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(54) SYSTEM AND METHOD FOR AN ALARM SYSTEM

(57) An alarm system (100), comprising: at least one motion sensor (102); at least one audio capture device (104), adapted to continuously record an audio signal; and at least one hardware processor (101), electrically connected to the at least one motion sensor and the at least one audio capture device, and adapted to: receive (301) a signal from the at least one motion sensor indicating detection of a moving object; receive (302) at least part of the audio signal from the at least one audio capture device; analyze (304) the at least part of the audio signal to determine a presence of at least one vehicle sound; identify (308) a correlation between the detection of a moving object and the determination of at least one vehicle sound presence; and decrease (309) sensitivity of at least one sensor of the alarm system for at least a predetermined period of time.

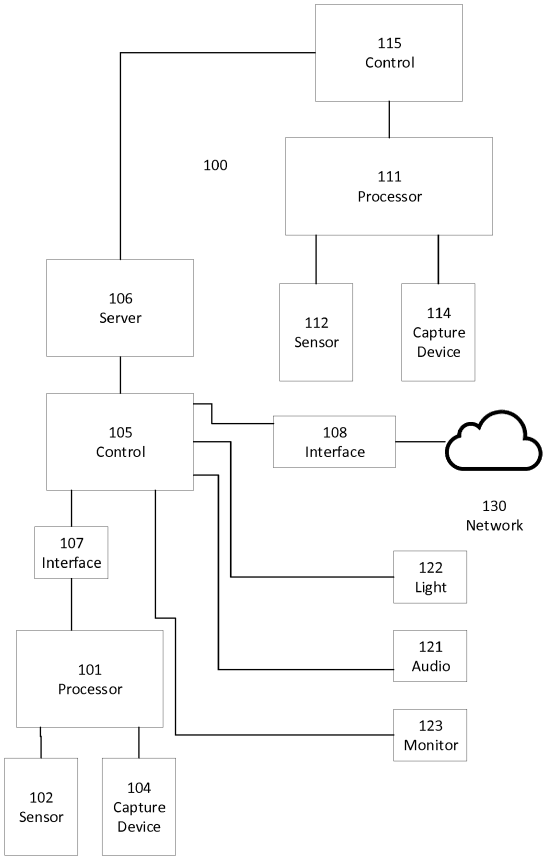

FIG. 1

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Description

BACKGROUND

[0001] The present invention, in some embodiments thereof, relates to monitoring premises, and more specifically, but not exclusively, monitoring premises such as a household, and detecting conditions for initiating communication with a remote server or receiver and alerting said remote server or receiver.

[0002] There exists the need for an alarm system that monitors presence(s) and/or action(s) of person(s) on premises and reacting to detected events. Examples of premises are a residence and an office. Examples of detected events are presence of a person, absence of a person, movement, absence of movement, opening of a door or a window, and closing of a door of a window.

[0003] An alarm system often comprises one or more sensors at various locations of the premises, configured to monitor one or more areas within or outside the premises, and a control component receiving one or more signals from the one or more sensors for the purpose of detecting an event and performing an action upon detecting the event. Examples of sensors are motion sensors, audio sensors and proximity sensors. A control component is also referred to as a control panel. Typically, a control component comprises a designated electrical hardware component such as a designated DSP microcontroller, or a processor running suitable software for processing the signals delivered by the sensor(s). Upon detecting an event, the control component may activate a device for producing an audio signal such as sounding an alarm, or a visual signal such as a flashing a light. Other examples of a reaction to detecting an event are sending a message to a designated person and sending a message to a server of the alarm system, for example for the purpose of recording the detected event or to trigger sending a person to the premises to help.

[0004] Two important factors of an alarm system are the system's detection rate, also referred to as hit ratio, and the system's false alarm rate. Detection rate relates to a ratio between an amount of events detected by the alarm system and an amount of hazardous situations that require attention from the designated person, for example a person attempting to intrude into a house. False alarm rate relates to a ratio between an amount of detected events of non-hazardous situations that do not require attention from the designated person, and an amount of all detected events.

[0005] Some sensors compare a value of an intercepted signal to a threshold value and detect an event subject to the value exceeding or being less than the threshold value. In such sensors, changing the sensor's threshold value changes the sensitivity of the sensor. In an alarm system, increasing a sensor's sensitivity may help increase the alarm system's detection rate, but may also increase the alarm system's false alarm rate, i.e., increasing a likelihood of the alarm system issuing an alert for a non-hazardous situation.

[0006] It may be the case that upon receiving a message, the designated person is required to go to the premises to check what caused the detected event. The designated person may not be continuously on the monitored premises and may go to the premises only upon receiving an alert, for example a home owner being at work during work hours. There is a need to reduce the alarm system's false alarm rate, to prevent unnecessary disturbances such as a loud alarm sound at night and unnecessary excursions to the premises. Such disturbances may be annoying to a degree that causes inhabitants of the premises or operators of the alarm system to avoid activating the alarm system, thus further exposing the premises to intrusions or other dangers.

SUMMARY

[0007] Aspects and embodiments of the present invention are set out in the appended claims. These and other aspects and embodiments of the invention are also described herein. It is an object of the present invention to provide a system and a method for reducing false alarms in an alarm system.

[0008] The foregoing and other objects are achieved by the features of the independent claims. Further implementation forms are apparent from the dependent claims, the description and the figures.

[0009] According to a first aspect of the invention, an alarm system comprises: at least one motion sensor; at least one audio capture device, adapted to continuously record an audio signal; and at least one hardware processor, electrically connected to the at least one motion sensor and the at least one audio capture device, and adapted to: receive a signal from the at least one motion sensor indicating detection of a moving object; receive at least part of the audio signal from the at least one audio capture device; analyze the at least part of the audio signal to determine a presence of at least one vehicle sound; identify a correlation between the detection of a moving object and the determination of at least one vehicle sound presence; and decrease sensitivity of at least one sensor of the alarm system for at least a predetermined period of time. Correlating an audio signature of a vehicle with a detection of motion facilitates reducing false alarms by avoiding an alarm due to a vehicle passing by monitored premises.

[0010] According to a second aspect of the invention, a method for an alarm system comprises: receiving from at least one sensor a first activity indication selected from a predefined set of activity indications; classifying the first activity indication as belonging to one of a predefined set of indication classes; and subject to classifying the activity as belonging to a first identified indication class: decreasing sensitivity of the at least one sensor for a first identified time period; receiving within the first identified time period from the at least one sensor a second activity indication selected from the predefined set of activity in-

dications; and delivering an output when the second activity indication is received. Decreasing a sensor's sensitivity increases probability that the second activity indication is of a problematic situation.

[0011] According to a third aspect of the invention, a security system comprises: at least one sensor; at least one capture device selected from a group consisting of: a camera, a thermal camera, an analog microphone, a digital microphone, a temperature sensor, a humidity sensor, a wind direction sensor and a wind speed sensor; and at least one hardware processor connected to the at least one sensor and the at least one capture device, adapted to: receive from the at least one capture device data comprising at least one environment parameter captured by the at least one capture device, the at least one environment parameter a member of a group consisting of: an image, an audio signal, a temperature value, a humidity value, a quantity of visible light, a wind direction value, and a wind speed value; compute a set of improved sensor operation parameters according to the data; and configure the at least one sensor with the set of improved sensor operation parameters. Automatically configuring operation parameters of an alarm system according to one or more environment parameters increases probability that the alarm system is tuned correctly to existing environment conditions, and increases probability that the alarm system detects only problematic events.

[0012] With reference to the first aspect, in a first possible implementation of the first aspect of the present invention the at least one hardware processor is further adapted to activate an alarm, subject to failing to identify said correlation.

[0013] With reference to the first aspect, or the first implementation of the first aspect, in a second possible implementation of the first aspect of the present invention activating the alarm comprises delivering an output after an identified period of time after receiving the signal. Waiting an identified period of time before activating the alarm may allow disarming the alarm, for example after lawful access to the monitored premises. Optionally, activating the alarm further comprises: receiving an instruction to disarm the alarm system; and delivering the output, subject to failing to receive the instruction within the identified amount of time after receiving the signal.

[0014] With reference to the first aspect, or the first or second implementations of the first aspect, in a third possible implementation of the first aspect of the present invention the system further comprises at least one control hardware processor associated with the at least one hardware processor. Delivering the output comprises delivering a notification to the at least one control hardware processor. Optionally, the at least one control hardware processor is electrically connected to the at least one hardware processor. Optionally, the system further comprises at least one data communication interface, electrically connected to the at least one hardware processor. Optionally, the at least one hardware processor delivers the notification to the at least one control hardware processor using the at least one data communication interface. Optionally, the at least one control hardware processor performs at least one alarm action upon receiving the notification. Optionally, the at least one alarm action is selected from a group of alarm actions consisting of: delivering an electrical current to an audio device capable of emitting an audio signal, delivering an electrical current to a visual device capable of emitting a visual signal, sending a message to at least one designated person, displaying a message on a monitor, and sending a message to a designated server associated with the at least one control hardware processor. Using another hardware processor to perform the alarm action may facilitate additional flexibility in design and implementation of the alarm system, optionally reducing costs by sharing a control hardware processor between a plurality of hardware processors.

[0015] With reference to the first aspect, in a fourth possible implementation of the first aspect of the present invention the at least one hardware processor comprises at least one audio classifier trained to identify vehicle sounds. Optionally, the at least one audio classifier is further adapted to determine whether the at least one vehicle sound is a sound of a stopping vehicle. Distinguishing between a moving vehicle and a stopping vehicle further facilitates avoiding a false alarm by activating an alarm when a stopping vehicle is detected.

