US 20190192011A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2019/0192011 A1**

York et al. (43) **Pub. Date: Jun. 27, 2019**

(54) **WEARABLE HEALTH MONITORING DATA SERVICE**

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(21) Appl. No.: **16/181,638**

(22) Filed: **Nov. 6, 2018**

Related U.S. Application Data

(60) Provisional application No. 62/581,929, filed on Nov. 6, 2017.

Publication Classification

(51) **Int. Cl.**

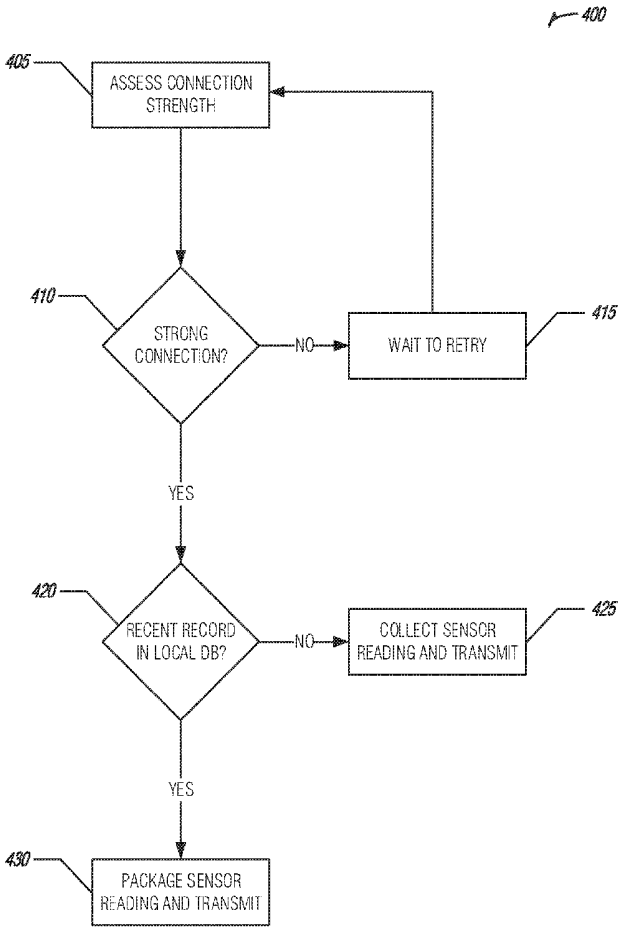
A61B 5/0205	(2006.01)
H04Q 9/00	(2006.01)
H04L 29/08	(2006.01)
G06F 3/0488	(2006.01)
G16H 40/67	(2006.01)
A61B 5/00	(2006.01)
A61B 5/145	(2006.01)
A61B 5/11	(2006.01)

(52) **U.S. Cl.**

CPC ***A61B 5/0205*** (2013.01); ***H04Q 9/00*** (2013.01); ***H04L 67/12*** (2013.01); ***G06F 3/04883*** (2013.01); ***G16H 40/67*** (2018.01); ***A61B 5/681*** (2013.01); *A61B 5/02438* (2013.01); ***A61B 5/7435*** (2013.01); ***A61B 5/7475*** (2013.01); ***A61B 5/14542*** (2013.01); ***A61B 5/1112*** (2013.01); ***A61B 5/7221*** (2013.01); *H04Q 2209/40* (2013.01); ***A61B 5/0022*** (2013.01)

(57) **ABSTRACT**

Systems and techniques for a wearable health monitor device and a wearable health monitoring data service are disclosed here. Sensor data may be periodically collected from a sensor array. The sensor data may be stored in a local database of the wearable health monitor device. The sensor data may be transmitted to a cloud-based platform upon detection of a strong network connection. An evaluation of the sensor data may be received for display on a display device of the wearable health monitor device.



