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**(54) APPARATUS, SYSTEM, AND METHODS FOR INTERFACING WITH A USER AND/OR EXTERNAL APPARATUS BY STATIONARY STATE DETECTION**

VORRICHTUNG, SYSTEM UND VERFAHREN ZUR SCHNITTSTELLENBILDUNG MIT EINEM BENUTZER UND/ODER EINER EXTERNEN VORRICHTUNG DURCH STATIONÄRE ZUSTANDSDETEKTION

APPAREIL, SYSTÈME ET PROCÉDÉS POUR ASSURER L'INTERFACE AVEC UN UTILISATEUR ET/OU UN APPAREIL EXTERNE PAR DÉTECTION D'ÉTAT STATIONNAIRE

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**Description**CROSS-REFERENCE TO RELATED APPLICATION(S)

**[0001]** This application claims the benefit under 35 U.S.C. § 119 of the earlier filing date of U.S. Provisional Application Serial No. 62/266,423, filed December 11, 2015.

TECHNICAL FIELD

**[0002]** This invention relates to an apparatus and a method for detection of states of an apparatus, including apparatuses and methods for interfacing with a user based on the detection of a state, such as a stationary state, of the apparatus and providing a response based on the state of the apparatus.

BACKGROUND

**[0003]** Conventional man machine interfaces (e.g., computer user interfaces) operate by the detection of specific commands from the user. The detection is typically performed by the user submitting specific inputs via input devices configured to receive the specific user input. More recently, user interfaces have been developed in which the detection of specific gestures or voice commands of a user are correlated by the user interface into specific commands that the interface is programmed to receive. Typically an input by a user requires some action (e.g., inputting a command, a particular gesture or a particular voice command) for the machine to receive a command. For example, in some of the conventional methods, the user directly provides one or more entries through input devices (e.g., keys, buttons, a mouse, a touch screen, a microphone, etc.) to signal one command or a sequence of commands to explicitly control the machine (e.g., an electronic apparatus). In other examples, the commands are received in the form of a particular gesture or user motion. These types of conventional interfaces require the user's attention and consciousness to the input of the commands. As such, conventional interfaces typically require the user's specific attention to the task to explicitly control the machine, which may be disruptive, cumbersome, or annoying for the user. Thus, user interfaces which enable interaction with an electronic apparatus in a more natural and implicit manner may be desirable. US2015/026647 A1 discloses a mobile terminal and a control method thereof. The mobile terminal includes a main body that is configured to be wearable on a specific portion of a user's body, a sensing unit that is configured to sense whether or not the main body has been worn, and also sense a user gesture for deciding the worn position of the main body, and a controller that is configured to decide the worn position of the main body according to the sensed user gesture, and setting a user input for generating a first control command in a different manner based on the decided worn position.

US2014/379341 A1 discloses a portable terminal, and more particularly, to a portable terminal and a method of detecting a gesture and controlling a function. A method of controlling a function of a portable terminal includes: detecting a gesture; activating a voice recognition module in response to the detected gesture; and analyzing a voice input into the activated voice recognition module, and executing a function corresponding to the input voice. US2014/139466 A1 discloses devices, systems, and methods for empathetic computing.

SUMMARY

**[0004]** The present invention relates to a method according to claim 1, and to an apparatus according to claim 10.

BRIEF DESCRIPTION OF THE DRAWINGS**[0005]**

Fig. 1 is a simplified block diagram of an apparatus in accordance with the present invention.

Fig. 2A is a perspective view of an apparatus in accordance with the present invention.

Fig. 2B-2E are perspective views of portions of the apparatus in FIG. 2A.

Fig. 3 is a flow diagram of a method of interfacing with a user including detecting a stationary state of an apparatus, in accordance with the present invention.

Fig. 4A is a flow diagram of processing of information associated with a user by the apparatus, in accordance with an embodiment not covered by the claims.

Fig. 4B is a table diagram of stillness level detection based on the detection of the motion of the apparatus, in accordance with an embodiment of the present disclosure

Fig. 4C is a flow diagram of detection of a motion of the apparatus by a gyroscope, in accordance with an embodiment not covered by the claims.

Fig. 5 is a flow diagram of detection of a command for an external apparatus based on gesture of a user, in accordance with an embodiment not covered by the claims.

Fig. 6 is a flow diagram of detection and extraction of an utterance of a user, in accordance with an embodiment of the present disclosure,

Fig. 7 is a flow diagram of a method of interfacing

with a user including processing information associated with the user in a stationary state of an apparatus, in accordance with an embodiment not covered by the claims.

Fig. 8 is a flow diagram of a method of interfacing with a user including processing information associated with the user in a stationary state of an apparatus, in accordance with an embodiment not covered by the claims.

Fig. 9 is a block diagram of an apparatus, in accordance with an embodiment of the present disclosure.

### DETAILED DESCRIPTION

**[0006]** Fig. 1 is a simplified block diagram of an apparatus 10 in accordance with the present invention. For example, the apparatus 10 includes a processor 12, a proximity sensor 11 and a motion sensor 13. While the application refers to "a" processor, "a" proximity sensor, and "a" motion sensor, it will be understood that any of these components (e.g., the processor, proximity sensor and/or the motion sensor) can include one or more individual processors, which may operate in parallel, and/or one or more sensors of the same or different type, the sensor data from which may be used to provide the data needed for performing the functions of the apparatus described herein. The proximity sensor 11 detects a user 1 in proximity of the electronic apparatus 10. For example, the proximity sensor 11 may include a touch sensor, such as capacitive sensor, a pressure sensor, or a combination thereof, which may detect physical contact (e.g., by the user 1) with the electronic apparatus 10 (e.g., touching the electronic apparatus 10, holding the electronic apparatus 10, etc.). In some examples, the proximity sensor 11 may include a passive infrared sensor, a capacitive sensor, a gyroscope, an accelerometer, a camera, a microwave sensor, an ultrasonic sensor, a laser based sensor, a photoelectric sensor, a plurality of microphones, a pressure sensor, a magnetic sensor, a thermal sensor, a radar, a combination thereof, which may be used to estimate that the user 1 is in proximity of the apparatus 10 by estimating a distance between the user 1 and the apparatus 10 or by detecting the user 1 in a sensor range from the apparatus 10. For example, the apparatus 10 is able to detect the user in proximity by detecting a movement of the apparatus 10, for example when the apparatus is picked up by the user 1, using a combination of the gyroscope and the accelerometer which in this instance may function as the proximity sensor 11. In some examples, wireless communication devices, such as WiFi, Bluetooth, LTE, near-field communication (NFC), or radiofrequency identification (RFID) enabled devices, may function as the proximity sensor 11, which may detect a portable device (e.g., tablet, smartphone, smart watch, etc. (not shown)) of the user 1 in proximity by pairing or handshaking with the portable

apparatus that may be held or worn by the user 1, The proximity sensor 11 may be coupled to the processor 12. In some examples, the proximity sensor may be coupled to a controller which controls operation of the proximity sensor and/or other sensors of the apparatus (e.g., activating/deactivating sensors, directing sensor data to the processor and/or to storage) and the proximity sensor 11 may thus be operatively coupled to the processor 12 via the controller. The proximity sensor 11 may provide sensor data to the processor 12, for example upon detection of the user 1 in proximity of the apparatus 10, as the user 1 approaches the apparatus 10. The processor 12 may cause the apparatus 10 to enter a first mode responsive to detection of the user 1 in proximity. The first mode may be interchangeably referred to herein as stillness detection mode.

**[0007]** As illustrated, the apparatus 10 includes a motion sensor 13 and one or more additional sensors 14 and output devices 18. Upon entering the first mode, the motion sensor 13, which is activated responsive to entering the first mode or prior to entering the first mode, begins to monitor movement of the apparatus. The stillness detection mode includes two phases. During a first phase, the apparatus 10 is configured to process sensor data from the motion sensor to detect initialization movement of the apparatus 10. The initialization movement may be indicative of the user picking up the apparatus 10 (e.g., lifting the apparatus 10 from a surface, such as a table or desk, supporting the apparatus prior to the user coming in proximity).

**[0008]** In some examples, the initialization movement may be detected responsive to detection of an acceleration and/or displacement of the apparatus along a direction normal to the supporting surface, which may be indicative of the apparatus having been picked up by the user. In some embodiments not covered by the claims, the initialization movement may be detected responsive to the detection of a touch by the user with a capacitive touch sensor positioned on a supporting side (e.g., the bottom side) of the apparatus, which may be indicative of the apparatus having been picked up and being held in the palm of the user.

**[0009]** The initialization movement invokes the second phase of the stillness detection mode. During the second phase (i.e., following detection of the initialization movement), the apparatus is configured to monitor motion of the apparatus in order to detect a stillness or stationary state of the apparatus. In this phase of the stillness detection mode, the processor periodically receives sensor data (e.g., at frame rates of 100ms or 200ms) and analyzes the data to identify if the apparatus 10 has achieved a stationary state. For example a stationary state, which may be interchangeably referred to as moment of stillness, may be a detected based on the processor determining, from the motion data, that the apparatus 10 has experience no movement for a predetermined period of time, such as 1 second or multiple consecutive seconds. Some users may naturally have a more steady hand than

others and thus this predetermined period of time may be configurable to reflect different user's natural tendencies. For example, for a user with a relatively steadier hand, the predetermined period which triggers a response may be extended for example to 2 or more seconds so as to filter out the natural steadiness of this particular user's hold. For users with a relatively less steady hand, the predetermined period which triggers a response may be reduced to for example to 1.5 seconds or less. The configuration of the predetermined period of stillness may be performed by the user (e.g., during set up of the apparatus) or may be performed by the apparatus (e.g., via machine learning over a training period).

**[0010]** Continuing with the description of the apparatus 10 in FIG. 1, the motion sensor 13 may be coupled to the processor 12 and/or intermediate controller (not shown) operatively connecting the motion sensor 13 to the processor 12. In some examples, the processor 12 activates the motion sensor 13, responsive to entering the first mode. In other examples, the motion sensor 13 may be active prior to detection of the user in proximity (e.g., prior to entering the first or stillness detection mode), e.g., responsive to powering up the apparatus 10. The motion sensor 13 provides motion data responsive to movement of the apparatus 1 while the apparatus 10 is in the first mode. For example, the motion sensor 13 may be either a gyroscope, an accelerometer, a camera, a passive infrared detector, a microwave sensor, an ultrasonic sensor, a capacitive sensor, a microphone, a photoelectric sensor, a thermal sensor, a pressure sensor, a magnetic sensor, a heart rate sensor, or a combination thereof. The processor 12 detects a stationary state of the apparatus 10 based on the motion data. For example, the processor 12 detects the stationary state, if the processor 12 detects back of a motion of the apparatus 10 for a predetermined period of time following the detection of the initialization movement. For example, the motion sensor 13 may include a gyroscope that detects and provides orientation information of the apparatus 10, and the processor 12 may detect the stationary state of the apparatus 10 if the orientation information indicates no change in the orientation of the apparatus 10. In some examples, the motion sensor 13 may alternatively or additionally include an accelerometer, which is operable to detect and provide acceleration information. The processor 12 may detect a stationary state of the apparatus 10 in the absence of acceleration of the apparatus as indicated by the acceleration information provided by the accelerometer. Depending on the sensitivity of the motion sensor 13, minute changes in orientation, acceleration or other detected motion which are below a motion threshold (e.g., less than 0.5 degrees of rotational change, or less than 1mm of translational change) may be ignored for purposes of detecting a stationary state. Other thresholds may be used, for example as may depend upon the natural movement tendencies (e.g., steady vs. shaky hands) of the user.

**[0011]** The processor 12 causes the apparatus 10 to

enter a second mode responsive to the detection of the stationary state of the apparatus 10. Upon entry of the second mode (e.g., upon detection of a stationary state following the initialization movement), the apparatus 10 provides a response. In some examples, the response is feedback to the user. The response is additionally or alternatively a communication (e.g., a wireless transmission of a command or data) from/to the apparatus 10 to/from an external apparatus 16. In some examples, in the second mode, the processor 12 may activate additional sensors 14 and/or output devices 18. The additional sensors 14, if applicable, may be used alone or in combination with the motion sensor 13. to monitor the user 1. such as to obtain information associated with the user 1. Information associated with the user 1 may include any voice, image and motion data recorded while the user 1 is holding the apparatus 10. The output devices, which may include one or more feedback devices and/or one or more wired or wireless communication devices, may be configured to provide response. As described herein, the response is feedback and/or communication with external electronic devices (e.g., external apparatus 16, which may be a computer, a smartphone, a television, a radio or other media device, or a household appliance such as a thermostat, a refrigerator, a cooking appliance, or other). In some examples, the communication with the external apparatus may include a command to the external apparatus 16 to transmit data to the apparatus 10 and the apparatus 10 may provide feedback based on the data received from the external apparatus 16,

**[0012]** A feedback response may include a visual, audible, or tactile response, which may be generated responsive to the detection of the stationary state alone or in conjunction with a communication response. The feedback response may be generally directed toward the user, such as to notify the user of the acknowledged interaction. A visual feedback response may be provided by way of illuminating a light or producing a pattern of light with one or a plurality of light sources of the apparatus. Similarly, an audible response may be provided by way of generating a sound or producing a pattern of sounds with one or a plurality of sound sources of the apparatus. Tactile responses may be provided by way of internally generated movement (e.g., via an actuator such as a vibrator) by the apparatus, which may cause the apparatus to move in a given manner (e.g., vibrate, hop, tilt or rock from side to side, move such as to cause the apparatus to change facing orientation with respect to the user, or motion which may resemble nodding such as tilting the apparatus toward and away from a direction facing the user). Providing feedback responses may be useful, not only during normal course of use of the apparatus 10 so as to provide a sense of communication between the user and the apparatus which may be pleasing to the user, but especially during a training period so as to aid the user in naturally learning the user interface provided by the apparatus 10.

**[0013]** Communication responses may be provided by

the apparatus 10, for example in the form of a wireless transmission to an external apparatus 16. A communication response may be configured to elicit a response from the external apparatus 16. For example, the communication (e.g., wireless transmission) may include a command for controlling a function of the external apparatus 16. The external apparatus 16 may perform a function (e.g., turn On or Off, control volume, temperature, or other parameter, begin playback of audio or visual information, store information, retrieve information, etc.) responsive to the communication from the apparatus 10. Different communications may be generated by the apparatus 10 depending on the user's actions in relation to the apparatus 10 during the stillness detection mode, as further described herein. In some examples, the apparatus 10 may be configured to receive information associated with the user during the stillness detection mode and the communication may include or be based, at least in part, on the received information, as farther described.

**[0014]** Referring back to the example in FIG. 1, the apparatus 10 may receive information associated with the user 1 from the sensors 14, which information may be processed by the processor 12 for providing a response with the apparatus 10, e.g., with one or more of the output devices 18. As discussed, in some examples, the response provided by the apparatus 10 may be directed to an external apparatus 16 rather than the user, such as by transmitting a command, data, instructions, or other type of communication. The communication response may be provided by communication circuitry of the apparatus 10, e.g., by communication device 15.

