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Hoffmann et al.

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(45) **Date of Patent: Jul. 6, 2021**

(54) **METHODS AND SYSTEMS FOR EVALUATING AND TRANSMITTING COMBINED EXTERNAL DATA FROM ONE OR MORE SOURCES TO A CENTRAL DATA PORTAL FOR PROCESSING, STORAGE, AND VISUALIZATION**

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(22) Filed: **Jul. 17, 2019**

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H04Q 9/00 (2006.01)

(52) **U.S. Cl.**
CPC ***H04Q 9/00*** (2013.01); *H04Q 2209/10* (2013.01); *H04Q 2209/50* (2013.01)

(58) **Field of Classification Search**
CPC ... H04Q 9/00; H04Q 2209/10; H04Q 2209/50
See application file for complete search history.

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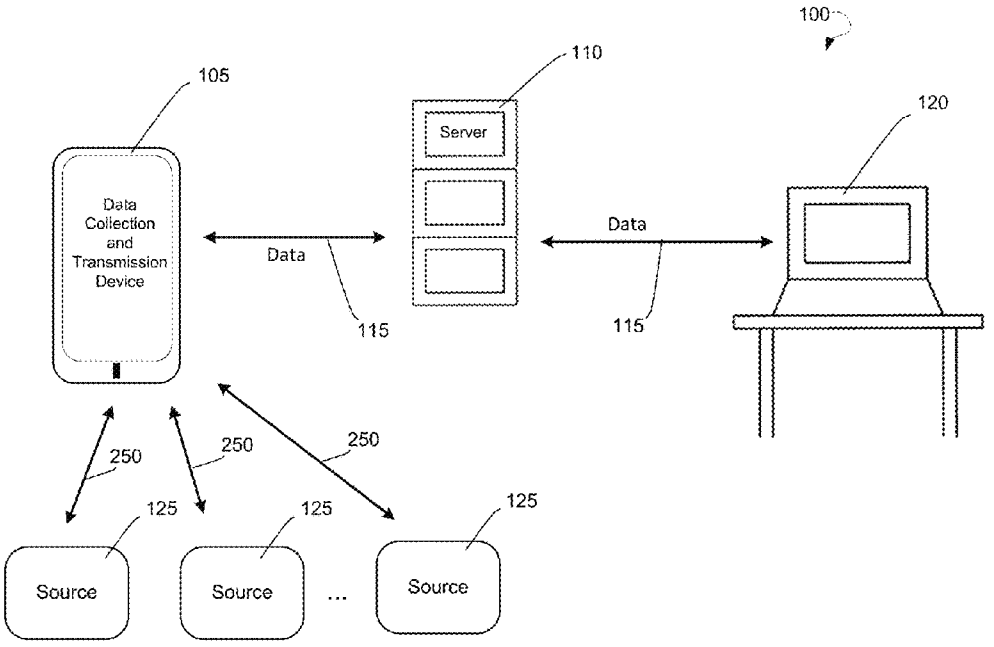
(74) *Attorney, Agent, or Firm* — Georgiy L. Khayet

(57) **ABSTRACT**

Systems and methods for evaluating and transmitting combined external data from one or more sources are described herein. An example method may include collecting, by a data collection device communicatively coupled to a central data portal, sensor data from one or more sources, processing, by the data collection device, the sensor data to evaluate status data concerning status of the one or more sources, transmitting, by the data collection device, the status data to a central data portal, and processing, by the central data portal, the status data for storage and visualization. The data collection device can be co-located with one of the sources. The sources may include one or more of a building, a room, outdoor location, an asset, a vehicle, and a person.

20 Claims, 16 Drawing Sheets



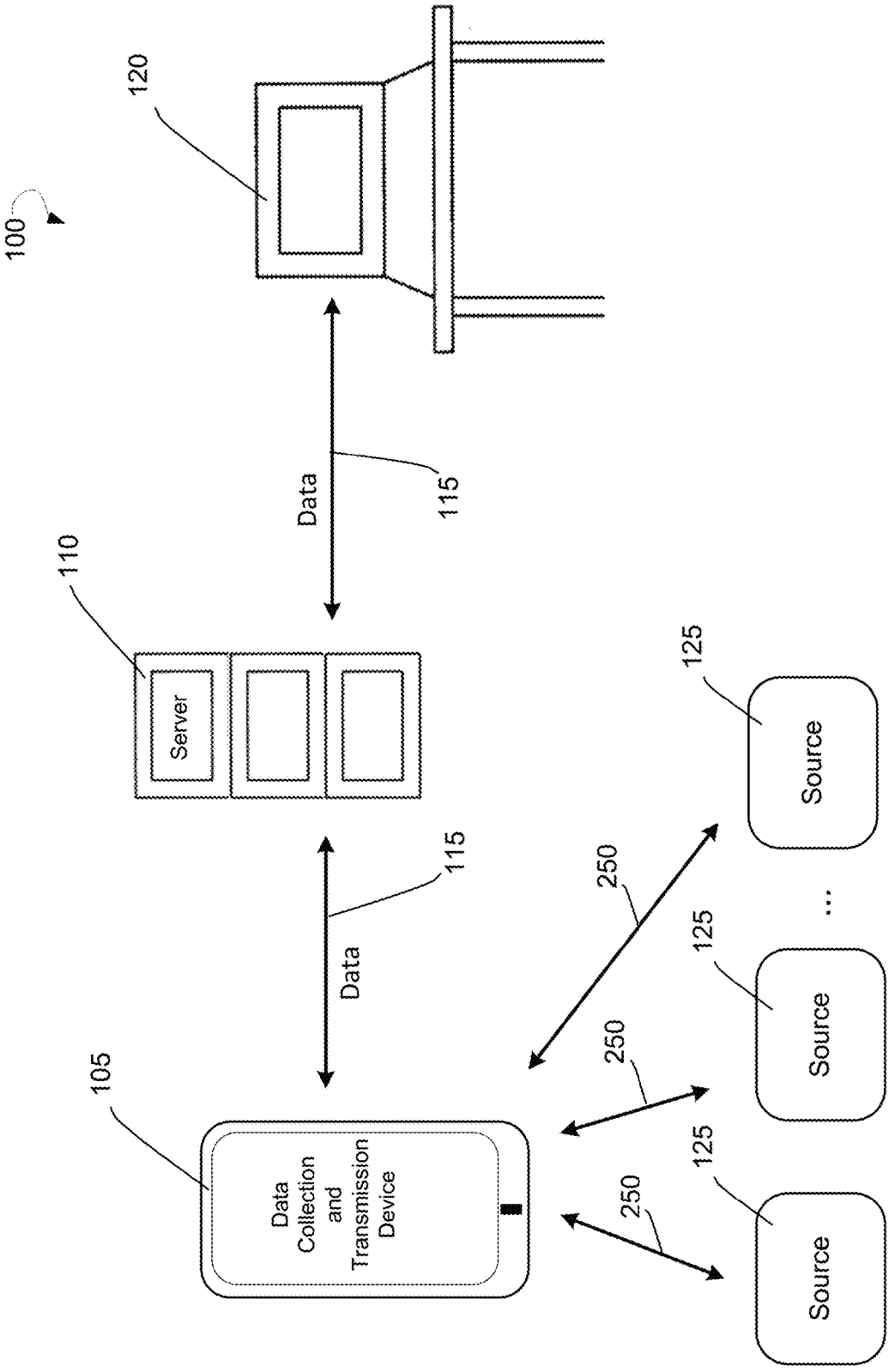

100
120
Data
115
110
Server
Data
115
105
Data Collection and Transmission Device
250
250
250
125
125
125
Source
Source
Source
...

FIG. 1

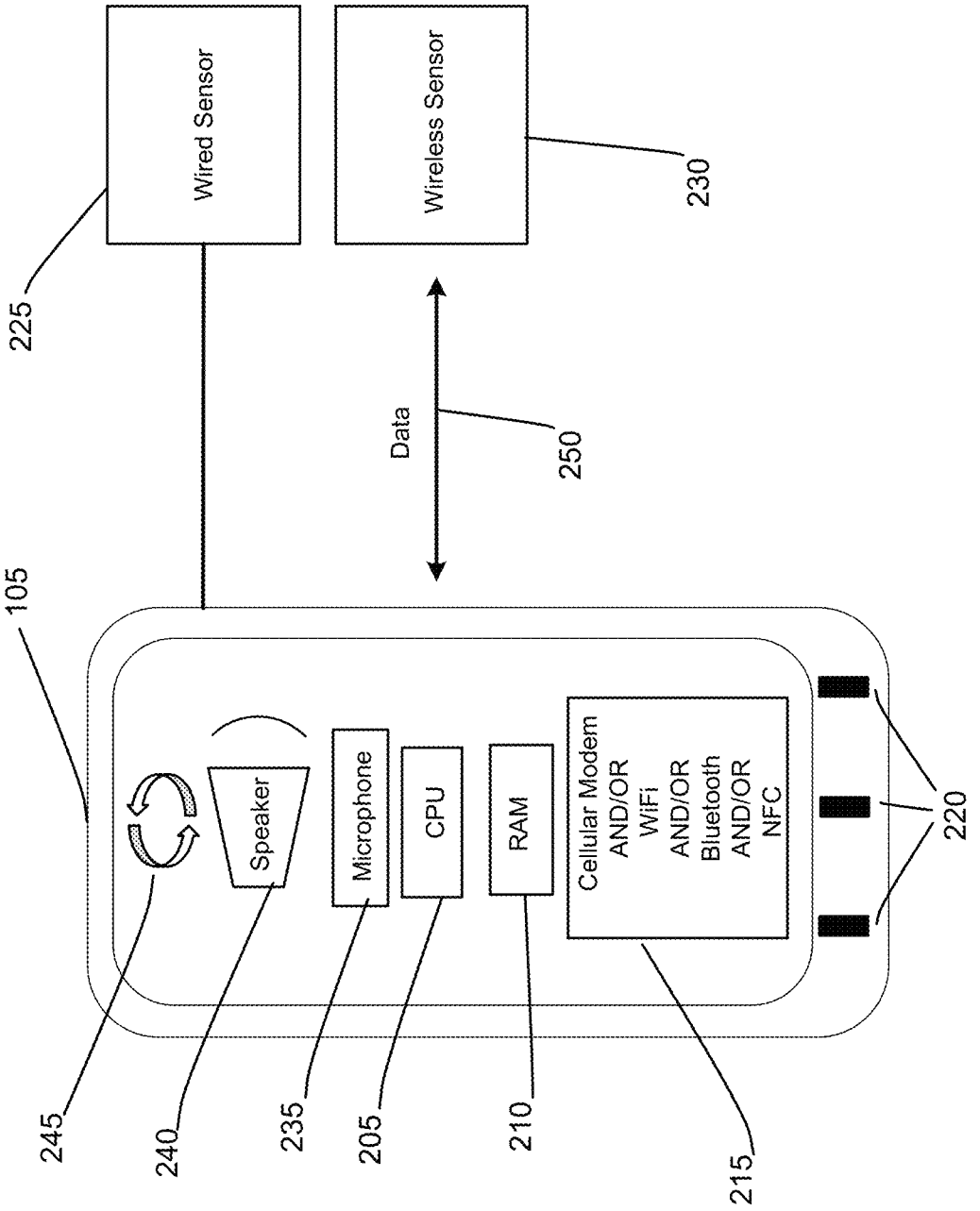

Wired Sensor
Wireless Sensor
225
230
Data
250
105
Speaker
Microphone
CPU
RAM
Cellular Modem
AND/OR
WiFi
AND/OR
Bluetooth
AND/OR
NFC
220
245
240
235
205
210
215