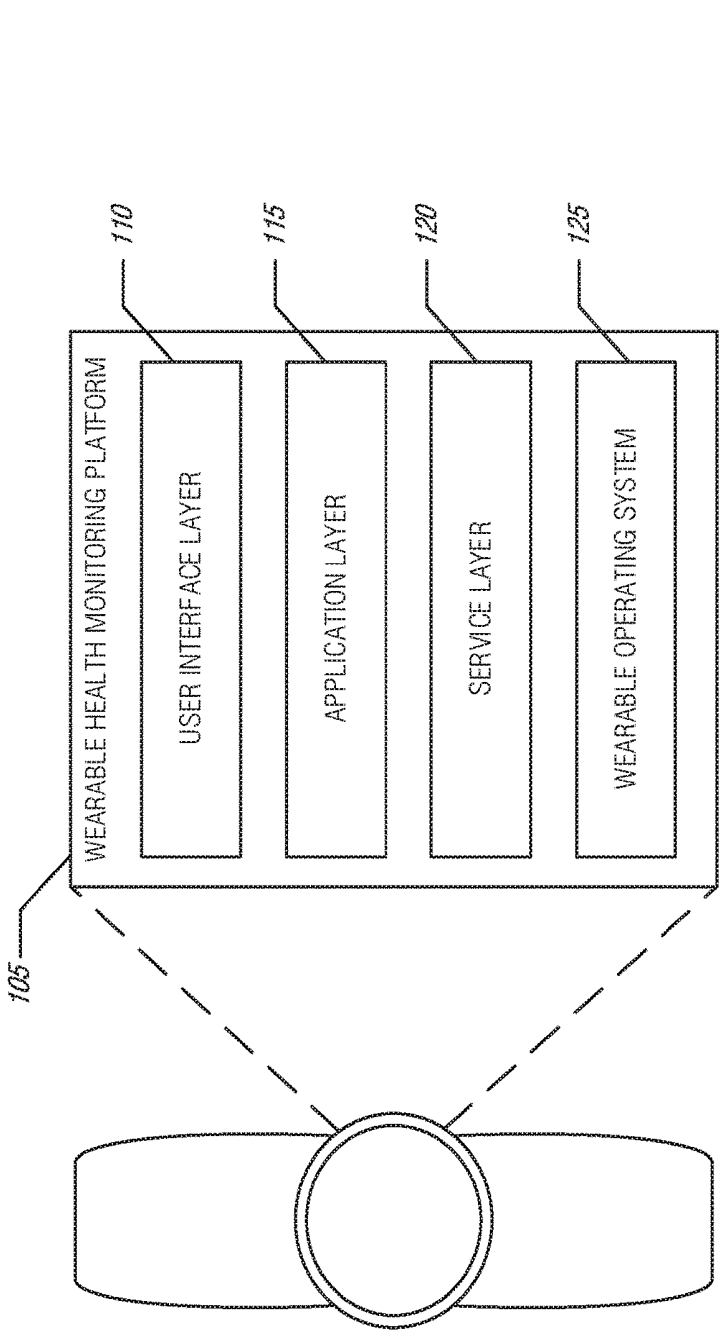

100
110
115
120
125
WEARABLE HEALTH MONITORING PLATFORM
USER INTERFACE LAYER
APPLICATION LAYER
SERVICE LAYER
WEARABLE OPERATING SYSTEM
105