**[0015]** As described, the apparatus 10 may include one or more additional sensors 14. For example, one additional sensor 14 may be a camera. The camera may capture a sequence of images of the user 1. Another additional sensor may be a microphone, which may capture sounds from the user. In some examples, the additional sensors may include additional motion sensor(s). In some examples, sensor data obtained by the additional sensors may be supplemented by sensor data from the motion sensor 13, in order to capture a sequence of motion data of the user 1 during the stillness detection mode. The processor may process sensor data obtained during the stillness detection mode. e.g., for providing feedback and/or response(s) as described herein.

**[0016]** The apparatus 10 may further include a memory device 17 configured to store data during the operation of the apparatus 10. For example, the memory device 17 may store the sequence of motion data, images, sounds, or other information associated with the user 1 received by the apparatus 10. In some embodiment, the processor 12 may retrieve previously stored sequences from the memory device 17 for analysis, for example to interpret a gesture of the user 1. The term gesture may be used to refer to any type of natural action of the user, such as actions performed by the user's hand holding the apparatus or action performed by other parts of the user such as the user's face (e.g., facial expressions including wink-

ing, smiling, frowning, etc.). The processor 12 may be configured to extract information associated with the user 1 from the gesture of the user 1.

**[0017]** In some examples, the additional sensors 14 may include a microphone. The microphone may be operatively associated with the processor 12 and memory 17 to detect and record sound by or around the user 1. In some examples, the apparatus 10 may be configured to detect utterances of a specific user. For example, the microphone may detect ambient sounds by or around the user 1 and identify the sound associated with the user 1, including the user's voice, or other sound generated by the user (e.g., cough, sneeze, surrounding noise) from the ambient sounds. The apparatus 10 may be configured, e.g., during a set-up or training process, to recognize the sound associated with the user 1. The processor 12 may extract information associated with the user 1 from the sound associated with the user 1. In some examples, the apparatus 10 may recognize speech and may extract utterances irrespective of the user producing the utterances.

**[0018]** As described, the processor 12 provides a response in the second mode and in some cases, the response may be provided automatically by the apparatus 10 responsive to entering the second mode. The term automatically, as used herein, is generally meant to imply that an action or response performed by the apparatus 10 occurs automatically responsive to a trigger without requiring further action or input by the user. The response includes a response to the user. The response involves a communication with an external apparatus. For example, with respect to the former, the apparatus 10 may include an output device 18, such as one or more light emitting diodes (LEDs), a speaker, one or more vibrators, etc. The response may be a visual response (e.g., illuminating a light or a pattern of lights with one or more light emitting diodes (LEDs)), an auditory response (e.g., generating a sound or a pattern of sounds with the one or more speakers), or a tactile response (e.g., causing the apparatus to vibrate, rock, or generating another type of motion with the one or more vibrators).

**[0019]** The apparatus 10 may include a wired or a wireless communication device 15 that transmits a command or data to an external apparatus 16 (e.g., another computing device, a electronic appliance such as a TV, radio, another media device or a household appliance). In some examples, the command may include a command to perform a function of the external apparatus 16 (e.g., turn the appliance on or off, volume control, begin playback of audio or video, temperature control of thermostat or a cooking appliance, etc.). The command or data transmitted to the external apparatus 16 may be based on the mode of apparatus 10. In some examples, the command or data may be transmitted responsive to the apparatus 10 entering a particular mode, such as responsive to entering the second mode. For example, the apparatus 10 may be configured to transmit a command to a media device to turn the media device ON responsive to the

apparatus entering the second mode. In some examples, the command or data transmitted to the external apparatus 10 may be based on the information associated with the user 1. In some examples, the data may include information (e.g., a tag or other metadata) to be associated with data in the external apparatus 16. In some examples, the data transmitted to the external apparatus 16 may be a recording associated with the user (e.g., audio, a still image or video, and/or context associated with the recording), which may be transmitted to the external apparatus 16 for storage and/or further processing by the external apparatus 16. In some examples, the apparatus 10 may transmit both data and a command (e.g., a recording and a command to playback the recording) upon entering a given mode. In some examples, the apparatus 10 may continue to monitor the state of the apparatus (e.g., via motion data) following the providing of the response in order to extract additional information and/or provide additional responses, for example during a second stillness detection mode.

**[0020]** In some examples, responsive to the command and/or data from the apparatus 10, the external apparatus 16 may perform the command (e.g., retrieve user data from storage) and/or may provide a return communication to the apparatus 10 based on the user data. The apparatus 10 may receive the return communication from the external apparatus 16. Responsive to the return communication, and in some cases jointly with the information associated with the user and/or a current state of the apparatus 10, the apparatus 10 may provide feedback to the user 1. The process of interfacing with the user 1 may continue until the apparatus 10 is replaced onto its supporting surface (e.g., table or desk), which may be detected for example by no longer detecting contact with a bottom sensor of the apparatus 10, which may return the apparatus to the first phase of the stillness detection mode or the standby mode, of the apparatus no longer detects the user in proximity.

**[0021]** Fig. 2A is a perspective view of an apparatus 900 in accordance with the present invention. An apparatus 900 may be used to implement the apparatus 10 of Fig. 1. The apparatus 900 may include elements that have been previously described with respect to the apparatus 10 of Fig. 1. For example, the apparatus 900 is a handheld apparatus having a relatively spherical shape. The apparatus 900 may be sized to fit in the palm of the user 1, which may enable the user 1 to perform various gestures effortlessly while holding the apparatus. By detecting and responding to moments of stillness of the user while holding the apparatus 900, and thus moments of stillness of the apparatus itself, the apparatus 900 may be configured to provide an effortless and unconscious interface between the user and any electronic device within the user's living or working space. For example, the apparatus 900 may be aesthetically, economically, or otherwise pleasingly shaped, which may not only enhance the user's living or working environment but may encourage the user to pick up and/or hold the ap-

paratus 900. Holding the apparatus 900. aside from any computer/user interface enabled thereby, may be pleasing and/or calming to the user. The natural interaction of the user with the apparatus 900 may thus enable a more intuitive and user friendly interface, e.g., without requiring significant or any effort, attention, or intention from the user to solicit responses from the apparatus 900 itself and/or other apparatuses in the user's environment. In some examples, the shape and/or the external appearance of the apparatus may provide an ornamental/aesthetic function.

**[0022]** The apparatus 900 may include an upper portion 901 and a lower portion 902 that may form an enclosure of the apparatus 900. In some examples, the enclosure may be made from a plastic material (e.g., plastic materials suitable for injection molding as is typically known in the consumer electronic industry). In some examples, a portion of the housing, such as the upper portion, may be translucent. In some examples, the enclosure or a portion thereof, may be made from acrylic. In further examples, the enclosure, or a portion thereof, may be formed of a natural material, such as wood, bamboo, quartz, marble, fabric made from synthetic or natural fibers, leather, or a combination thereof, which may provide distinctive color, texture, and tactile sensation and natural comfort that may reduce user's consciousness and stress when interfacing with the apparatus 900. For example, the upper portion 901 and the lower portion 902 may be either substantially hemispherical or hemi-ellipsoidal in shape. The apparatus 900 may maintain a static position when rested on a relatively flat surface that enables the apparatus to be in a stationary state with ease. The apparatus 900 may include a camera 903. As previously described the camera 903 may be used for proximity sensing, motion sensing, and gesture detection. The camera 903 may be able to detect free expressions of the user 1 from facial gesture, hand movement or body movement. The camera 903 may provide images to the processor 12.

**[0023]** Fig. 2B is a perspective view of the apparatus 900 in accordance with an embodiment not covered by the claims. Relative to Fig. 2A, the upper portion 901 of the apparatus 900 is not shown. As illustrated, the apparatus 900 may include a light adjusting device 910. The light adjusting device 910 may adjust light provided by one or more components located within the lower portion 902, thus the light provided by the apparatus 900 may be split, scattered and/or "softened," thereby reducing recognition of individual light sources of the apparatus 900,

**[0024]** Fig. 2C is a perspective view of an apparatus in accordance with an embodiment not covered by the claims. Relative to Fig. 2B, the light adjusting device 910 of the apparatus 900 is not shown. As illustrated, the apparatus 900 may include a plurality of proximity sensors 906, which may be used to implement the proximity sensor 11 of Fig. 1. Each of the proximity sensors 906 may determine the proximity of the user 1 to the appa-

ratus 900 and may be any infrared sensor known in the art. (e.g., cameras, a microwave sensor, an ultrasonic sensor, a laser based sensor, a magnetic sensor, an optical sensor, passive infrared sensors, a thermal sensor, a radar, microphones). As illustrated, in some examples, proximity sensors 906 may be disposed around a circumference of the apparatus 900. In other examples, the proximity sensors 906 may be located in other locations of the apparatus 900. The apparatus 900 may include an interface board 915. The interface board 915 may include a plurality of light emitting devices, such as light emitting diodes (LEDs) 920. Each of the LEDs 920 may provide light through the light adjusting device 910 and the upper portion 901 to provide light patterns of visual responses to the user 1. While shown as being arranged in a particular pattern (e.g., a spiral), the LEDs 920 may be arranged within the interface board 915 in any desired pattern, such as a grid. The interface board 915 will be explained in further detail herein (see Fig. 10).

**[0025]** Fig. 2D is a perspective view of an apparatus in accordance with an embodiment not covered by the claims. Relative to Fig. 2C, the interface board 915 is not shown. As illustrated, the apparatus 900 may include a battery 930 and a touch sensor 932. The battery 930 may be any battery, including for example, rechargeable batteries, known in the art and may store and provide power to various components of the apparatus 900. The battery may be detachable charged outside the apparatus 900 or installed integrated with an internal charger for wired/wirelessly charging within the apparatus 900. The touch sensor 932 may include a touch sensor belt disposed circumferentially about the apparatus 900 and may detect a contact of the user when the user 1 touches any portion of a surface of the apparatus 900 where the touch sensor 932 is disposed. The touch sensor 932 may be capacitive, resistive, piezoelectric, or a combination thereof.

**[0026]** Fig. 2E is an exploded perspective view of an apparatus in accordance with an embodiment not covered by the claims. Relative to Fig. 2D, the battery 930 is not shown. As illustrated, the touch sensor 932 may include a touch pad 908. The touch pad 908 may include a plurality of radial electrode lines radially extending from the center of the touch pad 908 and may determine whether the apparatus 900 is supported by a surface, such as a table or a palm of the user 1. In some examples, the proximity sensors 906 may be periodically disposed along the touch sensor belt of the touch sensor 932.

**[0027]** The apparatus (e.g., apparatus 10) interfaces with the user 1 and/or with external apparatuses (e.g., other computing or electronic devices in the user's environment), by detecting a stationary state and in some examples, by also detecting information associated with the user 1. Fig. 3 is a flow diagram of a method of interfacing with a user including detecting a stationary state of an apparatus (e.g., apparatus 10), in accordance with the present invention.

**[0028]** Initially, the apparatus 10 may be powered on

(e.g., via a battery) and is in a standby mode (S200). While the apparatus 10 is in a standby mode 100, the proximity sensor 11 is active so as to detect the user 1 when the user comes in proximity (S201) to the apparatus 10. The proximity sensor 11 continues to sense for an object (e.g., the user) in proximity until the so detected. Depending on the proximity sensor(s) employed, the user's approach or proximity to the apparatus 10 may be detected based on, for example, visual information such as images including one or more objects within the field of view of the sensor (e.g., an image capture device), auditory information such as change of an environmental noise level, optical, thermal or electromagnetic information caused by the presence of the user 1 within a predetermined range of the apparatus 10, or tactile information caused by the user's contact (e.g., touch) by the apparatus 10. In some examples, the user may be detected to be in proximity responsive to a detected touch on a touch sensor of the apparatus 10. In some examples, the user may be detected to be in proximity without requiring physical touch between the user and apparatus, such as responsive to detecting with for example an optical, thermal, or electromagnetic sensor, the user within a sensing range of the sensor. The apparatus 10 enters a stillness detection mode 110 responsive to detection of the user 1 in proximity (S201). During the stillness detection mode, the apparatus is configured to monitor movement of the apparatus for first detecting an initialization motion and then detecting a stillness or stationary state whereby a response may be provided responsive to the detection of the stationary state. As described, the apparatus, during a first phase of the stillness detection mode, may monitor movement of the apparatus to detect the initialization movement which may indicate that the apparatus 10 has been picked up and/or placed on the user's palm. Upon detecting of the initialization movement, the apparatus 10 may continue to monitor its movement during the stillness detection mode 110 for detecting a stationary state.

**[0029]** In the stillness detection mode, the processor 12 activates the motion sensor 13 if not already active, and the motion sensor 13 may periodically (e.g., every 1 second, 1 millisecond, etc), provide motion data to the processor (S202). The processor may process the motion data frames to identify a stationary state of the apparatus 10. For example, the motion data may be visual information, auditory information, velocity/acceleration information, orientation information, positional information, etc., that may change due to displacement (e.g., changes in a location) or tilts (e.g., changes in an orientation) of the apparatus 10. The processor 12 may periodically receive the motion data from the motion sensor 13, (S203) The processor 12 detects a stationary state 1 of the apparatus 10 based on the motion data (S204) during the stillness detection mode. For example, the processor 12 analyzes the motion frames during the stillness detection mode and detect the stationary state of the apparatus 10 by detecting lack of a motion of the

apparatus for a predetermined period. The predetermined period may be a fixed period of time, flexibly programmable for each user, or depending on contexts of the user 1.

**[0030]** The apparatus 10 enters a second stillness detection mode 120, responsive to detection of the stationary state of the apparatus 10. In the second stillness detection mode 120, the apparatus 10 may be configured to generate farther responses. In some examples, the apparatus may record information associated with the user (e.g., audio, still image(s) or video data, motion data while the apparatus 10 is being held by the user, etc.) which may be used when providing a response during the second stillness detection mode 120. For example, the processor 12 may process information associated with the user 1 (S205) received from the sensors 14 in the second stillness detection mode to determine and provide further response(s) (e.g., S206, S207). Depending on the information recorded, the apparatus 10 provides a feedback response via a feedback output devices 18 (S206) or via a communication output device 15. The apparatus 10 may continue to monitor interaction between the user and apparatus 10 and generate visual, auditory, or tactile responses to the user 1 communication response to external appliance(s), which responses may include any one or more of the responses described with reference to the first stillness detection mode 110.

**[0031]** A response by the apparatus 10 during the second stillness detection mode is based at least in part, on a detected pattern, for example a pattern of stationary states of the apparatus 10 (or moments of stillness) during the second stillness detection mode. In some examples, the response may be based, at least in part, on a detected motion or pattern of movements of the apparatus. In some examples, the response may be based, at least in part, on recorded information associated with the user (e.g., audiovisual recording of the user).

**[0032]** Fig. 4A is a flow diagram of a process in accordance with the present disclosure. The process 400 in Fig. 4A is used to process information associated with a user for example to detect one or more stationary states of the apparatus 10. The process may begin with the apparatus 10 receiving information associated with a user (as shown in block S410).

