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PROVIDING PRIMING CUES TO A USER OF AN ELECTRONIC DEVICE

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An electronic device can output a priming cue prior to outputting an alert on the electronic device. A priming cue can be a haptic priming cue, a visual priming cue, an audio priming cue, or various combinations of these priming cues. The priming cue can be perceived by a user either consciously or subconsciously and can increase a user's perceptual state for the alert.

PROVIDING PRIMING CUES TO A USER OF AN ELECTRONIC DEVICETechnical Field

5 **[0001]** The present invention relates to providing alerts to users of electronic devices, and more particularly to priming an alert.

Background

10 **[0002]** Electronic devices have become ubiquitous in people's daily lives. Certain electronic devices such as cell phones, tablet computing devices, personal digital assistants, and the like have become common items in the workplace and at home. Some of these electronic devices include an ability to notify or alert a user to a particular
15 item of interest, such as, for example, an incoming email or text message. However, in some situations, an alert may be inadvertently ignored by the user. The user's perception system may not detect the alert at all, or may be slow to detect the alert.

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Summary

25 **[0003]** An electronic device can output one or more priming cues prior to outputting one or more alerts on the electronic device. A priming cue can be a haptic priming cue, a visual priming cue, an audio priming cue, or various combinations of these priming cues. The priming cue can be perceived by a user either consciously or subconsciously, and may subliminally or unconsciously increase the awareness of the user without specifically attracting the user's attention
30 to the priming cue. The priming cue can heighten the awareness of the user or place the user in a more receptive state for perceiving the alert. In some situations, the priming cue can decrease a user's reaction time for perceiving the alert. The priming cue may be imperceptible
35 or barely perceptible for the entire duration of the priming cue in some embodiments. In other embodiments, the priming

cue may be imperceptible or barely perceptible for a portion of the duration and perceptible for the remaining portion of the duration.

[0004] The stimulus that constitutes the priming cue
5 may be uniform during the duration of the priming cue; can
vary over the duration of the priming cue; or can vary for
only a portion of the duration of the priming cue. As one
example, the stimulus can vary (e.g., increase) over time.
For example, the frequency, intensity, and/or the rhythm can
10 vary during the duration. Additionally or alternatively, the
stimulus can pulse (increase and decrease in intensity)
during some or all of the duration. Additionally or
alternatively, the priming cue can mimic known patterns,
sounds, or representations (e.g., image). As one example,
15 the priming cue can mimic a heartbeat. In some embodiments,
the variance in the stimulus may be noticeable by the user.

[0005] In one aspect, a method for priming an alert
on an electronic device can include detecting an action
that is associated with the alert and determining whether a
20 priming cue is to be produced for the alert based on one or
more factors. If a priming cue is to be produced, the
priming cue for the alert is output on the electronic device.
The alert is then output on the electronic device, where the
alert is offset in time from the priming cue by a period of
25 time. The one or more factors can include, but are not
limited to, the type of alert to be output, one or more
environmental conditions, and/or the motion (or lack thereof)
of the electronic device.

[0006] The period of time can be fixed for each
30 priming cue, or the period of time can vary depending on one
or more characteristics of the priming cue and/or of the
alert. For example, the type of priming cue and/or the alert
(e.g., haptic, audio, visual), the intensity of the priming
cue and/or of alert, and/or the duration of the priming cue

and/or of the alert can influence the amount of time that exists between the priming cue and the alert.

[0007] In another aspect, a method for priming a user for the receipt of an alert in an electronic device can include providing a priming cue to the user on the electronic device, and determining whether a user has responded to the priming cue. If the user responds to the priming cue, an alert may be provided to the user on the electronic device. In some embodiments, a stimulus of the priming cue can be modified if the user does not respond to the priming cue. In some embodiments, a determination may also be made as to whether or not a user responds to the alert. If the user does not respond to the alert, one or more characteristics of the alert may be modified. For example, an intensity and/or a duration of a priming cue may be modified if the user does not respond to the priming cue. Similarly, an intensity and/or a duration of an alert may be modified if the user does not respond to the alert.

[0008] In yet another aspect, an electronic device can include a priming and alert system, an input/output device operably connected to the priming and alert system, and a processing device operably connected to the priming and alert system and adapted to cause the priming and alert system to provide a priming cue to a user. The priming and alert system can include a haptic module, an audio module, and/or a visual module. The processing device may also be adapted to cause the priming and alert system to provide an alert to the user after the priming cue is provided to the user.

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Brief Description of the Drawings

[0009] Embodiments of the invention are better understood with reference to the following drawings. The elements of the drawings are not necessarily to scale

relative to each other. Identical reference numerals have been used, where possible, to designate identical features that are common to the figures.

5 **[0010]** FIG. 1 is a perspective view of one example of an electronic device that can produce a priming cue prior to outputting an alert;

[0011] FIG. 2 is an illustrative block diagram of the electronic device 100 shown in FIG. 1;

10 **[0012]** FIG. 3 illustrates a sample output from a sample electronic device, including both a priming cue and an alert waveform;

[0013] FIG. 4 is a flowchart of a first method of outputting a priming cue prior to an alert being produced in an electronic device;

15 **[0014]** FIG. 5 is a flowchart of a second method of outputting a priming cue before an alert is produced in an electronic device;

20 **[0015]** FIG. 6 is a flowchart of a method of outputting a priming cue to a group of users prior to an alert to be received on their electronic devices;

[0016] FIG. 7 is a flowchart of a method of a third party causing a priming cue to be produced before an alert is output on an electronic device; and

25 **[0017]** FIG. 8 is a flowchart of a method of identifying and outputting priming cues and alerts.

Detailed Description

30 **[0018]** An electronic device can present one or more alerts to a user based on the detection of an event or action. For example, a user can be alerted to the receipt of an email or text, or of an impending meeting or appointment scheduled in a calendar program. Each alert may define a distinct alert that may include multiple elements that provide different types of stimuli to the user. For example, an alert may define an audio alert, a visual alert, a haptic

alert, or various combinations of these alerts. The combinations of alerts can occur concurrently, consecutively, or with some overlap in time.

5 **[0019]** Alerts by themselves, however, are not always noticed by a user. The environment may be distracting or the user may be otherwise distracted. Further, in some situations it may be useful to emit an alert at a low power, which may cause the perceptibility of the alert to be diminished. This may be useful when the battery has a low
10 charge and a tradeoff may be made between the alert strength and charge conservation, for example.

[0020] Thus, certain embodiments may preface an alert with a priming cue. The priming cue may be an output that is minimally perceptible or subconsciously perceptible by a user
15 of an electronic device. In one embodiment, the priming cue is of a mode different than that of the alert itself. For example, the priming cue may be a haptic output while the alert is an audio output. In such an example, the haptic output of the priming cue may be designed to cause
20 sufficiently small motions in the electronic device that the user may be placed in a state of heightened awareness without being explicitly aware of the priming cue. The user, while in this state, may be more receptive to the alert and therefore may notice it more quickly (or at all). As another
25 example, the priming cue may take the form of a light or graphic flashing on a display at a rate too fast to be consciously perceived by the human eye, but subconsciously registered, thereby drawing the user's attention to the device and priming the user to receive the alert.

30 **[0021]** In other embodiments, the priming cue is the same mode as that of the alert or of components of the alert. For example, a priming cue and an alert may both be haptic outputs. Alternatively, a priming cue may be an audio

output, while an alert is a composition of an audio output and a visual output.

[0022] In certain embodiments the priming cue may be generated only when the device determines a priming cue is to be output, instead of before every alert. The electronic device may determine any or all of the last time at which a user interacted with the electronic device, the current activity and/or operational state of the electronic device, the user's current action, the presence or absence of environmental factors such as noise, bright light, and so on, and use these to intelligently determine if a priming cue should be output, if so, the strength of the priming cue.

[0023] As discussed above, embodiments described herein provide one or more priming cues to a user prior to issuing an alert. Each priming cue can take the form of a stimulus that is delivered as a haptic priming cue, a visual priming cue, an audio priming cue, or various combinations of these priming cues. The priming cue can be perceived by the user either consciously or subconsciously. A priming cue can prepare the user to perceive the stimulus of the alert, and in some situations, the priming cue may reduce a user's reaction time for perceiving the alert. In some embodiments, the priming cue may not be noticeable by the user, but instead causes the user to be in a state of heightened awareness that makes the user more likely to perceive an alert that exceeds a perceptual threshold (e.g., is sufficiently loud, bright, forceful, stirring, and so on).

[0024] Generally, the stimulus that constitutes the priming cue may be uniform during the duration of the priming cue; can vary over the duration of the priming cue; or can vary for only a portion of the duration of the priming cue. As one example, the stimulus can vary over time. For example, the frequency, intensity, and/or the rhythm can vary during the duration. Additionally or alternatively, the

stimulus can pulse (increase and decrease in intensity) during some or all of the duration. Additionally or alternatively, the priming cue can mimic known patterns, sounds, or representations (e.g., image). As one example, the priming cue can mimic a heartbeat. In some cases, a variable priming cue may be output by the electronic device until input is received from the user. For example, the user may touch the screen of the electronic device or provide another form of input that is received by the electronic device. In response to receiving the input, the electronic device may output an alert or an alert that is uniform or varies over some or all of the duration of the alert.

[0025] In some embodiments, an electronic device can detect the presence of other electronic devices that are located within a given distance of the electronic device. A priming cue can be provided to the multiple electronic devices at substantially the same time. As one example, a group of users may be in a meeting and a subset of the users may receive a priming cue and an alert for the same reason and at substantially the same time.

[0026] A third party may activate a priming cue in some embodiments. The third party may select the type of priming cue (e.g., haptic, audio, visual, or combinations thereof) to be provided to the user. Alternatively, the type of priming cue that is presented to the user can be based on how the user has configured his or her electronic device (e.g., with a preferences menu). As one example, the Emergency Alert System may trigger a priming cue and alert in the event of a national or regional emergency.

Alternatively, a restaurant may trigger a priming cue and alert to inform a user that a table is available for the user. As another example, a transportation system, such as an airline or light rail system can trigger a priming cue and

alert to inform a user that a plane is boarding or a light rail train is arriving or departing from a station.

[0027] The implementations described above may be implemented on an electronic device that is configured to produce one or more forms of output to the user. FIG. 1 is a perspective view of one example of an electronic device that can output a priming cue prior to providing an alert to a user. In the illustrated embodiment, the electronic device 100 is implemented as a wearable communication device. The wearable communication device may be configured to provide, for example, wireless electronic communication from other devices and/or health-related information or data such as but not limited heart rate data, blood pressure data, temperature data, oxygen level data, diet/nutrition information, medical reminders, health-related tips or information, or other health-related data.

[0028] Other embodiments can implement the electronic device differently. For example, the electronic device can be a smart telephone, a gaming device, a digital music player, a tablet computing device, and other types of portable and consumer electronic devices that provide alerts to a user.

