (e.g., center, edges boundaries, etc.) or with respect to other elements on the user interface. The alignment characteristic may also include alignment as it relates to the plurality of variable visual elements with respect to a location of the third version of the fluctuating progress indicator. For example, the alignments and/or orientations of the plurality of variable visual alignments with respect to a center of the third version of the fluctuating progress indicator may rotate with respect to the breathing rate.

[0100] Embodiments described herein may take the form of, be incorporated in, or operate with a suitable electronic device. One example of such a device is shown in FIG. 11 and takes the form of a wearable mechanism. As shown, the mechanism may be worn on a user's wrist and secured thereto by a band. The mechanism may have a variety of functions including, but not limited to: keeping time; monitoring a user's physiological signals and providing health-related information based on those signals; communicating (in a wired or wireless fashion) with other electronic devices, which may be different types of devices having different functionalities; providing alerts to a user, which may include audio, haptic, visual and/or other sensory output, any or all of which may be synchronized with one another; visually depicting data on a display; gather data form one or more sensors that may be used to initiate, control, or modify operations of the device; determine a location of a touch on a surface of the device and/or an amount of force exerted on the device, and use either or both as input; accepting voice input to control one or more functions; accepting tactile input to control one or more functions; and so on.

[0101] Alternative embodiments of suitable electronic devices include a phone; a tablet computing device; a portable media player; and so on. Still other suitable electronic devices may include laptop/notebook computers, personal digital assistants, touch screens, input-sensitive pads or surfaces, and so on.

[0102] FIG. 12 depicts an example schematic diagram of a wearable electronic device 1200. The wearable electronic device 1200 is an example of the wearable device 102. As shown in FIG. 12, the device 1200 includes one or more processing units 1202 that are configured to access a memory 1204 having instructions stored thereon. The instructions or computer programs may be configured to perform one or more of the operations or functions described with respect to the device 1200. For example, the instructions may be configured to control or coordinate the operation of the various components of the device. Such components include, but are not limited to, display 1206, one or more input/output components 1208, one or more communication channels 1210, one or more sensors 1212, a speaker 1214, microphone 1216, a battery 1218, wireless power 1220, bio sensors 1222, and/or one or more haptic feedback devices 1224. In some embodiments the speaker and microphone may be combined into a single unit and/or may share a common port through a housing of the device.

[0103] The processing units 1202 of FIG. 12 may be implemented as any electronic device capable of processing, receiving, or transmitting data or instructions. For example, the processing units 1202 may include one or more of: a microprocessor, a central processing unit (CPU), an application-specific integrated circuit (ASIC), a digital signal processor (DSP), or combinations of such devices. As described herein, the term “processor” is meant to encompass a single processor or processing unit, multiple processors, multiple processing units, or other suitably configured computing element or elements.

[0104] In some embodiments the electronic device may accept a variety of bands, straps, or other retention mechanisms (collectively, “bands”). These bands may be removably connected to the electronic device by a lug that is accepted in a recess or other aperture within the device and locks thereto. The lug may be part of the band or may be separable (and/or separate) from the band. Generally, the lug may lock into the electronic device’s recess and thereby maintain connection between the band and device. The user may release a locking mechanism to permit the lug to slide or otherwise move out of the recess. In some embodiments, the recess may be formed in the band and the lug may be affixed or incorporated into the device.

[0105] A user may change combinations of bands and electronic devices, thereby permitting mixing and matching of the two categories. It should be appreciated that devices having other forms and/or functions may include similar recesses and may releasably mate with a lug and/or band incorporating a lug. In this fashion, an ecosystem of bands and devices may be envisioned, each of which is compatible with another. A single band may be used to connect to devices, as one further example; in such embodiments the band may include electrical interconnections that permit the two devices to transmit signals to one another and thereby interact with one another.

[0106] In many embodiments, the electronic device may keep and display time, essentially functioning as a wristwatch among other things. Time may be displayed in an analog or digital format, depending on the device, its settings, and (in some cases) a user's preferences. Typically, time is displayed on a digital display stack forming part of the exterior of the device.

[0107] The display stack may include a cover element, such as a cover glass, overlying a display. The cover glass need not necessarily be formed from glass, although that is an option; it may be formed from sapphire, zirconia, alumina, chemically strengthened glass, hardened plastic and so on. Likewise, the display may be a liquid crystal display, an organic light-emitting diode display, or any other suitable display technology. Among other elements, the display stack may include a backlight in some embodiments.

[0108] The device may also comprise one or more touch sensors to determine a location of a touch on the cover glass. A touch sensor may be incorporated into or on the display stack in order to determine a location of a touch. The touch sensor may be self-capacitive in certain embodiments, mutual-capacitive in others, or a combination thereof.

[0109] Similarly, the device may include a force sensor to determine an amount of force applied to the cover glass. The force sensor may be a capacitive sensor in some embodiments and a strain sensor in other embodiments. In either embodiment, the force sensor is generally transparent and made from transparent materials, or is located beneath or away from the display in order not to interfere with the view of the display. The force sensor may, for example, take the form of two capacitive plates separated by silicone or another deformable material. As the capacitive plates move closer together under an external force, the change in capacitance may be measured and a value of the external force correlated from the capacitance change. Further, by comparing relative capacitance changes from multiple points on the force sensor, or from multiple force sensors, a location or locations at which force is exerted may be determined. In one embodiment the force sensor may take the form of a gasket extending beneath the periphery of the display. The gasket may be segmented or unitary, depending on the embodiment.

[0110] The electronic device may also provide alerts to a user. An alert may be generated in response to: a change in status of the device (one example of which is power running low); receipt of information by the device (such as receiving a message); communications between the device and another mechanism/device (such as a second type of device informing the device that a message is waiting or communication is in progress); an operational state of an application (such as, as part of a game, or when a calendar appointment is imminent) or the operating system (such as when the device powers on or shuts down); and so on. The number and types of triggers for an alert are various and far-ranging.

[0111] The alert may be auditory, visual, haptic, or a combination thereof. A haptic actuator may be housed within the device and may move linearly to generate haptic output (although in alternative embodiments the haptic actuator may be rotary or any other type). A speaker may provide auditory components of an alert and the aforementioned display may provide visual alert components. In some embodiments a dedicated light, display, or other visual output component may be used as part of an alert.

[0112] The auditory, haptic, and/or visual components of the alert may be synchronized to provide an overall experience to a user. One or more components may be delayed relative to other components to create a desired synchronization among them. The components may be synchronized so that they are perceived substantially simultaneously; as one example, a haptic output may be initiated slightly before an auditory output since the haptic output may take longer to be perceived than the audio. As another example, a haptic output (or portion thereof) may be initiated substantially before the auditory output, but at a weak or even subliminal level, thereby priming the wearer to receive the auditory output.

[0113] The example electronic device may communicate with other electronic devices either through a wired connection or wirelessly. Data may be passed between devices, permitting one device to relay information to another; control another; employ another's sensors, outputs, and/or inputs; and so on. FIG. 13 depicts a user 1300 wearing a first electronic device 1302 with a second electronic device 1304 in his pocket. Data may be wirelessly transmitted between the electronic devices 1302, 1304, thereby permitting the user 1300 to receive, view, and interact with data from the second device 1304 by means of the first electronic device 1302. Thus, the user 1300 may have access to part or all of the second device's functionality through the first electronic device 1302 without actually needing to interact directly with the second device 1304. In some examples, the second electronic device 1304 may be an example of the electronic device 110.

[0114] Further, the electronic devices 1302, 1304 may cooperate not only to share data, but to share functionality as well. For example, one of the two devices may incorporate a sensor, application, or function that the other lacks. The electronic device lacking such capabilities may request them from the other device, which may share wirelessly with the requesting device. Thus, multiple devices may operate together to provide expanded functions, software, access, and the like between the two and ultimately to a user. As one non-limiting example, the electronic device 1302 may be unable to place or receive telephone calls while the second device 1304 may be able to do so. A user may nonetheless make and/or receive calls through the first device 1302, which may employ the second device 1304 to actually place or accept a call.

[0115] As another non-limiting example, an electronic device 1302 may wirelessly communicate with a sales terminal nearby, thus permitting a user to quickly and efficiently conduct a transaction such as selling, buying, or returning a good. The electronic device may use near field communications technology to perform these and other functions.

[0116] As mentioned above, a band may be connected to two electronic devices and may serve as a wired communication path between the two. As another example, the devices may communicate wirelessly, thereby permitting one device to relay information from a second to a user. This latter example may be particularly useful when the second is inaccessible.

[0117] Certain embodiments may incorporate one or more biometric sensors to measure certain physiological characteristics of a user. The device may include a photoplesymogram sensor to determine a user's heart rate or blood oxygenation levels, for example. The device may also or instead include electrodes to measure the body impedance of a user, which may permit the device to estimate body fat percentages, the body's electrical activity, body impedance, and so on. Also include blood pressure, ultraviolet exposure, etc. Depending on the sensors incorporated into or associated with the electronic device, a variety of user characteristics may be measured and/or estimated, thereby permitting different health data to be provided to a user. In some examples, the sensed biometric data may be used, in part, to determine the historic, current, and/or predicted activity data of the user.

[0118] Certain embodiments may be wirelessly charged. For example, an inductive charging base may transmit power to an inductive receiver within the device in order to charge a battery of the device. Further, by varying the inductive field between the device and base, data may be communicated between the two. As one simple non-limiting example, this may be used to wake the base from a low-power sleep state to an active charging state when the device is placed on the base. Other wireless charging systems may also be used (e.g., near field magnetic resonance and radio frequency). Alternatively, the device may also employ wired charging through electrodes.

[0119] In certain embodiments, the device may include a rotary input, which may take the form of a crown with a stem. The crown and stem may be rotated to provide the rotary input. Rotation of the stem and/or crown may be sensed optically, electrically, magnetically, or mechanically. Further, in some embodiments the crown and stem may also move laterally, thereby providing a second type of input to the device.

[0120] The electronic device may likewise include one or more buttons. The button(s) may be depressed to provide yet another input to the device. In various embodiments, the button may be a dome switch, rocker switch, electrical contact, magnetic switch, and so on. In some embodiments the button may be waterproof or otherwise sealed against the environment.

[0121] Various embodiments may include or otherwise incorporate one or more motion sensors. A motion sensor may detect motion of the device and provide, modify, cease, or otherwise affect a state, output, or input of the device or associated applications based on the motion. As non-limiting examples, a motion may be used to silence the device or acknowledge an alert generated by the device. Sample motion sensors include accelerometers, gyroscopic sensors, magnetometers, GPS sensors, distance sensors, and so on. Some embodiments may use a GPS sensor to facilitate or enable location and/or navigation assistance.

[0122] As shown in FIG. 12, the device 1200 may also include one or more acoustic elements, including a speaker 1214 and/or a microphone 1216. The speaker 1214 may include drive electronics or circuitry and may be configured to produce an audible sound or acoustic signal in response to a command or input. Similarly, the microphone 1216 may also include drive electronics or circuitry and is configured to receive an audible sound or acoustic signal in response to a command or input. The speaker 1214 and the microphone 1216 may be acoustically coupled to port or opening in the case that allows acoustic energy to pass, but may prevent the ingress of liquid and other debris.

[0123] Certain embodiments may incorporate an ambient light sensor. The ambient light sensor may permit the device to sense a brightness of its environment and adjust certain operational parameters accordingly. For example, the electronic device may modify a brightness of a display in response to the sensed ambient light. As another example, the electronic device may turn the display off if little or no light is sensed for a period of time.

[0124] These and other functions, operations, and abilities of the electronic device will be apparent upon reading the specification in its entirety.

[0125] Certain embodiments of a wearable electronic device may include one or more sensors that can be used to calculate a health metric or other health-related information. As one example, a wearable electronic device may function as a wearable health assistant that provides health-related information (whether real-time or not) to the user, authorized third parties, and/or an associated monitoring device.

[0126] FIG. 14 depicts an example electronic device 1400 having one or more biometric sensors. The electronic device 1400 is an example of the wearable device 102. As shown in FIG. 14, an array of light sources and a photodetector 1451-1454 may be disposed on the rear surface of the device 1400. In one example, the light sources 1451-1453 are formed from light emitting diode (LED) elements that are configured to emit light into a portion of the wearer's body (e.g., wrist). The photodetector 1454 is shared between the multiple light sources 1451-1453 and is configured to receive light reflected from the body. The photodetector may be formed from a photodiode material that is configured to produce a signal based on the received light. In one implementation, the signal produced by the photodetector 1454 is used to compute a health metric associated with the wearer. In some cases, the light sources 1451-1453 and the photodetector 1454 form a photoplethysmography (PPG) sensor. The first light source 1451 may include, for example, a green LED, which may be adapted for detecting blood perfusion in the body of the wearer. The second light source 1452 may include, for example, an infrared LED, which may be adapted to detect changes in water content or other properties of the body. The third 1453 light source may be a similar type or different types of LED element, depending on the sensing configuration. The optical (e.g., PPG) sensor or sensors may be used to compute various health metrics, including, without limitation, a heart rate, a respiration rate, blood oxygenation level, a blood volume estimate, blood pressure, or a combination thereof. One or more of the light sources 1451-1453 and the photodetector 1454 may also be used for optical data transfer with a base or other device. While FIG. 14 depicts one example embodiment, the number of light sources and/or photodetectors may vary in different embodiments. For example, another embodiment may use more than one photodetector. Another embodiment may also use fewer or more light sources than are depicted in the example of FIG. 14.

[0127] Also as shown in FIG. 14, the device 1400 includes multiple electrodes 1431, 1432, 1433, 1434 that are located on or near external surfaces of the device 1400. In the present example, the device 1400 includes a first electrode 1431 and a second electrode 1432 that are located on or proximate to a rear-facing surface of the device body 1410. In this example, the first electrode 1431 and the second electrode 1432 are configured to make electrical contact with the skin of the user wearing the device 1400. In some cases, the first 1431 and second 1432 electrodes are used to take an electrical measurement or receive an electrical signal from the body of the user. As also shown in FIG. 14, the device 1400 may include a third electrode 1433 and a fourth electrode 1434 that are located on or proximate to a perimeter of the case of the device body 1410. In the present example, the third 1433 and fourth 1434 electrodes are configured to be contacted by one or more fingers of the user who is wearing or interacting with the device 1400. In some cases, the third 1433 and fourth 1434 electrodes are also used to take an electrical measurement or receive an electrical signal from the body of the user. In some cases, the first 1431, second 1432, third 1433, and fourth 1434 electrodes are all used to take a measurement or series of measurements that can be used to compute another health metric of the user's body. Health metrics that may be computed using the electrodes include, without limitation, heart functions (ECG, EKG), water content, body-fat ratios, galvanic skin resistance, and combinations thereof.

[0128] In the configuration depicted in FIG. 14, the electronic device 1400 includes one or more apertures in the case 1410. A light source 1451-1454 may be disposed in each aperture. In one embodiment, each light source 1451-1453 is implemented as a light-emitting diode (LED). In the present example, the four apertures, three light sources 1451-1453, and a single detector 1454 are used to form one or more sensors. Other embodiments can include any number of light sources. For example, two light sources can be used in some embodiments.

[0129] The light sources may operate at the same light wavelength range, or the light sources can operate at different light wavelength ranges. As one example, with two light sources one light source may transmit light in the visible wavelength range while the other light source can emit light in the infrared wavelength range. With four light sources, two light sources may transmit light in the visible wavelength range while the other two light sources can emit light in the infrared wavelength range. For example, in one embodiment, at least one light source can emit light in the wavelength range associated with the color green while another light source transmits light in the infrared wavelength range. When a physiological parameter of the user is to be determined, the light sources emit light toward the user's skin and the optical sensor senses an amount of reflected light. In some cases, a modulation pattern or sequence may be used to turn the light sources on and off and sample or sense the reflected light.

[0130] Illustrative methods and systems for managing user device connections are described above. Some or all of these systems and methods may, but need not, be implemented at least partially by architectures such as those shown at least in FIGS. 1-14 above. While many of the embodiments are described above with reference to personal, activity, and/or health-related information, it should be understood that any type of user information or non-user information (e.g., data of any type) may be managed using these techniques. Further, in the foregoing description, various non-limiting examples were described. For purposes of explanation, specific configurations and details are set forth in order to provide a thorough understanding of the examples. However, it should also be apparent to one skilled in the art that the examples may be practiced without the specific details. Furthermore, well-known features were sometimes omitted or simplified in order not to obscure the example being described.

[0131] The various embodiments further can be implemented in a wide variety of operating environments, which in some cases can include one or more user computers, computing devices or processing devices which can be used to operate any of a number of applications. User or client devices can include any of a number of general purpose personal computers, such as desktop or laptop computers running a standard operating system, as well as cellular, wireless and handheld devices running mobile software and capable of supporting a number of networking and messaging protocols. Such a system also can include a number of workstations running any of a variety of commercially-available operating systems and other known applications for purposes such as development and database management. These devices also can include other electronic devices, such as dummy terminals, thin-clients, gaming systems, and other devices capable of communicating via a network.

[0132] Most embodiments utilize at least one network that would be familiar to those skilled in the art for supporting communications using any of a variety of commercially-available protocols, such as TCP/IP, OSI, FTP, UPnP, NFS, CIFS, and AppleTalk. The network can be, for example, a local area network, a wide-area network, a virtual private network, the Internet, an intranet, an extranet, a public switched telephone network, an infrared network, a wireless network, and any combination thereof.

[0133] In embodiments utilizing a network server, the network server can run any of a variety of server or mid-tier applications, including HTTP servers, FTP servers, CGI servers, data servers, Java servers, and business application servers. The server(s) may also be capable of executing programs or scripts in response to requests from user devices, such as by executing one or more applications that may be implemented as one or more scripts or programs written in any programming language, such as Java®, C, C# or C++, or any scripting language, such as Perl, Python or TCL, as well as combinations thereof. The server(s) may also include database servers, including without limitation those commercially available from Oracle®, Microsoft®, Sybase®· and IBM®.

[0134] The environment can include a variety of data stores and other memory and storage media as discussed above. These can reside in a variety of locations, such as on a storage medium local to (and/or resident in) one or more of the computers or remote from any or all of the computers across the network. In a particular set of embodiments, the information may reside in a storage-area network (SAN) familiar to those skilled in the art. Similarly, any necessary files for performing the functions attributed to the computers, servers or other network devices may be stored locally and/or remotely, as appropriate. Where a system includes computerized devices, each such device can include hardware elements that may be electrically coupled via a bus, the elements including, for example, at least one central processing unit (CPU), at least one input device (e.g., a mouse, keyboard, controller, touch screen, or keypad), and at least one output device (e.g., a display device, printer, or speaker). Such a system may also include one or more storage devices, such as disk drives, optical storage devices, and solid-state storage devices such as RAM or ROM, as well as removable media devices, memory cards, flash cards, etc.

[0135] Such devices also can include a computer-readable storage media reader, a communications device (e.g., a modem, a network card (wireless or wired), an infrared communication device, etc.), and working memory as described above. The computer-readable storage media reader can be connected with, or configured to receive, a non-transitory computer-readable storage medium, representing remote, local, fixed, and/or removable storage devices as well as storage media for temporarily and/or more permanently containing, storing, transmitting, and retrieving computer-readable information. The system and various devices also typically will include a number of software applications, modules, services, or other elements located within at least one working memory device, including an operating system and application programs, such as a client application or browser. It should be appreciated that alternate embodiments may have numerous variations from that described above. For example, customized hardware might also be used and/or particular elements might be implemented in hardware, software (including portable software, such as applets) or both. Further, connection to other computing devices such as network input/output devices may be employed.

[0136] Non-transitory storage media and computer-readable media for containing code, or portions of code, can include any appropriate media known or used in the art, including storage media, such as, but not limited to, volatile and non-volatile, removable and non-removable media implemented in any method or technology for storage of information such as computer-readable instructions, data structures, program modules, or other data, including RAM, ROM, Electrically Erasable Programmable Read-Only Memory (EEPROM), flash memory or other memory technology, CD-ROM, DVD or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the desired information and which can be accessed by a system device. Based on the disclosure and teachings provided herein, a person of ordinary skill in the art will appreciate other ways and/or methods to implement the various embodiments.

[0137] The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense. It will, however, be evident that various modifications and changes may be made thereunto without departing from the broader spirit and scope of the disclosure as set forth in the claims.

[0138] Other variations are within the spirit of the present disclosure. Thus, while the disclosed techniques are susceptible to various modifications and alternative constructions, certain illustrated embodiments thereof are shown in the drawings and have been described above in detail. It should be understood, however, that there is no intention to limit the disclosure to the specific form or forms disclosed, but on the contrary, the intention is to cover all modifications, alternative constructions and equivalents falling within the spirit and scope of the disclosure, as defined in the appended claims.

[0139] The use of the terms “a” and “an” and “the” and similar referents in the context of describing the disclosed embodiments (especially in the context of the following claims) are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The terms “comprising,” “having,” “including,” and “containing” are to be construed as open-ended terms (e.g., meaning “including, but not limited to,”) unless otherwise noted. The term “connected” is to be construed as partly or wholly contained within, attached to, or joined together, even if there is something intervening. Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (e.g., “such as”) provided herein, is intended merely to better illuminate embodiments of the disclosure and does not pose a limitation on the scope of the disclosure unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the disclosure.

[0140] Disjunctive language such as the phrase "at least one of X, Y, or Z," unless specifically stated otherwise, is otherwise understood within the context as used in general to present that an item, term, etc., may be either X, Y, or Z, or any combination thereof (e.g., X, Y, and/or Z). Thus, such disjunctive language is not generally intended to, and should not, imply that certain embodiments require at least one of X, at least one of Y, or at least one of Z to each be present.

[0141] Preferred embodiments of this disclosure are described herein, including the best mode known to the inventors for carrying out the disclosure. Variations of those preferred embodiments may become apparent to those of ordinary skill in the art upon reading the foregoing description. The inventors expect skilled artisans to employ such variations as appropriate, and the inventors intend for the disclosure to be practiced otherwise than as specifically described herein. Accordingly, this disclosure includes all modifications and equivalents of the subject matter recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the disclosure unless otherwise indicated herein or otherwise clearly contradicted by context.

[0142] All references, including publications, patent applications, and patents, cited herein are hereby incorporated by reference to the same extent as if each reference were individually and specifically indicated to be incorporated by reference and were set forth in its entirety herein.

WHAT IS CLAIMED IS:

1. A computer-implemented method, comprising:

receiving a first input at a user interface of a device to initiate a breathing sequence;

during a configuration phase of the breathing sequence, receiving a second input at the user interface including configuration information corresponding to the breathing sequence, at least a part of the configuration information defining a variable time period for the breathing sequence;

during a preliminary phase of the breathing sequence, presenting a first version of a fluctuating progress indicator on the user interface, the fluctuating progress indicator comprising a plurality of variable visual characteristics, the fluctuating progress indicator fluctuating at a first cyclic rate, the first cyclic rate being determined by an estimated breathing pattern; and

during a breathing phase of the breathing sequence occurring subsequent to the preliminary phase, presenting a second version of the fluctuating progress indicator on the user interface, the second version of the fluctuating progress indicator fluctuating at a second cyclic rate different than the first cyclic rate, the second cyclic rate being determined by the defined variable time period.

2. The computer-implemented method of claim 1, wherein the second version of the fluctuating progress indicator having a first variable visual characteristic of the plurality of variable visual characteristics that changes with respect to a duration of the defined variable time period and having a second variable visual characteristic of the plurality of variable visual characteristics that changes with respect to a breathing rate.

3. The computer-implemented method of claim 1, wherein the first variable visual characteristic comprises a complexity of the fluctuating progress indicator, and wherein the second variable visual characteristic comprises a visibility characteristic of the fluctuating progress indicator.

4. The computer-implemented method of claim 3, wherein the plurality of variable visual characteristics comprises a third variable visual characteristic comprising an

alignment characteristic of the fluctuating progress indicator that changes with respect to the breathing rate during the breathing phase of the breathing sequence.

5. The computer-implemented method of claim 1, wherein the second input is received by an electro-mechanical input component on the device.

6. The computer-implemented method of claim 1, wherein the second input is received at a rotatable dial of the device.

7. The computer-implemented method of claim 1, wherein the presented fluctuating progress indicator comprises a plurality of presented overlapping graphical elements circularly disposed relative to a center of the fluctuating progress indicator.

8. The computer-implemented method of claim 1, wherein the part of the configuration information that defines the variable time period also defines a number of presented overlapping elements included in the second version of the presented fluctuating progress indicator.

9. The computer-implemented method of claim 1, further comprising:

during the preliminary phase of the breathing sequence, estimating, based at least in part on signal information obtained by the device, the estimated breathing pattern; and

initiating the breathing phase of the breathing sequence by at least presenting, based at least in part on a synchronization of the initial cyclic breathing pattern and the breathing sequence, the second version of the fluctuating progress indicator.

10. The computer-implemented method of claim 9, wherein obtaining the signal information by the device further comprises using sensors to obtain the signal information

11. A system for enabling a breathing exercise including a breathing sequence, comprising:

a memory configured to store computer-executable instructions;

an input component;

a processor in communication with the memory configured to execute the computer-executable instructions; and a display for presenting:

a first graphical user interface during a configuration phase of the breathing sequence in response to an input received at the input component, the graphical user interface including configuration information corresponding to the breathing sequence, at least a part of the configuration information defining a variable time period for the breathing sequence;

a second graphical user interface during a preliminary phase of the breathing sequence, the second graphical user interface presenting a first version of a fluctuating progress indicator on the second graphical user interface, the fluctuating progress indicator comprising a plurality of variable visual characteristics, the fluctuating progress indicator fluctuating at a first cyclic rate, the first cyclic rate being determined by an estimated breathing pattern; and

a third graphical user interface during a breathing phase of the breathing sequence occurring subsequent to the preliminary phase, the third graphical user interface presenting a second version of the fluctuating progress indicator on the third graphical user interface, the second version of the fluctuating progress indicator fluctuating at a second cyclic rate different than the first cyclic rate, the second cyclic rate being determined by the defined variable time period.

12. The system of claim 11, further comprising an electro-mechanical input device configured to receive input corresponding to the breathing sequence.

13. The system of claim 12, wherein the memory, the input component, the processor, the display, and the electro-mechanical input device are included in a wearable device.