FIG. 1

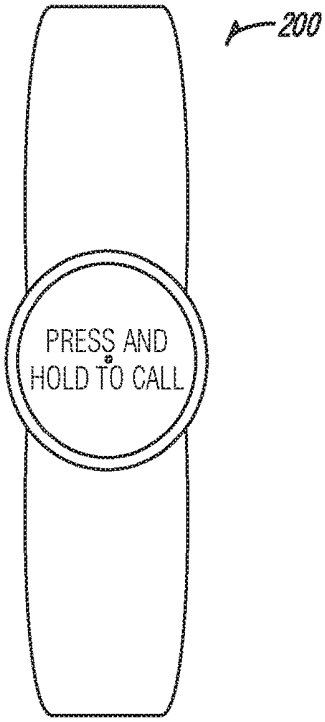


FIG. 2A

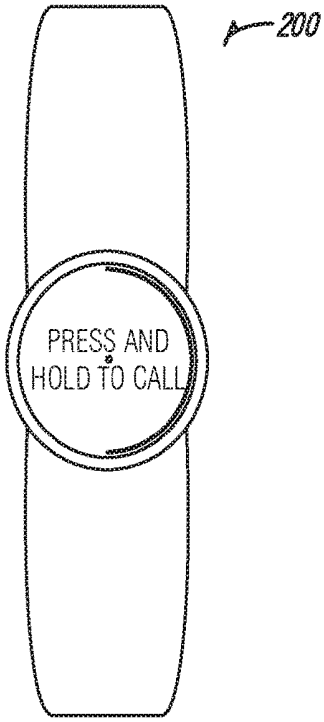


FIG. 2B

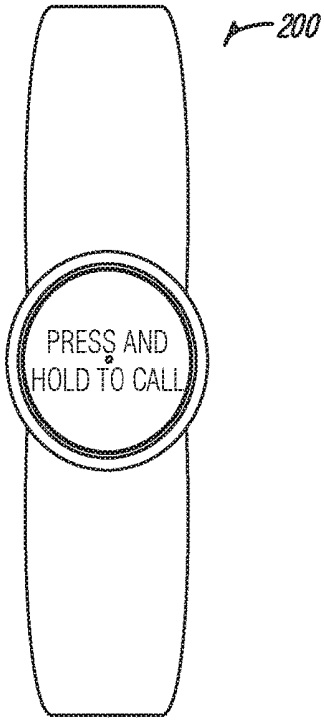


FIG. 2C

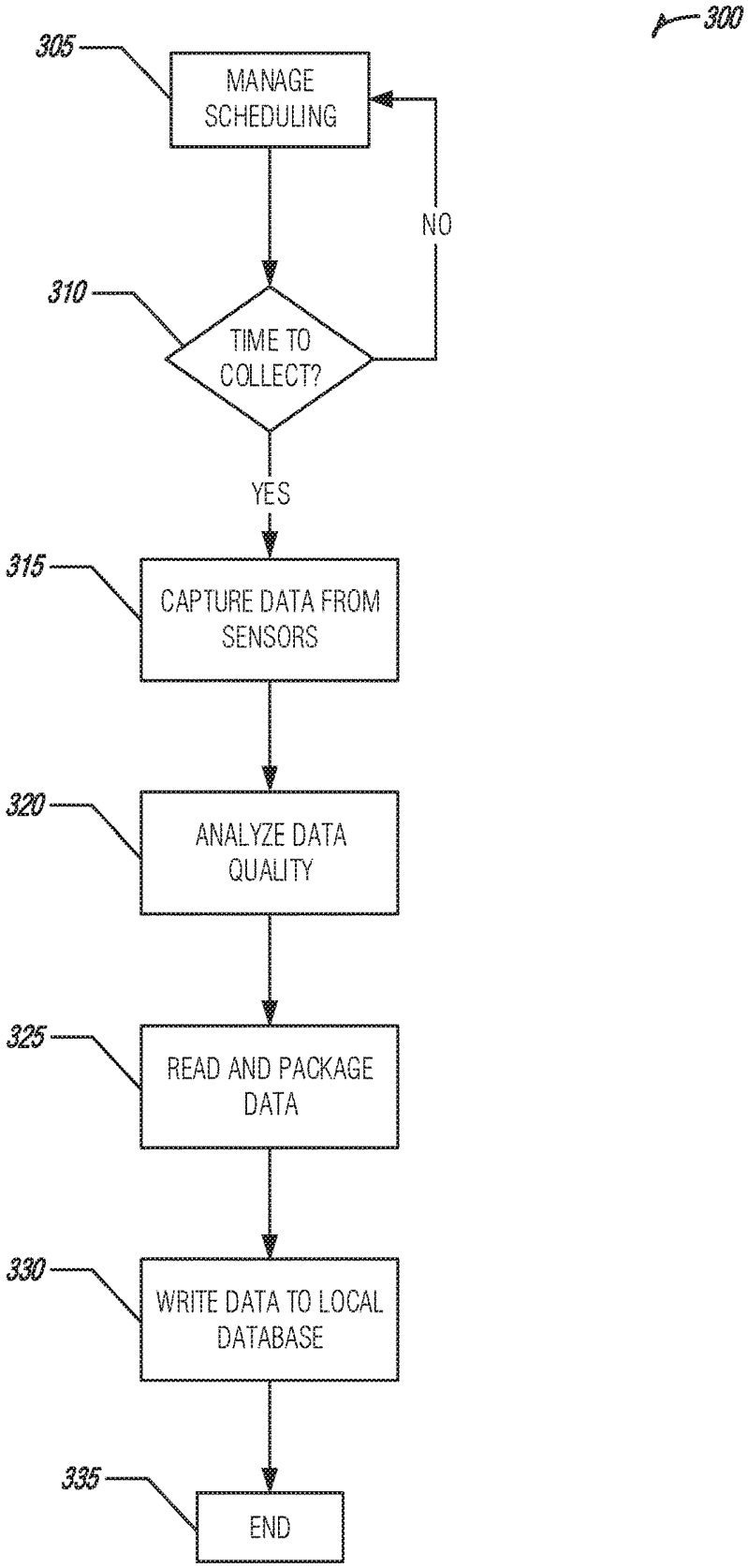

300
305
MANAGE SCHEDULING
NO
310
TIME TO COLLECT?
YES
315
CAPTURE DATA FROM SENSORS
320
ANALYZE DATA QUALITY
325
READ AND PACKAGE DATA
330
WRITE DATA TO LOCAL DATABASE
335
END

FIG. 3

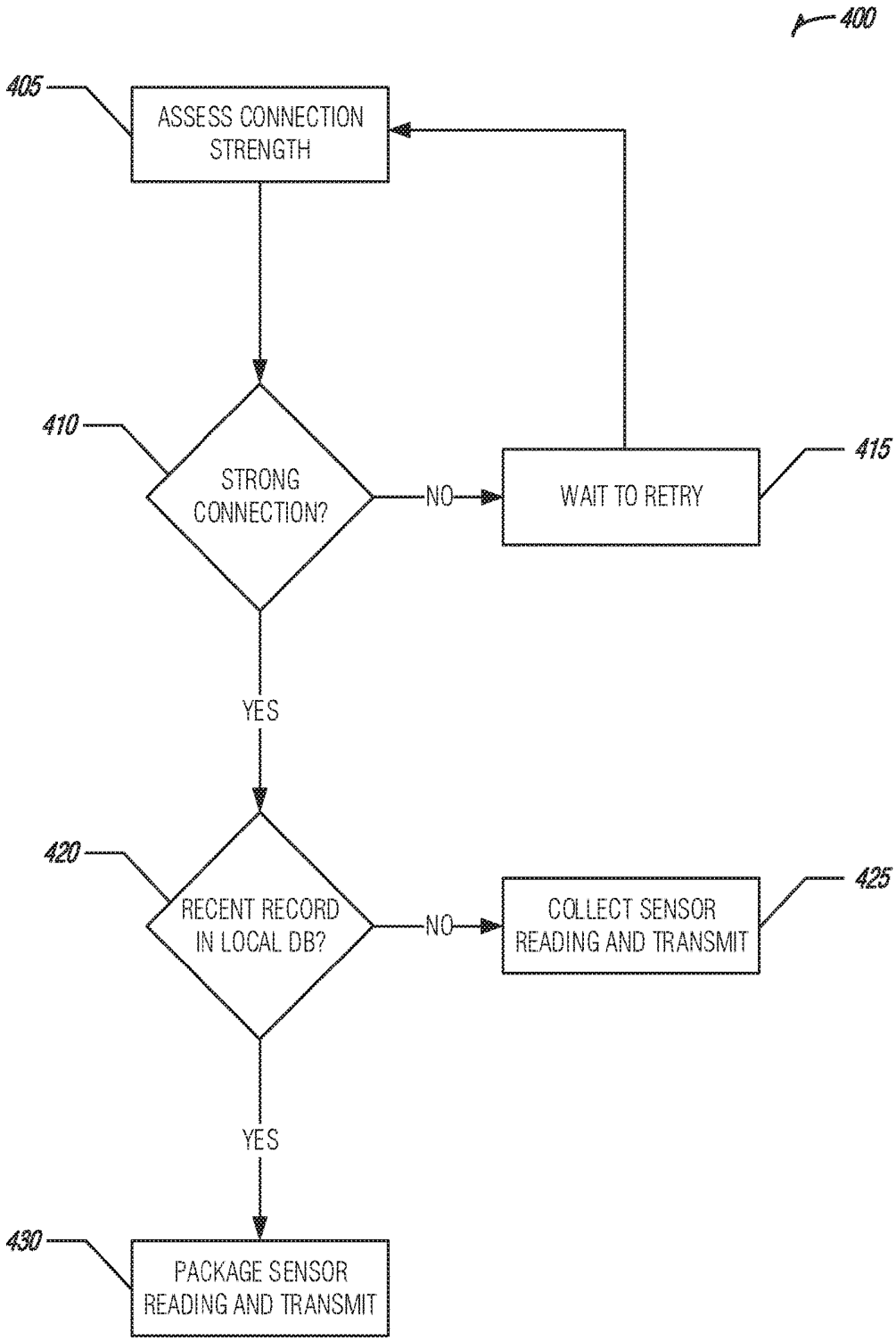

400
405
ASSESS CONNECTION STRENGTH
410
STRONG CONNECTION?
NO
415
WAIT TO RETRY
YES
420
RECENT RECORD IN LOCAL DB?
NO
425
COLLECT SENSOR READING AND TRANSMIT
YES
430
PACKAGE SENSOR READING AND TRANSMIT