[0016] With reference to the second aspect, in a first possible implementation of the second aspect of the present invention the predefined set of indication classes consists of: a class of relevant indications, a class of irrelevant indications, a class of probably relevant indications, and a class of probably irrelevant indications. The first identified indication class is a class of probably irrelevant indications. When an indication is classified as probably irrelevant, decreasing sensitivity may reduce probability of detecting a non-problematic occurrence.

[0017] With reference to the second aspect, in a second possible implementation of the second aspect of the present invention the method further comprises, subject to classifying the activity as belonging to a second identified indication class: increasing sensitivity of the at least one sensor for a second identified time period; receiving within the second identified time period from the at least one sensor the second activity indication selected from the predefined set of activity indications; and delivering an output when the second activity indication is received. Optionally, the second identified indication class is a class of probably relevant indications. When an indication is classified as probably relevant increasing sensitivity may increase probability of detecting a problematic occurrence.

[0018] With reference to the second aspect, in a third possible implementation of the second aspect of the present invention delivering the output comprises at least one of: sending a message to a designated server, sending a message to at least one designated person, delivering an electrical current to an audio device capable of

emitting an audio signal, delivering an electrical current to a visual device capable of emitting a visual signal, sending a message to at least one designated user, and displaying a message on a monitor.

[0019] With reference to the second aspect, in a fourth possible implementation of the second aspect of the present invention the at least one sensor is selected from a group consisting of: a volumetric air sensor, a Passive Infra-Red (PIR) sensor, a proximity switch, a mechanical switch, and an optical detector and a camera.

[0020] With reference to the second aspect, in a fifth possible implementation of the second aspect of the present invention the predefined set of activity indications consists of: indication of motion, indication of presence, indication of absence, indication of opening a door, indication of closing a door, indication of opening a window and indication of closing a window.

[0021] With reference to the second aspect, in a sixth possible implementation of the second aspect of the present invention the method further comprises: receiving an instruction to change sensitivity of the at least one sensor for a third identified time period; changing sensitivity of the alarm system for the third identified time period according to the instruction; receiving within the third identified time period from the at least one sensor a third activity indication selected from the predefined set of activity indications; and delivering an output when the third activity indication is received. Optionally, the instruction is received from at least one control hardware processor of the alarm system. Optionally, the instruction is received from a server of the alarm system. Receiving an instruction from a control hardware processor or a server may facilitate coordinating alarm system functionality between a plurality of premises.

[0022] With reference to the third aspect, in a first possible implementation of the third aspect of the present invention the set of improved sensor operation parameters comprises a threshold value of a sensor. Optionally, the set of improved sensor operation parameters comprises a sensor algorithm identifier. Optionally, the set of improved sensor operation parameters comprises a processor algorithm identifier.

[0023] With reference to the third aspect, in a second possible implementation of the third aspect of the present invention the system further comprises at least one control hardware processor, connected to the at least one hardware processor. The at least one hardware processor is further adapted to: send at least some of the data to the at least one control hardware processor; receive from the at least one control hardware processor at least one instruction to configure the at least one sensor; and configure the at least one sensor according to the at least one instruction. Distributing computation of the set of improved operation parameters between more than one hardware processor may facilitate additional flexibility in system design and implementation and may reduce costs by sharing computation between a plurality of monitored premises. Optionally, the system further comprises at least one data communication interface, electrically connected to the at least one hardware processor. The at least one hardware processor is optionally connected to the at least one control hardware processor via the at least one data communication interface. Using a data communication interface to connect between the at least one hardware processor and the at least one control hardware processor may facilitate installing the at least one control hardware processor at a location different from a location where the at least one hardware processor is installed.

[0024] With reference to the third aspect, in a third possible implementation of the third aspect of the present invention the data comprises a wind speed value. The at least one hardware processor compares the wind speed value to an identified wind speed threshold value; and the at least one hardware processor computes the set of improved sensor operation parameters subject to an outcome of the comparison. Some wind conditions may require a change in sensitivity, for example to avoid detecting arbitrary objects blown by a strong wind.

[0025] With reference to the third aspect, in a fourth possible implementation of the third aspect of the present invention data further comprises at least one activity indication, said at least one activity indication comprising at least one of a group consisting of: an amplitude of an intercepted signal, a frequency of an intercepted signal, a distance value of a moving object, a direction value of a moving object, a velocity of a moving object, an opening of a door, a closing of a door, an opening of a window, and a closing of a window. A system may have different improved operation conditions according to an activity indication.

[0026] Other systems, methods, features, and advantages of the present disclosure will be or become apparent to one with skill in the art upon examination of the following drawings and detailed description. It is intended that all such additional systems, methods, features, and advantages be included within this description, be within the scope of the present disclosure, and be protected by the accompanying claims.

[0027] The invention also provides a computer program or a computer program product for carrying out any of the methods described herein, and/or for embodying any of the apparatus features described herein, and a computer readable medium having stored thereon a program for carrying out any of the methods described herein and/or for embodying any of the apparatus features described herein.

[0028] The invention also provides a signal embodying a computer program or a computer program product for carrying out any of the methods described herein, and/or for embodying any of the apparatus features described herein, a method of transmitting such a signal, and a computer product having an operating system which supports a computer program for carrying out the methods described herein and/or for embodying any of the apparatus features described herein.

[0029] Any feature in one aspect of the invention may be applied to other aspects of the invention, in any appropriate combination. In particular, method aspects may be applied to apparatus aspects, and vice versa. As used herein, means plus function features may be expressed alternatively in terms of their corresponding structure, such as a suitably programmed processor and associated memory.

[0030] Furthermore, features implanted in hardware may generally be implemented in software, and vice versa. Any reference to software and hardware features herein should be construed accordingly.

[0031] Unless otherwise defined, all technical and/or scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which the invention pertains. Although methods and materials similar or equivalent to those described herein can be used in the practice or testing of embodiments of the invention, exemplary methods and/or materials are described below. In case of conflict, the patent specification, including definitions, will control. In addition, the materials, methods, and examples are illustrative only and are not intended to be necessarily limiting.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0032] Some embodiments of the invention are herein described, by way of example only, with reference to the accompanying drawings. With specific reference now to the drawings in detail, it is stressed that the particulars shown are by way of example and for purposes of illustrative discussion of embodiments of the invention. In this regard, the description taken with the drawings makes apparent to those skilled in the art how embodiments of the invention may be practiced.

[0033] In the drawings:

FIG. 1 is a schematic block diagram of an exemplary system, according to some embodiments of the present invention;

FIG. 2 is a schematic illustration of an exemplary alarm installation, according to some embodiments of the present invention;

FIG. 3 is a flowchart schematically representing an optional flow of operations for reducing false alarms using audio recordings, according to some embodiments of the present invention;

FIG. 4 is a flowchart schematically representing an optional flow of operations for reducing false alarms by changing a sensor's sensitivity, according to some embodiments of the present invention; and

FIG. 5 is a flowchart schematically representing another optional flow of operations for reducing false alarms by changing a sensor's sensitivity, according to some embodiments of the present invention.

DETAILED DESCRIPTION

[0034] A possible way to reduce an alarm system's false alarm rate is to adjust the operating parameters of the alarm system, for example threshold values of one or more of the alarm system's sensors, such that the one or more sensors are less sensitive. However, reducing the sensitivity of one or more or alarm system's sensors increases a likelihood of the one or more sensors missing a hazardous or problematic situation.

[0035] The present invention, in some embodiments therein, proposes several methods for reducing an alarm system's false alarm rate without impacting the alarm system's detection rate.

[0036] As used therein, the term "premises" means "monitored premises" and the terms are used interchangeably.

[0037] A motion sensor installed externally to a house near a road or a track is prone to detecting movement of a vehicle passing by the premises, for example a car, a truck or a train. The motion sensor may not be able to differentiate between motion of a person and motion of a vehicle. Such movement is typically not suspicious, unless the vehicle stops near the premises. In some embodiments of the present invention, an alarm system uses a correlation between detection of a vehicle signature and a detection of movement near the premises to identify a false alarm. Upon a sensor detecting motion near the premises, the control component may analyze an audio signal capturing sound from before, during, and after detecting the motion to identify a vehicle signature, for example a sound of a vehicle. The audio signal may be captured by an audio capture device, for example a microphone. The detected motion may have a time of detection. When a moving vehicle is detected at a time significantly identical to a motion time of detection, in some embodiments of the present invention the control component determines that the detected movement is of the vehicle and does not output an alert. Alternately, when a stopping vehicle is detected within a predefined period after the motion time of detection, the control component optionally determines that the detected movement is suspicious, and optionally outputs an alert. Alternately, when no vehicle is detected within another predefined period of time before and after the motion detection time, the control component optionally determines the detected movement is suspicious and optionally outputs an alert. Correlating a detection of motion by a sensor with detection of a vehicle in an audio signal captured near the sensor allows for eliminating alarm signals when a moving vehicle caused the motion detection, thus reducing the false alarm rate.

[0038] In some embodiments of the present invention, a sensitivity of one or more of an alarm system's sensors is changed temporarily, to reduce the alarm system's false alarm rate and/or increase the alarm system's detection rate. In embodiments where a motion sensor's sensing range covers an area accessible to a vehicle, a

person or a pet, the motion sensor may detect a non-threatening motion, for example a person walking by the premises, a passing vehicle in a street by the premises or a stray animal passing by the premises. Outputting an alarm signal in these situations is undesirable. The present invention, in some embodiments thereof, after a motion detection event, sensitivity of at least one sensor is reduced for an identified time period, for example by increasing a threshold value of the sensor or a control component. When within the identified amount of time another motion event is detected, the control component optionally determines that the detected movement is suspicious and optionally outputs an alarm signal. Detecting an additional movement by a less sensitive sensor increases likelihood of the movement being suspicious. Reducing sensitivity only for a predefined time period allows the alarm system to operate mostly at a higher sensitivity level, thus reducing risk of missing a hazardous or problematic situation.