14. The system of claim 13, wherein the electro-mechanical input device comprises a rotatable dial disposed at an exterior surface of the wearable device, and wherein the configuration information is received in response to rotating the rotatable dial.

15. The system of claim 12, wherein the part of the configuration information is a first part of the configuration information, and wherein, during the configuration phase, the configuration information is received in response to a second input at the electro-mechanical

input device, at least a second part of the configuration information defining a breathing pattern for the breathing sequence.

16. The system of claim 11, wherein the input received at the input component comprises at least one of:

a first user input received at the input component in response to presentation of a miniaturized version of the fluctuating progress indicator on the display;

a second user input received at the input component in response to a first notification presented on the display;

a third user input received at the input component in response to a second notification presented on the display, the second notification based at least in part on first sensor information indicating completion of one or more breathing events corresponding to a predetermined breathing initiation sequence; or

a fourth user input received at the input component in response to a third notification presented on the display, the third notification based at least in part on calendar information.

17. The system of claim 11, wherein the second version of the fluctuating progress indicator having a first variable visual characteristic of the plurality of variable visual characteristics that changes with respect to a duration of the defined variable time period and having a second variable visual characteristic of the plurality of variable visual characteristics that changes with respect to a breathing rate.

18. One or more computer-readable storage media storing computer-executable instructions that, when executed by a processor, configure the processor to perform operations comprising:

receiving a request to begin a breathing sequence, the breathing sequence configured to occur for a variable time period;

presenting, during a configuration phase of the breathing sequence, a fluctuating progress indicator that represents a suggested breathing pattern for a user for the breathing sequence, the fluctuating progress indicator comprising a set of variable visual elements and being configured to change from an initial version to a final version as time progresses during the variable time period;

presenting the initial version of the fluctuating progress indicator corresponding to an initial period of the variable time period of the breathing sequence, the initial version of the fluctuating progress indicator having an initial subset of variable visible elements of the set of variable visible elements;

presenting, in accordance with a suggested breathing rate, one or more additional versions of the fluctuating progress indicator corresponding to one or more additional periods of the variable time period, the one or more additional versions of the fluctuating progress indicator having progressively fewer variable visible elements than included in the initial subset of variable visible elements; and

presenting the final version of the fluctuating progress indicator corresponding to a final period of the breathing sequence, the final version of the fluctuating progress indicator having a final subset of variable visible elements of the set of variable visible elements.

19. The one or more computer-readable storage media of claim 18, wherein the computer-executable instructions, when executed by the processors, further configure the processor to perform operations comprising:

receiving configuration information comprising a duration of the suggested breathing pattern;

determining, based at least in part on the duration, a cumulative number of suggested breaths to be performed during the breathing sequence; and

during the configuration phase, presenting, the duration and the cumulative number of suggested breaths.

20. The one or more computer-readable storage media of claim 19, wherein a number of variable visual elements included in the set of variable visual elements that are visible when the fluctuating progress indicator is presented during the configuration phase of the breathing sequence is based at least in part on the configuration information.

ABSTRACT OF THE DISCLOSURE

A breathing sequence may define a suggested breathing pattern. Input may be received at a user interface of a device to initiate the breathing sequence. The breathing sequence may include a configuration phase in which configuration information may be received. The configuration information may define a variable time period for the breathing sequence. The breathing sequence also may include a preliminary phase during which a first version of a fluctuating progress indicator may be presented on the user interface. The fluctuating progress indicator may include a plurality of variable visual characteristics and may fluctuate at a first cyclic rate. The breathing sequence may also include a breathing phase during which a second version of the fluctuating progress indicator may be presented. The second version of the fluctuating progress indicator may fluctuate at a second cyclic rate according to a breathing rate.

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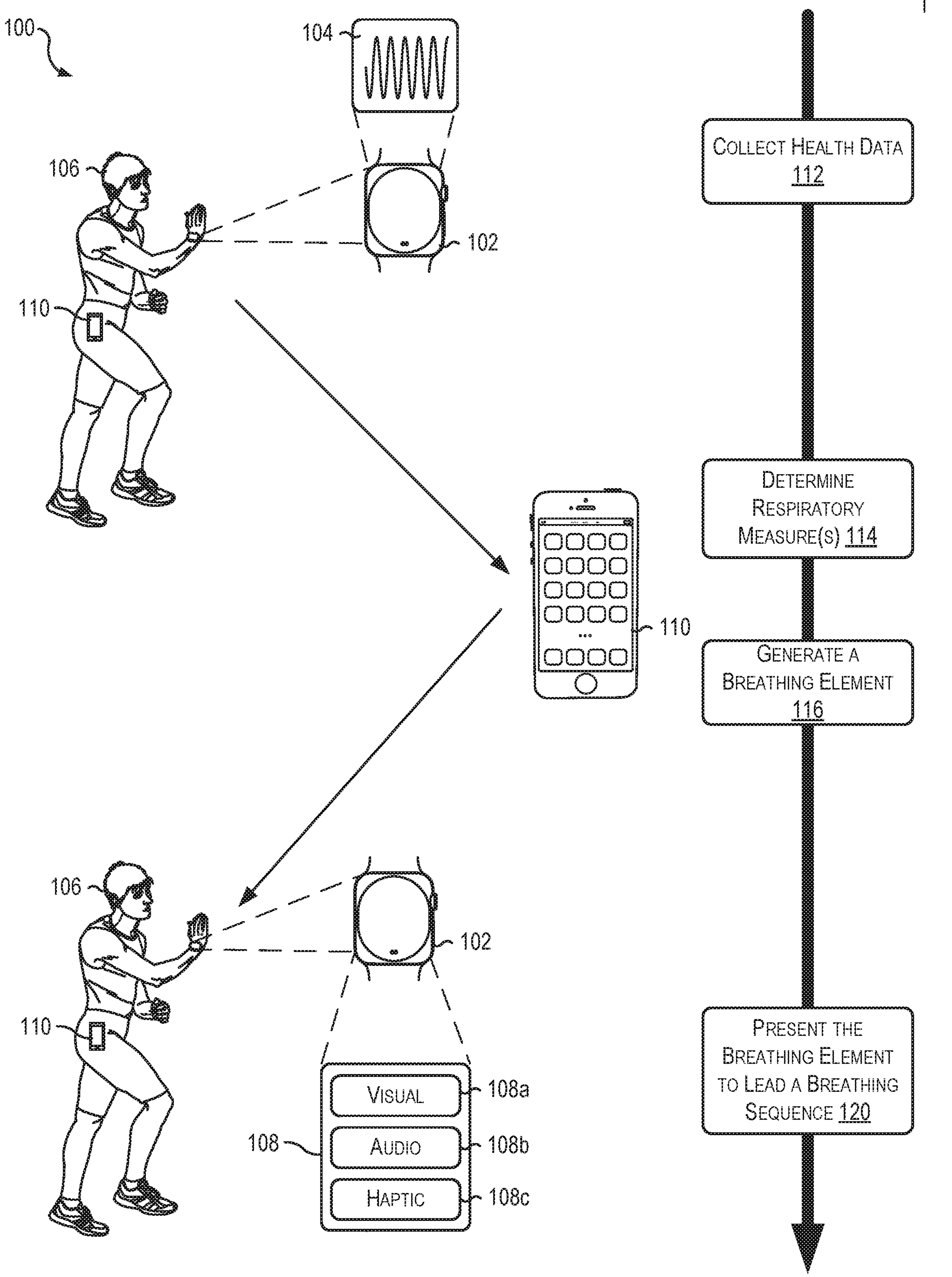
100
104
106
102
110
110
106
102
110
108
Visual
108a
Audio
108b
Haptic
108c
Collect Health Data 112
Determine Respiratory Measure(s) 114
Generate a Breathing Element 116
Present the Breathing Element to Lead a Breathing Sequence 120

FIG. 1

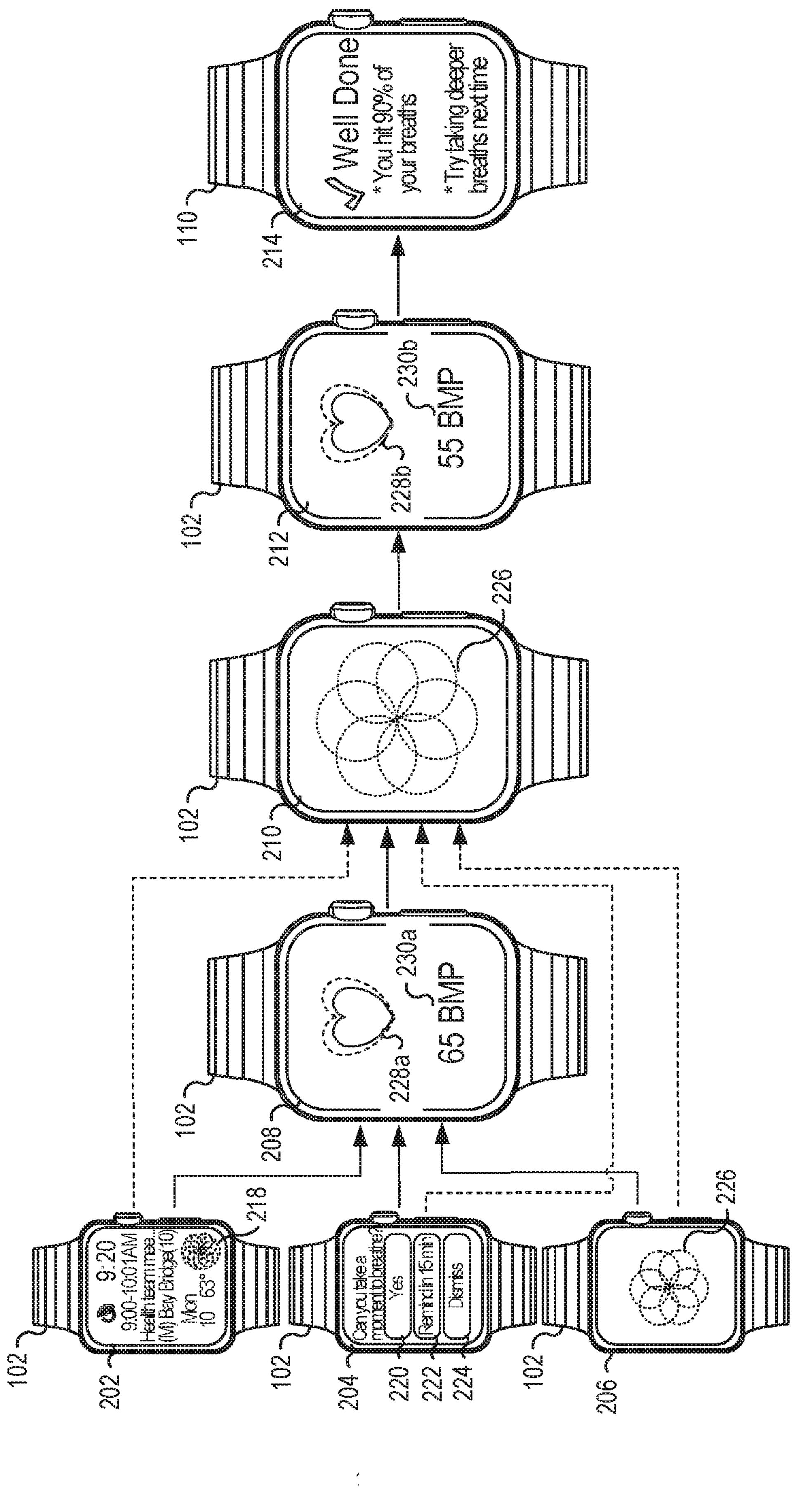
Well Done
* You hit 90% of your breaths
* Try taking deeper breaths next time
55 BMP
65 BMP
9:20
9:00-10:01AM
Health team mee...
(M) Bay Bridge(10)
Mon 10 63°
Can you take a moment to breathe?
Yes
Remind in 15 min
Dismiss
102
110
202
204
206
208
210
212
214
218
220
222
224
226
228a
228b
230a
230b

FIG. 2

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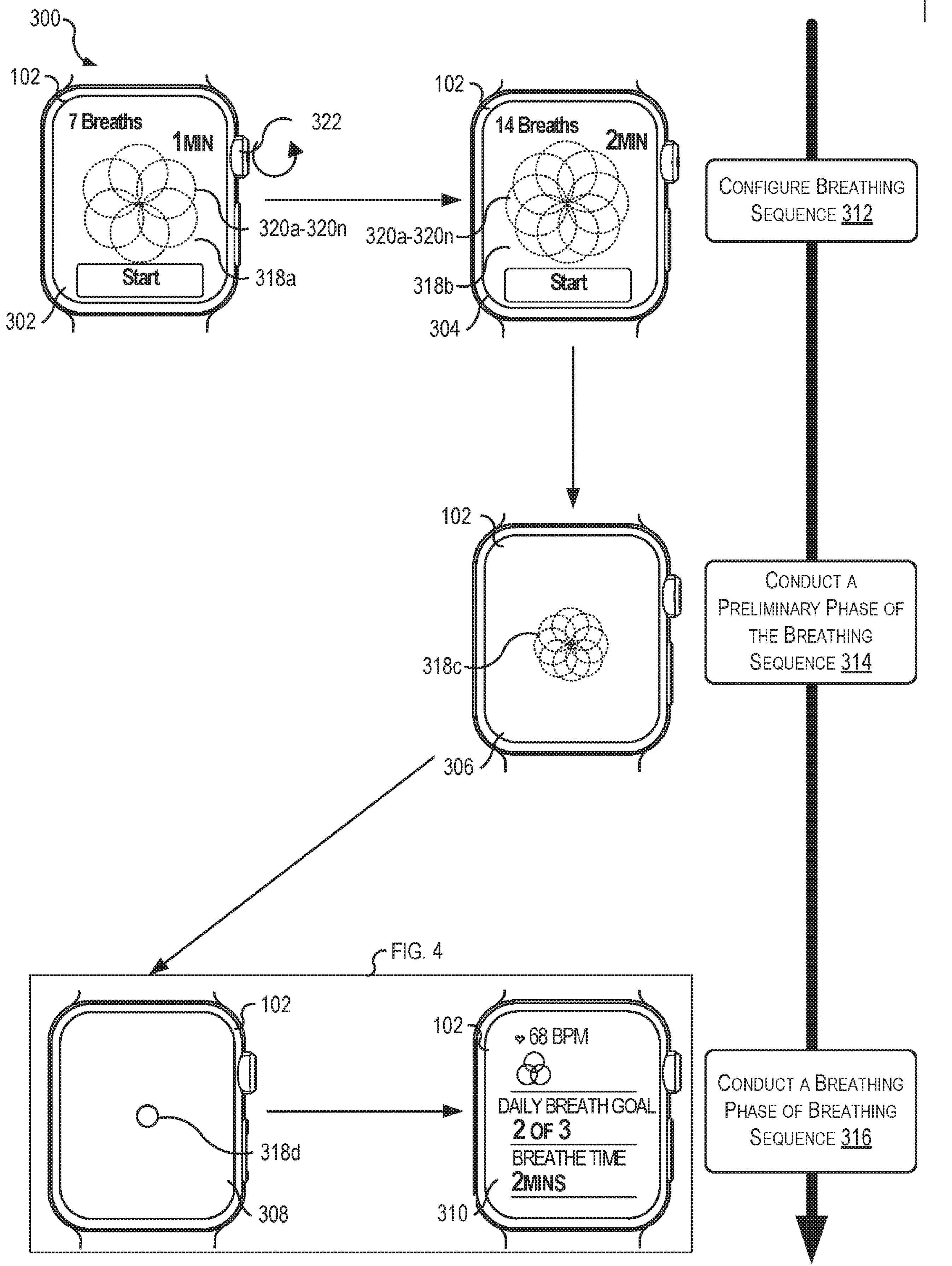
300
102
7 Breaths
1MIN
322
320a-320n
318a
Start
302
102
14 Breaths
2MIN
320a-320n
318b
Start
304
Configure Breathing Sequence 312
102
318c
306
Conduct a Preliminary Phase of the Breathing Sequence 314
FIG. 4
102
318d
308
102
68 BPM
DAILY BREATH GOAL
2 OF 3
BREATHE TIME
2MINS
310
Conduct a Breathing Phase of Breathing Sequence 316

FIG. 3

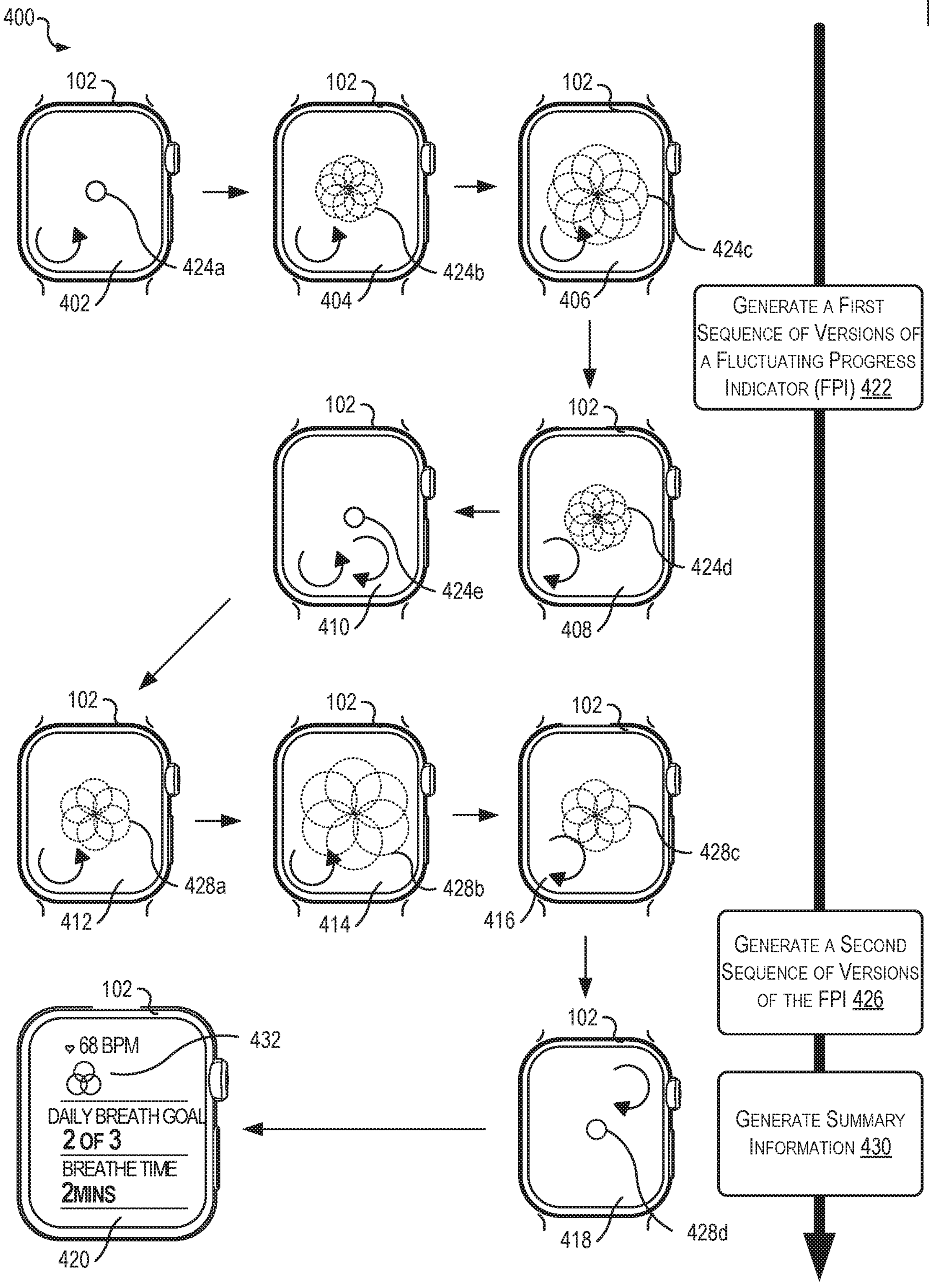
400
102
424a
402
424b
404
424c
406
GENERATE A FIRST SEQUENCE OF VERSIONS OF A FLUCTUATING PROGRESS INDICATOR (FPI) 422
424e
410
424d
408
428a
412
428b
414
428c
416
GENERATE A SECOND SEQUENCE OF VERSIONS OF THE FPI 426
68 BPM
432
DAILY BREATH GOAL
2 OF 3
BREATHE TIME
2MINS
420
418
428d
GENERATE SUMMARY INFORMATION 430

FIG. 4

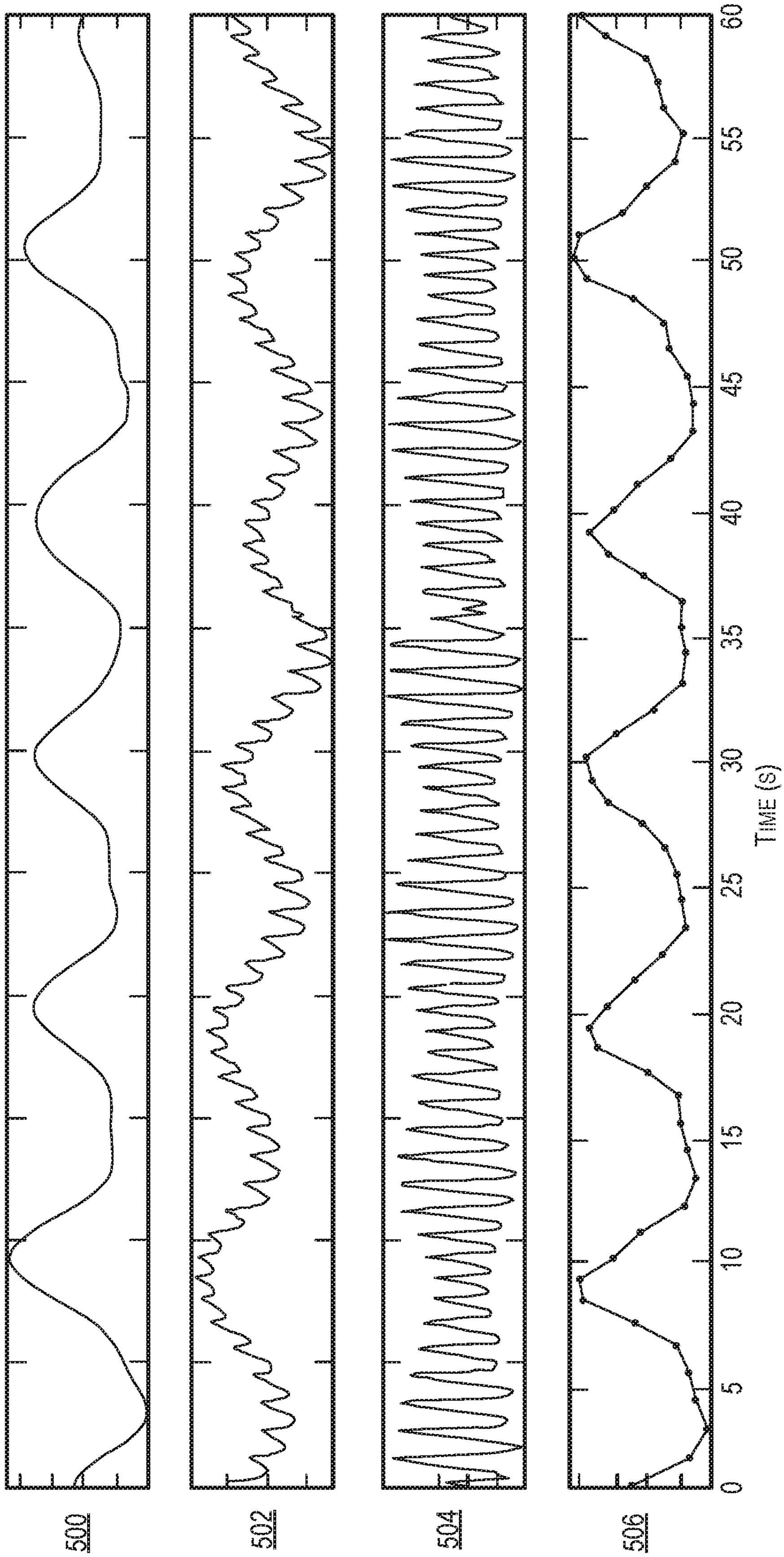

FIG. 5

6/14

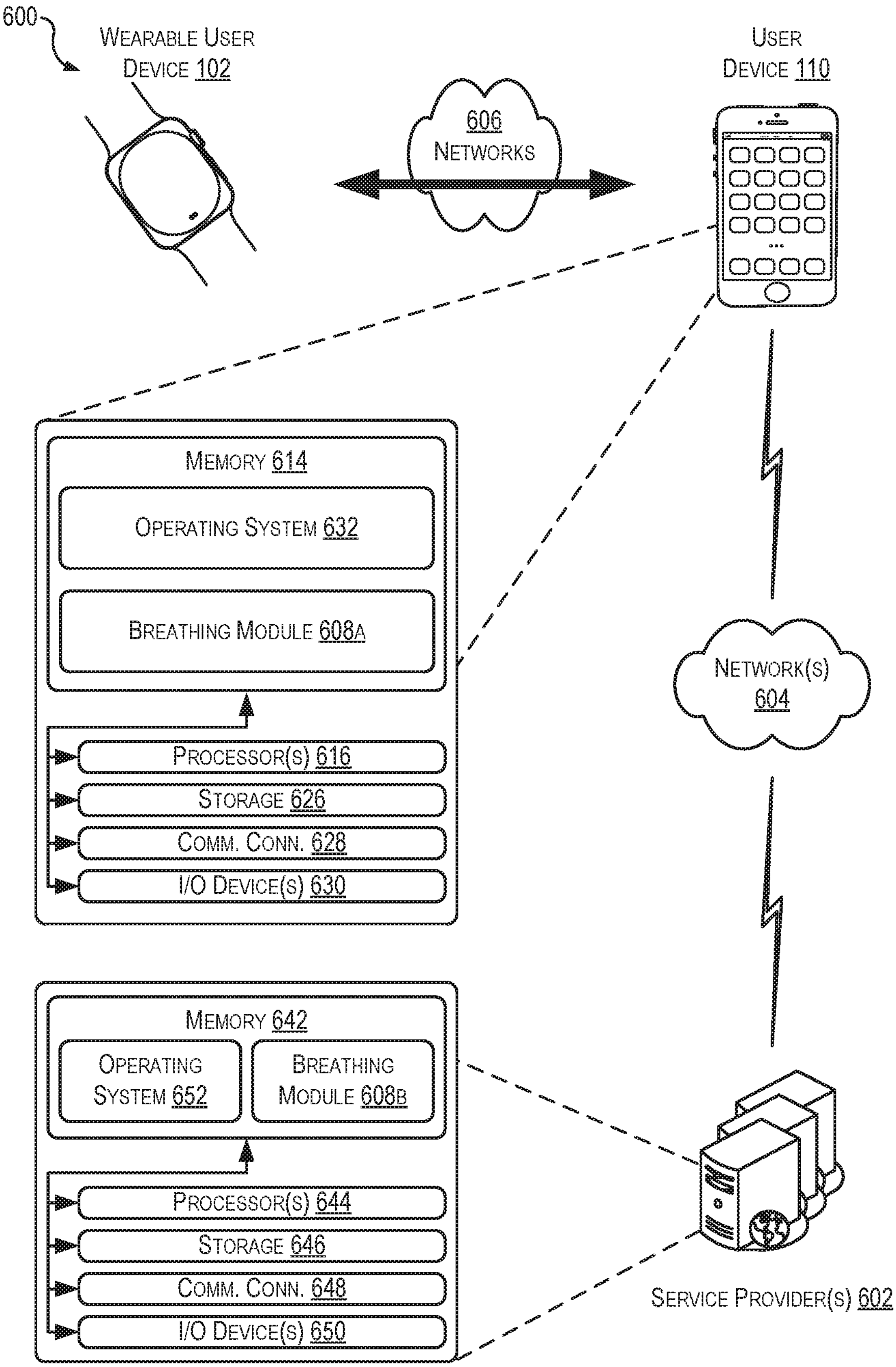
600
Wearable User Device 102
606 Networks
User Device 110
Memory 614
Operating System 632
Breathing Module 608a
Processor(s) 616
Storage 626
Comm. Conn. 628
I/O Device(s) 630
Network(s) 604
Memory 642
Operating System 652
Breathing Module 608b
Processor(s) 644
Storage 646
Comm. Conn. 648
I/O Device(s) 650
Service Provider(s) 602