FIG. 2

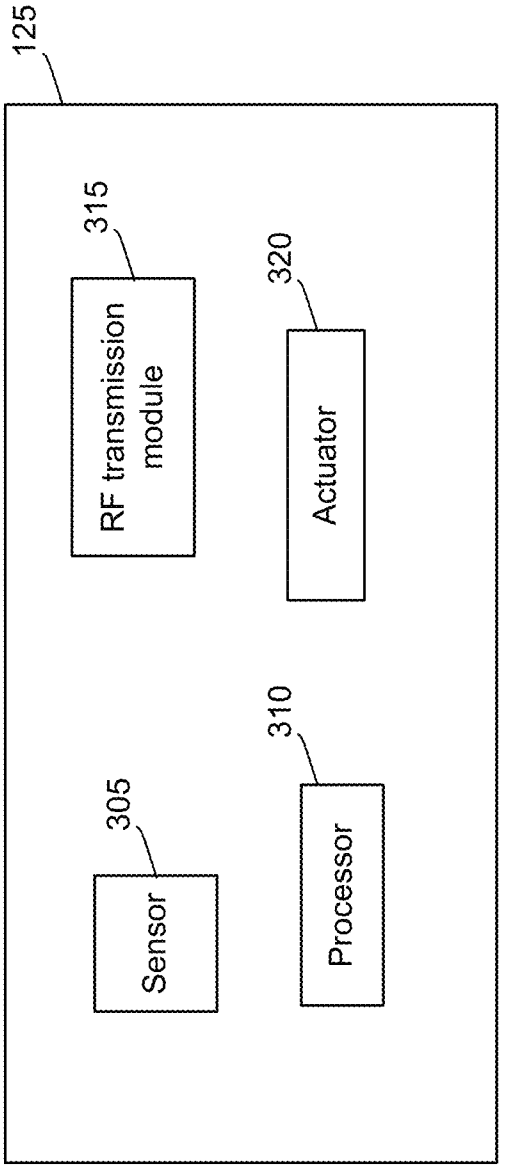

125
315
RF transmission module
320
Actuator
310
Processor
305
Sensor

FIG. 3

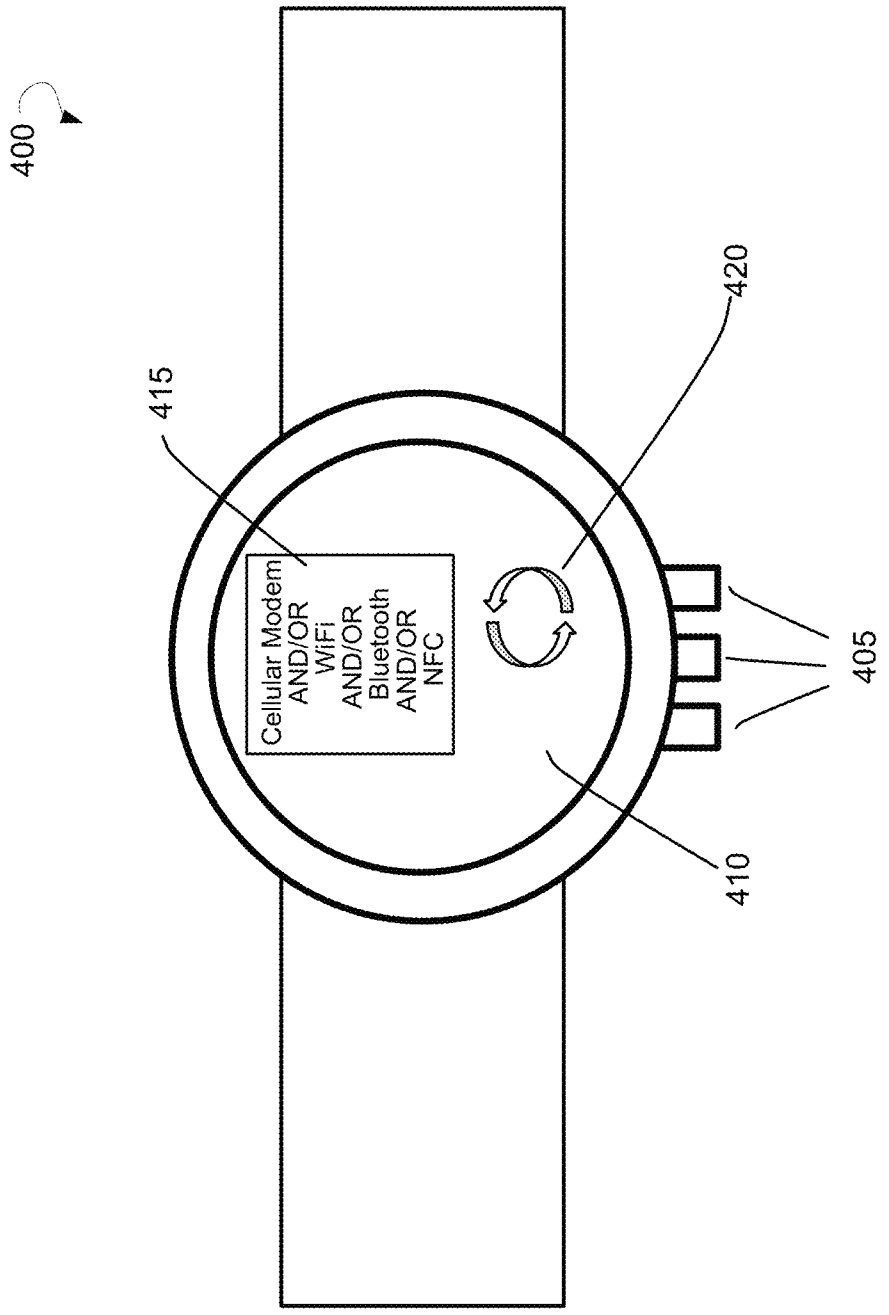

400
415
420
Cellular Modem
AND/OR
WiFi
AND/OR
Bluetooth
AND/OR
NFC
405
410

FIG. 4

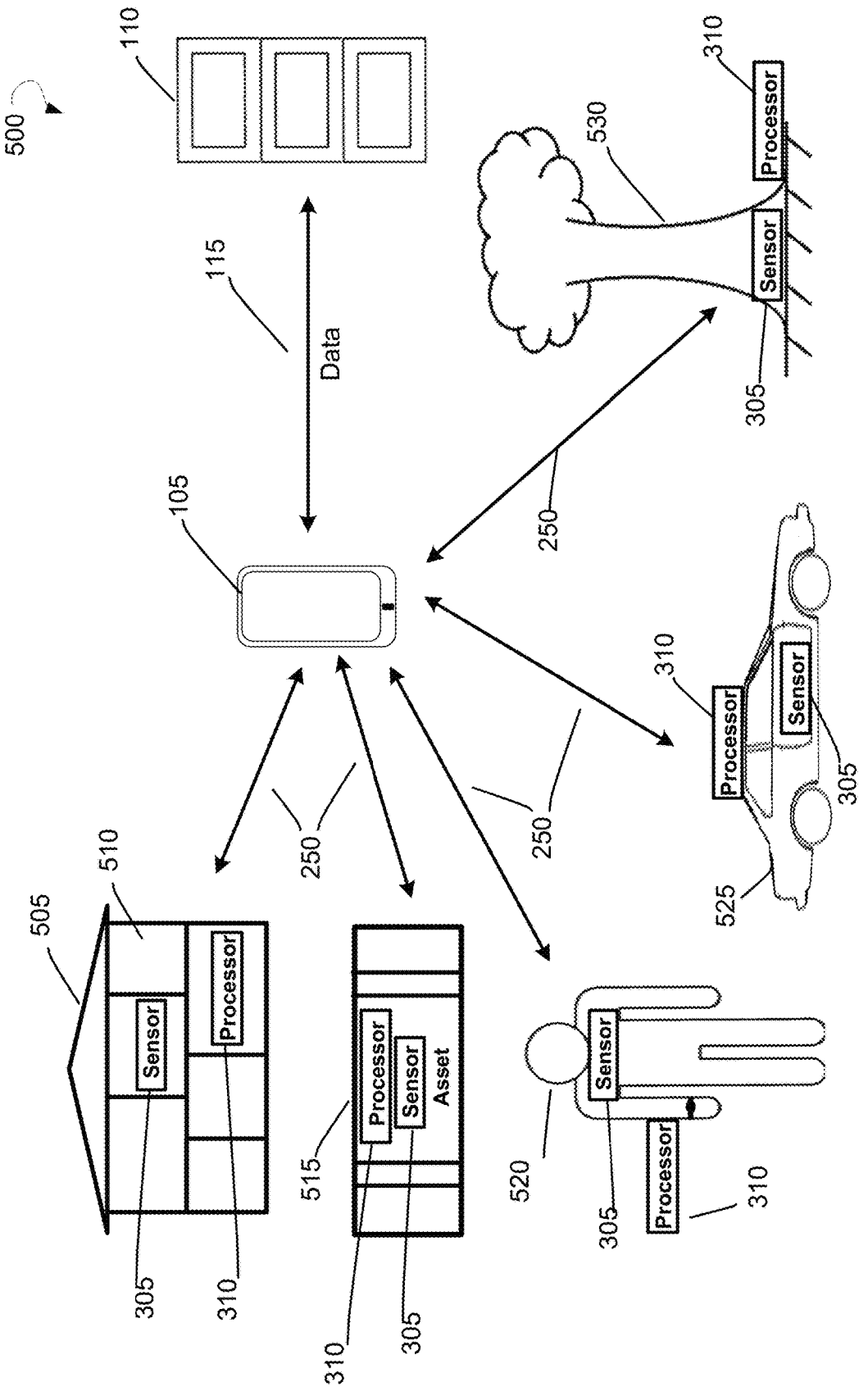

500
110
115
Data
105
530
310
Processor
Sensor
305
250
310
Processor
Sensor
305
525
250
250
505
510
Sensor
Processor
305
310
515
Processor
Sensor
Asset
310
305
520
Sensor
Processor
305
310

FIG. 5

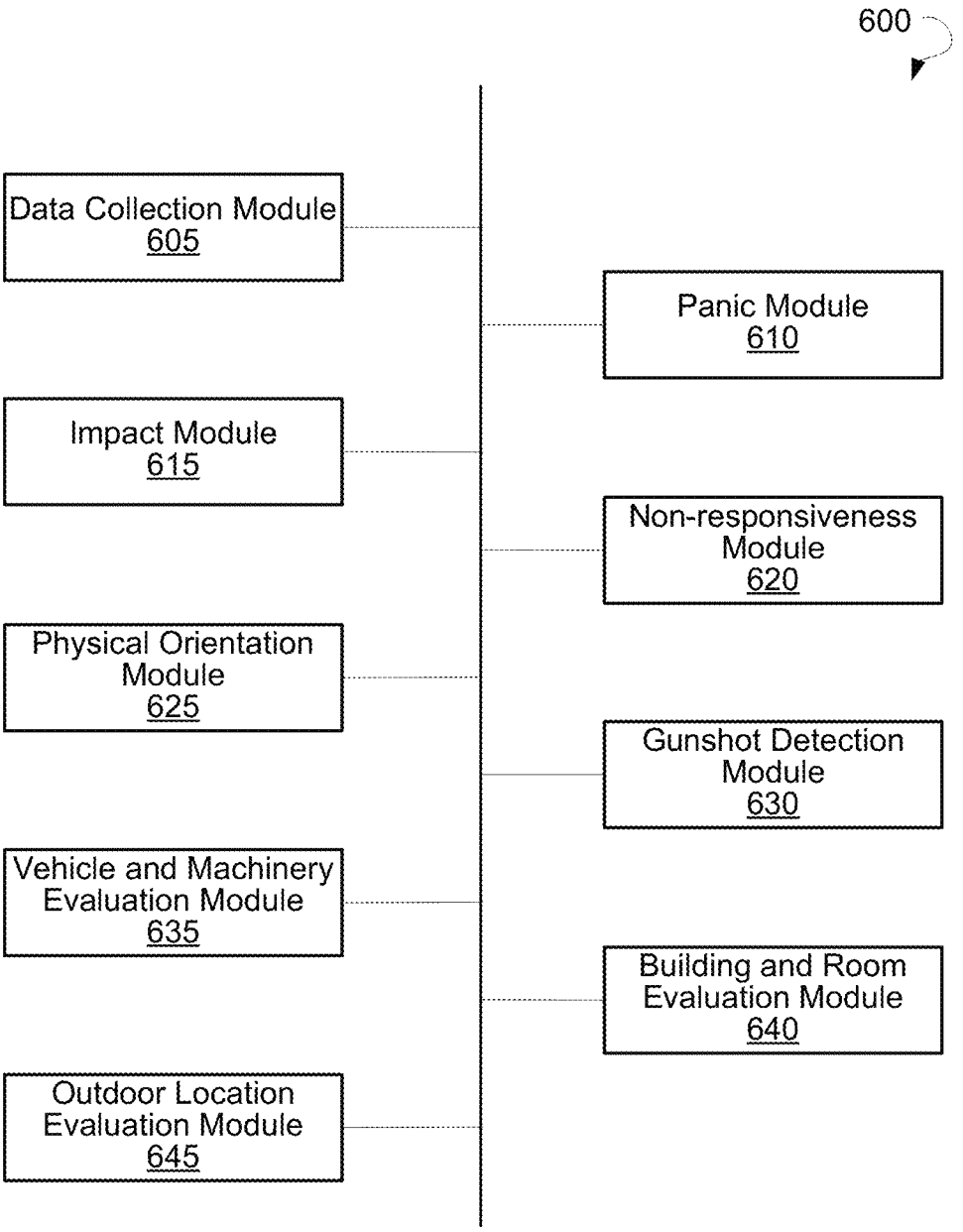

600
Data Collection Module
605
Panic Module
610
Impact Module
615
Non-responsiveness Module
620
Physical Orientation Module
625
Gunshot Detection Module
630
Vehicle and Machinery Evaluation Module
635
Building and Room Evaluation Module
640
Outdoor Location Evaluation Module
645

FIG. 6

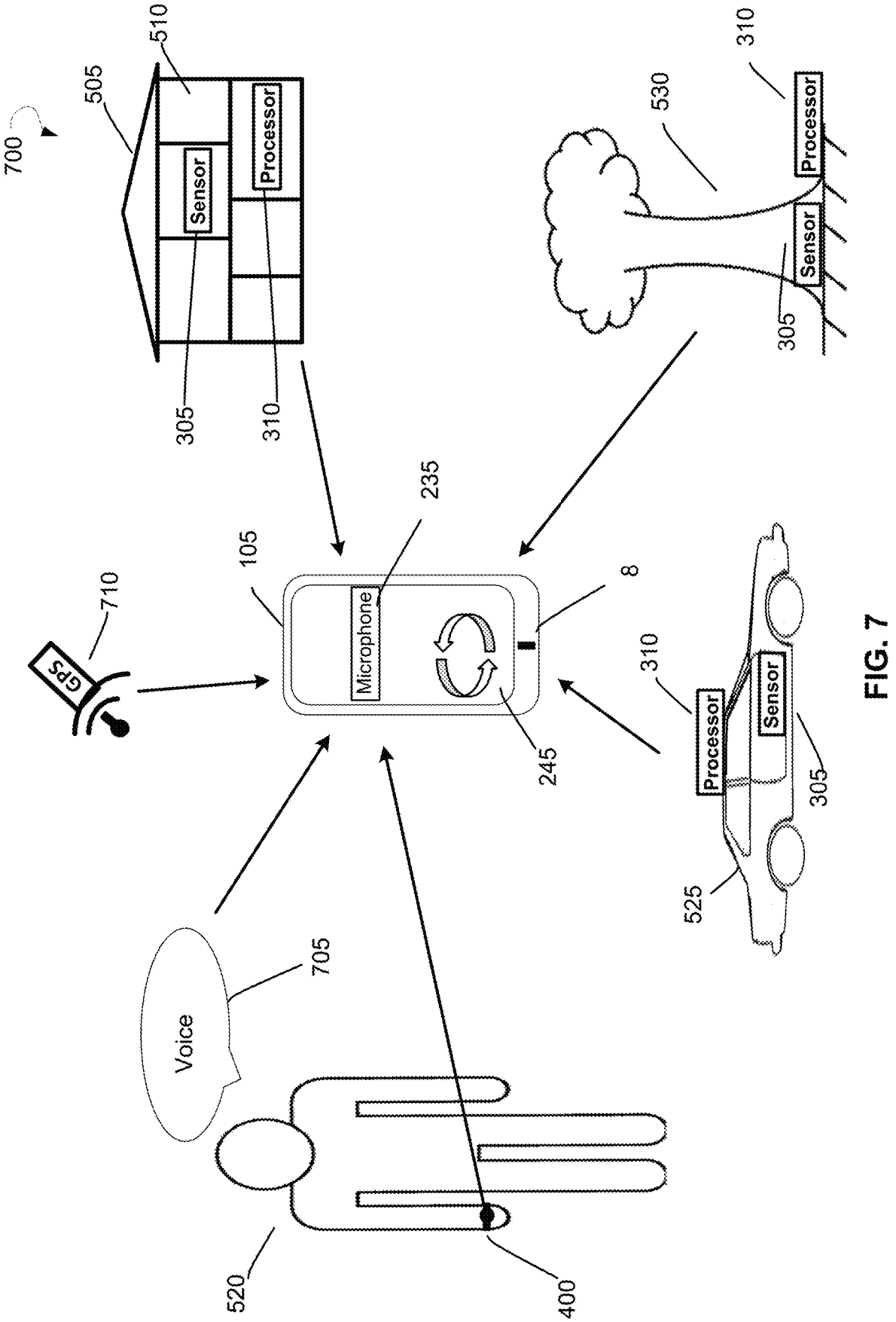

700
505
510
Sensor
Processor
305
310
530
310
Processor
Sensor
305
235
105
710
GPS
Microphone
8
245
310
Processor
Sensor
305
525
Voice
705
520
400