[0029] The electronic device 100 includes an enclosure 102 at least partially surrounding a display 104 and one or more buttons 106 or input devices. The enclosure 102 can form an outer surface or partial outer surface and protective case for the internal components of the electronic device 100, and may at least partially surround the display 104. The enclosure 102 can be formed of one or more components operably connected together, such as a front piece and a back piece. Alternatively, the enclosure 102 can be formed of a single piece operably connected to the display 104.

[0030] The display 104 can be implemented with any suitable technology, including, but not limited to, a multi-touch sensing touch screen that uses liquid crystal display (LCD) technology, light emitting diode (LED) technology, organic light-emitting display (OLED) technology, organic electroluminescence (OEL) technology, or another type of display technology.

[0031] The button 106 can take the form of a home button, which may be a mechanical button, a soft button (e.g., a button that does not physically move but still accepts inputs), an icon or image on a display or on an input region, and so on. Additionally or alternatively, the button 106 can be an input/output device that allows the user to interact with one or more functions and/or applications in the wearable communication device 100. Other mechanisms may be used as input/output devices, such as a speaker, a microphone, an on/off button, a mute button, or a sleep button. In some embodiments, the button 106 can be integrated as part of a cover glass of the electronic device.

[0032] The electronic device 100 can be permanently or removably attached to a band 108. The band 108 can be made of any suitable material, including, but not limited to, leather, metal, rubber or silicon, fabric, and ceramic. In the illustrated embodiment, the band is a wristband that wraps around the user's wrist. The wristband can include an attachment mechanism (not shown), such as a bracelet clasp, Velcro, and magnetic connectors. In other embodiments, the band can be elastic or stretchy such that it fits over the hand of the user and does not include an attachment mechanism.

[0033] FIG. 2 is an illustrative block diagram of the electronic device 100 shown in FIG. 1. The electronic device 100 can include the display 104, one or more processing devices 200, memory 202, one or more input/output (I/O)

devices 204, one or more sensors 206, a power source 208, a network communications interface 210, tactile sensing device 211, and a priming and alert system 212. The display 104 may provide an image or video output for the electronic device 100. The electronic device may also have an input surface for one or more input devices, such as, for example, a touch sensing device and/or a fingerprint sensor. The display 104 may be substantially any size and may be positioned substantially anywhere on the electronic device 100.

10 **[0034]** The processing device 200 can control some or all of the operations of the electronic device 100. The processing device 200 can communicate, either directly or indirectly with substantially all of the components of the electronic device 100. For example, a system bus or signal
15 line 214 or other communication mechanisms can provide communication between the processing device(s) 200, the memory 202, the I/O device(s) 204, the sensor(s) 206, the power source 208, the network communications interface 210, the tactile sensing device 211, and/or the priming and alert
20 system 212. The one or more processing devices 200 can be implemented as any electronic device capable of processing, receiving, or transmitting data or instructions. For example, the processing device(s) 200 can each be a
25 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 "processing device" is meant to encompass a single processor or processing unit, multiple processors, multiple processing units, or other suitably
30 configured computing element or elements.

[0035] The memory 202 can store electronic data that can be used by the electronic device 100. For example, a memory can store electrical data or content such as, for example, audio and video files, documents and applications,

device settings and user preferences, timing and control signals or data for the priming and alert system 212, data structures or databases, and so on. The memory 202 may also store application programs that may be executed by the processing device(s) 200. Example application programs include, but are not limited to, phone programs, e-mail programs, personal information management (PIM) programs, word processing programs, spreadsheet programs, Internet browser programs, messaging programs, and the like. The memory 202 can be configured as any type of memory. By way of example only, the memory can be implemented as random access memory, read-only memory, Flash memory, removable memory, or other types of storage elements, or combinations of such devices.

[0036] The one or more I/O devices 204 can transmit and/or receive data to and from a user or another electronic device. One example of an I/O device is button 106 in FIG. 1. The I/O device(s) 204 can include the display 104, a touch sensing input surface such as a track pad, one or more buttons, one or more microphones or speakers, one or more actuators, one or more ports such as a microphone port, and/or a keyboard.

[0037] The electronic device 100 may also include one or more sensors 206 positioned substantially anywhere on the electronic device 100. The sensor or sensors 206 may be configured to sense substantially any type of characteristic, such as but not limited to, images, pressure, light, touch, heat, position, motion, and so on. For example, the sensor(s) 206 may be an image sensor, a heat sensor, a light or optical sensor, a pressure transducer, a magnet, a gyroscope, an accelerometer, and so on.

[0038] The power source 208 can be implemented with any device capable of providing energy to the electronic device 100. For example, the power source 208 can be one or

more batteries or rechargeable batteries, or a connection cable that connects the remote control device to another power source such as a wall outlet. Additionally or alternatively, the power source 208 may be a wireless energy transfer system, such as an inductive energy transfer system, that provides power to the electronic device to recharge the batteries or to operate the electronic device.

[0039] The network communication interface 210 can facilitate transmission of data to or from other electronic devices. For example, a network communication interface can transmit electronic signals via a wireless and/or wired network connection. Examples of wireless and wired network connections include, but are not limited to, cellular, Wi-Fi, Bluetooth, IR, and Ethernet.

[0040] The tactile sensing device 211 is configured to receive tactile input from a user, such as, for example, one or more touch and/or force inputs. As described earlier, the display 104 can be a multi-touch sensing touchscreen. Additionally or alternatively, a tactile sensing device 211 may be a fingerprint sensing device that captures fingerprint data from a user of the electronic device. In some embodiments, the tactile sensing device 211, or components of a tactile sensing device, can be integrated into one or more other components of the electronic device 100. As one example, a fingerprint sensing device may be included in at least a portion of the display 104. As another example, a tactile sensing device can be a touch sensing input surface of a track pad or other I/O device 204.

[0041] The priming and alert system 212 can be adapted to provide priming cues and alerts via a haptic module 216, an audio module 218, and/or a visual module 220. A "module," as used herein, may be a hardware, firmware, or software component with particular functionality, operations, and/or output. It should be appreciated that certain modules

may be combined with one another or otherwise integrated together. The haptic module 216 can include an element that produces haptic feedback and the haptic module 216 is configured to produce a signal that is received by the element that produces haptic feedback. In the illustrated embodiment, the haptic module 216 includes one or more actuators 222 that receive signals from the haptic module 216. The actuator(s) 222 produce haptic feedback (e.g., vibrations) based on the signals received from the haptic module 216. The actuator(s) generate the haptic feedback as part of an I/O device 204 (e.g., a surface of the enclosure 102 or the band 108 in FIG. 1). The actuator(s) can move in one direction or multiple directions to provide a haptic priming cue to the user. For example, an actuator can translate in a horizontal direction (e.g., translate in parallel with or across the width of the user's wrist) and output one or more taps or vibrations that the user senses either consciously or subconsciously. The one or more actuators 222 may be configured as any suitable actuator. As a non-limiting example, an actuator 222 can be a linear electromagnetic actuator.

[0042] The audio module 218 is configured to produce audible priming cues and alerts. The audio module 218 can produce a signal that is received by an element that produces an audio output. In the illustrated embodiment, the audio module 218 includes a speaker 224 that receives signals from the audio module 218 and generates an audio output based on the received signals. Example audio outputs include, but are not limited to, a tone and a musical composition.

[0043] The visual module 220 may be used to provide visual priming cues and alerts to a user of the electronic device. In the illustrated embodiment, visual module 220 can include a light source 226 that receives signals from the visual module 220 and generates a visual output based on the

received signals. Thus, the light source 226 may be part of the I/O device 204. Any suitable type of light source may be used. As one example, the light source can be one or more light emitting diodes.

5 **[0044]** Additionally or alternatively, the visual module 220 can transmit signals to the display 104 that cause the display to generate a visual output based on the received signals. As one example, the visual priming cue may be output by the display around only the periphery or edges of
10 the display, or along a subset of the edges (e.g., one or two) of the display.

[0045] A processing device 228 may be included in the priming and alert system 212. The processing device 228 may be any suitable type of processing device. The processing
15 device 228 can provide the signals for each module 216, 218, 220 in the priming and alert system 212. In one embodiment, the signals for the actuator 222, the speaker 224, and the display 104 can be stored in memory 202 and accessed by the processing device 228.

20 **[0046]** In another embodiment, the processing device 228 is not included in the priming and alert system 212 and the processing device 200 provides signals to the modules 216, 218, 220. Additionally or alternatively, the processing devices 200 and 228 can control and provide signals to the
25 modules 216, 218, 220 by combined or distributed processing.

[0047] In some embodiments, a processing device 230 in an external device 232 can cause the priming and alert system 212 to present a priming cue and/or an alert to a user. The processing device 230 can transmit a signal to the
30 electronic device 100 using, for example, a network/comm. interface 234 (e.g., Wi-Fi, cellular, Bluetooth) operably connected to the processing device 230. As is described in more detail later, a processing device operated by a third party, such as a restaurant or a public transportation

system, may trigger the priming and alert system 212 to present a priming cue and/or an alert to a user.

[0048] Accordingly, alerts may be generated: upon receipt of data by the device from an external source (text messages, emails, phone calls, warning systems, and the like); by an application (for example, to indicate that a user input is requested); upon reaching a certain time (for example, a time at which a calendar entry occurs); by an operational state of the electronic device (for example, a low battery charge, an upgrade to the operating system of the device, the device temperature reaching a certain point, and so on); through a user-initiated setting (an alarm set to occur at a certain time); due to geographic factors (entering or exiting a certain area); proximity (as another person with another electronic device is nearby); and so on. These and other alert conditions will be appreciated upon reading this document in its entirety.

[0049] FIG. 3 illustrates a sample output from a sample electronic device, including both a priming cue 300 and an alert waveform 302. As shown, the amplitude of the priming cue 300 may be substantially lower than that of the alert 302, since the priming cue is not designed to actually draw the user's attention to an outputting electronic device but instead of place the user in a state of heightened or subliminal awareness. Additionally, the illustrated priming cue 300 increases in amplitude over time. The maximum amplitude of the priming cue 300, however, remains below the amplitude(s) of the alert 302. In other embodiments, the priming cue 300 can be constant over time. Thus, as previously mentioned, the priming cue facilitates the user's awareness of the alert when the alert actually occurs.

[0050] Additionally or alternatively, the amplitude of the alert 302 can vary over time or have a constant amplitude. The alert 302 shown in FIG. 3 increases to a

maximum second amplitude from a first amplitude. Other embodiments can gradually increase the amplitude over the entire time the alert is output. Alternatively, the amplitude of the alert can remain constant. The constant
5 amplitude may be the maximum amplitude or an amplitude that is less than the maximum amplitude.

[0051] As also shown in FIG. 3, a time delay 304 may separate the priming cue 300 and the alert waveform 302. The delay 304 may cause an anticipatory reaction in the user
10 insofar as the priming cue has ended but no other action has occurred. Further, the delay 304 ensures that the priming cue and the alert do not meld into one another. It should be appreciated that the timing delay is entirely optional and may be omitted in some embodiments.

