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(54) **INTEGRATED WELLNESS SYSTEM FOR STATIONARY UNITS**

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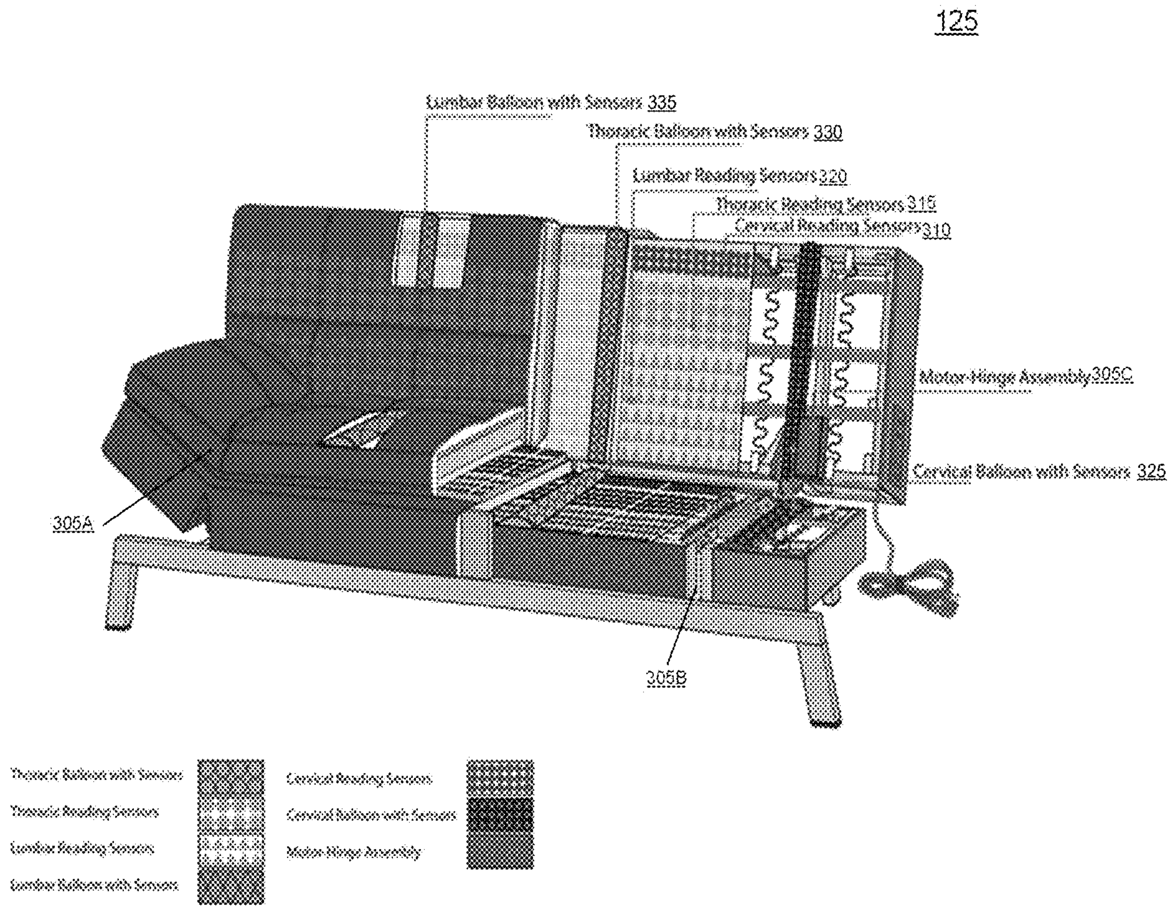
CPC ***G16H 20/30*** (2018.01); ***G16H 40/67*** (2018.01); ***G16H 50/30*** (2018.01); ***G06N 20/10*** (2019.01); ***A47C 1/0242*** (2013.01); ***A61B 5/0006*** (2013.01); ***G16H 80/00*** (2018.01)

(57) **ABSTRACT**

An integrated wellness system uses biometric sensor data received from an integrated stationary unit to generate user-specific wellness mappings and to automatically adjust one or more components of the stationary unit. Sensors in the integrated stationary unit transmit biometric sensor data to an integrated online system responsive to detecting that a user is interacting with the integrated stationary unit. Modules of the online system input the received sensor data into a trained configuration model that outputs a recommended optimal configuration of the integrated stationary unit for the user and instruct the integrated stationary unit to configure one or more components according to the recommended configuration. In some embodiments, the online system instructs the integrated stationary unit to further modify one or more components based on user input through a wellness application executing on a client device.



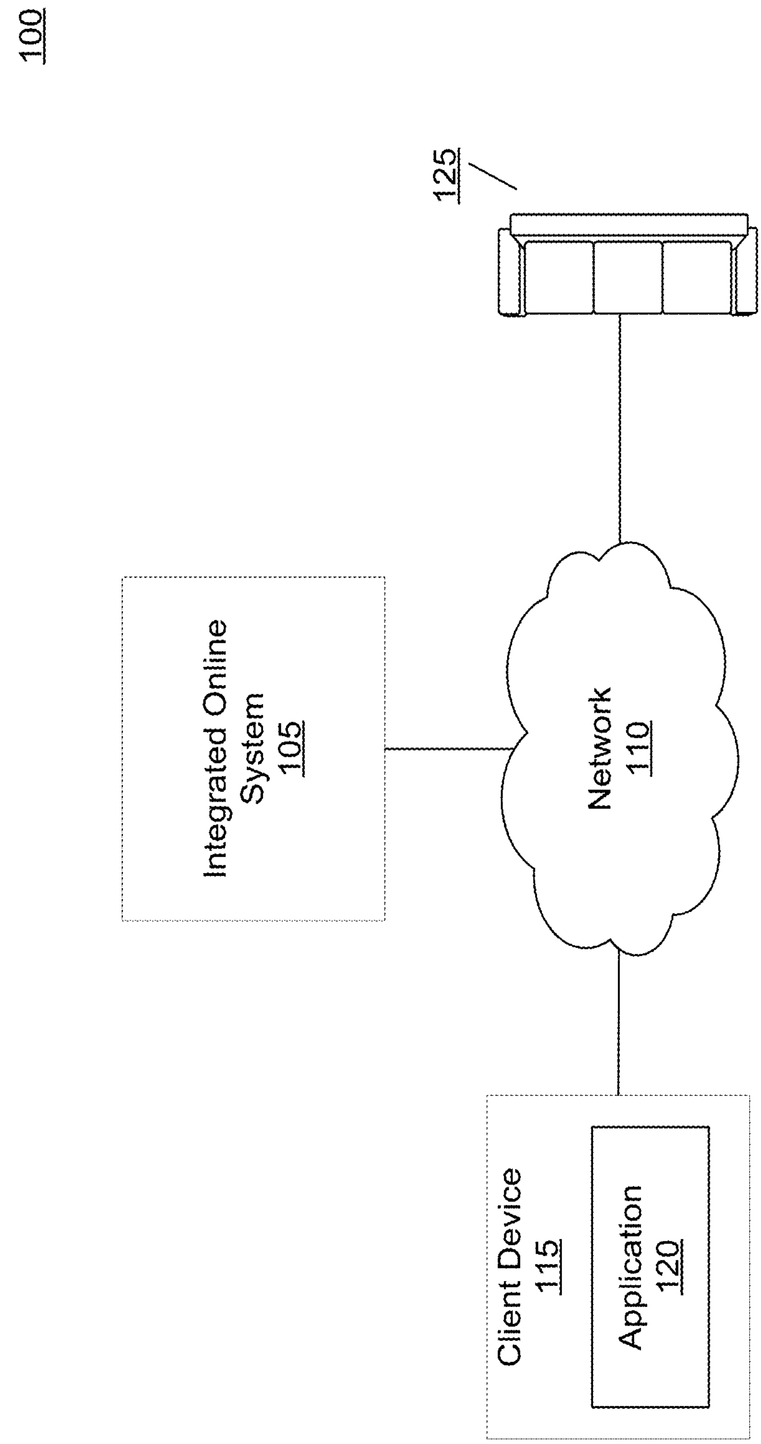

100
125
Integrated Online System 105
Network 110
Client Device 115
Application 120

FIG. 1

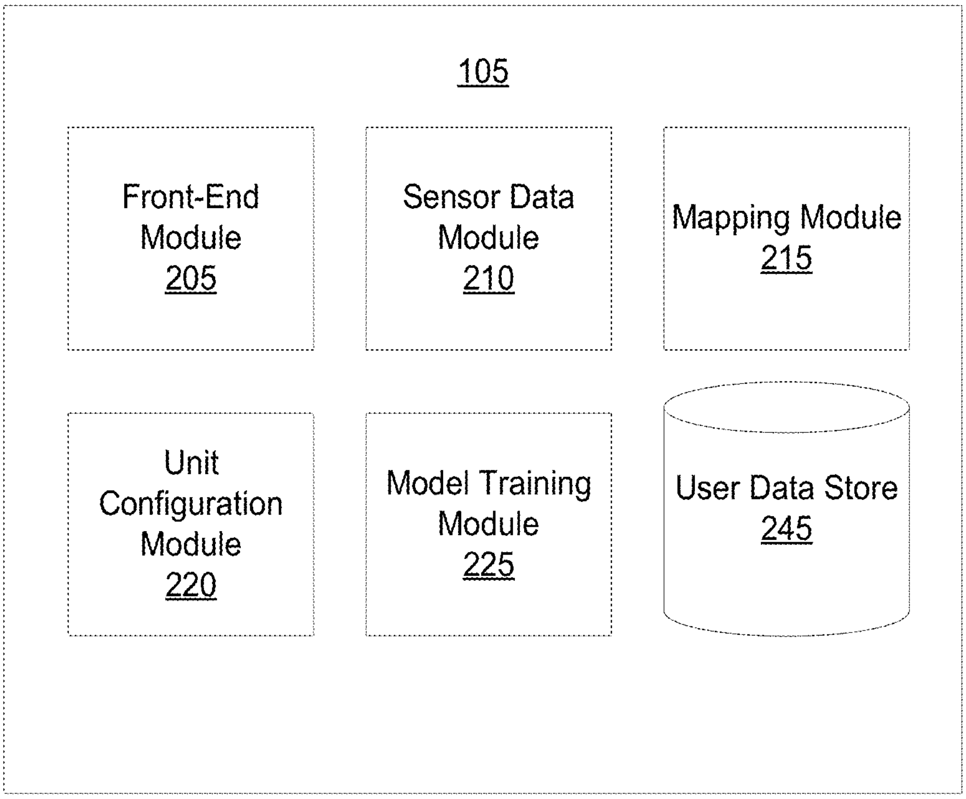

105
Front-End Module 205
Sensor Data Module 210
Mapping Module 215
Unit Configuration Module 220
Model Training Module 225
User Data Store 245