FIG. 6

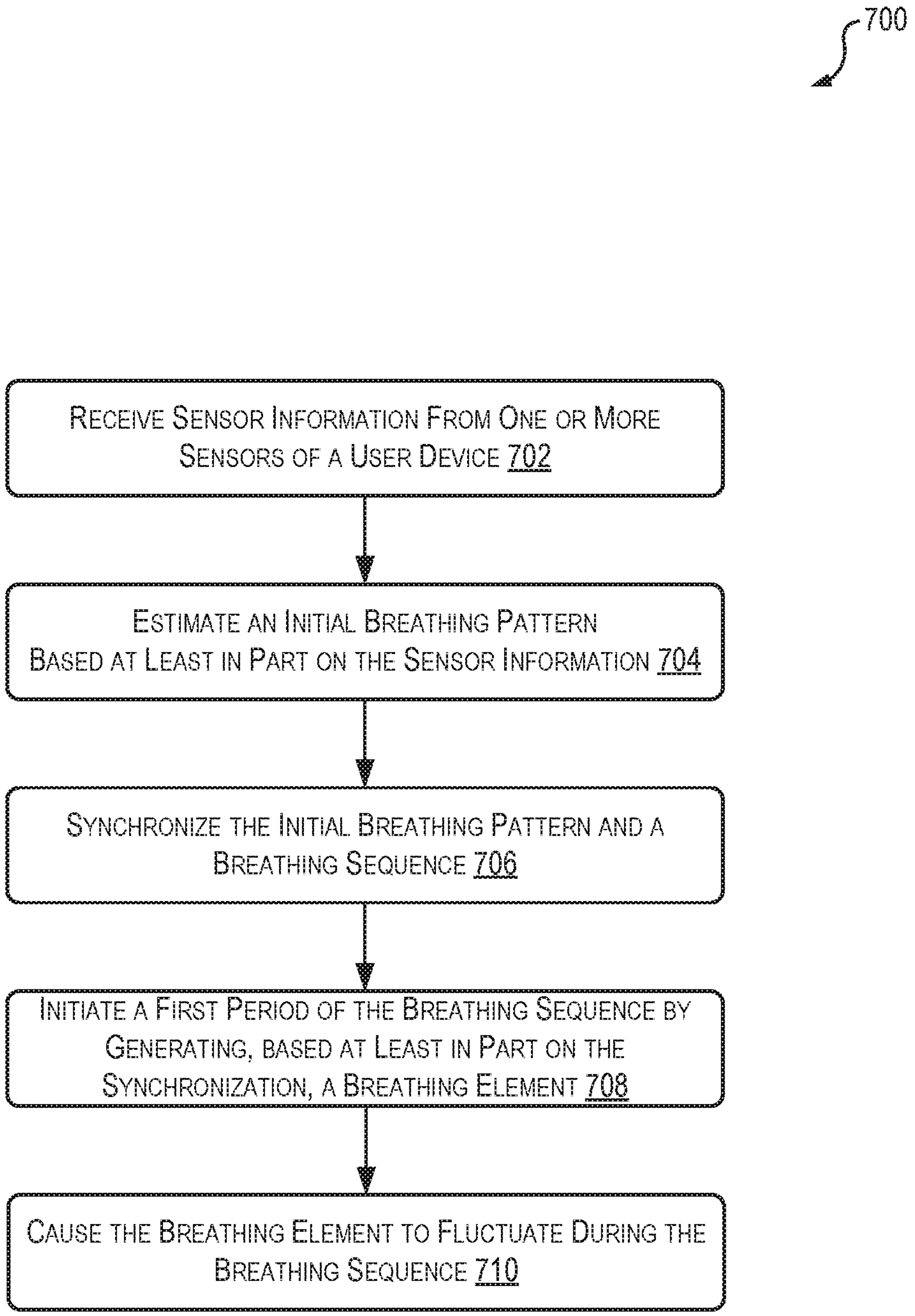
700
RECEIVE SENSOR INFORMATION FROM ONE OR MORE SENSORS OF A USER DEVICE 702
ESTIMATE AN INITIAL BREATHING PATTERN BASED AT LEAST IN PART ON THE SENSOR INFORMATION 704
SYNCHRONIZE THE INITIAL BREATHING PATTERN AND A BREATHING SEQUENCE 706
INITIATE A FIRST PERIOD OF THE BREATHING SEQUENCE BY GENERATING, BASED AT LEAST IN PART ON THE SYNCHRONIZATION, A BREATHING ELEMENT 708
CAUSE THE BREATHING ELEMENT TO FLUCTUATE DURING THE BREATHING SEQUENCE 710

FIG. 7

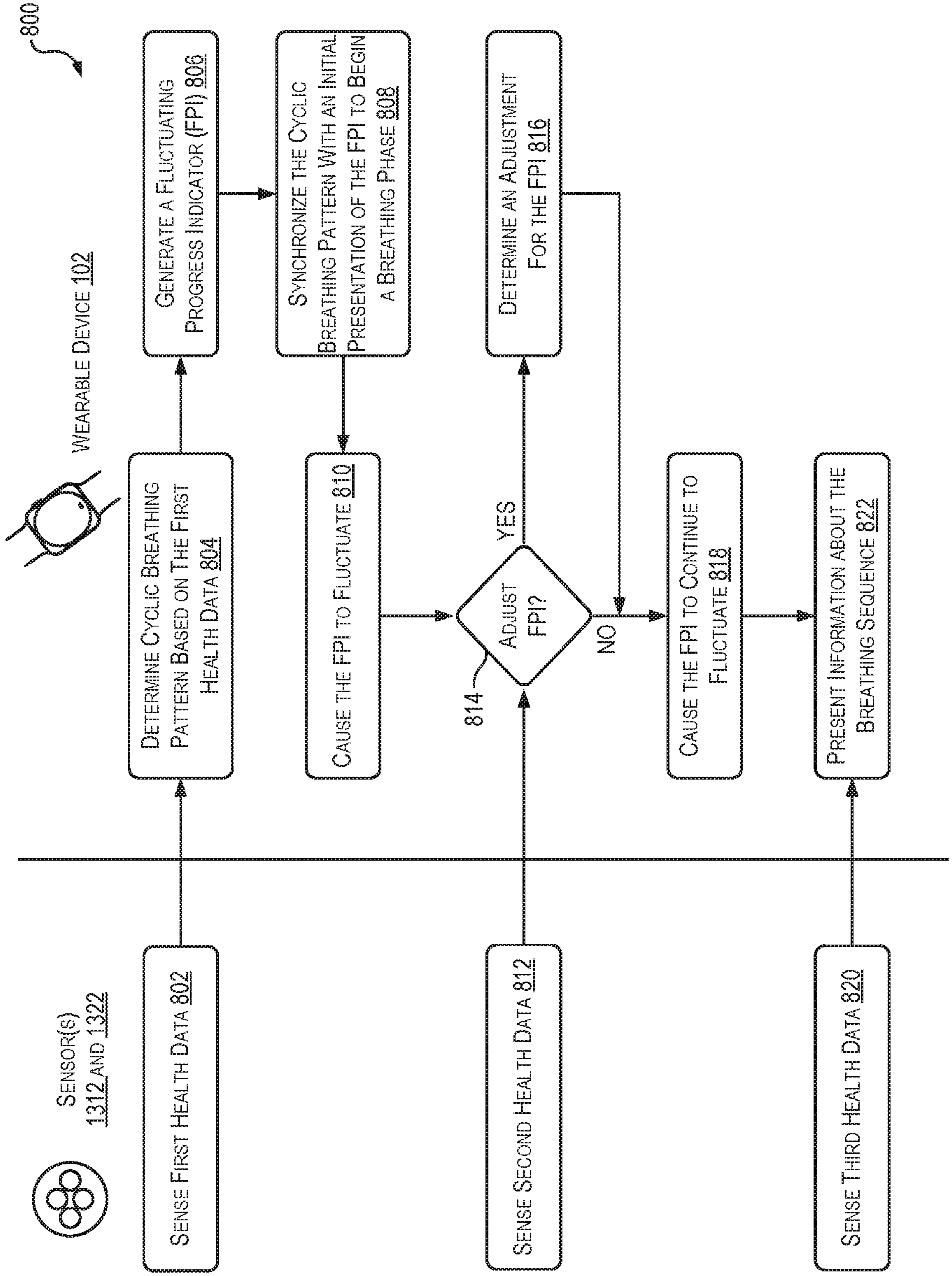
800
Sensor(s)
1312 and 1322
Wearable Device 102
Sense First Health Data 802
Determine Cyclic Breathing Pattern Based on The First Health Data 804
Generate a Fluctuating Progress Indicator (FPI) 806
Synchronize the Cyclic Breathing Pattern With an Initial Presentation of the FPI to Begin a Breathing Phase 808
Cause the FPI to Fluctuate 810
Sense Second Health Data 812
814
Adjust FPI?
Yes
No
Determine an Adjustment For the FPI 816
Cause the FPI to Continue to Fluctuate 818
Sense Third Health Data 820
Present Information About the Breathing Sequence 822

FIG. 8

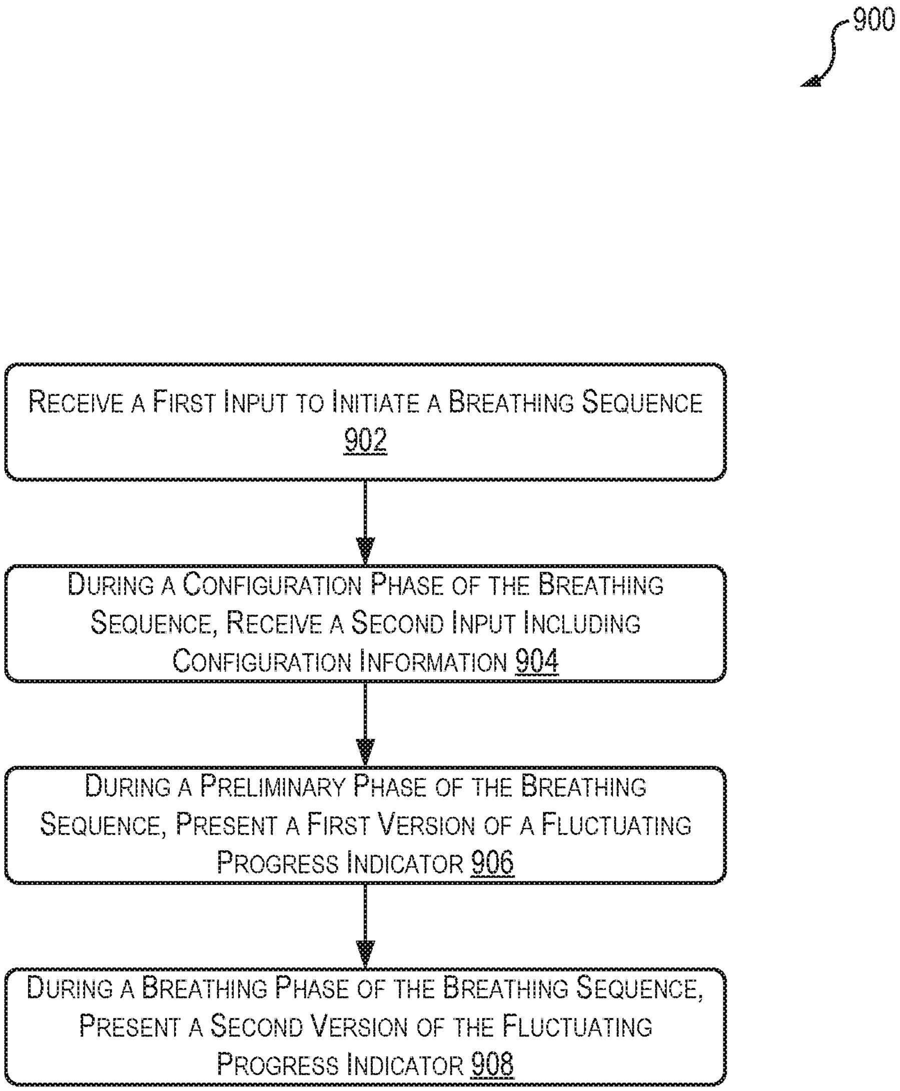
900
Receive a First Input to Initiate a Breathing Sequence 902
During a Configuration Phase of the Breathing Sequence, Receive a Second Input Including Configuration Information 904
During a Preliminary Phase of the Breathing Sequence, Present a First Version of a Fluctuating Progress Indicator 906
During a Breathing Phase of the Breathing Sequence, Present a Second Version of the Fluctuating Progress Indicator 908

FIG. 9

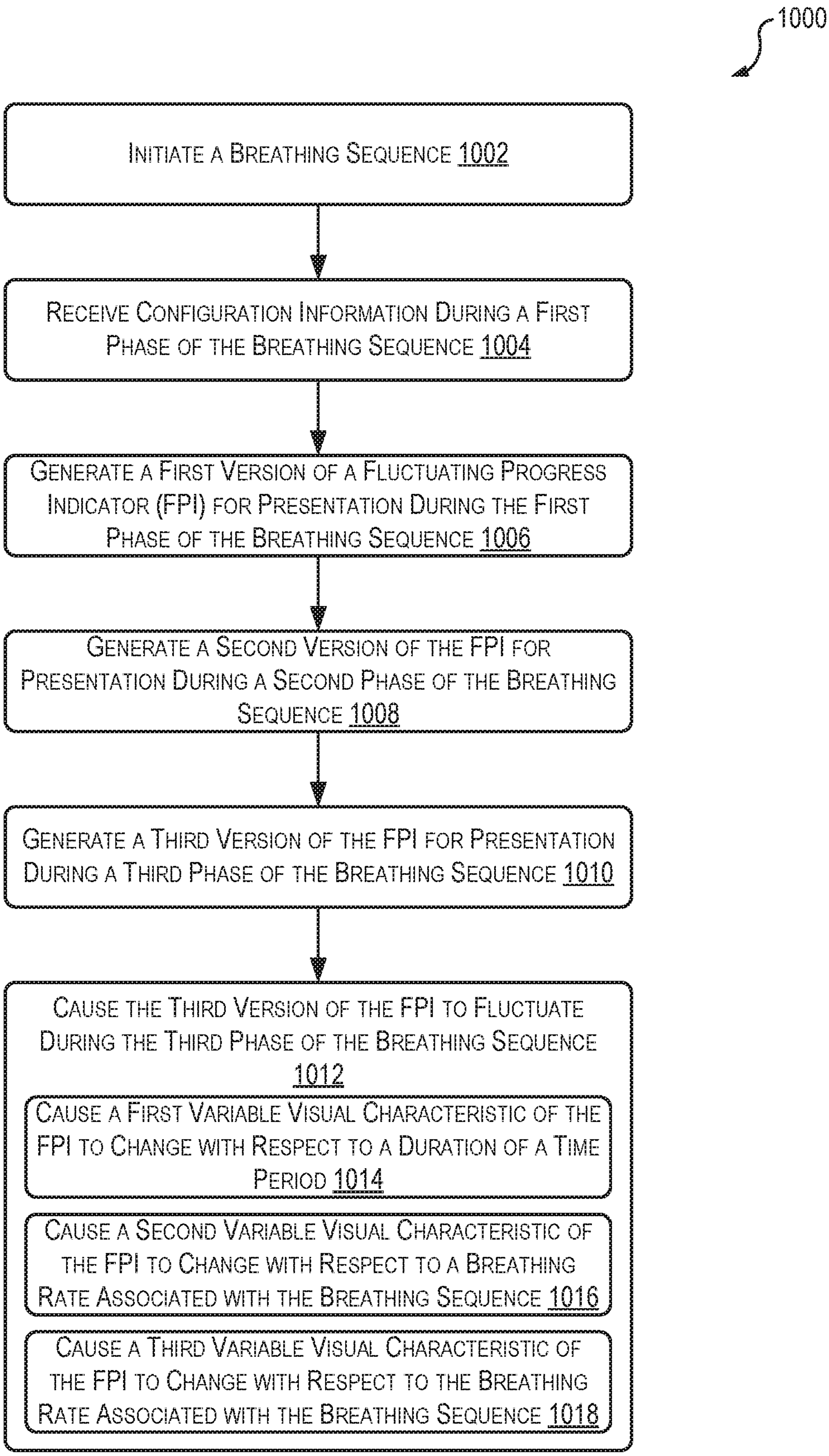
1000
Initiate a Breathing Sequence 1002
Receive Configuration Information During a First Phase of the Breathing Sequence 1004
Generate a First Version of a Fluctuating Progress Indicator (FPI) for Presentation During the First Phase of the Breathing Sequence 1006
Generate a Second Version of the FPI for Presentation During a Second Phase of the Breathing Sequence 1008
Generate a Third Version of the FPI for Presentation During a Third Phase of the Breathing Sequence 1010
Cause the Third Version of the FPI to Fluctuate During the Third Phase of the Breathing Sequence 1012
Cause a First Variable Visual Characteristic of the FPI to Change with Respect to a Duration of a Time Period 1014
Cause a Second Variable Visual Characteristic of the FPI to Change with Respect to a Breathing Rate Associated with the Breathing Sequence 1016
Cause a Third Variable Visual Characteristic of the FPI to Change with Respect to the Breathing Rate Associated with the Breathing Sequence 1018

FIG. 10

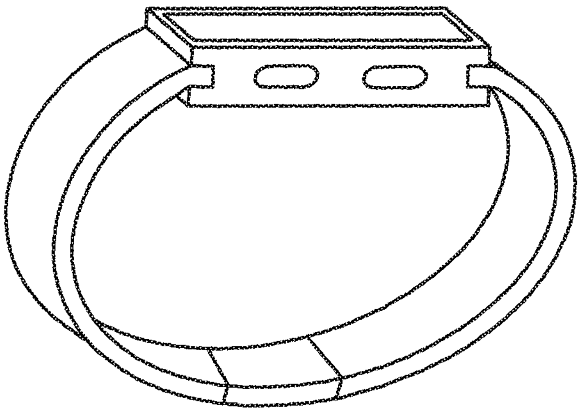

FIG. 11

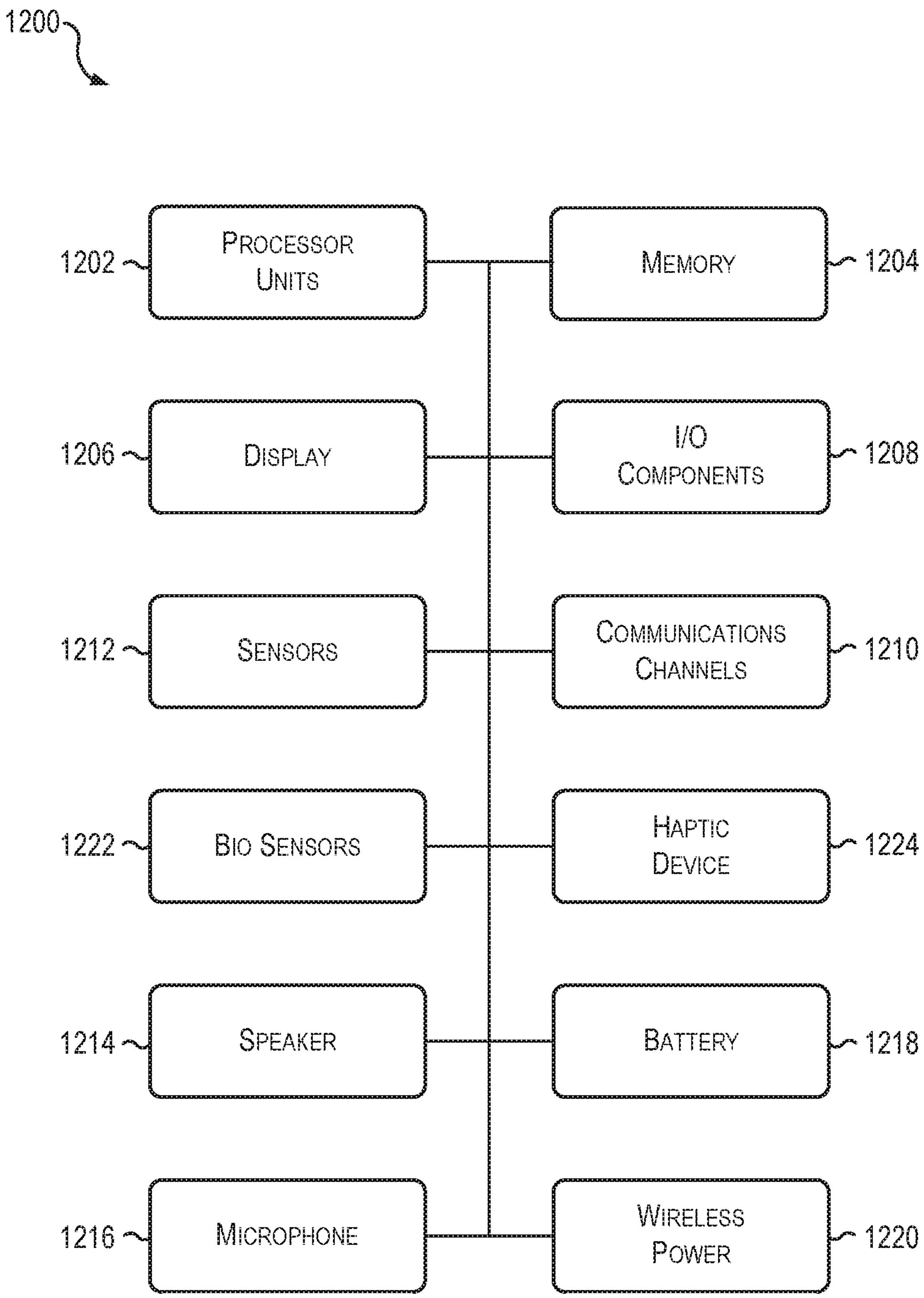
1200
1202
PROCESSOR UNITS
MEMORY
1204
1206
DISPLAY
I/O COMPONENTS
1208
1212
SENSORS
COMMUNICATIONS CHANNELS
1210
1222
BIO SENSORS
HAPTIC DEVICE
1224
1214
SPEAKER
BATTERY
1218
1216
MICROPHONE
WIRELESS POWER
1220