FIG. 4

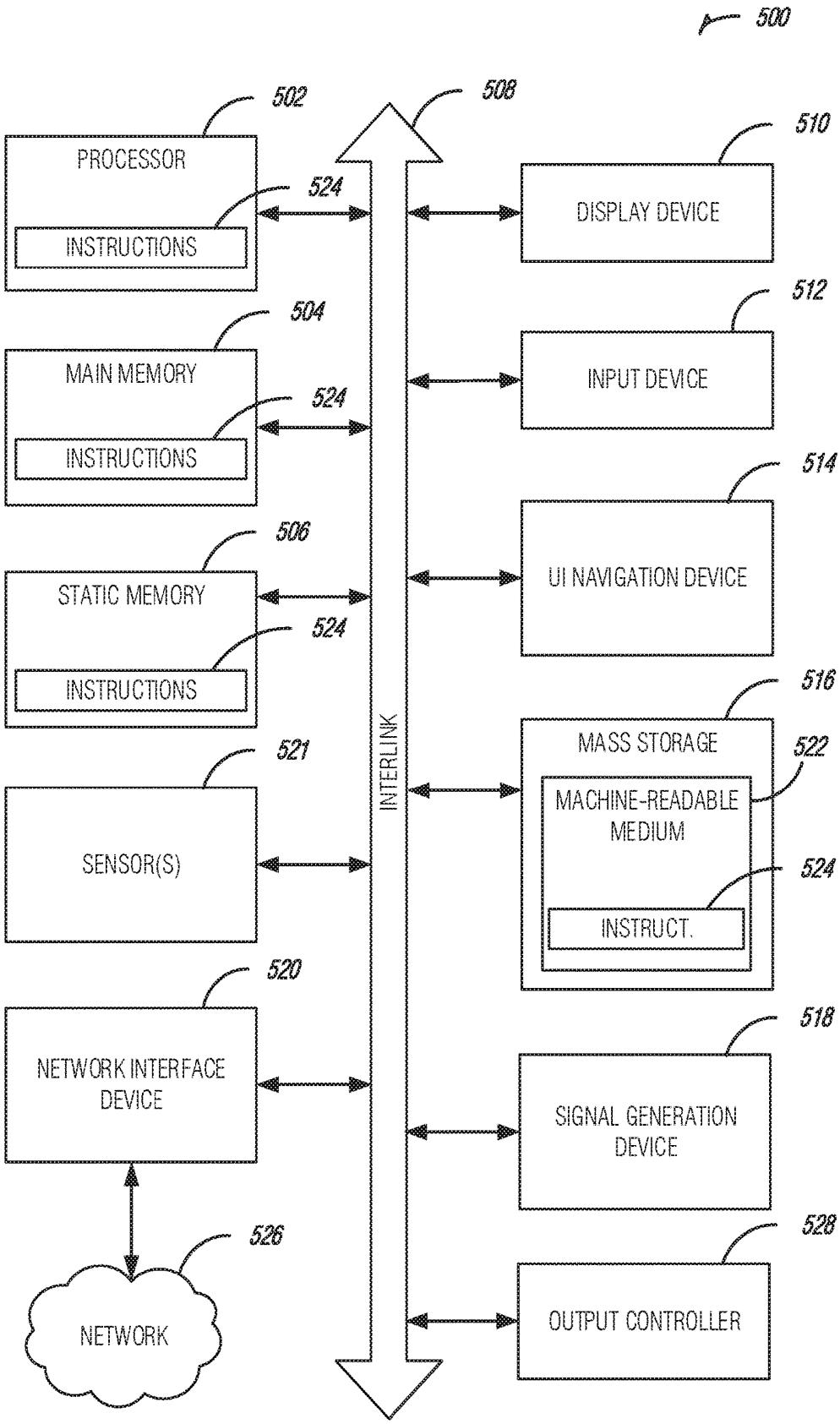

500
502
PROCESSOR
524
INSTRUCTIONS
504
MAIN MEMORY
524
INSTRUCTIONS
506
STATIC MEMORY
524
INSTRUCTIONS
521
SENSOR(S)
520
NETWORK INTERFACE DEVICE
526
NETWORK
508
INTERLINK
510
DISPLAY DEVICE
512
INPUT DEVICE
514
UI NAVIGATION DEVICE
516
MASS STORAGE
522
MACHINE-READABLE MEDIUM
524
INSTRUCT.
518
SIGNAL GENERATION DEVICE
528
OUTPUT CONTROLLER

FIG. 5

WEARABLE HEALTH MONITORING DATA SERVICE

CLAIM OF PRIORITY

[0001] This application claims the benefit of priority to U.S. Provisional Application Ser. No. 62/581,929, filed on Nov. 6, 2017, which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments described herein generally relate to wearable device configuration, data management, and data analysis, in some embodiments, more specifically to a wearable health monitoring data service.

BACKGROUND

[0003] Wearable devices may collect data about a user and their activities and surroundings. A wearable device may be configured in a specific manner to maximize efficiency in collecting data that may be used to evaluate performance of a wearer. The data collected by the wearable may be stored and analyzed to provide the wearer or another individual with information regarding the performance of the wearer.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] In the drawings, which are not necessarily drawn to scale, like numerals may describe similar components in different views. Like numerals having different letter suffixes may represent different instances of similar components. The drawings illustrate generally, by way of example, but not by way of limitation, various embodiments discussed in the present document.

[0005] FIG. **1** illustrates an example of a wearable health monitor device and a system for a wearable health monitoring data service, according to an embodiment.

[0006] FIGS. **2**A, **2**B, and **2**C illustrate an example of a press and hold user interface for a wearable health monitoring data service, according to an embodiment.

[0007] FIG. **3** illustrates an example of a process for data management for a wearable health monitoring data service, according to an embodiment.

[0008] FIG. **4** illustrates an example of a process for battery optimization for a wearable health monitoring data service, according to an embodiment.

[0009] FIG. **5** is a block diagram illustrating an example of a machine upon which one or more embodiments may be implemented.

DETAILED DESCRIPTION

[0010] As the population ages and technology improves, there may be opportunities that seniors to lead more independent lives. As people age, they may develop or be more susceptible to health issues (e.g., disease, illness, etc. injury (e.g., due to falls, decreased activity levels, etc.). Close monitoring of the activity and vital signs of a senior may allow the senior or their caregiver to identify risks. The senior or their caregiver may then take appropriate steps to promote changes to daily activities that may reduce the risk of developing or worsening illness and injury. Traditionally, continuous monitoring of a senior may be facilitated by residency in a care facility which may have physical and emotional consequences for the senior. The senior may feel confined and the continued monitoring may be viewed as undignified.