FIG. 2

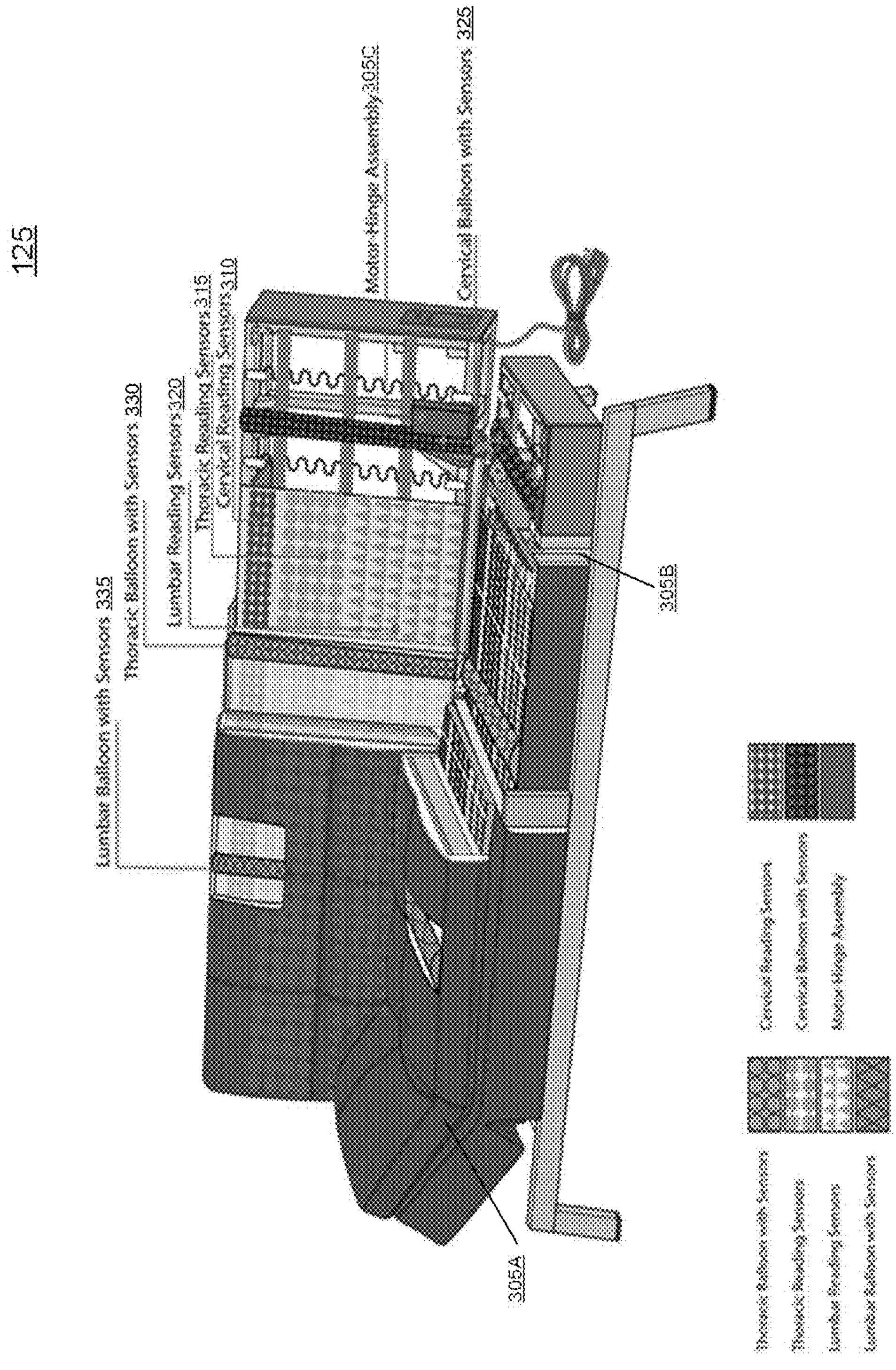
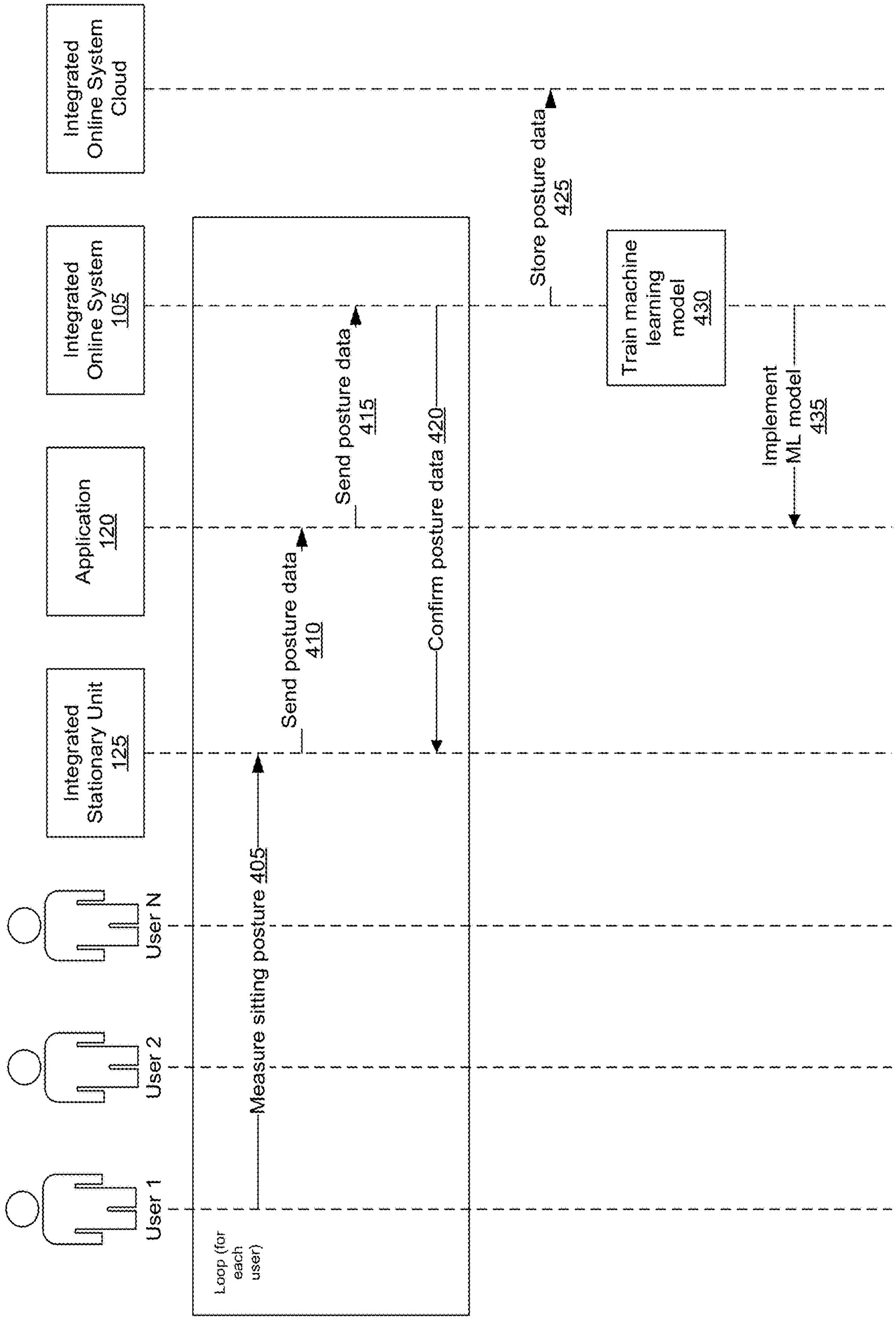

125
Lumbar Balloon with Sensors 335
Thoracic Balloon with Sensors 330
Lumbar Reading Sensors 320
Thoracic Reading Sensors 315
Cervical Reading Sensors 310
Motor Hinge Assembly 305C
Cervical Balloon with Sensors 325
305B
305A
Thoracic Balloon with Sensors
Thoracic Reading Sensors
Lumbar Reading Sensors
Lumbar Balloon with Sensors
Cervical Reading Sensors
Cervical Balloon with Sensors
Motor Hinge Assembly