FIG. 7

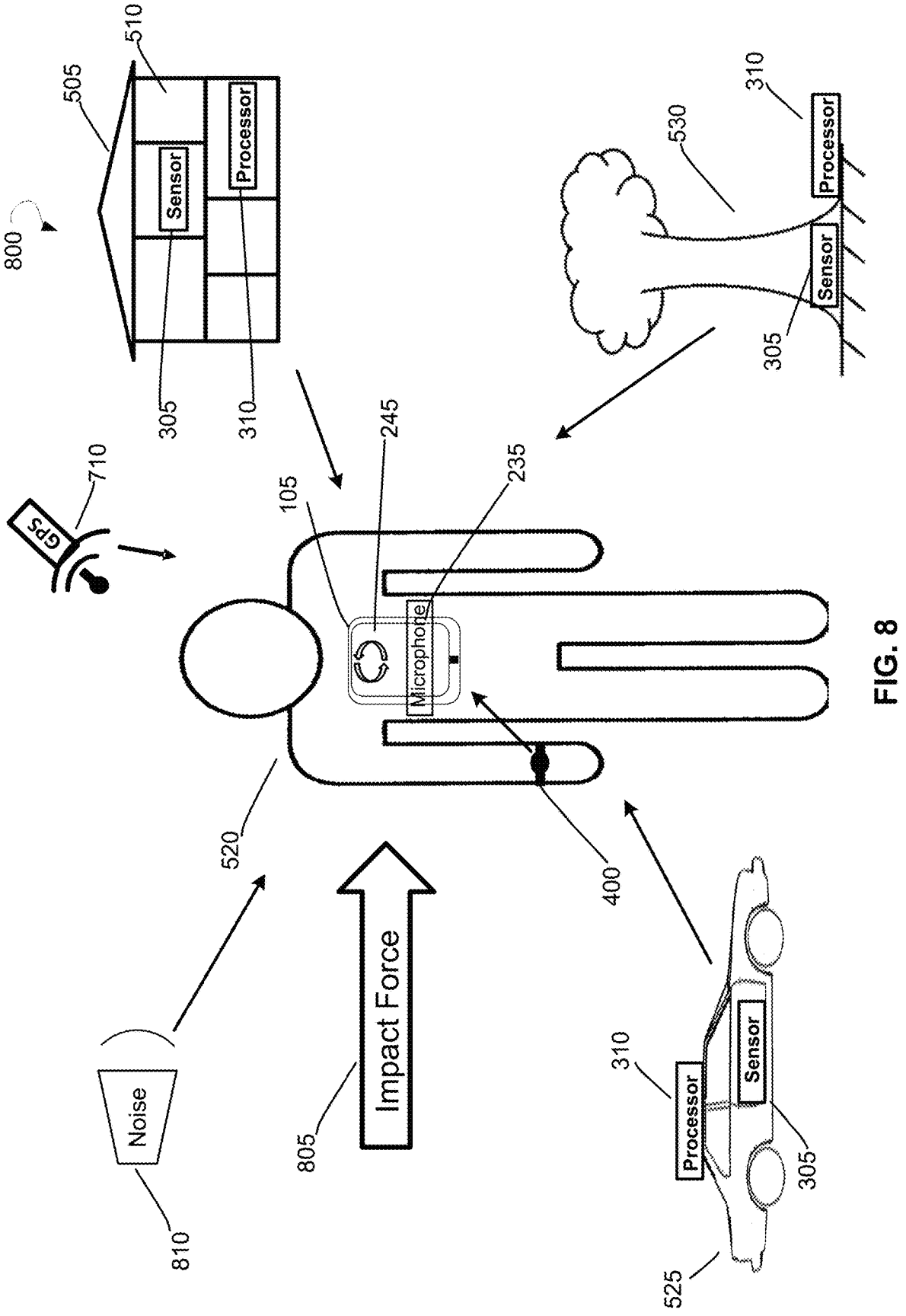

800
505
510
Sensor
Processor
305
310
710
GPS
105
245
235
Microphone
520
400
530
310
Processor
Sensor
305
Impact Force
805
Noise
810
310
Processor
Sensor
305
525

FIG. 8

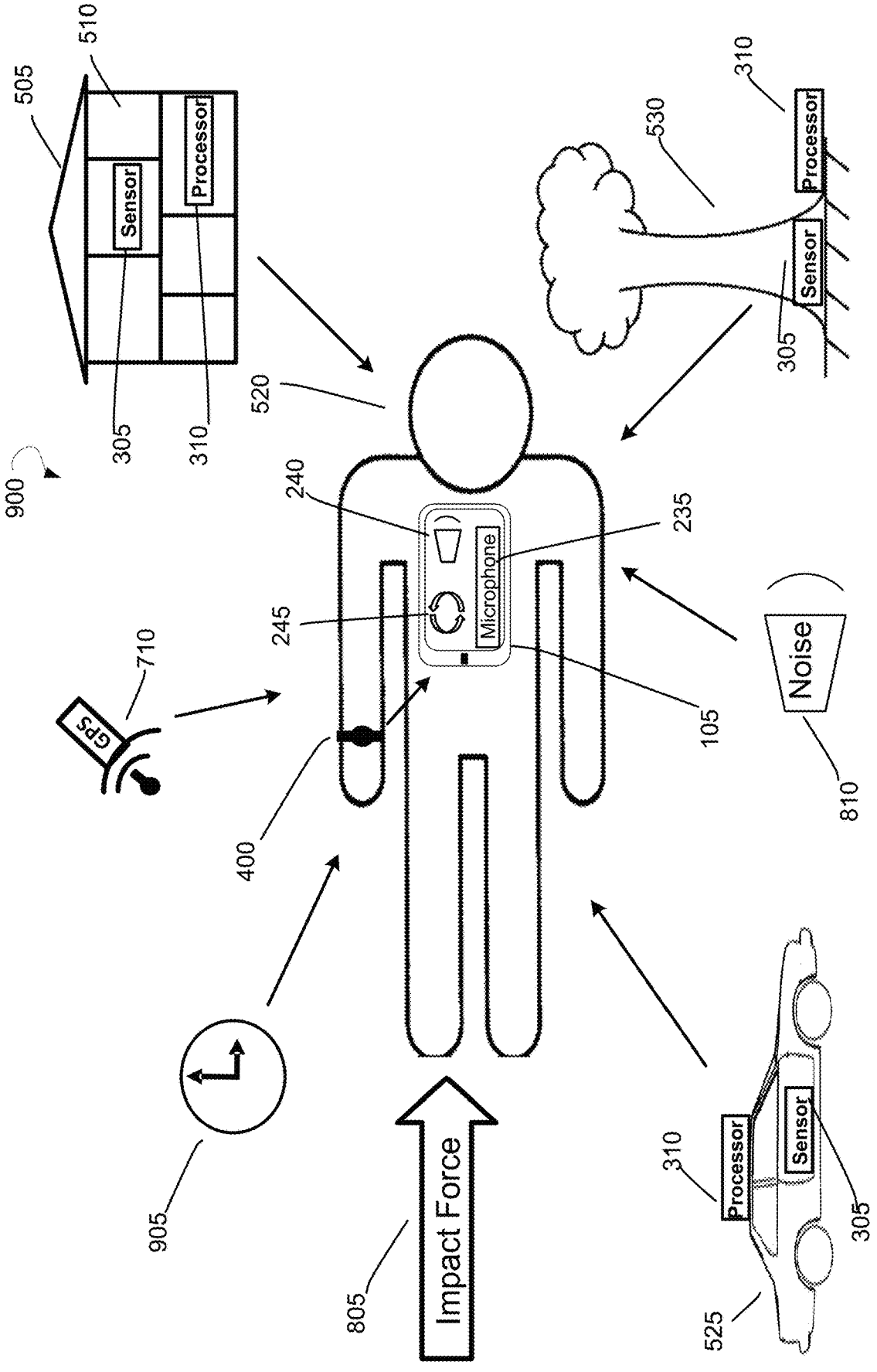

900
505
510
Sensor
Processor
305
310
520
530
310
Processor
Sensor
305
240
235
Microphone
245
105
710
GPS
400
Noise
810
905
805
Impact Force
310
Processor
Sensor
305
525

FIG. 9

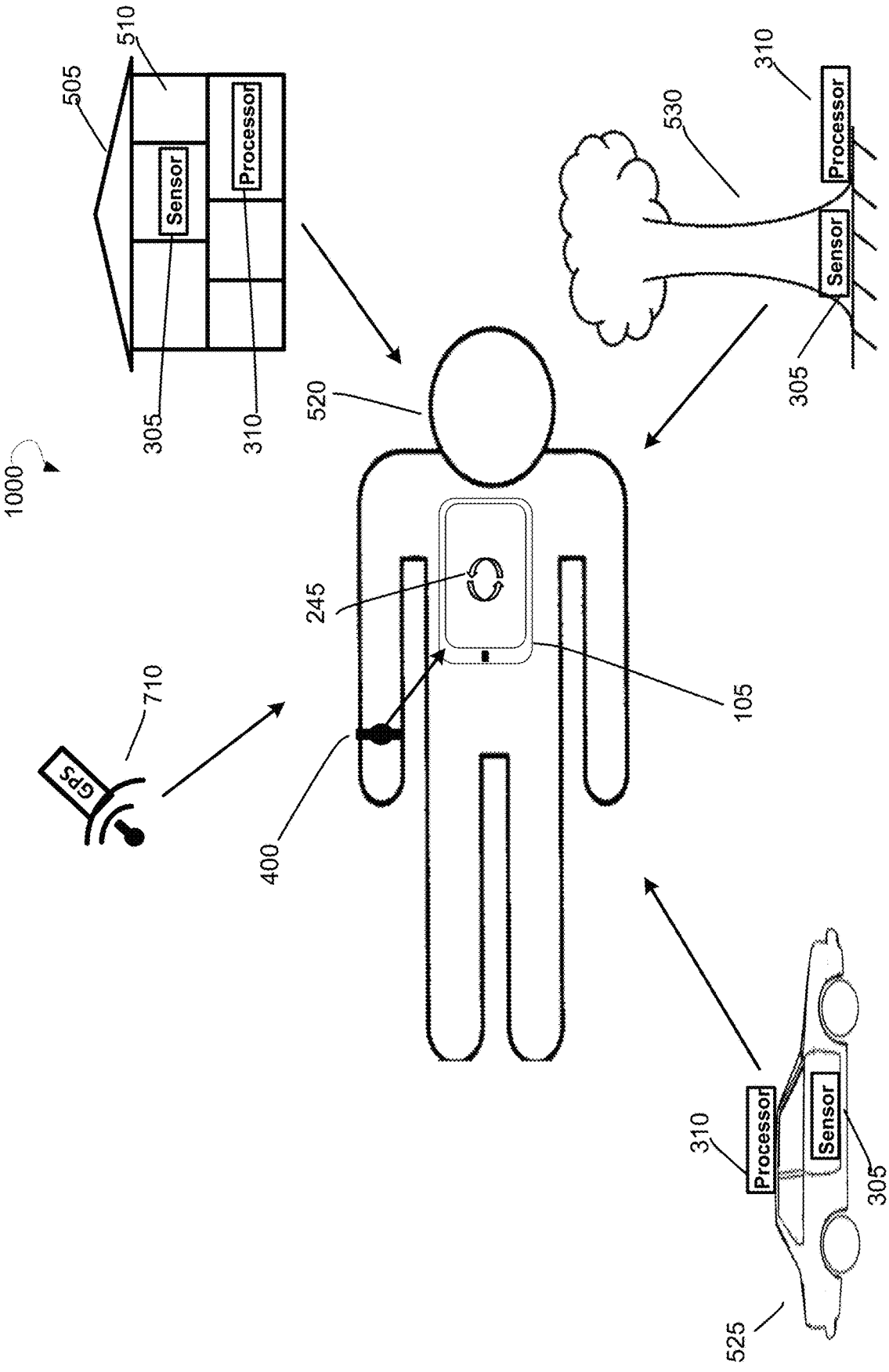

1000
505
510
Sensor
Processor
305
310
520
530
310
Processor
Sensor
305
245
105
710
GPS
400
310
Processor
Sensor
305
525

FIG. 10

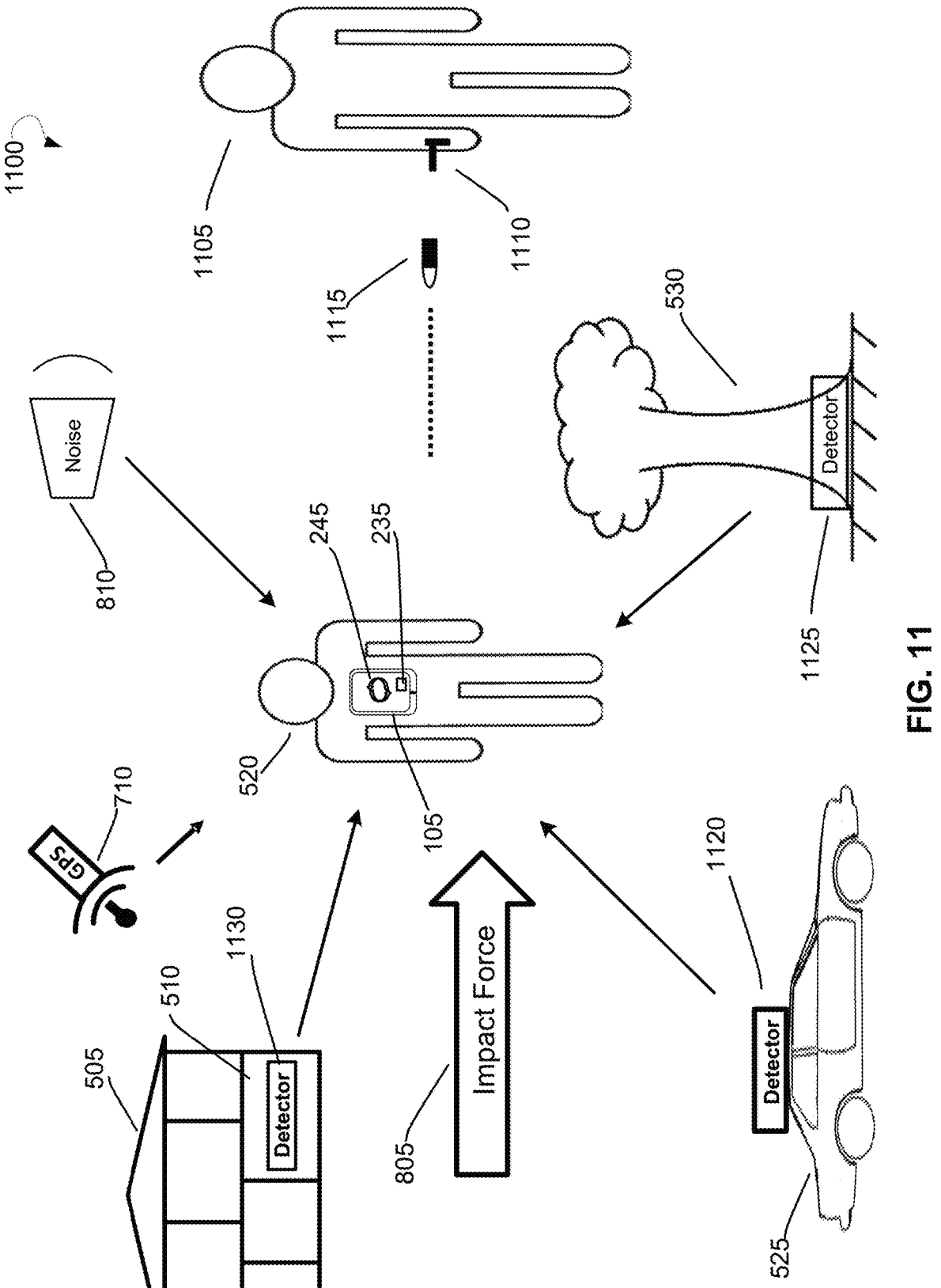

1100
1105
1110
1115
530
Noise
810
Detector
245
235
1125
520
105
710
GPS
1120
1130
510
Impact Force
Detector
505
805
525