FIG. 12

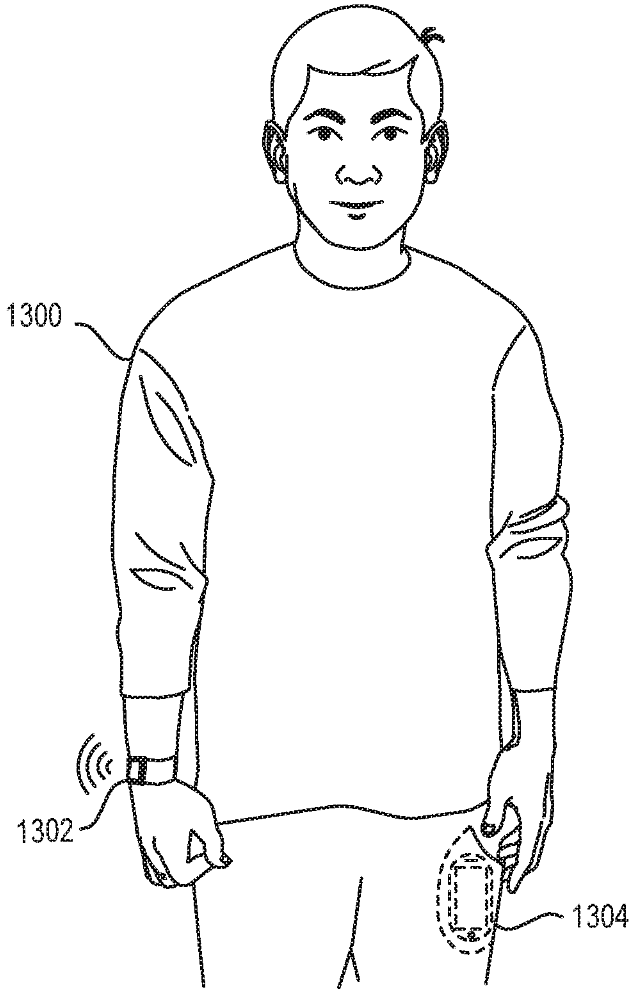

FIG. 13

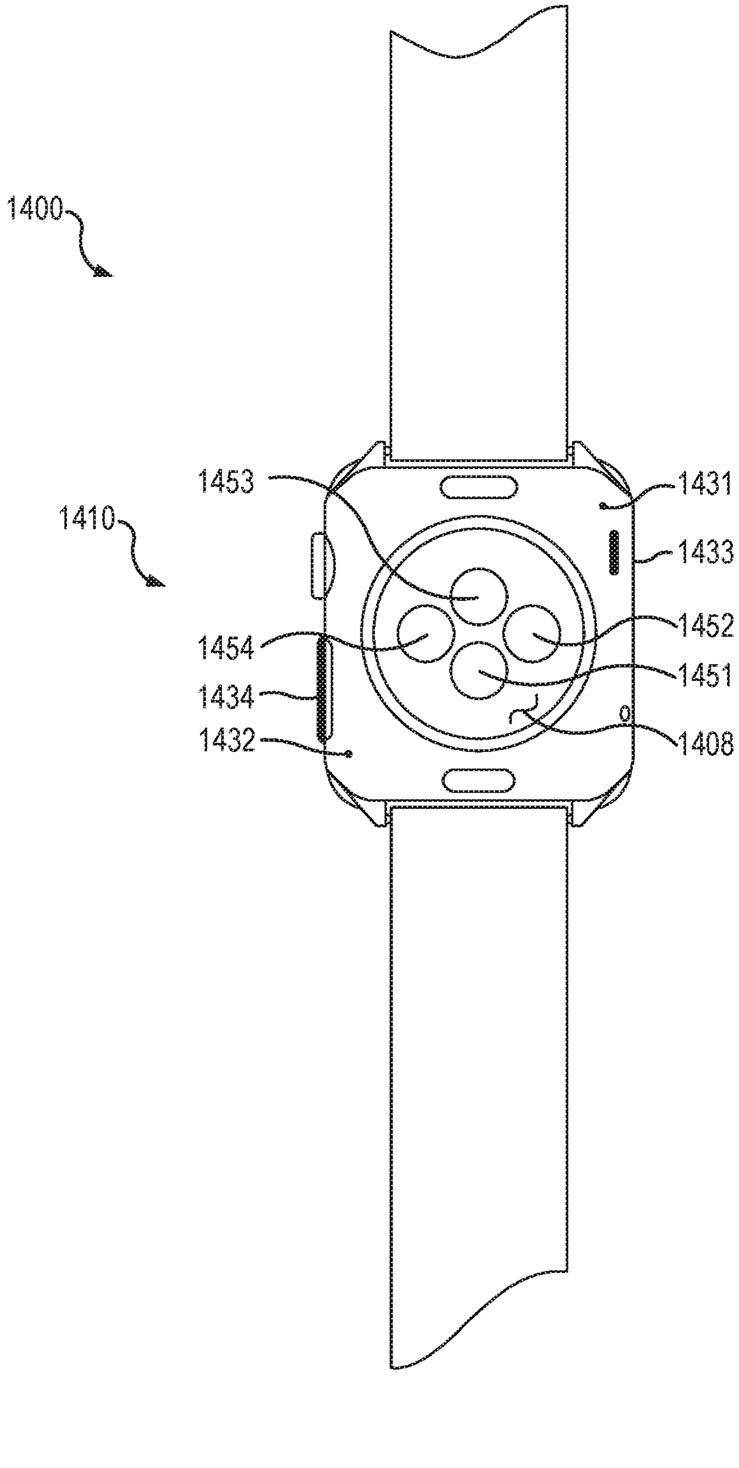

FIG. 14

CLAIMS

What is claimed is:

1. A computer-implemented method, comprising:
at an electronic device with a display:
detecting a time associated with a first breathing sequence;
generating a prompting criteria based on a predetermined prompting frequency and the detected time associated with the first breathing sequence;
determining if the prompting criteria has been met;
in accordance with a determination that the prompting criteria has been met, displaying, on the display, a prompt to initiate a second breathing sequence, wherein the prompt comprises a first affordance, and wherein the prompting criteria include a criterion that is met when one or more of a device motion condition and a scheduled calendar event condition are met;
receiving user input selection of the first affordance;
in response to receiving the user input selection of the first affordance, displaying, on the display, a second breathing sequence user interface; and
in accordance with a determination that the second breathing sequence reaches completion, displaying, on the display, a breathing sequence summary user interface corresponding to the second breathing sequence, wherein the breathing sequence summary user interface includes at least one of a pulse rate, a heart rate, a heart rate variability measure, temperature data, a number of steps, an amount of time standing and sitting, and a number of calories burned.

2. The computer-implemented method of claim 1, wherein the predetermined prompting frequency is a predetermined length of time.

3. The computer-implemented method of claim 2,
wherein generating the prompting criteria comprises:
determining a prompting time that occurs the predetermined length of time after the time associated with the first breathing sequence; and
wherein determining if the prompting criteria has been met comprises:
determining if the prompting time has occurred.

4. The computer-implemented method of claim 3,
wherein generating the prompting criteria further comprises:
setting a timer in accordance with the predetermined length of time; and
starting the timer; and
wherein determining if the prompting time has occurred comprises:
determining whether the timer has expired.

5. The computer-implemented method of any one of claims 1-4, wherein detecting the time associated with the first breathing sequence comprises:
detecting a time that occurred during the first breathing sequence.

6. The computer-implemented method of any one of claims 1-4, wherein detecting the time associated with the first breathing sequence comprises:
detecting an initiation time of a breathing phase of the first breathing sequence.

7. The computer-implemented method of any one of claims 1-4, wherein detecting the time associated with the first breathing sequence comprises:
detecting a completion time of a breathing phase of the first breathing sequence.

8. The computer-implemented method of any one of claims 1-4, further comprising:
prior to a determination that the prompting criteria has been met:
detecting a time associated with a third breathing sequence; and
in accordance with a detection of the time associated with the third breathing sequence, updating the prompting criteria based on the predetermined prompting frequency and the detected time associated with the third breathing sequence.

9. The computer-implemented method of any one of claims 1-4, further comprising:
receiving a first user input;
in response to receiving the first user input, progressing to a breathing phase of the second breathing sequence; and
during the breathing phase of the second breathing sequence:
displaying, on the display, a first version of a progress indicator; and

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fluctuating the first version of the progress indicator in accordance with a selected number of cycles.

10. The computer-implemented method of claim 9, further comprising:

prior to progressing to the breathing phase of the second breathing sequence:

receiving a second user input; and

in response to receiving the second user input, adjusting a number of cycles of the second breathing sequence to the selected number of cycles.

11. The computer-implemented method of any one of claims 1-4, wherein the prompt to initiate the second breathing sequence comprises a second affordance, the method further comprising:

receiving user input selection of the second affordance; and

in response to receiving the user input selection of the second affordance:

ceasing display, on the display, of the prompt; and

updating the prompting criteria.

12. The computer-implemented method of claim 11, wherein updating the prompting criteria comprises:

updating the prompting criteria based on the predetermined prompting frequency and the detected time associated with the first breathing sequence.

13. The computer-implemented method of claim 11, wherein updating the prompting criteria comprises:

detecting a time associated with the received user input selection of the second affordance; and

updating the prompting criteria based on the predetermined prompting frequency and the detected time associated with the received user input selection of the second affordance.

14. The computer-implemented method of claim 11, wherein updating the prompting criteria comprises:

updating the prompting criteria based on a snooze interval, wherein the predetermined prompting frequency is a predetermined length of time, and

wherein the snooze interval is a length of time that is distinct from the predetermined prompting frequency.

15. The computer-implemented method of claim 11, further comprising:

further in response to receiving the user input selection of the second affordance:

forgoing display of all prompts to initiate a breathing sequence during the remainder of a current day.

16. The computer-implemented method of claim 11, further comprising:

determining if the updated prompting criteria has been met;

in accordance with a determination that the updated prompting criteria has been met, displaying, on the display, a prompt to initiate a fourth breathing sequence, wherein the prompt comprises a third affordance;

receiving user input selection of the third affordance; and

in response to receiving the user input selection of the third affordance, displaying, on the display, a fourth breathing sequence user interface.

17. An electronic device, comprising:

a display;

one or more processors;

memory; and

one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors, the one or more programs including instructions for performing the method of any one of claims 1-16.

18. A computer-readable storage medium storing one or more programs, the one or more programs comprising instructions, which, when executed by an electronic device with a display, cause the device to perform the method of any one of claims 1-16.

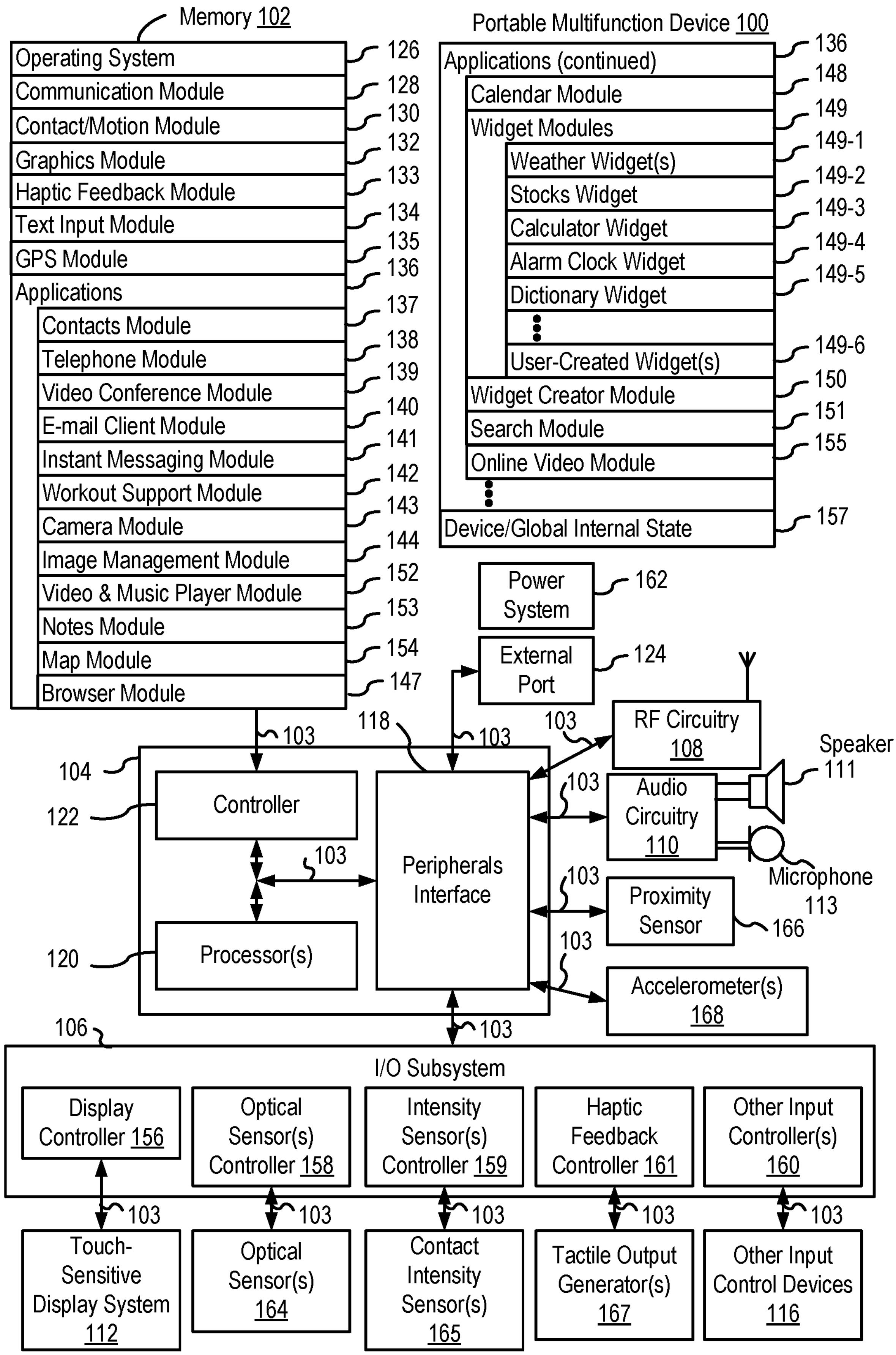
Memory 102
Operating System 126
Communication Module 128
Contact/Motion Module 130
Graphics Module 132
Haptic Feedback Module 133
Text Input Module 134
GPS Module 135
Applications 136
Contacts Module 137
Telephone Module 138
Video Conference Module 139
E-mail Client Module 140
Instant Messaging Module 141
Workout Support Module 142
Camera Module 143
Image Management Module 144
Video & Music Player Module 152
Notes Module 153
Map Module 154
Browser Module 147
Portable Multifunction Device 100
Applications (continued) 136
Calendar Module 148
Widget Modules 149
Weather Widget(s) 149-1
Stocks Widget 149-2
Calculator Widget 149-3
Alarm Clock Widget 149-4
Dictionary Widget 149-5
User-Created Widget(s) 149-6
Widget Creator Module 150
Search Module 151
Online Video Module 155
Device/Global Internal State 157
Power System 162
External Port 124
RF Circuitry 108
Speaker 111
Audio Circuitry 110
Microphone 113
Proximity Sensor 166
Accelerometer(s) 168
104
122
120
118
Controller
Processor(s)
Peripherals Interface
103
106
I/O Subsystem
Display Controller 156
Optical Sensor(s) Controller 158
Intensity Sensor(s) Controller 159
Haptic Feedback Controller 161
Other Input Controller(s) 160
Touch-Sensitive Display System 112
Optical Sensor(s) 164
Contact Intensity Sensor(s) 165
Tactile Output Generator(s) 167
Other Input Control Devices 116

FIG. 1A

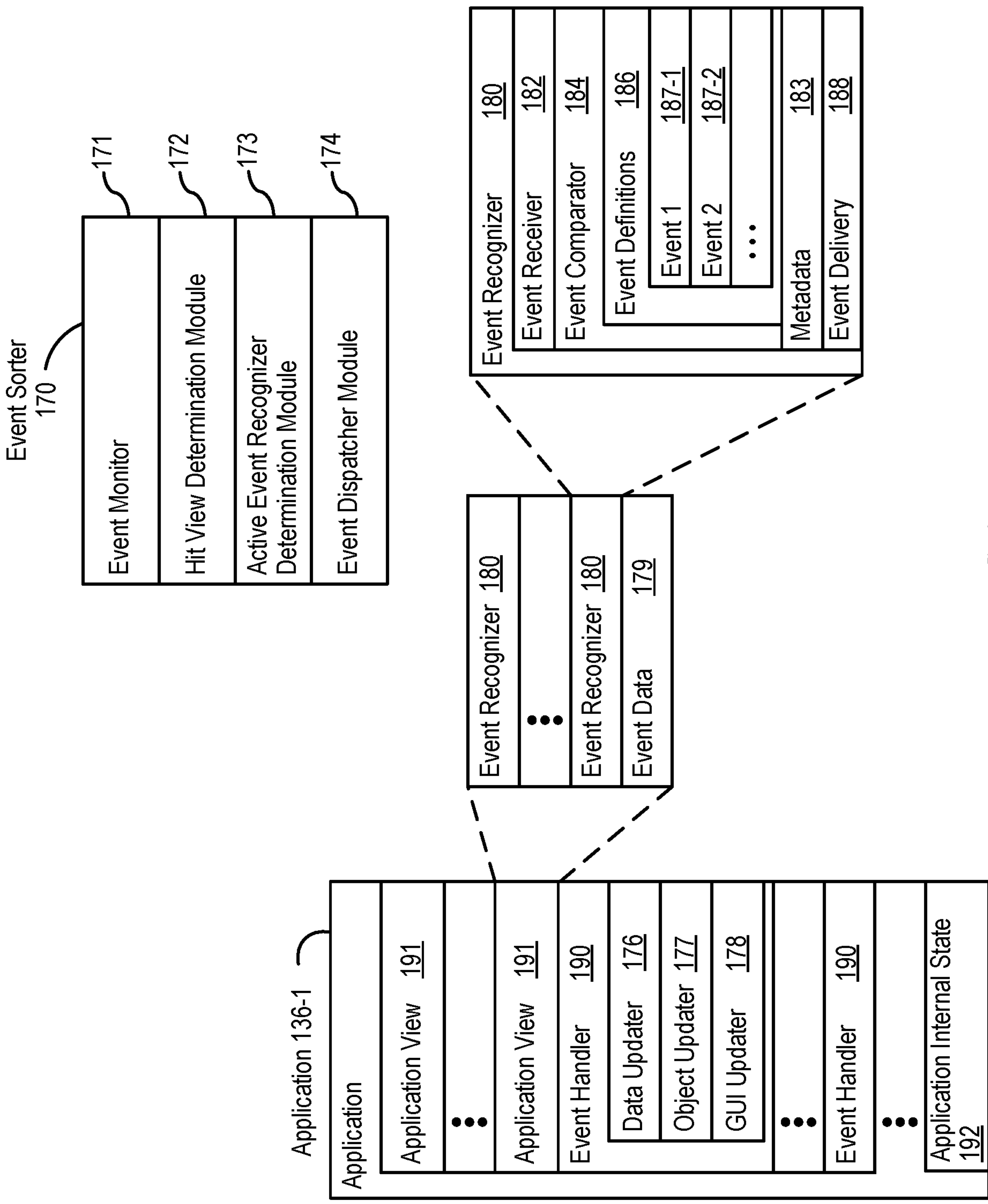
Event Sorter 170
Event Monitor
171
Hit View Determination Module
172
Active Event Recognizer Determination Module
173
Event Dispatcher Module
174
Event Recognizer 180
Event Receiver 182
Event Comparator 184
Event Definitions 186
Event 1 187-1
Event 2 187-2
Metadata 183
Event Delivery 188
Event Recognizer 180
Event Recognizer 180
Event Data 179
Application 136-1
Application
Application View 191
Application View 191
Event Handler 190
Data Updater 176
Object Updater 177
GUI Updater 178
Event Handler 190
Application Internal State 192

FIG. 1B

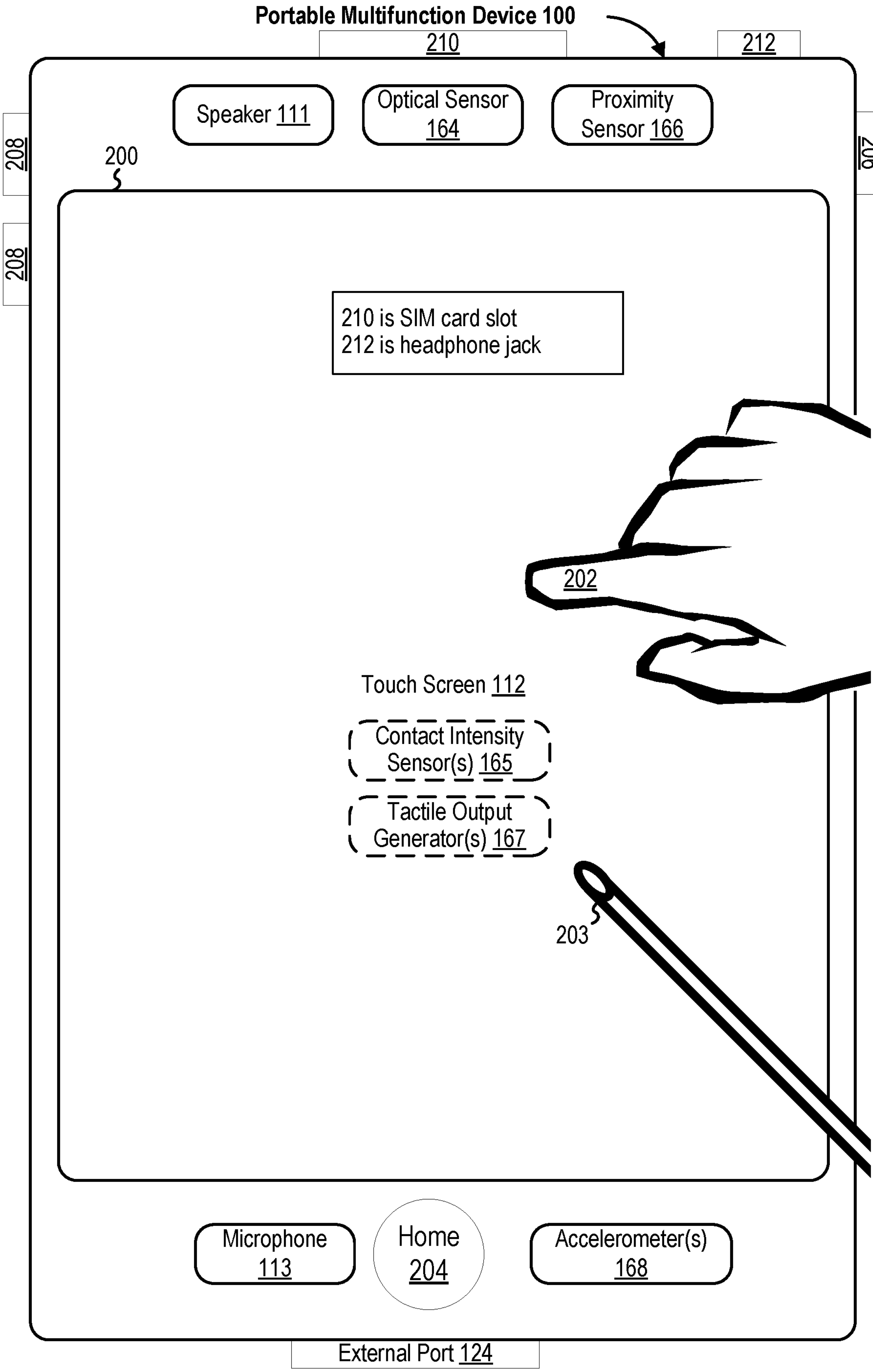
Portable Multifunction Device 100
210
212
Speaker 111
Optical Sensor 164
Proximity Sensor 166
208
208
206
200
210 is SIM card slot
212 is headphone jack
202
Touch Screen 112
Contact Intensity Sensor(s) 165
Tactile Output Generator(s) 167
203
Microphone 113
Home 204
Accelerometer(s) 168
External Port 124

FIG. 2

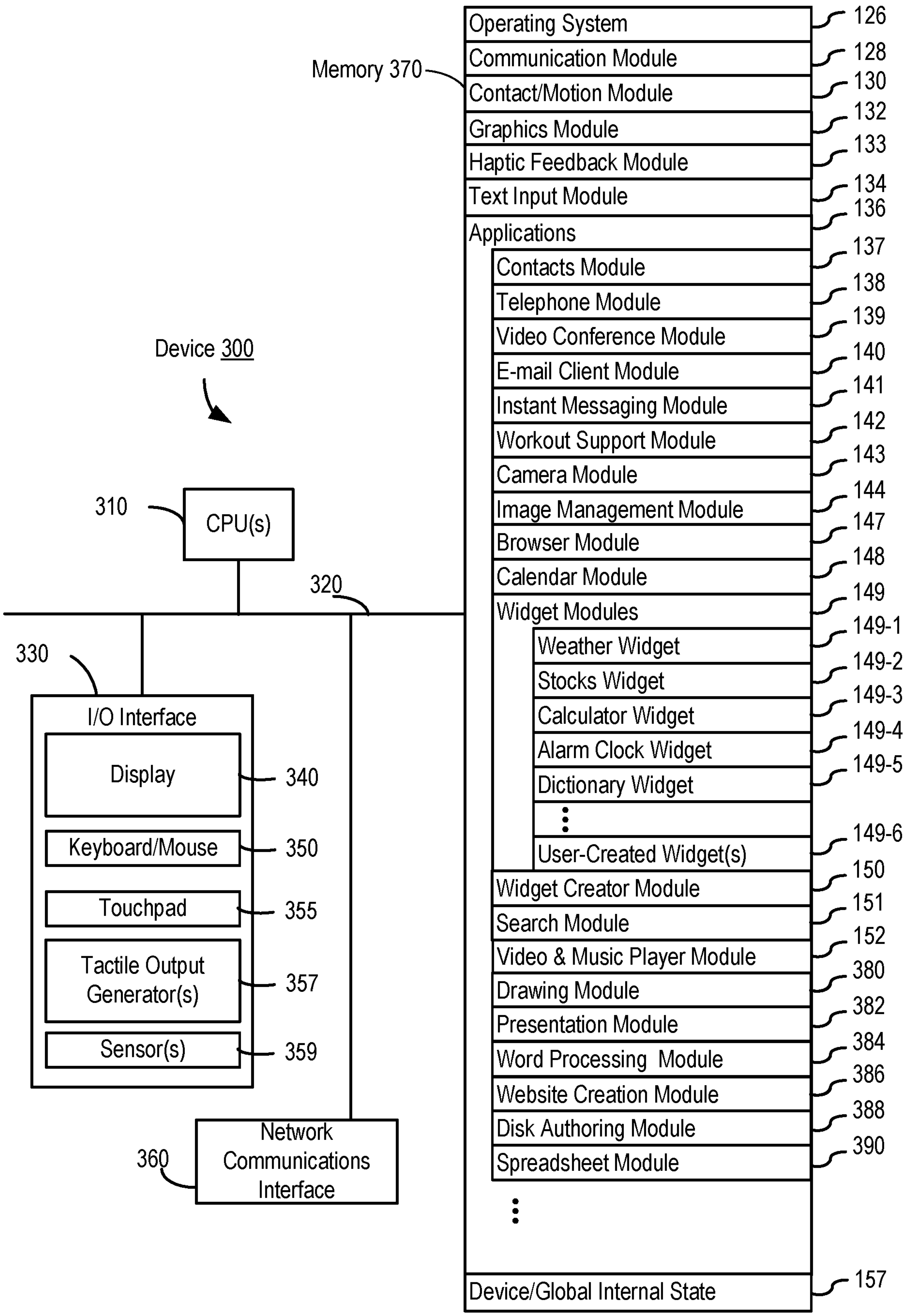
Memory 370
Operating System
126
Communication Module
128
Contact/Motion Module
130
Graphics Module
132
Haptic Feedback Module
133
Text Input Module
134
Applications
136
Contacts Module
137
Telephone Module
138
Video Conference Module
139
E-mail Client Module
140
Instant Messaging Module
141
Workout Support Module
142
Camera Module
143
Image Management Module
144
Browser Module
147
Calendar Module
148
Widget Modules
149
Weather Widget
149-1
Stocks Widget
149-2
Calculator Widget
149-3
Alarm Clock Widget
149-4
Dictionary Widget
149-5
User-Created Widget(s)
149-6
Widget Creator Module
150
Search Module
151
Video & Music Player Module
152
Drawing Module
380
Presentation Module
382
Word Processing Module
384
Website Creation Module
386
Disk Authoring Module
388
Spreadsheet Module
390
Device/Global Internal State
157
Device 300
310
CPU(s)
320
330
I/O Interface
Display
340
Keyboard/Mouse
350
Touchpad
355
Tactile Output Generator(s)
357
Sensor(s)
359
360
Network Communications Interface