FIG. 3



User 1
User 2
User N
Integrated Stationary Unit 125
Application 120
Integrated Online System 105
Integrated Online System Cloud
Loop (for each user)
Measure sitting posture 405
Send posture data 410
Send posture data 415
Confirm posture data 420
Store posture data 425
Train machine learning model 430
Implement ML model 435

FIG. 4

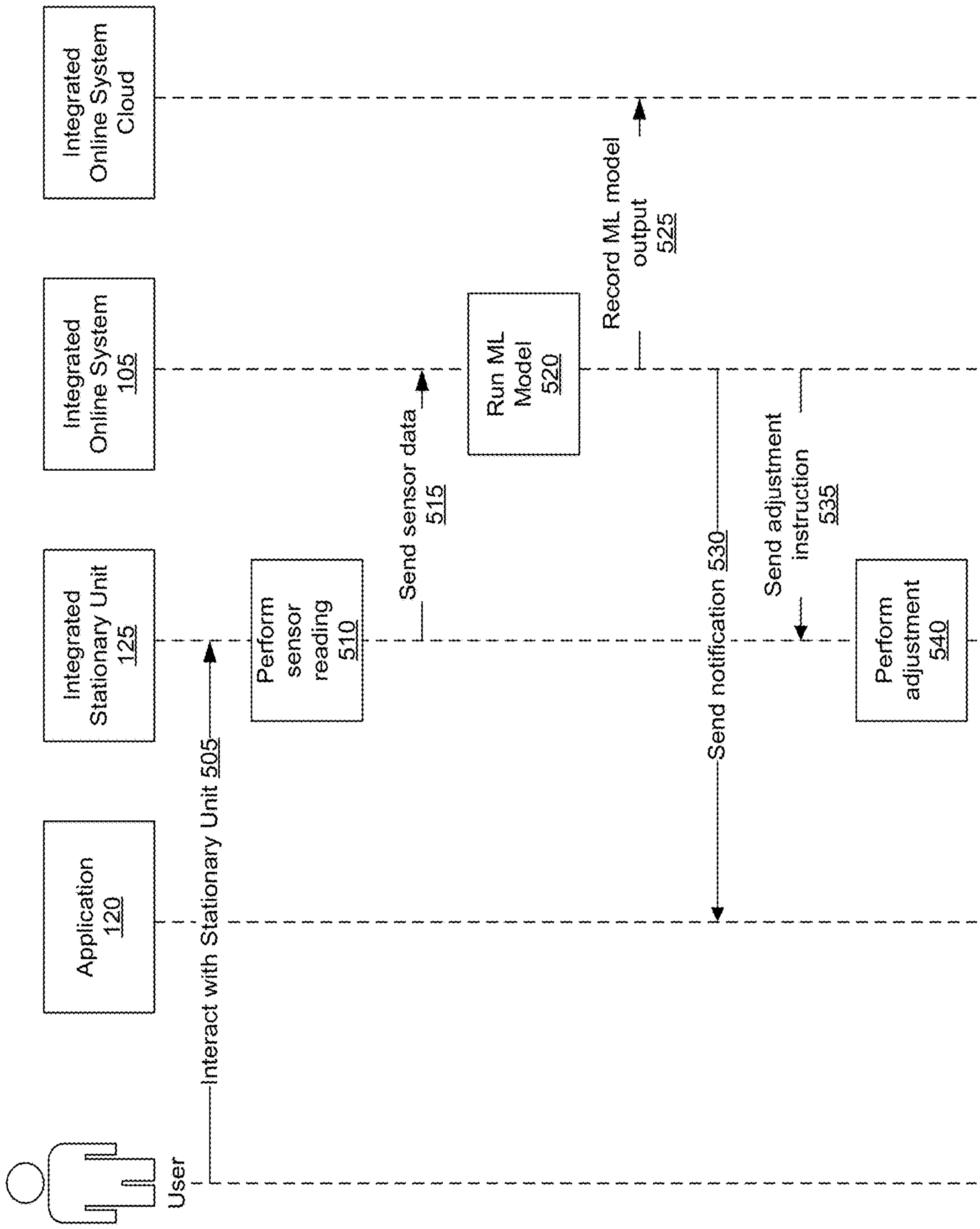
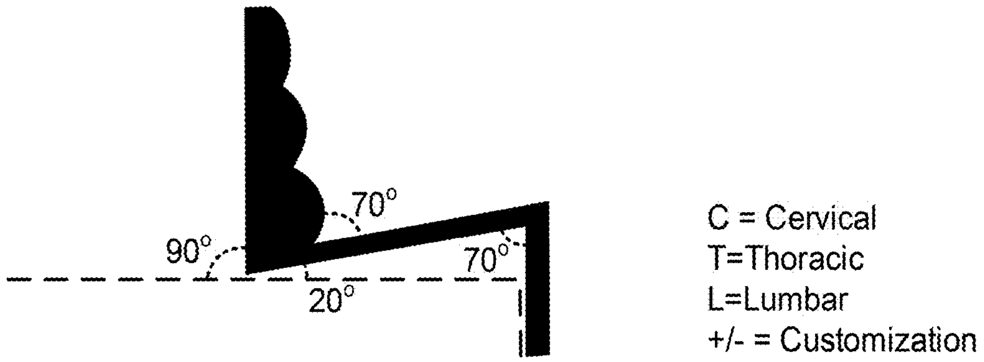

User
Application 120
Integrated Stationary Unit 125
Integrated Online System 105
Integrated Online System Cloud
Interact with Stationary Unit 505
Perform sensor reading 510
Send sensor data 515
Run ML Model 520
Record ML model output 525
Send notification 530
Send adjustment instruction 535
Perform adjustment 540

FIG. 5

READING



Couch Index

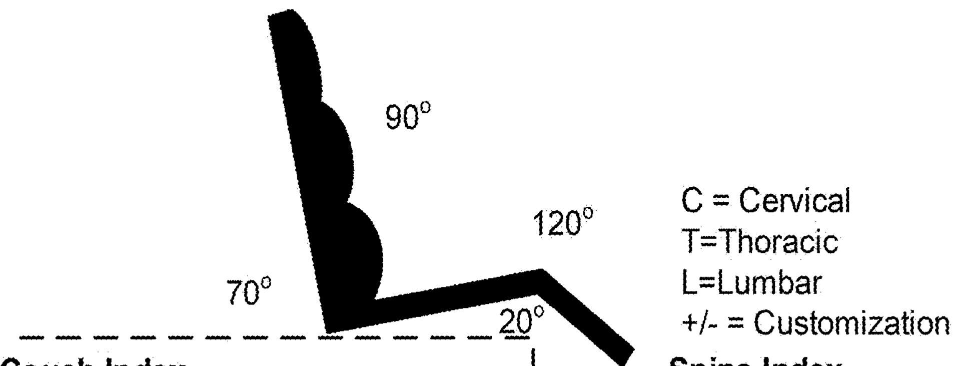
				90
				75
				60
				45
				30
				15
Back	Seat	Foot	+/-	

Spine Index

				90
				75
				60
				45
				30
				15
C	T	L	+/-	

FIG. 6A

WATCHING TV



Couch Index

				90
				75
				60
				45
				30
				15
Back	Seat	Foot	+/-	

Spine Index

				90
				75
				60
				45
				30
				15
C	T	L	+/-	

FIG. 6B

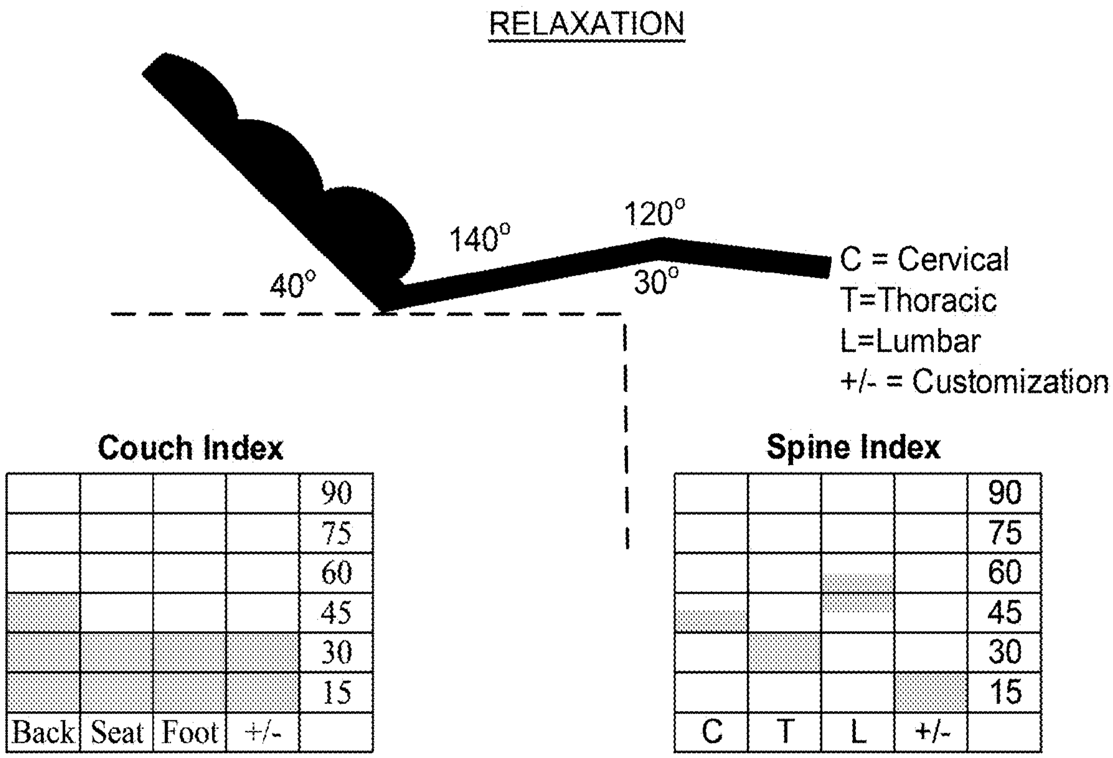

RELAXATION
40°
140°
120°
30°
C = Cervical
T=Thoracic
L=Lumbar
+/- = Customization
Couch Index
90
75
60
45
30
15
Back
Seat
Foot
+/-
Spine Index
90
75
60
45
30
15
C
T
L
+/-

