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(54) **DATA COLLECTION GLOVE**

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(57)

ABSTRACT

Related U.S. Application Data

(60) Provisional application No. 62/239,405, filed on Oct. 9, 2015, provisional application No. 62/405,483, filed on Oct. 7, 2016.

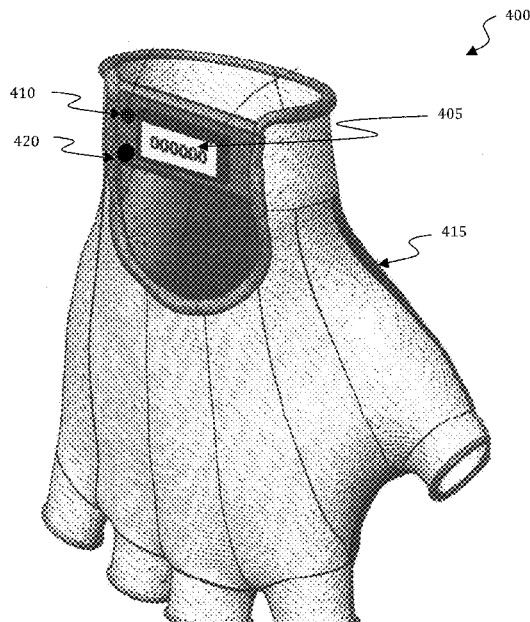
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A system, method, and apparatus comprising a glove, at least one motion sensor configured on the glove to collect data associated with motion of the glove, at least one flex sensor configured on the glove to measure a weight being grasped with the glove, a counter configured to count repetitions of movement recorded by the motion sensor, a timer configured to time intervals associated with the repetitions of movement, and a display configured on the glove for displaying the count of repetitions and the time intervals.