[0039] Alternately or additionally, in some embodiments of the present invention the control component receives input from an external source, for example a central control server or another alarm system. Optionally, the input from the external source comprises information about a suspicious event or an instruction to increase a sensor's sensitivity. For example, for a plurality of alarm systems, each installed in one of a plurality of neighboring homes, it may be desired to increase sensitivity of one or more sensors in each of the plurality of alarm systems after at least one suspicious event was identified in at least one of the neighboring homes, to reduce risk of missing a hazardous or problematic situation in other of the neighboring homes. A central control server optionally instructs a control component of an alarm system to increase sensitivity of at least one sensor for another identified time period. In some embodiments, another of the plurality of alarm systems notifies the control component of the alarm system of a suspicious event, following which the control component increases sensitivity of at least one sensor of the alarm system. Reverting sensitivity level of the at least one sensor after the other identified time period allows the alarm system to operate mostly at a lower sensitivity level, reducing risk of false alarms.

[0040] Environment parameters such as ambient temperature, humidity, wind direction and wind speed impact false alarm rates. In addition, changes in an environment of a sensor impact a rate of false alarms triggered by the sensor. A signal produced by a motion sensor when detecting motion of an object has a frequency and amplitude influenced, among other influencing factors, by a height, a width, a weight and a velocity of the object. A strong wind may cause vigorous movement of leaves of a tree such that a signal detected by the movement of the leaves has a frequency and an amplitude within a range of frequencies or a range of amplitudes characteristic of human motion. For example, in strong wind a motion sensor detecting movement of leaves may produce a signal having a frequency in the range of 4-6 Megahertz and an amplitude of less than 1.5 millivolts. When the tree is close enough to a motion sensor to be within the motion sensor's detection range, the motion sensor may mistake the leaves' movement in a strong wind for human motion. In such a situation, to avoid a false alarm, it may be advisable to reduce sensitivity of the motion sensor when the weather is windy. When weather changes and wind speed decreases, it may be advisable to restore higher sensitivity of the motion sensor, as the likelihood of a false alarm is decreased.

[0041] In another example, there may be a tree in the vicinity of a motion sensor installed outdoors. When the tree is young its branches and leaves may not be within the motion sensor's detection range, however over time the tree may grow and some of its branches and leaves may grow into the motion sensor's detection range. In addition, an amount of leaves on the tree may increase as the tree matures, increasing the likelihood that a motion sensor detects movement of the leaves. In such a situation it may be advisable to identify an increase in an amount of leaves in the motion sensor's detection range, and decrease the motion sensor's sensitivity, to reduce likelihood of a false alarm. A possible way to identify an increase in the amount of leaves in the motion sensor's range is by analyzing one or more images of the vicinity of the motion sensor, captured by one or more cameras.

[0042] In another example, a sensor's sensitivity may be impacted by ambient temperature or humidity. For example, a person moving in front of a wall in warm weather will create a smaller change in an amplitude of signal generated by a passive infra-red (PIR) motion sensor than the person moving in front of the wall in cold weather, due to the wall having a higher temperature in warm weather than in cold weather, thus in warm weather the PIR sensor detects a smaller difference between the person's temperature and the wall's temperature than in cold weather. Adjusting the PIR sensor's threshold to warm weather conditions may produce more false alarms in cold weather, where smaller, non-human, objects may be detected. To avoid this, in some embodiments of the present invention, sensitivity of a PIR motion sensor may be changed according to an ambient temperature measured by a temperature sensor.

[0043] The present invention, in some embodiments thereof, suggests computing according to data comprising one or more environment parameters an improved set of sensor or control component operation parameters and configuring at least one sensor of the alarm system with the improved set of sensor operation parameters. The one or more environment parameters optionally comprise a temperature value, a humidity value, an image, an audio signal, a wind direction value and a wind speed value. The one or more environment parameters are optionally captured by a capture device such as a camera, a microphone, and an ambient sensor. Dynamically adapting sensor operating parameters according to one or more environment parameters captured at a

certain time allows a continuous improved balance between the need to increase the alarm system's detection rate and the need to reduce the alarm system's false alarm rate.

[0044] Before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not necessarily limited in its application to the details of construction and the arrangement of the components and/or methods set forth in the following description and/or illustrated in the drawings and/or the Examples. The invention is capable of other embodiments or of being practiced or carried out in various ways.

[0045] The present invention may be a system, a method, and/or a computer program product. The computer program product may include a computer readable storage medium (or media) having computer readable program instructions thereon for causing a processor to carry out aspects of the present invention.

[0046] The computer readable storage medium can be a tangible device that can retain and store instructions for use by an instruction execution device. The computer readable storage medium may be, for example, but is not limited to, an electronic storage device, a magnetic storage device, an optical storage device, an electromagnetic storage device, a semiconductor storage device, or any suitable combination of the foregoing.

[0047] Computer readable program instructions described herein can be downloaded to respective computing/processing devices from a computer readable storage medium or to an external computer or external storage device via a network, for example, the Internet, a local area network, a wide area network and/or a wireless network.

[0048] The computer readable program instructions may execute entirely on the user's computer, partly on the user's computer, as a stand-alone software package, partly on the user's computer and partly on a remote computer or entirely on the remote computer or server. In the latter scenario, the remote computer may be connected to the user's computer through any type of network, including a local area network (LAN) or a wide area network (WAN), or the connection may be made to an external computer (for example, through the Internet using an Internet Service Provider). In some embodiments, electronic circuitry including, for example, programmable logic circuitry, field-programmable gate arrays (FPGA), or programmable logic arrays (PLA) may execute the computer readable program instructions by utilizing state information of the computer readable program instructions to personalize the electronic circuitry, in order to perform aspects of the present invention.

[0049] Aspects of the present invention are described herein with reference to flowchart illustrations and/or block diagrams of methods, apparatus (systems), and computer program products according to embodiments of the invention. It will be understood that each block of the flowchart illustrations and/or block diagrams, and combinations of blocks in the flowchart illustrations and/or block diagrams, can be implemented by computer readable program instructions.

[0050] The flowchart and block diagrams in the Figures illustrate the architecture, functionality, and operation of possible implementations of systems, methods, and computer program products according to various embodiments of the present invention. In this regard, each block in the flowchart or block diagrams may represent a module, segment, or portion of instructions, which comprises one or more executable instructions for implementing the specified logical function(s). In some alternative implementations, the functions noted in the block may occur out of the order noted in the figures. For example, two blocks shown in succession may, in fact, be executed substantially concurrently, or the blocks may sometimes be executed in the reverse order, depending upon the functionality involved. It will also be noted that each block of the block diagrams and/or flowchart illustration, and combinations of blocks in the block diagrams and/or flowchart illustration, can be implemented by special purpose hardware-based systems that perform the specified functions or acts or carry out combinations of special purpose hardware and computer instructions.

[0051] Reference is now made to FIG. 1, showing a schematic block diagram of an exemplary alarm system 100, according to some embodiments of the present invention. In such embodiments, at least one sensor 102 is installed at monitored premises and is connected to at least one hardware processor 101. Optionally, the at least one hardware processor comprises at least one audio classifier, trained to identify vehicle sounds. Optionally, the at least one audio classifier is further adapted to determine whether a vehicle sound is the sound of a stopping vehicle. Optionally, the least one hardware processor 101 and at least one sensor 102 are installed in a shared housing. At least one sensor 102 may be a volumetric air sensor. Optionally, at least one sensor 102 is a motion detection sensor, for example a passive infrared (PIR) sensor. Optionally, at least one sensor 102 is a proximity switch or a mechanical switch. Optionally, at least one sensor 102 is an optical detector or a camera. Optionally, at least one sensor 102 is electrically connected to at least one hardware processor 101. Alternately, at least one sensor 102 is optionally connected to at least one hardware processor 101 using a data communication network, for example a Local Area Network (LAN) or a Wide Area Network (WAN). For brevity, the term "network" is used henceforth to mean a data communication network. The network may be a wired network, for example an Ethernet network. Optionally, the network is a wireless network, for example a Wireless Fidelity (WiFi) network or a cellular network such as a Global System for Mobile (GSM) network. Optionally, the network uses an Internet Protocol (IP) based network protocol such as User Datagram Protocol (UDP) or Transmission Control Protocol (TCP).

[0052] In some embodiments, at least one hardware processor 101 is connected to at least one capture device

104 installed at monitored premises. A capture device may be used to capture specifically, but not limited to, ambient climate parameters of part of the monitored premises, such as temperature and wind speed, ambient noise, or an image of part of the monitored premises. Examples of a capture device are a camera, a thermal camera, an analog microphone, a digital microphone, a temperature sensor, a humidity sensor, a wind direction sensor and a wind speed sensor. Optionally, at least one capture device 104 is electrically connected to at least one hardware processor 101. Alternately, at least one capture device 104 is connected to at least one hardware processor 101 using a network, for example a Local Area Network (LAN) or a Wide Area Network (WAN). The network may be a wired network, for example an Ethernet network. Optionally, the network is a wireless network, for example a Wireless Fidelity (WiFi) network or a cellular network such as a Global System for Mobile (GSM) network. Optionally, the network uses an Internet Protocol (IP) based networking protocol such as User Datagram Protocol (UDP) or Transmission Control Protocol (TCP).