**[0033]** Upon receiving information associated with a user, in this case motion data, the apparatus 10 processes the information of the user 1 (as shown in block S412) to detect one or more stationary states (as shown in block S414). The processor 12 detects one or more periods of the stationary state of the apparatus 10 based on the motion data. In some examples the apparatus may identify a level of stillness (e.g., as described further with reference to Fig. 4B) and/or a pattern of the stationary states, as shown in block S418. In some examples, different degrees of stillness may correspond to different stationary states and the processor may categorize the detected one or more stationary states in accordance with the degree of stillness (e.g., a calm state, a still state,

etc.), as shown in optional block S416. In some examples, the determination of stationary state may be binary, e.g., the apparatus is either in a stationary state if a condition is met (e.g., lack of motion as defined by a motion thresholds to filter out noise) or the apparatus is in a non-stationary state if the condition is not satisfied. The process may be configured to end upon detection of a large number of non-stationary states in a sequence, and in some examples, responsive to detection of a greater number of consecutive non-stationary states than a predetermined threshold (e.g., 2, 3, 4 or more consecutive non-stationary states), as shown in block S422. which may cause the apparatus to exit the second stillness detection and return to the first stillness detection mode, and in some examples to phase two of the first stillness detection mode whereby the apparatus 10 may monitor motion data to identify a subsequent stationary state (e.g., to enter the second stillness detection mode) or a particular motion state (e.g., for performing further functions as described herein).

**[0034]** The processor 12 may record a sequence of states of the apparatus 10 including one or more stationary states or non-stationary states occurring in the second stillness detection mode to detect a pattern of the stationary state in the second stillness detection mode. The apparatus 10 is configured to provide a response upon detection of one or more stationary states, and in some cases a particular response is provided responsive to detection of a particular level of stillness or pattern of stationary states, as shown in block S420. Based on the detected level of stillness or pattern of the stationary states, the apparatus 10 may be configured to extract further information associated with the user 1 (e.g., begin recording audio and or images/video), transmit a command to control the external apparatus, and/or provide feedback (e.g., blinking, playing sound, or vibration) to the user 1. In some examples, the apparatus 10 may store a plurality of sequences of states (e.g., in the memory device 17) and determine a pattern of the stationary states by comparing a currently recorded sequence of states of the apparatus 10 with the plurality of stored sequences. In some examples, the stored sequences may be preprogrammed in the apparatus 10, e.g., stored in a pre-existing database of sequences generated by the user, and the pattern may be determined based on the sequences in the database of sequences generated by the user. For example, the apparatus 10 may use a pre-existing database of sequences obtained from different users, and the pattern may be determined based on sequences in the pre-existing database of sequences. In some examples, the stored sequences may be stored in a database of sequences obtained only from user 1 and/or the apparatus 10 may be configured to add sequences to the database for enhancing and tailoring the pattern recognition to a particular user.

**[0035]** In some examples, the pattern detection may include detecting a level of stillness (e.g., as shown in block S418 of Fig. 4A). Fig. 4B is a table diagram of still-



ness level detection based on the detection of the motion of the apparatus in accordance with an embodiment of the present disclosure. For example, the apparatus 10 may record a sequence of the states of the apparatus 10. In the illustrated example, ten cycles are shown but a different number of cycles may be analyzed for determining a pattern in accordance with other examples. The states may include a "rough" state where the apparatus 10 is in a dynamic state, a first stationary state (e.g., a "calm" state) or a second stationary state (e.g., a "still" state) which corresponds to a greater degree of stillness than the first stationary state. The illustrated Sequences I and II start with the apparatus 10 in the "rough" state. In Sequence I, a "still" state of the apparatus is recorded at the third, fourth, seventh, ninth and tenth cycles, and a "calm" state of the apparatus is recorded at the second, fifth, sixth and eighth cycles. In Sequence II, a "calm" state is recorded from the second cycle to the tenth cycle. Because of Sequence I has a greater number of occurrences of the "still" state than Sequence II, the processor 10 may determine that Sequence I has a higher level of stillness compared to the level of stillness of Sequence II.

**[0036]** The states of the apparatus 10, such as the "rough" state, the "calm" state, or the "still" state may be determined based on detected motion data, such as displacement or tilts. For example, a gyroscope may be used as the motion sensor 13. Fig. 4C is a flow diagram of detection of a motion of the apparatus by a gyroscope, in accordance with an embodiment not covered by the claims. Once the processor 12 may determine tilt information (T) based on motion data from the gyroscope (S430). For example, the gyroscope may be a three-axis gyroscope that provides the motion data that may include three-axis data, including two data indicating tilts from two orthogonal axes on a horizontal plane and another data indicating a tilt from a vertical axis perpendicular to the horizontal plane. In other examples, accelerometers (e.g., arranged along three axes corresponding to the horizontal and vertical axes) may be used to obtain the tilt information or degree of stillness may be based on amount of acceleration rather than amount of tilt. Based on the motion data, the processor 12 may obtain the tilt information (T) and evaluate the tilt information (S432). If the tilt information (T) is nearly equal zero (e.g., smaller than a first threshold angle (for example,  $T < 01$ )), the processor 12 may determine that the apparatus 10 is in the "still" state (S436). If the tilt information (T) is relatively small (e.g., between the first threshold angle and a second threshold angle (e.g.,  $01 \leq T \leq 02$ )), the processor 12 may determine that the apparatus 10 is in the "calm" state (S439). If the tilt information (T) is relatively large (e.g., greater than the second threshold angle (for example,  $T > 02$ )), the processor 12 may determine that the apparatus 10 is in the "rough" state (S434).

**[0037]** As described, the apparatus 10 may be configured to provide a response (e.g., as shown in block S420 in Fig. 4A) based information associated with a user and received by the apparatus 10. In some examples, differ-

ent levels of stillness of different recorded sequences may elicit different responses by the apparatus. For example, a first level of stillness may be associated with a first response (e.g., transmit a command to an external apparatus), while a second level of stillness may be associated with another response (e.g., provide feedback to the user and/or begin recording audiovisual data of the user). In some examples, different patterns of stationary states may elicit a different response by the apparatus. For example, referring back to the table in FIG. 4B, the apparatus 10 may be configured to not only identify a level of stillness but identify sequential arrangements of different stationary states (e.g., at least two sequential "still" states in a sequence may elicit a particular response such as begin recording audiovisual data, or at least three sequential "still" states in a sequence may elicit a response of transmit an ON command to an external media apparatus), in some examples, the apparatus may be configured to transition to yet another mode of operation (e.g., a third mode, which may be referred to as motion pattern sensing mode) responsive to a particular pattern of stationary states. In some examples, the apparatus may be configured to enter the third mode responsive to the termination of process 400 (e.g., as shown in block S422).

**[0038]** For example, the apparatus may be configured to perform pattern detection in a third mode, which may include detection of user gestures. The apparatus may be configured to provide a response based on the detected user gesture. Fig. 5 is a flow diagram of motion detection process, which may be used to generate a command for an external apparatus based on a gesture of a user, in accordance with an embodiment not covered by the claims. As shown in block S500, the motion detection process may begin with the processor 12 receiving a sequence of motion data of the user 1. In some examples, recorded sequences of motion data may be stored in the memory device 17 for subsequent use in interpreting subsequent recorded sequences of motion data. The processor 12 may retrieve one or more scored sequences of motion data of the user 1 to interpret a gesture. The stored sequences may be categorized into a plurality of categories. For example, the categories may include pronation, supination, flexion, extension, or rotation, or a change in the manner of contact (e.g., change from simply supporting or holding the apparatus to holding the apparatus more rightly such as to "grip" of the apparatus 10). The change in the manner of contact may be detected by one or more touch sensors or a pressure sensors positioned at various perimeter portions of the apparatus for example to detect contact with perimeter sides of the apparatus in addition to the contact with the bottom side. Lack of movement may be categorized in the third mode as a "calm" gesture, as previously described. The apparatus 10 may be configured to provide different responses responsive to different detected gestures. For example, the apparatus may be configured to provide a "forward" command (S503a) or a "backward" command

(S503b) to the external apparatus 16 responsive to detection of a pronation gesture and a supination gesture (S502a), respectively. The apparatus 10 may be configured to provide a "menu +/-" command (S503c) or a "play/pause" command (S503d) to the external apparatus 16 responsive to detection of a flexion gesture or an extension gesture (S502b), respectively. The apparatus 10 may be configured to provide a "volume +/-" command (S503e), a "return" command (S503f), and a "menu/voice input" command (S503g) to the external apparatus 16 responsive to a rotation gesture (S502c), a grip gesture (S502d), and a calm gesture (S502c), respectively. In this manner, various gestures of the user 1 may be interpreted and information associated with the user may be extracted for example for use in controlling an external apparatus such as a media apparatus or a household appliance. Based on the extracted information, a command or other information associated with the user 1 may be generated and transmitted to the external apparatus 17. Categories of gestures and commands associated with the gesture categories are merely an example, and the categorization and association are not limited to the above description. For example, the gestures, as well as patterns of stillness pattern, may be used to identify the external apparatus 17 of a plurality of external apparatuses. For example, a plurality of gestures may be associated with the plurality of external apparatuses, or a gesture directing the apparatus 10 to have a certain orientation towards the external apparatus 17 may be interpreted as an identifier of the external apparatus 17,

**[0039]** In accordance with further examples, utterances of the user may be extracted, tagged and stored from information associated with the user 1 obtained by the apparatus 10. Fig. 6 is a flow diagram of detection and extraction of an utterance of a user, in accordance with an embodiment of the present disclosure. For example, the processor 12 may initiate detection of the utterance of the user 1 (S600). Upon detecting an intent of the user 1 to speak in previously extracted information associated with the user 1. The intent of the user to speak may be detected responsive to detection of a stationary state and/or a particular sequence of stationary states (e.g., two consecutive "still" states, or a sequence of 3, 4, 5, or more "calm" states). The processor 12 may activate microphone(s) (S601), if not previously activated, as additional sensors 14. The microphone 12 may detect sounds from the user 1 and transmit audio data corresponding to the sounds to the processor 10. The processor 12 may determine whether a voice of the user 1 may be detected for a predetermined period of time (S602). If the processor 12 does not detect sounds related to the voice of the user 1 or the processor 12 detects environmental noise around the apparatus 10 is too loud for voice recognition in the predetermined period of time, the process 620 of detecting utterance(s) of the user may be halted (as shown in block S603). In some examples, upon termination of the process 620, the apparatus 10 may transition to a different mode. If the processor 12 detects the voice

of the user 1, the processor 12 may record the audio data in the audio signal on the memory device 17. The processor 12 may buffer the recorded audio data and extract an utterance of the user from the audio data (S604). If the utterance is intelligible and interpretable as a control command, a tag command, or free text (e.g., idea, feeling, thoughts, etc.) (S605), the processor may generate a response based on the utterance. For example, if the utterance is interpretable as a control command (e.g., "turn TV On"), the apparatus 10 may transmit a corresponding control command for controlling the external apparatus 16 using the wired/wireless communication device 15 to the external apparatus 16 (S606). In other examples, the utterance may be correlated to other commands (e.g., "forward," "backward," "menu up/down," "play/pause," "volume up/down," "return," "menu/voice input," etc.) and corresponding control command may be transmitted to an external apparatus. The control command may be indicative of an instruction to search content associated with the user that is stored on the external apparatus 17. For example, if the utterance is interpretable as a tag command for tagging contents in the external apparatus 16, the apparatus 10 may transmit the tag command using the wired/wireless communication device 15 to the external apparatus 16 (S607). For example, the content may be a currently played content, or a currently broadcasted and recorded as a background task but not being currently played.

**[0040]** If the utterance is interpretable as free text (e.g., idea, feeling, thoughts, etc.), the apparatus 10 may transmit the free text to an external computer (not shown) using the wired/wireless communication device 15 (S608), for example for storage. The apparatus 10 may include one or more wired/wireless communication devices 15, any one of which may be specifically configured for communicating with any number of external apparatuses (e.g., the external computer or household appliance). For example, the apparatus 10 may include a Wi-Fi enabled communication device for communicating information including audiovisual data of the user to an external computer. The apparatus 10 may additionally or alternatively include communication devices configured according to other communication protocols (e.g., Bluetooth, ZigBee, in some cases, IR communication device for transmittal of control commands) for communicating with any number of external apparatuses. In the case of Bluetooth, for example, different pairing codes may be used for communicatively coupling the apparatus 10 to a plurality of external apparatuses.

**[0041]** In some examples, the external computer may store archives of information associated with the user 1 (e.g., context, past entries, user preference, user attributes, user background information, etc.) and provide information associated with the free text to the apparatus 10. For example, the information may be related to one or more content items from the content stored on the external apparatus 16. For example, the information may be an identifier associated with a key word or a key phrase

and the processor 12 may count and store a number of occurrences of the extracted key word or a key phrase in the audio data by using the identifier. Based on the number of occurrences of the key word or the key phrase, the processor 12 may provide (e.g., calculate, assign) a weight for the extracted information associated with the user 1, and generate an instruction based, at least in part, on the weight. For example, the instruction may be a mark command of the external apparatus 16 and the apparatus may send the mark command for marking contents with the free text with context (S609), such as the weight. For example, the instruction may be for the apparatus 10 to execute direct user interface interaction with the user 1, and the apparatus 10 may provide feedback (e.g., blinking, playing sound, or vibration) directly to the user 1 (S610).

**[0042]** Detection of stationary states of the apparatus 10 and extraction of information associated with the user 1 may be used in a variety of user interactions. Fig. 7 is a flow diagram of a method of interfacing with the user 1 in a stationary state of the apparatus 10, in accordance with an embodiment not covered by the claims. The apparatus 10 may be powered on to be in a standby state (S700). The proximity sensor 11 may detect the user 1 in proximity (S701) while the apparatus 10 is in a standby mode 100. The apparatus 10 may enter a first stillness detection mode, upon detection of the user 1 in proximity (S701), and the processor 12 may activate the motion sensor 13 to periodically provide motion data to the processor (S702). Following a triggering motion, also referred to herein as initialization movement (e.g., upon detection that the apparatus is being held by the user), the processor 12 may detect a stationary state 1 of the apparatus 10 based on the motion data in the first stillness detection mode, and the apparatus 10 may enter a second stillness detection mode (S703) responsive to detection of the stationary state of the apparatus 10. The processor 12 may process information associated with the user 1 (S703) received from the sensors/output devices 14 in the second stillness detection mode, for example, a result of processing the information associated with the user 1 may prompt the apparatus 10 to provide a command to control the external apparatus 16 that is a television (TV) to turn on, and the apparatus 10 may transmit a command "Turn on" to the television via the wired/wireless communication device 15 (S704). The television in a standby state (S710) may receive the command "Turn on" from the apparatus 10, and may transition from the standby state to active state, responsive to the command "Turn on" (S711). Further, continuous processing of the information associated with the user 1 may prompt the apparatus 10 to provide data related to the television extracted from the information associated with the user 1 to the television. The apparatus 10 may transmit the data "Turn on" to the television via the wired/wireless communication device 15 (S705). The television may continuously receive the data from the apparatus 10, and may display

the data on a screen. responsive to the received data (S712),

**[0043]** In another example, detection of stationary states of the apparatus 10 and extraction of information associated with the user 1 may be applied for various user interactions in collaboration with an external computer. Fig. 8 is a flow diagram of a method of interfacing with a user including processing information associated with the user in a stationary state of an apparatus, in accordance with an embodiment not covered by the claims. The apparatus 10 may be powered on to be in a standby state (S800). The proximity sensor 11 may detect the user 1 in proximity (S801) while the apparatus 10 is in a standby mode 100. The apparatus 10 may enter a first stillness detection mode, upon detection of the user 1 in proximity (S801), and the processor 12 may activate the motion sensor 13 to periodically provide motion data to the processor (S802). Following a triggering motion, also referred to herein as initialization movement (e.g., upon detection that the apparatus is being held by the user), the processor 12 may detect a stationary state 1 of the apparatus 10 based on the motion data in the first stillness detection mode the apparatus 10 may enter a second stillness detection mode (S803), responsive to detection of the stationary state of the apparatus 10.