FIG 6C

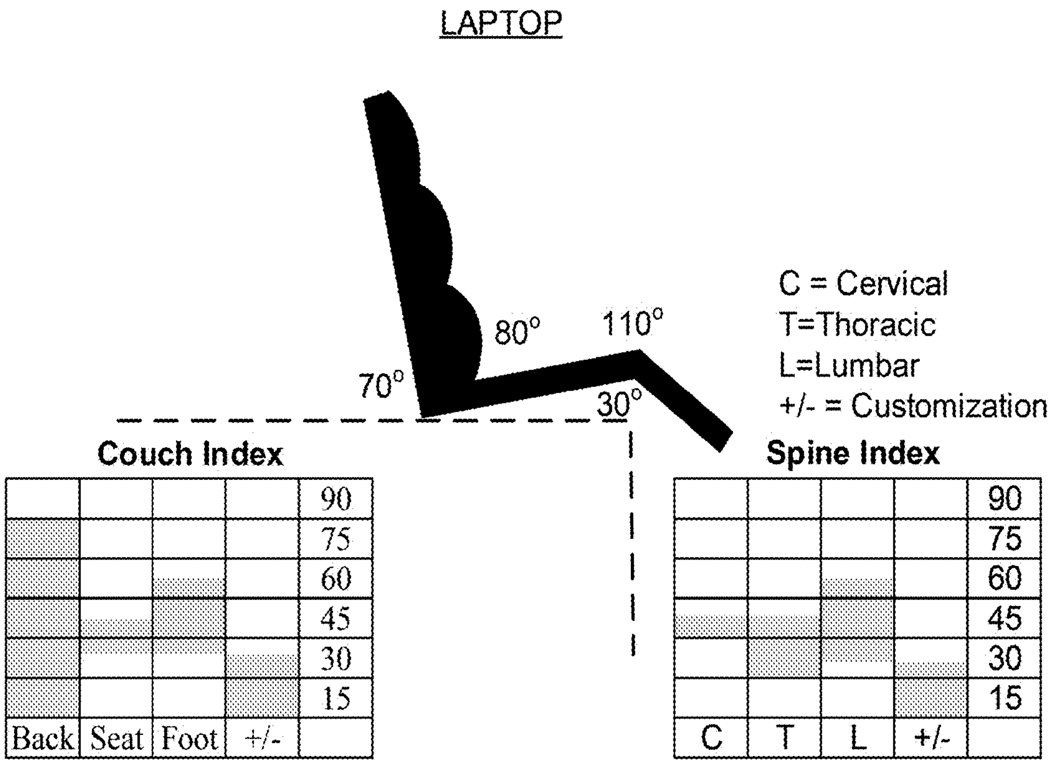

LAPTOP
70°
80°
110°
30°
C = Cervical
T=Thoracic
L=Lumbar
+/- = Customization
Couch Index
90
75
60
45
30
15
Back
Seat
Foot
+/-
Spine Index
90
75
60
45
30
15
C
T
L
+/-

FIG 6D

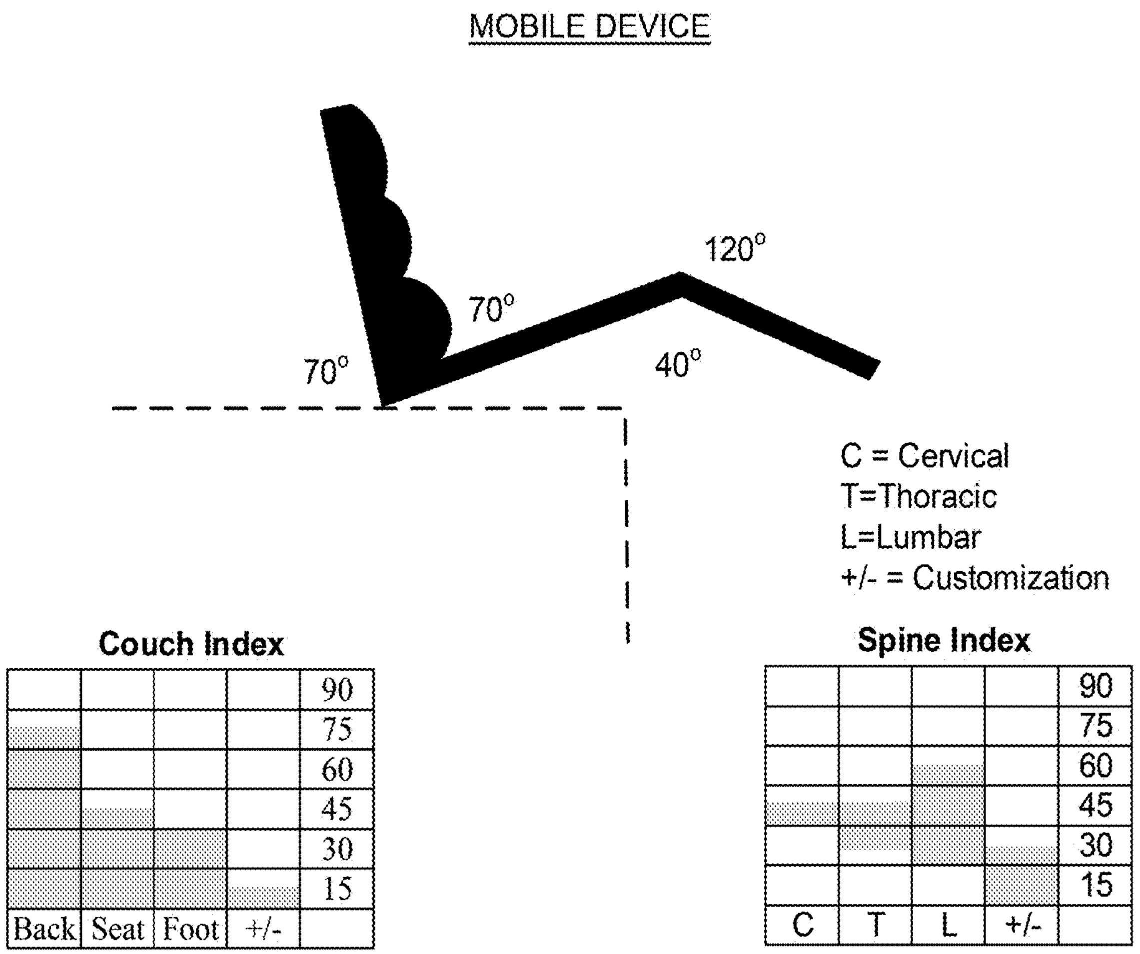

MOBILE DEVICE
120°
70°
70°
40°
C = Cervical
T=Thoracic
L=Lumbar
+/- = Customization
Couch Index
90
75
60
45
30
15
Back
Seat
Foot
+/-
Spine Index
90
75
60
45
30
15
C
T
L
+/-