FIG. 11

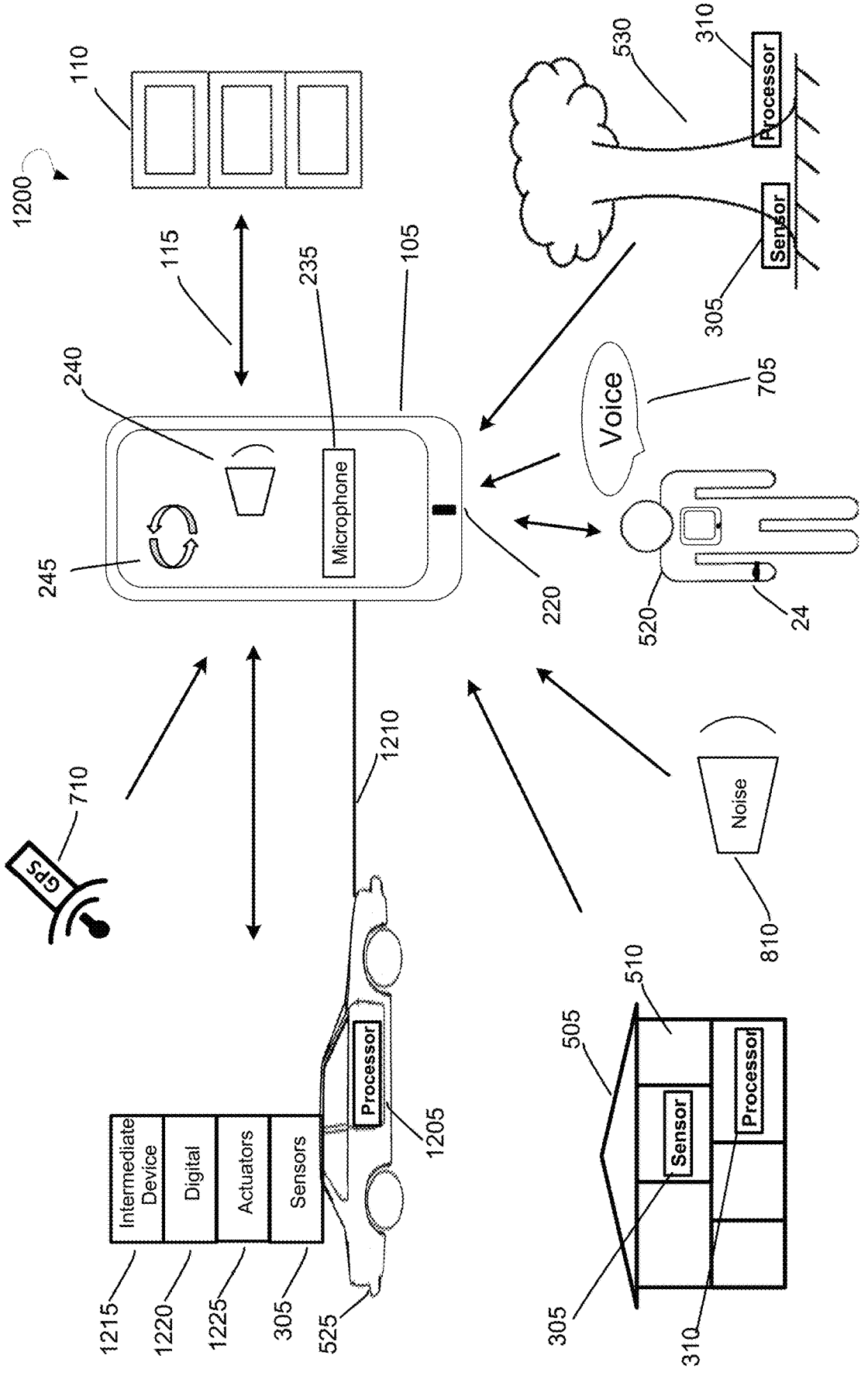

1200
110
115
235
105
240
245
Microphone
220
530
310
Processor
Sensor
305
Voice
705
520
24
710
GPS
1210
Noise
810
505
510
Sensor
Processor
305
310
Intermediate Device
Digital
Actuators
Sensors
Processor
1205
1215
1220
1225
305
525

FIG. 12

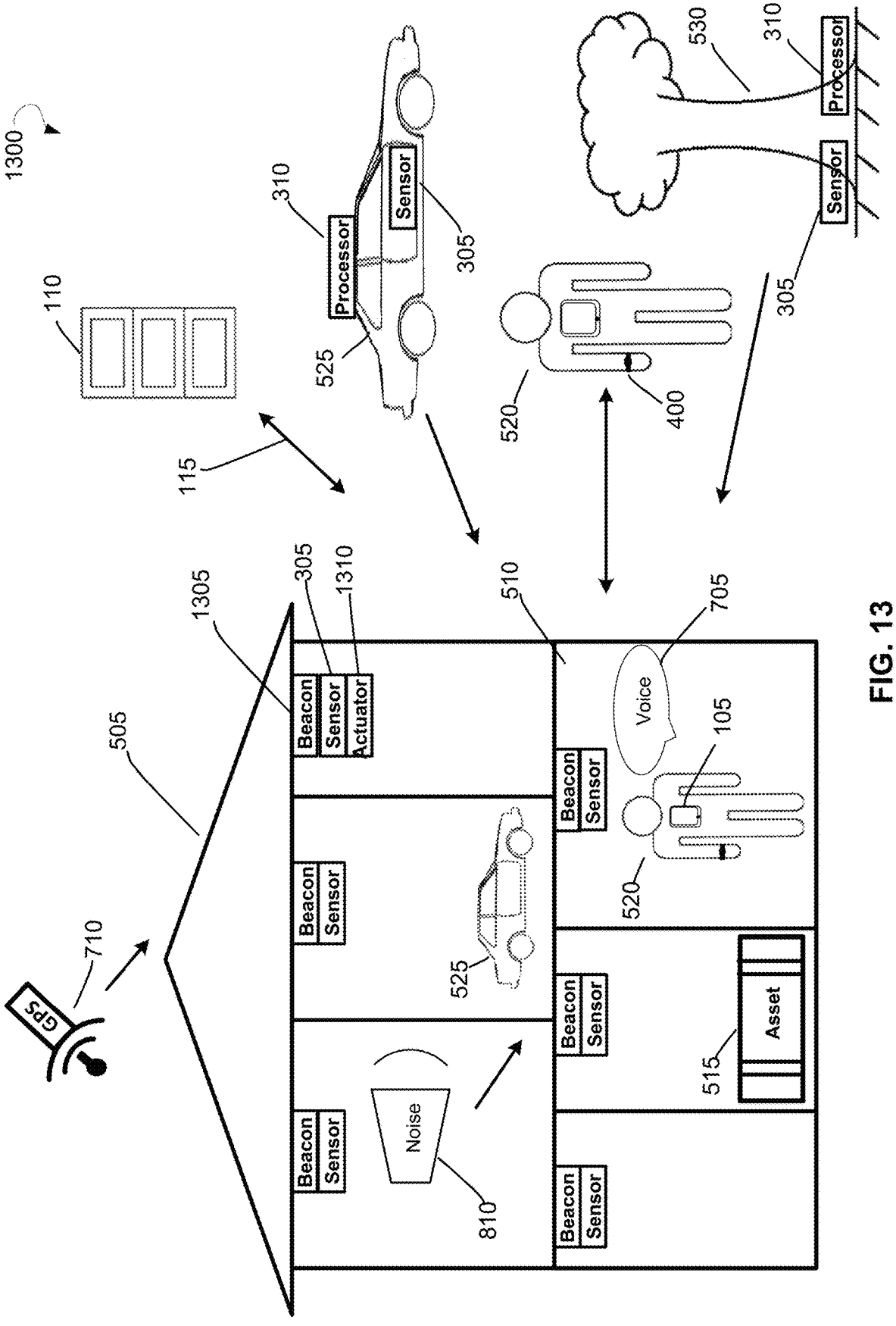

1300
110
115
310
Processor
Sensor
305
525
520
400
530
310
Processor
Sensor
305
505
710
GPS
1305
305
1310
Beacon
Sensor
Actuator
Beacon
Sensor
Beacon
Sensor
Beacon
Sensor
Noise
810
525
510
705
Voice
105
520
Beacon
Sensor
Beacon
Sensor
515
Asset

FIG. 13

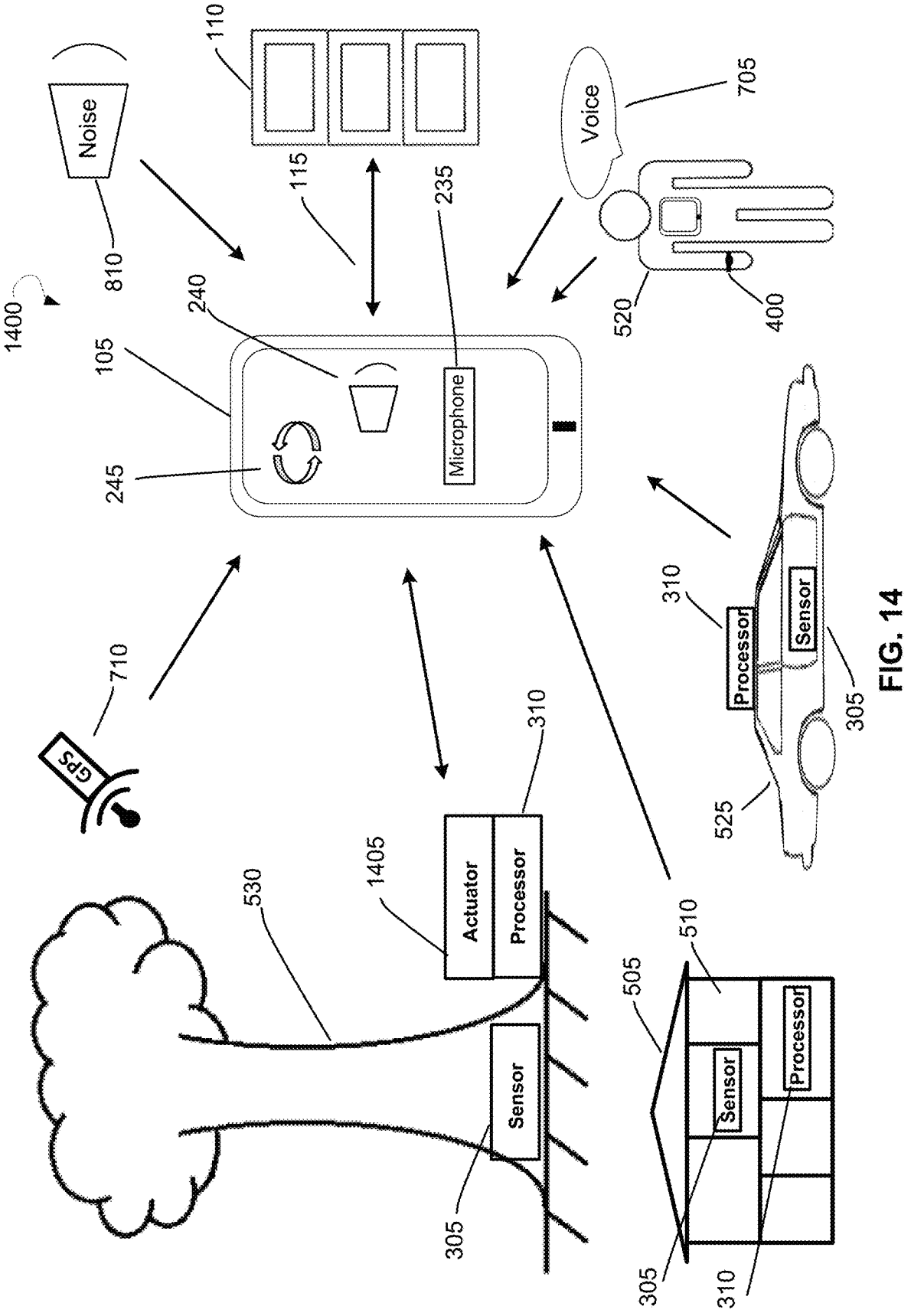

110
Noise
810
115
235
Voice
705
1400
240
105
520
400
Microphone
245
310
Processor
Sensor
305
710
GPS
525
310
1405
Actuator
Processor
530
505
510
Sensor
Processor
305
310