**[0044]** The processor 12 may process information associated with the user 1 (S803) received from the sensors/output devices 14 in the second stillness detection mode. For example, a result of processing the information associated with the user 1 may prompt the apparatus 10 to provide a "tag" command to control the external apparatus 16 that is a television (TV) to tag a content with a time and a place included in the information associated with the user 1. The content may be explicitly specified by the information associated with the user 1, or implicitly identified by a currently showing program or a currently recording program. The apparatus 10 may transmit a command "Tag" and tag information including the time, the place and the content information to the television via the wired/wireless communication device 15 (S804). The television in a standby state (S810) may receive the command "Tag" and the tag information from the apparatus 10, and may retrieve the content (e.g., a program, a video clip, an audio clip, etc.) or the content information (e.g., a "table of content (TOC)" information for a content item) internally or from an external archive (S811). The external archive may be local (e.g., hard disc recorder) or global (e.g., cloud storage, internet resources). Once the content or the content information is retrieved, the television may associate the content or the content information with the tag information (S812). Furthermore, continuous processing of the information associated with the user 1 may prompt the apparatus 10 may include extracting free text. The free text may be feeling, thoughts, ideas, etc. of the user 1 regarding the content. The apparatus 10 may transmit the free text to the external computer (S805). Simultaneously, the apparatus 10 may transmit an instruction to the television,

causing the television to send content information regarding the content to the external compute (S805). For example, the transmission of the free text and the transmission of the instruction may be via the same wired/wireless communication device 15. For example, the transmission of the free text to the external computer may be via internet (e.g., wi-fi, LTE, etc.) and the transmission of the instruction to the television may be via infrared command transmission. The television may provide the content information to the external computer (S813). The external computer may receive the free text from the apparatus 10 and the content information from the television, and may obtain context information regarding the free text and the content information. For example, the processor 12 may process the free text to extract internal information of the user 1, such as the feeling, thoughts, ideas, etc. of the user 1, and may associate the internal information of the user 1 with the content information. The external computer may store the association of the internal information of the user 1 and the content information and may further build the context information of the user 1 based on the stored sets of association of the internal information of the user 1 and the content information (S821). Although not described above, the apparatus 10 may extract free text without association with another external apparatus, and may process the free text in collaboration with the external computer.

**[0045]** Fig. 9 is a block diagram of an apparatus 1000, in accordance with the present invention. The apparatus 1000 is used to implement the apparatus 900 of Figs. 2A-2E. The apparatus 1000 may include an interface board 1010, a power region 1030, and a control board 1050. As described, each of the interface board 1010, power region 1030, and control board 1050 may be located in a lower portion of the apparatus 1000. The interface board 1010 may include a controller 1012 that may receive user data from one or more sensors of the interface board 1010. For example, the controller 1012 may be coupled to a compass/accelerometer 1018, a gyroscope 1020, an ambient light sensor 1022, a touch sensor 1024, and infrared sensors 1026, and receive data therefrom. Each of the sensors 1018, 1020, 1022, 1024 and 1026 may provide respective data to the controller 1012. The controller 1012 may in turn provide the data to a processor 1052 included in the control board 1050. The processor 1052 may be used to implement the processor 12 of Fig. 1. The processor 1052 may use the data to identify information associated with the user 1, as described herein. In some examples, the controller 1012 may filter and/or otherwise modify data received from the sensors prior to providing the data to the processor 1052.

**[0046]** As described, the touch sensor 1024 may be used to determine whether the user 1 is in physical contact with the apparatus 1000. In some examples, the compass/accelerometer 1018 and the gyroscope 1020 may be additionally or alternatively be used to determine whether the user 1 is in contact with the apparatus 1000. The gyroscope 1020, for instance, may provide signals

indicating that the apparatus 1000 has been tilted as a result of the user 1 touching the apparatus 1000. In this manner, the apparatus 1000 may determine whether the user 1 is in physical contact with the apparatus 1000 even if the touch sensor 1024 does not detect any physical contact with the user 1 at a portion of the apparatus 1000 where the touch pad of the touch sensor 1024 is disposed. In some examples, a speed, a frequency or an amplitude of displacement which the apparatus 100 sways back and forth may be used to determine the manner in which the user 1 is in physical contact with the apparatus 1000. A lower speed, frequency or larger amplitude of displacement (due to larger swings) may, for instance, indicate a more forceful touch.

**[0047]** The interface board 1010 may further include an LED driver 1016 and LEDs 1014 that may provide visual responses to a user 1. For example, the controller 1012 may cause the LED driver 1016 to illuminate one or more of the LEDs 1014 to provide a specified light pattern of a particular visual response. The interface board 1010 may further include a speaker 1028 that may provide auditory responses to the user 1. Auditory responses may be based on one or more audio signals received from the audio control logic 1070, described in further detail below.

**[0048]** The power region 1030 may be located between the interface board 1010 and the control board 1050 and include a board connector 1032 and a battery 1034. The board connector 1032 may provide data between respective components of the interface board 1010 and the control board 1050. For example, the board connector 1032 may provide signals from the audio control logic 1070 to the speaker 1028. For the sake of clarity, specific connections provided by the board connector 1032 are not shown in Fig. 10. The power region 1030 may further include a battery 1034 that may be applied to implement the battery 930 of Figs. 2A-2E. The battery 1034 may store and/or provide power to one or more components of the apparatus 1000.

**[0049]** The control board 1050 may include the processor 1052. Generally, the processor 1052 governs operation of the apparatus 1000 and may execute one or more computer readable instructions stored in the non-volatile memory 1056 such that the apparatus 1000 may operate as described herein. The processor 1052 may receive data from one or more of the devices of the control board 1050. For example, the processor 1052 may receive data from the camera 1058, network device 1066, wireless network device 1068, and/or audio control logic 1070. The camera 1058 may provide visual data associated with the user 1, such as a facial expression or natural gesture of the user 1. The network device 1066 may communicate with one or more wired networks, such as a USB network or Ethernet network, and the wireless network device 1068 may communicate with one or more wireless networks. Accordingly, the network device 1066 and/or the wireless network device 1068 may allow the processor 1052 to communicate with one or more exter-

nal apparatuses 1080 (e.g., content devices, such as a television, a streaming device, etc.) and an external computer 1081 using a wired or wireless network. The audio control logic 1070 may be coupled to one or more microphones 1072 and may receive audio data (e.g., voice data) associated with the user 1. The audio control logic 1070 may provide audio data to and receive audio data from the processor 1052. Audio data may be provided from the microphones 1072 to the processor 1052, and may be provided from the processor 1052 to the speaker 1028. In some examples, the audio control logic 1070 may include one or more analog-to-digital converters and digital-to-analog converters and/or may further include one or more audio filters or codecs. The control board 1050 may further include a vibrator 1078 that may provide vibration responses to the user 1. For example, the processor 1052 may cause the vibrator 1078 to vibrate in a particular manner during a vibrational response.

**[0050]** The control board 1050 may include power circuitry comprising an inductive charge module 1060, charging control logic 1062, and power management control logic 1064. During a charging sequence, the inductive charge module 1060 may be coupled to an external charging device, such as a charging mat or port (not shown) and provide the charge received from the charging mat to the charging control logic 1062. In turn, the charging control logic 1062 may charge the battery 1034. When either the battery 1034 is fully charged, or the inductive charge module 1060 is no longer coupled to the external device, the charging control logic 1062 may terminate the charging sequence. The power management control logic 1064 may manage allocation of power to components of the apparatus 1000. In some examples, the apparatus 1000 may include a coil (not shown) for inductive charging. For example, the coil may be stacked with (e.g., over or under) a touch pad, such as the touch pad 908 of Fig. 2E.

**[0051]** In some examples, the apparatus 1000 may selectively enable one or more components according to a mode of the apparatus 1000. In this manner, the apparatus 1000 may increase power usage efficiency. By way of example, the apparatus 1000 may determine that a user 1 is not in proximity and enter a standby mode. In response, the processor 1052 may enter low power operation (e.g., in a standby state). In at least one embodiment not covered by the claims, the power management control logic 1064 may cause the processor 1052 to enter low power operation, for instance, responsive to the user 1 not being in proximity to the apparatus 1000 for a particular amount of time. While the processor 1052 is in low power operation (e.g., in a standby state), the controller 1012 and one or more proximity sensors of the apparatus 1000, such as the infrared sensors 1026 or microphones 1072, may continue to operate. Responsive to the one or more proximity sensors detecting that a user 1 is in proximity to the apparatus 1000, the processor 1052 may exit the low power operation and begin processing user data.

**[0052]** In some examples, other features and/or components of the apparatus 1000 may be selectively enabled as well. Speech analysis, for example, may be selectively enabled (e.g., by the processor 1052) based on whether the apparatus 1000 is in contact with the user 1 in a second stillness mode 120 in Fig. 2. In another example, the camera 1058 may be selectively enabled based on whether the apparatus 1000 is in contact with the user 1 in a second stillness mode 120 in Fig. 2. In some examples, the apparatus 1000 may select a mode based on whether the apparatus 1000 is charging. In response, the apparatus 1000 may selectively enable one or more features and/or components of the apparatus 1000. For example, the apparatus 1000 may remain connected to one or more available wireless networks while charging. Additionally or alternatively, the apparatus 1000 may transfer and/or backup data to an external computer 1081, when charging.

**[0053]** In some examples, the interface board 1010 and control board 1050 may each be an integrated circuit, and accordingly, respective components of the interface board 1010 and control board 1050 may be integrated. In other examples, one or more respective components may be separately installed and not integrated in either of the interface board 1010 and the control board 1050. Moreover, while particular components have been described as being located in the interface board 1010, the power region 1030, or the control board 1050, it will be appreciated that in other embodiments components of the apparatus 1000 may be arranged in other configurations. The compass/accelerometer 1018 and/or the gyroscope 1020, for instance, may be included in the control board 1050 and/or the microphones 1072 and the audio control logic 1070 may be located in the interface board 410.

**[0054]** It should be understood that various features and aspects of the disclosed embodiments can be combined with or substituted for one another in order to form varying mode of the disclosed invention. Thus, it is intended that the scope of at least some of the present invention herein disclosed should not be limited by the particular disclosed embodiments described above.

## 45 Claims

1. A method of interfacing with a user, comprising:

providing a handheld apparatus (10, 900) in standby mode (100), wherein the apparatus comprises a proximity sensor (11) configured to detect a user (1) in proximity without physical touch between the user and the apparatus, wherein the proximity sensor is active while the apparatus is in standby mode;  
while in standby mode (100), using the proximity sensor (11) to sense the user in proximity of the apparatus (S201) by detecting whether the user

is within a predetermined range of the apparatus;  
 entering a first phase of a first stillness detection mode (110) of the apparatus responsive to detection of the user in proximity, and activating a motion sensor, if not already active (S202), wherein the apparatus is configured to monitor movement (S203) of the apparatus for detecting an initialization movement while the apparatus is in the first phase of the first stillness detection mode (110);  
 detecting (S204) the initialization movement of the apparatus;  
 entering a second phase of the first stillness detection mode (110) upon detection of the initialization movement, and, for a period of time following the initialization movement, continuing to monitor the movement of the apparatus during the second phase of the first stillness detection mode to identify a pattern of stationary states of the apparatus, wherein the apparatus is configured to detect the pattern of stationary states by processing motion data and detecting lack of movement of the apparatus for a predetermined period of time following the initialization movement;  
 entering a second stillness detection mode (120) of the apparatus responsive to the detection of lack of movement; and  
 providing a response (S206) with the apparatus in the second stillness detection mode, wherein the response includes at least one of providing feedback to the user and a communication between the handheld apparatus (10, 900) and an external apparatus (16), wherein the response is based, at least in part, on the detected pattern of stationary states of the apparatus during the second stillness detection mode.

- 2. The method of claim 1, wherein the providing a response comprises:

transmitting a command to the external apparatus;  
 receiving return communication from the external apparatus responsive to the command, wherein the return communication is based on user data retrieved by the external apparatus; and  
 generating feedback by the apparatus based, at least in part, on the return communication.

- 3. The method of claim 1 or 2, further comprising:

processing information associated with the user while the apparatus is in the second stillness detection mode,

wherein processing the information associated with the user during the second stillness detection mode of the apparatus includes detecting a plurality of periods of the lack of movement of the apparatus to detect the pattern of stationary states.

- 4. The method of claim 3, wherein the apparatus further comprises a microphone (1072) and a memory device (17, 1054, 1056), and wherein processing the information comprises:

detecting sounds from the user using the microphone; and  
 recording audio data corresponding to the sounds on a memory device;  
 extracting information from the audio data by the processor;  
 generating an instruction to search content associated with the user and stored on the external apparatus, based on the extracted information; and  
 transmitting the instruction to the external apparatus.

- 5. The method of claim 4, further comprising:

counting a number of occurrences of the extracted information in the audio data; and  
 providing a weight for the extracted information based on the number,  
 wherein the instruction to associate the extracted information with the content is based, at least in part, on the weight.

- 6. The method of any of the preceding claims, further comprising recording a sequence of states of the apparatus including one or more stationary states or non-stationary states occurring in the second stillness detection mode.

- 7. The method of claim 6, further comprising: determining a pattern of the sequence of states by comparing the sequence of states with a plurality of stored sequences.

- 8. The method of claim 6 or 7, further comprising generating a command to the external apparatus based on the pattern of the sequence of states and transmitting the command to the external apparatus.

- 9. The method of claim 8, further comprising identifying one of a plurality of external apparatuses based on the pattern of the sequence of states and transmitting the command to the identified external apparatus.

- 10. An apparatus (10, 900) comprising:

a proximity sensor (11) configured to detect a user (1) in proximity of the apparatus without physical touch between the user and the apparatus, wherein the proximity sensor is active while the apparatus is in a standby mode (100), and wherein the apparatus is configured to be a handheld apparatus;

while in standby mode, the proximity sensor is configured to sense for the user in proximity of the apparatus (S201) by detecting whether the user is within a predetermined range of the apparatus; and

a processor (12) configured to cause the apparatus to enter a first phase of a first stillness detection mode (110) responsive to detection of the user in proximity and

to activate a motion sensor (13) of the apparatus, if not already active (S202), wherein the apparatus is configured to monitor movement (S203) of the apparatus for detecting (S204) an initialization movement while the apparatus is in the first phase of the first stillness detection mode, wherein the processor is configured to cause the apparatus to enter a second phase of the first stillness detection mode (110) upon detection of the initialization movement; and

wherein the processor (12) is configured to continue monitoring the movement of the apparatus for a period of time following the initialization movement during the second phase of the first stillness detection mode to identify a pattern of stationary states of the apparatus, wherein the processor is configured to process the motion data and detect a lack of motion of the apparatus for a predetermined period of time following the initialization movement, and further configured to cause the apparatus to enter a second stillness detection mode (120) of the apparatus responsive to the detection of the lack of motion and to cause the apparatus to provide a response (S206) in the second stillness detection mode, wherein the response includes at least one of providing feedback to the user and a communication between the apparatus and an external apparatus (16), and wherein the response is based, at least in part, on the detected pattern of stationary states of the apparatus during the second stillness detection mode.