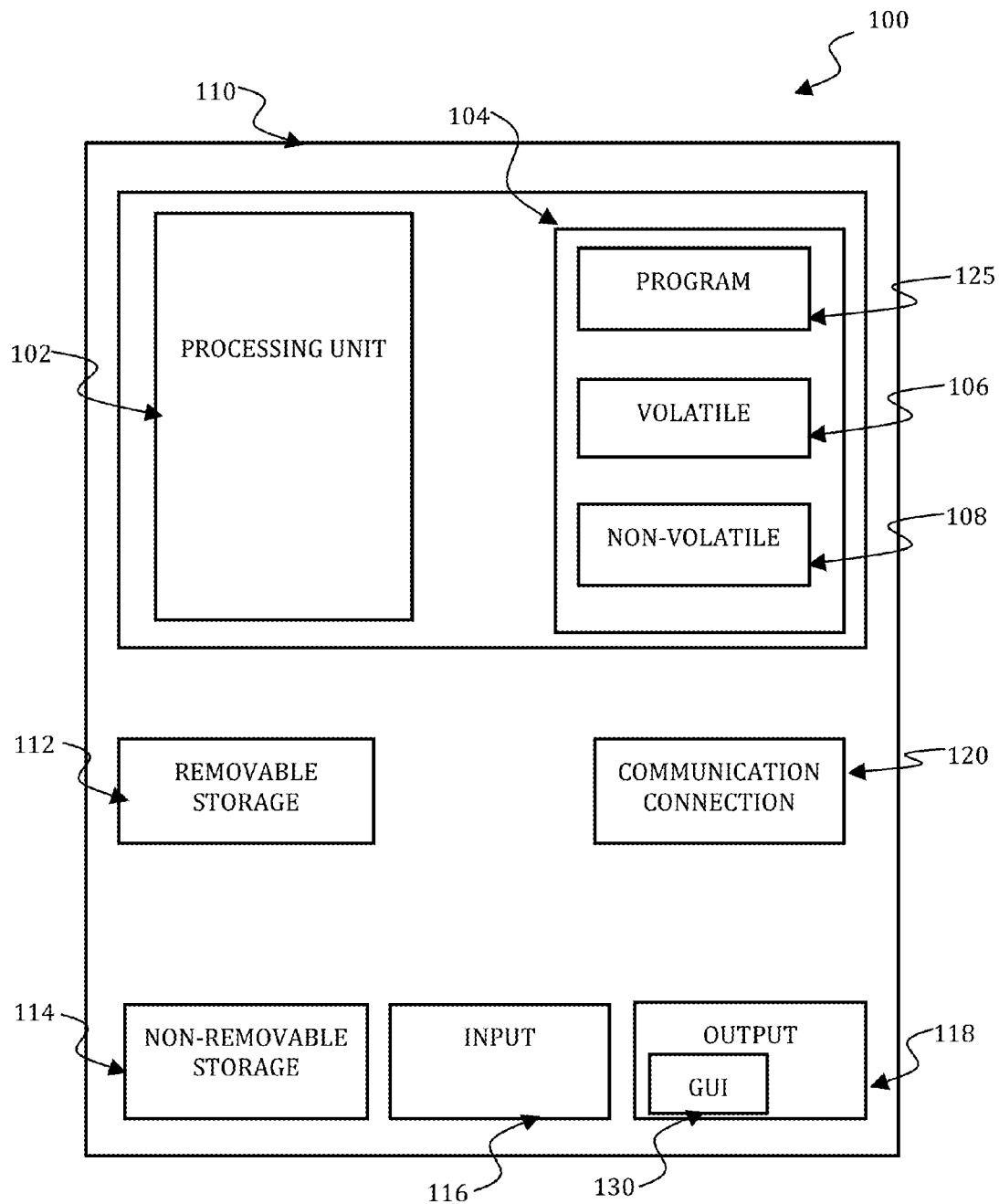


FIG. 1

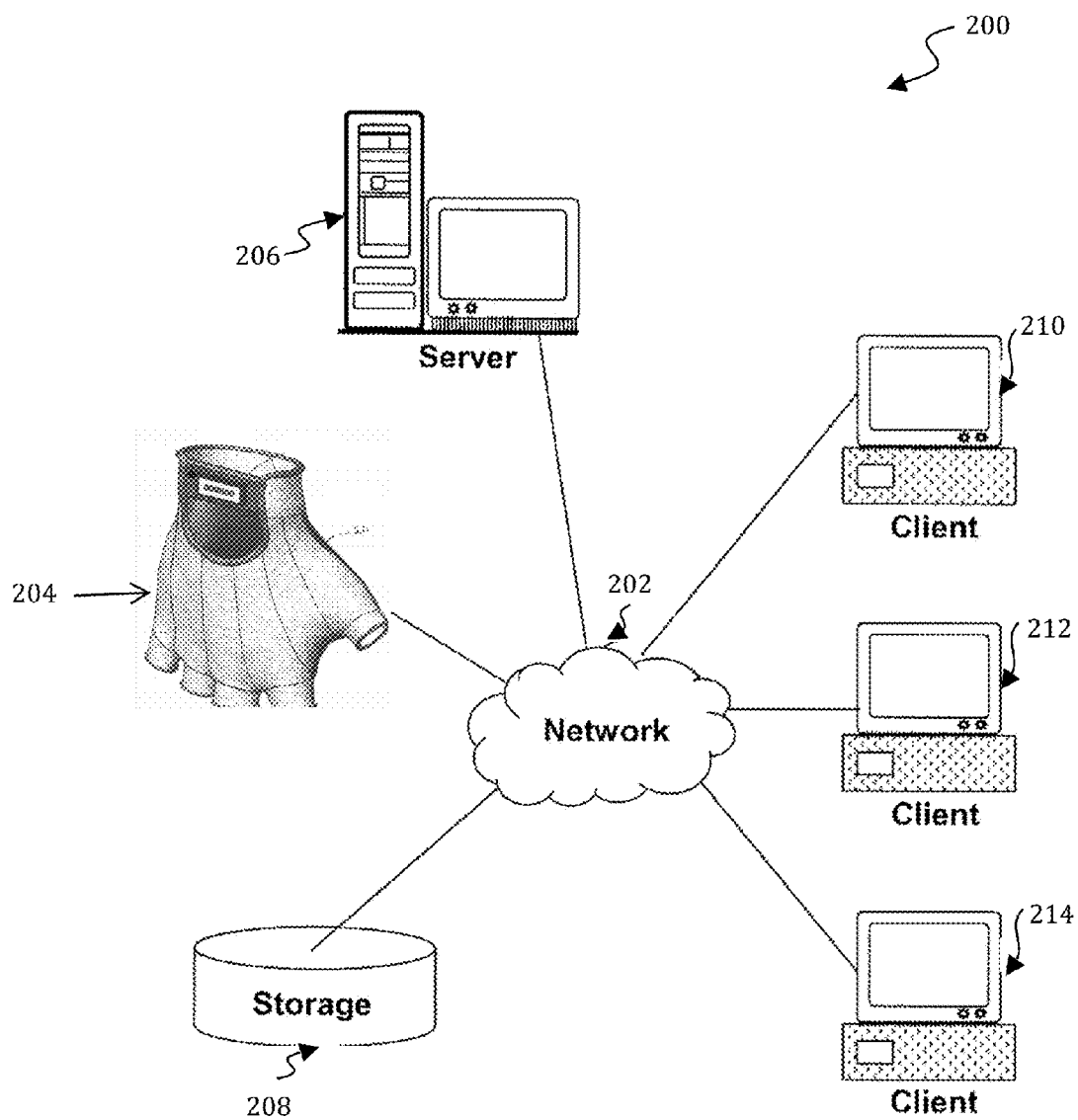


FIG. 2

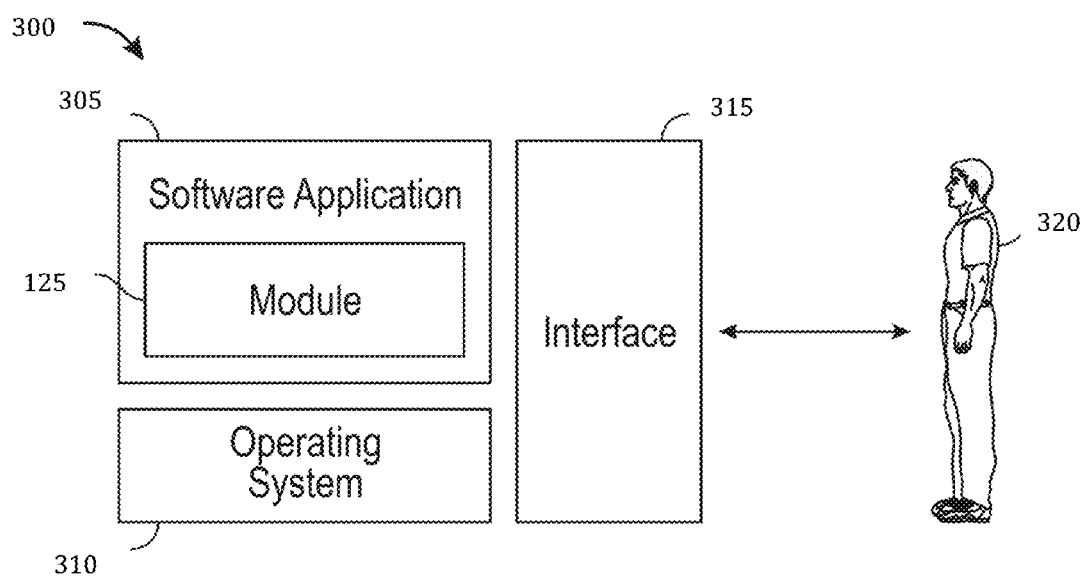


FIG. 3

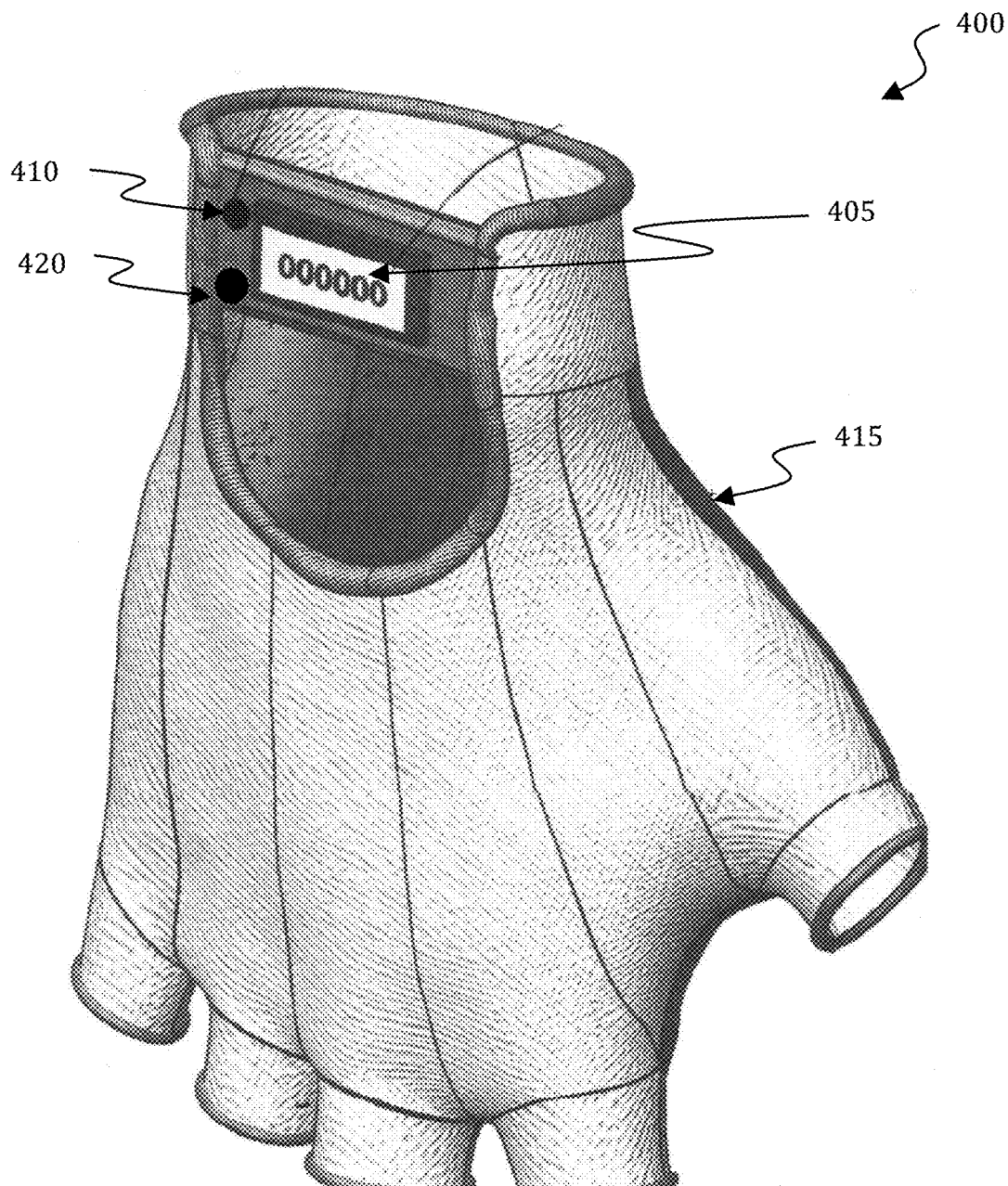


FIG. 4

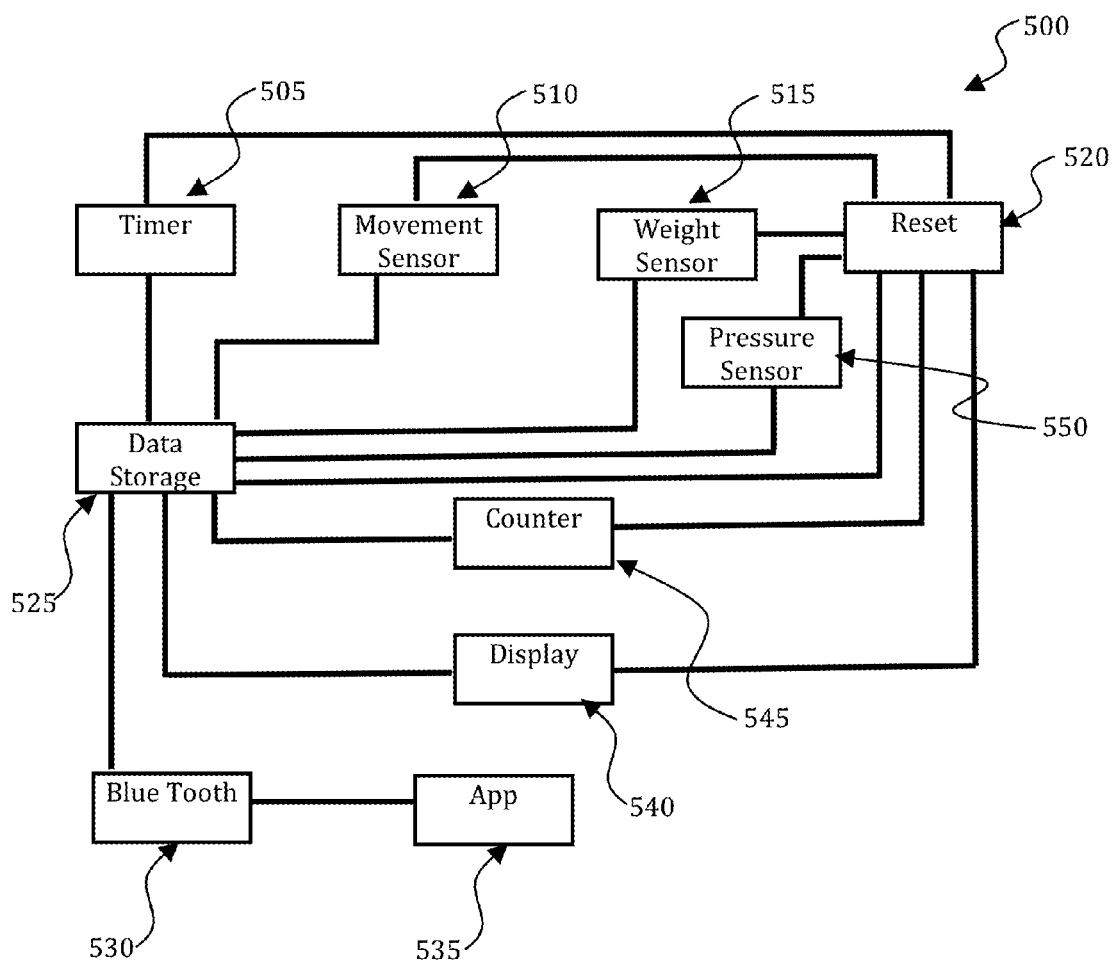


FIG. 5

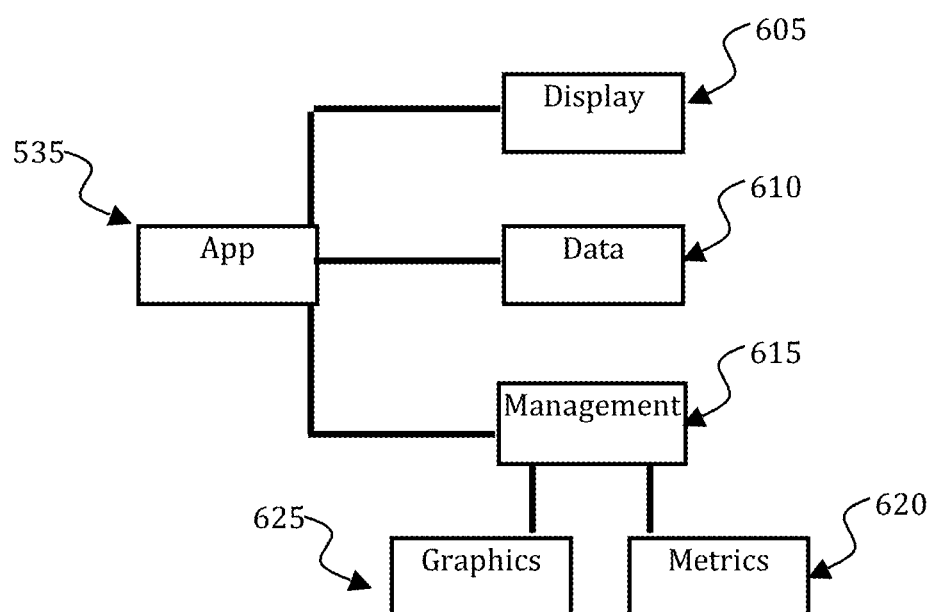


FIG. 6

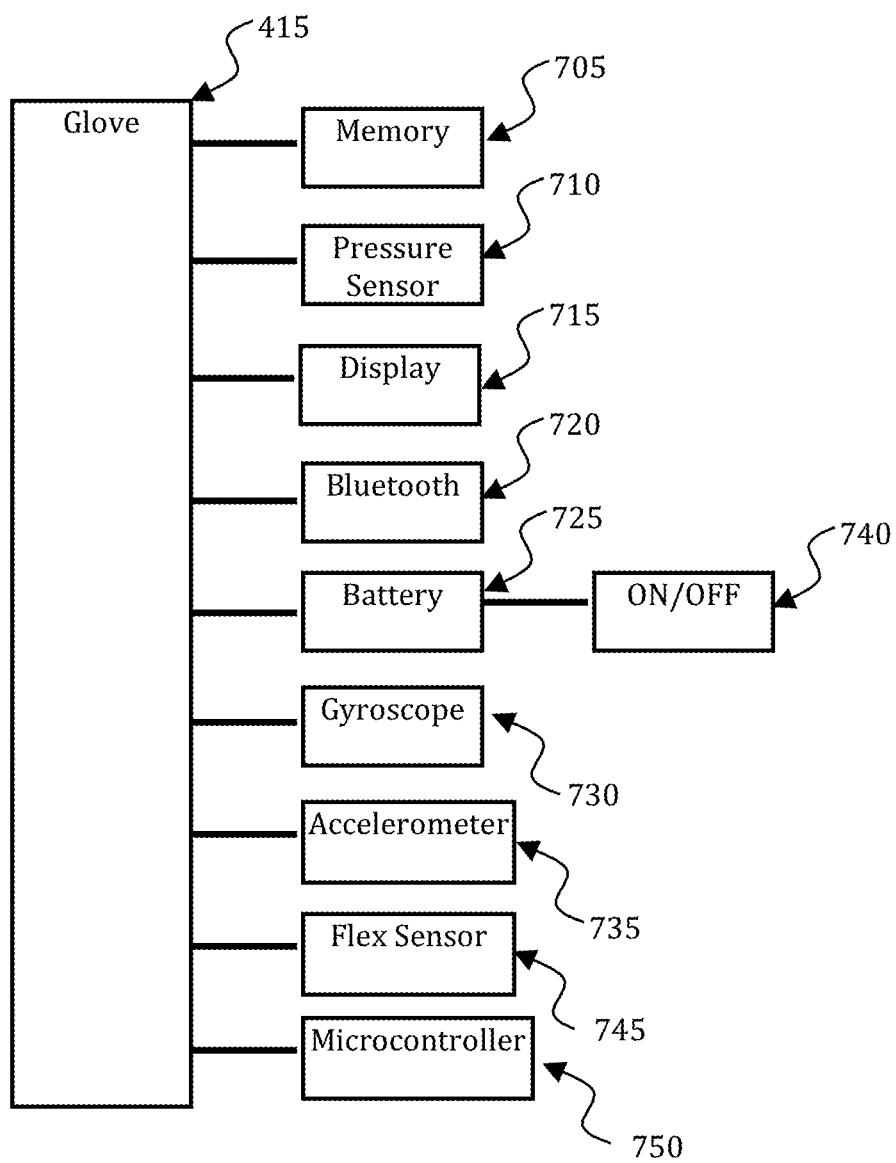


FIG. 7

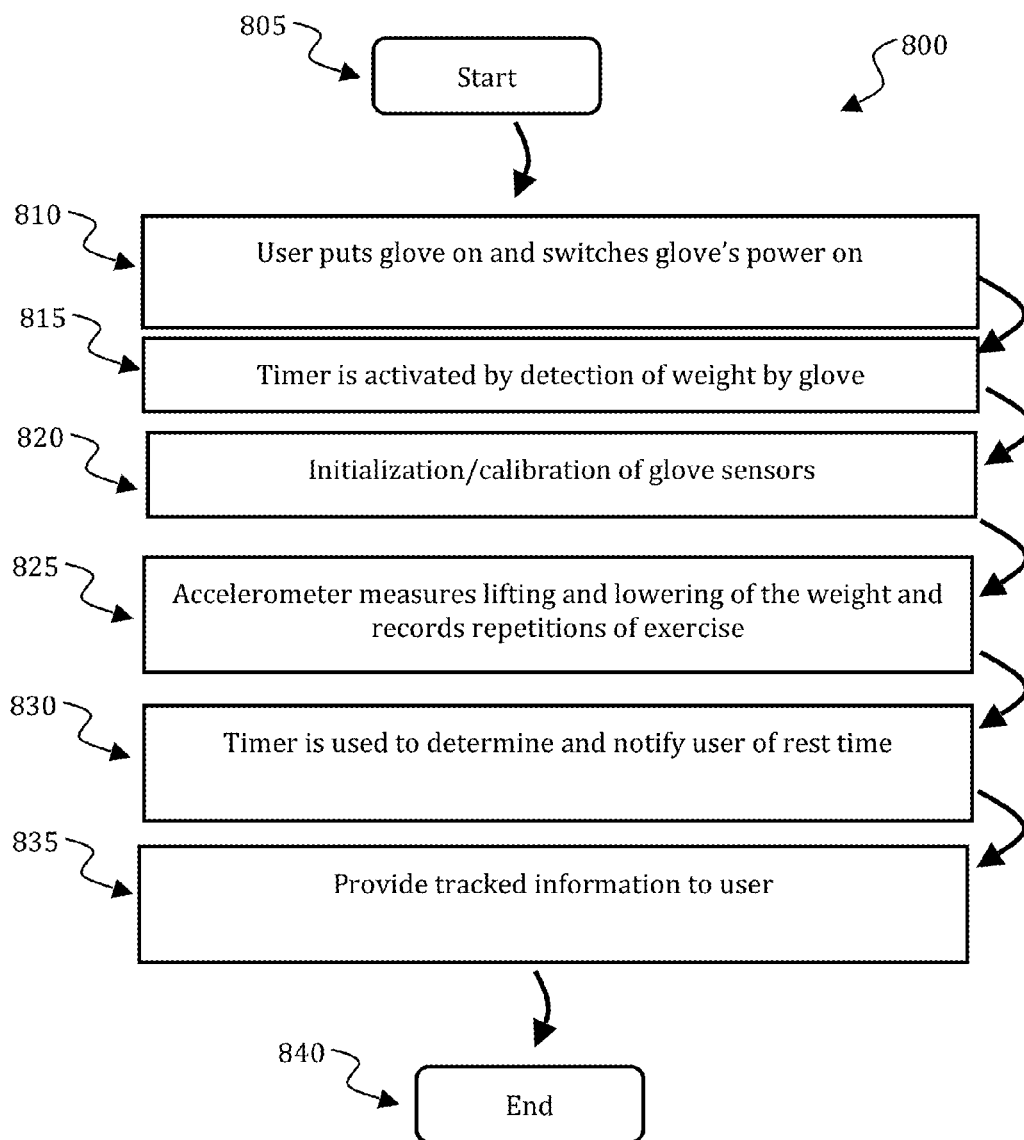


FIG. 8

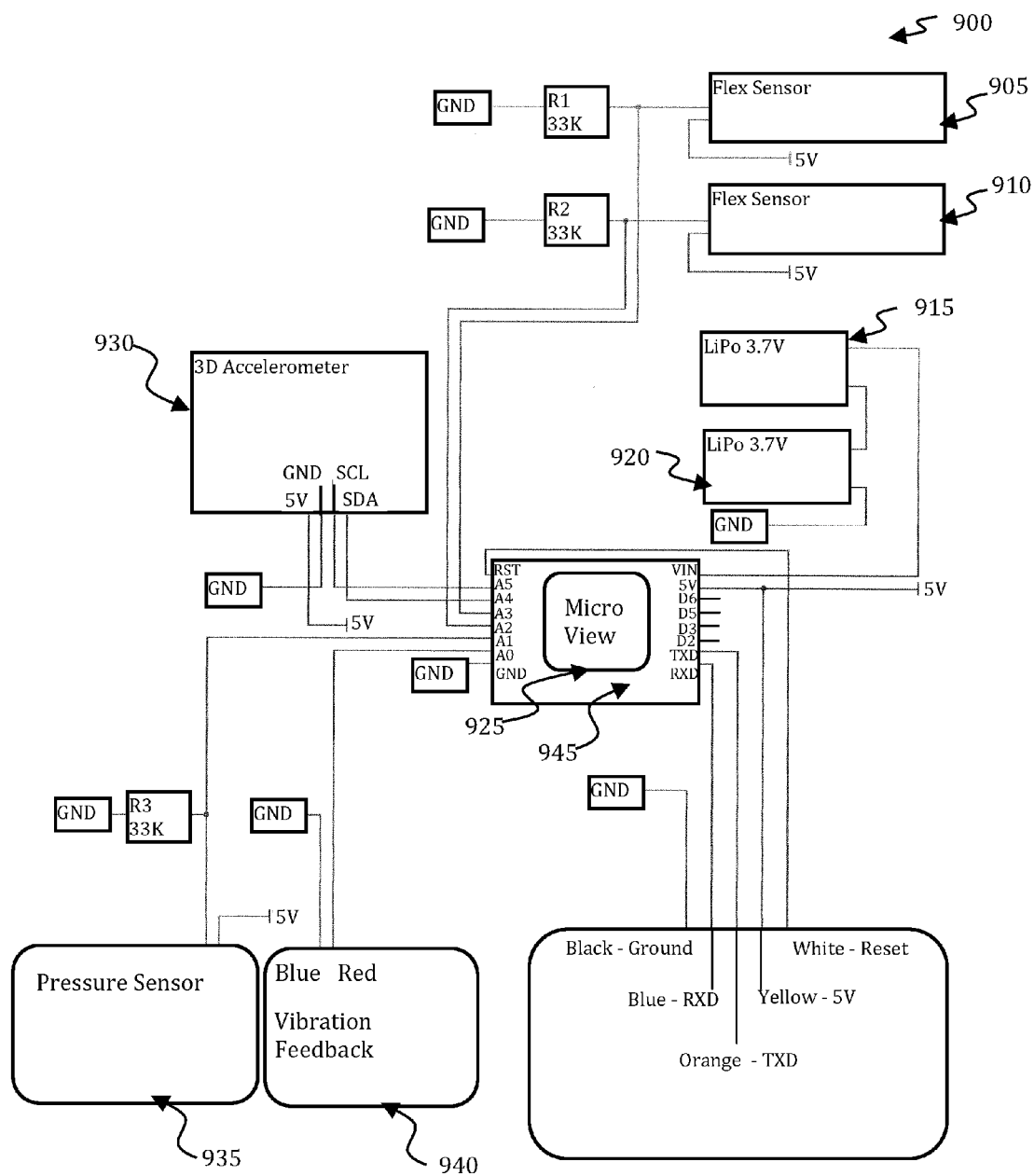


FIG. 9

DATA COLLECTION GLOVE

CROSS REFERENCE TO RELATED PATENT APPLICATIONS

[0001] This patent application claims the priority and benefit under 35 U.S.C. §119(e) of U.S. Provisional Patent Application Ser. No. 62/239,405 filed Oct. 9, 2015, entitled "TIMER GLOVE." U.S. Provisional Patent Application Ser. No. 62/239,405 is herein incorporated by reference in its entirety.

[0002] This patent application also claims the priority and benefit under 35 U.S.C. §119(e) of U.S. Provisional Patent Application Ser. No. 62/405,483 filed Oct. 7, 2016, entitled "DATA COLLECTION GLOVE." U.S. Provisional Patent Application Ser. No. 62/405,483 is herein incorporated by reference in its entirety.

TECHNICAL FIELD

[0003] Embodiments are generally related to the field of data collection. Embodiments are also related to methods and systems for tracking data related to workout results. Embodiments are further related to methods and systems for monitoring, tracking, and documenting exercises.