[0052] In some embodiments, the time delay 304 can permit an element that produced a priming cue to return to a nominal or settled state before the same element is used to generate an alert. As one example, a priming cue waveform can be received by an actuator to output a priming cue. The
20 time delay allows the actuator to return to a settled state before the actuator receives an alert waveform. Allowing the actuator to return to the settled state ensures the moving component in the actuator does not move in an unpredictable or undesirable manner.

[0053] Referring now to FIG. 4, there is shown a flowchart of a first method of outputting a priming cue prior to the production of an alert. Initially, as shown in block 400, the electronic device detects the occurrence of an action that is associated with, or produces an alert that is
30 presented to a user. As one example, the action may be the receipt of an email or text message. As another example, the action may be a reminder for a calendar entry.

[0054] A determination may then be made at block 402 as to whether or not a priming cue is to be output based on

the detected occurrence or non-occurrence of an action. In some embodiments, an electronic device can detect certain factors and determine whether or not to present a priming cue to a user based on the factors. As one example, an

5 electronic device may detect a user has not interacted with the electronic device within a given period of time. For example, a user may not have provided an input on a touch screen for a given period of time, may not have provided a voice command to the device recently, or may have provided
10 (or not) some other type of input within a period.

Alternatively, one or more sensors associated with the electronic device (e.g., sensors 206 in FIG. 2) may not have produced an output that indicates the electronic device has moved within the given period of time. As yet another

15 option, the device may determine aspects of an environment through environmental sensors and use that data to determine whether or not a priming cue would facilitate perception of the alert. For example, in a dark environment, there may be no need for a priming cue to precede a visual alert because
20 the impact of the visual alert will be magnified under the circumstances. The same is true with respect to an audio alert in a quiet environment. Conversely, some environmental factors (e.g., noise, light) may increase the likelihood that the device will initiate a priming cue.

25 **[0055]** In some embodiments, a motion sensor may be used to determine if a user is walking, running, or engaging in physical activity. If so, the device may be more likely to initiate a priming cue, as the user is occupied in activities that occupy some significant portion of his or her
30 attention. Certain embodiments may employ biometric sensors, such as PPG sensors, to track a user's heart rate in order to determine how strenuous an activity is and use that data to modify the strength of a priming cue. Likewise, a device sensor may measure skin conductance to determine how close

the device is to the user's skin; higher values may indicate a looser connection and/or greater distance between device and skin. Again, such data may be used to determine whether or not to initiate a priming cue and to determine the

5 strength thereof. The motion sensor may likewise be used to determine a user's engagement with the electronic device, for example, whether the user has picked up the device recently or is holding the device in a position that indicates the user is looking at the device. In such cases, the device may
10 decide not to generate a priming cue or to mitigate the strength of the priming cue.

[0056] If a determination is made at block 402 that a priming cue is to be output, the priming cue is generated at block 404. The priming cue may take the form of one or more
15 stimuli that is presented to the user. For example, a stimulus in the form of a haptic priming cue may be provided to the user. The haptic priming cue may be more personal and private in some situations compared to a visual or audio priming cue. An audio priming cue and/or a visual priming
20 cue can be produced at block 404 instead of, or in addition to, a haptic priming cue.

[0057] As described earlier, the priming cue can be perceived by a user either consciously or subconsciously, and may subliminally or unconsciously increase the sensitivity of
25 the user without specifically attracting the user's attention to the priming cue. The priming cue can heighten the awareness of the user or place the user in a more sensitive or receptive state for perceiving the alert. The priming cue may be imperceptible or barely perceptible for the entire
30 duration of the priming cue in one embodiment. In another embodiment, the priming cue may be imperceptible or barely perceptible for a portion of the duration and perceptible for the remaining portion of the duration. And in yet another

embodiment, the priming cue may be perceptible for the duration of the priming cue.

[0058] A given first period of time can then pass at block 406. The priming cue may end prior to block 406, or
5 the priming cue can continue during some or all of the wait period. Any suitable amount of time can be used in block 406. In some embodiments, the amount of time is fixed for each priming cue. In other embodiments, the amount of time can vary depending on one or more characteristics of the
10 priming cue. For example, the type of priming cue (e.g., haptic, audio, or visual), the duration of the priming cue, and/or the intensity of the stimulus of the priming cue can influence the amount of time in block 406. A lesser amount of time can pass in block 406 when the intensity of the
15 stimulus is strong or greater. Conversely, a greater amount of time can pass in block 406 when the intensity of the stimulus is weaker. As another example, a lesser amount of time can pass in block 406 when the duration of the stimulus for the priming cue is greater, while a greater amount of
20 time can pass when the duration of the stimulus is longer.

[0059] Additionally or alternatively, the amount of time in block 406 can vary depending on one or more characteristics of the first alert to be produced. For
example, the type of alert (e.g., haptic, visual, or audio),
25 the duration, and/or the intensity of the alert stimulus can influence the amount of time in block 406. A lesser amount of time can pass in block 406 when the intensity of the stimulus is weaker. Conversely, a greater amount of time can pass in block 406 when the intensity of the stimulus is
30 greater. As another example, a lesser amount of time can pass in block 406 when the duration of the stimulus for the alert is greater, while a greater amount of time can pass when the duration of the stimulus is longer.

[0060] If a priming cue will not be output at block 402, or after the given amount of time has passed at block 406, the alert is produced at block 408. The first alert that is output to the user in block 408 can have the same modality or a different modality as the priming cue, or modalities of portions of the alert and priming cue can be the same. As one example, the priming cue and the alert have the same modality if a haptic priming cue is provided at block 404 and a haptic alert is produced at block 408. As another example, the priming cue and the alert are different modalities if a haptic priming cue is presented at block 404 and an audio alert is provided at block 408. As another example, modalities of portions of the priming cue and alert can be the same if a haptic priming cue is presented at block 404 and an audio and haptic alert is provided at block 408.

[0061] A given second period of time can pass at block 410 before a second alert is output to the user (block 412). The second period of time can be fixed or variable, and may be the same amount of time or a different amount of time as the first period of time in block 406. One or more characteristics of the first alert and/or of the second alert can influence the amount of time that passes at block 410. For example, the stimulus type (e.g., haptic or audio), the intensity of the stimulus, and/or the duration of the stimulus of the first and/or second alert can influence the amount of time in the second time period.

[0062] In some embodiments, for select second alerts the second period of time can be zero and the second alert is combined with the first alert to form a composition. In other words, the two alerts can be synchronized with the second alert output to the user immediately after the first alert. As one example, an audio alert can be provided to a user immediately after a haptic alert. The select second alerts can be selected based on one or more characteristics

of the first alert. For example, the stimulus type (e.g., haptic or audio), the intensity of the stimulus, and/or the duration of the stimulus of the first alert can influence the amount of time in the second given period of time in block

5 410. In some embodiments, the second alerts can be selected based at least in part on the alert conditions. Different types of alerts have different alert conditions. As one example, a second period of time can follow a haptic alert that is produced with an increased or high intensity to
10 permit the moving component of the actuator to settle before the actuator produces a second alert.

[0063] Additionally or alternatively, the second alert may be presented to the user substantially simultaneously with the first alert, or the second alert can
15 be presented with some overlap in time with the first alert.

[0064] One or more characteristics of the first alert can also influence a characteristic or characteristics of the second alert provided to the user at block 412. For example, the stimulus type (e.g., haptic or audio), the intensity of
20 the stimulus, and/or the duration of the stimulus of the first alert can influence the stimulus type, the intensity of the stimulus, and/or the duration of the stimulus of the second alert. In some embodiments, a second alert may not be presented to the user. For example, a second alert may not
25 be provided to the user for select first alerts.

Alternatively, an electronic device can be configured to not provide a second alert to a user. As another example, the second alert may or may not be preceded by its own priming cue; the electronic device may employ the same parameters and
30 analysis as described elsewhere herein to determine whether a second alert is preceded by a second priming cue (in the event the first and second alerts are not simultaneously presented).

[0065] In some embodiments, more than two alerts can be output to a user. Each alert can be separated by a period of time, or some alerts may be presented to a user as a composition without any time breaks between the alerts (e.g.,
5 the alerts may be provided concurrently, consecutively, or with some overlap in time). In some embodiments, a second priming cue may be presented to the user after a certain number of alerts have been produced. Adding a priming cue after a certain number of alerts can reduce the likelihood
10 that a user will develop "alert fatigue", where the alerts become annoying or irritating to the user.

[0066] FIG. 5 is a flowchart of a second method of outputting a priming cue before an alert is produced in an electronic device. Initially, the electronic device may
15 detect at block 500 the occurrence of an action that is associated with, or produces an alert. Alternatively, the electronic device can detect the absence of an action at block 500. A determination may then be made at block 502 as to whether or not a priming cue is to be output to a user.
20 If so, a priming cue is output to a user at block 502.

[0067] A determination may be made at block 504 as to whether or not a user has responded to the priming cue. As one example, a user can touch a touch screen or a given area of an enclosure of the electronic device to respond to the
25 priming cue. Alternatively, a user can perform a gesture to respond to the priming cue. As another example, an image sensor in the electronic device can be used to monitor the user's gaze. A priming cue may be output, for example, if the user has not looked at the electronic device over a given
30 period of time. Alternatively, a motion sensor (e.g., gyroscope, accelerometer, magnetometer, etc.) can detect the absence of motion for the electronic device over a given period of time, and a priming cue can be generated if the

electronic device has not moved during the given period of time.

[0068] If a response is not received from the user at block 504, the process passes to block 506 where a

5 determination is made as to whether or not a time period for providing a priming cue to the user has expired. If not, at least one characteristic of the stimulus of the priming cue can be modified at block 508 and the method returns to block 504. For example, the type of stimulus can be changed and/or
10 the duration of the stimulus can be increased at block 508

[0069] If the time period for providing a priming cue to the user has ended, the electronic device can take an action at block 510. For example, the electronic device can wait for a given amount of time and then re-present the same
15 priming cue or a different priming cue. Alternatively, the electronic device may determine the user is not able to perceive the priming cue or is not wearing the electronic device based on an output received from one or more sensors in the electronic device. As one example, the output from the
20 one or more sensors may be used to determine or estimate a noise level and/or a light level of the environmental conditions associated with the electronic device. Based on the noise level and/or the light level, the electronic device may determine the user is unable to perceive the priming cue
25 and may stop presenting the priming cue to the user.

[0070] Additionally or alternatively, the output from one or more sensors can be used to determine a motion level of the electronic device. Based on the motion level (e.g., no motion for a given period of time), the electronic device
30 may determine the user is not wearing the electronic device. Alternatively, if the motion level is high (e.g., the user is exercising), the electronic device can determine the user is not able to perceive the priming cue and may stop outputting the priming cue. As another example, the processing device

in the electronic device can detect the battery is being charged using, for example, a power cord or a wireless energy transfer system, and determine the user is not wearing the electronic device.