11. The apparatus of claim 10, further comprising:

a memory device (17, 1054, 1056) configured to record information associated with the user while the apparatus is in the second stillness detection mode;

at least one microphone (1072) configured to detect ambient sound in the second stillness detection mode;

wherein the memory device is configured to record the ambient sound, and

wherein the processor is configured to extract the information associated with the user from the ambient sound.

12. The apparatus of claim 10, further comprising a memory device configured to record information associated with the user while the apparatus is in the second stillness detection mode and a camera configured to capture a sequence of images of the user, wherein the memory device is configured to store the sequence of images of the user, and wherein the processor is configured to retrieve the sequence of images, to interpret a gesture of the user in the sequence of images, and further configured to extract the information associated with the user from the gesture of the user.

13. The apparatus of claim 11 or 12, wherein the motion sensor is further configured to capture a sequence of motion data of the user in the second stillness detection mode, wherein the memory device is configured to store the sequence of motion data of the user, and wherein the processor is configured to retrieve the sequence of motion data, to interpret a gesture of the user in the sequence of motion data, and further configured to extract the information associated with the user from the gesture of the user.

14. The apparatus of any of claims 10-13, further comprising a wireless transmitter configured to transmit a command to an external apparatus based on the information associated with the user, the command being indicative of a function of the external apparatus.

15. The apparatus of any of claims 11-14, further comprising an enclosure made, at least in part, from wood.

**Patentansprüche**

1. Verfahren zur Schnittstellenbildung mit einem Benutzer, das Folgendes umfasst:

Bereitstellen einer Handeinrichtung (10, 900) im Bereitschaftsmodus (100), wobei die Einrichtung einen Näherungssensor (11) umfasst, der ausgelegt ist zum Detektieren eines Benutzers (1) in der Nähe, ohne physische Berührung zwischen dem Benutzer und der Einrichtung, wobei der Näherungssensor aktiv ist während sich die Einrichtung im Bereitschaftsmodus befindet; während im Bereitschaftsmodus (100) befindlich, Verwenden des Näherungssensors (11)

zum Erfassen des Benutzers in der Nähe der Einrichtung (S201) durch Detektieren, ob sich der Benutzer innerhalb einer vorbestimmten Reichweite der Einrichtung befindet;  
 Eintreten in eine erste Phase eines ersten Stillstanddetektionsmodus (110) der Einrichtung als Reaktion auf Detektion des Benutzers in der Nähe und Aktivieren eines Bewegungssensors, falls nicht bereits aktiv (S202), wobei die Einrichtung ausgelegt ist zum Überwachen von Bewegung (S203) der Einrichtung zum Detektieren einer Initialisierungsbewegung, während sich die Einrichtung in der ersten Phase des ersten Stillstanddetektionsmodus (110) befindet;  
 Detektieren (S204) der Initialisierungsbewegung der Einrichtung;  
 Eintreten in eine zweite Phase des ersten Stillstanddetektionsmodus (110) bei Detektion der Initialisierungsbewegung, und, für einen der Initialisierungsbewegung folgenden Zeitraum, Weiterführen des Überwachens der Bewegung der Einrichtung während der zweiten Phase des ersten Stillstanddetektionsmodus zum Identifizieren eines Musters von stationären Zuständen der Einrichtung, wobei die Einrichtung ausgelegt ist zum Detektieren des Musters von stationären Zuständen durch Verarbeiten von Bewegungsdaten und Detektieren von Fehlen von Bewegung der Einrichtung für einen vorbestimmten auf die Initialisierungsbewegung folgenden Zeitraum;  
 Eintreten in einen zweiten Stillstanddetektionsmodus (120) der Einrichtung als Reaktion auf Detektion von Fehlen von Bewegung; und  
 Liefern einer Reaktion (S206) mit der Einrichtung in dem zweiten Stillstanddetektionsmodus, wobei die Reaktion Liefern von Rückmeldung an den Benutzer und/oder eine Kommunikation zwischen der Handvorrichtung (10, 900) und einer externen Einrichtung (16) beinhaltet, wobei die Reaktion zumindest teilweise auf dem detektierten Muster von stationären Zuständen der Einrichtung während des zweiten Stillstanddetektionsmodus basiert.

2. Verfahren nach Anspruch 1, wobei das Liefern einer Reaktion Folgendes umfasst:

Übertragen eines Befehls an die externe Einrichtung;  
 Empfangen von Rückkommunikation von der externen Einrichtung als Reaktion auf den Befehl, wobei die Rückkommunikation auf durch die externe Einrichtung abgerufenen Benutzerdaten basiert; und  
 Erzeugen von Rückmeldung durch die Einrichtung, zumindest teilweise basierend auf der Rückkommunikation.

3. Verfahren nach Anspruch 1 oder 2, das ferner Folgendes umfasst:

Verarbeiten von mit dem Benutzer verknüpften Informationen, während sich die Einrichtung in dem zweiten Stillstanddetektionsmodus befindet, wobei Verarbeiten von mit dem Benutzer verknüpften Informationen, während des zweiten Stillstanddetektionsmodus der Einrichtung, Detektieren einer Vielzahl von Perioden mit Fehlen von Bewegung der Einrichtung beinhaltet, um die Muster von stationären Zuständen zu detektieren.

4. Verfahren nach Anspruch 3, wobei die Einrichtung ferner ein Mikrofon (1072) und eine Speichervorrichtung (17, 1054, 1056) umfasst, und wobei Verarbeiten der Informationen Folgendes umfasst:

Detektieren von Schall von dem Benutzer unter Verwendung des Mikrofons; und  
 Aufzeichnen von Audiodaten, die dem Schall entsprechen, auf einer Speichervorrichtung;  
 Extrahieren von Informationen aus den Audiodaten durch den Prozessor;  
 Erzeugen einer Anweisung zum Durchsuchen von mit dem Benutzer verknüpften und auf der externen Einrichtung gespeicherten Inhalt, basierend auf den extrahierten Informationen; und  
 Übertragen der Anweisung an die externe Einrichtung.

5. Verfahren nach Anspruch 4, das ferner Folgendes umfasst:

Zählen einer Anzahl von Auftretisfällen der extrahierten Informationen in den Audiodaten; und  
 Liefern eines Gewichts für die extrahierten Informationen basierend auf der Anzahl, wobei die Anweisung, die extrahierten Informationen mit dem Inhalt zu verknüpfen, zumindest teilweise auf dem Gewicht basiert.

6. Verfahren nach einem der vorhergehenden Ansprüche, ferner umfassend Aufzeichnen einer Sequenz von Zuständen der Einrichtung einschließlich eines oder mehrerer stationärer Zustände oder nichtstationärer Zustände, die in dem zweiten Stillstanddetektionsmodus auftreten.

7. Verfahren nach Anspruch 6, ferner Folgendes umfassend:

Bestimmen eines Musters der Sequenz von Zuständen durch Vergleichen der Sequenz von Zuständen mit einer Vielzahl von gespeicherten Sequenzen.



8. Verfahren nach Anspruch 6 oder 7, ferner umfassend Erzeugen eines Befehls an die externe Einrichtung, basierend auf dem Muster der Sequenz von Zuständen und Übertragen des Befehls an die externe Einrichtung. 5
9. Verfahren nach Anspruch 8, ferner umfassend Identifizieren einer aus einer Vielzahl von externen Einrichtungen, basierend auf dem Muster der Sequenz von Zuständen und Übertragen des Befehls an die identifizierte externe Einrichtung. 10
10. Einrichtung (10, 900), die Folgendes umfasst:
- einen Näherungssensor (11), der ausgelegt ist zum Detektieren eines Benutzers (1) in der Nähe der Einrichtung, ohne physische Berührung zwischen dem Benutzer und der Einrichtung, wobei der Näherungssensor aktiv ist, während sich die Einrichtung in einem Bereitschaftsmodus (100) befindet, 15
- und wobei die Einrichtung als eine Handeinrichtung ausgestaltet ist; 20
- während im Bereitschaftsmodus befindlich, ist der Näherungssensor ausgelegt zum Erfassen des Benutzers in der Nähe der Einrichtung (S201) durch Detektieren, ob sich der Benutzer innerhalb einer vorbestimmten Reichweite der Einrichtung befindet; und 25
- einen Prozessor (12), ausgelegt zum Veranlassen der Einrichtung zum Eintreten in eine erste Phase eines ersten Stillstanddetektionsmodus (110) als Reaktion auf Detektion des Benutzers in der Nähe und zum Aktivieren eines Bewegungssensors (13) der Einrichtung, falls nicht bereits aktiv (S202), wobei die Einrichtung ausgelegt ist zum Überwachen von Bewegung (S203) der Einrichtung zum Detektieren (S204) einer Initialisierungsbewegung, während sich die Einrichtung in der ersten Phase des ersten Stillstanddetektionsmodus befindet; 30
- wobei der Prozessor ausgelegt ist zum Veranlassen der Einrichtung zum Eintreten in eine zweite Phase des ersten Stillstanddetektionsmodus (110) bei Detektion der Initialisierungsbewegung; und 35
- wobei der Prozessor (12) ausgelegt ist zum Weiterführen des Überwachens der Bewegung der Einrichtung für einen der Initialisierungsbewegung folgenden Zeitraum, während der zweiten Phase des ersten Stillstanddetektionsmodus, zum Identifizieren eines Musters von stationären Zuständen der Einrichtung, wobei der Prozessor ausgelegt ist zum Verarbeiten der Bewegungsdaten und Detektieren von Fehlen von Bewegung der Einrichtung für einen vorbestimmten auf die Initialisierungsbewegung folgenden Zeitraum, und ferner ausgelegt ist zum 40
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Veranlassen der Einrichtung zum Eintreten in einen zweiten Stillstanddetektionsmodus (120) der Einrichtung als Reaktion auf Detektion von Fehlen von Bewegung und zum Veranlassen der Einrichtung zum Liefern einer Reaktion (S206) in dem zweiten Stillstanddetektionsmodus, wobei die Reaktion Liefern von Rückmeldung an den Benutzer und/oder eine Kommunikation zwischen der Einrichtung und einer externen Einrichtung (16) beinhaltet, und wobei die Reaktion zumindest teilweise auf dem detektierten Muster von stationären Zuständen der Einrichtung während des zweiten Stillstanddetektionsmodus basiert.

11. Einrichtung nach Anspruch 10, ferner Folgendes umfassend:

eine Speichervorrichtung (17, 1054, 1056), ausgelegt zum Aufzeichnen von mit dem Benutzer verknüpften Informationen, während sich die Einrichtung in dem zweiten Stillstanddetektionsmodus befindet; 15

mindestens ein Mikrofon (1072), ausgelegt zum Detektieren von Umgebungsschall in dem zweiten Stillstanddetektionsmodus; 20

wobei die Speichervorrichtung ausgelegt ist zum Aufzeichnen des Umgebungsschalls, und wobei der Prozessor ausgelegt ist zum Extrahieren der mit dem Benutzer verknüpften Informationen aus dem Umgebungsschall. 25

12. Einrichtung nach Anspruch 10, ferner umfassend eine Speichervorrichtung, die ausgelegt ist zum Aufzeichnen von mit dem Benutzer verknüpften Informationen, während sich die Einrichtung in dem zweiten Stillstanddetektionsmodus befindet, und eine Kamera, die ausgelegt ist zum Aufnehmen einer Sequenz von Bildern des Benutzers, 30
- wobei die Speichervorrichtung ausgelegt ist zum Speichern der Sequenz von Bildern des Benutzers, und wobei der Prozessor ausgelegt ist zum Abrufen der Sequenz von Bildern zum Interpretieren einer Geste des Benutzers in der Sequenz von Bildern, und ferner ausgelegt ist zum Extrahieren der mit dem Benutzer verknüpften Informationen aus der Geste des Benutzers. 35

13. Einrichtung nach Anspruch 11 oder 12, wobei der Bewegungssensor ferner ausgelegt ist zum Aufnehmen einer Sequenz von Bewegungsdaten des Benutzers in dem zweiten Stillstanddetektionsmodus, wobei die Speichervorrichtung ausgelegt ist zum Speichern der Sequenz von Bewegungsdaten des Benutzers, und 40
- wobei der Prozessor ausgelegt ist zum Abrufen der Sequenz von Bewegungsdaten zum Interpretieren einer Geste des Benutzers in der Sequenz von Be- 45
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wegungsdaten, und ferner ausgelegt ist zum Extrahieren der mit dem Benutzer verknüpften Informationen aus der Geste des Benutzers.

14. Einrichtung nach einem der Ansprüche 10-13, ferner umfassend einen drahtlosen Sender, der ausgelegt ist zum Übertragen eines Befehls an eine externe Einrichtung, basierend auf den mit dem Benutzer verknüpften Informationen, wobei der Befehl eine Funktion der externen Einrichtung angibt. 5  
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15. Einrichtung nach einem der Ansprüche 11-14, ferner umfassend ein zumindest teilweise aus Holz hergestelltes Gehäuse. 15

### Revendications

1. Procédé d'interfaçage avec un utilisateur, comprenant :

la prévision d'un appareil portatif (10, 900) dans un mode de veille (100), cet appareil comportant un capteur de proximité (11) configuré de façon à détecter un utilisateur (1) à proximité sans contact physique entre l'utilisateur et l'appareil, ce capteur de proximité étant actif tandis que l'appareil est dans le mode de veille ; 25  
tandis que l'appareil est dans le mode de veille (100), l'utilisation du capteur de proximité (11) pour détecter l'utilisateur à proximité de l'appareil (S201) en détectant si oui ou non l'utilisateur est à l'intérieur d'une portée prédéterminée de l'appareil ; 30  
l'entrée dans une première phase d'un premier mode de détection d'immobilité (110) de l'appareil en réponse à la détection de l'utilisateur à proximité, et l'activation d'un capteur de mouvement, s'il n'est pas déjà actif (S202), l'appareil étant configuré de façon à surveiller un mouvement (S203) de l'appareil pour détecter un mouvement d'initialisation tandis que l'appareil est dans la première phase du premier mode de détection d'immobilité (110) ; 35  
la détection (S204) du mouvement d'initialisation de l'appareil ; 40  
l'entrée dans une deuxième phase du premier mode de détection d'immobilité (110) lors de la détection du mouvement d'initialisation, et, pendant une période de temps suivant le mouvement d'initialisation, la continuation de la surveillance du mouvement de l'appareil pendant la deuxième phase du premier mode de détection d'immobilité afin d'identifier une tendance d'états immobiles de l'appareil, l'appareil étant configuré de façon à détecter la tendance d'états immobiles en 45  
traitant des données de mouvement et en dé-

tectant un manque de mouvement de l'appareil pendant une période de temps prédéterminée suivant le mouvement d'initialisation ;  
en entrant dans un deuxième mode de détection d'immobilité (120) de l'appareil en réponse à la détection du manque de mouvement ; et  
en fournissant une réponse (S206) avec l'appareil dans le deuxième mode de détection d'immobilité,  
cette réponse comprenant au moins soit la fourniture d'une réaction à l'utilisateur, soit une communication entre l'appareil portatif (10, 900) et un appareil externe (16),  
cette réponse étant basée, au moins en partie, sur la tendance détectée des états immobiles de l'appareil pendant le deuxième mode de détection d'immobilité.