[0053] In some embodiments, at least one hardware processor 101 is connected to at least one control hardware processor 105. For brevity, the term "control panel" is used to mean at least one control hardware processor. Optionally, the control panel is installed remote to the monitored premises. Optionally, at least one hardware processor 101 is electrically connected to a data communication network interface 107 for the purpose of communicating with control panel 105 via a second data communication network. Optionally, the second network is a LAN or a WAN. The second network may be a wired network, for example an Ethernet network. Optionally, the second network is a wireless network, for example a WiFi network or a cellular network such as a GSM network. Optionally, the second network uses an IP based networking protocol such as UDP or TCP. Optionally, control panel 105 is installed on the same premises as at least one hardware processor 101. Alternately, control panel 105 is installed at a location remote to the monitored premises.

[0054] Alternately, at least one hardware processor 101 is optionally electrically connected (not shown) to at least one control hardware processor 105.

[0055] In some embodiments, control panel 105 is connected to at least one server 106, for the purpose of recording events, managing the alarm system, activating one or more visual devices 122, one or more audio devices 121 or monitor 123 detailed below, and coordinating between a plurality of control panels. Optionally, the server is at least one server hardware processor. The control panel is optionally connected to the server over a third data communication network, which may be wired or wireless, for example an Ethernet network, a WiFi network and a GSM network. Optionally, the third network uses an IP based networking protocol such as UDP or TCP.

[0056] In some embodiments, control panel 105 is connected to a second data communication interface 108 for the purpose of communicating with a designated user using a fourth network 130. Optionally, the fourth network is a voice communication network such as a public switched telephone network (PSTN), a cellular network such as GSM or an IP based voice communication network. Optionally, the fourth network allows sending digital data messages to the designated user.

[0057] Any two or three or four of the networks can be the same network.

[0058] In some embodiments, a sequence of operations of the system comprises the at least one hardware processor receiving one or more signals from the at least one sensor and sending either the one or more signals or an analysis of the one or more signals to the control panel, and the control panel activating an alarm upon detecting a problematic event in the one or more received signals or the analysis. Examples of activating an alarm are triggering an audio signal, triggering a visual signal, sending a message to a designated user and displaying a message on a monitor.

[0059] Optionally, control panel 105 is electrically connected to one or more audio devices 121 capable of producing an audio signal, for example a buzzer. When a problematic event occurs, the control panel may deliver an electrical current to the one or more audio devices for the purpose of producing a sound to draw the attention of a person designated to monitor the one or more audio devices.

[0060] Optionally, control panel 105 is electrically connected to one or more visual devices 122 capable of producing a visual signal, for example a flashing light. When a problematic event occurs, the control panel may deliver an electrical current to the one or more visual devices for the purpose of producing a visual signal to draw the attention of a person designated to monitor the one or more visual devices.

[0061] Optionally, control panel 105 is electrically connected to one or more monitors 123, for example a computer monitor or a television screen. When a problematic event occurs, the control panel may deliver a message current to the one or more monitors for the purpose of producing a display of the message on the one or more monitors, to draw the attention of a person designated to monitor the one or more monitors.

[0062] Optionally, the one or more audio device or the one or more visual device or both are electrically connected to the at least one hardware processor.

[0063] Optionally, a second control panel 115 is connected to server 106. The second control panel may be connected to at least one other hardware processor 111, connected to at least one other sensor 112 installed at a second monitored premises. Optionally, another at least one capture device 114 is installed at the second monitored premises and connected to at least one other hardware processor 111. In some embodiments of the present invention server 106 sends one or more mes-

sages to control panel 105, following data received from second control panel 115.

[0064] In some embodiments of the present invention a sensor is installed outside a building, near a road used by vehicles. Reference is now also made to FIG. 2, showing a schematic illustration of an exemplary alarm installation, according to some embodiments of the present invention. In such embodiments, sensor 204 is mounted on an outside wall of building 200. Building 200 is located sufficiently close to road 212 such that a vehicle 208 driving on the road is intercepted by sensor 204. For example, when sensor 204 is a PIR sensor, sensor 204 may intercept heat from car 208 as it drives by building 200.

[0065] Optionally, sensor 204 is an audio sensor. When sensor 204 is an audio sensor, sensor 204 may intercept a sound of car 208. Sensor 204 may be adapted to identify a sound of a driving car or a stopping car. Alternately, sensor 204 may be connected to an audio classifier adapted to identify a sound of a driving car or a stopping car, as detailed below. A car driving by a building is usually not a hazardous situation. However, a car stopping near the building might be hazardous. For example, building 200 may be an office building. A car stopping by the building at an hour of the night when the offices are closed may be considered problematic, and require attention from a designated security officer or a manager of the building. Thus, detecting a car driving by may be suspicious until ascertaining the car has not stopped.

[0066] In some embodiments of the present invention, the alarm system implements a plurality of operation states, where upon detecting a suspicious event the system transitions from operating at a normal level of operation to operating at a higher warning level. At such a higher warning level the system may wait an identified time period after detecting the suspicious event before activating the alarm. During the identified time period the alarm system may be disarmed (that is, completely disabled) or returned to operate at a normal level of operation, thus preventing a false alarm detection. For example, an alarm system may detect an intrusion into a monitored premises, for example by detecting motion in a room or the opening of a door. During the identified time period a person may input a numerical code and upon receiving the numerical code the control panel may instruct disabling the alarm system.

[0067] In some embodiments of the present invention, the alarm system implements the following optional method for detecting a false alarm using audio recordings.

[0068] Reference is now also made to FIG. 3, showing a flowchart schematically representing an optional flow of operations 300 for reducing false alarms using audio recordings, according to some embodiments of the present invention. In such embodiments, at least one of the at least one sensors is a motion sensor and at least one of the capture devices is an audio capture device, adapted to continuously record an audio signal. In such embodiments, the at least one hardware processor comprises at least one audio classifier trained to identify vehicle sounds. Optionally, the at least one audio classifier is trained with examples of vehicle sounds. Optionally, the at least one hardware processor identifies motion in 301 by receiving a signal from the at least one motion sensor indicating detection of a moving object. In 302, the at least one hardware processor optionally receives from the at least one audio capture device captured data comprising at least part of the captured audio signal. Optionally, the captured data comprises audio captured at a predefined audio capture time immediately before and immediately after the detection of a moving object. Next, in 304 the at least one hardware processor optionally analyzes the captured data to determine a presence of at least one vehicle sound. It will be appreciated that the captured data may be analyzed by a plurality of hardware processors of the at least one hardware processor using at least one distributed audio processing method. Optionally, analyzing the captured data comprises preprocessing. Analyzing the captured data may produce a classification of a sound as a vehicle sound. The classification may have a certainty degree value, and determining a presence of at least one vehicle sound may be subject to the certainty degree value exceeding a predefined certainty threshold value.

[0069] The at least one hardware processor optionally determines in 308 a correlation between the detection of the moving object and the presence of at least one vehicle sound. For example, the at least one hardware processor may determine the presence of the at least one vehicle sound occurred significantly simultaneously with the detection of the moving object, for example at a time less than 20 seconds before and less than 25 seconds after the detection of the moving object. Optionally, the at least one hardware processor sends the control panel information comprising the captured data and an indication of detection of motion and the control panel analyzes the information to determine whether the captured data is associated with a vehicle. Alternatively, the information optionally comprises an indication of detection of motion and characteristics of the captured data, for example a Fast Fourier Transform of the captured data. When no correlation is found, in 312 the at least one hardware processor optionally activates an alarm by transitioning to a higher warning operation level. Activating the alarm optionally comprises delivering an output to the control panel, for example delivering a notification to the control panel, optionally via the data communication interface. Optionally, activating the alarm comprises performing an alarm action, for example delivering an output to an audio device electrically connected to the at least one hardware processor, and additionally or alternatively to a visual device electrically connected to the at least one hardware processor. Optionally, the at least one hardware processor performs an alarm action or delivers a notification to the control panel immediately upon determining no correlation.

[0070] In some embodiments, the at least one hardware processor performs an alarm action or delivers a notification to the control panel after an identified period of time after receiving the signal indicating detection of motion. During the identified period of time, the at least one hardware processor may receive an instruction to disarm the alarm system, for example by a person inputting a disarm code. In such embodiments, the at least one hardware processor performs an alarm action or delivers a notification to the control panel subject to not receiving an instruction to disarm the alarm system.

[0071] When a correlation is determined, the at least one hardware processor optionally temporarily decreases in 309 the sensitivity of the motion sensor, to prevent additional indications until the vehicle is assumed to be out of the motion sensor's range, for example for 10 seconds.

[0072] In some embodiments of the present invention, the audio classifier may be further adapted to determine whether a vehicle sound is a sound of a stopping vehicle. Optionally, the audio classifier is further adapted to determine other classes of vehicle sounds, for example a vehicle advancing towards the audio capture device or a vehicle retracting from the audio capture device. In embodiments where the audio classifier is adapted to determine whether a vehicle sound is a sound of a stopping vehicle, in 316 the at least one processor determines whether the at least one vehicle sound is a sound of a stopping vehicle, and transitions in 320 to a higher warning level upon determination of a stopping vehicle. Otherwise, when no stopping vehicle is determined, the at least one hardware processor may resume normal operation of the alarm system in 324.

[0073] Similarly, identifying a retracting vehicle sound may prevent transitioning to a higher warning level, whereas after identifying an advancing vehicle additional processing may be performed.