[0011] The present subject matter provides a wearable health monitor device and corresponding data service that may be wont by a senior that may monitor the activity and vital signs of the senior. Data may be collected regarding the senior without the need for confinement in a specialized facility or conventional vital sign collection by a caregiver. Thus, the senior may be able to continue living at home or in a less confining facility such as a private unit in an assisted living facility. The data for the senior may be collected and analyzed and compared against statistical models to identify if the activity and vital signs of the senior are meeting the needs of a current care plan and/or whether the data indicates the senior is at an increased risk of health degradation or injury.

[0012] Sensor data may be collected from the wearable health monitor device for the purpose of improving an individual's health and the healthcare services they're offered. As an example, consider a senior individual over the age of 65 years old. Older users may have mobility challenges, mental challenges, or may not be familiar with current technology. Thus, user interfaces may be designed to provide streamlined interaction and easy to understand output. Thus, the present solution may provide value to the senior by providing an easy to use user interface and readily consumable output. In addition, an easy to use interface for activating an emergency response protocol may be provided via the wearable allowing rapid access to a personal emergency response service.

[0013] The present subject matter may be implemented as a software architecture platform in the wearable health monitor device which may allow for flexibility in developing services and applications to run on the wearable health monitor device. The platform may include a data service that may capture and transmit sensor data to a cloud computing platform (e.g., an internet connected cluster of computing devices, etc.). The platform may include a set of battery optimization algorithms allowing for increased device efficiency and increased run time between charging.

[0014] FIG. **1** illustrates an example of a wearable health monitor device **100** and a system **105** for a wearable health monitoring data service, according to an embodiment. The wearable health monitor device **100** may be a smartwatch, wristband, smart clothing, or other device including sensors capable of capturing user activity data and vital sign data (e.g., gyroscope, accelerometer, magnetometer, infrared sensor, camera, microphone, gas sensor, photodetector, etc.).

[0015] The system **105** may be implemented in the wearable health monitor device **100**. The system **100** may be a wearable architecture such as a wearable health monitoring platform that may include a user interface layer **110**, an application layer **115**, a service layer **120**, and a wearable operating system **125**. The system **105** may include a set of machine instructions stored in machine readable memory of the wearable health monitor device **100** that, when executed by processing circuitry of the wearable health monitor device **100**, perform a variety of operations including the capture and transmission of sensor data.

[0016] The system **105** may be configured to allow for flexibility of the type of data captured and the manner of data transmission. In an example, data capture may include resident sensors on the wearable health monitor device and

may include other devices providing sensor readings or data packets that the wearable health monitor device **100** may be able to capture. The other devices including sensors may be connected to the wearable health monitor device **100** using a variety of connectivity techniques such as, for example, Bluetooth, NFC, wireless, cellular, etc. Data transmission may utilize a cloud environment as an end point or any other connected data storage and analysis environment.

[0017] The system **105** may include a variety of layers. The individual layers may provide a separation of processing operations that may allow for asynchronous development of components within each layer. Such separation may be provided using interface points between components or services of each layer. Each component or service may include a set of instructions that may be a part of (or may work in conjunction with) processing circuitry that may cause hardware and software components in the wearable health monitor device **100** to perform a variety of operations.

[0018] The wearable operating system **125** may provide basic operating instructions that provide basic input, basic output, post, and other basic operability functions for the wearable health monitor device **100**. The wearable device **100** may include communication hardware such as, for example, a cellular network transceiver. The wearable operating system **125** may facilitate communication between components of the system **105** and the communication hardware.

[0019] The service layer **120** may work in conjunction with the wearable operating system **125** to manage data capture and data transmission functions of the wearable heath monitor device **100**. For example, the service layer **120** may manage an array of sensors included in the wearable health monitor device **100** to collect sensor readings at various intervals and transmit the sensor data from the wearable health monitor device **100** to the cloud-based service.

[0020] In an example, the service layer **120** may include a capture data service that first captures sensor data from the wearable health monitor device. This would include data such as battery level, heart rate readings, step count reading and GPS location readings. This capture data service would capture the information and manage the local storage of the data.

[0021] In an example, the service layer **120** may include a transmission data service that would track available connections (e.g., cellular, etc.) and transmit data when the connection allows.

[0022] The service layer **120** may include a scheduling data service that coordinates the execution of the capture data service and once completed, initiates the data transmission service.

[0023] The application layer **115** may provide interfaces between the wearable operating system **125**, the service layer **120**, the user interface layer **110**, the cloud-based service, and other devices. In an example, the application layer **115** may include a wireless communication application (e.g., Bluetooth, etc.) that connects to a wireless enabled device (e.g., a weight scale, a blood pressure monitor, etc.) to collect sensor readings from sensors included in the devices. The wireless communication application may utilize the capture data service of the service layer **120** to store the sensor readings in a local storage medium.

[0024] The user interface layer may provide instructions for generating graphical interfaces with which the user may interact with the wearable health monitor device **100**. In an example, the user interface layer **110** may include a wearable user interface that allows the user to initiate the heart rate sensor and to place an emergency call using a Press and Hold User Interface.

[0025] FIGS. **2**A, **2**B, and **2**C illustrate an example of a press and hold user interface **200** for a wearable health monitoring data service, according to an embodiment. A user may touch the screen (or otherwise activate an emergency call feature) of a wireless health monitor device. The press and hold user interface **200** may be displayed (e.g., as shown in FIG. **2**A). As the user holds the screen, the press and hold user interface **200** may provide a graphical user interface element showing the progress of the request (e.g., as shown in FIG. **2**B). The delay in activating the call may prevent false activations for users that may have mobility issues or may be prone to accidental screen touches (e.g., via bumping, accidental swipes, etc.). The delay and corresponding visual elements may be adjusted for individual users and for groups of users depending on conditions and needs of the user and group. For example, a delay may be shortened for a user with a heart condition while the delay may be increased for a user with hand tremors, and so forth. Once the delay has been reached, the visual indicator may reach a final stage (e.g., as shown in FIG. **2**C) and the call may be placed.

[0026] FIG. **3** illustrates an example of a process **300** for data management for a wearable health monitoring data service, according to an embodiment.