5 **[0071]** Returning to blocks 502 and 504, if a priming cue will not be output at block 502, or if a response is received based on the priming cue at block 404, the process continues at block 512 where an alert is output to the user. The alert can be a single alert (e.g., a haptic alert) or a
10 combination of alerts that form a composition. The combination of alerts may have the same or different modalities and may or may not be separated by a period of time.

[0072] A determination may then be made at block 514
15 as to whether or not the user has responded to the alert. If not, the process passes to block 516 where a determination is made as to whether or not a time period for providing the alert to the user has expired. If not, one or more characteristics of the stimulus of the alert can be modified
20 at block 518 and the method returns to block 514. For example, the type of stimulus can be changed and/or the duration of the stimulus can be increased at block 518.

[0073] If the time period for providing an alert has ended, the electronic device can take an action at block 520.
25 Similar to the priming cue, the electronic device can wait for a given amount of time and then re-present the same or a different alert. Alternatively, the electronic device may determine the user is not able to perceive the alert or is not wearing the electronic device based an output received
30 from one or more sensors in the electronic device. Additionally or alternatively, the output from one or more sensors can be used to determine a motion level of the electronic device, and based on the motion level, the

electronic device may determine the user is not wearing the electronic device or is not able to perceive the alert.

[0074] Referring now to FIG. 6, there is shown a method of outputting a priming cue to a group of users prior to an alert to be received on their electronic devices. In some embodiments, a priming cue and an alert may be sent to the group of users for the same reason and at substantially the same time. Initially, as shown in block 600, an electronic device detects the presence of one or more other electronic devices located within a given distance from the electronic device. The electronic device that detects the presence of the other electronic devices may be an electronic device of one of the users in the group of users, or a separate electronic device that is in communication with the electronic devices in the group of users. As one example, an electronic device can detect another electronic device using a network communication interface (e.g., network communication interface 210 in FIG. 2) such as Bluetooth.

[0075] A determination may then be made at block 602 as to whether or not an alert is to be received by two or more of the electronic devices. If so, a determination can be made at block 604 as to whether or not a priming cue is to be output by the electronic devices. If so, a priming cue is output by the electronic devices at block 606 based on an impending event or action. Each electronic device can produce the same type of priming cue or one or more electronic devices can output different priming cues. The type of priming cue output by an electronic device may be based on how a user has configured the electronic device (e.g., through a preferences menu). As described previously, the priming cues can direct or focus the user's attention and prepare the users to perceive, either consciously or subconsciously, the stimulus of a later received alert. The

priming cues may decrease the user's reaction time for perceiving the subsequent alert.

[0076] A first given period of time can pass at block 608 before an alert is output by the electronic devices at block 610. Again, the same amount of time can pass for each user or a different amount of time can be used at block 608 for one or more users. The amount of time that passes in block 608 can be based on the type of stimulus for the alert and/or how a user has configured his or her electronic device (e.g., through a preferences menu).

[0077] Any suitable amount of time can be used in block 608. In some embodiments, the amount of time is fixed for each priming cue. In other embodiments, the amount of time can vary depending on one or more characteristics of the priming cue and/or of the alert to be output by the electronic devices. For example, the stimulus strength of the priming cue can influence the amount of time in block 608. A lesser amount of time can pass in block 608 when the intensity of the stimulus is strong or greater. As another example, a lesser amount of time can pass in block 608 when the duration of the stimulus for the priming cue is greater, while a greater amount of time can pass when the duration of the stimulus is longer.

[0078] The alert that is output in block 610 can have the same modality or a different modality as the priming cue. Additionally, the alert can be a single alert or a combination of alerts that form a composition. The combination of alerts in the composition may have the same or different modalities and may or may not be separated by a period of time. Some users may receive a single alert and other users a combination of alerts, depending on the event that provides the alert, the type of alert, and/or how a user has configured his or her electronic device.

[0079] FIG. 7 is a flowchart of a method of a third party causing a priming cue to be produced before an alert is output on an electronic device. Initially, a third party may trigger the priming and alert system at block 700. As one
5 example, a processing device associated with the third party (e.g., processing device 230 in FIG. 2) may transmit a signal that activates the priming and alert system in a user's electronic device.

[0080] A determination may then be made at block 702
10 as to whether or not a priming cue is to be produced. If not, the process passes to block 706. If a priming cue is to be produced, a priming cue may then be output at block 704. In some embodiments, the third party may select the type of priming cue (e.g., haptic, audio, visual, or combinations
15 thereof) to be provided to the user. Alternatively, the type of priming cue that is presented to the user can be based on how the user has configured his or her electronic device (e.g., with a preferences menu).

[0081] Next, as shown in blocks 706 and 708, the
20 third party can transmit a message to the electronic device and an alert may be output in conjunction with the message. Again, the third party may select the type of alert (e.g., haptic, audio, visual, or combinations thereof) to be provided to the user. Alternatively, the type of alert that
25 is presented to the user can be based on how the user has configured his or her electronic device.

[0082] As one example, the Emergency Alert System may trigger the priming and alert system in the event of a national or regional emergency. Alternatively, a wireless
30 emergency alert system such as the AMBER alert system can trigger the priming and alert system in an electronic device. As another example, a restaurant may trigger the priming and alert system to inform a user that a table is available for the user. Additionally, a transportation system, such as an

airline or light rail system can trigger the priming and alert system to inform a user that the plane is boarding or a light rail train is arriving or departing from a station.

[0083] Referring now to FIG. 8, there is shown a method of identifying and outputting priming cues and alerts. The method of FIG. 8 can be used in conjunction with any one of the methods shown in FIGS. 4-7. Initially, as shown in block 800, a determination can be made as to whether or not a priming cue is to be output. If not, the process continues at block 808. If a priming cue is to be produced, the type of priming cue is identified at block 802. The type of priming cue may be identified based on one or more factors. As one example, the type of alert to be produced can influence the type of priming cue identified at block 802. Additionally or alternatively, the type of priming cue can be based on a preference set by the user. As one example, the user can select the actions that result in the generation of a priming cue, and associate different types of priming cues with the select actions. One type of priming cue can be generated for the receipt of an email while another type of priming cue is output for the receipt of a text message.

[0084] In some embodiments, the type of priming cue identified at block 802 may be a default priming cue set by a device manufacturer or by the user. Environmental conditions can influence the type of priming cue identified at block 802. For example, output from one or more sensors can be used to determine the type of priming cue. For example, in a dark environment, there may be no need for a priming cue to precede a visual alert because the impact of the visual alert will be magnified under the circumstances. The same is true with respect to an audio alert in a quiet environment. Conversely, some environmental factors (e.g., noise, light) may increase the likelihood that the device will initiate a priming cue. Alternatively, a priming cue that is more

likely to be perceived by the user can be selected based on temperature or humidity. For example, at lower temperatures it may be difficult for a user to perceive a priming cue due to additional clothing (heavy coat and hat or earmuffs)

5 and/or because the colder temperatures reduces a user's sensitivity to the priming cue. In this example situation, a priming cue that the user is more likely to perceive may be selected (e.g., by a processing device).

10 **[0085]** Additionally or alternatively, as described earlier, an electronic device may detect a user has not interacted with the electronic device within a given period of time and use this information to identify a type of priming cue. For example, a user may not have provided an input on a touch screen for a given period of time, may not
15 have provided a voice command to the device recently, or may have provided (or not) some other type of input within a period. As another option, the device may determine aspects of an environment through environmental sensors and use that data to determine the type of a priming cue that would
20 facilitate perception of the alert. In some embodiments, a motion sensor may be used to determine if a user is walking, running, or engaging in physical activity. If so, the device may identify a priming cue that is more likely to be perceived by the user.

25 **[0086]** The identified priming cue is then output at block 804. A given period of time may optionally pass at block 806 before a type of alert is identified at block 808. Like the priming cue, the type of alert may be identified based on one or more factors. If a priming cue is produced
30 at block 804, one factor that can influence the type of alert identified at block 808 is the type of priming cue that is output at block 804. Additionally or alternatively, one or more of the example factors described in conjunction with identifying the type of priming cue can be used by the

electronic device to identify an alert type at block 808.
The identified alert is then output at block 810.

[0087] Various embodiments have been described in detail with particular reference to certain features thereof,
5 but it will be understood that variations and modifications can be effected within the spirit and scope of the disclosure. And even though specific embodiments have been described herein, it should be noted that the application is not limited to these embodiments. In particular, any features
10 described with respect to one embodiment may also be used in other embodiments, where compatible. Likewise, the features of the different embodiments may be exchanged, where compatible.

CONCLUSIES

1. Elektronische inrichting, omvattende:

5 een voorbereiding- en alarmeringsysteem dat er
ten minste een omvat van een haptische module, een audiomo-
dule, en een visuele module;

een invoer-/uitvoerinrichting die functioneel
is verbonden met het voorbereiding- en alarmeringsysteem; en

10 een verwerkingsinrichting die functioneel is
verbonden met het voorbereiding- en alarmeringsysteem en is
ingericht om te veroorzaken dat het voorbereiding- en alarme-
ringsysteem een voorbereidende secundaire prikkel uitvoert
voorafgaand aan het voortbrengen van een alarm.

2. Elektronische inrichting volgens conclusie 1,
15 bovendien een sensor omvattend die functioneel is verbonden
met de verwerkingsinrichting.

3. Elektronische inrichting volgens conclusie 2,
waarbij de sensor is ingericht om er één waar te nemen van
licht, beweging, aanraking, warmte, positie, druk, geluid en
20 afbeeldingen.

4. Elektronische inrichting volgens conclusie 3,
waarbij de verwerkingsinrichting is ingericht om een voorbe-
reidende secundaire prikkel te identificeren op basis van één
of meer factoren voorafgaand aan het uitvoeren van de voorbe-
25 reidende secundaire prikkel.

5. Elektronische inrichting volgens conclusie 4,
waarbij de een of meer factoren er ten minste een omvatten
van:

30 een voort te brengen type alarm; en
een uitvoer vanaf de sensor.

6. Elektronische inrichting volgens conclusie 3,
waarbij de verwerkingsinrichting is ingericht om het alarm te
identificeren op basis van één of meer factoren voorafgaand
aan het uitvoeren van het alarm.

7. Elektronische inrichting volgens conclusie 6, waarbij de een of meer factoren er ten minste een omvatten van:

5 een type voorbereidende secondaire prikkel die
voorafgaand aan het alarm is voortgebracht;
een uitvoer vanaf de sensor; en
een standaard voorbereidende secondaire prikkel.

8. Elektronische inrichting volgens conclusie 1,
10 waarbij de verwerkingseenheid is ingericht om te veroorzaken dat het voorbereiding- en alarmeringsysteem een alarm verschaft aan de gebruiker nadat de voorbereidende secondaire prikkel aan de gebruiker wordt verschaft.