[0074] In embodiments where the at least one hardware processor delivers a notification to the control panel, upon receiving the notification the control panel may perform at least one alarm action. The at least one alarm action may be delivering an output to an audio device electrically connected to the control panel, and additionally or alternatively to a visual device electrically connected to the control panel. Optionally, the control panel displays a message on a monitor upon receiving the notification. Optionally, the control panel sends a management message to the server, for example for the purpose of recording the correlation. Optionally, the control panel sends a message to a designated user using the second data communication network interface.

[0075] It may be the case that a motion sensor detects a non-threatening motion, for example a person walking by the premises, a passing vehicle in a street by the premises or a stray animal passing by the premises. To differentiate a non-threatening motion and a threatening motion by changing sensitivity of at least one sensor, the alarm system may implement the following optional method.

[0076] Reference is now also made to FIG. 4, showing a flowchart schematically representing an optional flow of operations 400 for reducing false alarms by changing a sensor's sensitivity, according to some embodiments of the present invention. In such embodiments, the at least one hardware processor or the control panel receive in 401 from at least one sensor a first activity indication. For brevity, the term hardware processor is used to mean the at least one hardware processor or the control panel. An activity indication may be an indication of a detection of motion, for example by a PIR motion sensor. Examples of an indication of motion are an amplitude of an intercepted signal, a frequency of an intercepted signal, a distance value of a moving object, a direction value of a moving object and a velocity value of a moving object. Optionally, an activity indication is an indication of a presence of an object or of an absence of an object, for example by a volumetric air sensor, detection in an image captured by a camera or detection of activity in a captured audio signal. Optionally, an activity indication is an indication of an interruption in a switch, such as an opening of a door, an opening of a window, a closing of a door and a closing of a window. Upon reception of the first activity indication, the hardware processor optionally classifies in 404 the first activity indication as belonging to a one of a predefined set of indication classes. For example, the set optionally comprises: a class of relevant indications, a class of irrelevant indication, a class of probably relevant indications and a class of probably irrelevant indications.

[0077] Optionally, after classifying the first activity indication as belonging to an identified indication class, in 416 the hardware processor decreases sensitivity of at least one of the at least one sensor for a first identified time period. The first identified time period may be an amount of minutes. Optionally, the first identified time period is an amount of hours or days. The first indication class is optionally a class of probably irrelevant indications. For example, to avoid a false alarm due to detection of a pet, after initially detecting motion by a motion sensor the motion sensor's sensitivity may be temporarily decreased to detect only larger objects. In 430, the hardware processor optionally determines whether a second activity indication is received from the at least one sensor within an identified time period, for example the first identified time period. The hardware processor may receive within the first identified time period a second activity indication from the at least one sensor, in which case in 412 the hardware processor may determine the first activity indication indicates a threat and may deliver an output, for example sending an alert message to the control panel, sending a message to a designated person, delivering an electrical current to the audio device, delivering an electrical current to the visual device, and additionally or alternatively displaying a message on the monitor.

[0078] Optionally, the second activity indication is re-

ceived from a sensor other than one of the at least one sensor delivering the first activity indication.

[0079] Optionally, classifying the first activity indication as belonging to a second identified indication class is followed by increasing in 420 sensitivity of at least one sensor for a second identified time period. The second identified indication class is optionally a class of possibly relevant indications. For example, a first activity indication of an open window may be as a result of an intruder reaching the window without being detected by a motion sensor. Thus, after receiving a first activity indication of an open window the sensitivity of a motion sensor may be increased. Now in 430, the hardware processor optionally determines whether a second activity indication is received from the at least one sensor within the second identified time period. The hardware processor may receive within the second identified time period a second activity indication from the at least one sensor, in which case in 412 the hardware processor may determine whether the first activity indication indicates a threat and may deliver an output. Optionally, the second activity indication is received from a sensor other than one of the at least one sensor delivering the first activity indication, for example increasing sensitivity of a motion sensor after detecting an open window by a switch sensor may enable the motion sensor to detect an intruder's movement previously undetected.

[0080] Optionally, upon receiving an alert message, the control panel sends the server a notification of the alert message. Following reception of the notification of the alert message, the server may send a control panel of the alarm system associated with another monitored premises an instruction to change sensitivity.

[0081] Optionally, in 418 the hardware processor receives from the server an instruction to increase sensitivity. Optionally, in 414 the hardware processor receives from the server an instruction to decrease sensitivity. Optionally, the instruction to increase sensitivity or the instruction to decrease sensitivity are sent from the server following reception of one or more alert messages from another control panel associated with other monitored premises.

[0082] Optionally, classifying the first activity indication as belonging to a third identified indication class is followed immediately by delivering an alarm in 412. The third identified indication class is optionally a class of relevant indications. For example, in some embodiments of the present invention detection of an open window is classified as relevant and requiring immediate attention, as opposed to raising sensitivity of a motion sensor.

[0083] Optionally, classifying the first activity indication as belonging to a fourth identified indication class is followed immediately by ignoring the activity indication in 408. The third identified indication class is optionally a class of irrelevant indications. For example, detection of an animal in an image, as opposed to detection of a human, may be ignored.

[0084] Changing sensitivity of a sensor optionally comprises changing an operation parameter of the sensor, for example a threshold amplitude value or a threshold frequency value. Optionally, changing sensitivity of a sensor comprises changing an operation parameter of the hardware processor receiving one or more signals from the sensor. Optionally, changing sensitivity of a sensor comprises changing an algorithm used by the hardware processor for processing the one or more signals received from the sensor.

[0085] It may be the case that changing operational parameters of one or more of the at least one sensor over time reduces the false alarm rate. Examples of operational parameters are: a threshold value of a sensor, a sensor algorithm identifier identifying one of a plurality of possible algorithms implemented by a sensor, and a control algorithm identifier identifying one of a plurality of possible algorithms implemented by the at least one hardware processor or the control panel.

[0086] In some embodiments of the present invention, the alarm system implements the following optional method to reduce false alarm rates by automatically configuring improved operational parameters.

[0087] Reference is now made also to FIG. 5, showing a flowchart schematically representing another optional flow of operations 500 for reducing false alarms by changing a sensor's sensitivity, according to some embodiments of the present invention. In such embodiments, the at least one hardware processor receives in 501 data comprising at least one environment parameter captured by the at least one capture device. Examples of an environment parameter are: an image, for example an image of a part of the monitored premises, an artifact identified in an image, an audio signal, for example an audio signal captured on the monitored premises, an artifact identified in an audio signal, a temperature value, a humidity value, a quantity of visible light, a wind direction value, and a wind speed value. Optionally, in 504 the at least one hardware processor computes a set of improved sensor operation parameters according to the received data and in 509 optionally configures the at least one sensor or control panel with the set of improved sensor operation parameters. For example, when the data comprises a wind speed value exceeding an identified wind speed threshold value, the set of improved operation parameters may comprise a new amplitude threshold value for a motion sensor higher than an amplitude threshold value configured in the motion sensor, to prevent the motion sensor from detecting movement of objects displaced by the wind such as leaves of a tree or a piece of cardboard. When the data comprises a wind speed value less than the identified wind speed threshold, the set of improved operation parameters may comprise a newer amplitude threshold value for a motion sensor lower than the new amplitude threshold value. In another example, when the data comprises an amount of visible light, the set of improved operation parameters may comprise a camera's sensor algorithm indicator of an algorithm optimized for low light conditions. In yet an-

other example, where the data comprises an ambient temperature value, the set of improved operation parameters may comprise a PIR sensor's amplitude threshold value optimized for the ambient temperature value.

[0088] Optionally, the at least one hardware processor sends at least some of the data to the server in 505, and in 507 optionally receives from the server at least one instruction to configure at least one sensor of the at least one sensors. In 509 the at least one hardware processor optionally configures the at least one sensor according to the instruction received from the server. Optionally, the instruction to configure at least one sensor comprises a threshold value, for example an amplitude threshold value or a frequency threshold value. Optionally, the instruction to configure at least one sensor comprises an indication of a selected algorithm of the at least one sensor or of the at least one hardware processor receiving one or more signals from the at least one sensor.

[0089] Optionally, the data received by the at least on hardware processor further comprises at least one activity indication. The set of improved sensor operation parameters may be computed using the at least one activity indication. For example, when the data comprises a distance of a moving object exceeding an identified distance threshold value, the set of improved sensor operation parameters may comprise a new amplitude threshold value for a motion sensor higher than an amplitude threshold value configured in the motion sensor, to prevent the motion sensor from detecting movement of distant objects.

[0090] The alarm system optionally implements one of the methods described above. In some embodiments of the present invention the alarm system implements more than one of the methods described above.

[0091] The descriptions of the various embodiments of the present invention have been presented for purposes of illustration, but are not intended to be exhaustive or limited to the embodiments disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art without departing from the scope and spirit of the described embodiments. The terminology used herein was chosen to best explain the principles of the embodiments, the practical application or technical improvement over technologies found in the marketplace, or to enable others of ordinary skill in the art to understand the embodiments disclosed herein.

[0092] It is expected that during the life of a patent maturing from this application many relevant sensors and capture devices will be developed and the scope of the terms "sensor" and "capture device" is intended to include all such new technologies a priori.

[0093] As used herein the term "about" refers to $\pm$ 10 %.

[0094] The terms "comprises", "comprising", "includes", "including", "having" and their conjugates mean "including but not limited to". This term encompasses the terms "consisting of" and "consisting essentially of".

[0095] The phrase "consisting essentially of" means that the composition or method may include additional ingredients and/or steps, but only if the additional ingredients and/or steps do not materially alter the basic and novel characteristics of the claimed composition or method.

[0096] As used herein, the singular form "a", "an" and "the" include plural references unless the context clearly dictates otherwise. For example, the term "a compound" or "at least one compound" may include a plurality of compounds, including mixtures thereof.