2. Procédé selon la revendication 1, dans lequel la fourniture d'une réponse comprend :

la transmission d'une commande à l'appareil externe ;  
la réception d'une communication en retour venant de l'appareil externe en réponse à la commande, cette communication en retour étant basée sur des données utilisateur récupérées par l'appareil externe ; et  
la génération d'une réaction par l'appareil basée, au moins en partie, sur la communication en retour.

3. Procédé selon la revendication 1 ou 2, comprenant en outre :

le traitement d'informations associées à l'utilisateur tandis que l'appareil est dans le deuxième mode de détection d'immobilité,  
le traitement des informations associées à l'utilisateur pendant le deuxième mode de détection d'immobilité comprenant la détection d'une pluralité de périodes du manque de mouvement de l'appareil afin de détecter la tendance des états immobiles.

4. Procédé selon la revendication 3, dans lequel l'appareil comprend en outre un microphone (1072) et un dispositif de mémoire (17, 1054, 1056), et dans lequel le traitement des informations comprend :

la détection de sons venant de l'utilisateur utilisant le microphone ; et  
l'enregistrement de données audio correspondant aux sons sur un dispositif de mémoire ;  
l'extraction d'informations à partir des données audio par le processeur ;  
la génération d'une instruction pour rechercher

- le contenu associé à l'utilisateur et stocké sur l'appareil externe, en se basant sur les informations extraites ; et  
la transmission de cette instruction à l'appareil externe. 5
- 5.** Procédé selon la revendication 4, comprenant en outre :
- le comptage d'un nombre d'occurrences des informations extraites dans les données audio ; et  
la fourniture d'un poids pour les informations extraites en se basant sur ce nombre,  
l'instruction d'associer les informations extraites au contenu étant basée, au moins en partie, sur ce poids. 10 15
- 6.** Procédé selon l'une quelconque des revendications précédentes, comprenant en outre l'enregistrement d'une séquence d'états de l'appareil comprenant un ou plusieurs états immobiles et états non immobiles se produisant dans le deuxième mode de détection d'immobilité. 20
- 7.** Procédé selon la revendication 6, comprenant en outre :  
la détermination d'une tendance de la séquence d'états en comparant la séquence d'états avec une pluralité de séquences stockées. 25 30
- 8.** Procédé selon la revendication 6 ou 7, comprenant en outre la génération d'une commande à l'appareil externe en se basant sur la tendance de la séquence d'états et la transmission de cette commande à l'appareil externe. 35
- 9.** Procédé selon la revendication 8, comprenant en outre l'identification d'un d'une pluralité d'appareils externes en se basant sur la tendance de la séquence d'états et la transmission de cette commande à l'appareil externe identifié. 40
- 10.** Appareil (10, 900) comprenant :
- un capteur de proximité (11) configuré de façon à détecter un utilisateur (1) à proximité de l'appareil sans contact physique entre l'utilisateur et l'appareil, ce capteur de proximité étant actif tandis que l'appareil est dans un mode de veille (100), et l'appareil étant configuré de façon à être un appareil portatif ;  
tandis que l'appareil est dans le mode de veille, le capteur de proximité étant configuré de façon à détecter l'utilisateur à proximité de l'appareil (S201) en détectant si oui ou non l'utilisateur est à l'intérieur d'une portée prédéterminée de l'appareil ; et  
un processeur (12) configuré de façon à faire 45 50 55
- entrer l'appareil dans une première phase d'un premier mode de détection d'immobilité (110) en réponse à la détection de l'utilisateur à proximité et à activer un capteur de mouvement (13) de l'appareil, s'il n'est pas déjà actif (S202), l'appareil étant configuré de façon à surveiller le mouvement (S203) de l'appareil pour détecter (S204) un mouvement d'initialisation tandis que l'appareil est dans la première phase du premier mode de détection d'immobilité,  
le processeur étant configuré de façon à faire entrer l'appareil dans une deuxième phase du premier mode de détection d'immobilité (110) lors de la détection du mouvement d'initialisation ; et  
le processeur (12) étant configuré de façon à continuer de surveiller le mouvement de l'appareil pendant une période de temps suivant le mouvement d'initialisation durant la deuxième phase du premier mode de détection d'immobilité afin d'identifier une tendance d'états immobiles de l'appareil,  
le processeur étant configuré de façon à traiter les données de mouvement et à détecter un manque de mouvement de l'appareil pendant une période de temps prédéterminée suivant le mouvement d'initialisation, et étant configuré en outre de façon à faire entrer l'appareil dans un deuxième mode de détection d'immobilité (120) de l'appareil en réponse à la détection du manque de mouvement et à faire fournir à l'appareil une réponse (S206) dans le deuxième mode de détection d'immobilité, cette réponse comprenant au moins soit la fourniture d'une réaction à l'utilisateur, soit une communication entre l'appareil et un appareil externe (16), et cette réponse étant basée, au moins en partie, sur la tendance détectée d'états immobiles de l'appareil pendant le deuxième mode de détection d'immobilité.
- 11.** Appareil selon la revendication 10, comprenant en outre :
- un dispositif de mémoire (17, 1054, 1056) configuré de façon à enregistrer des informations associées à l'utilisateur tandis que l'appareil est dans le deuxième mode de détection d'immobilité ;  
au moins un microphone (1072) configuré de façon à détecter des sons ambiants dans le deuxième mode de détection d'immobilité ;  
le dispositif de mémoire étant configuré de façon à enregistrer les sons ambiants, et  
le processeur étant configuré de façon à extraire les informations associées à l'utilisateur à partir des sons ambiants.

12. Appareil selon la revendication 10, comprenant en outre un dispositif de mémoire configuré de façon à enregistrer des informations associées à l'utilisateur tandis que l'appareil est dans le deuxième mode de détection d'immobilité et une caméra configurée de façon à capturer une séquence d'images de l'utilisateur, 5  
ce dispositif de mémoire étant configuré de façon à stocker cette séquence d'images de l'utilisateur, et le processeur étant configuré de façon à récupérer la séquence d'images, à interpréter un geste de l'utilisateur dans la séquence d'images, et étant configuré en outre de façon à extraire les informations associées à l'utilisateur à partir du geste de l'utilisateur. 10 15
13. Appareil selon la revendication 11 ou 12, dans lequel le capteur de mouvement est configuré en outre de façon à capturer une séquence de données de mouvement de l'utilisateur dans le deuxième mode de détection d'immobilité, 20  
le dispositif de mémoire étant configuré de façon à stocker cette séquence de données de mouvement de l'utilisateur, et  
le processeur étant configuré de façon à récupérer la séquence de données de mouvement, à interpréter un geste de l'utilisateur dans la séquence données de mouvement, et étant configuré en outre de façon à extraire les informations associées à l'utilisateur à partir du geste de l'utilisateur. 25 30
14. Appareil selon l'une quelconque des revendications 10 à 13, comprenant en outre un transmetteur sans fil configuré de façon à transmettre une commande à un appareil externe en se basant sur les informations associées à l'utilisateur, cette commande étant indicative d'une fonction de l'appareil externe. 35
15. Appareil selon l'une quelconque des revendications 11 à 14, comprenant une enceinte faite, au moins en partie, en bois. 40

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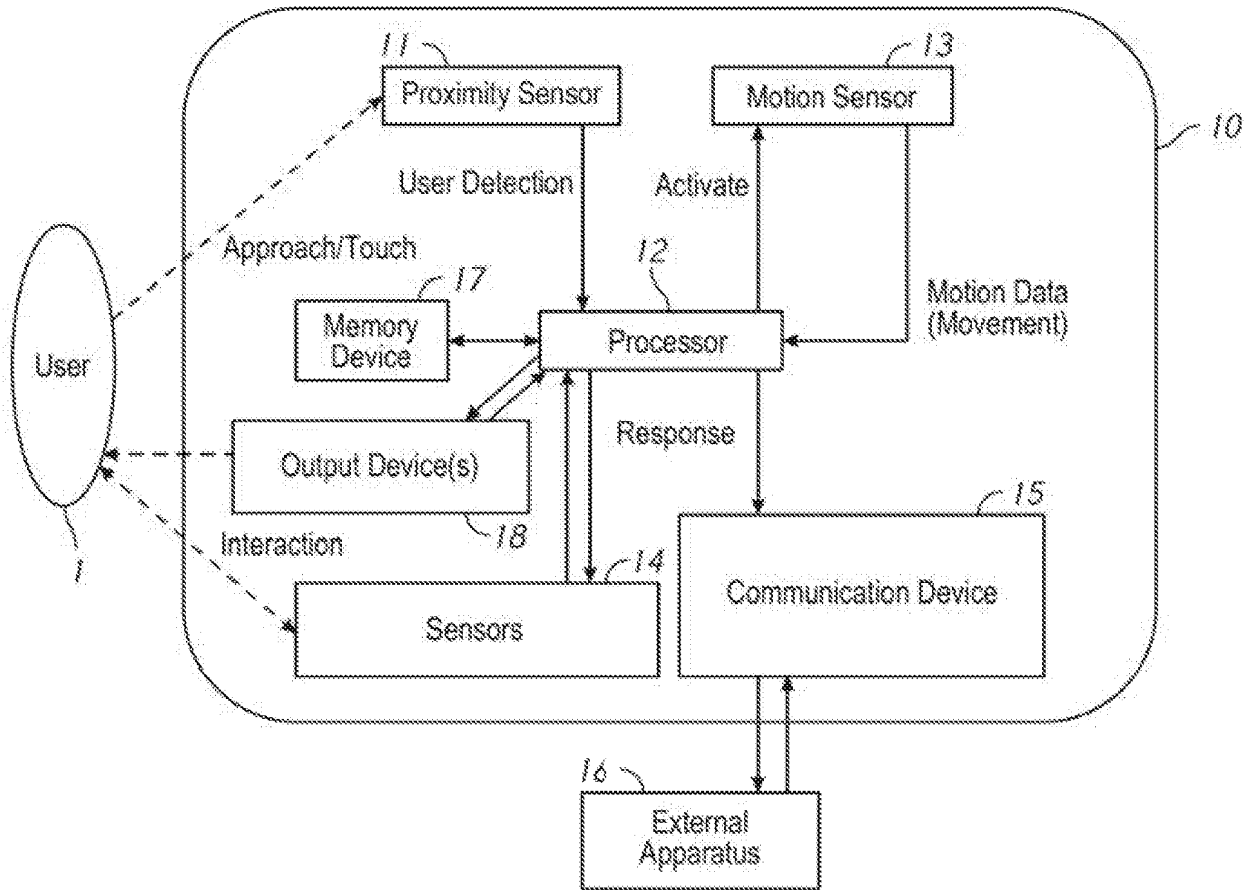