FIG. 14

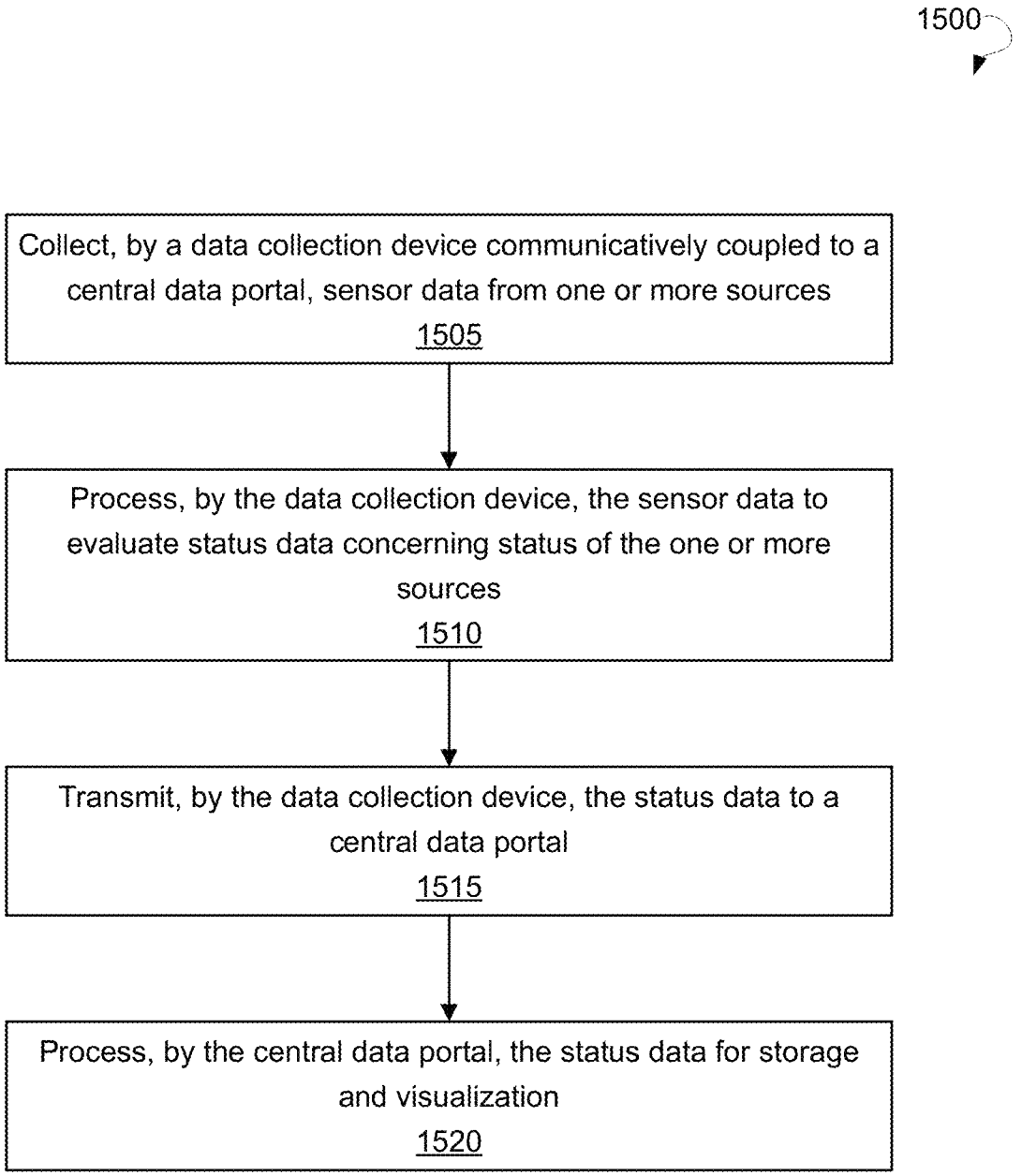

1500
Collect, by a data collection device communicatively coupled to a central data portal, sensor data from one or more sources
1505
Process, by the data collection device, the sensor data to evaluate status data concerning status of the one or more sources
1510
Transmit, by the data collection device, the status data to a central data portal
1515
Process, by the central data portal, the status data for storage and visualization
1520

FIG. 15

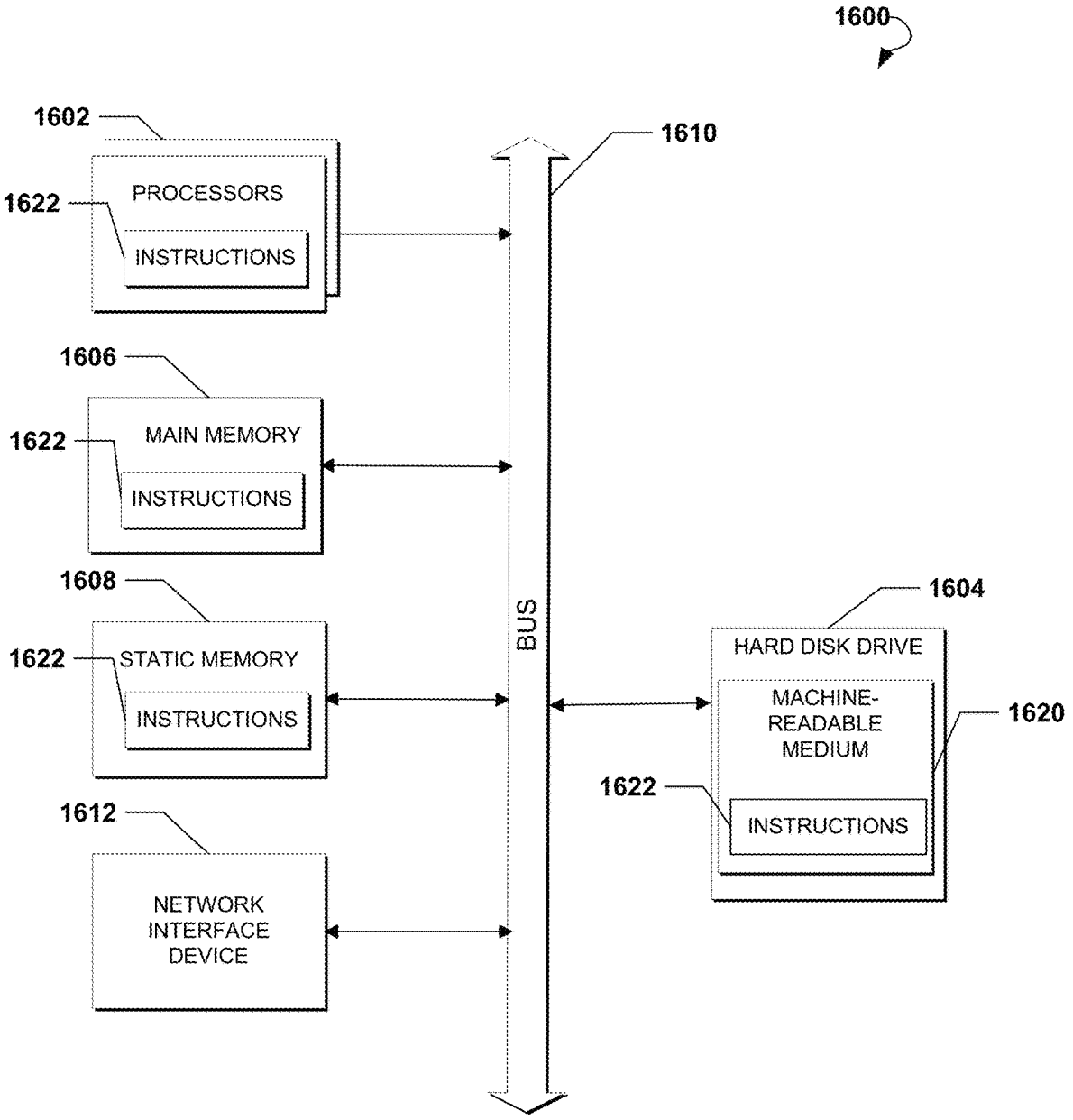

1600
1602
PROCESSORS
1622
INSTRUCTIONS
1610
1606
MAIN MEMORY
1622
INSTRUCTIONS
1608
STATIC MEMORY
1622
INSTRUCTIONS
1612
NETWORK INTERFACE DEVICE
BUS
1604
HARD DISK DRIVE
MACHINE-READABLE MEDIUM
1620
1622
INSTRUCTIONS

FIG. 16

METHODS AND SYSTEMS FOR EVALUATING AND TRANSMITTING COMBINED EXTERNAL DATA FROM ONE OR MORE SOURCES TO A CENTRAL DATA PORTAL FOR PROCESSING, STORAGE, AND VISUALIZATION

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority of U.S. Provisional Patent Application No. 62/700,532 filed on Jul. 19, 2018, entitled "Methods and System for the evaluation and transmission of combined external data from one or more sources to a central data portal for processing, storage, and visualization," which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

The present disclosure relates generally to data processing and, more specifically, to methods and systems for evaluating and transmitting combined external data from one or more sources to a central data portal for processing, storage, and visualization.

BACKGROUND

The approaches described in this section could be pursued but are not necessarily approaches that have previously been conceived or pursued. Therefore, unless otherwise indicated, it should not be assumed that any of the approaches described in this section qualify as prior art merely by virtue of their inclusion in this section.

Existing systems for the transmission of external data are employed independently of each other and, therefore, are limited in their ability to collect or combine information from different and multiple data sources for transmission and evaluation using a single data transmission source.

Existing systems operating in the telemetry space are also constrained by limited modes or limited combinations of modes for data transmission. These limitations can prevent combining data from different multiple sources at a single data portal for the processing, storage and visualization of the data. Thus, data related to persons, vehicles, machineries, assets, buildings or external environments are treated as separate entities during processing, storing, and visualization while aggregated at a centralized data portal.

SUMMARY

This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

Provided are computer-implemented systems and methods for evaluating and transmitting combined external data from one or more sources to a central data portal for processing, storage, and visualization.

According to one example embodiment, a system for evaluating and transmitting combined external data from one or more sources is provided. The system may include a central data portal and a data collection device communicatively coupled to the central data portal. The data collection device can be configured to collect sensor data from the one or more sources. The data collection device may process the sensor data to evaluate status data concerning states of the one or more sources. The data collection device may transmit the status data to a central data portal. The central data portal can be configured to process the status data for storage and visualization.

The evaluation of a status of a first source of the sources can be partially based on sensor data collected from a second source of the sources, wherein the second source is different from the first source.

The sensor data can be transmitted between the sources and the data collection device via one or more wired communication channels. The sensor data are transmitted between the sources and the data collection device via one or more wireless communication channels.

The sources may include one or more of a building, a room, outdoor location, an asset, a vehicle, a person, and a wearable device worn by the person. The data collection device can include a handheld microprocessor device associated with the person. The data collection device can be configured to determine, based on the sensor data, a status concerning a state of panic of the person.

The data collection device can be configured to determine, based on the sensor data, status concerning an impact imposed on the person. The data collection device can be configured to determine, based on the sensor data, a status concerning non-responsiveness of the person. The data collection device can be configured to determine, based on the sensor data, a status concerning a physical orientation of the person. The data collection device can be configured to determine, based on the sensor data, a status concerning a presence of a gunshot in a proximity of the person.

The data collection device can be configured to determine, based on the sensor data, a status concerning an actuated operational state, performance and diagnostics of the vehicle.

The data collection device can be configured to determine or actuate, based on the sensor data, a status concerning a building or a room. The status concerning the building or the room may include at least one or more of the following: the room is unlocked, the room is locked, a window is opened, a window is closed, a temperature of the room is higher a pre-determined temperature threshold, a smoke detector alarm, a gas detector alarm, a fire detector alarm, a humidity level being outside of a pre-determined humidity range, an air quality level being outside of a pre-determined air quality range, a gunshot is detected, a window glass is broken, a door is impacted, and a wall is impacted.

The data collection device can be configured to determine, based on the sensor data, a status concerning the outdoor location. The status concerning the outdoor location may include at least one or more of the following: a humidity level at the outdoor location is outside of a pre-determined humidity range, an air temperature at the outdoor location is outside of a pre-determined temperature range, an air quality level at the outdoor location is outside of a pre-determined air quality range, a gunshot is detected at the outdoor location, a smoke detector at the outdoor location is set off, and a gas detector at the outdoor location is set off.

According to another example embodiment, a method for evaluating and transmitting combined external data from one or more sources is provided. The method may include collecting, by a data collection device communicatively coupled to a central data portal, sensor data from one or more sources. The method may include processing, by the data collection device, the sensor data to evaluate status data

concerning statuses of the sources. The method may include transmitting, by the data collection device, the status data to a central data portal. The method may include processing, by the central data portal, the status data for storage and visualization.

Additional objects, advantages, and novel features will be set forth in part in the detailed description section of this disclosure, which follows, and in part will become apparent to those skilled in the art upon examination of this specification and the accompanying drawings or may be learned by production or operation of the example embodiments. The objects and advantages of the concepts may be realized and attained by means of the methodologies, instrumentalities, and combinations particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments are illustrated by way of example and not limitation in the figures of the accompanying drawings, in which like references indicate similar elements and in which:

FIG. **1** illustrates an environment within which methods and systems for evaluating and transmitting combined external data from one or more sources to a central data portal can be implemented.

FIG. **2** is a block diagram showing an example data collection and transmission device, according to an example embodiment.

FIG. **3** is a block diagram showing a source, according to an example embodiment.

FIG. **4** is block diagram showing a wearable device, according to some example embodiment.

FIG. **5** illustrates an environment within which methods and systems for evaluating and transmitting combined external data from one or more sources to a central data portal can be implemented, according to some example embodiment.

FIG. **6** is a block diagram showing various modules of a system for evaluating and transmitting combined external data from one or more sources to a central data portal, in accordance with certain embodiments.

FIG. **7** illustrates an environment within which a panic module of the system for evaluating and transmitting combined external data from one or more sources to a central data portal can be implemented, according to some example embodiments.

FIG. **8** illustrates an environment within which an impact module of the system for evaluating and transmitting combined external data from one or more sources to a central data portal can be implemented, according to some example embodiments.

FIG. **9** illustrates an environment within which a non-responsiveness module of the system for evaluating and transmitting combined external data from one or more sources to a central data portal can be implemented, according to some example embodiments.

FIG. **10** illustrates an environment within which a physical orientation module of the system for evaluating and transmitting combined external data from one or more sources to a central data portal can be implemented, according to some example embodiments.

FIG. **11** illustrates an environment within which a gunshot detection module of the system for evaluating and transmitting combined external data from one or more sources to a central data portal can be implemented, according to some example embodiments.

FIG. **12** illustrates an environment within which a vehicle and machinery evaluation module of the system for evaluating and transmitting combined external data from one or more sources to a central data portal can be implemented, according to some example embodiments.

FIG. **13** illustrates an environment within which a building and room evaluation module of the system for evaluating and transmitting combined external data from one or more sources to a central data portal can be implemented, according to some example embodiments.

FIG. **14** illustrates an environment within which an outdoor location evaluation module of the system for evaluating and transmitting combined external data from one or more sources to a central data portal can be implemented, according to some example embodiments.

FIG. **15** is a flow chart showing a method for evaluating and transmitting combined external data from one or more sources to a central data portal can be implemented.

FIG. **16** shows a computing system that can be used to implement a method for evaluating and transmitting combined external data from one or more sources to a central data portal, according to an example embodiment.