[0097] The word "exemplary" is used herein to mean "serving as an example, instance or illustration". Any embodiment described as "exemplary" is not necessarily to be construed as preferred or advantageous over other embodiments and/or to exclude the incorporation of features from other embodiments.

[0098] The word "optionally" is used herein to mean "is provided in some embodiments and not provided in other embodiments". Any particular embodiment of the invention may include a plurality of "optional" features unless such features conflict.

[0099] Throughout this application, various embodiments of this invention may be presented in a range format. It should be understood that the description in range format is merely for convenience and brevity and should not be construed as an inflexible limitation on the scope of the invention. Accordingly, the description of a range should be considered to have specifically disclosed all the possible subranges as well as individual numerical values within that range. For example, description of a range such as from 1 to 6 should be considered to have specifically disclosed subranges such as from 1 to 3, from 1 to 4, from 1 to 5, from 2 to 4, from 2 to 6, from 3 to 6 etc., as well as individual numbers within that range, for example, 1, 2, 3, 4, 5, and 6. This applies regardless of the breadth of the range.

[0100] Whenever a numerical range is indicated herein, it is meant to include any cited numeral (fractional or integral) within the indicated range. The phrases "ranging/ranges between" a first indicate number and a second indicate number and "ranging/ranges from" a first indicate number "to" a second indicate number are used herein interchangeably and are meant to include the first and second indicated numbers and all the fractional and integral numerals therebetween.

[0101] It is appreciated that certain features of the invention, which are, for clarity, described in the context of separate embodiments, may also be provided in combination in a single embodiment. Conversely, various features of the invention, which are, for brevity, described in the context of a single embodiment, may also be provided separately or in any suitable subcombination or as suitable in any other described embodiment of the invention. Certain features described in the context of various embodiments are not to be considered essential features of those embodiments, unless the embodiment is inoperative without those elements.

[0102] All publications, patents and patent applications

mentioned in this specification are herein incorporated in their entirety by reference into the specification, to the same extent as if each individual publication, patent or patent application was specifically and individually indicated to be incorporated herein by reference. In addition, citation or identification of any reference in this application shall not be construed as an admission that such reference is available as prior art to the present invention. To the extent that section headings are used, they should not be construed as necessarily limiting.

[0103] It will be understood that the invention has been described above purely by way of example, and modifications of detail can be made within the scope of the invention.

[0104] Each feature disclosed in the description, and (where appropriate) the claims and drawings may be provided independently or in any appropriate combination.

[0105] Reference numerals appearing in the claims are by way of illustration only and shall have no limiting effect on the scope of the claims.

Claims

1. An alarm system (100), comprising:

at least one motion sensor (102);
at least one audio capture device (104), adapted to continuously record an audio signal; and
at least one hardware processor (101), electrically connected to said at least one motion sensor and said at least one audio capture device, and adapted to:

receive (301) a signal from said at least one motion sensor indicating detection of a moving object;
receive (302) at least part of said audio signal from said at least one audio capture device;
analyze (304) said at least part of said audio signal to determine a presence of at least one vehicle sound;
identify (308) a correlation between said detection of a moving object and said determination of at least one vehicle sound presence; and
decrease (309) sensitivity of at least one sensor of the alarm system for at least a predetermined period of time.

2. The system (100) of claim 1, wherein said at least one hardware processor (101) is further adapted to activate an alarm, subject to failing to identify said correlation;
wherein activating said alarm comprises delivering an output after an identified period of time after receiving said signal; and
wherein said at least one hardware processor is further adapted to:

receiving an instruction to disarm said alarm system; and
delivering said output, subject to failing to receive said instruction within said identified amount of time after receiving said signal.

3. The system (100) of claim 1 or 2, wherein said at least one hardware processor (101) comprises at least one audio classifier trained to identify vehicle sounds; and
wherein said at least one audio classifier is further adapted to determine whether said at least one vehicle sound is a sound of a stopping vehicle.

4. The system (100) of claim 2 or 3 further comprising at least one control hardware processor (105) electrically connected to said at least one hardware processor (101);
wherein delivering said output comprises delivering a notification to said at least one control hardware processor;
wherein said at least one control hardware processor performs at least one alarm action upon receiving said notification; and
wherein said at least one alarm action is selected from a group of alarm actions consisting of: delivering an electrical current to an audio device (121) capable of emitting an audio signal, delivering an electrical current to a visual device (122) capable of emitting a visual signal, sending a message to at least one designated person, displaying a message on a monitor (123) and sending a message to a designated server (106) associated with said at least one control hardware processor.

5. The system (100) of any preceding claim, further comprising:

at least one control hardware processor (105); and
at least one data communication interface (107), electrically connected to said at least one hardware processor (101);
wherein said at least one hardware processor delivers said notification to said at least one control hardware processor using said at least one data communication interface;
wherein said at least one control hardware processor performs at least one alarm action upon receiving said notification; and
wherein said at least one alarm action is selected from a group of alarm actions consisting of: delivering an electrical current to an audio device (121) capable of emitting an audio signal, delivering an electrical current to a visual device

(122) capable of emitting a visual signal, sending a message to at least one designated person, displaying a message on a monitor (123) and sending a message to a designated server (106) associated with said at least one control hardware processor.

6. A method (400) for an alarm system (100), comprising:

receiving (401) from at least one sensor (102) a first activity indication selected from a predefined set of activity indications;
classifying (404) said first activity indication as belonging to one of a predefined set of indication classes; and
subject to classifying said activity as belonging to a first identified indication class:

decreasing (416) sensitivity of said at least one sensor for a first identified time period;
receiving within said first identified time period from said at least one sensor a second activity indication selected from said predefined set of activity indications; and
delivering (412) an output when said second activity indication is received.

7. The method (400) of claim 6, further comprising:

subject to classifying (404) said activity as belonging to a second identified indication class:

increasing (420) sensitivity of said at least one sensor (112) for a second identified time period;
receiving within said second identified time period from said at least one sensor said second activity indication selected from said predefined set of activity indications; and
delivering (412) an output when said second activity indication is received.

8. The method (400) of claim 6 or 7, wherein delivering (412) said output comprises at least one of: sending a message to a designated server (106), sending a message to at least one designated person, delivering an electrical current to an audio device (121) capable of emitting an audio signal, delivering an electrical current to a visual device (122) capable of emitting a visual signal, sending a message to at least one designated user, and displaying a message on a monitor (123); and
wherein said predefined set of activity indications consists of: indication of motion, indication of presence, indication of absence, indication of opening a door, indication of closing a door, indication of opening a window and indication of closing a window.

9. The method (400) of any of claims 6 to 8, wherein said at least one sensor (102) is selected from a group consisting of: a volumetric air sensor, a Passive Infra-Red (PIR) sensor, a proximity switch, a mechanical switch, and an optical detector and a camera.

10. The method (400) of any of claims 6 to 9, further comprising:

receiving an instruction to change sensitivity of said at least one sensor for a third identified time period;
changing sensitivity of said alarm system for said third identified time period according to said instruction;
receiving within said third identified time period from said at least one sensor a third activity indication selected from said predefined set of activity indications; and
delivering (412) an output when said third activity indication is received.

11. The method (400) of claim 10, wherein said instruction is received from at least one control hardware processor (105) of said alarm system (100) or from a server (106) of said alarm system.

12. A security system (100), comprising:

at least one sensor (102);
at least one capture device (104) selected from a group consisting of: a camera, a thermal camera, an analog microphone, a digital microphone, a temperature sensor, a humidity sensor, a wind direction sensor and a wind speed sensor; and
at least one hardware processor (101) connected to said at least one sensor and said at least one capture device, adapted to:

receive (501) from said at least one capture device data comprising at least one environment parameter captured by said at least one capture device, said at least one environment parameter a member of a group consisting of: an image, an audio signal, a temperature value, a humidity value, a quantity of visible light, a wind direction value, and a wind speed value;
compute (504) a set of improved sensor operation parameters according to said data; and
configure (509) said at least one sensor with said set of improved sensor operation parameters.

13. The system (100) of claim 12, wherein said set of

improved sensor operation parameters comprises at least one of a set of parameters consisting of: a threshold value of a sensor, a sensor algorithm identifier and a processor algorithm identifier.

14. The system (100) of claim 12 or 13, further comprising at least one control hardware processor (105), connected to said at least one hardware processor (101);
wherein said at least one hardware processor is further adapted to:

send (505) at least some of said data to said at least one control hardware processor;
receive (507) from said at least one control hardware processor at least one instruction to configure said at least one sensor (102); and
configure (509) said at least one sensor according to said at least one instruction.

15. The system (100) of any of claims 12 to 14, wherein said data comprises a wind speed value;
wherein said at least one hardware processor (101) compares said wind speed value to an identified wind speed threshold value; and
wherein said at least one hardware processor computes said set of improved sensor operation parameters subject to an outcome of said comparison.