BACKGROUND

[0004] Technologic sports equipment such as pedometers are presently available in the market. There are also supporting sport apps that allow a user to track some data with mobile applications. However, these technologies all require active monitoring.

[0005] Additionally, there is a market demand for more specialized and functional data recording devices that allow a user to track a specific activity. For example, the Fitbit™ has provided users with a new method of monitoring biometrics during physical activities associated with endurance exercise such as walking or running. Presently, there are no data tracking applications that allow a user to accurately, conveniently, and easily monitor an anaerobic workout such as weight lifting.

[0006] Prior art monitoring applications are inconvenient, time consuming and not useful in many settings. Accordingly, there is a need in the art for methods and systems that do not require active monitoring, and can be used for exercises beyond simply walking or running.

SUMMARY

[0007] The following summary is provided to facilitate an understanding of some of the innovative features unique to the embodiments disclosed and is not intended to be a full description. A full appreciation of the various aspects of the embodiments can be gained by taking the entire specification, claims, drawings, and abstract as a whole.

[0008] It is, therefore, one aspect of the disclosed embodiments to provide a tracking device.

[0009] It is another aspect of the disclosed embodiments to provide a method and system for tracking athletic training.

[0010] It is yet another aspect of the disclosed embodiments to provide an enhanced method and system including a glove with integrated tracking electronics that provides tracking of physical workouts.

[0011] It is an additional aspect of the disclosed embodiments to provide an enhanced method, system, and apparatus that serves to identify a weight being used, count

repetitions of an exercise, calculate rest time, recognize the exercise being performed, differentiate between different exercises, and collect associated data.

[0012] The aforementioned aspects and other objectives and advantages can now be achieved as described herein. In embodiments disclosed herein, a system, method, and apparatus for tracking a workout comprising a glove, at least one motion sensor configured on the glove to collect data associated with motion of the glove, at least one flex sensor configured on the glove to measure a weight being grasped with the glove, a microcontroller that can transform the data from the motion sensor, pressure sensor, and flex sensor into signals that drive a counter configured to count repetitions of movement recorded by the motion sensor, a timer configured to time intervals associated with the repetitions of movement, displacement data associated with patterns of motion, and a display configured on the glove for displaying the count of repetitions of the exercise and the time intervals. The data can be sent together with all the other data to a software application for further processing, archiving, and/or display.

BRIEF DESCRIPTION OF THE FIGURES

[0013] The accompanying figures, in which like reference numerals refer to identical or functionally-similar elements throughout the separate views and which are incorporated in and form a part of the specification, further illustrate the embodiments and, together with the detailed description, serve to explain the embodiments disclosed herein.

[0014] FIG. 1 depicts a block diagram of a computer system which is implemented in accordance with the disclosed embodiments;

[0015] FIG. 2 depicts a graphical representation of a network of data-processing devices in which aspects of the present invention may be implemented;

[0016] FIG. 3 depicts a computer software system for directing the operation of the data processing system depicted in FIG. 1, in accordance with an example embodiment;

[0017] FIG. 4 depicts a system for tracking a workout in accordance with the disclosed embodiments;

[0018] FIG. 5 depicts a schematic diagram of a system for tracking a workout in accordance with the disclosed embodiments;

[0019] FIG. 6 depicts a schematic diagram of a module for tracking a workout in accordance with disclosed embodiments;

[0020] FIG. 7 depicts a schematic diagram of a glove used in a system for tracking a workout in accordance with the disclosed embodiments;

[0021] FIG. 8 depicts a flow chart illustrating steps in a method for tracking a workout in accordance with the disclosed embodiments; and

[0022] FIG. 9 depicts a schematic diagram of a system for tracking a workout in accordance with an alternative embodiments.

DETAILED DESCRIPTION

[0023] The particular values and configurations discussed in these non-limiting examples can be varied and are cited merely to illustrate at least one embodiment and are not intended to limit the scope thereof.

[0024] FIGS. 1-3 are provided as exemplary diagrams of data-processing environments in which embodiments of the

present invention may be implemented. It should be appreciated that FIGS. 1-3 are only exemplary and are not intended to assert or imply any limitation with regard to the environments in which aspects or embodiments of the disclosed embodiments may be implemented. Many modifications to the depicted environments may be made without departing from the spirit and scope of the disclosed embodiments.

[0025] A block diagram of a computer system **100** that executes programming for implementing the methods and systems disclosed herein is shown in FIG. 1. A general computing device in the form of a computer **110** may include a processing unit **102**, memory **104**, removable storage **112**, and non-removable storage **114**. Memory **104** may include volatile memory **106** and non-volatile memory **108**. Computer **110** may include or have access to a computing environment that includes a variety of transitory and non-transitory computer-readable media such as volatile memory **106** and non-volatile memory **108**, removable storage **112** and non-removable storage **114**. Computer storage includes, for example, random access memory (RAM), read only memory (ROM), erasable programmable read-only memory (EPROM) and electrically erasable programmable read-only memory (EEPROM), flash memory or other memory technologies, compact disc read-only memory (CD ROM), Digital Versatile Disks (DVD) or other optical disk storage, magnetic cassettes, magnetic tape, magnetic disk storage, or other magnetic storage devices, or any other medium capable of storing computer-readable instructions as well as data, including data comprising frames of video.

[0026] Computer **110** may include or have access to a computing environment that includes input **116**, output **118**, and a communication connection **120**. The computer may operate in a networked environment using a communication connection to connect to one or more remote computers or devices. The remote computer may include a personal computer (PC), mobile device, server, router, network PC, a peer device or other common network node, or the like. The remote device may include a sensor, photographic camera, video camera, accelerometer, gyroscope, sensing device, tracking device, or the like. The communication connection may include a Local Area Network (LAN), a Wide Area Network (WAN), or other networks. This functionality is described in more fully in the description associated with FIG. 2 below.

[0027] Output **118** is most commonly provided as a computer monitor, but may include any computer output device. Output **118** may also include a data collection apparatus associated with computer system **100**. In addition, input **116**, which commonly includes a computer keyboard and/or pointing device such as a computer mouse, computer track pad, or the like, allows a user to select and instruct computer system **100**. A user interface can be provided using output **118** and input **116**. Output **118** may function as a display for displaying data and information for a user and for interactively displaying a graphical user interface (GUI) **130**.

[0028] Note that the term “GUI” generally refers to a type of environment that represents programs, files, options, and so forth by means of graphically displayed icons, menus, and dialog boxes on a computer monitor screen. A user can interact with the GUI to select and activate such options by directly touching the screen and/or pointing and clicking with a user input device **116** such as, for example, a pointing device such as a mouse and/or with a keyboard. A particular

item can function in the same manner to the user in all applications because the GUI provides standard software routines (e.g., module **125**) to handle these elements and report the user's actions. The GUI can further be used to display the data and metrics as discussed below.

[0029] Computer-readable instructions, for example, program module **125**, which can be representative of other modules described herein, are stored on a computer-readable medium and are executable by the processing unit **102** of computer **110**. Program module **125** may include a computer application. A hard drive, CD-ROM, RAM, Flash Memory, and a USB drive are just some examples of articles including a computer-readable medium.

[0030] FIG. 2 depicts a graphical representation of a network of data-processing systems **200** in which aspects of the present invention may be implemented. Network data-processing system **200** is a network of computers in which embodiments of the present invention may be implemented. Note that the system **200** can be implemented in the context of a software module such as program module **125**. The system **200** includes a network **202** in communication with one or more clients **210**, **212**, and **214**. Network **202** is a medium that can be used to provide communications links between various devices and computers connected together within a networked data processing system such as computer system **100**. Network **202** may include connections such as wired communication links, wireless communication links, or fiber optic cables. Network **202** can further communicate with one or more servers **206**, one or more external devices such as tracking device **204**, and a memory storage unit such as, for example, memory or database **208**.

[0031] In the depicted example, tracking device **204** and server **206** connect to network **202** along with storage unit **208**. In addition, clients **210**, **212**, and **214** connect to network **202**. These clients **210**, **212**, and **214** may be, for example, personal computers or network computers. Computer system **100** depicted in FIG. 1 can be, for example, a client such as client **210**, **212**, and/or **214**. Alternatively, clients **210**, **212**, and **214** may also be, for example, a photographic camera, video camera, tracking device, sensor, accelerometer, gyroscope, mobile device, etc.