[0027] The present subject matter may include a wearable data service. The wearable data service may include, a set of functions and algorithms that manage data capture of a wearable health monitor device's sensors, a set of functions and algorithms that analyze the quality of the sensor reading, a light weight local relational database that provides persistent storage of the sensor readings and allows for ingress and egress of data as well as flexibility to add or modify sensor readings, a set of functions and algorithms that manage the reading and packaging of sensor readings from the local relational database, a set of functions and algorithms that manage the transmission of data packets from the wearable to non-local cloud storage via cellular, Wi-Fi etc.

[0028] The wearable data service may include a set of functions and algorithms that manage the schedule for data management functions such as, for example, initiating sensor readings, analyzing sensor readings, interfacing with the local relational database, reading and packaging of local data, transmitting local data packets to non-local cloud storage, etc. The wearable data service may optimize a wearable health monitor device to perform operations such as, for example, collection of heart rate reading(s) from the wearable health monitor device, storage of the heart rate reading(s) locally on a storage medium of the wearable health monitor device, and transmission of the heart rate reading(s) from the wearable health monitor device to non-local cloud storage via a network (e.g., wireless network, near-field communication, wired network, short-wave radio, etc.).

[0029] The wearable data service may utilize a schedule function to periodically check the local time and invoke a heart rate check every 15 minutes. The service then invokes a function that listens for the latest heart rate reading (e.g., at operation **305**). Upon receiving the latest heart rate reading, the service checks against the current local time. If

the interval is greater than 15 minutes (e.g., as determined at decision **310**), it invokes a heart rate collection function (e.g., at operation **315**). The heart rate collection invokes a function that attempts to collect a heart rate for a period of 10 seconds. If successful, it records the reading and proceeds. If unsuccessful, it retries the same function but adjusts the period to 15 seconds (e.g., at operation **305**). This retry loop can be adjusted dynamically. The retry loop also has an unsuccessful threshold level that when reached, will record an unsuccessful attempt.

[0030] Upon either a successful attempt or unsuccessful attempt, the service then invokes a data quality check that evaluates the accuracy of the reading (e.g., at operation **320**). For any successful reading, it uses a custom algorithm to label the reading as "accurate" or "not accurate" (e.g., at operation **325**). For any unsuccessful reading, it labels the reading as "not accurate". After labeling each reading, the service compiles a SQL statement to insert the record into a local persistent database (e.g., at operation **330**). The service invokes the statement. The service writes to a local audit log to determine if the statement was successful and the process **300** ends (e.g., at end **335**).

[0031] FIG. **4** illustrates an example of a process **400** for battery optimization for a wearable health monitoring data service, according to an embodiment. A variety of battery optimization techniques may be used to maximize the run time of the wearable health monitor device between recharge. These techniques may increase the sensor data collection cycles that may be performed between charges and may reduce the frequency with which a senior or caregiver must recharge the wearable health monitor. This may increase the ease of use and independence of seniors using the devices, especially those with arthritis or other ailments affecting dexterity, by reducing potentially unwanted visits into their personal space (e.g., private apartment, etc.

[0032] The battery optimization algorithms are based on the operating characteristics of the wearable health monitor device. Power draw of individual sensors (e.g., heart rate sensor, GPS, etc.) of the wearable health monitor device may be approximated. Power draw of individual functions (e.g., data transmission request, etc.) may be approximated. Characteristics of individual functions (e.g., accuracy of sensor readings, connection strength, etc. may be assessed. The power draw approximations and characteristics may be used to model and test different combinations of sensor readings and function calls to assess performance relating to approximate power draw, reliability, and accuracy of a modeled combination. Based on characteristics of individual sensor/functions and combination(s), new data collection processes may be developed based on the modeling and testing to collect data while incurring lowest possible power draw.

[0033] In an example, connection strength may be used in optimizing battery usage in data transmission. This may result in shorter data transmission times resulting in lower battery usage. The connection strength may be assessed (e.g., at operation **405**). Connection strength may be based on signal strength, available bandwidth, or other characteristics of the connection indicative of reduced data transmission times. If the connection is determined not to be strong (e.g., at decision **410**), the wearable health monitor device may wait to reattempt data collection (e.g., at operation **315**). A threshold may be employed to determine if a connection is strong. For example, if currently detected bandwidth is below fifty percent of an expected available bandwidth value the connect may not be determined as strong while current available bandwidth above fifty percent of the expected bandwidth value may be determined to be a strong connection. If the connection is strong (e.g., as determined at decision **410**), it may be determined in a recent record for the sensor collection item in a local database (e.g., at decision **420**). If there is not a recent record in the local database, the sensor reading may be collected and transmitted (e.g., at operation **425**). If there is a recent record in the local database, the sensor reading may be package and transmitted (e.g., at operation **430**).

[0034] FIG. **5** illustrates a block diagram of an example machine **500** upon which any one or more of the techniques (e.g., methodologies) discussed herein may perform. In alternative embodiments, the machine **500** may operate as a standalone device or may be connected (e.g., networked) to other machines. In a networked deployment, the machine **500** may operate in the capacity of a server machine, a client machine, or both in server-client network environments. In an example, the machine **500** may act as a peer machine in peer-to-peer (P2P) (or other distributed) network environment. The machine **500** may be a personal computer (PC), a tablet PC, a set-top box (STB), a personal digital assistant (PDA), a mobile telephone, a web appliance, a network router, switch or bridge, or any machine capable of executing 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, such as cloud computing, software as a service (SaaS), other computer cluster configurations.

[0035] Examples, as described herein, may include, or may operate by, logic or a number of components, or mechanisms. Circuit sets are a collection of circuits implemented in tangible entities that include hardware (e.g., simple circuits, gates, logic, etc.). Circuit set membership may be flexible over time and underlying hardware variability. Circuit sets include members that may, alone or in combination, perform specified operations when operating. In an example, hardware of the circuit set may be immutably designed to carry out a specific operation (e.g., hardwired). In an example, the hardware of the circuit set may include variably connected physical components (e.g., execution units, transistors, simple circuits, etc.) including a computer readable medium physically modified (e.g., magnetically, electrically, moveable placement of invariant massed particles, etc.) to encode instructions of the specific operation. In connecting the physical components, the underlying electrical properties of a hardware constituent are changed, for example, from an insulator to a conductor or vice versa. The instructions enable embedded hardware (e.g., the execution units or a loading mechanism) to create members of the circuit set in hardware via the variable connections to can out portions of the specific operation when in operation. Accordingly, the computer readable medium is communicatively coupled to the other components of the circuit set member when the device is operating. In an example, any of the physical components may be used in more than one member of more than one circuit set. For example, under operation, execution units may be used in a first circuit of a

first circuit set at one point in time and reused by a second circuit in the first circuit set, or by a third circuit in a second circuit set at a different time.