FIG. 1

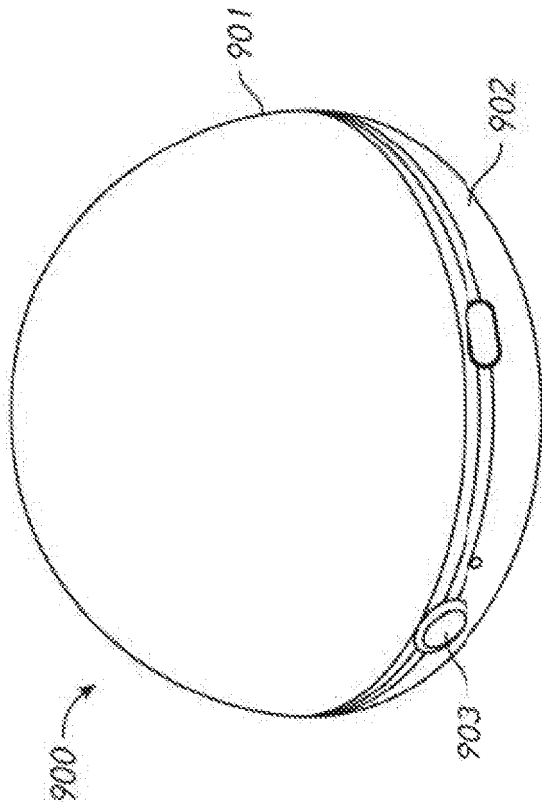


FIG. 2A

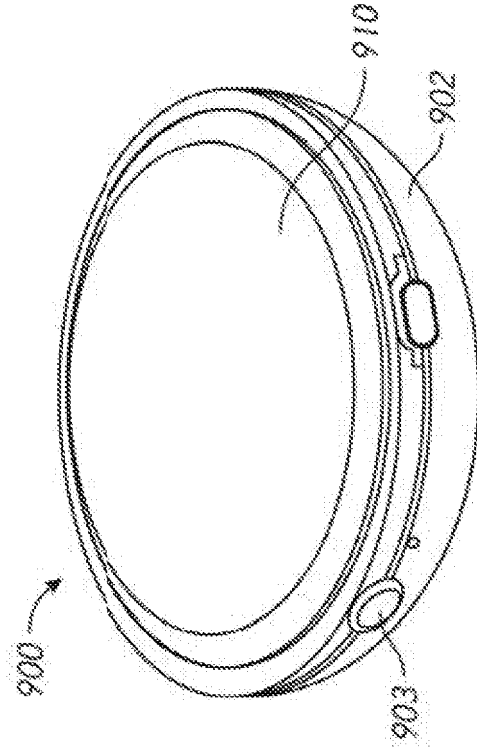


FIG. 2B

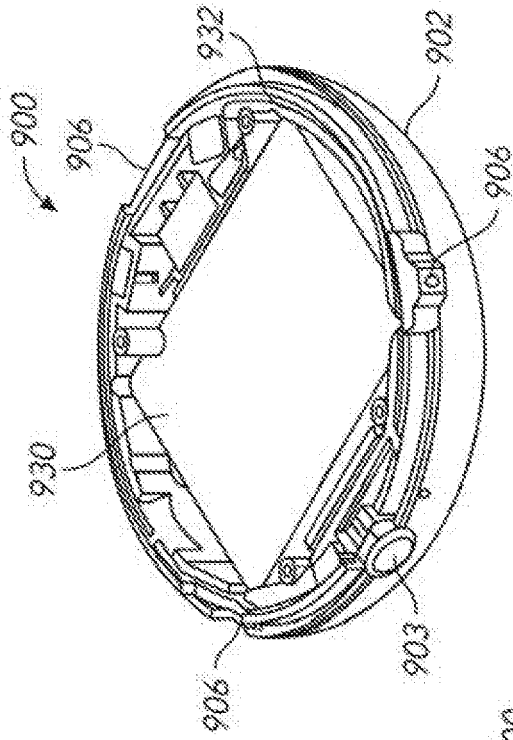


FIG. 2D

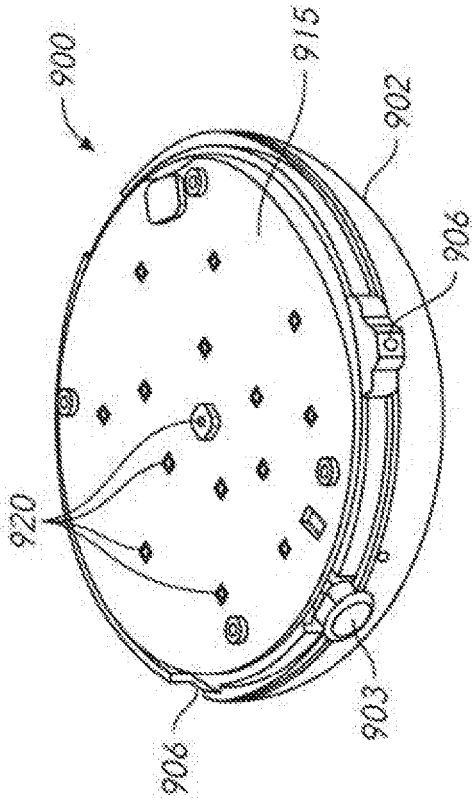


FIG. 2C

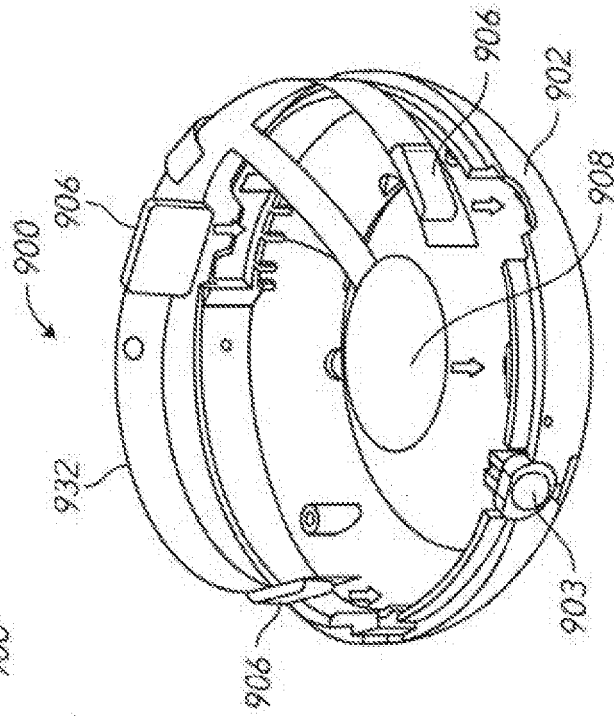


FIG. 2E

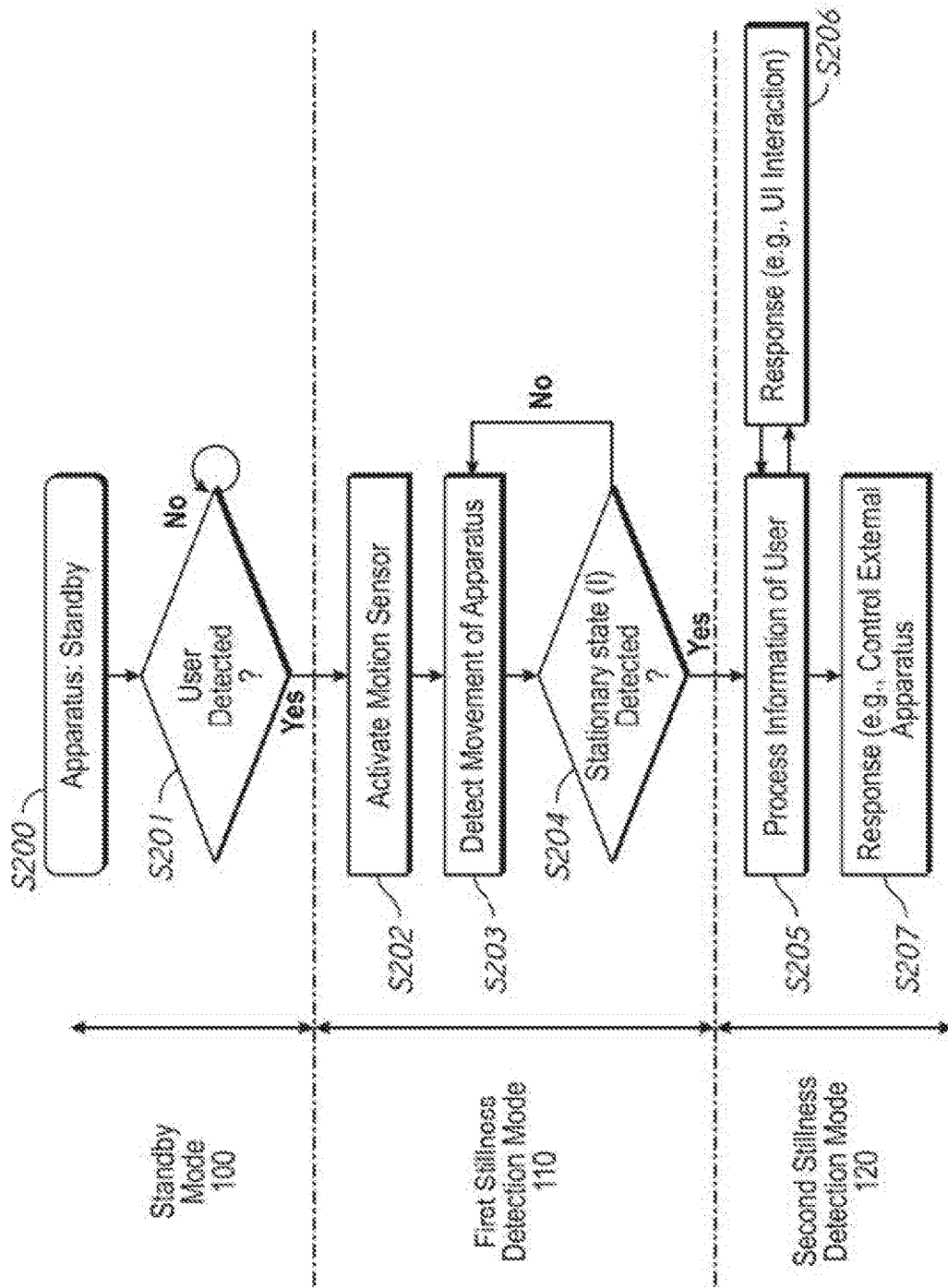


FIG. 3



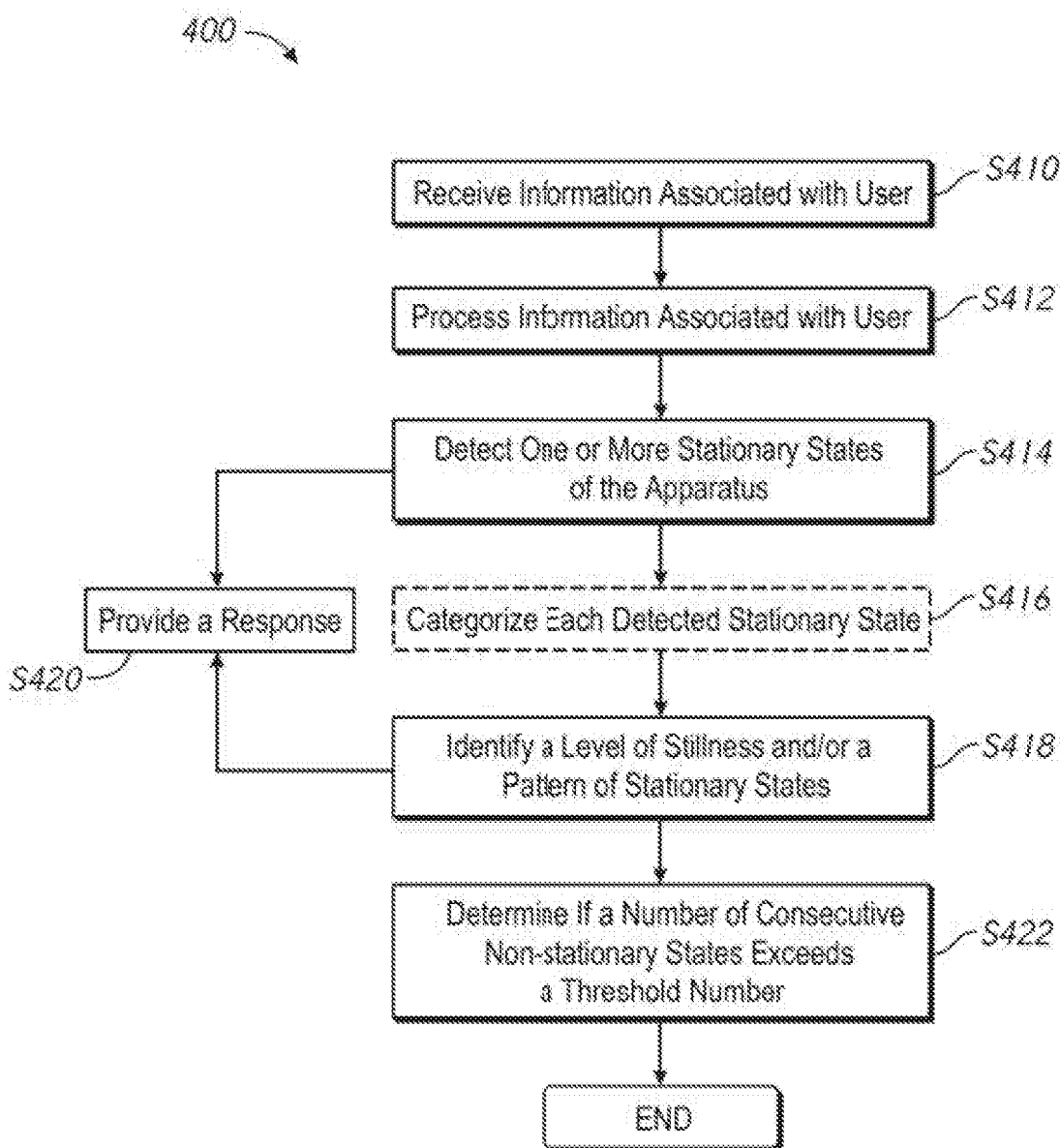


FIG. 4A

Cycle	1	2	3	4	5	6	7	8	9	10	Stillness Level
Sequence I	Rough	Calm	Still	Still	Calm	Calm	Still	Calm	Still	Still	High
Sequence II	Rough	Calm	Calm	Calm	Calm	Calm	Calm	Calm	Calm	Calm	Low