[0032] Computer system **100** can also be implemented as a server such as server **206**, depending upon design considerations. In the depicted example, server **206** provides data such as boot files, operating system images, applications, and application updates to clients **210**, **212**, and **214**, and/or to tracking device **204**. Clients **210**, **212**, and **214** and tracking device **204** are clients to server **206** in this example. Network data-processing system **200** may include additional servers, clients, and other devices not shown. Specifically, clients may connect to any member of a network of servers, which provide equivalent content.

[0033] In the depicted example, network data-processing system **200** is the Internet with network **202** representing a worldwide collection of networks and gateways that use the Transmission Control Protocol/Internet Protocol (TCP/IP) suite of protocols to communicate with one another. At the heart of the Internet is a backbone of high-speed data communication lines between major nodes or host computers consisting of thousands of commercial, government, educational, and other computer systems that route data and messages. Of course, network data-processing system **200** may also be implemented as a number of different types of networks such as, for example, an intranet, a local area

network (LAN), or a wide area network (WAN). FIGS. 1 and 2 are intended as examples and not as architectural limitations for different embodiments of the present invention.

[0034] FIG. 3 illustrates a computer software system 300, which may be employed for directing the operation of the data-processing systems such as computer system 100 depicted in FIG. 1. Software application 305, may be stored in memory 104, on removable storage 112, or on non-removable storage 114 shown in FIG. 1, and generally includes and/or is associated with a kernel or operating system 310 and a shell or interface 315. One or more application programs, such as module(s) 125, may be “loaded” (i.e., transferred from removable storage 112 into the memory 104) for execution by the data-processing system 100. The data-processing system 100 can receive user commands and data through user interface 315, which can include input 116 and output 118, accessible by a user 320. These inputs may then be acted upon by the computer system 100 in accordance with instructions from operating system 310 and/or software application 305 and any software module(s) 125 thereof.

[0035] Generally, program modules (e.g., module 125) can include, but are not limited to, routines, subroutines, software applications, programs, objects, components, data structures, etc., that perform particular tasks or implement particular abstract data types and instructions. Moreover, those skilled in the art will appreciate that the disclosed method and system may be practiced with other computer system configurations such as, for example, hand-held devices, multi-processor systems, data networks, microprocessor-based or programmable consumer electronics, networked personal computers, minicomputers, mainframe computers, servers, and the like.

[0036] Note that the term module as utilized herein may refer to a collection of routines and data structures that perform a particular task or implements a particular abstract data type. Modules may be composed of two parts: an interface, which lists the constants, data types, variable, and routines that can be accessed by other modules or routines; and an implementation, which is typically private (accessible only to that module) and which includes source code that actually implements the routines in the module. The term module may also simply refer to an application such as a computer program designed to assist in the performance of a specific task such as word processing, accounting, inventory management, etc.

[0037] The interface 315 (e.g., a graphical user interface 130) can serve to display results, whereupon a user 320 may supply additional inputs or terminate a particular session. In some embodiments, operating system 310 and GUI 130 can be implemented in the context of a “Windows” system. It can be appreciated, of course, that other types of systems are possible. For example, rather than a traditional “windows” system, other operation systems such as, for example, a real time operating system (RTOS) more commonly employed in wireless systems may also be employed with respect to operating system 310 and interface 315. The software application 305 can include, for example, module(s) 125, which can include instructions for carrying out steps or logical operations such as those shown and described herein.

[0038] The following description is presented with respect to embodiments of the present invention, which can be embodied in the context of a data-processing system such as computer system 100, in conjunction with program module

125, and data-processing system 200 and network 202 depicted in FIGS. 1-3. The present invention, however, is not limited to any particular application or any particular environment. Instead, those skilled in the art will find that the system and method of the present invention may be advantageously applied to a variety of system and application software including database management systems, word processors, and the like. Moreover, the present invention may be embodied on a variety of different platforms including Macintosh, UNIX, LINUX, and the like. Therefore, the descriptions of the exemplary embodiments, which follow, are for purposes of illustration and not considered a limitation.

[0039] In certain embodiments, methods and systems are described that achieve exercise detection by monitoring inherent motions for a number of exercises. Such exercises may include, but are not limited to, bicep curls, the standard bench press, triceps extension, chest flys, and similar exercises involving one or both arms.

[0040] In general, the systems take advantage of the standard approach to exercises where a user clenches their hand around an apparatus, followed by a repetitive predominantly one-dimensional motion, followed by the release of the apparatus. This series of behaviors, in this specific order, can be accurately monitored. For example, when a user initiates a workout set (or series of repetitions) by grasping an apparatus, the systems and methods disclosed herein are configured to monitor the number and quality of repetitions, and provide a means of tracking rest time for the user.

[0041] In certain embodiments, the system provides detection with at least three sensors positioned strategically in an exercise glove. The first sensing mechanism (detecting the clenched fist around the apparatus) is a flex sensor array located along each primary finger in the glove. The second is a pressure sensor, which is also integrated in the glove. The flex sensors operate by providing a relative voltage depending on how tightly the fingers are curled around the apparatus. An open or relaxed fist provides a relatively low voltage, while a clenched fist around an apparatus provides a relatively high voltage. The pressure sensor collects information indicative of the variation of the pressure applied. Monitoring both of these sensors during an exercise allows the system to accurately determine when the user is beginning or ending a set. The pressure sensor can also be used to determine the weight of the object being lifted.

[0042] While the first and second sensing mechanisms, comprising the flex sensor and/or pressure sensor, indicate if an apparatus has been engaged, the third sensing mechanism is an accelerometer, gyroscope, magnetometer, inertial measurement unit, or combination thereof. These sensors provide a means of tracking the movement of the user in three dimensions. A typical exercise requires repetition of a given pattern of motion. This usually involves an up-and-down motion. The respective displacement associated with the pattern of motion can be calculated from the data collected by the accelerometers and the cyclical behavior can be monitored to determine when the user has started and finished performing repetitions of the current exercise.

[0043] When the system detects the completion of an exercise set, a preset rest timer is initiated automatically. Upon completion of the rest period, the system can provide either an audible tone from a speaker associated with the glove or a software application associated with the system, or a vibration of the glove which indicates that the next set

should begin. At this point, the system resumes detecting when the repetitions start/stop in order to provide a method of keeping the user on track with the exercise routine. The glove and/or associated system can provide a display so that during each portion of the activity, the status is displayed on a screen for ease of use and insight to the user.

[0044] In an embodiment, a system 400 for tracking a workout is provided as illustrated in FIG. 4. Glove 415 can be made from any suitable material, natural or man-made. Glove 400 is configured to be worn by a person during a physical workout and to provide protection to the user commensurate with that of common workout gloves. Glove 400 includes an externally visible display 405 and an on/off switch 410. Another toggle switch or button 420 can also be included to configure the rest time settings.

[0045] FIG. 5 illustrates a schematic layout of, and general logic associated with, an embodiment of a system for tracking exercises during a workout. In an embodiment, the circuit 500, shown in schematic form in FIG. 5, is configured on or in glove 415. Components of the circuit 500 include timer 505, movement sensor 510, weight sensor 515, reset module 520, a counter 545, and a pressure sensor 550. Data storage 525 transmits information for display to display unit 540. It should be appreciated that movement sensor 510 may comprise one or more of a three-axis accelerometer, a three-axis gyroscope, a magnetometer, and an inertial measurement unit. Likewise weight sensor 510 can comprise or include a flex sensor or flex sensor array and/or a pressure sensor.

[0046] Glove 415 can include a Bluetooth unit 530 which can be connected to a smart device (e.g., mobile phone, smart phone, tablet device, computer, etc.) application module 535. In other embodiments, unit 530 may be embodied to transmit information between the glove sensors and application module 535 via wireless network, BLE, near field communications cellular network, wired connection, or the like.

[0047] FIG. 6 illustrates, in schematic form, an embodiment of the functionality of application module 535 on a portable smart device such as a telephone or tablet. App 535 can drive a display 805 to show data 610 transmitted from glove 415. App 535 can also be used to drive management module 615 to show information about metrics 820 of a workout or graphics 625 associated with the workout.