9. Elektronische inrichting volgens conclusie 1,
15 waarbij de voorbereidende secondaire prikkel ten minste een van een visuele voorbereidende secondaire prikkel, een audio voorbereidende secondaire prikkel en een haptische voorbereidende secondaire prikkel omvat en de invoer-/uitvoerinrichting ten minste een van een beeldscherm, een
20 lichtbron en een actuator omvat.

10. Elektronische inrichting volgens conclusie 1, waarbij de voorbereidende secondaire prikkel ingericht is om niet waarneembaar te zijn voor een gebruiker en waarbij het alarm in tijd is verschoven ten opzichte van de voorberei-
25 dende secondaire prikkel met een tijdsperiode die is gebaseerd op eigenschappen van de voorbereidende secondaire prikkel.

11. Elektronische inrichting volgens conclusie 1, waarbij de voorbereidende secondaire prikkel is ingericht om
30 buiten een drempelgebied te liggen van een voorspelde gebruikersperceptie, en waarbij het alarm in tijd is verschoven ten opzichte van de voorbereidende secondaire prikkel met een tijdsperiode die is gebaseerd op eigenschappen van de voorbereidende secondaire prikkel.

12. Elektronische inrichting volgens conclusie 3, waarbij de voorbereidende secondaire prikkel een modus, intensiteit of golfvorm heeft die verschilt van het alarm.

13. Werkwijze voor het voorbereiden van een alarm
5 van een elektronische inrichting, de werkwijze omvattende:

het detecteren van een handeling die verband houdt met het alarm;

het vaststellen of er een voorbereidende secondaire prikkel dient te worden voortgebracht voor het alarm
10 op basis van een of meer eerste factoren;

het, indien er een voorbereidende secondaire prikkel dient te worden voortgebracht, uitvoeren van de voorbereidende secondaire prikkel voor het alarm op de elektronische inrichting; en

15 het uitvoeren van het alarm op de elektronische inrichting, waarbij het alarm over een tijdspanne in tijd is versprongen ten opzichte van de voorbereidende secondaire prikkel.

14. Werkwijze volgens conclusie 13, waarbij de een
20 of meer eerste factoren er ten minste een omvatten van:

een voort te brengen type alarm;

een beweging van de elektronische inrichting;

en

een omgevingsomstandigheid.

25 15. Werkwijze volgens conclusie 13, bovendien het identificeren omvattend van een type voorbereidende secondaire prikkel op basis van één of meer tweede factoren voorafgaand aan het uitvoeren van de voorbereidende secondaire prikkel voor het alarm.

30 16. Werkwijze volgens conclusie 15, waarbij de een of meer tweede factoren er ten minste een omvatten van:

een voort te brengen type alarm;

een beweging van de elektronische inrichting;

en

een omgevingsomstandigheid.

17. Werkwijze volgens conclusie 13, bovendien het identificeren omvattend van een type alarm op basis van een of meer derde factoren voorafgaand aan het uitvoeren van het alarm.

18. Werkwijze volgens conclusie 17, waarbij de een of meer derde factoren er ten minste een omvatten van:

een type voorbereidende secondaire prikkeluitvoer voorafgaand aan het alarm;

een beweging van de elektronische inrichting; en

een omgevingsomstandigheid.

19. Werkwijze volgens conclusie 13, waarbij de actie die is geassocieerd met het alarm een plaatsvinden van een actievoorwaarde is die overeenkomt met het alarm;

waarbij de werkwijze verder omvat:

het bepalen, in reactie op het detecteren van het plaatsvinden van de alarmvoorwaarde, of er voor de elektronische inrichting meerdere verzamelingen voorwaarden gelden omvattende:

een eerste verzameling voorwaarden waaronder het alarm een eerste waarschijnlijkheid heeft om te worden waargenomen door een gebruiker van de inrichting; en

een tweede verzameling voorwaarden waaronder het alarm een tweede waarschijnlijkheid, groter dan de eerste waarschijnlijkheid, heeft om te worden waargenomen door een gebruiker van de inrichting;

het uitvoeren van het alarm na het uitvoeren van ten minste een deel van de voorbereidende secondaire prikkel in reactie op het bepalen dat de eerste verzameling voorwaarden geldt voor de inrichting; en

het uitvoeren van het alarm op de elektronische inrichting zonder het uitvoeren van de voorbereidende secundaire prikkel in reactie op het bepalen dat de tweede verzameling voorwaarden geldt voor de inrichting.

5 20. Werkwijze volgens conclusie 13, verder omvattende:

het bepalen of er een reactie is op de voorbereidende secundaire prikkel; en

10 het aanpassen van de voorbereidende secundaire prikkel indien er geen reactie is op de voorbereidende secundaire prikkel.

21. Werkwijze volgens conclusie 20, verder omvattende:

15 het bepalen of er een reactie is op de voorbereidende secundaire prikkel; en

het aanpassen van de voorbereidende secundaire prikkel indien er geen reactie is op de voorbereidende secundaire prikkel; en

20 het beëindigen van het alarm indien er een tijdspanne voor het uitvoeren van het alarm eindigt en de gebruiker niet heeft gereageerd op de voorbereidende secundaire prikkel.

22. Werkwijze volgens conclusie 13, bovendien omvattend:

25 het vaststellen of er een reactie op het alarm is; en

aanpassen van het alarm indien er geen reactie op het alarm is.

30 23. Werkwijze volgens conclusie 22, bovendien het beëindigen van het alarm omvattend indien een tijdspanne voor het uitvoeren van het alarm eindigt en de gebruiker niet op het alarm heeft gereageerd.

24. Werkwijze volgens conclusie 13, waarbij de voorbereidende secundaire prikkel er ten minste een omvat van

een haptische voorbereidende secondaire prikkel, een auditive voorbereidende secondaire prikkel, en een visuele voorbereidende secondaire prikkel.

5 25. Werkwijze volgens conclusie 24, waarbij de tijdspanne is gebaseerd op één of meer eigenschappen van de voorbereidende secondaire prikkel.

10 26. Werkwijze volgens conclusie 25, waarbij de een of meer eigenschappen er ten minste een omvatten van een type voorbereidende secondaire prikkel, een tijdsduur van de voorbereidende secondaire prikkel, en een intensiteit van de voorbereidende secondaire prikkel.

15 27. Werkwijze volgens conclusie 13, waarbij het alarm er ten minste een omvat van een haptisch alarm, een auditief alarm, en een visueel alarm.

 28. Werkwijze volgens conclusie 27, waarbij de tijdspanne is gebaseerd op een of meer eigenschappen van het alarm.

20 29. Werkwijze volgens conclusie 28, waarbij de een of meer eigenschappen er ten minste een omvatten van een type alarm, een tijdsduur van het alarm en een intensiteit van het alarm.

25 30. Werkwijze volgens conclusie 13, waarbij een of meer eigenschappen van het alarm zijn gebaseerd op een of meer eigenschappen van de voorbereidende secondaire prikkel.

 31. Werkwijze volgens conclusie 13, waarbij de voorbereidende secondaire prikkel wordt uitgevoerd op de elektronische inrichting op basis van een vanaf een externe verwerkingsinrichting ontvangen signaal.