FIG 6E

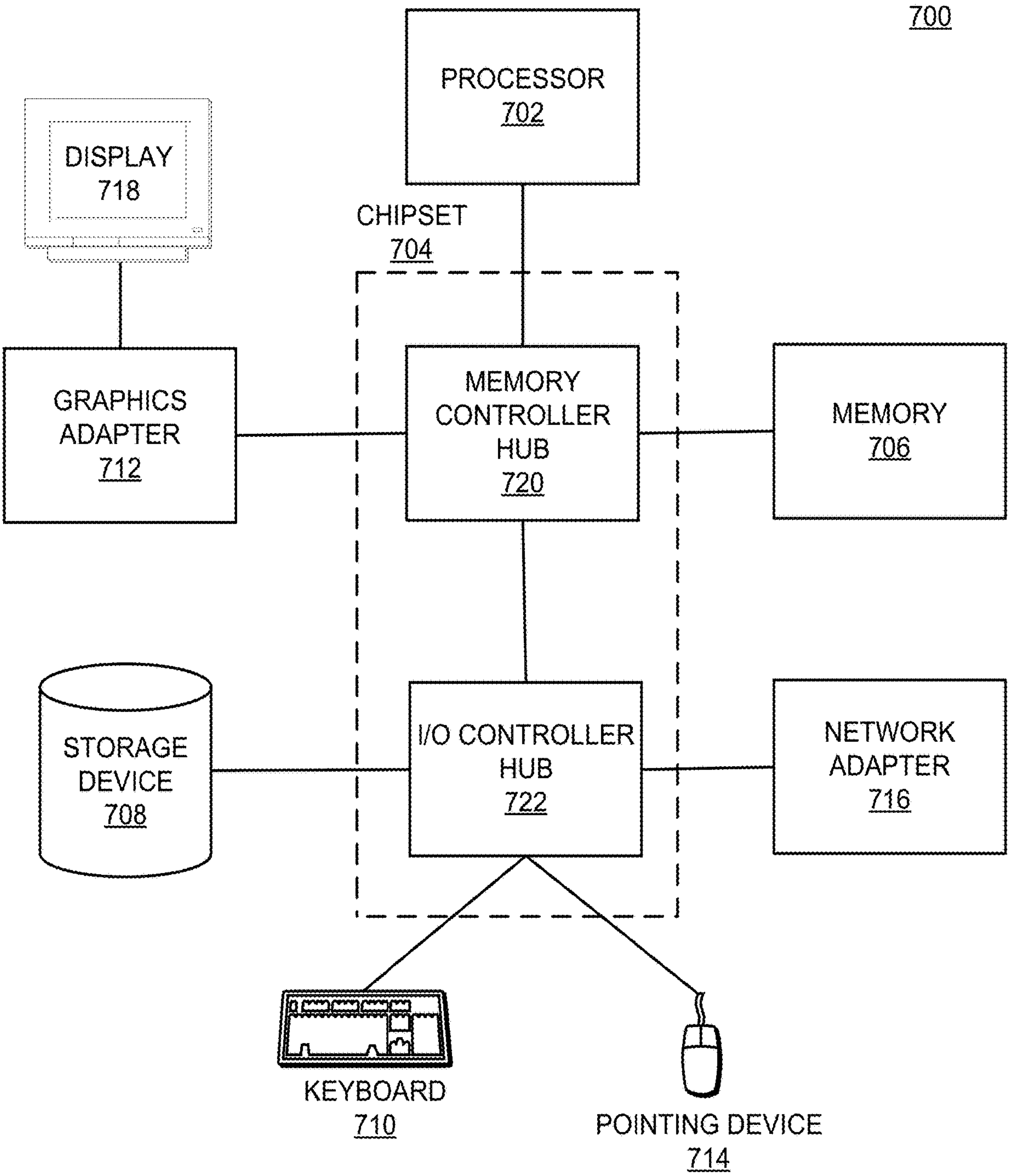

700
PROCESSOR
702
DISPLAY
718
CHIPSET
704
GRAPHICS
ADAPTER
712
MEMORY
CONTROLLER
HUB
720
MEMORY
706
STORAGE
DEVICE
708
I/O CONTROLLER
HUB
722
NETWORK
ADAPTER
716
KEYBOARD
710
POINTING DEVICE
714

FIG. 7

INTEGRATED WELLNESS SYSTEM FOR STATIONARY UNITS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims a benefit of U.S. Provisional Application No. 62/755,970, filed Nov. 5, 2018, which is incorporated by reference in its entirety.

TECHNICAL FIELD

[0002] The subject matter described generally relates to the field of smart appliances, and in particular, to an integrated system that uses biometric sensor data from a stationary unit to generate user-specific wellness mappings and to automatically make physical configuration adjustments of the stationary unit.

BACKGROUND

[0003] Current stationary units, such as couches and chairs, are limited in design and functionality to accommodate only basic and generic ergonomic needs of users. Users who wish to adjust one or more components of these units must do so manually and independently and use trial and error to find a comfortable position. However, while such manual adjustments may result in user comfort, the user-specified configuration might not be ergonomically optimal and may ultimately cause more discomfort to the user in the long term. Even if the user manually configures the unit to an ergonomically optimal position, the adjustments are not stored such that if the unit is returned to its initial configuration, the user will need to make the same manual adjustments each time he or she wishes to return to the ergonomically optimal position. Nor does the unit provide any mechanism for gathering evidence of user comfort and discomfort in a meaningful manner or use gathered data to provide feedback to the user about managing physical mechanics and increasing overall wellness.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. **1** is a block diagram illustrating an integrated wellness system, according to one embodiment.

[0005] FIG. **2** is a block diagram illustrating a system architecture of an integrated online system, according to one embodiment.

[0006] FIG. **3** illustrates an exemplary integrated stationary unit with one or more biometric sensors, according to one embodiment.

[0007] FIG. **4** is an interaction diagram illustrating a method for training a configuration model to output user-specific configurations of the integrated stationary unit and feedback on postures and corrective measures to users of the integrated wellness system, according to one embodiment, according to one embodiment.

[0008] FIG. **5** is an interaction diagram illustrating a method for using the trained configuration model to generate a user-specific configuration of the integrated stationary unit, according to one embodiment.

[0009] FIGS. **6**A-**6**E illustrate example preset configurations of an integrated stationary unit, according to one embodiment.

[0010] FIG. **7** illustrates a computer suitable for use in the integrated wellness system of FIG. **1**, according to one embodiment.

DETAILED DESCRIPTION

[0011] The Figures (FIGS.) and the following description describe certain embodiments by way of illustration only. One skilled in the art will readily recognize from the following description that alternative embodiments of the structures and methods may be employed without departing from the principles described. Reference will now be made to several embodiments, examples of which are illustrated in the accompanying figures. It is noted that wherever practicable similar or like reference numbers are used in the figures to indicate similar or like functionality.

Overview and Benefits

[0012] Disclosed by way of embodiment is an integrated wellness system that is structured to receive biometric sensor data from an integrated stationary unit. The data may be processed to generate user-specific wellness mappings and to automatically generate signals to adjust one or more mechanical and/or micro-electro mechanical systems (MEMS) components of the stationary unit. An example configuration may include a client device (e.g., a computing or other processing device) executing an application associated with the integrated wellness system. A user, through the client device, can provide input through the application to view or modify wellness mappings and recommended configurations. The example configuration also may include an integrated stationary unit with a plurality of biometric sensors positioned at designated locations throughout the integrated stationary unit. An integrated online system also may be included that uses a configuration model to generate recommended configurations of the integrated stationary unit based on received biometric sensor data and automatically send adjustment instructions to the integrated stationary unit.

[0013] By incorporating components into a single, comprehensive system, the integrated wellness system combines hardware and software in a manner that morphs the physical attributes of the stationary unit conducive to a user's comfort and reduces the risk of injury. The configuration model feeds the integrated stationary unit with real-time recommendations for physical configuration adjustments based on data gathered by the biometric sensors. The model additionally uses the received biometric sensor data to generate and provide to the user behavioral heuristics to improve user wellness. Finally, by storing sensor data and recommended configurations associated with the user, the system can automatically adjust one or more components of the integrated stationary unit responsive to determining that the user is interacting with the integrated stationary unit, thus obviating the need for repeated manual adjustments by the user.

Example Systems

[0014] Figure ("FIG.") **1** illustrates one embodiment of an integrated wellness system **100** that uses user-specific wellness mappings generated based on received sensor data to adjust the physical configuration of an integrated stationary unit. In the embodiment shown in FIG. **1**, the integrated wellness system **100** includes an integrated online system **105** in communication through a network **110** with a client device **115** executing a wellness application **120**, and an integrated stationary unit **125** with one or more biometric sensors **130** (shown in FIG. **3**). In other embodiments, the integrated wellness system **100** contains different and/or additional elements. In addition, the functions may be distributed among the elements in a different manner than described.

[0015] The integrated online system **105** receives sensor data from the biometric sensors **130** in the integrated stationary unit **125** and uses the received data to generate user-specific wellness mappings. Machine learning techniques may be used to generate a configuration model that uses the sensor data and generated mappings to compute user-specific recommended configurations of one or more components of the integrated stationary unit **125**. These recommended configurations may further be adjusted based on user input through the client device **115**. Modules of the integrated online system **105** further generate one or more preset configurations of the integrated stationary unit **125** and corresponding wellness indices based on an associated user activity, such as reading, watching television, or working on a laptop or other device. As discussed in more detail below with respect to FIG. **2**, the user may provide input to modify one or more components of a preset configuration. Additionally, while the example embodiment displayed in FIG. **1** shows the integrated online system **105** as a separate server communicatively coupled to the client device **115** and the integrated stationary unit **125** through the network **110**, in other example embodiments, the integrated online system **105** is integrated into the client device **115** and/or the integrated stationary unit **125**.

[0016] The network **110** may comprise any combination of local area and/or wide area networks, using both wired and/or wireless communication systems. In one embodiment, the network **110** uses standard communications technologies and/or protocols. For example, the network **110** includes communication links using technologies such as Ethernet, 802.11, worldwide interoperability for microwave access (WiMAX), 3G, 4G, code division multiple access (CDMA), digital subscriber line (DSL), etc. Examples of networking protocols used for communicating via the network **110** include multiprotocol label switching (MPLS), transmission control protocol/Internet protocol (TCP/IP), hypertext transport protocol (HTTP), simple mail transfer protocol (SMTP), and file transfer protocol (FTP). Data exchanged over the network **110** may be represented using any suitable format, such as hypertext markup language (HTML) or extensible markup language (XML). Those skilled in the art will recognize that encryption using other suitable techniques will be appropriate for various applications based on the nature of the network **110**.

[0017] The client device **115** is a computing device capable of receiving user input as well as transmitting and/or receiving data via the network **110**. In one embodiment, the client device **115** is a conventional computer system, such as a desktop or laptop computer. Alternatively, the client device **115** is a device having computer functionality, such as a mobile telephone, a smartphone, a set-top box, a smart home device, or another suitable device. The client device **115** further includes a camera capable of capturing images and videos, an input/output (I/O) component to transfer data to, and receive data from, other entities in the integrated wellness system **100**, and a storage unit to store, for example, user-specific mappings generated by the integrated online system **105**. An example of some or all components of an architecture of the client device **115** is illustrated and described with respect to FIG. **7**.

[0018] The client device **115** executes an application, such as a wellness application **120** associated with the integrated online system **105**. In one embodiment, the wellness application **120** includes a user interface that provides for display sensor data received from the integrated stationary unit **125**, user-specific wellness mappings generated by the integrated online system **105**, personalized configurations of the integrated stationary units **125**, and user-specific wellness recommendations. The wellness application **120** is further capable of receiving user input, such as an instruction to modify a physical configuration of an integrated stationary unit **125** or to generate or adjust a user-specific mapping.