[0036] Machine (e.g., computer system) **500** may include a hardware processor **502** (e.g., a central processing unit (CPU), a graphics processing unit (GPU), a hardware processor core, or any combination thereof), a main memory **504** and a static memory **506**, some or all of which may communicate with each other via an interlink (e.g., bus) **508**. The machine **500** may further include a display unit **510**, an alphanumeric input device **512** (e.g., a keyboard), and a user interface (UI) navigation device **514** (e.g., a mouse). In an example, the display unit **510**, input device **512** and UI navigation device **514** may be a touch screen display. The machine **500** may additionally include a storage device (e.g., drive unit) **516**, a signal generation device **518** (e.g., a speaker), a network interface device **520**, and one or more sensors **521**, such as a global positioning system (GPS) sensor, compass, accelerometer, or other sensor. The machine **500** may include an output controller **528**, such as a serial (e.g., universal serial bus (USB), parallel, or other wired or wireless (e.g., infrared (IR), near field communication (NFC), cellular, etc.) connection to communicate or control one or more peripheral devices (e.g., a printer, card reader, etc.).

[0037] The storage device **516** may include a machine readable medium **522** on which is stored one or more sets of data structures or instructions **524** (e.g., software) embodying or utilized by any one or more of the techniques or functions described herein. The instructions **524** may also reside, completely or at least partially, within the main memory **504**, within static memory **506**, or within the hardware processor **502** during execution thereof by the machine **500**. In an example, one or any combination of the hardware processor **502**, the main memory **504**, the static memory **506**, or the storage device **516** may constitute machine readable media.

[0038] While the machine readable medium **522** is illustrated as a single medium, the term "machine readable medium" may include a single medium or multiple media (e.g., a centralized or distributed database, and/or associated caches and servers) configured to store the one or more instructions **524**.

[0039] The term "machine readable medium" may include any medium that is capable of storing, encoding, or carrying instructions for execution by the machine **500** and that cause the machine **500** to perform any one or more of the techniques of the present disclosure, or that is capable of storing, encoding or carrying data structures used by or associated with such instructions. Non-limiting machine readable medium examples may include solid-state memories, and optical and magnetic media. In an example, a massed machine readable medium comprises a machine readable medium with a plurality of particles having invariant (e.g., rest) mass. Accordingly, massed machine-readable media are not transitory propagating signals. Specific examples of massed machine readable media may include: non-volatile memory, such as semiconductor memory devices (e.g., Electrically Programmable Read-Only Memory (EPROM), Electrically Erasable Programmable Read-Only Memory (EEPROM)) and flash memory devices; magnetic disks, such as internal hard disks and removable disks; magneto-optical disks; and CD-ROM and DVD-ROM disks.

[0040] The instructions **524** may further be transmitted or received over a communications network **526** using a transmission medium via the network interface device **520** utilizing any one of a number of transfer protocols (e.g., frame relay, Internet protocol (IP), transmission control protocol (TCP), user datagram protocol (UDP), hypertext transfer protocol (HTTP), etc.). Example communication networks may include a local area network (LAN), a wide area network (WAN), a packet data network (e.g., the Internet), mobile telephone networks (e.g., cellular networks), Plain Old Telephone (POTS) networks, and wireless data networks (e.g., Institute of Electrical and Electronics Engineers (IEEE) 802.11 family of standards known as Wi-Fi®, IEEE 802.16 family of standards known as WiMax®), IEEE 802.15.4 family of standards, peer-to-peer (P2P) networks, among others. In an example, the network interface device **520** may include one or more physical jacks (e.g., Ethernet, coaxial, or phone jacks) or one or more antennas to connect to the communications network **526**. In an example, the network interface device **520** may include a plurality of antennas to wirelessly communicate using at least one of single-input multiple-output (SIMO), multiple-input multiple-output (MIMO), or multiple-input single-output (MISO) techniques. The term "transmission medium" shall be taken to include any intangible medium that is capable of storing, encoding or carrying instructions for execution by the machine **500**, and includes digital or analog communications signals or other intangible medium to facilitate communication of such software.

1. A wearable health monitor device for a wearable health monitoring data service, the wearable health monitor device comprising:

at least one processor; and

memory including instructions that, when executed by the at least one processor, cause the at least one processor to perform operations to:

periodically collect sensor data from a sensor array;

store the sensor data in a local database of the wearable health monitor device;

transmit, upon detection of a strong network connection, the sensor data to a cloud-based platform; and

receive, an evaluation of the sensor data for display on a display device of the wearable health monitor device.

2. The wearable health monitor device of claim **1** further comprising instructions to:

generate, upon detection of a touch of the display device of the wearable health monitor device, a push and hold user interface for display on the display device of the wearable health monitor device;

display the push and hold user interface on the display device of the wearable health monitor device;

display, in the push and hold user interface, a graphical user interface element that varies over time the longer a touch of the display device is detected; and

transmit, instructions to initiate a communication session, via a wireless network, based on a lapse of time of the detected touch of the display device being outside a threshold.

3. The wearable health monitor device of claim **1**, wherein the strong network connection is a connection to a cellular data network.

4. The wearable health monitor device of claim **1**, wherein the sensor array includes at least one sensor of a group of

sensors comprising: a heart rate monitor, an oxygen sensor, a global positioning system receiver, a gyroscope, and an accelerometer.

5. The wearable health monitor device of claim **1**, wherein the wearable health monitor device is a smartwatch.

6. The wearable health monitor device of claim **1**, wherein the evaluation of the sensor data includes determining a quality level of the data and the evaluation of the sensor data is displayed upon a determination that the quality level is outside a threshold.