DETAILED DESCRIPTION

The following detailed description includes references to the accompanying drawings, which form a part of the detailed description. The drawings show illustrations in accordance with exemplary embodiments. These exemplary embodiments, which are also referred to herein as "examples," are described in enough detail to enable those skilled in the art to practice the present subject matter. The embodiments can be combined, other embodiments can be utilized, or structural, logical, and electrical changes can be made without departing from the scope of what is claimed. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope is defined by the appended claims and their equivalents.

The present disclosure is directed to systems and methods for evaluating and transmitting combined external data from one or more sources to a central data portal for processing, storage, and visualization. Some embodiments of the present disclosure may allow combining information from various and multiple data sources to be transmitted to a central data portal via a single device. The information can be obtained from persons, vehicles, machineries, assets, buildings, or outdoor locations. The information can be evaluated by methods that combine information from multiple data evaluation sources. Embodiments of the present disclosure may further aggregate data from these various sources for processing, storage, and visualization on a central data portal. Embodiments of the present disclosure may also provide one or more modes for transferring the data to the central portal.

One of the main differences between the technology disclosed herein and existing technologies is the ability to combine information from various and multiple data sources and transfer the data to a central portal. The information collected from various multiple sources can be processed and used by advanced evaluation methods to enhance system features and create new features that are not possible within the constraints of the existing technologies.

Modes of data transmission described herein are not limited to the data transmission used by existing technologies. Embodiments of the present disclosure may enhance the ability to monitor personnel both indoor and outdoor. Some embodiments of the present disclosure may allow unifying data from various sources and, thereby, provide

efficacy and cost savings by eliminating the need for multiple data transmission devices.

Existing systems can be designed to take data from a single source whether it be a person, vehicle, building or environment and then transfer the data to a portal for processing, storage, and visualization. The processing, storage and visualization data at the portal are based on the relevancy of the single source. The existing methods in which the data from a source is evaluated are also limited to the data collected from the source.

Limiting the transmission of data to a single source system requires users to access multiple single-source systems in order to review data from all sources. This separation of data limits the ability to effectively process data from multiple sources for advanced methods. Such systems are further limited in their inability to collect and evaluate data from various sources from a single device, resulting in the need to have multiple devices with redundant capabilities evaluate and transmit data.

Some embodiments of the present disclosure may provide visibility to information obtained from various sources and aggregated at a single portal. Furthermore, the transfer of data from various sources can be evaluated and transmitted using a single device. Thus, embodiments of the present disclosure may allow eliminating the need for multiple systems using multiple devices to evaluate the sources. Embodiments of the present disclosure may also provide advanced algorithms that can depend on data from multiple sources. Therefore, systems and methods disclosed herein can analyze, using aggregated source information and evaluation, the following functionalities: impact, panic, physical orientation, responsiveness, monitoring indoor and outdoor, vehicle prognostics, vehicle diagnostics, vehicle monitoring, building monitoring and access, environmental monitoring, asset monitoring, gunshot detection, and biometrics.

According to some embodiments of the present disclosure, a system for evaluating and transmitting combined external data from one or more sources to a central data portal may include a handheld microprocessor device (for example, a smart phone) and a software application running on the handheld microprocessor device. The handheld microprocessor device may collect sensor data from multiple sources for evaluation. The handheld microprocessor device may then send the data to a central data portal via wireless radio frequency (RF) communication or, optionally, by a secondary RF communication device. The secondary RF communication device can be used when the standard frequencies of the handheld microprocessor device are not sufficient to transmit the data over a distance.

The central data portal may include a computer with processing capabilities, memory, storage, and internet connection. Software programming on the central data portal can be required to receive data from the handheld microprocessor, store, post process, and deliver data to the user interface web portal. To provide further enhancement to the evaluation and processing of data, additional devices can be used to collect data from a different source and then send the collected data to the central handheld microprocessor device.

Some embodiments of the present disclosure may allow equipping personnel with the handheld microprocessor devices that monitors sensors inherent to the devices and sensors of devices connected to the handheld microprocessor devices. The connected devices may monitor other personnel, vehicles, assets, indoor environments and outdoor environments. Sensor data can be collected for all entities and sent through applicable transmission methods to the central data portal. All collected data can be processed and displayed via a user on a web-portal.

Embodiments of the present disclosure may allow aggregation of data from multiple sources at a central data portal for processing and visualization. This may allow avoiding using multiple monitoring systems for mixed fleet of different sources. The data collected by the central data portal can be used by web portal users for the following applications: general telemetry practices, safety monitoring and planning, dispatching, vehicle fleet monitoring and maintenance, emergency response and preparedness, asset monitoring, building monitoring and control, hospitality worker panic safety, indoor positioning, gunshot detection and shooter positioning, and building access.

Referring now to the drawings, FIG. **1** illustrates an environment **100** within which methods and systems for evaluating and transmitting combined external data from one or more sources to a central data portal can be implemented. The environment **100** may include a data collection and transmission device **105**, a central data portal **115**, a user interface portal **120**, and one or more connected sources **125**.

In some embodiments, the data collection and transmission device **105** may include a handheld microprocessor device, such as a smartphone or a tablet computer. The data collection and transmission device **105** may receive data from one or more sources **125**. The sources **125** may include buildings, rooms of the buildings, outdoor locations, vehicles, and so forth. Each of the sources may include sensors, processors, actuators, and communication interface. The sources **125** can be connected to the device **105** by one or more communication channels **250** including but not limited to wireless methods of connectivity such as cellular connections, two-way radio connection, WiFi, Bluetooth™, near field communication (NFC), Satellite, Zigbee, microwave, infrared, or other protocols of wireless radio frequency (RF) connections.

The data collection and transmission device **105** may include sensors. Furthermore, the data collection and transmission device **105** may be configured to evaluate data received from the sensors and connected sources and send the data to the central data portal via communication channel **115**. The data communication channel **115** may be selected from a cellular data communication channel, a two-way radio data communication channel, WiFi, Bluetooth, Near Field Communication (NFC), a satellite data communication channel, Ethernet, ZigBee, Microwave, Infrared, or other forms of wireless RF or wired data transmission. The data collection and transmission device **105** can be equipped with electronics for the transmission of data via any single mode or any combination of modes of data transfer, or any combination of cellular, two-way radio, WiFi, Bluetooth, NFC, satellite, Ethernet, ZigBee, Microwave, Infrared, or other forms of wireless RF transmission or wired data transmission.

The central data portal **110** may include one or more servers and/or cloud based computational resources. The central data portal **110** may store information received from the data collection and transmission device **105**. The user interface portal **120** may include a personal computer, a tablet computer, a smartphone, and so forth. The user interface portal **120** can retrieve stored information from the central data portal **110** and send data for further processing and storage.

FIG. **2** is a block diagram showing an example data collection and transmission device **105**, according to an example embodiment. The data collection and transmission device **105** can include a central processing unit **205** for

evaluating data, memory **210** for locally storing data and a RF transmission module **215** for sending and rescinding data with the central data portal **110** (shown in FIG. **1**).

The data collection and transmission device **105** can include sensors. The sensors may include sensors **220** fixed on the device **105**. The sensors may include remote sensors **225** connected to the device **105** via a wired connection. The sensors may also include sensors **230** connected to the device **105** via a wireless communication channels **250**, such as cellular, two-way radio, WiFi, Bluetooth™, NFC, Satellite, Zigbee, Microwave, Infrared, or other forms of wireless RF connection. The sensors **220** fixed on the device **105** may include but are not limited to buttons, fingerprint sensor, temperature sensor, pressure sensor, light sensor, camera, and touch screen.

The data collection and transmission device **105** may include a microphone **235**, speaker **240**, and a movement sensor **245**. The movement sensor may include an accelerometer and/or a gyroscope. The device **105** can be connected wirelessly to one or more of sources that include buildings, rooms, assets, person, vehicles, or outdoor locations. The device **105** can be also communicatively connected with wearable devices being worn by one or more persons.

FIG. **3** is a block diagram showing a source **125**, according to an example embodiment. The source **125** may include a sensor **305** and a processor **310**, a RF transmission module **315**, and actuator **320**. The source **125** may be configured to collect data and transmit data to the device **105** and receive data from the device **105**. The data between the source **125** and the device **105** can be transmitted wirelessly by communication channels **250** (shown in FIG. **1**).

FIG. **4** is block diagram showing a wearable device **400**, according to some example embodiments. The wearable device **400** may include sensors **405** fixed at the wearable device **400**, a touch screen **410**, a wireless connection module **415**, and a movement sensor **420**. The sensors **405** fixed at the wearable **400** can include but are not limited to buttons, fingerprint sensor, temperature sensor, pressure sensor, light sensor, camera, and heartrate sensor.

FIG. **5** illustrates an environment **500** within which methods and systems for evaluating and transmitting combined external data from one or more sources to a central data portal can be implemented, according to some example embodiments. The environment **500** may include a data collection and transmission device **105**, a building **505**, a room **510**, an asset **515**, a person **520**, a vehicle source **525**, and outdoor location **530**, a central data portal **110**. Each of the sources **505**, **510**, **515**, **520**, **525**, and **530** may include its own source sensor **305** and source processor **310**. The sources **505**, **510**, **515**, **520**, **525**, and **530** may include wireless or wired communication interface. The sources **505**, **510**, **515**, **520**, **525**, and **530** may be communicatively connected with the data collection and transmission device **105** by a communication channel **250**. The data collection and transmission device **105** and the central data portal **110** can be commensurately coupled via a communication channel **115**.

In one embodiment of the present disclosure, the data collection and transmission device **105** may include a handheld microprocessor device with a touchscreen display, sensors, buttons and RF transmission capabilities. The central data portal **110** may include data processing and storage hardware capable of receiving data via internet connection and publishing content to a web browser. The handheld microprocessor device may connect with other devices to collect additional information. The connection can be carried out via a wired connection (USB or similar connection) or wireless connection (Bluetooth™, NFC, Wi-Fi, cellular or similar connection) for data transmission. Each of the connected device may collect data from a source. The source can include a person, a vehicle, an asset, indoor environment (for example building and rooms), or outdoor environment. The data collected from all sources can be used to evaluate states of the sources or host source by the handheld microprocessor device (device **105**).

In embodiments where the sources include one or more persons, the device **105** may collect and transmit data including, but not limited to: GPS location, time, speed, direction, orientation, impact detected, impact detected due to gunshot, gunshot detected, biometrics, heartrate, status of buttons and switches, temperature, pressure, light intensity, audio, images, files, magnetic proximity, and biometrics.

In embodiments where the sources includes one or more vehicles and assets, the handheld microprocessor device (the device **105**) can collect and transmit data including, but not limited to: GPS location, time, speed, direction of vehicle, run status, fuel level, door status, crash detected, driver behavior data, gunshot detected, status of buttons and switches, temperature, pressure, light intensity, audio, magnetic proximity, Controller Area Network data, Local Interconnect Network data, Ethernet data, Serial data, Engine diagnostic data, driver status reports, odometer, driver user input display status, electronic driver logs, images, and files.

In embodiments where the sources include indoor environment or outdoor environment, the handheld microprocessor device (the device **105**) can collect and transmit data from, but not limited to, the following sensors: door sensor, window sensor, gunshot detector, gas detector, and smoke detector. The data may include one or more the following: time, GPS location, switch status, temperature, pressure, air quality, light intensity, audio, and video.

The handheld microprocessor device (the device **105**) can process the received data to evaluate states of the sources. The evaluated data can be further sent to the central data portal **110** for further processing, storage, and visualization. The data from various sources can be used for advanced post processing by combining the evaluated states of the sources to calculate new states. States concerning persons may pertain, but not limited to, impact, panic, physical orientation, responsiveness, gunshot detection, health, safety conditions, state of working, active, or off duty, and location.

States concerning the vehicles and assets may pertain, but not limited to prognostics, diagnostics, running, speeding, idling, tamper, location, and safety. States concerning indoor environment and outdoor environments may pertain, but not limited to, safety, air quality, occupancy, and gunshot detected.

FIG. **6** is a block diagram showing various modules of a system **600** for evaluating and transmitting combined external data from one or more sources to a central data portal in accordance with certain embodiments. Specifically, the system **600** may include a data collection module **605**, a panic module **610**, an impact module **615**, a non-responsiveness module **620**, a physical orientation module **625**, a shot detection module **630**, a vehicle and machinery evaluation module **635**, a building and room evaluation module **640**, and an outdoor location evaluation module **645**. In one example embodiment, the modules of the system **600** can be implemented as processor-executable instructions stored in memory of the data collection and transmission device **105**.

In some embodiments, the data collection and transmission device **105** may include a mobile device of a person. The data collection module may continuously collect data from sources, for example sources **505-530**, wearable device

400 worn by a person, sensors, microphone, and movement sensor of the mobile of the data collection and transmission device 105 (mobile device of the person).

FIG. 7 illustrates an environment 700 within which the panic module 610 of the system 600 can be implemented, according to some example embodiments. The environment 700 includes a data collection and transmission device 105, a building 505, a room 510, a person 520, a vehicle source 525, and outdoor location 530. The system 600 may by implemented as a software application on the device 105.

Panic module 610 may receive data including: voice commands and speech 705 of person 520 via microphone 235 of the data collection and transmission device 105, movement data of the device 105 via movement sensor 245, and GPS signals 710. The panic module 610 may receive data from person wearable devices 400, vehicles 525 and sensors 305 and processor 310 associated with the vehicles 525, outdoor locations 530 and sensors 305 and processor 310 associated with the outdoor locations 530, buildings 505, rooms 510 and sensors 305 and processor 310 associated with the buildings 505 and rooms 510. The panic module 610 can evaluate, based on the received data, a state of a person concerning a panic situation. Data for determining state of panic situation can be collected from inherent sensors of the device 105, connected sources, external sensors, and external stimuli.

In some example embodiments of the present disclosure, a user can trigger the panic event by pressing a button of device 105 (for example, a handheld microprocessor device). The panic event can be also triggered based on one or more of the following inputs: motion data of the device 105, voice command, result of speech analysis, touch screen button press or gesture, physical body orientation, audible gunshot detection, pressing a button on a device of connected source, and detection of a voice command by the device of connected source. The connected source can include other persons, vehicles, machineries, buildings, rooms, outdoor locations and assets. The trigger and or sequence of triggers can be configurable and adaptable for the situation and environment. The trigger can be enabled or disabled based on the location being indoors or outdoors or a proximity to a known location, asset, building or vehicle or by manual or central data portal commanded input. Voice commands can be set by the user.

The module 610 can perform speech analysis of the voice command to determine a panic event. A video or imagery captured by the handheld microprocessor device or externally connected source device and person heartrate can be analyzed to determining a panic event. The panic event can be transmitted to the central data portal 110 for processing, storage and visualization.