FIG. 3

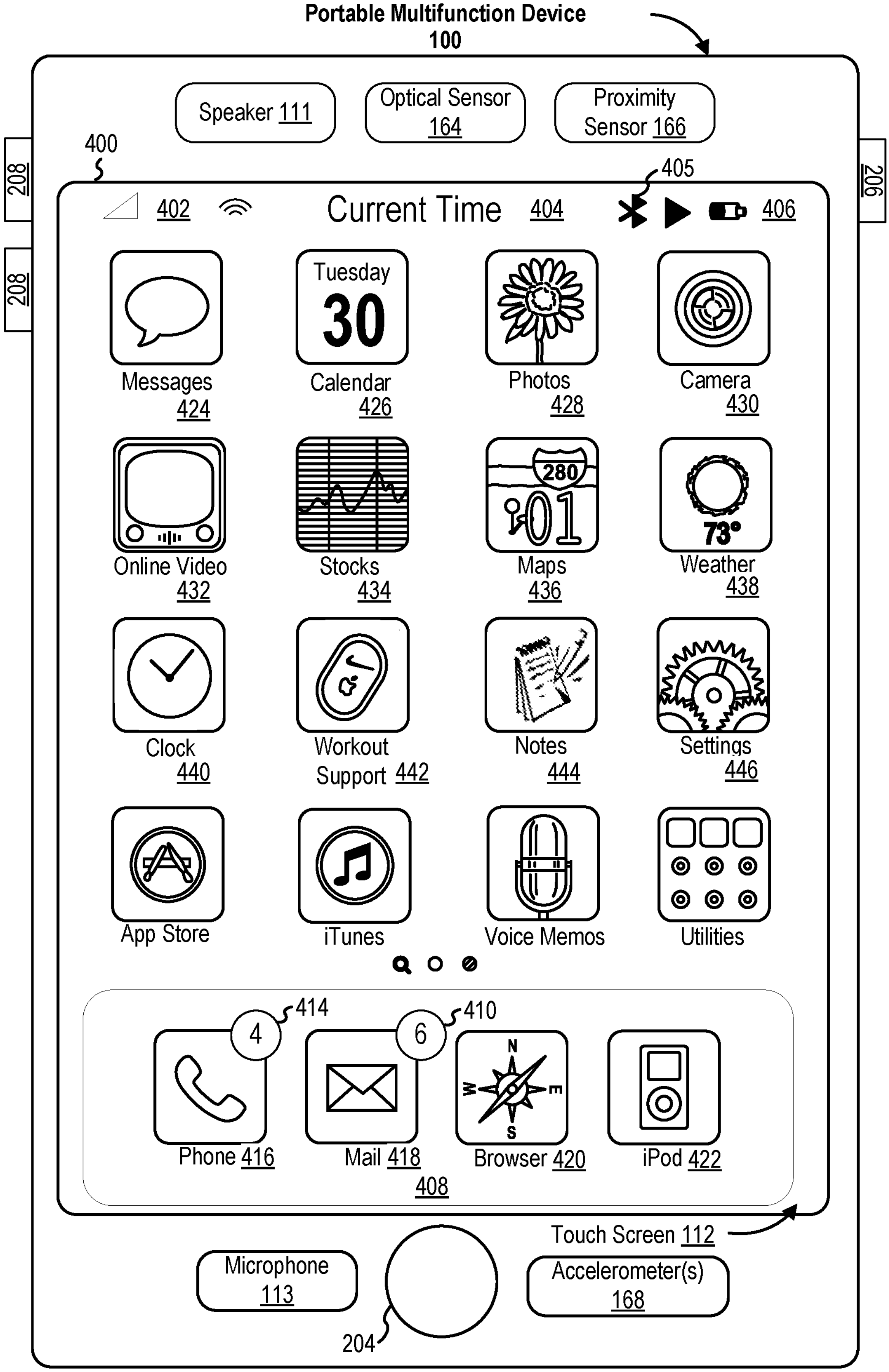
Portable Multifunction Device
100
Speaker 111
Optical Sensor 164
Proximity Sensor 166
400
208
208
206
405
402
Current Time 404
406
Tuesday
30
Messages 424
Calendar 426
Photos 428
Camera 430
Online Video 432
Stocks 434
280
Maps 436
73°
Weather 438
Clock 440
Workout Support 442
Notes 444
Settings 446
App Store
iTunes
Voice Memos
Utilities
414
4
410
6
N
W
E
S
Phone 416
Mail 418
Browser 420
iPod 422
408
Touch Screen 112
Microphone 113
Accelerometer(s) 168
204

FIG. 4A

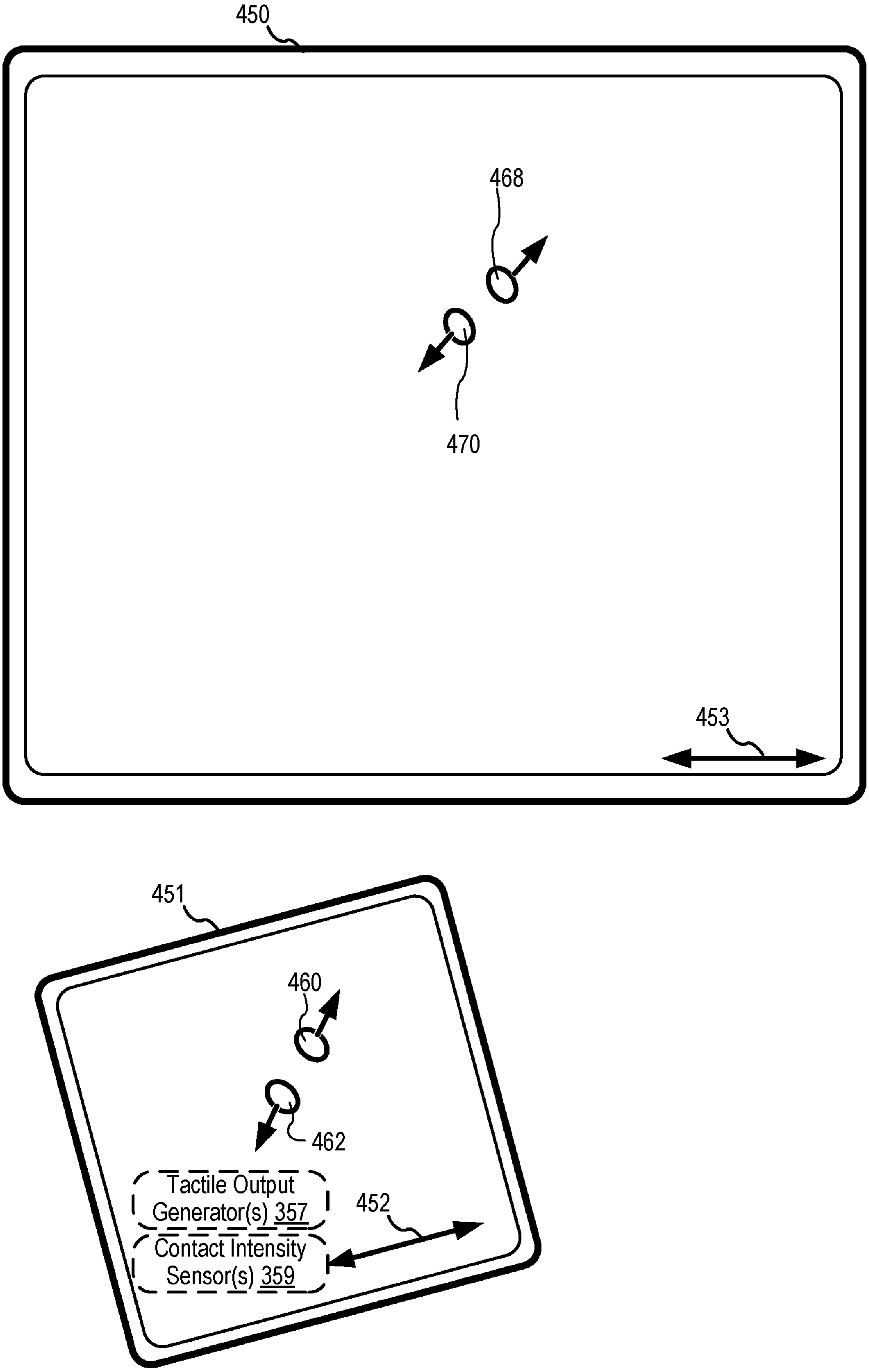
450
468
470
453
451
460
462
Tactile Output Generator(s) 357
Contact Intensity Sensor(s) 359
452

FIG. 4B

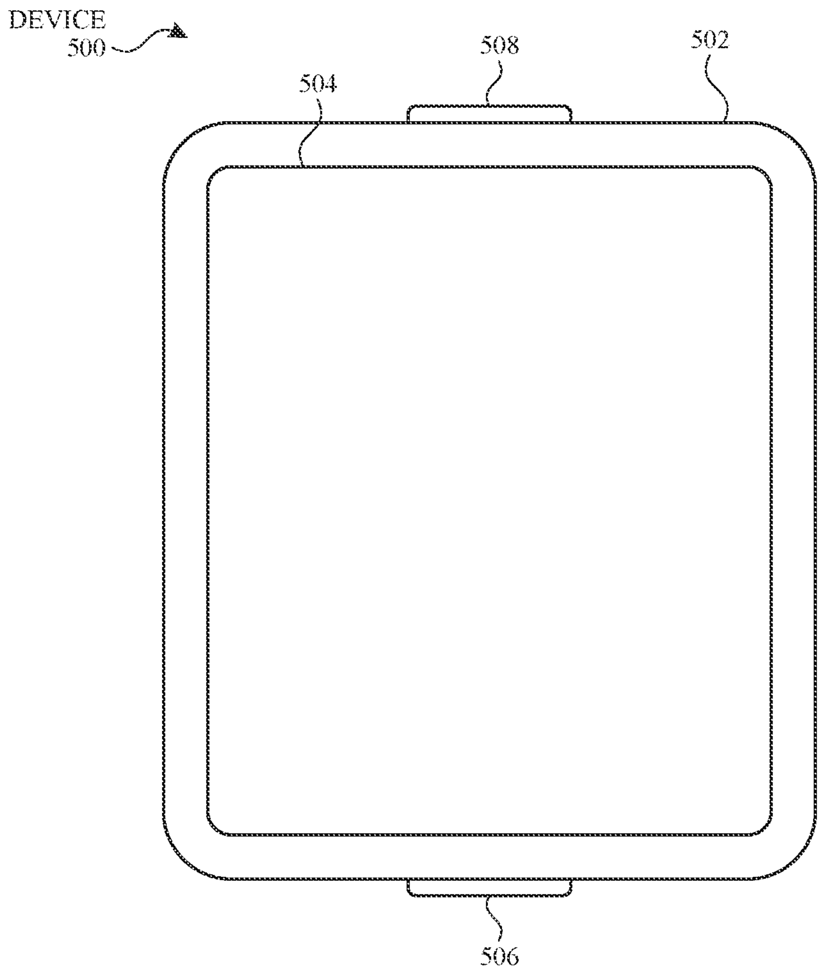

FIG. 5A

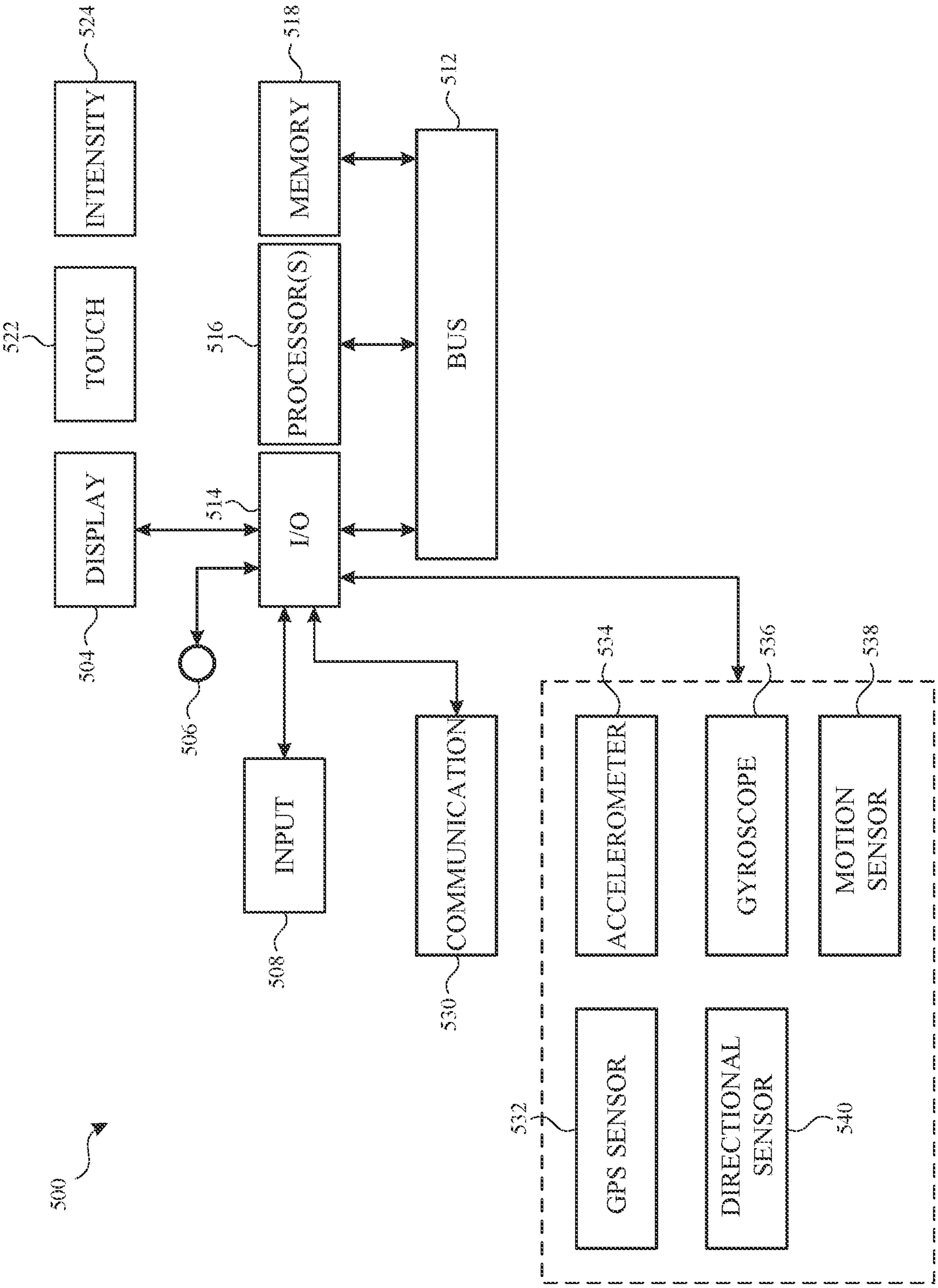
500
INTENSITY
524
TOUCH
522
DISPLAY
504
MEMORY
518
PROCESSOR(S)
516
I/O
514
BUS
512
506
INPUT
508
COMMUNICATION
530
532
ACCELEROMETER
534
GYROSCOPE
536
MOTION SENSOR
538
GPS SENSOR
DIRECTIONAL SENSOR
540

FIG. 5B

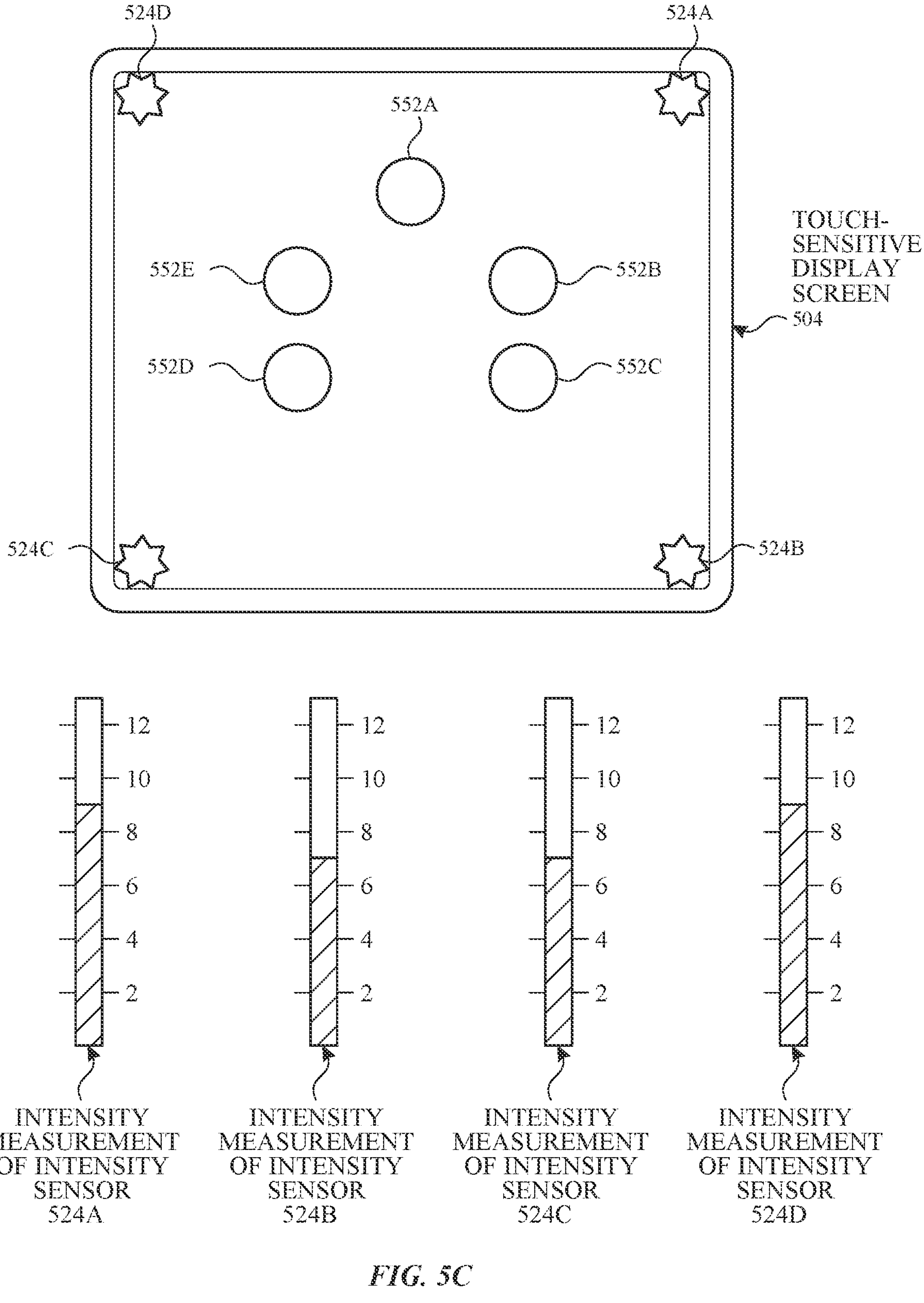
524D
524A
552A
552E
552B
552D
552C
TOUCH-SENSITIVE DISPLAY SCREEN 504
524C
524B
12
10
8
6
4
2
INTENSITY MEASUREMENT OF INTENSITY SENSOR 524A
INTENSITY MEASUREMENT OF INTENSITY SENSOR 524B
INTENSITY MEASUREMENT OF INTENSITY SENSOR 524C
INTENSITY MEASUREMENT OF INTENSITY SENSOR 524D

FIG. 5C

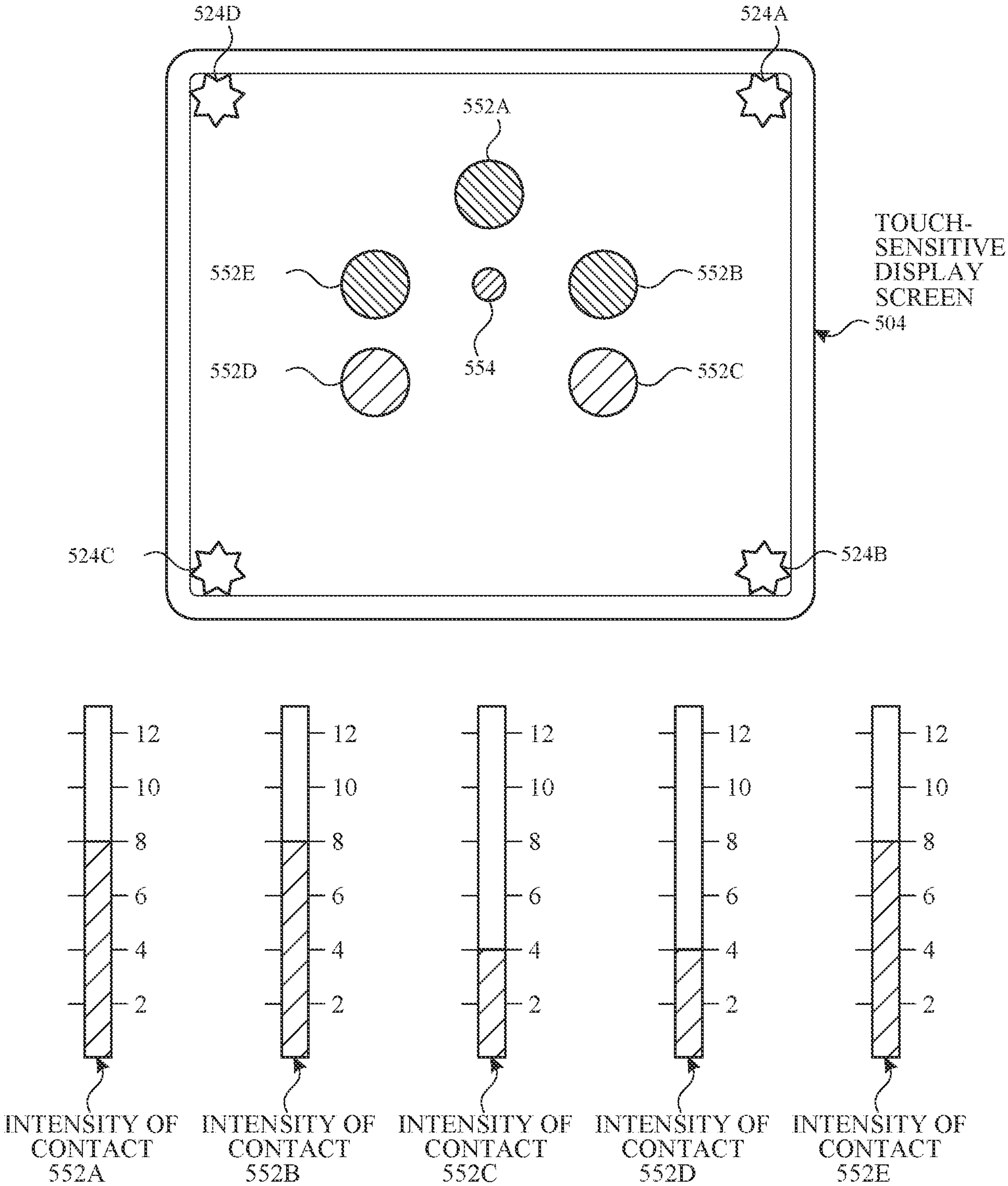
524D
524A
552A
TOUCH-SENSITIVE DISPLAY SCREEN 504
552E
552B
552D
554
552C
524C
524B
12
10
8
6
4
2
INTENSITY OF CONTACT 552A
INTENSITY OF CONTACT 552B
INTENSITY OF CONTACT 552C
INTENSITY OF CONTACT 552D
INTENSITY OF CONTACT 552E

FIG. 5D

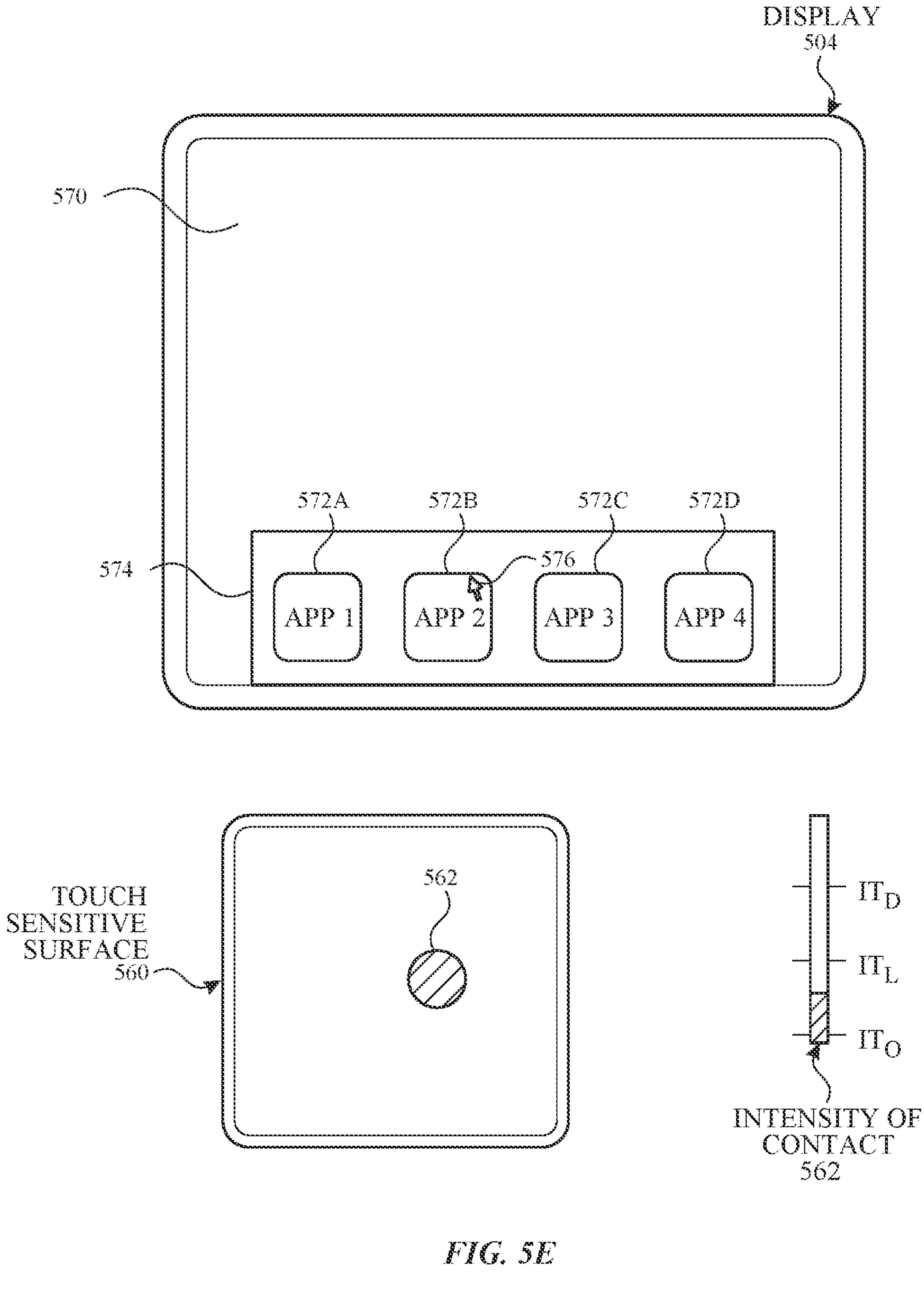
DISPLAY
504
570
572A
572B
572C
572D
574
576
APP 1
APP 2
APP 3
APP 4
TOUCH
SENSITIVE
SURFACE
560
562
IT_D
IT_L
IT_O
INTENSITY OF
CONTACT
562