[0019] The integrated stationary unit **125** is an item of furniture configured to support the bodies of one or more individuals sitting, laying, or otherwise putting weight on the integrated stationary unit **125**. Exemplary integrated stationary units **125** include, but are not limited to, couches, beds, daybeds, reclining chairs, lounge chairs, desk chairs, and the like. In one embodiment, one or more components of the integrated stationary unit **125**, such as the arm rests, back support, seat slope, surface contours, or foot support, can be automatically or manually adjusted to different positions or angles to provide differing amounts of support to the individual. One or more servo or actuary motors are connected to hinge assemblies in the integrated stationary unit **125** to control the adjustment of the one or more components. Additionally, in some embodiments, the integrated online system **105** stores one or more preset configurations of the components of the integrated stationary unit **125**. For example, a preset "reading" configuration might include a back component configured at a 90-degree angle, a seat component configured at a 20-degree angle, and a foot support component configured at a 0-degree angle.

[0020] The integrated stationary unit **125** includes one or more biometric sensors **130** placed at predefined locations in the integrated stationary unit **125**. The biometric sensors **130** are located at positions that capture data based on a plurality of different body types, heights, genders, and other factors and may be densely packed or spread out. In one embodiment, the biometric sensors **130** measure biometric data of users interacting with the integrated stationary unit **125** and report measured data to the integrated online system **105**. Exemplary biometric sensors **130** include ballistocardiograph (BCG) sensors that measure user heart rate, lumbar, thoracic, and cervical reading sensors that measure pressure on regions of the spine, a pulse oximeter that measures an oxygen level in the blood, and electrocardiogram (ECG) sensors that measure electrical activity of the heart. The integrated stationary unit **125** further includes one or more pneumatic lifting/dropping balloons that are inflated or deflated by a coupled compression unit. The integrated online system **105** triangulates data collected from the sensors **130** with location data (e.g., GPS data received from a client device **115**) to formulate patterns that help to identify a user interacting with the integrated stationary unit **125** without having to explicitly query a client device **115** to request the identity of the user. In some embodiments, the integrated online system **105** generates user-specific mappings and configures one or more components of the integrated stationary unit **125** based on the measured sensor data, as discussed in more detail below with respect to FIG. **2**.

[0021] The integrated stationary unit **125** is an Internet of Things (IoT) device that connects to the network **110** to communicate with the integrated online system **105** and the client device **115**. For example, the integrated stationary unit **125** can be configured to report (e.g., periodically or on-demand) one or more sensor readings from the biometric sensors **130** to the integrated online system **105** for purposes of generating a user-specific mapping or configuration. As another example, the integrated stationary unit **125** can be configured to receive user input via the application **120** to adjust one or more components (e.g., a back-support angle) of the integrated stationary unit **125**. In some embodiments, the integrated stationary unit **125** further includes an on/off button, localized charging ports, USB ports, a wireless charging pad, and localized heating and cooling components.

[0022] Turning now to FIG. **2**, it illustrates a system architecture of an integrated online system **105**, according to one example embodiment. In the embodiment shown in FIG. **2**, the integrated online system **105** includes a front-end module **205**, a sensor data module **210**, a mapping module **215**, a unit configuration module **220**, a model training module **225**, and a user data store **225**. In other embodiments, the integrated online system **105** includes additional, fewer, or different components for various applications. Conventional components, such as network interfaces, security functions, load balancers, failover servers, management and network operations consoles, and the like are not shown so as not to obscure the details of the system architecture. The modules and/or components of the integrated online system **105** may be embodied as program code (or software) and executable by a computing device. An example of some or all components of an architecture of the computing device that may execute the program code is illustrated and described with respect to FIG. **7**.

[0023] The front-end module **205** facilitates communication between the client device **115** and the integrated online system **105**. For example, in one embodiment, the user provides input through a client device **115** to register one or more integrated stationary units **125** and/or one or more users with the integrated wellness system **100** such that the integrated online system **105** generates one or more wellness mappings for the registered user(s) based on the sensor data received from the registered integrated stationary unit **125**. The integrated online system **105** returns to the user, through the front-end module **205**, data regarding the generated mappings and/or one or more preset configurations of an integrated stationary unit **125**, and the user may further provide, through the client device **115**, additional input to view or modify a mapping or preset configuration as well as restrictions regarding the storage and use of biometric sensor data associated with the user.

[0024] The sensor data module **210** receives data from the biometric sensors **130** in the integrated stationary unit **125**. In one embodiment, a user provides input through the application **120** indicating that the user is sitting, lying on, or otherwise interacting with the integrated stationary unit **125** and wishes to share biometric sensor data with the integrated online system **105**. Responsive to receiving the user input, the sensor data module **210** instructs a processor in the integrated stationary unit **125** to provide sensor data for use in generating a wellness mapping for the user. The biometric sensors **130** in the integrated stationary unit **125** return, to the sensor data module **210**, sensor data including measurements calculated by the BCG sensors, the lumbar, thoracic, and cervical reading sensors, the pulse oximeter, the ECG sensors, and one or more additional sensors in the integrated stationary unit **125**. In one embodiment, sensor data is transmitted periodically from the biometric sensors **130** and may continually be transmitted to the sensor data module **210** until the user provides input including an instruction to stop data transmission or the sensor data indicates that the user is no longer interacting with the integrated stationary unit **125**. In one example embodiment, the rate at which sensor data is collected and transmitted is based in part on a charge level of an associated battery or other charging mechanism. For instance, if the integrated stationary unit **125** is powered by a fully charged battery or connected outlet, the data capture frequency is approximately 60 seconds, and the data is transmitted to the sensor data module **210** approximately every 300 seconds. In instances where the integrated stationary unit **125** is not connected to an outlet and the battery level has decreased, the frequency of data collection and transmission is reduced to a minimum level to preserve local battery operations. Additionally, in some embodiments, the sensor data is captured and analyzed locally at the integrated stationary unit **125**.

[0025] In some embodiments, the sensor data module **210** instructs the integrated stationary unit **125** to return sensor data measurements associated with a user of the integrated wellness system **100** without receiving user input comprising an instruction to begin data transmission. For example, responsive to detecting that a user is interacting with the integrated stationary unit **125** (e.g., responsive to receiving sensor data indicating that a user is sitting or lying on the integrated stationary unit **125**), the sensor data module **210** compares the received sensor data to stored sensor data and previously generated user-specific wellness mappings. If a comparison between the received data and the stored sensor data and/or wellness mappings exceeds a similarity threshold, the sensor data module **210** determines that the user associated with the stored data and/or the wellness mapping is currently interacting with the integrated stationary unit **125** and instructs the integrated stationary unit **125** to continue to transmit sensor data for the identified user. In some embodiments, the sensor data module **210** further queries a client device **115** associated with the identified user to confirm that the user is currently interacting with the integrated stationary unit **125** (e.g., "Are you sitting on the living room sofa?"). Additionally or alternatively, during a registration process, an owner of the integrated stationary unit **125** may identify, through the application **120**, one or more users who intend to interact with the integrated stationary unit **125** and provide identifying characteristics for each user, such as the user's height, weight, and the like. When a user interacts with the integrated stationary unit **125**, the sensor data module **210** receives biometric sensor data and compares the received data to the identifying characteristics to determine an identity of the interacting user. In other embodiments, software on the integrated stationary unit **125** is used to map the sitting data pattern to its closest user match and determine the user identity.

[0026] The sensor data module **210** transmits the received sensor data to the mapping module **215** for use in generating the user-specific mapping and to the user data store **245** for storage in a user profile. In one embodiment, storage and use of the sensor data associated with users of the integrated wellness system **100** is subject to user permissions. For example, user permission input may dictate that the integrated online system **105** may store sensor data measurements for a specified period of time or may share gathered sensor data with one or more third-party systems (e.g., a client device **115** associated with a user's doctor or physical therapist). Additionally, in some embodiments, the sensor data module **210** encrypts the user sensor data prior to data storage and/or transmission.

[0027] The mapping module **215** receives sensor data measurements from the sensor data module **210**, along with an identification of a user with whom the measured data is associated, and uses the received data to generate or augment a wellness mapping for the identified user. In one embodiment, the wellness mapping comprises a graph, chart, or other data visualization that includes historical sensor data for the user, including indications of when sensor data was received, an identification of the integrated stationary unit **125** and the sensor(s) in the unit that transmitted the data, and one or more data measurements. Additionally, the mapping module **215** may compute or identify one or more wellness statistics using the received data, such as a mean, median, or mode of data received from a specified sensor, an identification of a highest or a lowest measurement received from the sensor along with an indication of when the highest or lowest measurement was received, or an outlier measurement that varies from a mean sensor measurement for the user by more than a threshold amount. Still further, a user-specific mapping may include other demographic and health data for the user, including a user height, weight, or identification of relevant medical conditions, such as sciatica, a herniated disc, muscle strain, a degenerative disc disease, arthritis, and the like.

[0028] The mapping module **215** sends the generated or augmented wellness mapping to the user for display through the application **120** and, in some embodiments, receives user input via the front-end module **120** regarding the use or storage of the wellness mapping. For example, the user might provide an instruction to send a copy of, or a link to, the generated mapping to a client device **115** associated with the user's doctor. User permissions associated with the data sharing request may limit the third-party's access to the mapping and data to a specified time period or may allow the third-party to access only some of the measured data. Additionally, the user may provide input to modify one or more components of the mapping, for example, by disclosing a medical condition or a recent injury.