FIG. 8 illustrates an environment 800 within which the impact module 615 of the system 600 can be implemented, according to some example embodiments. The environment 800 includes a data collection and transmission device 105, a building 505, a room 510, a person 520, a vehicle source 525, and outdoor location 530. The system 600 can run as a software application on the device 105.

The impact module 615 can receive the following data: impact force 805 via movement sensor 245 (accelerometer/gyroscope) of the device 105, environmental noise 810 via microphone 235, person 520 movement via movement sensors 245 (accelerometer/gyroscope), and GPS signals 710. The impact module 615 may receive data from person 520, wearable devices 400, vehicles 525, sensors 305, and processor 310 associated with vehicles 305, outdoor locations 530 and sensors 305 and processor 310 associated with outdoor locations 530, buildings 505, rooms 510 and sensors 305 and processor 310 associated with buildings 505 and rooms 510. The impact module 615 may evaluate, based on received data, a state of person pertaining to an impact. Data for determining the state of the person pertaining to an impact (impact event) can be collected from inherent sensors fixed on the device, connected sources, external sensors, and external stimuli.

In some embodiments of the present disclosure, the impact event can be triggered based on determination that impact force applied to a person, vehicle, or a building results in an acceleration of the device 105 (handheld microprocessor device) or a sensor connected to the device 105. The acceleration as sensed by an accelerometer and or gyroscope can be evaluated by computing amplitude of the acceleration over time in both time domain and frequency domain. The trigger and or sequence of triggers can be configurable and adaptable for the situation and environment. The trigger can be enabled or disabled based on the location indoors or outdoors or proximity to known people, location, asset, building or vehicle or by manual input or command from the central data portal 110. Other sensors and inputs can be used to evaluate the acceptance of the impact triggers. These inputs may include but are not limited to person heartrate, button press, voice command, environmental noise, audible gunshot detection, GPS signal, indoor positions, physical body orientation, connected source device button press, and connected source device voice command. The connected source may include other persons, vehicles, machineries, buildings, rooms, outdoor locations and assets. The event data can be transmitted to the central data portal for processing, storage and visualization.

FIG. 9 illustrates an environment 900 within which the non-responsiveness module 620 of the system 600 can be implemented, according to some example embodiments. The environment 900 includes a data collection and transmission device 105, building 505, room 510, person 520, vehicle source 525, and outdoor location 530. The system 600 may be implemented as a software application running on the device 105.

The non-responsiveness module 620 may receive the following data: relative time 905 as calculated by the handheld microprocessor device 105, impact force 805 movement data via movement sensors 245 (accelerometer/gyroscope), environmental noise 810 detected by microphone 235, person 520 movement detected by movement sensors 245 (accelerometer/gyroscope), person 520 physical body orientation. The data can be also received from person wearable devices 400, GPS signals 710, vehicles 525 and sensors 305 and processor 310 associated with the vehicle 520, outdoor locations 530, sensors 305, processor 310 associated with outdoor locations 530, buildings 505, rooms 510, sensors 305, and processor 310 associated with the buildings 505 and rooms 510. The non-responsiveness module 620 may evaluate, based on the received data, a state of a person pertaining to the non-responsiveness. Data for determining the state of the person pertaining to the non-responsiveness can be collected from inherent sensors fixed on the device 105, connected sources, external sensors, and external stimuli.

In some embodiments of the present disclosure, a non-responsiveness event can be triggered based on a duration of time during which acceleration and or orientation of the device 105 (for example, a handheld microprocessor device) or a connected sensor is below a threshold. The threshold can be configurable and adaptable. The acceleration and or orientation as sensed by an accelerometer and or gyroscope

can be evaluated by computing amplitude of the acceleration and/or orientation over time in both time domain and frequency domain. The trigger or sequence of triggers can be configurable and adaptable for the situation and environment. The trigger can be enabled or disabled based on the location of person indoors or outdoors or proximity to a known people, location, asset, building or vehicle or by manual or central data portal commanded input. Other sensors and inputs can be used to evaluate the acceptance of the non-responsiveness trigger. These inputs may include but are not limited to person's heartrate, button press, voice command, environmental noise, audible gunshot detection, GPS signal, indoor positions, physical body orientation, connected source device button press, and connected source device voice command. Connected source may include other persons, vehicles/machinery, buildings/rooms, outdoor locations, and assets. The event data can be then transmitted to the central data portal for processing, storage and visualization.

FIG. **10** illustrates an environment **1000** within which physical orientation module **625** of the system **600** can be implemented, according to some example embodiments. The environment **1000** can include a data collection and transmission device **105**, building **505**, room **510**, person **520**, vehicle source **525**, and outdoor location **530**. The system **600** may run as a software application on the device **105**.

The physical orientation module **625** may receive data from the following sources: person **520** transferred movement via movement sensors **245** (accelerometer/gyroscope), person wearable devices **400**, GPS signals **710**, vehicles **525** and sensors **305** and processor **310** associated with the vehicle **520**, outdoor locations **530** and sensors **305** and processor **310** associated with outdoor locations **530**, buildings **505**, rooms **510**, sensors **305**, processor **310** associated with the buildings **505**, and rooms **510**. The physical orientation module **625** may evaluate, based on the received data, a state of physical orientation of the person. The state pertaining to physical orientation of a person can be evaluated based on data collected from inherent sensors fixed on the device, connected sources, external sensors, and external stimuli.

In some embodiments of the present disclosure, the state of the physical orientation can be evaluated based on determination that acceleration and/or orientation to the handheld microprocessor device or connected sensor is within a threshold range. The threshold range can be configurable and adaptable. The acceleration and/or orientation as sensed by an accelerometer and or gyroscope can be evaluated by computing an amplitude of the acceleration or orientation over time in both time domain and frequency domain. The state and/or sequence of states can be configurable and adaptable for the situation and environment. The determination of the state can be enabled or disabled based on the location of person indoors or outdoors or proximity to known people, location, asset, building or vehicle or by manual or central data portal commanded input. Other sensors and inputs can be used to evaluate the acceptance of the orientation state. These inputs may include but are not limited to button press, GPS signal, indoor positions, connected wearable device orientation, connected source device button press. Connected source may include other persons, vehicles/machinery, buildings/rooms, outdoor locations and assets. The state of the physical orientation to the person can be transmitted to the central data portal for processing, storage and visualization.

FIG. **11** illustrates an environment **1100** within which gunshot detection module **630** of the system **600** can be implemented, according to some example embodiments. The environment **1100** includes a data collection and transmission device **105**, building **505**, room **510**, person **520**, vehicle source **525**, outdoor location **530**, shooter **1105**, firearm **1110**, and bullet **1115**. The system **600** may be implemented to run as a software application on the device **105**.

The gunshot detection module **630** can be configured to detect the presence of an audible gunshot of a bullet **1115** from firearm **1110** and the location of the shooter **1100**. The shot detection module **630** may receive the following data: impact force **805** movement via movement sensors **245** (accelerometer/gyroscope), environmental noise (**810**) via microphone **235**, and GPS signals **710**. The data can be also received from person wearable devices **400**, vehicles **520** and vehicle detectors **1120**, outdoor locations **530** and associated outdoor detectors **1125**, buildings **505** and rooms **510** and their associated indoor detectors **1130**. The gunshot detection module **630** may evaluate, based on the received data, a state of gunshot detected status. Data for detection of gunshot can be collected from inherent sensors of the device **105**, connected sources, external sensors, and external stimuli.

In some embodiments of the present disclosure, the device **105** may trigger a gunshot detection event by determining that audible input is above a threshold. The threshold can be configurable and adaptable. The audible input due to a firearm discharging and projectile can be detected by microphone of the handheld microprocessor device or connected sensor. The audible input as sensed by the microphone can be evaluated by computing the amplitude of the audible input over time in both time domain and frequency domain. The trigger and or sequence of triggers can be configurable and adaptable for the situation and environment. The trigger can be enabled or disabled based on the location of person indoors or outdoors or proximity to a known people, asset, building or vehicle or by manual input or command from central data portal. Other sensors and inputs can be used to evaluate the acceptance of the shot detection trigger. These inputs may include but are not limited to person's heartrate, button press, voice command, environmental noise, GPS signal, indoor positions, connected source device button press, and connected source device audio input. The connected source can include other persons, vehicles, machineries, buildings, rooms, outdoor locations, and assets. The event data can be transmitted to the central data portal for processing, storage, and visualization.

FIG. **12** illustrates an environment **1200** within which vehicle and machinery evaluation module **630** of the system **600** can be implemented, according to some example embodiments. The environment **1200** includes a data collection and transmission device **105**, building **505**, room **510**, person **520**, vehicle **525**, and outdoor location **530**, and central data portal **110**. The system **600** may run as a software application on the device **105**.

The vehicle and machinery evaluation module **630** may receive data from a vehicle **525**. Data may be pertaining to the vehicle's past, current and future performance and operation running state as evaluated by vehicle processor **1205**. The data can be transmitted to the data collection and transmission device **105** via a wired connection **1210** or wirelessly. The device **105** may receive the vehicle's data directly from the vehicle **525** or via an intermediate vehicle communication and processing device **1215**. Sensor data

from sensors **305** and digitally communicated vehicle and machinery data **1220** can be transmitted to the device **105** and then to the central data portal **110** over communication channel **115**.

The device **105** can receive commands from a person **520** and or central data portal **110** to actuate actuators **1225** and/or modify data of the vehicle processor **1205** on the vehicle **525**. The device **105** can receive commands from a person **520** and or central data portal **110** to modify data or command outputs of the vehicle intermediate vehicle communication and processing device **1215**. Upon receiving the command outputs, the intermediate vehicle communication and processing device **1215** can actuate one or more states of the vehicle **525**. The states may include, but are not limited to, one or more of the following: a vehicle running state, states of lights, states of pumps, states of doors, and states of windows.

Connected sensors and sources can be used for the mutual evaluation of the sensors associated with vehicle **525** and person **520** and other sources. The sources may include the following: GPS signals **710**, other vehicles and sensors and processor associated with other vehicles, outdoor locations **530** and sensors **305** and processor **310** associated with the outdoor locations, buildings **505** and rooms **510**, sensors **305** and processor **310** associated with buildings **505** and rooms **510**, and person wearable devices **400**. The evaluation can be based on the following data: person **520** movement detected via movement sensors **245** (accelerometer/gyroscope), voice commands and speech **705** detected via microphone **240**, environmental noise **810** detected via microphone **240**, data from bio-metrics sensors either inherent to the device **105** or external to the device **105**, verbal passwords, and visual passwords. Motions or RF communications can be used to allow/deny access to vehicle **525** for person **520** by way of unlocking/locking or opening/closing passageways.

In some embodiments, the data for evaluation of state of vehicle **525** and person **520** can be collected from inherent sensors fixed on the device **105** (the handheld microprocessor device), vehicle connected to the device **105**, external sensors, and external stimuli. The device **105** may collect data from the vehicle via a wired or wireless connection. Data can be collected directly from the vehicle or through an intermediate communication and processing device. The digitally communicated vehicle data collected either directly or through the intermediate device can be in the form of an industry standard protocol. The industry protocols may include but are not limited to SAE J1939, SAE J1708, SAE J1587, OBD-II, CAN FD, CAN 2.0 A/B, LIN, Flexray, RS-232, Modbus, CANopen.

The data collected from the vehicle can be evaluated to determine vehicle's performance, diagnostics, and prognostics. The data for evaluation can be received from other sensors and sources. The data may include but are not limited to: person's heartrate, button press, voice command, environmental noise, bio-metrics for vehicle access to door lock state and powertrain run state, audible gunshot detection, GPS signal, indoor positions, gas detection, smoke detection, temperature, video and images, impact force imposed on the handheld microprocessor device, physical body orientation, connected source device button press, and connected source device voice command. Connected source may include other persons, vehicles, machineries, buildings, rooms, outdoor locations and assets.

The interface between the vehicle **525** and the device **105** (for example, a handheld microprocessor device) may include a graphical display of the handheld microprocessor device or connected intermediate device. The graphical display may provide feedback concerning vehicle performance, diagnostics, and prognostics. The graphical display may provide a mode for additional user input. Evaluations can be configurable and adaptable for the situation and environment. The evaluation can be enabled or disabled based on the location of the vehicle and whether the person is indoors or outdoors or the proximity to a known person, location, asset, building, or vehicle. The evaluation can be enabled by manual input or command from the central data portal. The evaluated data can be transmitted to the central data portal for processing, storage and visualization.

FIG. **13** illustrates an environment **1300** within which building and room evaluation module **635** of the system **600** can be implemented, according to some example embodiments. The environment **1300** includes a data collection and transmission device **105**, building **505**, room **510**, person **520**, vehicle **525**, outdoor location **530**, and central data portal **110**. The system **600** may run as a software application on the device **105**.

The building and room evaluation module **635** may receive data from a connected room sensor **305** or beacon **1305**. Data can pertain to states of the building and room and environment of the building and room. The data can be transmitted to the device **105** via wireless data connectivity. Data can be transmitted to the device **105** and then to the central data portal **110** via a communication channel **115**.

Connected sensors and sources can be used for the mutual evaluation of the buildings **505**, rooms **510**, and host person **520**. The sensors may include but are not limited to door open detectors, window open detectors, temperature sensors, smoke detector, gas detector, fire detector, humidity sensors, air quality sensors, gunshot detector, lock, door barricade deployment, explosion detectors, glass break detectors, door impact detectors, wall impact detectors, and GPS signals **710**. The data can be obtained from other buildings and rooms and sensors and beacons associated with the other buildings and rooms, outdoor locations **530** and associated sensors **305** and processor **310**, and person's wearable devices **400**. The data may include voice commands and speech detected via microphone **235** (shown in FIG. **2**), or environmental noise detected via microphone **235**.

The device **105** can receive commands from a person **520** or central data portal **110**. The commands can be generated as a result of evaluation of the building and/or room. The commands can result in actuation of room actuators **1310**. Beacons **1305**, other sensors, and sensors of the device **105** can be used for determining positions of people **520**, assets **515** and vehicles **525** within the building **505** or room **510**. Bio-metrics sensors either inherent to the device **105** or external to the device **105**, verbal passwords, visual passwords, motion, or RF communication can be used to allow/deny access to building **505** and/or room **510** for person **520** by way of unlocking/locking or opening/closing passageways.

The building and room evaluation module **635** may evaluate state of the building, room and person both individually and collectively. Data for the evaluation can be collected from inherent sensors fixed on the device **105** (for example, a handheld microprocessor device), sensors/beacons/processor of connected room, external sensors and external stimuli.