FIG. 5E

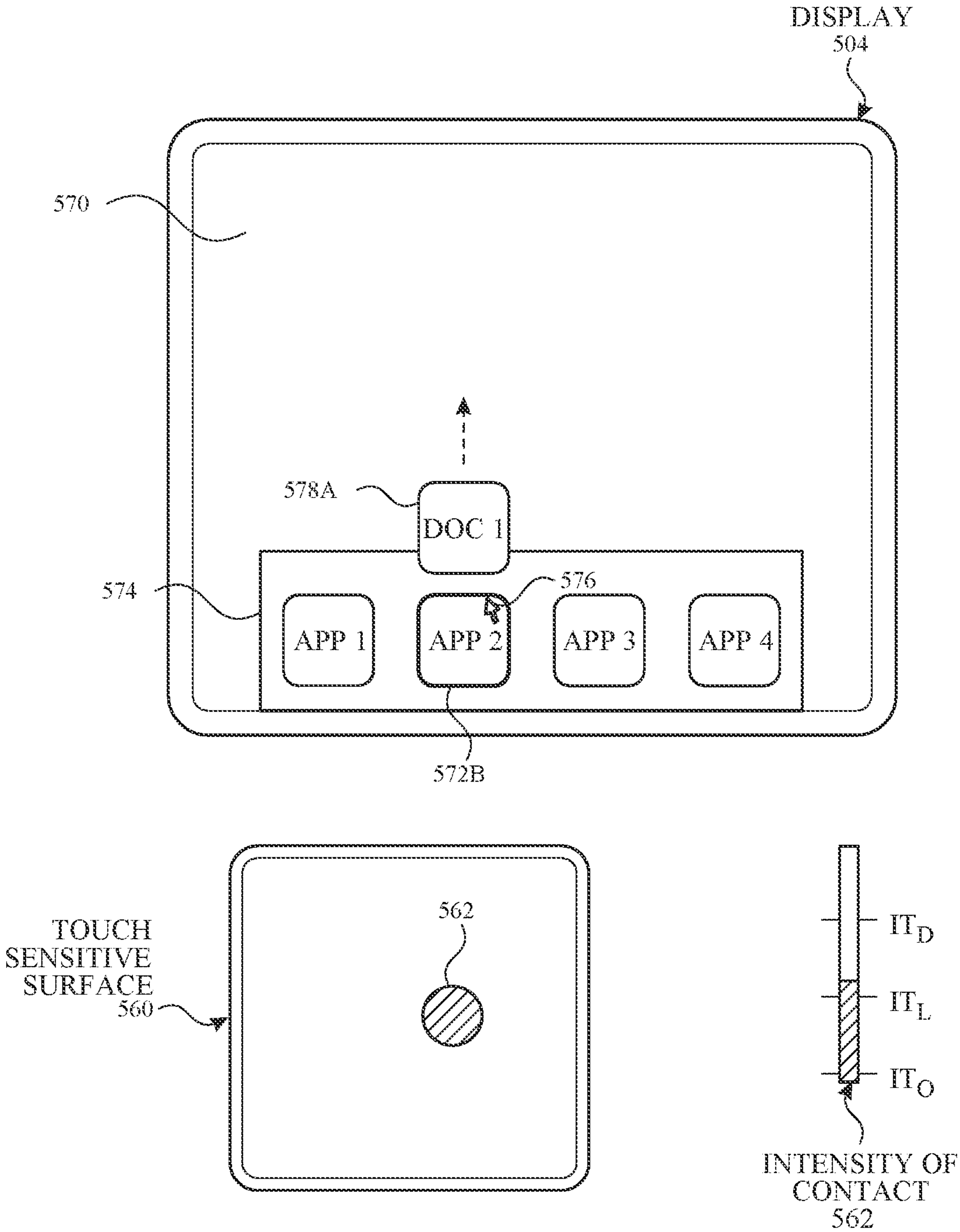
DISPLAY
504
570
578A
DOC 1
574
576
APP 1
APP 2
APP 3
APP 4
572B
TOUCH
SENSITIVE
SURFACE
560
562
IT_D
IT_L
IT_O
INTENSITY OF
CONTACT
562

FIG. 5F

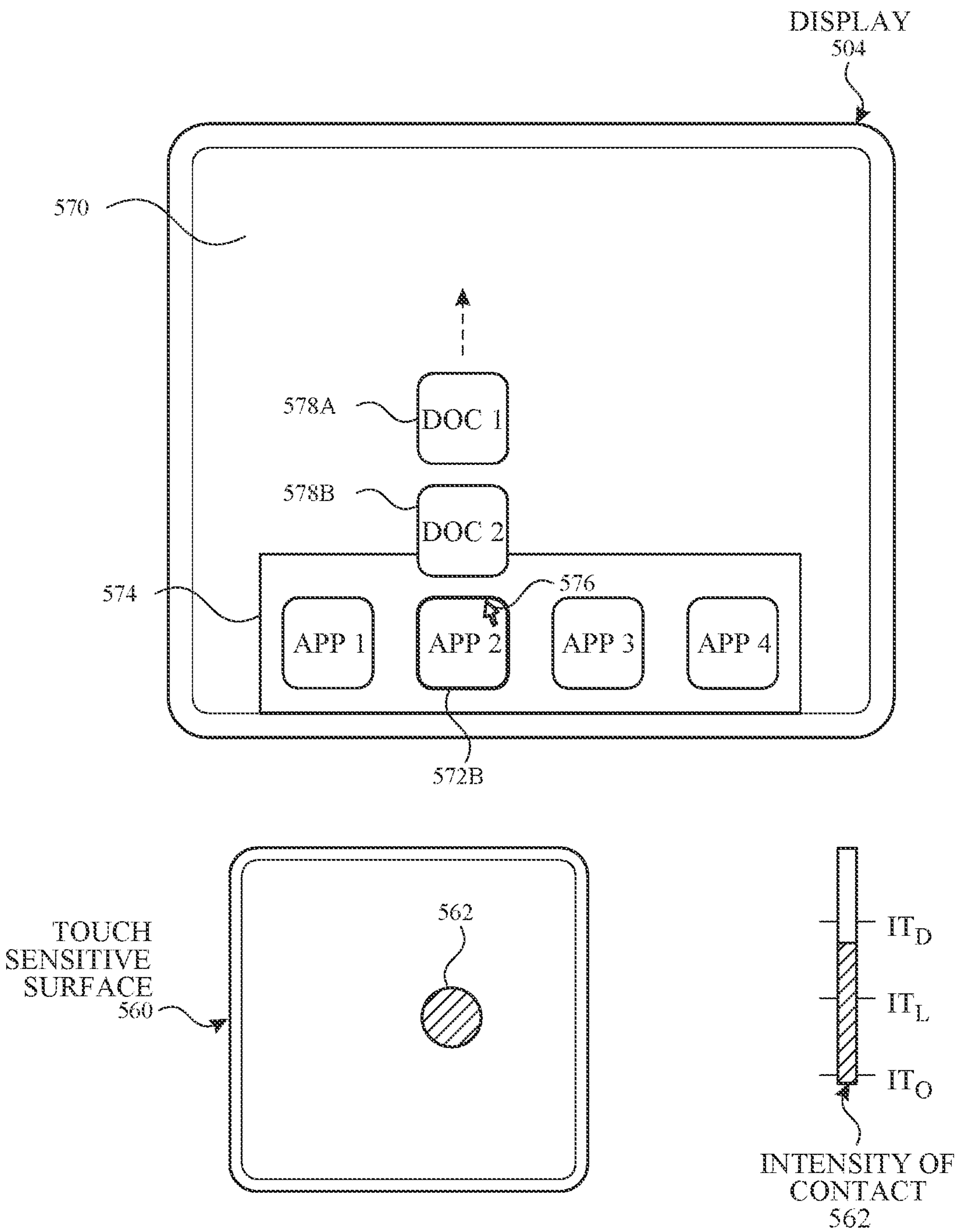
DISPLAY
504
570
578A
DOC 1
578B
DOC 2
574
576
APP 1
APP 2
APP 3
APP 4
572B
TOUCH
SENSITIVE
SURFACE
560
562
IT_D
IT_L
IT_O
INTENSITY OF
CONTACT
562

FIG. 5G

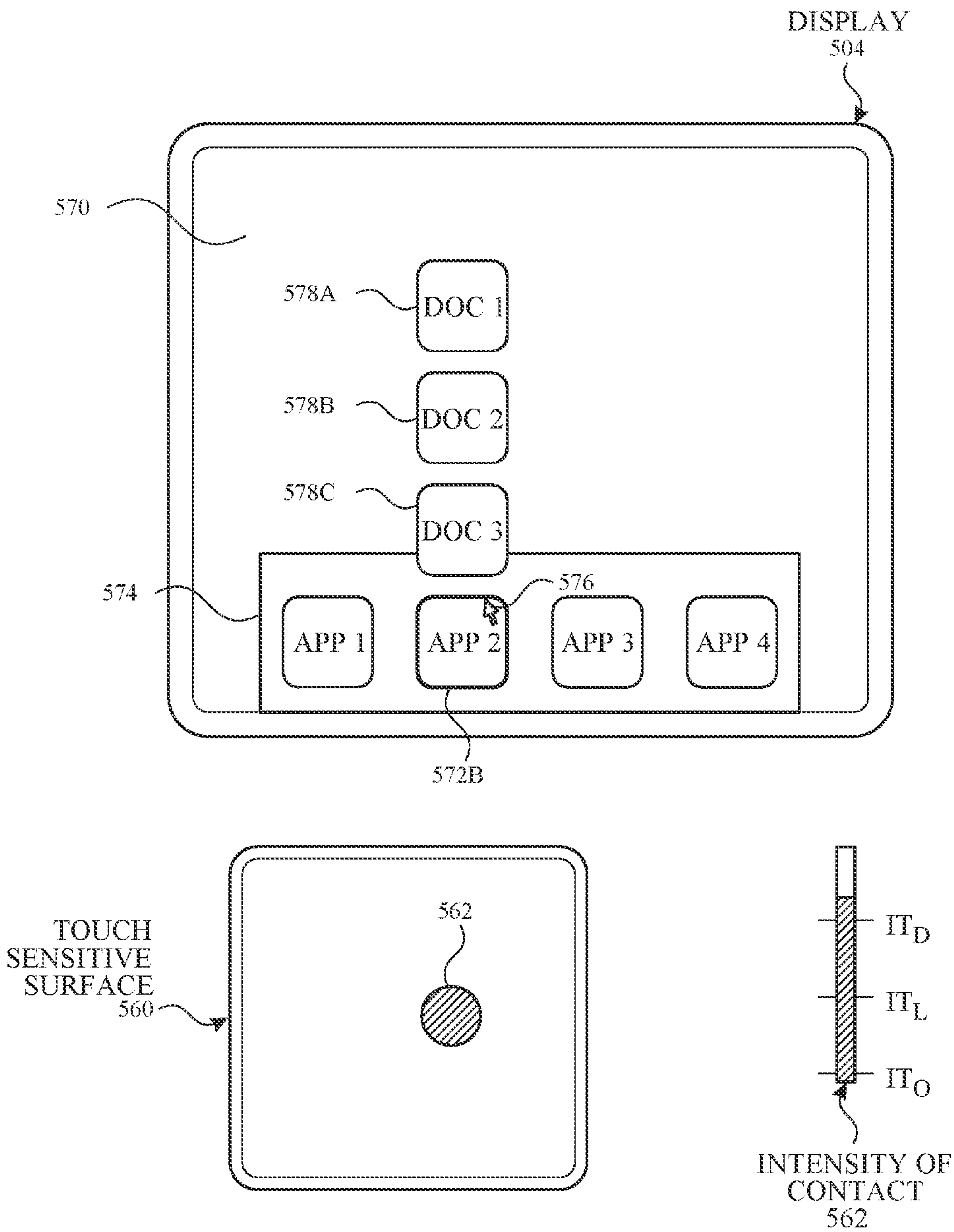
DISPLAY
504
570
578A
DOC 1
578B
DOC 2
578C
DOC 3
576
574
APP 1
APP 2
APP 3
APP 4
572B
TOUCH
SENSITIVE
SURFACE
560
562
IT_D
IT_L
IT_O
INTENSITY OF
CONTACT
562

FIG. 5H

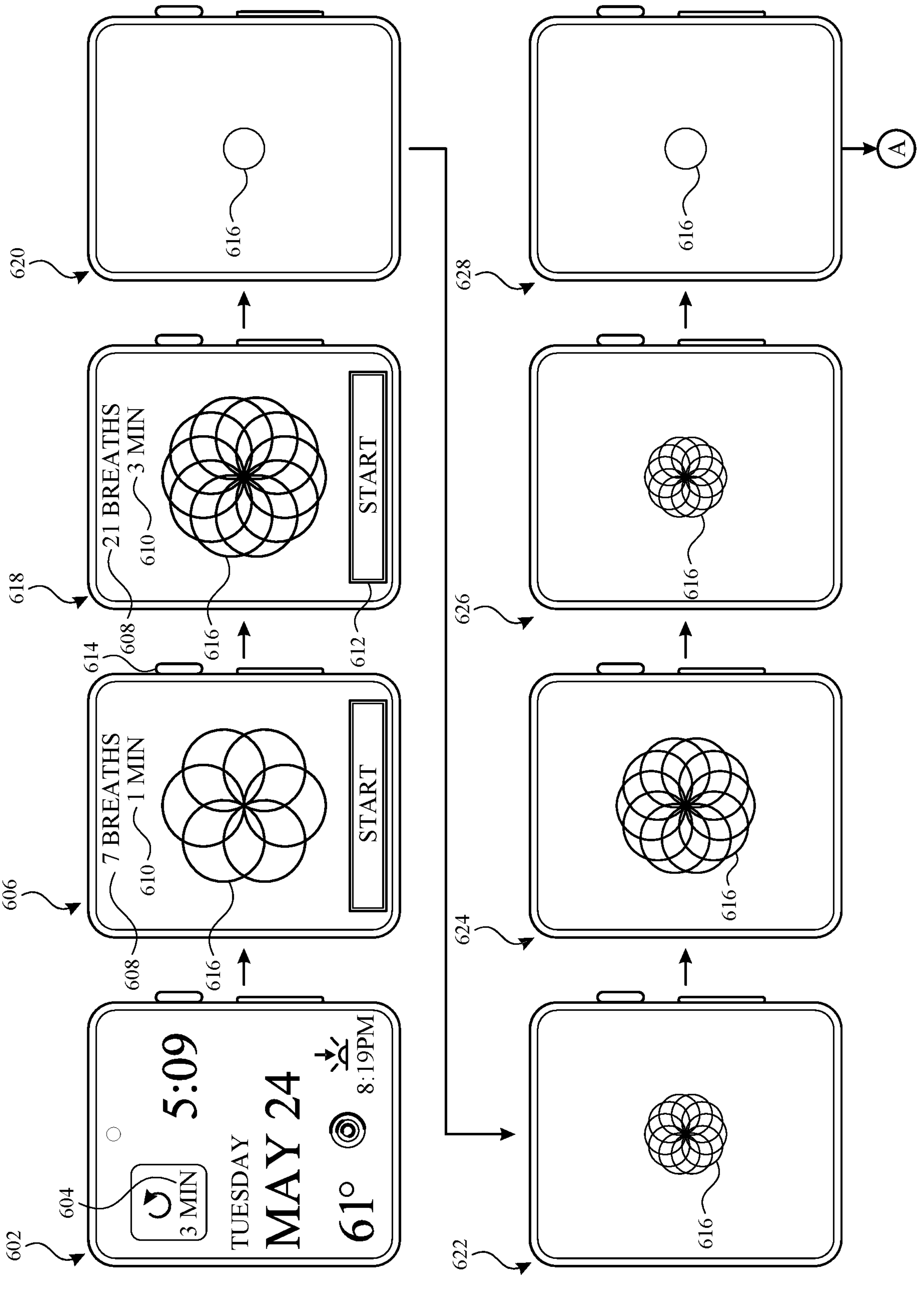
602
604
3 MIN
5:09
TUESDAY
MAY 24
61°
8:19PM
606
608
610
616
7 BREATHS
1 MIN
START
614
618
21 BREATHS
3 MIN
612
620
622
624
626
628
A

FIG. 6A

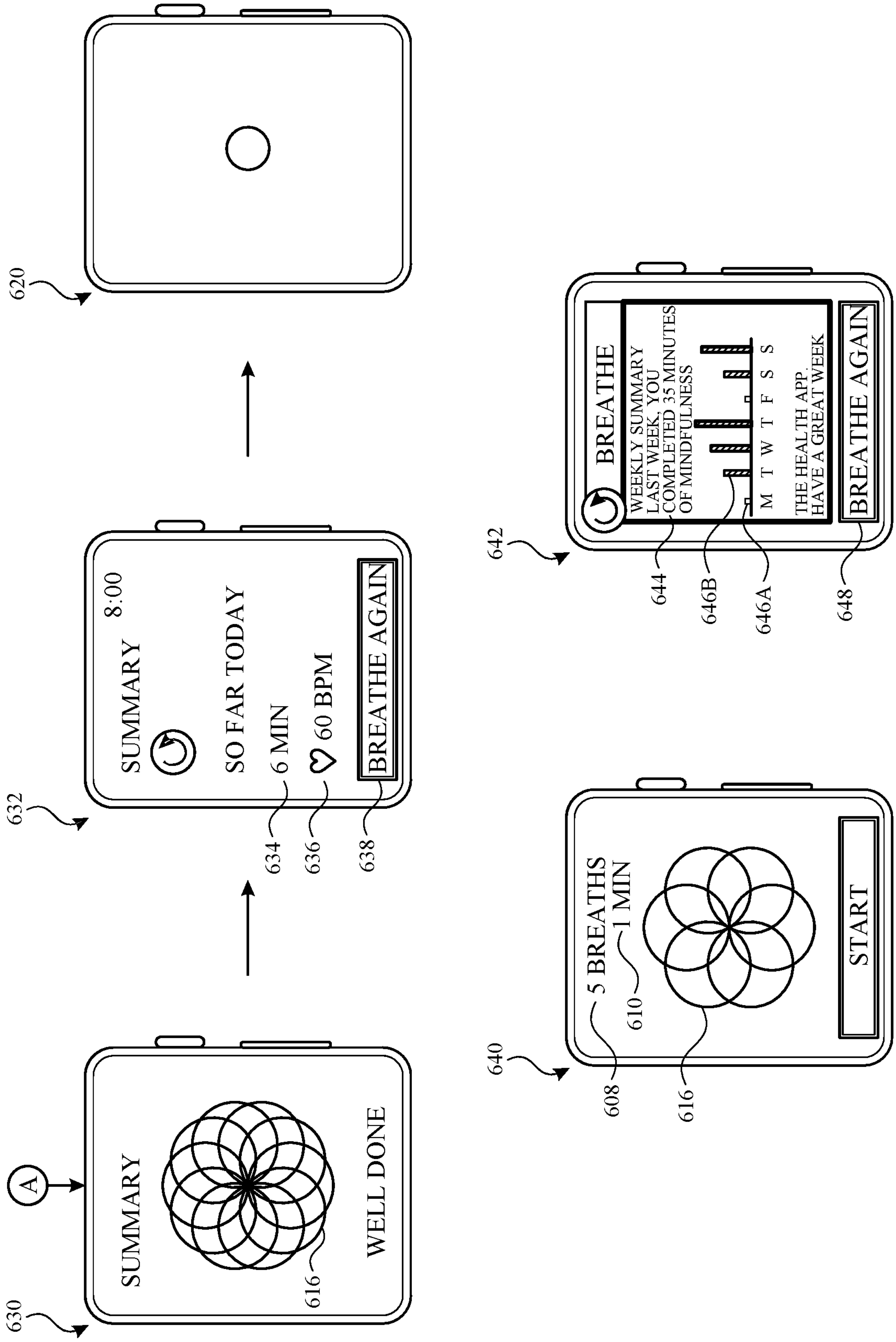
A
630
SUMMARY
616
WELL DONE
632
SUMMARY
8:00
SO FAR TODAY
6 MIN
60 BPM
BREATHE AGAIN
634
636
638
620
640
5 BREATHS
1 MIN
START
608
610
616
642
BREATHE
WEEKLY SUMMARY
LAST WEEK, YOU
COMPLETED 35 MINUTES
OF MINDFULNESS
M T W T F S S
THE HEALTH APP.
HAVE A GREAT WEEK
BREATHE AGAIN
644
646B
646A
648

FIG. 6B

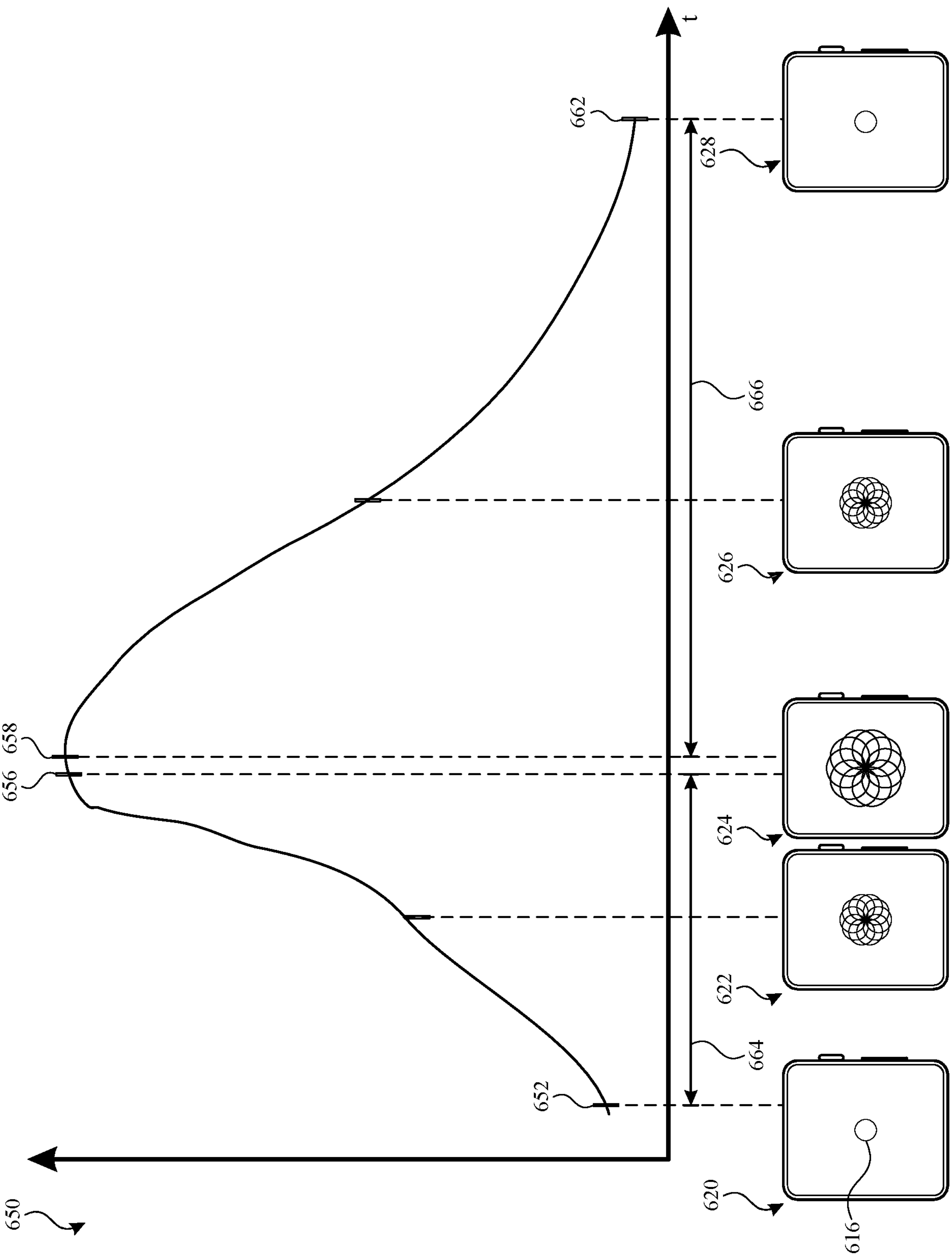

FIG. 6C

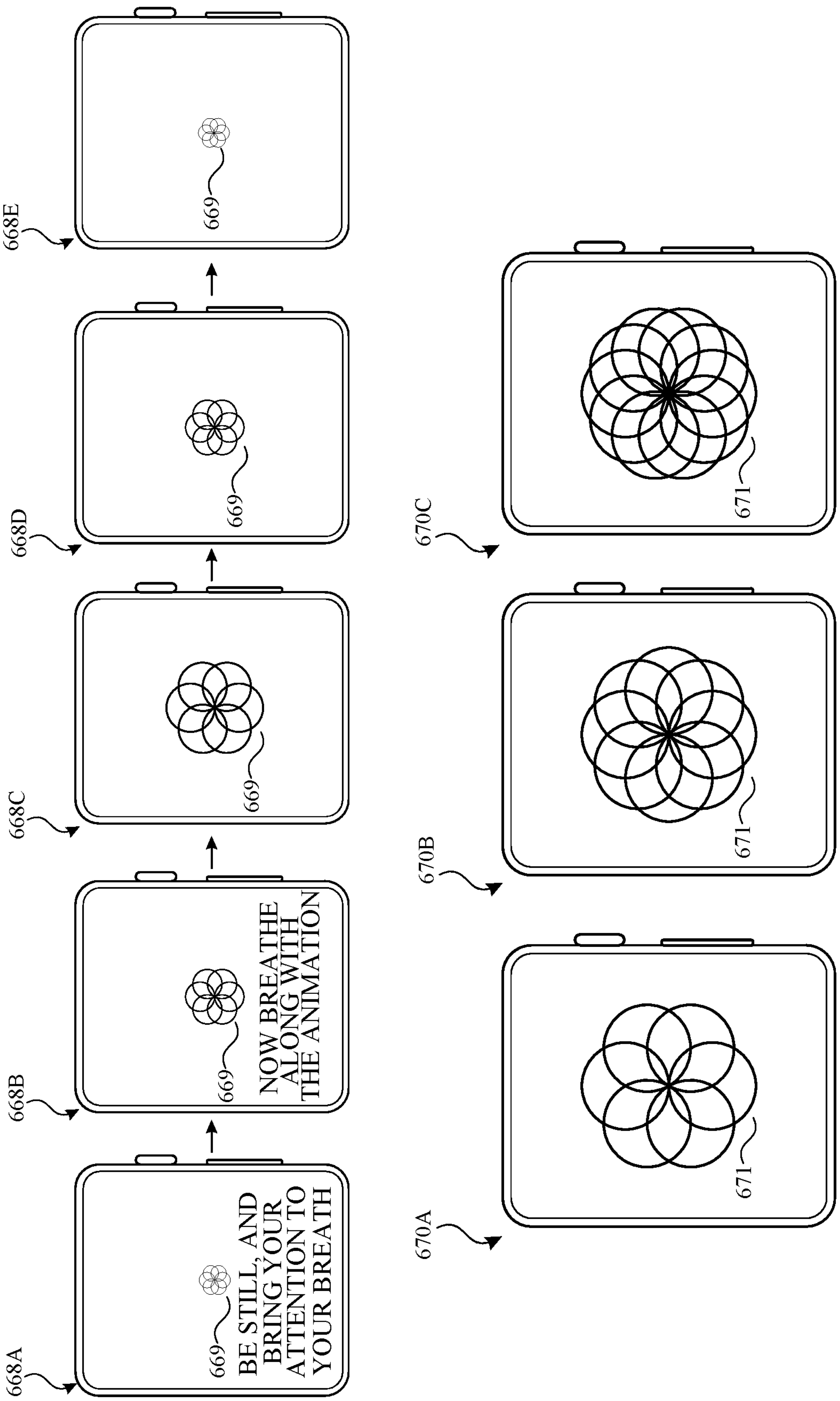
668A
669
BE STILL, AND BRING YOUR ATTENTION TO YOUR BREATH
668B
669
NOW BREATHE ALONG WITH THE ANIMATION
668C
669
668D
669
668E
669
670A
671
670B
671
670C
671