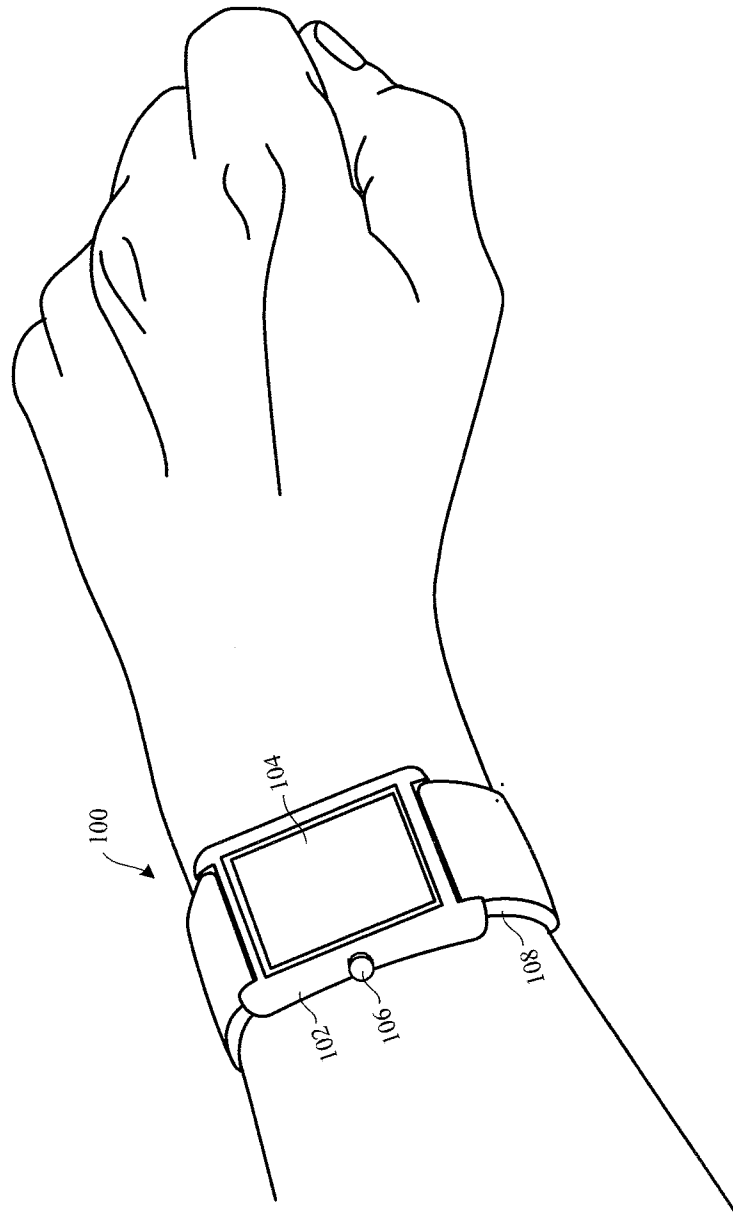


FIG. 1

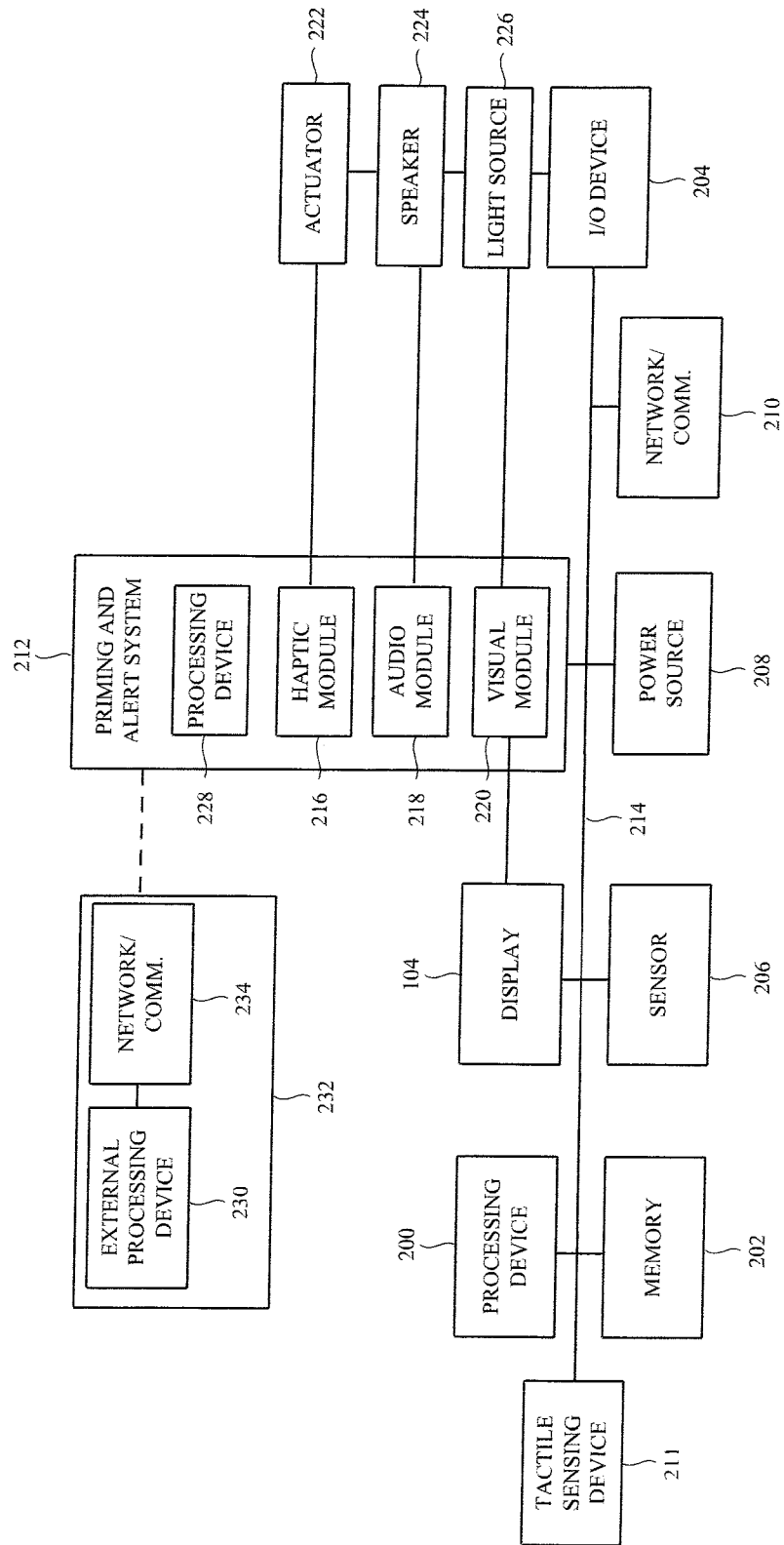
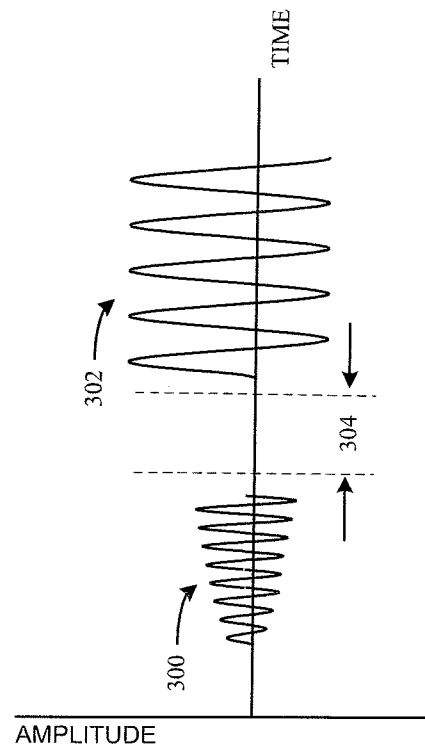
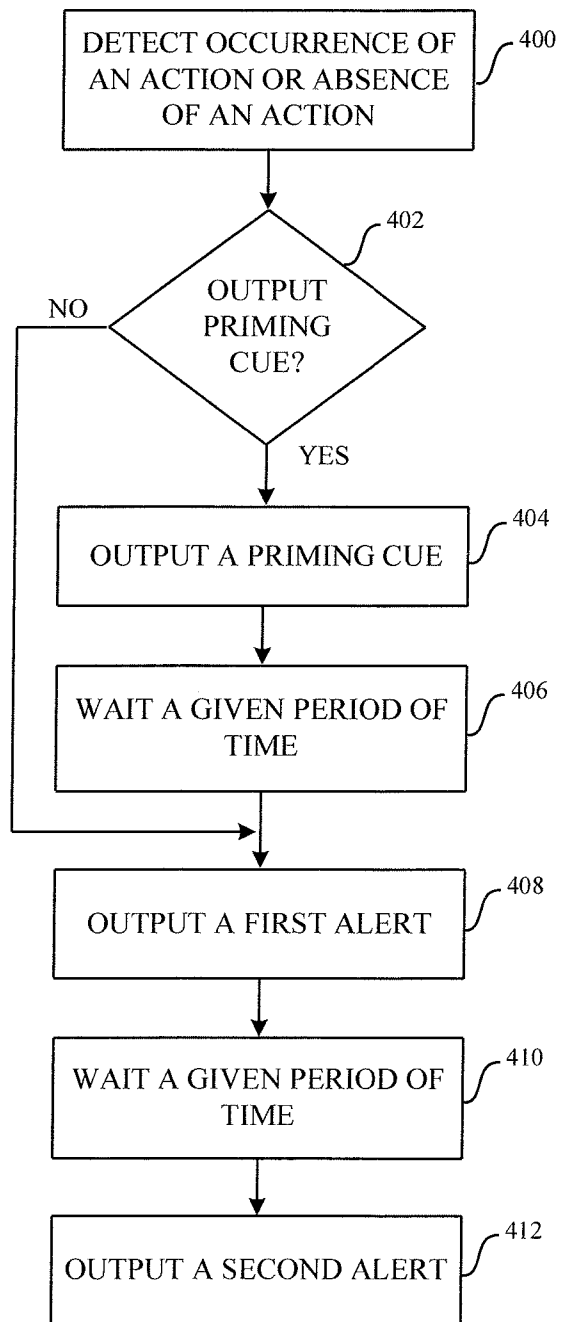