FIG. 4B

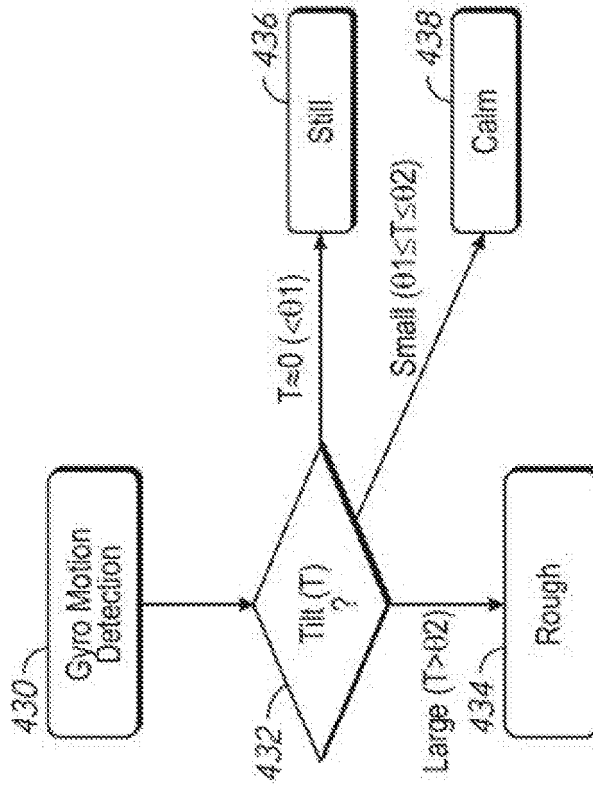


FIG. 4C

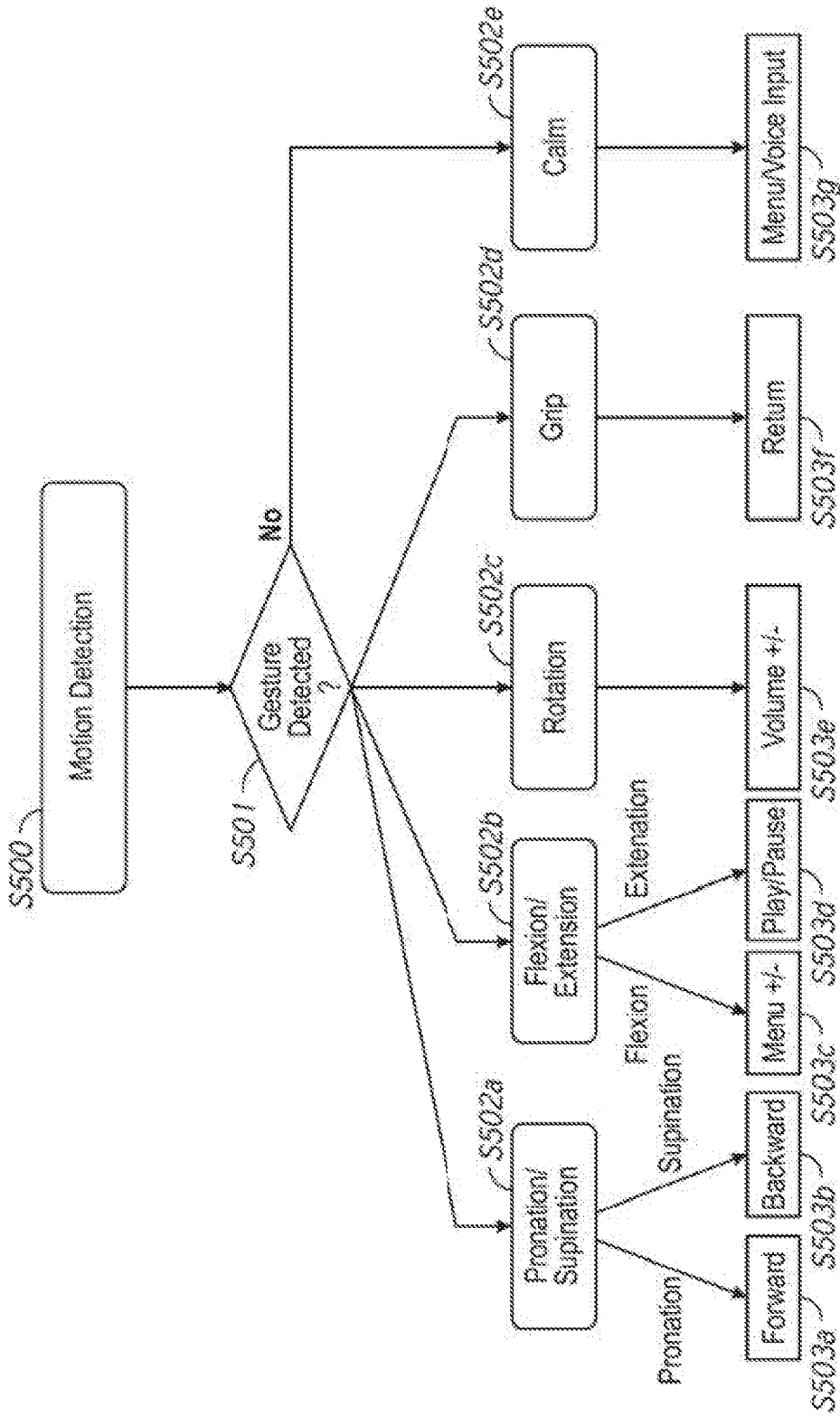


FIG. 5

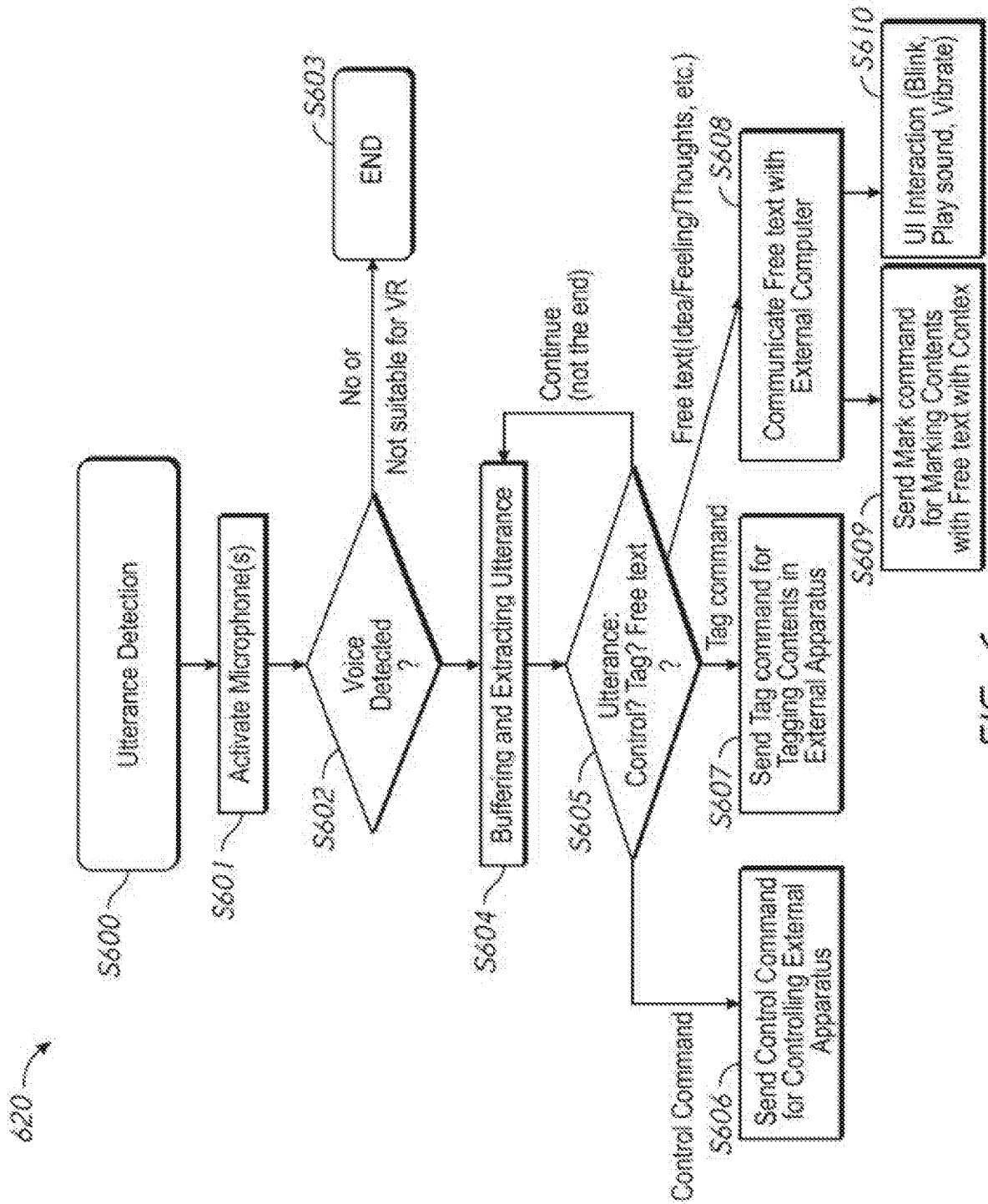


FIG. 6

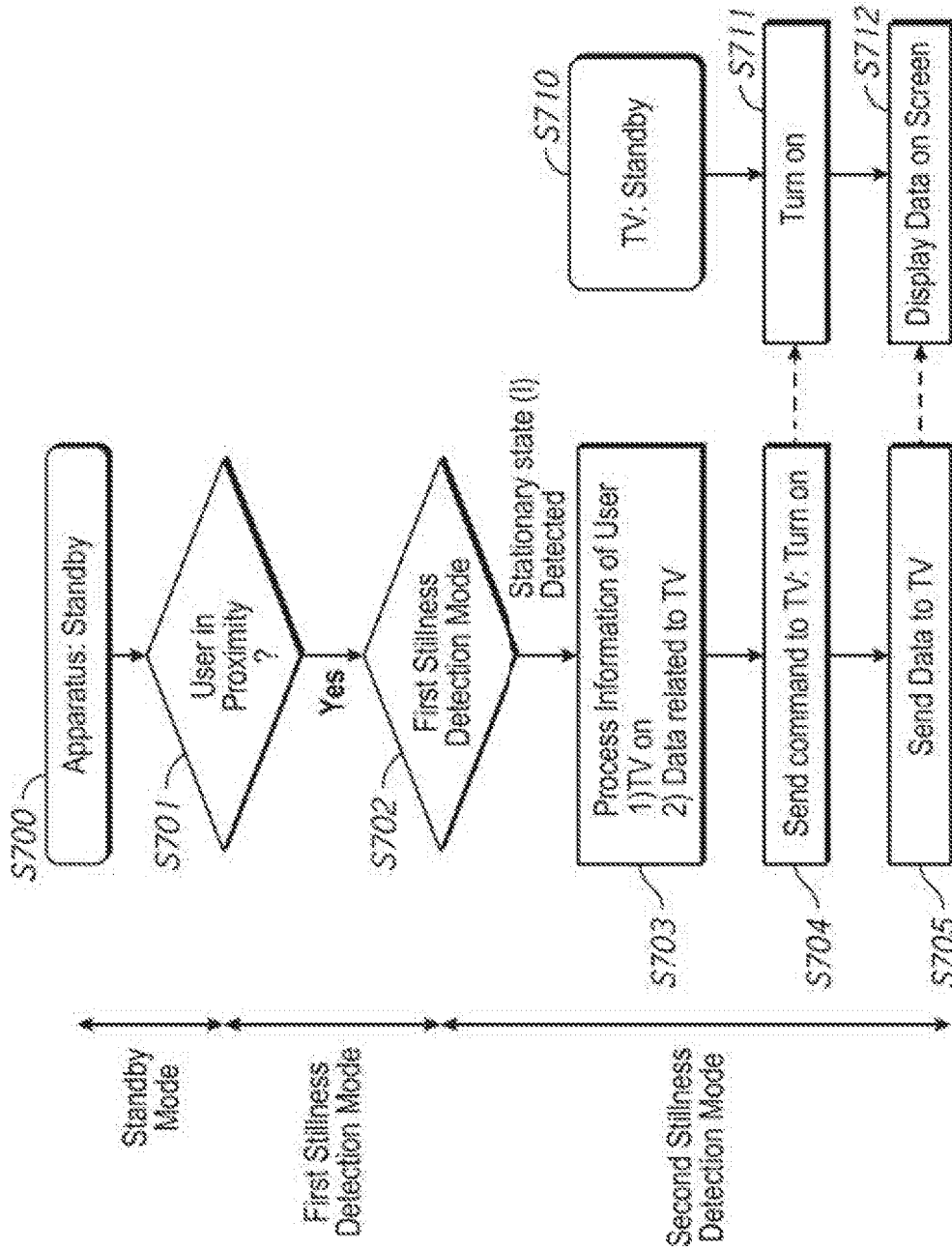


FIG. 7

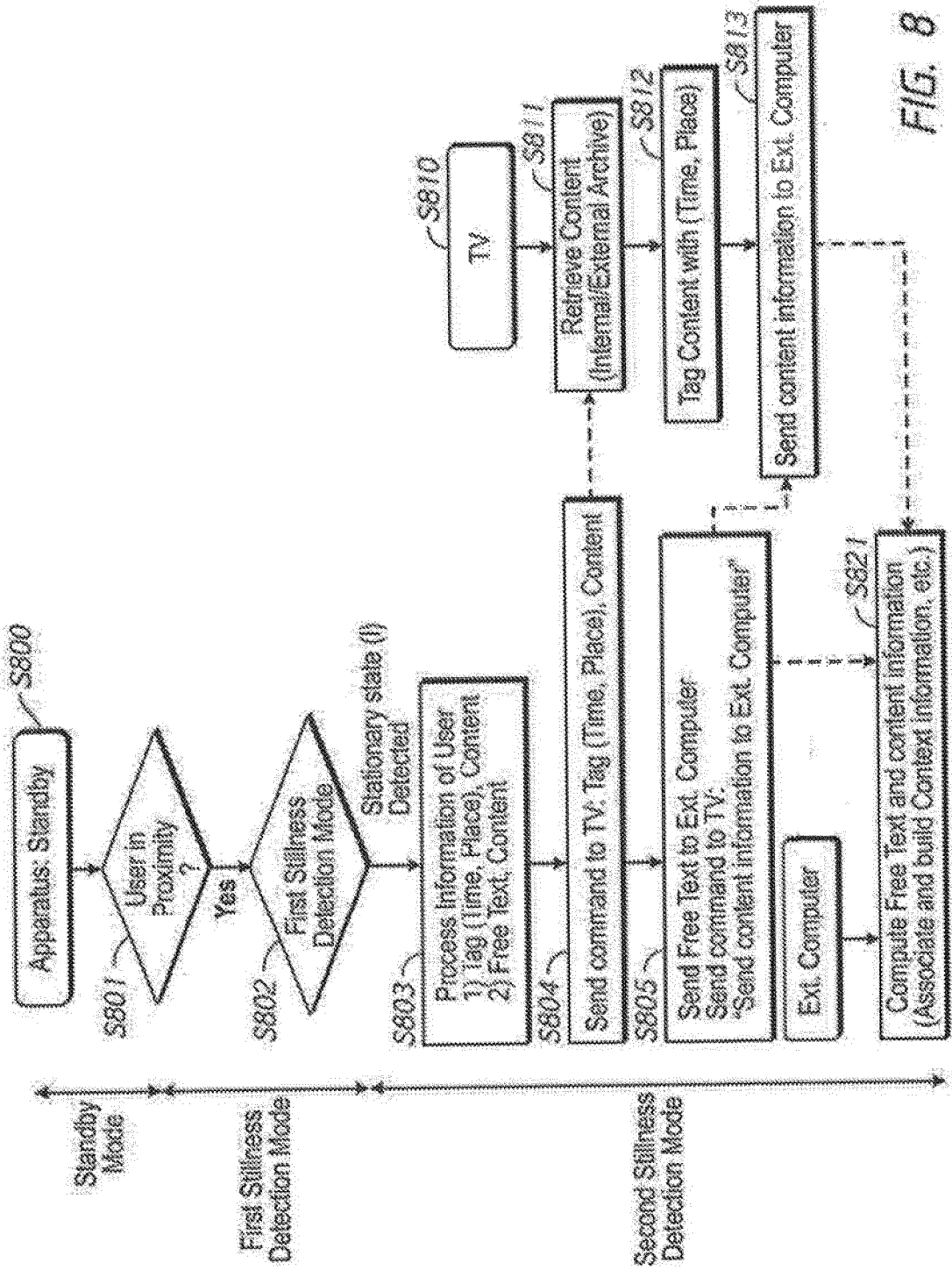


FIG. 8

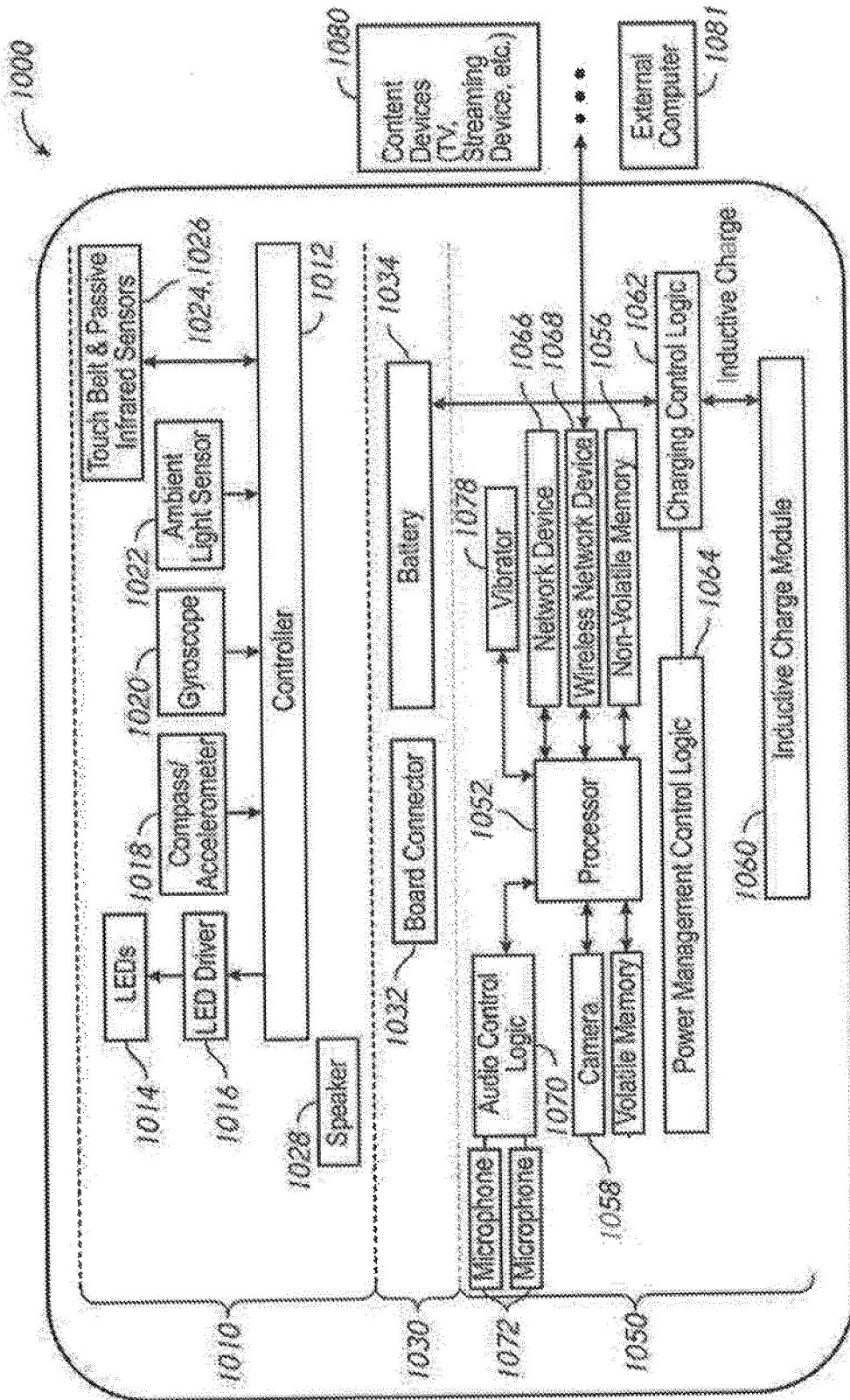


FIG. 9

**REFERENCES CITED IN THE DESCRIPTION**

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