FIG. 6D

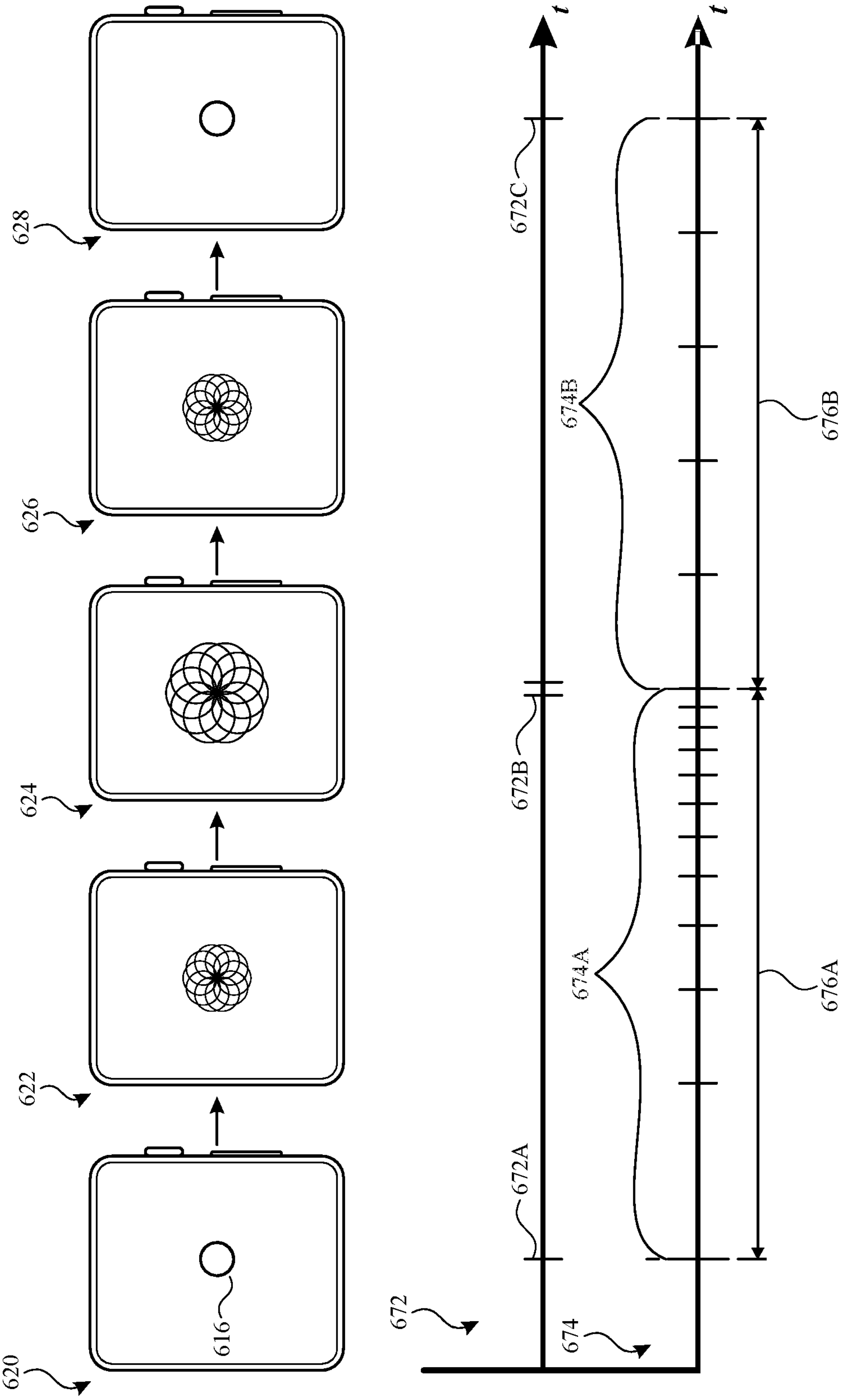
628
626
624
622
620
616
t
t
672C
672B
672A
674B
674A
676B
676A
672
674

FIG. 6E

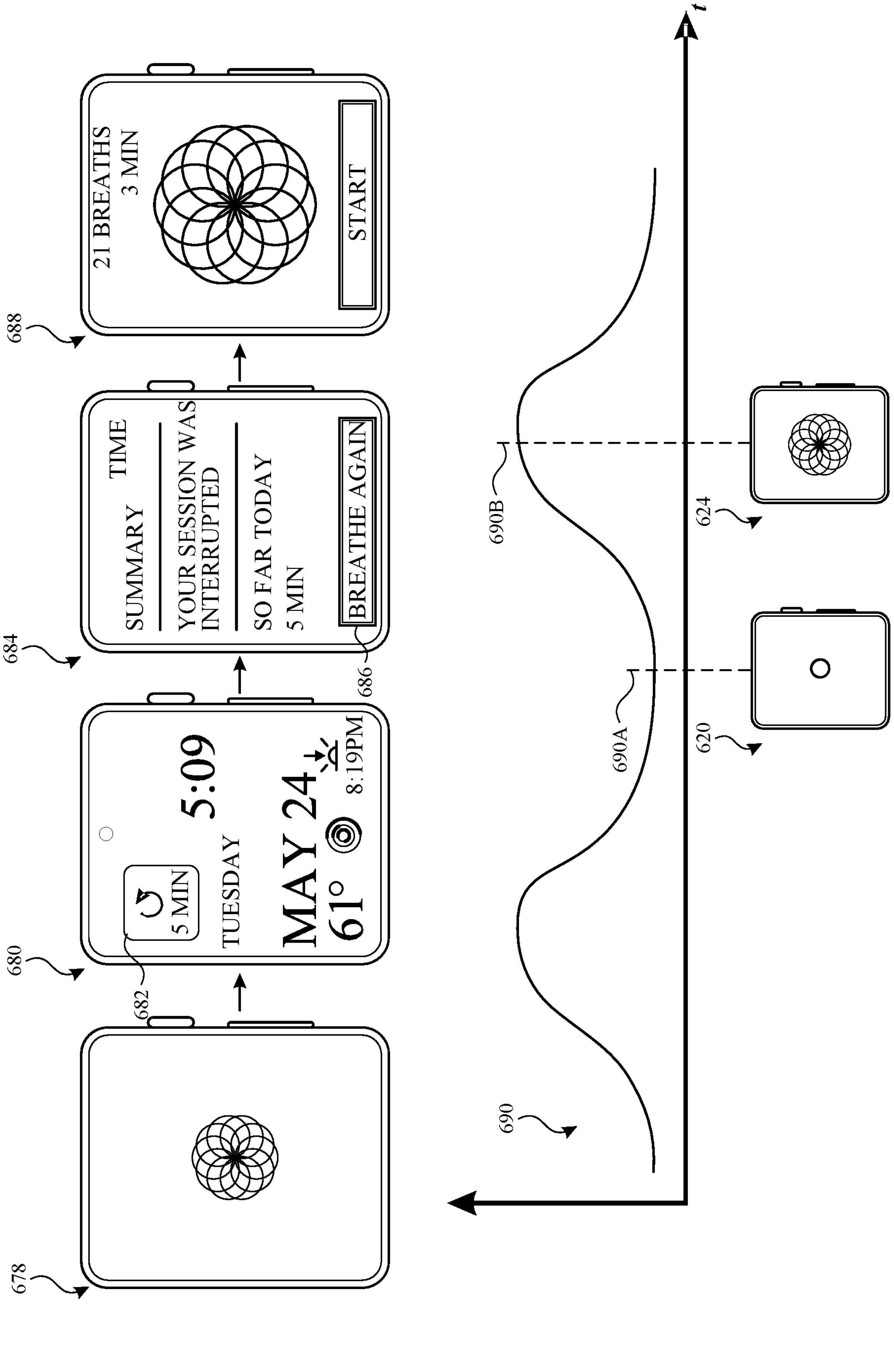
678
680
682
5 MIN
TUESDAY
5:09
MAY 24
61°
8:19PM
684
686
SUMMARY
TIME
YOUR SESSION WAS INTERRUPTED
SO FAR TODAY
5 MIN
BREATHE AGAIN
688
21 BREATHS
3 MIN
START
t
690
690A
690B
620
624

FIG. 6F

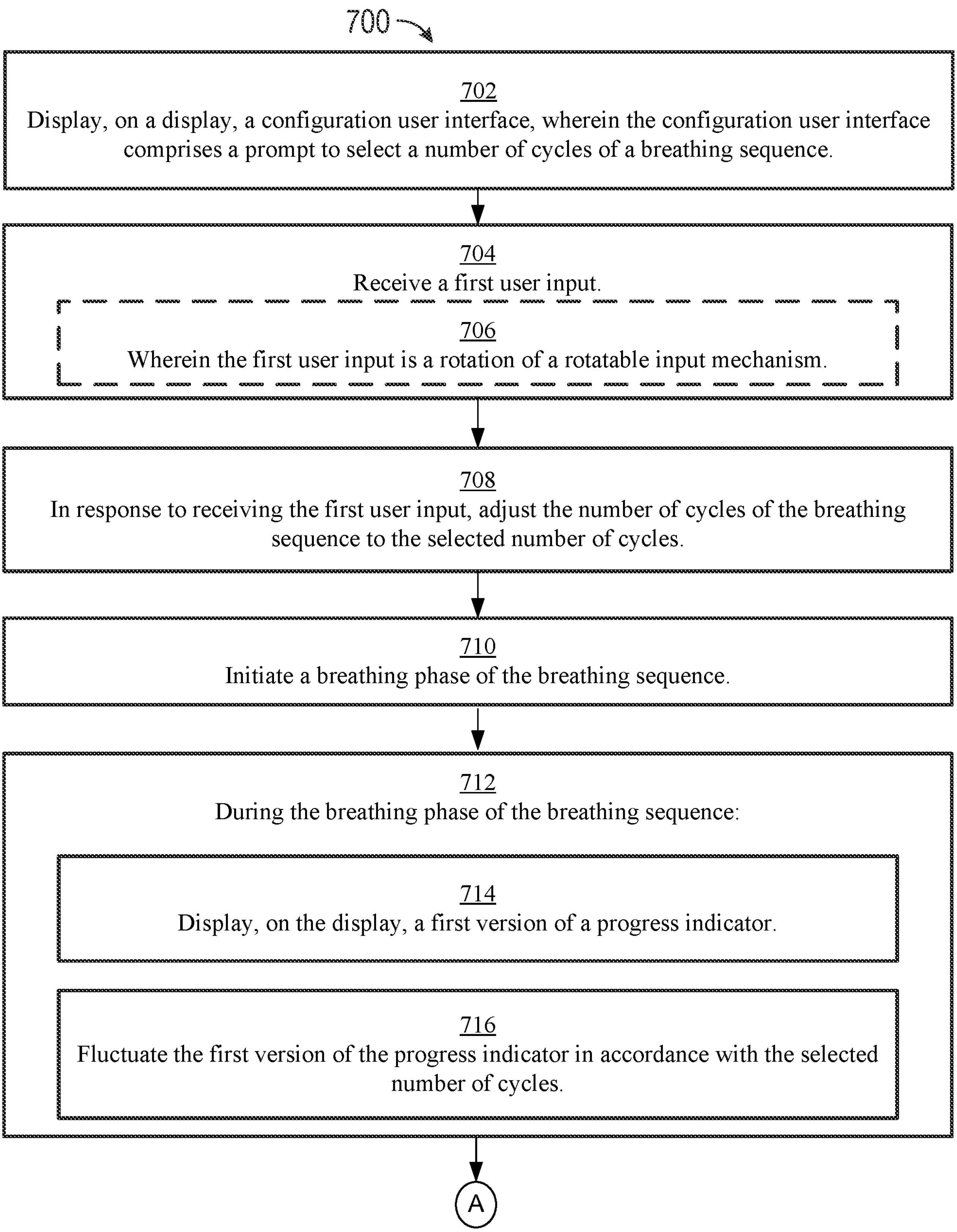
700
702
Display, on a display, a configuration user interface, wherein the configuration user interface comprises a prompt to select a number of cycles of a breathing sequence.
704
Receive a first user input.
706
Wherein the first user input is a rotation of a rotatable input mechanism.
708
In response to receiving the first user input, adjust the number of cycles of the breathing sequence to the selected number of cycles.
710
Initiate a breathing phase of the breathing sequence.
712
During the breathing phase of the breathing sequence:
714
Display, on the display, a first version of a progress indicator.
716
Fluctuate the first version of the progress indicator in accordance with the selected number of cycles.
A

FIG. 7A

A

718

Prior to initiating the breathing phase of the breathing sequence:

720

Receive a second user input.

722

Wherein the first user input and the second user input are the same.

724

In response to receiving the second user input, progress to the breathing phase of the breathing sequence.

726

Wherein each cycle of the selected number of cycles comprises a first period of time and a second period of time distinct from the first period, and wherein fluctuating the first version of the progress indicator comprises, during each cycle of the selected number of cycles:

728

Change, at the start of the first period of time, a first variable visual characteristic of the progress indicator.

730

Change, at the start of the second period of time, the first variable visual characteristic of the progress indicator.

732

Wherein the second period of time is greater than the first period of time.

B

FIG. 7B

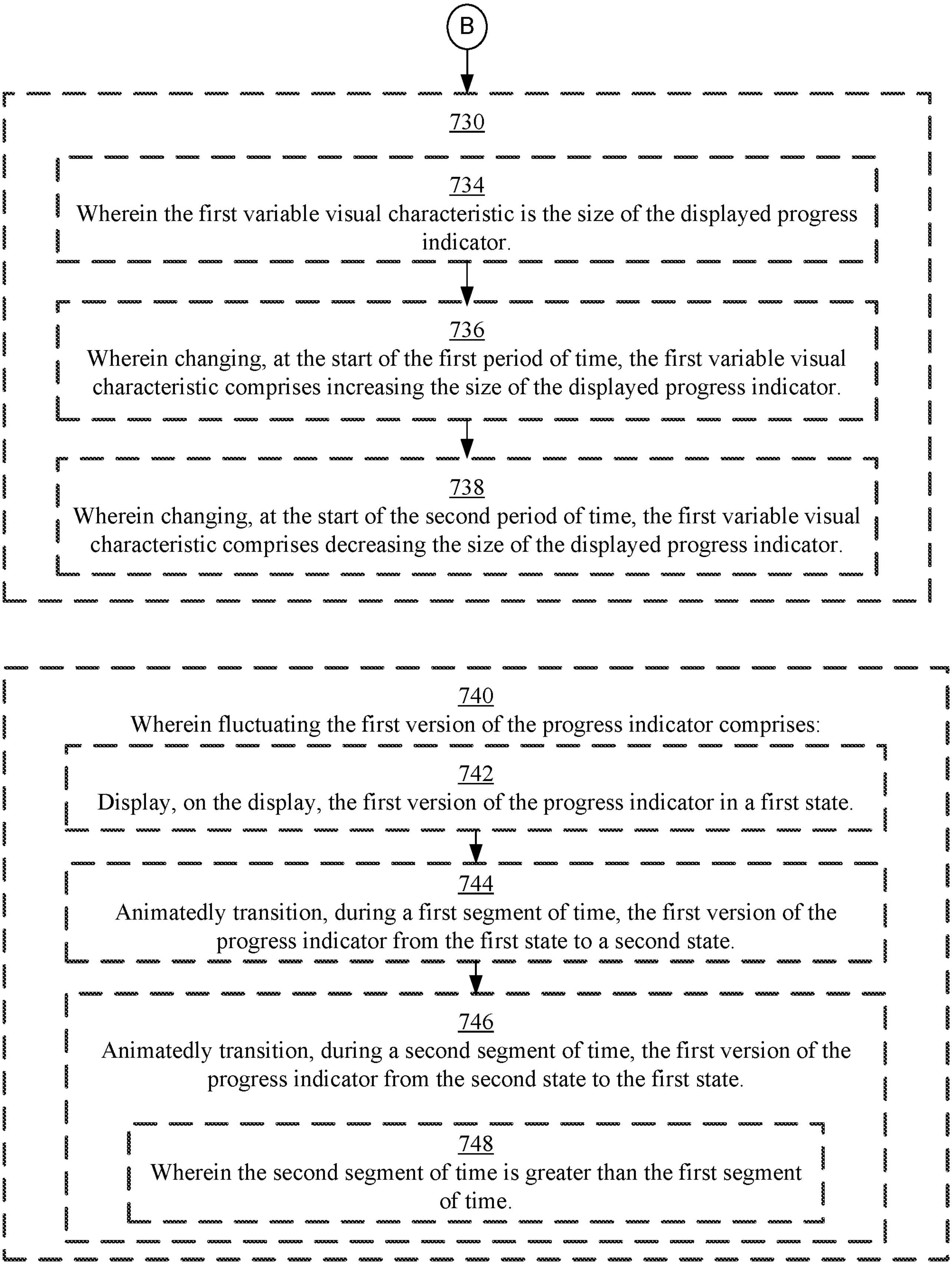
B
730
734
Wherein the first variable visual characteristic is the size of the displayed progress indicator.
736
Wherein changing, at the start of the first period of time, the first variable visual characteristic comprises increasing the size of the displayed progress indicator.
738
Wherein changing, at the start of the second period of time, the first variable visual characteristic comprises decreasing the size of the displayed progress indicator.
740
Wherein fluctuating the first version of the progress indicator comprises:
742
Display, on the display, the first version of the progress indicator in a first state.
744
Animatedly transition, during a first segment of time, the first version of the progress indicator from the first state to a second state.
746
Animatedly transition, during a second segment of time, the first version of the progress indicator from the second state to the first state.
748
Wherein the second segment of time is greater than the first segment of time.

FIG. 7C

750
Wherein the first version of the progress indicator fluctuates at a first cyclic rate.

752
Receive a value of the first cyclic rate.

754
In response to receiving the value of the first cyclic rate, set the first cyclic rate to the received value.

756
Wherein the first cyclic rate is a predetermined number of cycles per unit of time.

758
Prior to displaying, on the display, the configuration user interface:

760
Determine whether a prompting criteria has been met.

762
Wherein determining whether a prompting criteria has been met comprises determining whether a predetermined period of time has passed after a time associated with a previous breathing sequence.

764
Wherein the time associated with the previous breathing sequence is a beginning time associated with the previous breathing sequence.

766
Wherein the time associated with the previous breathing sequence is a completion time associated with the previous breathing sequence.

C

FIG. 7D

758

C

768
In accordance with a determination that the prompting criteria has been met, display, on the display, a prompt that comprises a first affordance.

770
Receive user input selection of the first affordance.

772
In response to receiving the user input selection of the first affordance, display, on the display, the configuration user interface.

774
Prior to initiating the breathing phase of the breathing sequence:

776
Initiate a preliminary phase of the breathing sequence.

778
During the preliminary phase of the breathing sequence:

780
Display, on the display, a second version of the progress indicator.

782
Fluctuate the second version of the progress indicator in accordance with a preliminary number of cycles.

D

FIG. 7E

774

778

D

782

784
Wherein the preliminary number of cycles is independent of the selected number of cycles.

786
Wherein the first version of the progress indicator fluctuates at a first cyclic rate, wherein the second version of the progress indicator fluctuates at a second cyclic rate, and wherein the second cyclic rate is greater than the first cyclic rate.

788
Wherein the first version of the progress indicator comprises a second variable visual characteristic.

790
Further in response to receiving the first user input, select an initial state of the second variable visual characteristic in accordance with the selected number of cycles.

792
During the breathing phase of the breathing sequence:

794
Detect completion of a portion of the selected number of cycles.

796
Wherein detecting completion of the portion of the selected number of cycles comprises **determining whether the progress indicator has fluctuated in accordance with a predetermined number of cycles**.

798
Wherein detecting completion of the portion of the selected number of cycles comprises detecting whether a predetermined amount of time has passed during the breathing phase of the breathing sequence.

E

FIG. 7F

792

E

7100
In response to detecting completion of the portion of the selected number of cycles, change the second variable visual characteristic of the progress indicator.

7102
Wherein the first version of the progress indicator comprises a plurality of graphical elements, and wherein changing the second variable visual characteristic of the progress indicator comprises **changing a number of the displayed graphical elements of the plurality of graphical elements.**

7104
Wherein the device includes a haptic output device, and during the breathing phase of the breathing sequence, output one or more haptic breathing cues according to a haptic profile.

7106
Wherein outputting the one or more haptic breathing cues according to the haptic profile comprises:

7108
Output, at the start of the first period of time, a first number of haptic breathing cues.

7110
Output, at the start of the second period of time, a second number of haptic breathing cues, wherein the first number and the second number are different.

F

FIG. 7G

F

7104

7112
Wherein outputting the one or more haptic breathing cues according to the haptic profile comprises:

7114
Output a first plurality of haptic breathing cues at a first frequency between cues during the first period of time.

7116
Output a second plurality of haptic breathing cues at a second frequency between cues during the second period of time.

7118
Wherein the first frequency between cues is an increasing frequency, and wherein the second frequency between cues is a constant frequency.

7120
Wherein the device includes a sensor.

7122
Receive a first signal from the sensor during the breathing phase of the breathing sequence.

7124
Determine an estimated heart rate based at least in part on the received first signal.

7126
Display, on the display, an indication of the estimated heart rate.

7128
Wherein the indication of the estimated heart rate is displayed subsequent to completion of the breathing phase.

FIG. 7H

7130
Suppress, during the breathing phase of the breathing sequence, the output of at least a subset of alerts that the device is configured to output.

7132
During the breathing phase of the breathing sequence, receive a third user input.

7134
Determine whether the third user input meets a breathing sequence interrupt criteria.

7136
In accordance with a determination that the third user input meets the breathing sequence interrupt criteria, end the breathing phase of the breathing sequence.

7138
Subsequent to ending the breathing phase of the breathing sequence:

7140
Display, on the display, an indication of a completed number of cycles, wherein the completed number of cycles includes the number of cycles, of the selected number of cycles, that the progress indicator fluctuated in accordance with after the breathing phase was initiated and before the third user input was received.

7142
Display, on the display, a second affordance.

7144
Receive user input selection of the second affordance.

7146
In response to the user input selection of the second affordance, display, on the display, the configuration user interface.

FIG. 7I

7148
Determine an aggregate amount of time representing a completed number of cycles of the breathing sequence over a goal period.

7150
Wherein the first version of the progress indicator fluctuates at a first cyclic rate, and wherein the aggregate amount of time is determined based at least in part on the first cyclic rate.

7152
Wherein the goal period is the current day.

7154
In response to detecting completion of the breathing phase of the breathing sequence, display, on the display, a completion interface comprising: an indication of the aggregate amount of time, and a third affordance.

7156
Wherein detecting completion of the breathing phase comprises detecting that a predetermined amount of time has elapsed.