FIG. 2

**FIG. 3**

**FIG. 4**

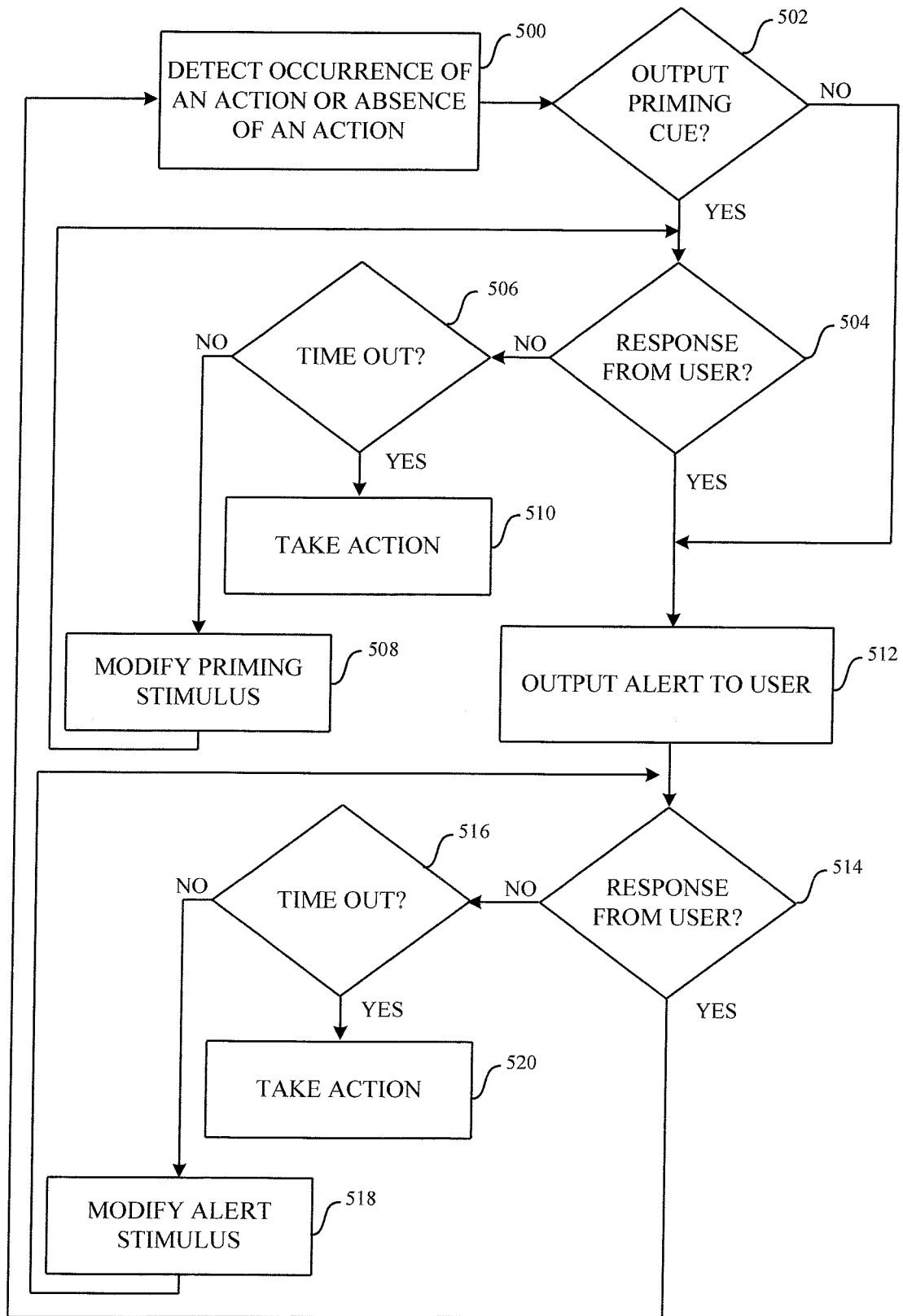
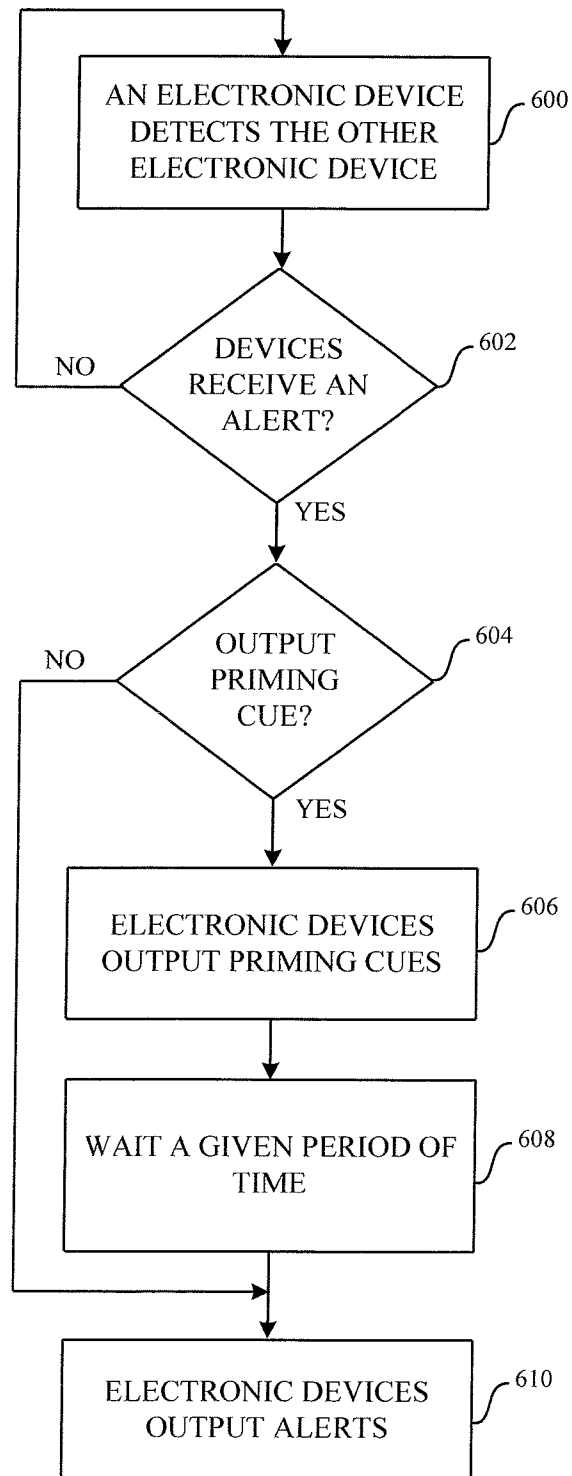
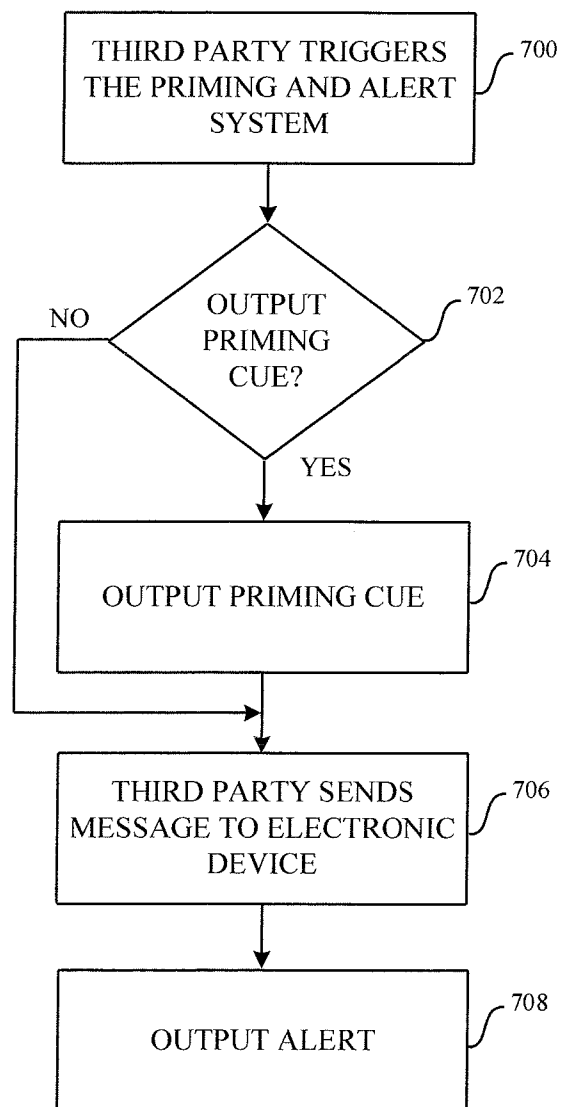
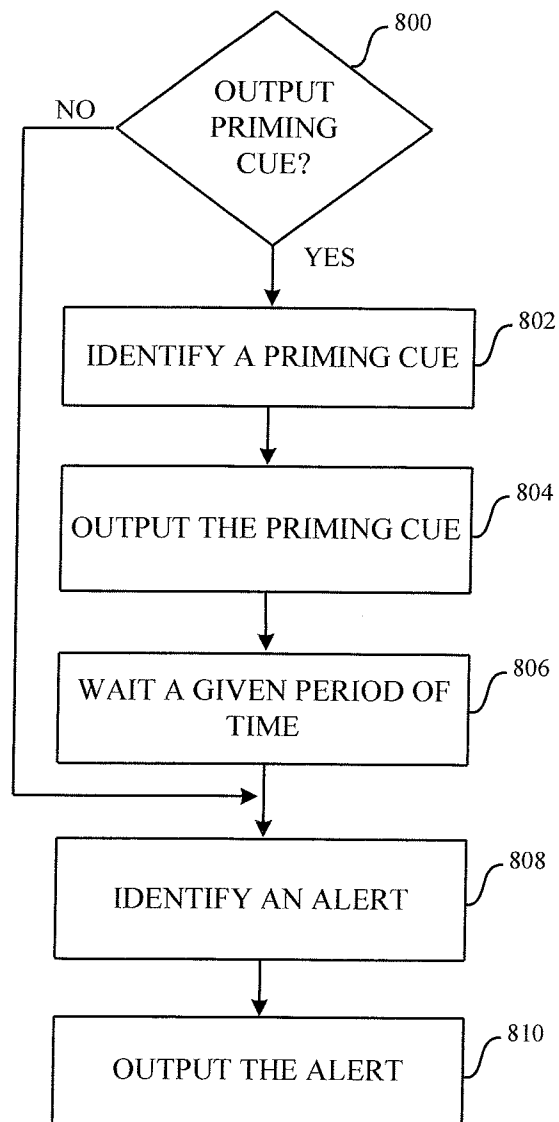


FIG. 5

**FIG. 6**

**FIG. 7**

**FIG. 8**

ABSTRACT

An electronic device can output a priming cue prior to outputting an alert on the electronic device. A priming cue
5 can be a haptic priming cue, a visual priming cue, an audio priming cue, or various combinations of these priming cues. The priming cue can be perceived by a user either consciously or subconsciously and can increase a user's perceptual state for the alert.



RAPPORT BETREFFENDE HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK

Octrooiaanvraag 2015343

Classificatie van het onderwerp ¹ : H04M19/04; H04M1/725; H04W4/16; G06F1/16	Onderzochte gebieden van de techniek ¹ : H04M; H04W; G06F
Computerbestanden: EPODOC, WPI	Omvang van het onderzoek: Volledig
Datum van de onderzochte conclusies: 10 november 2015	Niet onderzochte conclusies: -

Van belang zijnde literatuur

Categorie ²	Vermelding van literatuur met aanduiding, voor zover nodig, van speciaal van belang zijnde tekstgedeelten of figuren	Van belang voor conclusie(s)
X Y	WO 2006/057770 A (CISCO TECH INC) 1 juni 2006 * figuren 2-4; alinea's [0017]-[0020], [0024]-[0026], [0030], [0031], [0052] * - - -	1-30 31
X Y	US 6408187 B (SUN MICROSYSTEMS INC) 18 juni 2002 * figuren 1-3; kolom 1, regel 55 – kolom 2, regel 51; kolom 3, regel 26 – kolom 5, regel 63; kolom 6, regels 21-61 * - - -	1-30 31
Y	US 2007/0161412 A (NEVID JEFFREY S et al.) 12 juli 2007 * alinea [0014] * - - - - -	31
Datum waarop het onderzoek werd voltooid: 29 januari 2018		De bevoegde ambtenaar: J.C. van der Linden Octrooiencentrum Nederland onderdeel van Rijksdienst voor Ondernemend Nederland

¹ Gedefinieerd volgens International Patent Classification (IPC).

² Verklaring van de categorie-aanduiding: zie apart blad.

Categorie van de vermelde literatuur:

- X: op zichzelf van bijzonder belang zijnde stand van de techniek
- Y: in samenhang met andere geciteerde literatuur van bijzonder belang zijnde stand van de techniek
- A: niet tot de categorie X of Y behorende van belang zijnde stand van de techniek
- O: verwijzend naar niet op schrift gestelde stand van de techniek
- P: literatuur gepubliceerd tussen voorrrangs- en indieningsdatum
- T: niet tijdig gepubliceerde literatuur over theorie of principe ten grondslag liggend aan de uitvinding
- E: octrooiliteratuur gepubliceerd op of na de indieningsdatum van de onderhavige aanvraag en waarvan de indieningsdatum of de voorrrangsdatum ligt voor de indieningsdatum van de onderhavige aanvraag
- D: in de aanvraag genoemd
- L: om andere redenen vermelde literatuur
- &: lid van dezelfde octrooifamilie; corresponderende literatuur



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AANHANGSEL

Behorende bij het Rapport betreffende het Onderzoek naar de Stand van de Techniek

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Het aanhangsel bevat een opgave van elders gepubliceerde octrooiaanvragen of octrooien (zogenaamde leden van dezelfde octrooifamilie), die overeenkomen met octrooigeschriften genoemd in het rapport. De opgave is samengesteld aan de hand van gegevens uit het computerbestand van het Europees Octrooibureau per 2 februari 2018. De juistheid en volledigheid van deze opgave wordt noch door het Europees Octrooibureau, noch door Octrooicentrum Nederland gegarandeerd; de gegevens worden verstrekt voor informatiedoeleinden.