[0029] The model training module **220** applies machine learning techniques to generate a configuration model that uses the sensor data measurements and mappings to compute user-specific recommended configurations of one or more integrated stationary units **125** and to generate posture recommendations and feedback to users of the integrated online system **105**. As part of the generation of the configuration model, the model training module **220** forms training data by identifying a training set of user sensor measurements and associated configurations of integrated stationary units **125**. The model training module **220** extracts feature values from the training data, the features being variables deemed potentially relevant to the association of one or more sensor data measurements and one or more component configurations of the integrated stationary units **125**. Specifically, the features extracted by the model training module **220** include sensor data measurements received from the biometric sensors **130**, a configuration of one or more components of the integrated stationary unit **125** when the sensor data measurements were taken, a time when the sensor data measurements were taken, an amount of time that the user remains on or otherwise interacting with the integrated stationary unit **125**, relevant medical conditions of the user, and the like.

[0030] The model training module **220** uses supervised machine learning to train the configuration model, with the feature vectors of the training data serving as the inputs. Different machine learning techniques—such as linear support vector machine (linear SVM), boosting for other algorithms (e.g., AdaBoost), neural networks, logistic regression, naïve Bayes, memory-based learning, random forests, bagged trees, decision trees, boosted trees, or boosted stumps—may be used in different embodiments. The configuration model, when applied to feature vectors extracted from the received sensor data and/or user-specific wellness mapping, outputs a recommended optimal configuration of one or more integrated stationary units **125** to improve the user's posture, comfort, and spinal health. In embodiments where the configuration model has previously generated a recommended configuration of an integrated stationary unit **125** for a user, additional user data transmitted by the biometric sensors **130** and/or an updated wellness mapping for the user are used as input to the trained model, which may output an updated recommended configuration based on the additional sensor data. Still further, in some embodiments, the configuration model further outputs one or more wellness or lifestyle recommendations associated with the recommended configuration. For example, the model might output a recommendation that the user sit all the way back in her desk chair or place her feet flat on the ground to improve posture or provide recommended stretches for the user based on the wellness mapping.

[0031] The recommended configuration of the integrated stationary unit **125** and, optionally, the wellness recommendations are output to the user through the front-end module **205**. In one embodiment, one or more components of the recommended configuration may be modified based on user input. For example, a recommended optimal configuration for a user using a laptop on the integrated stationary unit **125** might include a back support configured at an 80-degree angle and a seat configured at a 30-degree angle. However, the user might provide input that overrides the configuration generated by the model, for instance, by adjusting the back-support to a 70-degree angle.

[0032] The unit configuration module **220** instructs the integrated stationary unit **125** to adjust one or more components of the unit **125** based on the recommended optimal configuration and/or user-specified manual adjustments. For example, responsive to the user providing input through the application **120** indicating that the user is sitting, lying on, or otherwise interacting with the integrated stationary unit **125** (or, alternatively, responsive to the sensor data module **210** detecting that the user is interacting with the integrated stationary unit **125**), the unit configuration module **220** retrieves the applicable wellness mapping for the user from the user data store **245** and instructs the integrated stationary unit **125** to configure one or more components according to the mapping. For example, the unit configuration module **220** might instruct the integrated stationary unit **125** to adjust a back support to an approximately 140-degree angle computed by the configuration model as an optimal back support angle for the user.

[0033] The integrated stationary unit **125** notifies the unit configuration module **220** when the components of the integrated stationary unit **125** have been adjusted to the recommended configuration for the user. In one embodiment, the sensor data module **210** continues to monitor sensor data received from the biometric sensors **130** and sends the additional sensor data to the configuration model, which outputs, in some embodiments, further modifications of the integrated stationary unit **125** based on the additional sensor data. Alternatively, the configuration of one or more components of the integrated stationary unit **125** may further be adjusted based on user input through the application **120**.

[0034] In some embodiments, the unit configuration module **220** generates one or more preset configurations of the integrated stationary unit **125** that may be used regardless of whether an individual interacting with the integrated stationary unit **125** is a user of the integrated wellness system **100**. That is, in some embodiments, the one or more preset configurations are not based on sensor data associated with a specific user, but are instead based on recommended configurations generated by the unit configuration module **220** for one or more designated activities. For example, as discussed in more detail below with respect to FIGS. **6**A-**6**C, the preset configurations may include configurations associated with a "reading" position, a "watching television" position, a "relaxation" position, a "laptop" position, a "mobile device" position, and the like. Additionally, users of the integrated stationary unit **125** may add one or more additional preset configurations by providing input through the application **120** to record a specified configuration that was adjusted manually. The additional preset configuration is stored in association with the specified user such that the user may later provide input to automatically adjust the integrated stationary unit **125** to the additional preset configuration without the need for further manual adjustment.

[0035] Each preset configuration of the integrated stationary unit **125** is associated with one or more indices representing measurements associated with the preset configuration. For example, in one embodiment, a first index includes a recommended angle or position of each component of the integrated stationary unit **125** as well as an indication of whether a user of the integrated wellness system **100** has provided input to customize the recommended angles, and if so, the amount of customization. The first index further includes an adjustment factor that may be based on a user's specific body type or medical condition and that may be entered manually by the user or inferred through model variables to account for the various body types of users interacting with the integrated stationary unit **125**. A second index includes measures an amount of pressure on different portions of the user's spine.

[0036] The user data store **225** stores user profiles associated with each user of the integrated online system **105**. A user profile includes declarative information about the user that was explicitly shared by the user and may also include profile information inferred by the integrated online system **105**. In one embodiment, a user profile includes multiple data fields, each describing one or more attributes of the corresponding user of the integrated online system **105**. Examples of information stored in a user profile include biographic, demographic (e.g., age or gender), medical (e.g., height, weight, known medical conditions), sensor readings from the biometric sensors **130** in one or more integrated stationary units **125**, and the like. In one embodiment, the user profile further includes one or more user-specific mappings and preset configurations for one or more integrated stationary units **125** associated with the user.

Example Integrated Stationary Unit

[0037] FIG. **3** illustrates an exemplary integrated stationary unit **125** having a plurality of biometric sensors **130**. In the example embodiment shown in FIG. **3**, the integrated stationary unit **125** is a couch. However, in other embodiments, the integrated stationary unit **125** is, for example, a bed, a daybed, a reclining chair, a lounge chair, a desk chair, or other sitting assembly.

[0038] The integrated stationary unit **125** is configurable such that one or more components of the integrated stationary unit **125** may be adjusted manually based on user input through the client device **115** or automatically based on a user-specific wellness mapping or preset configuration. In one embodiment, the integrated stationary unit **125** includes one or more motor hinge assemblies **305** that control the angle of each adjustable component. For example, in an embodiment where the integrated stationary unit **125** is a couch, the integrated stationary unit **125** includes three motor hinge assembles: a first assembly **305**A located at a first end of a horizontal portion of the couch, a second assembly **305**B located at a second end of the horizontal portion of the couch, and a third assembly **305**C located at a base of a vertical portion of the couch and spanning the length of the horizontal portion of the couch. The first and second assemblies **305**A and **305**B can thus be used to control an angle of a headrest and/or a footrest if the user is lying on the integrated stationary unit **125**, and the third assembly **305**C can be used to control a back-support angle if the user is sitting up on the integrated stationary unit **125**.

[0039] The integrated stationary unit **125** includes a plurality of biometric sensors **130** located at predefined locations in the interior of the integrated stationary unit **125**. For example, in one embodiment, a plurality of cervical reading sensors **310** are configured in rows spanning a horizontal length of a vertical portion of the integrated stationary unit **125** to measure an amount of pressure on the top of a user's spine. Similarly, a plurality of thoracic reading sensors **315** are configured in rows and positioned below the cervical reading sensors **310** to measure an amount of pressure on the midpoint of the user's spine, and a plurality of lumbar reading sensors **320** are configured in rows and positioned below the thoracic reading sensors **315** at a base of the vertical portion of the integrated stationary unit **125** to measure an amount of pressure on the base of the user's spine. The biometric sensors **130** include both input sensors that collect data (e.g., force-sensitive resistors) and output sensors comprising actuators that control pneumatic lifting and dropping balloons in the integrated stationary unit **125** for pressure stabilization or angle adjustment.

[0040] The pneumatic lifting and dropping balloons are located at predefined locations in the interior of the integrated stationary unit **125**. In one example embodiment, the balloons include a cervical balloon **325**, a thoracic balloon **330**, and an inflatable bladder (e.g., a lumbar balloon) **335**. The inflatable bladders (e.g., lumbar balloons) **335** are controlled by an actuator in the integrated stationary unit **125** that receives a signal from a software algorithm running on the integrated online system **105** or the integrated stationary unit **125**.

Example Model Generation and Training Method

[0041] FIG. **4** illustrates a method **400** for training a configuration model to provide user-specific configurations of the integrated stationary unit **125** and feedback on postures and corrective measures to users of the integrated wellness system **100**, according to one embodiment. The steps of FIG. **4** are illustrated from the perspective of the integrated online system **105** performing the method **400**. However, some or all of the steps may be performed by other entities or components. In addition, some embodiments may perform the steps in parallel, perform the steps in different orders, or perform different steps.

[0042] The model training module **225** trains the configuration model using training data for each user (one, two, or more) of the integrated online system **105**. To generate the training data, the integrated stationary unit **125** measures **405**, for each user included in the training data set, posture data received from the biometric sensors **130** in the integrated stationary unit **125**. In one embodiment, the measured posture data includes sensor data received from the lumbar, thoracic, and cervical reading sensors, the measurements representing an amount of pressure on different portions of the user's spine.