7158
Wherein the completion interface further comprises an indication of an estimated heart rate.

7160
Receive user input selection of the third affordance.

7162
In response to receiving the user input selection of the third affordance, progress to the breathing phase of the breathing sequence.

FIG. 7J

7164
Determine an aggregate amount of time representing a completed number of cycles of the breathing sequence over a goal period for each of a plurality of goal periods.

7166
Wherein the goal period is a day and the plurality of goal periods is seven days.

7168
Display, on the display, a summary interface comprising an indicator for each of the plurality of goal periods, wherein the indicator for each of the plurality of goal periods represents the determined aggregate amount of time for its respective goal period of the plurality of goal periods.

7170
Receive a second signal during the breathing sequence.

7172
Wherein the device includes a sensor, and wherein receiving the second signal comprises receiving the second signal from the sensor during the breathing sequence.

7174
Determine an estimated breathing pattern based at least in part on the received second signal.

7176
Synchronize the initiation of the breathing phase of the breathing sequence and the display of the progress indicator during the breathing phase of the breathing sequence with the estimated breathing pattern.

7178
Wherein synchronizing the initiation of the breathing phase of the breathing sequence and the display of the progress indicator during the breathing phase of the breathing sequence with the estimated breathing pattern comprises:

7180
Determine a synchronization event that is a transition between an inhale period and an exhale period of the estimated breathing pattern.

F

FIG. 7K

7176

7178

F

7182
In accordance with a determination that the synchronization event has occurred:

7184
Initiate the breathing phase of the breathing sequence.

7186
Display, on the display, the first version of the progress indicator.

7188
Prior to displaying the configuration user interface:

7190
Determine an aggregate amount of time representing a completed number of cycles of one or more breathing sequences over a goal period.

7192
Display, on the display, a fourth affordance comprising an indication of the aggregate amount of time.

7194
Receive user input selection of the fourth affordance,
wherein the configuration user interface is displayed in response to receiving the user input selection of the fourth affordance.

FIG. 7L

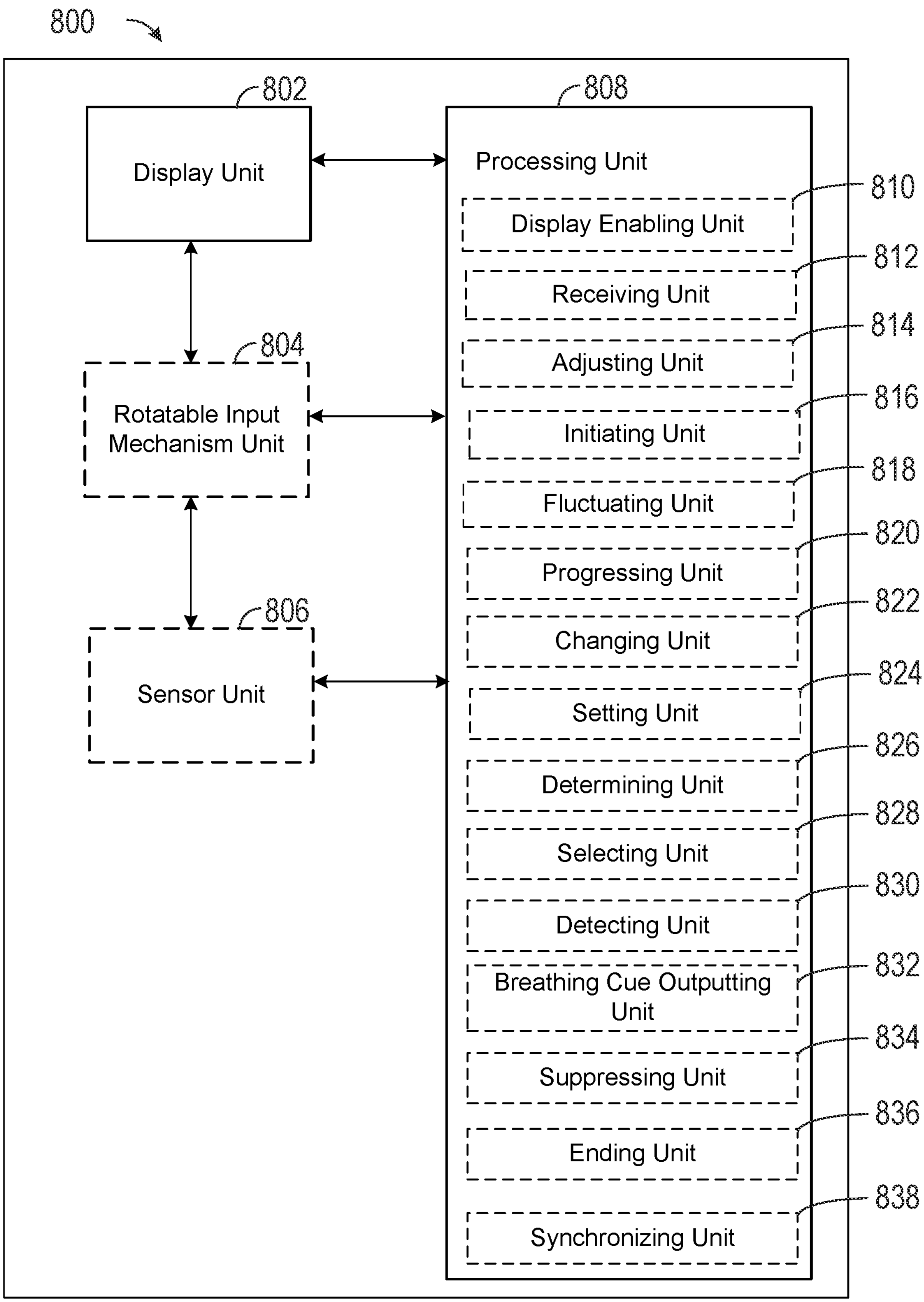
800
802
Display Unit
808
Processing Unit
810
Display Enabling Unit
812
Receiving Unit
814
Adjusting Unit
816
Initiating Unit
818
Fluctuating Unit
820
Progressing Unit
822
Changing Unit
824
Setting Unit
826
Determining Unit
828
Selecting Unit
830
Detecting Unit
832
Breathing Cue Outputting Unit
834
Suppressing Unit
836
Ending Unit
838
Synchronizing Unit
804
Rotatable Input Mechanism Unit
806
Sensor Unit

FIG. 8

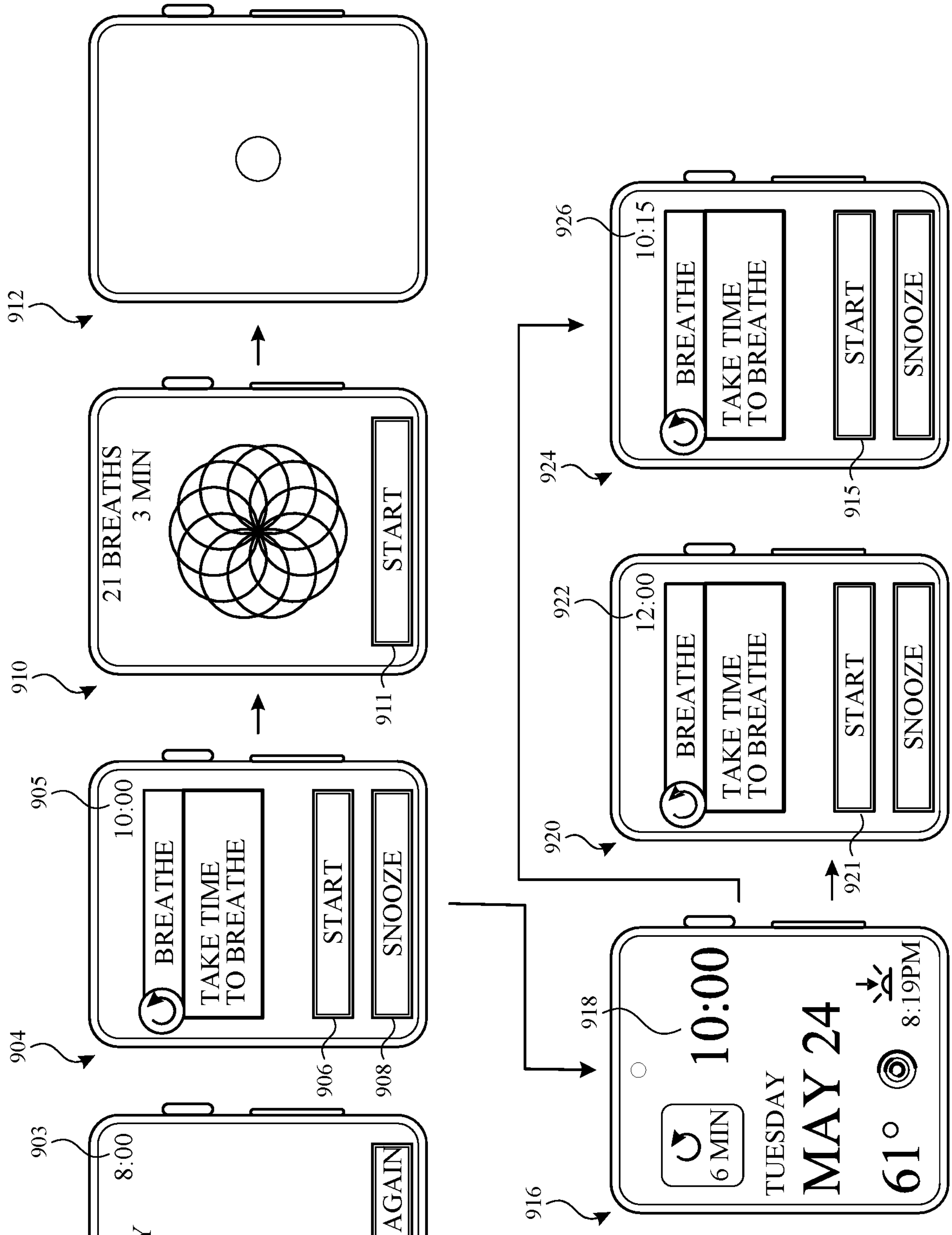
902
903
8:00
SUMMARY
SO FAR
6 MIN
60 BPM
BREATHE AGAIN
904
905
10:00
BREATHE
TAKE TIME TO BREATHE
START
SNOOZE
906
908
910
21 BREATHS
3 MIN
START
911
912
916
918
10:00
6 MIN
TUESDAY
MAY 24
61°
8:19PM
920
922
12:00
BREATHE
TAKE TIME TO BREATHE
START
SNOOZE
921
924
926
10:15
BREATHE
TAKE TIME TO BREATHE
START
SNOOZE
915

FIG. 9A

930

FIRST BREATHING SEQUENCE INITIATION TIME (930A)	FIRST BREATHING SEQUENCE COMPLETION TIME (930B)	PROMPTING FREQUENCY (930C)	PROMPT DISPLAY TIME (930D)
7:57 AM	8:00 AM	2	9:57 AM - 10:00 AM
7:57 AM	8:00 AM	4	11:57 AM - 12:00 PM
7:57 AM	8:00 AM	6	1:57 PM - 2:00 PM
7:57 AM	8:00 AM	8	3:57 PM - 4:00 PM
7:57 AM	8:00 AM	10	5:57 PM - 6:00 PM
7:57 AM	8:00 AM	12	7:57 PM - 8:00 PM

FIG. 9B

1000

1002
Detect a time associated with a first breathing sequence.

1004
Wherein detecting the time associated with the first breathing sequence comprises detecting a time that occurred during the first breathing sequence.

1006
Wherein detecting the time associated with the first breathing sequence comprises detecting an initiation time of a breathing phase of the first breathing sequence.

1008
Wherein detecting the time associated with the first breathing sequence comprises detecting a completion time of a breathing phase of the first breathing sequence.

1010
Generate a prompting criteria based on a predetermined prompting frequency and the detected time associated with the first breathing sequence.

1012
Wherein the predetermined prompting frequency is a predetermined length of time.

A

FIG. 10A

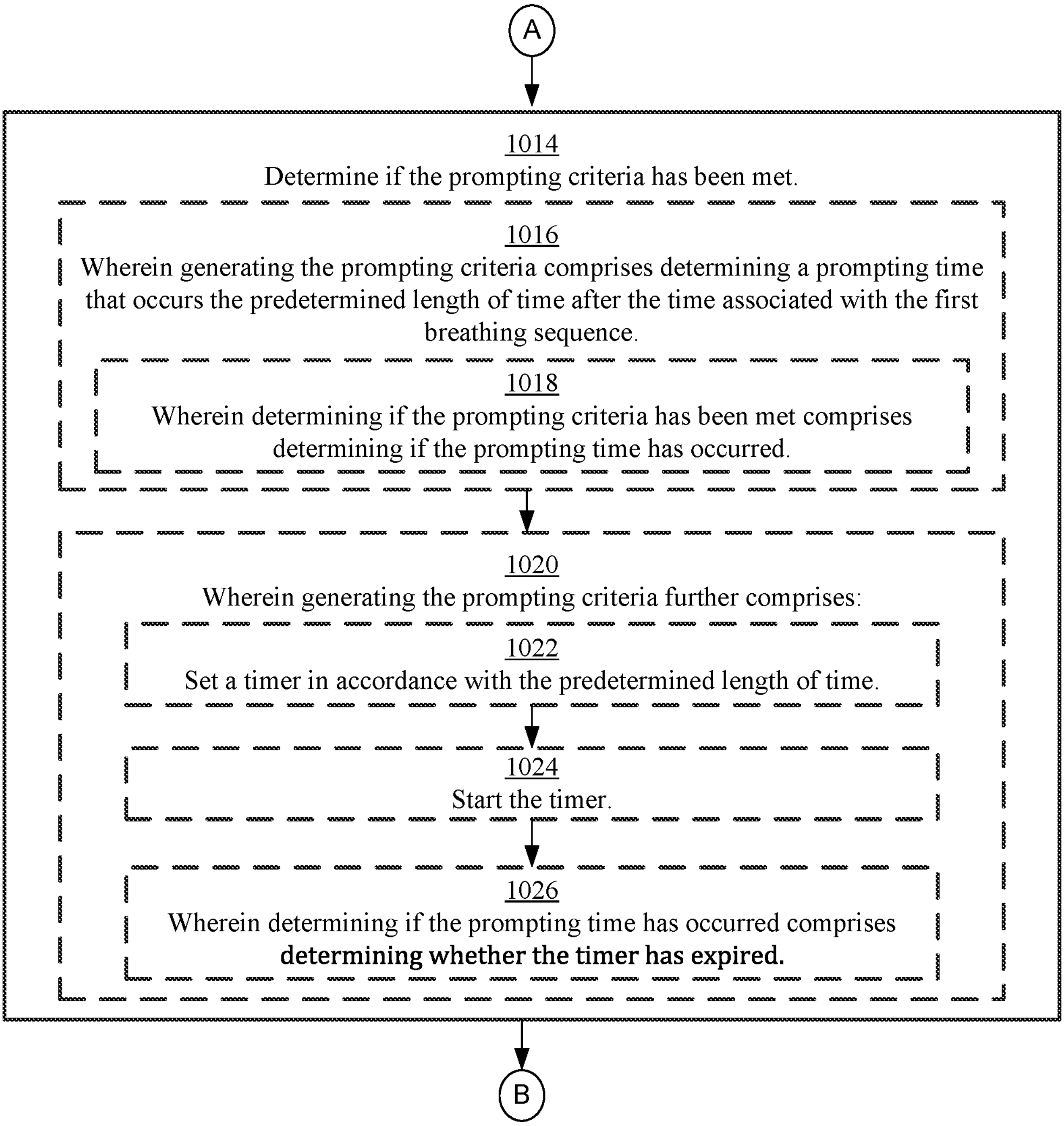
A
1014
Determine if the prompting criteria has been met.
1016
Wherein generating the prompting criteria comprises determining a prompting time that occurs the predetermined length of time after the time associated with the first breathing sequence.
1018
Wherein determining if the prompting criteria has been met comprises determining if the prompting time has occurred.
1020
Wherein generating the prompting criteria further comprises:
1022
Set a timer in accordance with the predetermined length of time.
1024
Start the timer.
1026
Wherein determining if the prompting time has occurred comprises determining whether the timer has expired.
B

FIG. 10B

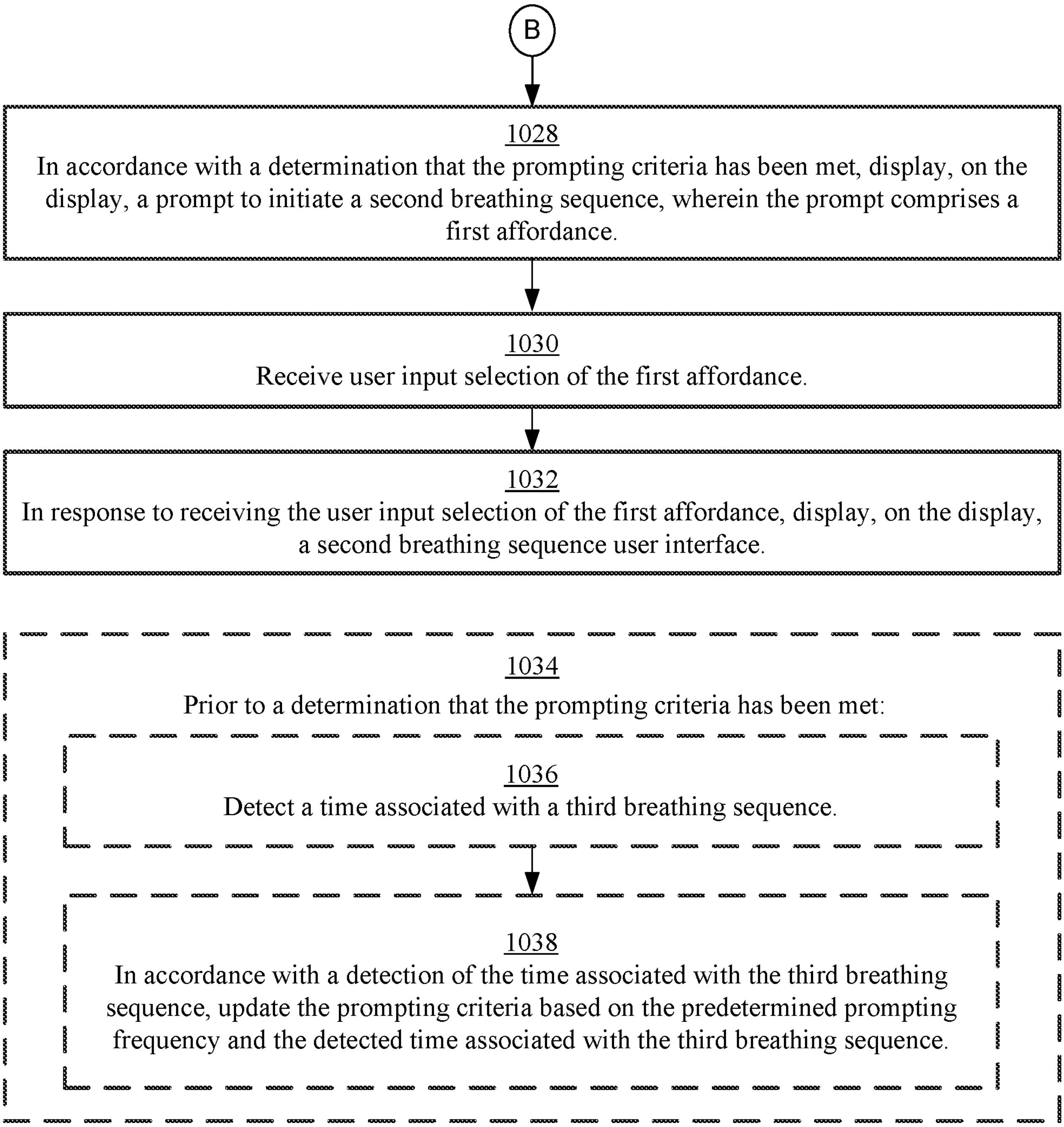
B
1028
In accordance with a determination that the prompting criteria has been met, display, on the display, a prompt to initiate a second breathing sequence, wherein the prompt comprises a first affordance.
1030
Receive user input selection of the first affordance.
1032
In response to receiving the user input selection of the first affordance, display, on the display, a second breathing sequence user interface.
1034
Prior to a determination that the prompting criteria has been met:
1036
Detect a time associated with a third breathing sequence.
1038
In accordance with a detection of the time associated with the third breathing sequence, update the prompting criteria based on the predetermined prompting frequency and the detected time associated with the third breathing sequence.

FIG. 10C

1040
Receive a first user input.

1042
In response to receiving the first user input, initiate a breathing phase of the second breathing sequence.

1044
Prior to initiating the breathing phase of the second breathing sequence:

1046
Receive a second user input.

1048
In response to receiving the second user input, adjust a number of cycles of the second breathing sequence to the selected number of cycles.

1050
During the breathing phase of the second breathing sequence:

1052
Display, on the display, a first version of a progress indicator.

1054
Fluctuate the first version of the progress indicator in accordance with a selected number of cycles.

FIG. 10D

1056
Wherein the prompt to initiate the second breathing sequence comprises a second affordance.

1058
Receive user input selection of the second affordance.

1060
In response to receiving the user input selection of the second affordance:

1062
Cease display, on the display, of the prompt.

1064
Update the prompting criteria.

1066
Wherein updating the prompting criteria comprises updating the prompting criteria based on the predetermined prompting frequency and the detected time associated with the first breathing sequence.

1068
Wherein updating the prompting criteria comprises detecting a time associated with the received user input selection of the second affordance, and updating the prompting criteria based on the predetermined prompting frequency and the detected time associated with the received user input selection of the second affordance.

1070
Wherein updating the prompting criteria comprises updating the prompting criteria based on a snooze interval, wherein the predetermined prompting frequency is a predetermined length of time, and wherein the snooze interval is a length of time that is distinct from the predetermined prompting frequency.

1072
Forgo display of all prompts to initiate a breathing sequence during the remainder of a current day.

C

FIG. 10E

C

1074
Determine if the updated prompting criteria has been met.

1076
In accordance with a determination that the updated prompting criteria has been met, display, on the display, a prompt to initiate a fourth breathing sequence, wherein the prompt comprises a third affordance.

1078
Receive user input selection of the third affordance.

1080
In response to receiving the user input selection of the third affordance, display, on the display, a fourth breathing sequence user interface.

FIG. 10F

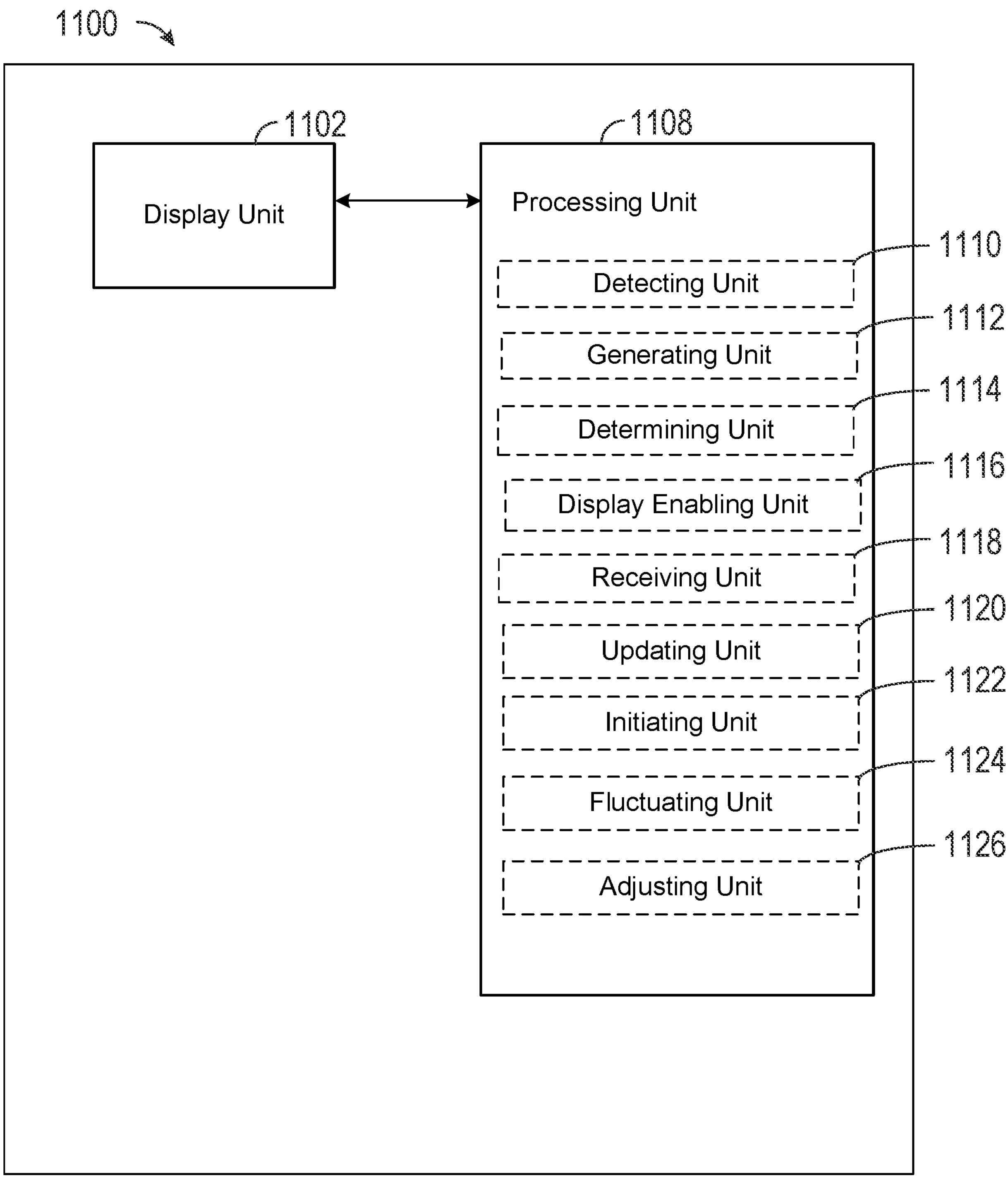
1100
1102
Display Unit
1108
Processing Unit
1110
Detecting Unit
1112
Generating Unit
1114
Determining Unit
1116
Display Enabling Unit
1118
Receiving Unit
1120
Updating Unit
1122
Initiating Unit
1124
Fluctuating Unit
1126
Adjusting Unit

FIG. 11