In het rapport genoemd octrooigeschrift		Datum van publicatie	Overeenkomende octrooigeschriften		Datum van publicatie
WO 2006057770	A2	01-06-2006	US 2007161412 US 6408187	A1 B1	12-07-2007 18-06-2002
US 6408187	B1	18-06-2002	US 2007161412 WO 2006057770	A1 A2	12-07-2007 01-06-2006
US 2007161412	A1	12-07-2007	US 6408187 WO 2006057770	B1 A2	18-06-2002 01-06-2006



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SCHRIFTELIJKE OPINIE

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Indieningsdatum: 25 augustus 2015	Vorrangsdatum: 2 september 2014; 05 december 2014																
Classificatie van het onderwerp ¹ : H04M19/04; H04M1/725; H04W4/16; G06F1/16	Aanvrager: Apple Inc.																
Deze schriftelijke opinie bevat een toelichting op de volgende onderdelen: <table><tr><td>☒ Onderdeel I</td><td>Basis van de schriftelijke opinie</td></tr><tr><td>☒ Onderdeel II</td><td>Vorrang</td></tr><tr><td>☐ Onderdeel III</td><td>Vaststelling nieuwheid, inventiviteit en industriële toepasbaarheid niet mogelijk</td></tr><tr><td>☐ Onderdeel IV</td><td>De aanvraag heeft betrekking op meer dan één uitvinding</td></tr><tr><td>☒ Onderdeel V</td><td>Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid</td></tr><tr><td>☐ Onderdeel VI</td><td>Andere geciteerde documenten</td></tr><tr><td>☐ Onderdeel VII</td><td>Overige gebreken</td></tr><tr><td>☐ Onderdeel VIII</td><td>Overige opmerkingen</td></tr></table>		☒ Onderdeel I	Basis van de schriftelijke opinie	☒ Onderdeel II	Vorrang	☐ Onderdeel III	Vaststelling nieuwheid, inventiviteit en industriële toepasbaarheid niet mogelijk	☐ Onderdeel IV	De aanvraag heeft betrekking op meer dan één uitvinding	☒ Onderdeel V	Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid	☐ Onderdeel VI	Andere geciteerde documenten	☐ Onderdeel VII	Overige gebreken	☐ Onderdeel VIII	Overige opmerkingen
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☐ Onderdeel VI	Andere geciteerde documenten																
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	De bevoegde ambtenaar: J.C. van der Linden Octrooiencentrum Nederland onderdeel van Rijksdienst voor Ondernemend Nederland																

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Onderdeel I Basis van de schriftelijke opinie

Deze schriftelijke opinie is opgesteld op basis van de op 10 november 2015 ingediende conclusies.

Onderdeel II Voorrang

Het controleren van de voorrang maakt geen deel uit van het reguliere onderzoek naar de stand van de techniek. Deze schriftelijke opinie is daarom opgesteld zonder dat onderzocht is of de ingeroepen voorrang geldig is, tenzij hieronder anders is aangegeven.

Onderdeel V Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid

1. Verklaring

Nieuwheid	Ja: conclusie(s)	21, 23, 25, 26, 28, 29, 31
	Nee: conclusie(s)	1-20, 22, 24, 27, 30
Inventiviteit	Ja: conclusie(s)	
	Nee: conclusie(s)	21, 23, 25, 26, 28, 29, 31
Industriële toepasbaarheid	Ja: conclusie(s)	1-31
	Nee: conclusie(s)	

2. Literatuur en toelichting

In het rapport betreffende het onderzoek naar de stand van de techniek worden de volgende publicaties genoemd:

- D1: WO 2006/057770 A (CISCO TECH INC) 1 juni 2006
- D2: US 6408187 B (SUN MICROSYSTEMS INC) 18 juni 2002
- D3: US 2007/0161412 A (NEVID JEFFREY S et al.) 12 juli 2007

Document D1

Uit D1 is een elektronische inrichting bekend ('handheld communications device', alinea's [0017]-[0018]) met een voorbereiding- en alarmeringsstelsel ('alert mode selection circuitry 10' met 'alert output control unit 13'). Dit stelsel omvat een haptische module, een audiomodule, en een visuele module ('vibration unit 34', audio unit 31', display unit 33', figuur 2, alinea [0019]). Dit stelsel kan door een gebruiker geprogrammeerd worden ('user-programmed alert mode response', alinea [0030]) Hiermee wordt impliciet bekend geacht dat de inrichting volgens D1 een invoer-/uitvoerinrichting omvat die functioneel is verbonden met het voorbereiding- en alarmeringsstelsel. Het stelsel volgens D1 omvat een verwerkingsinrichting ('processor 12') die functioneel is verbonden met het

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voorbereiding- en alarmeringsstelsel (alinea's [0024]-[0026], figuur 2) en is ingericht om te veroorzaken dat het voorbereiding- en alarmeringsstelsel een voorbereidende secundaire prikkel ('vibration', 'vibrate alert') uitvoert voorafgaand aan het voortbrengen van een alarm (zie alinea's [0020], [0025], [0031]). Conclusie 1 is hierom niet nieuw ten opzichte van D1.

De inrichting volgens D1 omvat verschillende sensoren die verbonden zijn met de verwerkingsinrichting (alinea [0017], figuur 2, sensoren genummerd 21-26), voor het waarnemen van onder meer licht ('light sensor 23'), beweging ('motion sensor 25'), positie ('GPS sensor 24'), aanraking ('capacitive/inductive proximity'), warmte ('infrared'), en geluid ('audio sensor 21'). Conclusies 2 en 3 zijn hierom niet nieuw ten opzichte van D1.

Bij de inrichting volgens D1 wordt op basis van uitvoer vanaf de sensoren bepaald welke voorbereidende secundaire prikkel wordt gegeven en welk alarm hierna gegeven wordt (alinea's [0017]-[0020], [0025], [0031]). Conclusies 4-8 zijn hierom niet nieuw ten opzichte van D1.

De voorbereidende prikkel kan een haptische ('vibration', alinea [0025]), visuele ('flashing ... display', alinea [0025], 'flashing lights', alinea [0031]) of audio (alinea [0031]) prikkel zijn. Conclusies 9-12 zijn hierom niet nieuw ten opzichte van D1.

Uit D1 is ook bekend een werkwijze voor het voorbereiden van een alarm van een elektronische inrichting, waarbij een handeling die verband houdt met het alarm wordt gedetecteerd ('incoming call or transmission', figuur 3, alinea [0030]). Op basis van onder meer omgevingsgeluid, een bepaling of een telefoon dicht bij een gebruiker is, wordt opgeladen of in beweging is, wordt bepaald of er een voorbereidende secundaire prikkel en/of een alarmt dient te worden voortgebracht. Ook wordt op basis van deze factoren bepaald welke prikkel en welk alarm worden voortgebracht (figuren 3, 4). Vervolgens wordt eerst de prikkel en dan het alarm uitgevoerd (alinea's [0020], [0025], [0031]). Hieruit wordt impliciet bekend geacht dat het alarm over een tijdspanne in de tijd is versprongen ten opzichte van de voorbereidende prikkel. Conclusies 13-18 en 24 zijn hierom niet nieuw ten opzichte van D1.

Bij de werkwijze volgens D1 wordt bepaald of een gebruiker reageert op de voorbereidende secundaire prikkel ('In the event that a user fails to answer the incoming call', alinea [0025]). Wanneer de gebruiker niet reageert wordt de secundaire prikkel aangepast, bij uitblijven van een reactie volgt een serie steeds luider wordende alarmsignalen ('supplanted by a series ... that gradually increase in volume over time', alinea [0025]). Conclusies 19, 20 en 22 zijn hierom niet nieuw ten opzichte van D1.

Het uitgevoerde alarm kan bij de inrichting volgens D1 een haptisch, visueel en/of auditief alarm zijn (zie figuren 3 en 4, alinea [0019]). Conclusie 27 is hierom niet nieuw ten opzichte van D1.

Het beëindigen van een alarm wanneer een gebruiker na een bepaalde tijdspanne niet heeft gereageerd op een oproep is algemeen bekend en voegt geen inventiviteit toe. Conclusies 21 en 23

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zijn hierom niet inventief op basis van de combinatie van D1 en de algemene kennis van de vakman.

Een werkwijze volgens conclusies 25, 26, 28 en 29 waarbij het alarm over een tijdspanne is versprongen en de tijdspanne afhankelijk is van eigenschappen van de voorbereidende prikkel dan wel het alarm, is niet bekend uit D1. In de onderhavige aanvraag wordt vermeld dat een tijdspanne tussen voorbereidende prikkel en alarm nodig is om te zorgen dat een actuator na een eerste signaal in een ruststand kan terugkeren voordat een tweede signaal gegeven wordt (alinea [0052]). Rekening houden met de technische beperkingen van de onderdelen van het elektronische apparaat en het daarop afstemmen van een tijdspanne tussen signalen ligt voor de vakman op het gebied van elektronische inrichtingen voor de hand en voegt geen inventiviteit toe. Ook het aanpassen van de timing van de signalen, bijvoorbeeld om een gebruiker meer tijd te geven om te reageren of om te zorgen dat een signaal zo snel mogelijk wordt opgemerkt ligt binnen bereik van de vakman. In de onderhavige aanvraag wordt vermeld dat de lengte van de tijdspanne gevarieerd kan worden, hierbij wordt geen verrassend technisch effect genoemd. Conclusies Conclusies 25, 26, 28 en 29 worden hierom niet inventief bevonden op basis van de combinatie van D1 en de algemene kennis van de vakman.

Conclusie 30 noemt het bepalen van eigenschappen van het alarm gebaseerd op eigenschappen van de voorbereidende secundaire prikkel. In D1 kan een vooraf bepaalde serie van voorbereidende prikkels en alarmen worden uitgevoerd. Hiermee wordt bekend geacht dat een uit te voeren prikkel of alarm afhankelijk is van een hieraan voorafgaand signaal. Conclusie 30 is hierom niet nieuw ten opzichte van D1.

Een werkwijze volgens conclusie 31, waarbij de voorbereidende prikkel wordt uitgevoerd op basis van een vanaf een externe verwerkingsinrichting ontvangen signaal, is niet bekend uit D1. Conclusie 31 is daarom nieuw ten opzichte van D1. Het voordeel van het uitvoeren van de prikkel op basis van een vanaf een andere inrichting ontvangen signaal is dat een gebruiker van een andere inrichting kan bepalen met welk signaal de gebruiker op zijn oproep wordt geattendeerd. De vakman op het gebied van mobiele telefonie die bekend is met D1 en die de opdracht krijgt om te zorgen dat degene die de oproep doet invloed heeft op het oproepsignaal, zal op zoek gaan naar een oplossing voor zijn probleem in de vakliteratuur. Hierbij vindt hij D3. Uit D3 is een werkwijze bekend waarbij een beller bepaalt welk oproepsignaal dient te worden gegeven, deze gegevens worden meegezonden bij de oproep en bepalen het oproepsignaal dat door de ontvangende inrichting wordt gegeven (alinea [0014]). Indien de vakman deze methode toepast bij de werkwijze bekend uit D1, dan wordt de werkwijze volgens conclusie 31 verkregen. Conclusie 31 wordt hierom niet inventief bevonden op basis van de combinatie van D1 en D3.

Document D2

Uit D2 is eveneens een elektronische inrichting met een voorbereiding- en alarmeringsstelsel volgens conclusie 1 bekend ('communications device 1'), waarmee een voorbereidende secundaire prikkel ('vibrate') kan worden uitgevoerd voorafgaand aan een alarm ('audio alert', zie figuur 2).

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Analoog aan de redenering bij D1 en conclusies 2-31 worden deze conclusies niet inventief bevonden ten opzichte van D2 in combinatie met de de algemene kennis van de vakman dan wel D3.