In some embodiments, the handheld microprocessor device may collect data from the building/room via a wireless connection. Data can be collected directly from the building/room or through an intermediate communication and processing device. The data collected from the building/

room can be evaluated to determine building/room status. The evaluation may also be based on data from other sensors and sources. These data may include but are not limited to: person heartrate sensor, button press, voice command, environmental noise, bio-metrics for building/room access to passageway lock state, audible gunshot detection, GPS signal, indoor positions, gas detection, smoke detection, temperature, humidity, air quality, video and images, impact force imposed on handheld microprocessor device, physical body orientation, connected source device button press, connected source device voice command. Connected source may include other persons, vehicles/machinery, buildings/rooms, outdoor locations, and assets.

In some embodiments, interface between the building/room and handheld microprocessor device may include a graphical display of the handheld microprocessor device or connected intermediate device. The graphical display may provide feedback on building/room status. The graphical display may provide a mode for additional user input. Evaluations of status of building or room can be configurable and adaptable for the situation and environment. The evaluation can be enabled or disabled based on the location indoors or outdoors or proximity to a known person, location, asset, building or vehicle or by manual or central data portal commanded input. The evaluated data can be transmitted to the central data portal for processing, storage and visualization.

FIG. **14** illustrates an environment **1400** within which outdoor location evaluation module **635** of the system **600** can be implemented, according to some example embodiments. The environment **1300** includes a data collection and transmission device **105**, a building **505**, a room **510**, person **520**, a vehicle **525**, and outdoor location **530**, and central data portal **110**. The system **600** may run as a software application on the device **105**.

The outdoor location evaluation module will receive data from a connected outdoor location **530** and sensors **305** and processor **310** associated with the outdoor location. The data may pertain to the outdoor location environment. The data can be transmitted to the device **105** via wireless communication channel. Data can be further transmitted from the device **105** to the central data portal **110** via communication channel **115**.

Connected sensors and sources can be used for the mutual evaluation of the outdoor location **530** and host person **520**. The sensors may include but are not limited to a temperature detector, smoke detector, gas detector, fire detector, humidity detector, air quality detector, gunshot detector, and explosion detector. The sources may include GPS signals **710**, other outdoor locations and sensors and processors associated with the other outdoor locations, buildings **505**, rooms **510**, and sensors **305** and processors **505** associated with the buildings **505** and rooms **510**, person **520** movement and transferred movement to movement sensors **345** (accelerometer/gyroscope), person wearable devices **420**, voice commands and speech **705** via microphone **235**, and environmental noise **810** via microphone **235**. The device **105** can receive commands from a person **520**, central data portal **110**. The command can be generated based result of evaluation of the outdoor location. The commands can result in actuation of outdoor actuators **1405**.

The outdoor location evaluation module **635** and may be configured to evaluate states the outdoor location and person both individually and collectively. Data can be collected from inherent sensors fixed on the handheld microprocessor device, connected outdoor location sensors and processors, and external sensors and external stimuli.

In some embodiment of the present disclosure, the device **105** (for example, a handheld microprocessor device) may collect data from the outdoor location **530** via a wireless connection. Data can be collected directly from the outdoor location or through an intermediate communication and processing device. The data collected from the location **530** can be used for evaluation of outdoor location status. The evaluation of the outdoor location status can be also based on data received from other sensors and sources. The data may include but are not limited to person's heartrate, button press, voice command, environmental noise, data of audible gunshot detectors, GPS signal, indoor positions, data of gas detectors, data of smoke detectors, temperature, humidity, air quality, video and images, impact force imposed on handheld microprocessor device, physical body orientation, connected source device button press, and connected source device voice command. The connected source may include other persons, vehicles/machinery, buildings/rooms, other outdoor locations and assets.

The outdoor location evaluation module **635** may provide and an interface between the outdoor location and handheld microprocessor device via a graphical display of the handheld microprocessor device or connected intermediate device. The graphical display may provide feedback on outdoor location status. The graphical display may provide a mode for additional user input. Evaluations of status of outdoor location can be configurable and adaptable based on situation and environment. The evaluation can be enabled or disabled based on the location indoors or outdoors or proximity to a known person, location, asset, building or vehicle. The evaluation can be enabled by manual input or command from central data portal. The evaluated data can be transmitted to the central data portal for processing, storage and visualization.

FIG. **15** is flow chart illustrating a method **1500** for evaluating and transmitting combined external data from one or more sources to a central data portal. The method **1500** can be performed within environment **100** shown in FIG. **1** or environment **700** shown in FIG. **7**.

The method **1500** may commence, in block **1505**, with collecting, by a data collection device communicatively coupled to a central data portal, sensor data from one or more sources. In block **1510**, the method **1500** may proceed with processing, by the data collection device, the sensor data to evaluate status data concerning status of the one or more sources. In block **1515**, the method **1500** may proceed with transmitting, by the data collection device, the status data to a central data portal. In block **1520** may proceed with processing, by the central data portal, the status data for storage and visualization.

FIG. **16** shows a diagrammatic representation of a computing device for a machine in the exemplary electronic form of a computer system **1600**, within which a set of instructions for causing the machine to perform any one or more of the methodologies discussed herein can be executed. In various exemplary embodiments, the machine operates as a standalone device or can be connected (e.g., networked) to other machines. In a networked deployment, the machine can operate in the capacity of a server or a client machine in a server-client network environment, or as a peer machine in a peer-to-peer (or distributed) network environment. The machine can be a PC, a tablet PC, a set-top box, a cellular telephone, a digital camera, a portable music player (e.g., a portable hard drive audio device, such as an Moving Picture Experts Group Audio Layer 3 (MP3) player), a web appliance, a network router, a switch, a bridge, or any machine capable of executing a set of

instructions (sequential or otherwise) that specify actions to be taken by that machine. Further, while only a single machine is illustrated, the term "machine" shall also be taken to include any collection of machines that individually or jointly execute a set (or multiple sets) of instructions to perform any one or more of the methodologies discussed herein.

The computer system **1600** may include a processor or multiple processors **1602**, a hard disk drive **1604**, a main memory **1606**, and a static memory **1608**, which communicate with each other via a bus **1610**. The computer system **1600** may also include a network interface device **1612**. The hard disk drive **1604** may include a computer-readable medium **1620**, which stores one or more sets of instructions **1622** embodying or utilized by any one or more of the methodologies or functions described herein. The instructions **1622** can also reside, completely or at least partially, within the main memory **1606** and/or within the processors **1602** during execution thereof by the computer system **1600**. The main memory **1606** and the processors **1602** also constitute machine-readable media.

While the computer-readable medium **1620** is shown in an exemplary embodiment to be a single medium, the term "computer-readable medium" should be taken to include a single medium or multiple media (e.g., a centralized or distributed database, and/or associated caches and servers) that store the one or more sets of instructions. The term "computer-readable medium" shall also be taken to include any medium that is capable of storing, encoding, or carrying a set of instructions for execution by the machine and that causes the machine to perform any one or more of the methodologies of the present application, or that is capable of storing, encoding, or carrying data structures utilized by or associated with such a set of instructions. The term "computer-readable medium" shall accordingly be taken to include, but not be limited to, solid-state memories, optical and magnetic media. Such media can also include, without limitation, hard disks, floppy disks, NAND or NOR flash memory, digital video disks, Random Access Memory, Read-Only Memory, and the like.

The example embodiments described herein may be implemented in an operating environment comprising software installed on a computer, in hardware, or in a combination of software and hardware.

In some embodiments, the computer system **1600** may be implemented as a cloud-based computing environment, such as a virtual machine operating within a computing cloud. In other embodiments, the computer system **1600** may itself include a cloud-based computing environment, where the functionalities of the computer system **1600** are executed in a distributed fashion. Thus, the computer system **1600**, when configured as a computing cloud, may include pluralities of computing devices in various forms, as will be described in greater detail below.

In general, a cloud-based computing environment is a resource that typically combines the computational power of a large grouping of processors (such as within web servers) and/or that combines the storage capacity of a large grouping of computer memories or storage devices. Systems that provide cloud-based resources may be utilized exclusively by their owners or such systems may be accessible to outside users who deploy applications within the computing infrastructure to obtain the benefit of large computational or storage resources.

The cloud may be formed, for example, by a network of web servers that comprise a plurality of computing devices, such as the computer system **1600**, with each server (or at least a plurality thereof) providing processor and/or storage resources. These servers may manage workloads provided by multiple users (e.g., cloud resource customers or other users). Typically, each user places workload demands upon the cloud that vary in real-time, sometimes dramatically. The nature and extent of these variations typically depends on the type of business associated with the user.

Thus, systems and methods for evaluating and transmitting combined external data from one or more sources to a central data portal for processing, storage, and visualization are described. Although embodiments have been described with reference to specific exemplary embodiments, it will be evident that various modifications and changes can be made to these exemplary embodiments without departing from the broader spirit and scope of the present application. Accordingly, the specification and drawings are to be regarded in an illustrative rather than a restrictive sense.

What is claimed is:

1. A system for monitoring a person by evaluating and transmitting combined external data from one or more sources, the system comprising:

a central data portal; and

a data collection device communicatively coupled to the central data portal, the data collection device being configured to:

collect sensor data from the one or more sources, wherein:

the one or more sources include a first source and a second source, the first source including a vehicle and the second source including a handheld microprocessor device associated with the person; and

the sensor data include first position data of the vehicle and second position data and motion data of the handheld microprocessor device;

process the sensor data to evaluate status data of the one or more sources, wherein the evaluation of the status data is enabled or disabled based on a first location of the first source, a type of a second location of the second source, and a proximity of the first source to the second source, wherein;

the proximity of the first source to the second source is determined based on the sensor data collected from the first source and the second source;

the type of the second location includes one of an outdoor location or an indoor location; and

the evaluation of the status data includes determination, based on the second position data and the motion data of the handheld microprocessor device, a presence of an impact imposed on the person; and

transmit the status data to the central data portal, wherein the central data portal is configured to process the status data for storage and visualization.

2. The system of claim **1**, wherein the evaluation of the status data concerning a first status of the first source is partially based on a second sensor data of the sensor data collected from the second source, the second source being different from the first source.

3. The system of claim **1**, wherein the sensor data are transmitted between the one or more sources and the data collection device via one or more wired communication channels.

4. The system of claim **1**, wherein the sensor data are transmitted between the one or more sources and the data collection device via one or more wireless communication channels.

5. The system of claim **1**, wherein the one or more sources may include one or more of a building, a room, the outdoor location; and an asset.

6. The system of claim 5, wherein the data collection device incudes the handheld microprocessor device associated with the person.

7. The system of claim 6, wherein the data collection device is configured to determine, based on the sensor data, a status concerning a state of panic of the person.

8. The system of claim 6, wherein the data collection device is configured to determine, based on the sensor data, a status concerning a non-responsiveness of the person.

9. The system of claim 6, wherein the data collection device is configured to determine, based on the sensor data, a status concerning a physical orientation of the person.

10. The system of claim 6, wherein the data collection device is configured to determine, based on the sensor data, a status concerning a presence of a gunshot in a proximity of the person.

11. The system of claim 6, wherein the data collection device is configured to determine, based on the sensor data, a status concerning performance and diagnostics of the vehicle.

12. The system of claim 6, wherein the data collection device is configured to actuate a state of the vehicle.

13. The system of claim 6, wherein the data collection device is configured to determine or actuate, based on the sensor data, a status concerning the building or the room, the status concerning the building or the room including at least one or more of the following: the room is unlocked, the room is locked, a window is opened, the window is closed, temperature of the room is higher a pre-determined temperature threshold, a smoke detector alarms, a gas detector is alarming, a fire detector alarming, a humidity level is outside of a pre-determined humidity range, air quality level is outside of a pre-determined air quality range, a gunshot is detected, a window glass is broken, door is impacted, and a wall is impacted.

14. The system of claim 6, wherein the data collection device is configured to determine, based on the sensor data, a status concerning the outdoor location, the status concerning the outdoor location including at least one or more of the following: a humidity level at the outdoor location is outside of a pre-determined humidity range, an air temperature at the outdoor location is outside of a pre-determined temperature range, an air quality level at the outdoor location is outside of a pre-determined air quality range, a gunshot is detected at the outdoor location, a smoke detector at the outdoor location is alarming, and a gas detector at the outdoor location is alarming.

15. A method for monitoring a person by evaluating and transmitting combined external data from one or more sources, the method comprising:

collecting, by a data collection device communicatively coupled to a central data portal, sensor data from the one or more sources, wherein:

the one or more sources include a first source and a second source, the first source including a vehicle and the second source including a handheld microprocessor device associated with the person; and

the sensor data include first position data of the vehicle and second position data and motion data of the handheld microprocessor device;

processing, by the data collection device, the sensor data to evaluate status data of the one or more sources, wherein the evaluation of the status data is enabled or disabled based on a first location of the first source, a type of a second location of the second source, and a proximity of the first source to the second source, wherein;

the proximity of the first source to the second source is determined based on the sensor data collected from the first source and the second source;

the type of the second location includes one of an outdoor location or an indoor location; and

the evaluation of the status data includes determination, based on the second position data and the motion data of the handheld microprocessor device, a presence of an impact imposed on the person;

transmitting, by the data collection device, the status data to the central data portal; and

processing, by the central data portal, the status data for storage and visualization.

16. The method of claim 15, wherein the evaluation of the status data concerning a first status of the first source is based on a second sensor data of the sensor data collected from the second source, the second source being different from the first source.

17. The method of claim 15, wherein the sensor data are transmitted between the one or more sources and the data collection device via one or more wired communication channels.

18. The method of claim 15, wherein the sensor data are transmitted between the one or more sources and the data collection device via one or more wireless communication channels.

19. The system of claim 15, wherein the one or more sources may include one or more of a building, a room, the outdoor location; and an asset.

20. A system for monitoring a person by evaluating and transmitting combined external data from one or more sources, the system comprising:

a central data portal; and

a data collection device communicatively coupled to the central data portal, the data collection device being configured to:

collect sensor data from the one or more sources, wherein:

the one or more sources include a first source and a second source, the first source including a vehicle and the second source including a handheld microprocessor device associated with the person; and

the sensor data include first position data of the vehicle and second position data and motion data of the handheld microprocessor device;

process the sensor data to evaluate status data of the one or more sources, wherein the evaluation of the status data is enabled or disabled based on a first location of the first source, a type of a second location of the second source, and a proximity of the first source to the second source, wherein;

the proximity of the first source to the second source is determined based on the sensor data collected from the first source and the second source;

the type of the second location includes one of an outdoor location or an indoor location; and

the evaluation of the status data includes determination, based on the second position data and the motion data of the handheld microprocessor device, a presence of an impact imposed on the person; and

transmit the status data to the central data portal, wherein the central data portal is configured to process the status data for storage and visualization; and

a user interface portal communicatively coupled to the central data portal, the user interface portal being configured to provide the person with access to the

status data stored on the central data portal for the visualization on a user device.

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