[0048] FIG. 7 shows, in schematic form, components configured on or in glove 415. The major operating circuit of glove 415 is illustrated in FIG. 7. Glove 415 also includes accelerometer 735, gyroscope 730, and battery 725. On/Off switch 740 is connected to battery 725 and is used to controller battery 725 which powers the functions of glove 415. Likewise, display 715, pressure sensor 710 (it should be appreciated that the pressure sensor may equivalently be a weight sensor), flex sensor 745, Bluetooth unit 720, and memory or data storage 705 are shown again as components included on or in glove 415. A microcontroller 750 may also be included to controller the various sensors and collect data. The microcontroller may be embodied as an Arduino microcontroller.

[0049] FIG. 8 illustrates a flow chart of a method 800 associated with operation of the systems and apparatuses described herein. The method begins at block 805. At block 810, the user puts on one or more gloves 415. This action generally correlates with the user preparing to engage in a workout. At block 815, the timer 505 can be activated by

weight sensor 515 based on the detection of a weight in the glove 415 and the variation on, the flex sensor 745. In certain embodiments, this detection correlates with a user grasping a weight to begin exercising. It should be appreciated that every time the wearer of glove 415 initially engages or reengages an apparatus for their workout, timer 505 will be reset by the reset module 520. The weight sensor can measure the total weight being held in the glove and save that information for later retrieval and tracking.

[0050] In certain embodiments, at block 820, an initialization can be performed to identify the starting point of the weight and calibrate the sensors in the glove. This may entail bringing the glove 415 to a desired starting position and then pausing at that point for a predetermined time. At block 825, the sensors in the glove, including accelerometer 735 in glove 415, can measure the raising and lowering of the glove. In certain embodiments, the sensors can record detailed analysis of the path of the weight during the repetition and save such information for further review and analysis, or transmit such information to software modules associated with the system.

[0051] When the glove returns to a starting position, a counter module 545 (which may be embodied as a computer module) can indicate and record that one repetition of the exercise has been completed. In certain embodiments, the analysis of the path of the glove can be used to identify the exercise that was performed. A certain number of repetitions can be performed by the user and counter module 545 can be used to keep track of the number of repetitions in each set. Accelerometer 735 and gyroscope 730 can compensate for the speed of the movement of the glove and rotational movements during the set of repetitions.

[0052] When the weight is released from the glove 415 after the completion of a set of repetitions, timer 505 starts, when the weight is retrieved, the timer stops as shown at block 830. In certain embodiments, the optimal rest time can be preset and the timer can notify the user via sound from a speaker configured on the glove, or from; a speaker on an associated smartphone or tablet running app 535, that the optimal rest time has elapsed and a new set of repetitions should begin. Alternatively, the user may be notified by vibration of glove 415. This allows the system to keep accurate track of the user rest time and/or optimize user rest time.

[0053] The data recorded by the various sensors can be provided to the user at block 835. In certain embodiments, the data may be displayed on display unit 540. In other embodiments, app 535 may be used to present data about workouts. The data may comprise feedback about performance and performance trends. Performance trends may include providing metrics and performance data related to various workouts performed at different times. Performance data can include, but is not limited to, workout time, set time, repetition time, rest time, weight used, exercise performed, movement efficiency, caloric output, etc. Thus, a user of glove 415 is aided in maintaining discipline in their workout program.

[0054] When the workout session is complete, the user may shutdown the power to the glove 415 with on/off switch 740 and the method ends at block 840.

[0055] FIG. 9 illustrates a schematic diagram of a circuit 900 associated with the method and systems disclosed herein. This circuit 900 may be installed on or in glove 415. This embodiment can include a first flex sensor 905 and

second flex sensor **910**. It should be appreciated that these flex sensors may be embodied as sensor arrays. Accelerometer **930** and pressure sensor **935** can also be configured for data collection. Vibration feedback unit **940** can be used to provide vibratory stimulus to the user, for example, when an optimal rest period has passed between sets of exercises.

[0056] Battery **915** and battery **920** can provide power to the various sensors and display **925** configured on microcontroller **945**. It should be appreciated that a communication module may further be provided for transmitting and receiving information from an associated app such as app **535** installed on a Smartphone, computer, tablet, or other such device. A memory may also be provided for storing data collected by the various sensors.

[0057] In an exemplary embodiment, a glove is provided that is equipped with a timer that counts the time between each set of exercises. Once the time ends, the glove beeps or vibrates, signaling the user that it is time to start another set. This timer can be activated by a weight sensor. Every time the user holds a weight, the timer can be reset. When the user drops the weight, the timer starts a countdown to the next set of the exercise. This serves to increase athletes' focus, as well as optimize their workout schedule, and maximize muscle gains.

[0058] Sensors in the glove are configured to identify the weight carried by the user and count the repetitions on every exercise. The glove offers the protection of a standard workout glove. Important information can be displayed on an LED screen integrated in the glove.

[0059] In certain embodiments, an application can be associated with the glove sensors. The app connects to the glove circuitry via Bluetooth or other such communication protocol and gathers the data collected during the user's training. The software application can provide the user updates on their performance and tracking services related to their performance over time. The application can allow users to set goals, compare their results with friends and other system users, check their improvements, and give them workout advice and health tips.

[0060] In certain embodiments, a controller can be used, which can operate with a nine degrees-of-freedom inertial measurement unit, which is composed of a 3-axis gyro, a 3-axis accelerometer, and a magnetometer. These are required to capture the motion of the user and compute the repetitions, the exercise duration, and other pertinent information.

[0061] In another embodiment, the system provides exercise detection by monitoring inherent motion associated with common types of lifts for specific exercises. This can include, but is not limited to, bicep curls, the standard bench press, triceps extension, and similar exercises involving one or both arms. The expected and common pattern associated with such exercises includes clenching an apparatus followed by a repetitive (often predominantly one-dimensional) motion, followed by the release of the apparatus. This series of behaviors in this specific order can be captured in order to accurately monitor when a user has initiated a set (or series of repetitions), monitor the number and quality of repetitions, and finally provide a method of tracking rest time for the user.

[0062] It should be appreciated that different exercises require cyclic behaviors in different axes and provided unique orientations. The signal energy in the time domain, signal variance, and signal energy of the Welch transform

can be used in the identification process. Because the exercises are separable in several dimensions, separability can be performed with a simple linear classifier. A Support Vector Machine without a Kernel Function using One vs. One Classification may preferably be used for pattern matching in order to identify the exercise being performed.

[0063] In certain embodiments, the system may offer modes of operation to the user. The modes of operation can be used to distinguish between when a user is casually moving around the gym versus when the user is engaged in an exercise. This can provide a better portrait of the user's workout.

[0064] In yet another embodiment, the bottom portion of the glove can be configured to be removable or can be formed with a pocket configured so that the microcontroller can be removed. This way the user can change or wash the upper portion of the glove (which may become sweaty and/or damaged during use) while retaining the bottom portion, which contains the most expensive technology (the microcontroller). In such an embodiment, the upper removable portion of the glove can be configured to contain the less expensive sensors, such as the flex and pressure sensor.

[0065] Based on the foregoing, it can be appreciated that a number of embodiments, preferred and alternative, are disclosed herein. For example, in one embodiment, a system comprises a glove, at least one motion sensor configured on said glove to collect data associated with motion of said glove, at least one pressure sensor configured on said glove to collect data associated with a weight being grasped with said glove, at least one flex sensor configured on said glove to collect data associated with a deflection of said glove, a microcontroller configured to receive said data and calculate time intervals associated with said data and repetitions of an exercise, and a display configured on said glove for displaying said count of repetitions and said time intervals.

[0066] In another embodiment, the system further comprises a memory for storing said collected data associated with motion of said glove, said count of repetitions, and said time intervals.

[0067] In another embodiment, the system further comprises a communication module configured to transmit information collected by said at least one motion sensor and at least one flex sensor to an associated device.

[0068] In an embodiment, the at least one motion sensor comprises at least one of an inertial measurement unit, an accelerometer, a gyroscope, and a magnetometer.