7. The wearable health monitor device of claim **6**, wherein determining the quality level includes evaluating the sensor data against another set of sensor data collected from the sensor array during a retry loop, and wherein the evaluation of the sensor data is displayed upon a determination that the evaluation of the sensor data and the other sensor data indicates the sensor data is stable.

8. At least one non-transitory machine-readable medium including instructions for interaction between a wearable health monitoring device and a wearable health monitoring data service that, when executed by the at least one processor, cause the at least one processor to perform operations to:

periodically collect sensor data from a sensor array;

store the sensor data in a local database of the at least one non-transitory machine-readable medium;

transmit, upon detection of a strong network connection, the sensor data to a cloud-based platform; and

receive, an evaluation of the sensor data for display on a display device of the at least one non-transitory machine-readable medium.

9. The at least one non-transitory machine-readable medium of claim **8**, further comprising instructions to:

generate, upon detection of a touch of the display device of the at least one non-transitory machine-readable medium, a push and hold user interface for display on the display device of the at least one non-transitory machine-readable medium;

display the push and hold user interface on the display device of the at least one non-transitory machine-readable medium;

display, in the push and hold user interface, a graphical user interface element that varies over time the longer a touch of the display device is detected; and

transmit, instructions to initiate a communication session, via a wireless network, based on a lapse of time of the detected touch of the display device being outside a threshold.

10. The at least one non-transitory machine-readable medium of claim **8**, wherein the strong network connection is a connection to a cellular data network.

11. The at least one non-transitory machine-readable medium of claim **8**, wherein the sensor array includes at least one sensor of a group of sensors comprising: a heart rate monitor, an oxygen sensor, a global positioning system receiver, a gyroscope, and an accelerometer.

12. The at least one non-transitory machine-readable medium of claim **8**, wherein the wearable health monitor device is a smartwatch.

13. The at least one non-transitory machine-readable medium of claim **8**, wherein the evaluation of the sensor data includes determining a quality level of the data and the evaluation of the sensor data is displayed upon a determination that the quality level is outside a threshold.

14. The at least one non-transitory machine-readable medium of claim **13**, wherein determining the quality level includes evaluating the sensor data against another set of sensor data collected from the sensor array during a retry loop, and wherein the evaluation of the sensor data is displayed upon a determination that the evaluation of the sensor data and the other sensor data indicates the sensor data is stable.

15. A method for interaction between a wearable health monitor device and a wearable health monitoring data service, the method comprising:

periodically collecting sensor data from a sensor array;

storing the sensor data in a local database of the method;

transmitting, upon detection of a strong network connection, the sensor data to a cloud-based platform; and

receiving, an evaluation of the sensor data for display on a display device of the method.

16. The method of claim **15**, further comprising:

generating, upon detection of a touch of the display device of the method, a push and hold user interface for display on the display device of the method;

displaying the push and hold user interface on the display device of the method;

displaying, in the push and hold user interface, a graphical user interface element that varies over time the longer a touch of the display device is detected; and

transmitting, instructions to initiate a communication session, via a wireless network, based on a lapse of time of the detected touch of the display device being outside a threshold.

17. The method of claim **15**, wherein the strong network connection is a connection to a cellular data network.

18. The method of claim **15**, wherein the sensor array includes at least one sensor of a group of sensors comprising: a heart rate monitor, an oxygen sensor, a global positioning system receiver, a gyroscope, and an accelerometer.

19. The method of claim **15**, wherein the wearable health monitor device is a smartwatch.

20. The method of claim **15**, wherein the evaluation of the sensor data includes determining a quality level of the data and the evaluation of the sensor data is displayed upon a determination that the quality level is outside a threshold.

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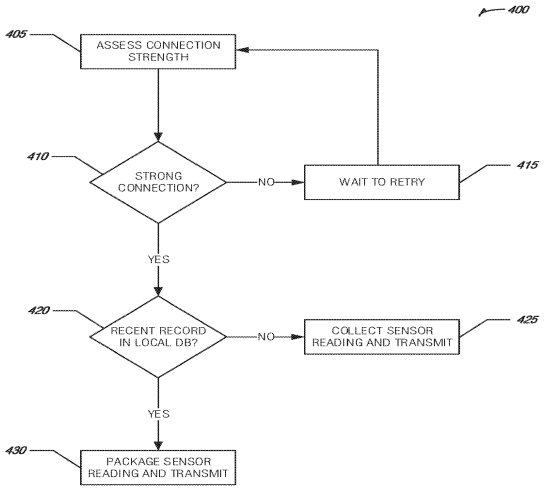
专利名称(译)	可穿戴健康监测数据服务		
公开(公告)号	US20190192011A1	公开(公告)日	2019-06-27
申请号	US16/181638	申请日	2018-11-06
[标]申请(专利权)人(译)	PLAYTABASE		
发明人	YORK, DAVID LEE OBRINGER, PETER EGGEMAN BASA, JOSE EDUARDO BETZ, JR., ROBERT DAMIEN RABUSE, CHRIS JAMES REHL, SUSAN ELIZABETH CLAYPOOL, JAKE JONES		
IPC分类号	A61B5/0205 H04Q9/00 H04L29/08 G06F3/0488 G16H40/67 A61B5/00 A61B5/145 A61B5/11		
CPC分类号	A61B5/0205 H04Q9/00 H04L67/12 G06F3/04883 G16H40/67 A61B5/681 A61B5/0022 A61B5/7435 A61B5/7475 A61B5/14542 A61B5/1112 A61B5/7221 H04Q2209/40 A61B5/02438 A61B2562/0219 G06F3/014 G06F2203/011 G16H10/60 G16H40/63 H04L67/22 H04Q2209/43 H04Q2209/50 H04Q2209/823		
优先权	62/581929 2017-11-06 US		
外部链接	Espacenet USPTO		

摘要(译)

这里公开了用于可穿戴健康监测设备和可穿戴健康监测数据服务的系统和技术。可以从传感器阵列周期性地收集传感器数据。传感器数据可以存储在可穿戴健康监测设备的本地数据库中。可以在检测到强网络连接时将传感器数据发送到基于云的平台。可以接收传感器数据的评估以在可穿戴健康监测设备的显示设备上显示。