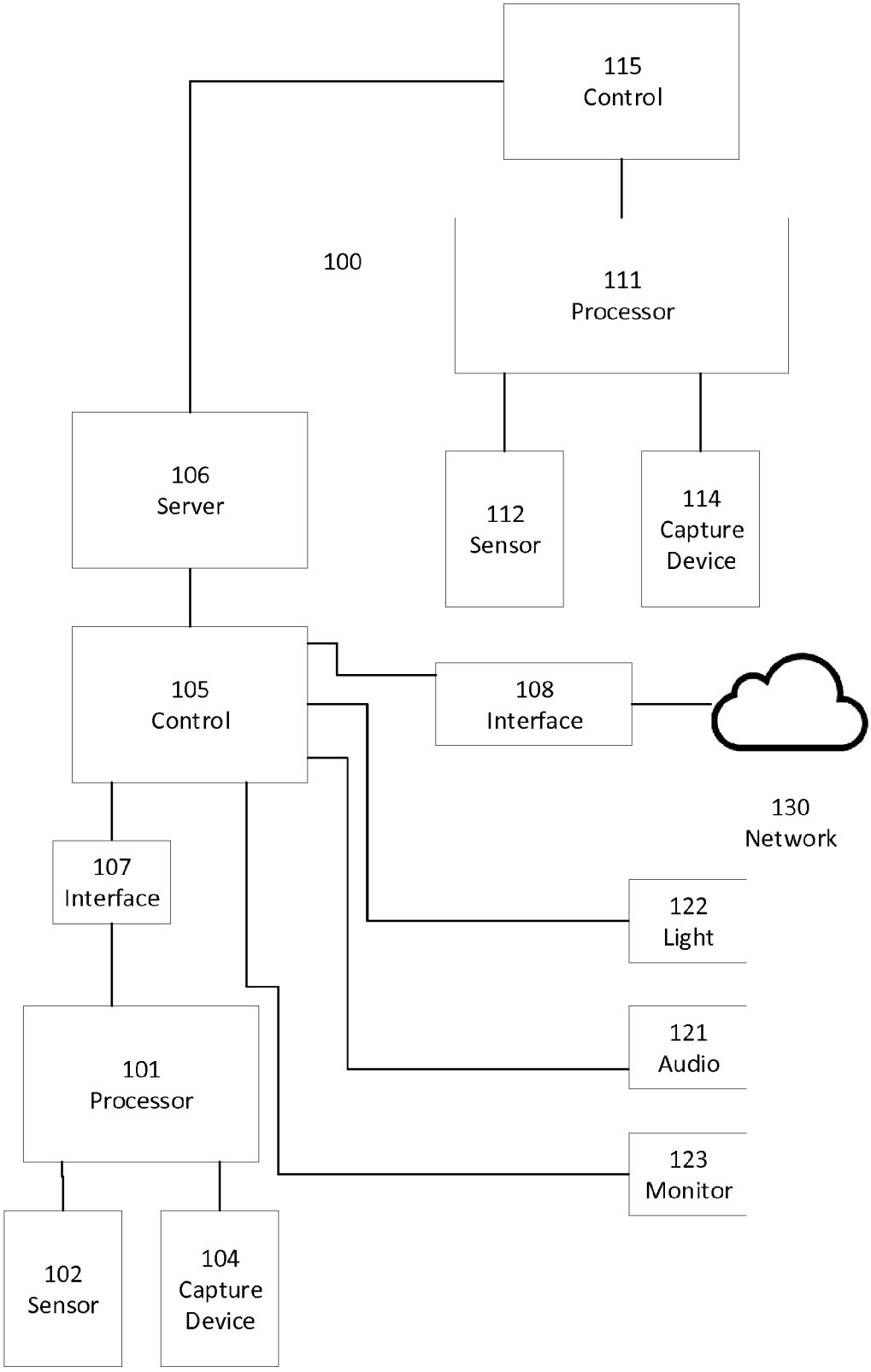
115
Control
100
111
Processor
106
Server
112
Sensor
114
Capture
Device
105
Control
108
Interface
130
Network
107
Interface
122
Light
121
Audio
101
Processor
123
Monitor
102
Sensor
104
Capture
Device

FIG. 1

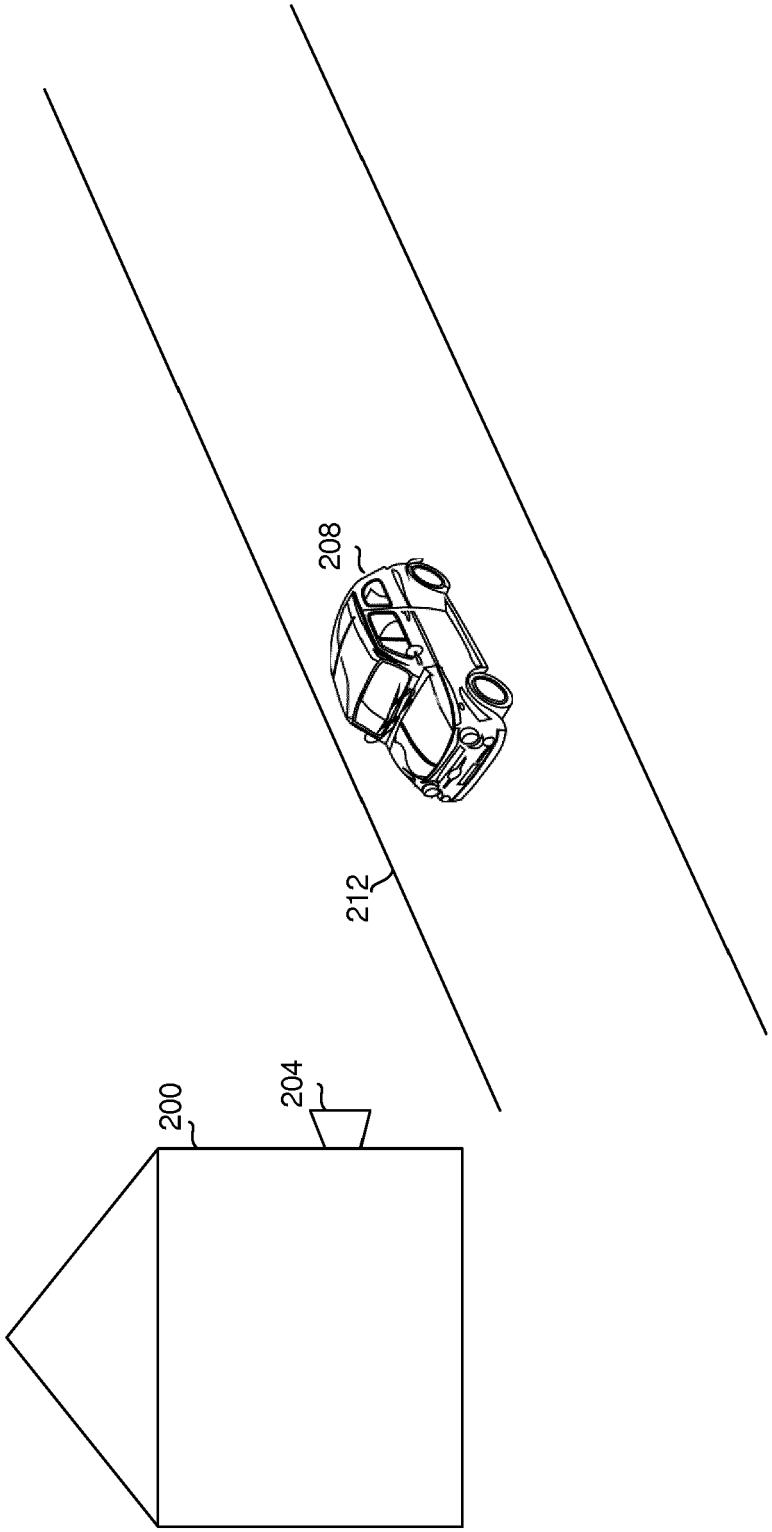

FIG. 2

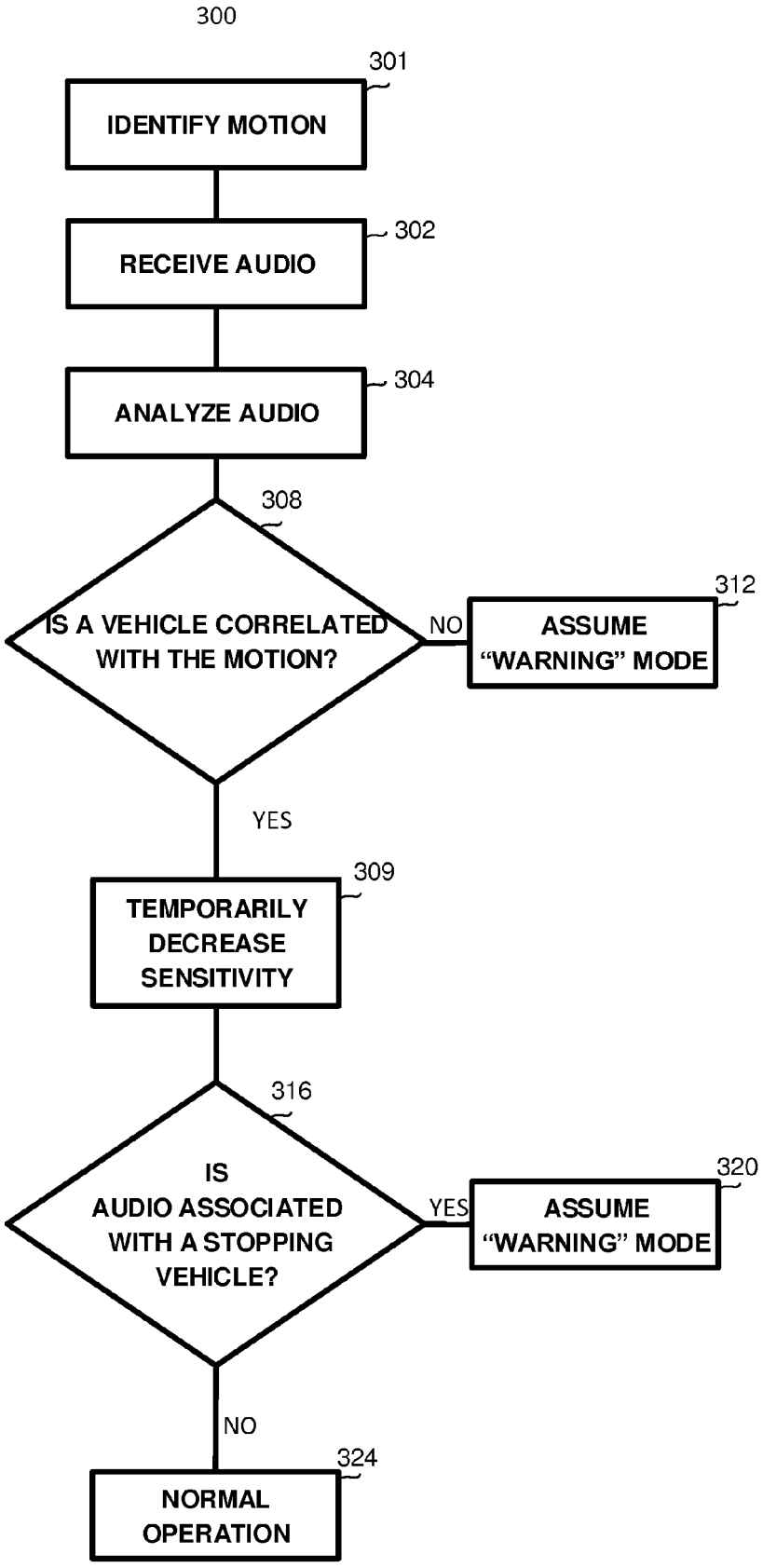
300
301
IDENTIFY MOTION
302
RECEIVE AUDIO
304
ANALYZE AUDIO
308
IS A VEHICLE CORRELATED WITH THE MOTION?
NO
312
ASSUME "WARNING" MODE
YES
309
TEMPORARILY DECREASE SENSITIVITY
316
IS AUDIO ASSOCIATED WITH A STOPPING VEHICLE?
YES
320
ASSUME "WARNING" MODE
NO
324
NORMAL OPERATION