[0069] In an embodiment, the data associated with said motion of said glove is compared to stored motion patterns using pattern recognition in order to identify an exercise being performed.

[0070] In another embodiment, the system further comprises an alert module configured to alert a user when an optimal rest time has expired. In an embodiment, the alert module comprises at least one of a speaker and a vibration unit.

[0071] In another embodiment, a method for tracking a workout comprises wearing a glove configured with at least one motion sensor, at least one flex sensor, a counter, a timer, and a display, collecting data associated with motion of said glove with said motion sensor, measuring a weight being grasped with said glove with said at least one flex sensor and at least one pressure sensor, counting repetitions of movement recorded by said motion sensor with a microcontroller, timing time intervals associated with said repetitions of

movement with said microcontroller, and displaying said count of repetitions and said time intervals on said display.

[0072] In an embodiment, the method further comprises storing said collected data associated with motion of said glove, said count of repetitions, and said time intervals on a memory configured in said glove.

[0073] In an embodiment, the method further comprises transmitting information collected by said at least one motion sensor, said at least one pressure sensor, and at least one flex sensor to an associated device with a communication module.

[0074] In another embodiment, the at least one motion sensor comprises at least one of an accelerometer, a gyroscope, and a magnetometer.

[0075] In an embodiment, the method further comprises comparing said data associated with said motion of said glove to stored motion patterns using pattern recognition and identifying an exercise being performed according to said pattern recognition.

[0076] In an embodiment, the method further comprises alerting a user when an optimal rest time has expired with an alert module. The alert module comprises at least one of a speaker and a vibration unit.

[0077] In yet another embodiment, a workout tracking apparatus comprises a glove, at least one motion sensor configured on said glove to collect data associated with motion of said glove, at least one pressure sensor configured on said glove to collect data associated with a weight being grasped with said glove, at least one flex sensor configured on said glove to collect data associated with a deflection of said glove a microcontroller configured to receive said data and calculate time intervals associated with said data and repetitions of an exercise, a memory for storing said collected data associated with motion of said glove, said count of repetitions, and said time intervals, a communication module configured to transmit information collected by said at least one motion sensor, said at least one pressure sensor, and said at least one flex sensor to an associated device, and a display configured on said glove for displaying said count of repetitions and said time intervals.

[0078] In another embodiment, the at least one motion sensor comprises at least one of an inertial measurement unit, an accelerometer, a gyroscope, and a magnetometer.

[0079] In an embodiment, the data associated with said motion of said glove is compared to stored motion patterns using pattern recognition in order to identify an exercise being performed.

[0080] In an embodiment, the apparatus further comprises an alert module configured to alert a user when an optimal rest time has expired. The alert module comprises at least one of a speaker and a vibration unit.

[0081] In an embodiment, the apparatus further comprises a processor and a computer-usable medium embodying computer code, said computer-usable medium being coupled to said processor, said computer code comprising non-transitory instruction media executable by said processor configured for: receiving data from said at least one motion sensor, said at least one pressure sensor, and said at least one flex sensor; tracking said data associated with motion of said glove for at least one workout session; tracking said exercise being performed for at least one workout session; tracking said weight being grasped with said glove for at least one workout session; tracking a rest time for at least one workout session; tracking a count of

said repetitions for at least one workout session; and providing data related to said at least one workout session to a user.

[0082] In an embodiment, the apparatus is configured for presenting said data related to said at least one workout session to a user as at least one of graphics and metrics.

[0083] It will be appreciated that variations of the above-disclosed and other features and functions, or alternatives thereof, may be desirably combined into many other different systems or applications. Also, various presently unforeseen or unanticipated alternatives, modifications, variations or improvements therein may be subsequently made by those skilled in the art which are also intended to be encompassed by the following claims.

1. A system comprising:
 - a glove;
 - at least one motion sensor configured on said glove to collect data associated with motion of said glove;
 - at least one pressure sensor configured on said glove to collect data associated with a weight being grasped with said glove;
 - at least one flex sensor configured on said glove to collect data associated with a deflection of said glove;
 - a microcontroller configured to receive said data and calculate time intervals associated with said data and repetitions of an exercise; and
 - a display configured on said glove for displaying said count of repetitions and said time intervals.
2. The system of claim 1 further comprising:
 - a memory for storing said collected data associated with motion of said glove, said count of repetitions, and said time intervals.
3. The system of claim 1 further comprising:
 - a communication module configured to transmit information collected by said at least one motion sensor and at least one flex sensor to an associated device.
4. The system of claim 1 wherein said at least one motion sensor comprises at least one of:
 - an inertial measurement unit;
 - an accelerometer;
 - a gyroscope; and
 - a magnetometer.
5. The system of claim 1 wherein said data associated with said motion of said glove is compared to stored motion patterns using pattern recognition, in order to identify an exercise being performed.
6. The system of claim 1 further comprising:
 - an alert module configured to alert a user when an optimal rest time has expired.
7. The system of claim 6 wherein said alert module comprises at least one of:
 - a speaker; and
 - a vibration unit.
8. A method for tracking a workout comprising:
 - wearing a glove configured with at least one motion sensor, at least one flex sensor, a counter, a timer, and a display;
 - collecting data associated with motion of said glove with said motion sensor;
 - measuring a weight being grasped with said glove with said at least one flex sensor and at least one pressure sensor;
 - counting repetitions of movement recorded by said motion sensor with a microcontroller;

timing time intervals associated with said repetitions of movement with said microcontroller; and displaying said count of repetitions and said time intervals on said display.

9. (canceled)

9. The method of claim 8 further comprising:

storing said collected data associated with motion of said glove, said count of repetitions, and said time intervals on a memory configured in said glove; and

transmitting information collected by said at least one motion sensor, said at least one pressure sensor, and at least one flex sensor to an associated device with a communication module.

10. The method of claim 8 wherein said at least one motion sensor comprises at least one of;

an inertial measurement unit;

an accelerometer;

a gyroscope; and

a magnetometer.

11. The method of claim 8 further comprising;

comparing said data associated with said motion of said glove to stored motion patterns using pattern recognition; and

identifying an exercise being performed according to said pattern recognition.

12. The method of claim 8 further comprising:

alerting a user when an optimal rest time has expired with an alert module.

13. The method of claim 12 wherein said alert module comprises at least one of:

a speaker; and

a vibration unit.

14. A workout tracking apparatus comprising:

a glove;

at least one motion sensor configured on said glove to collect data associated with motion of said glove;

at least one pressure sensor configured on said glove to collect data associated with a weight being grasped with said glove;

at least one flex sensor configured on said glove, to collect data associated with a deflection of said glove

a microcontroller configured to receive said data and calculate time intervals associated with said data and repetitions of an exercise;

a memory for storing said collected data associated with motion of said glove, said count of repetitions, and said time intervals;

a communication module configured to transmit information collected by said at least one motion sensor, said at

least one pressure sensor, and said at least one flex sensor to an associated device; and
a display configured on said glove for displaying said count of repetitions and said time intervals.

15. The apparatus of claim 14 wherein said at least one motion sensor comprises at least one of:

an inertial measurement unit;

an accelerometer;

a gyroscope; and

a magnetometer.

16. The apparatus of claim 14 wherein said data associated with said motion of said glove is compared to stored motion patterns using pattern recognition in order to identify an exercise being performed.

17. The apparatus of claim 14 further comprising:

an alert module configured to alert a user when an optimal rest time has expired.

18. The apparatus of claim 14 wherein said alert module comprises at least one of:

a speaker; and

a vibration unit.

19. The apparatus of claim 16 further comprising:

a processor; and

a computer-usable medium embodying computer code, said computer-usable medium being coupled to said processor, said computer code comprising non-transitory instruction media executable by said processor configured for:

receiving data from said at least one motion sensor, said at least one pressure sensor, and said at least one flex sensor;

tracking said data associated with motion of said glove for at least one workout session;

tracking said exercise being performed for at least one workout session;

tracking said weight being grasped with said glove for at least one workout session;

tracking a rest time for at least one workout session;

tracking a count of said repetitions for at least one workout session; and

providing data related to said at least one workout session to a user.

20. The apparatus of claim 19 further comprising:

presenting said data related to said at least one workout session to a user as at least one of:

graphics; and

metrics.

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