FIG. 3

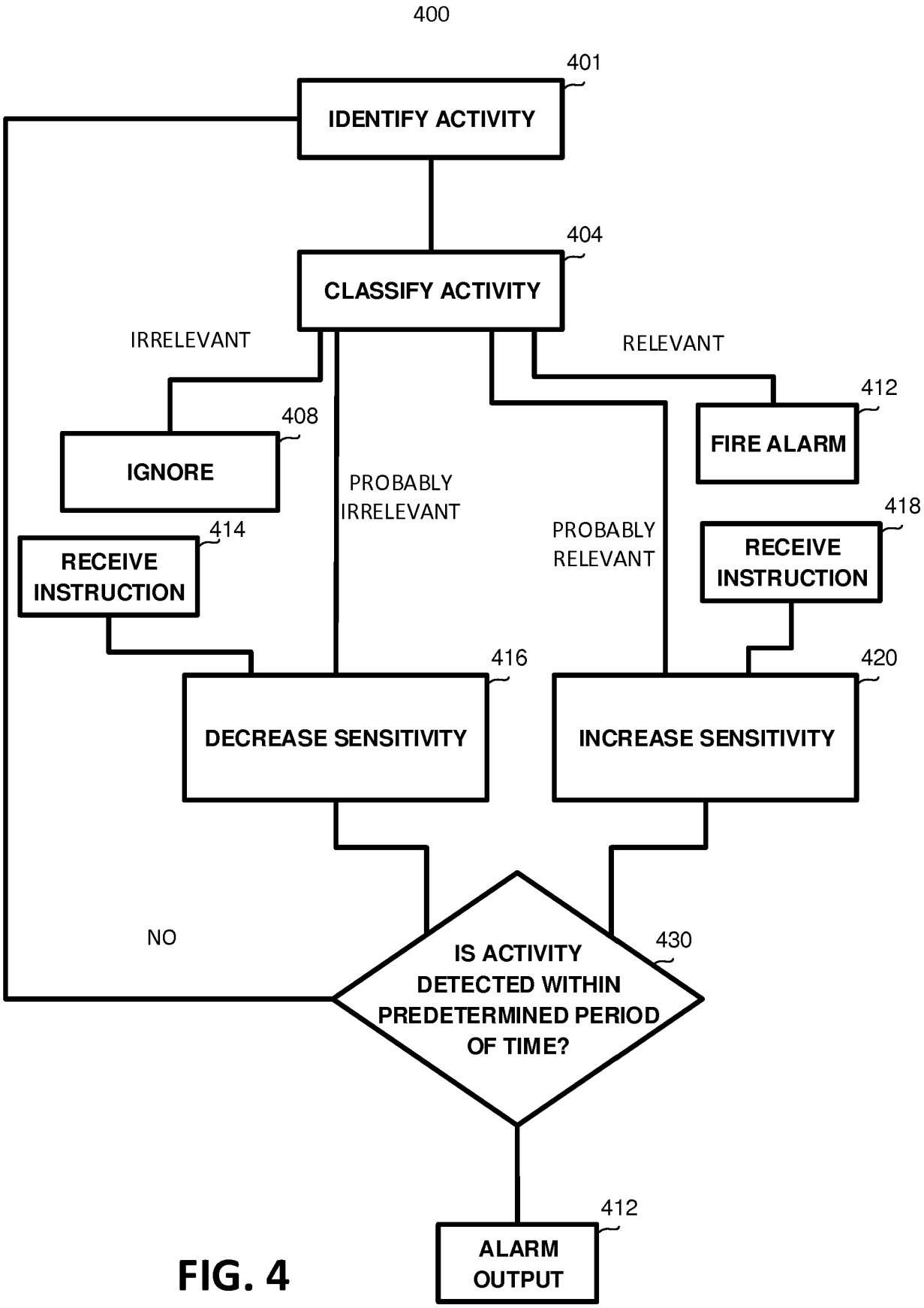
400
401
IDENTIFY ACTIVITY
404
CLASSIFY ACTIVITY
IRRELEVANT
RELEVANT
408
IGNORE
412
FIRE ALARM
PROBABLY IRRELEVANT
PROBABLY RELEVANT
414
RECEIVE INSTRUCTION
418
RECEIVE INSTRUCTION
416
DECREASE SENSITIVITY
420
INCREASE SENSITIVITY
NO
430
IS ACTIVITY DETECTED WITHIN PREDETERMINED PERIOD OF TIME?
412
ALARM OUTPUT

FIG. 4

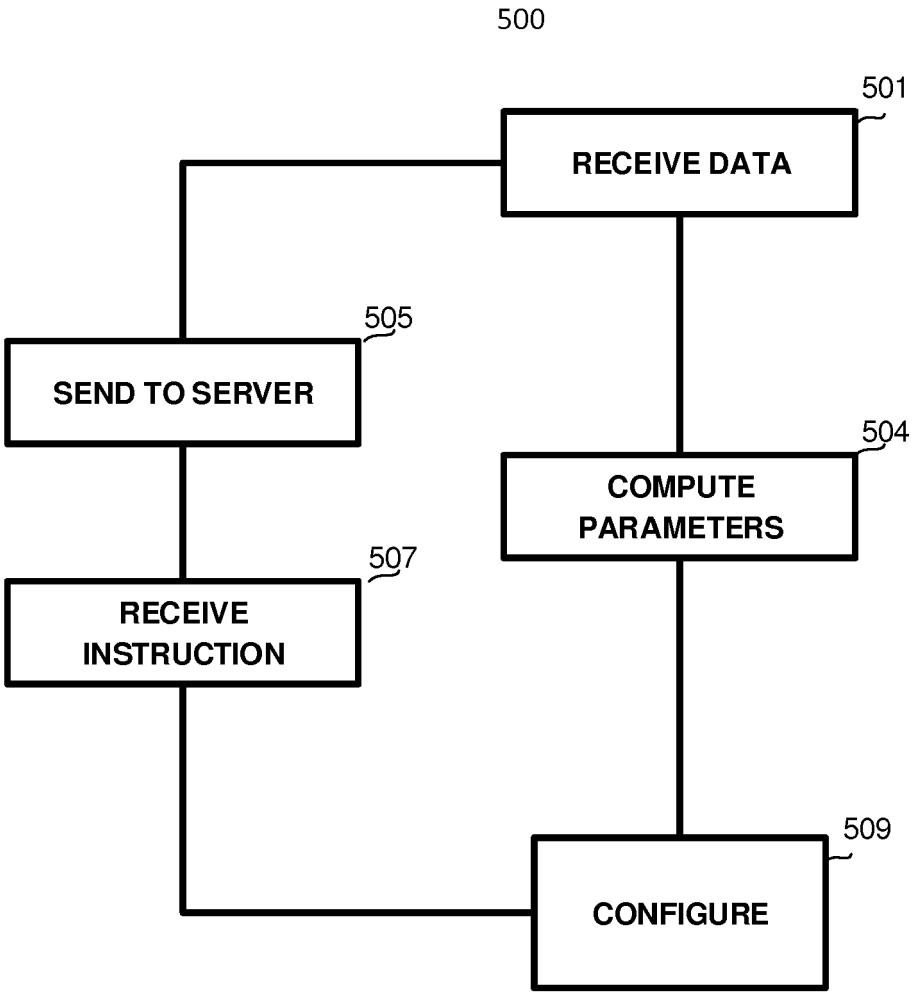
500
501
RECEIVE DATA
505
SEND TO SERVER
504
COMPUTE PARAMETERS
507
RECEIVE INSTRUCTION
509
CONFIGURE

FIG. 5