[0043] At **410**, the integrated stationary unit **125** sends the posture data for the subject user to the application **120**. In one embodiment, the application **120** interacts with the integrated stationary unit **125** to receive user input and provide to the user notifications regarding collected data and associated feedback and recommended corrective measures.

[0044] The application **120** sends (or transmits) **415** the posture data for the subject user to the integrated online system **105** for use in training a configuration model to generate user-specific configurations of the integrated stationary unit **125** and to provide feedback and corrective measures to users through the application **120**. In one embodiment, the model training module **225** confirms **420** the posture data with the integrated stationary unit **125** before using the received data as training input to the configuration model.

[0045] The integrated online system **105** stores **425** the posture data for each user in the training set. In one embodiment, the model training module **225** sends the received posture data to an integrated online system cloud for storage. Alternatively, the data is stored in a user profile for each subject user in the user data store **245** on the integrated online system **105**.

[0046] The model training module **225** on the integrated online system **105** uses the posture data for users in the training data set to train **430** the configuration model. As discussed above with respect to FIG. **2**, the model training module **225** extracts feature values from the training data and uses the extracted feature values as inputs to the configuration model. Different machine learning techniques—such as linear SVM, boosting for other algorithms (e.g., AdaBoost), neural networks, logistic regression, naïve Bayes, memory-based learning, random forests, bagged trees, decision trees, boosted trees, or boosted stumps—may be used in different embodiments. After training the model, the integrated online system **105** implements **435** the trained model to the application **120**. The trained model is configured to output, for a given set of posture data or other set of sensor data received from the integrated stationary unit **125** for a user of the integrated online system **105**, a recommended configuration of the integrated stationary unit **125** and/or one or more recommendations to the user regarding posture and corrective measures. For example, the model might output a recommendation that the user stand or stretch if the sensor data indicates that the user has been sitting or lying on the integrated stationary unit **125** for at least a threshold amount of time or might recommend that the user watch a specified video based on the user's posture condition. Additionally, in some embodiments, the recommendations include one or more photos associated with the recommended corrective measures.

Example Wellness Mapping and Adjustment Method

[0047] FIG. **5** illustrates an example process (or method) **500** for using the trained configuration model to generate a user-specific configuration of the integrated stationary unit, according to one embodiment. The steps of FIG. **5** are illustrated from the perspective of the integrated online system **105** performing the method **500**. However, some or all of the steps may be performed by other entities or components. In addition, some embodiments may perform the steps in parallel, perform the steps in different orders, or perform different steps.

[0048] A user of the integrated online system **105** interacts **505** with the integrated stationary unit **125** by sitting on, laying on, or otherwise resting on the integrated stationary unit **125**. In one embodiment, the user provides input through the application **120** to notify the integrated online system **105** that she is interacting with the integrated stationary unit **125**. Alternatively, the integrated online system **105** queries the client device **115** to determine whether the user is interacting with the integrated stationary unit **125** responsive to receiving sensor readings from the integrated stationary unit **125**.

[0049] The integrated stationary unit **125** performs **510** sensor readings based on the user interaction with the integrated stationary unit **125**. For example, as discussed above with respect to FIG. **3**, biometric sensors **130** positioned at predefined locations within the integrated stationary unit **125** include cervical reading sensors **310**, thoracic reading sensors **315**, and lumbar reading sensors **320**. Additional sensors positioned in the integrated stationary unit **125** include, in various embodiments, BCG sensors, a pulse oximeter, and ECG sensors.

[0050] The integrated stationary unit **125** sends **515** the sensor data from the biometric sensors **130** to the integrated online system **105** for use in generating or updating user-specific wellness mappings and generating one or more recommended configurations of the integrated stationary unit **125**. In one embodiment, sensor data is transmitted periodically (e.g., every 60 seconds) from the biometric sensors **130** and may continually be transmitted to the integrated online system **105** until the user provides input including an instruction to stop data transmission or the sensor data indicates that the user is no longer interacting with the integrated stationary unit **125**. In other embodiments, the sensor data is transmitted once (e.g., after the user has been interacting with the integrated stationary unit **125** for a predefined period of time) or a predefined number of times.

[0051] At **520**, modules of the integrated online system **105** run the configuration model on the sensor data received from the integrated stationary unit **125** and the configuration model outputs, based on the received sensor data, a recommended configuration of one or more components of the integrated stationary unit **125**. For example, a recommended configuration might include a back support configured at a 90-degree angle, a seat configured at a 20-degree angle, and a foot support configured at a 0-degree angle and include a recommendation that the user sit upright in the integrated stationary unit **125** to minimize strain on the user's back. In some embodiments, the sensor data and/or the recommended configuration are additionally used to generate or update a user-specific wellness mapping for the user of the integrated online system **105**.

[0052] The integrated online system **105** records **525** the configuration and recommendation output from the configuration model in the integrated online system cloud and, optionally, in the user data store **245** on the integrated online system **105**. At **530**, the integrated online system **105** sends a notification to the user through the application **120** with a recommended configuration of the integrated stationary unit **125** and, optionally, one or more recommendations regarding posture and corrective measures based on the sensor data measurements and output of the configuration model. In one embodiment, the notification includes a query asking the user to confirm that the integrated stationary unit **125** should be configured according to the recommended configuration. In various embodiments, the user may provide input through the application **120** to confirm the recommended configuration or to modify one or more components of the integrated stationary unit **125** (e.g., by changing the configuration of the foot support from the recommended 0-degree angle to a 30-degree angle).

[0053] Responsive to receiving confirmation or modification of the recommended configuration through the client device **115**, the integrated online system **105** sends **535** an adjustment instruction to the integrated stationary unit **125** and the integrated stationary unit **125** performs **540** the requested adjustment. The adjusted configuration may be used to update a user-specific wellness mapping and/or a user profile for the user. Additionally, in some embodiments, the user may provide further input through the application **120** to make additional modifications to one or more components of the integrated stationary unit **125** after the integrated stationary unit has reached the requested configuration.

Example Preset Configurations of Stationary Unit

[0054] FIGS. **6**A-**6**C illustrate example preset configurations of the integrated stationary unit **125**. As discussed above with respect to FIG. **2**, the unit configuration module **220** generates one or more preset configurations for activities frequently associated with the integrated stationary unit. A user may provide input through the application **120** to instruct the integrated online system **105** to configure the integrated stationary unit **125** to one of the preset configurations or to further modify one or more components of the integrated stationary unit **125**.

[0055] FIG. **6**A illustrates a preset configuration **605**A and indices **610**A and **615**A associated with a "reading" configuration of the integrated stationary unit **125**. In the embodiment shown in FIG. **6**A, the reading configuration of the integrated stationary unit **125** includes a back support configured at a 90-degree angle, a seat configured at a 20-degree angle, and a foot support configured at a 0-degree angle. The integrated stationary unit index **610**A includes angle measurements for each of the components in the reading configuration as well as an indication of an amount of customization of one or more components of the integrated stationary unit **125**. For instance, in the displayed embodiment, the customized portion is the seat and the angle between the horizontal and vertical assemblies. Additionally, the spine index **615**A provides a measurement scale that indicates the amount of pressure on portions of the user's spine.

[0056] FIG. **6**B illustrates a preset configuration **605**B and indices **610**B and **615**B associated with a "watching TV" configuration of the integrated stationary unit **125**. In the embodiment shown in FIG. **6**B, the watching TV configuration of the integrated stationary unit **125** includes a back support configured at a 70-degree angle, a seat configured at a 20-degree angle, and a foot support configured at a 40-degree angle. The integrated stationary unit index **610**B includes angle measurements for each of the components in the reading configuration as well as an indication of an amount of customization of one or more components of the integrated stationary unit **125**. Additionally, the spine index **615**B provides a measurement scale that indicates the amount of pressure on portions of the user's spine.

[0057] FIG. **6**C illustrates a preset configuration **605**C and indices **610**C and **615**C associated with a "relaxation" configuration of the integrated stationary unit **125**. In the embodiment shown in FIG. **6**C, the relaxation configuration of the integrated stationary unit **125** includes a back support configured at a 40-degree angle, a seat configured at a 30-degree angle, and a foot support configured at a −10-degree angle. The integrated stationary unit index **610**C includes angle measurements for each of the components in the relaxation configuration as well as an indication of an amount of customization of one or more components of the integrated stationary unit **125**. Additionally, the spine index **615**C provides a measurement scale that indicates the amount of pressure on portions of the user's spine.

[0058] FIG. **6**D illustrates a preset configuration **605**D and indices **610**D and **615**D associated with a "laptop" configuration of the integrated stationary unit **125**. In the embodiment shown in FIG. **6**C, the laptop configuration of the integrated stationary unit **125** includes a back support configured at a 70-degree angle, a seat configured at a 30-degree angle, and a foot support configured at a 40-degree angle. The integrated stationary unit index **610**D includes angle measurements for each of the components in the laptop configuration as well as an indication of an amount of customization of one or more components of the integrated stationary unit **125**. Additionally, the spine index **615**D provides a measurement scale that indicates the amount of pressure on portions of the user's spine.

[0059] FIG. **6**E illustrates a preset configuration **605**E and indices **610**E and **615**E associated with a "mobile device" configuration of the integrated stationary unit **125**. In the embodiment shown in FIG. **6**E, the mobile device configuration of the integrated stationary unit **125** includes a back support configured at a 70-degree angle, a seat configured at a 40-degree angle, and a foot support configured at a 20-degree angle. The integrated stationary unit index **610**E includes angle measurements for each of the components in the mobile device configuration as well as an indication of an amount of customization of one or more components of the integrated stationary unit **125**. Additionally, the spine index **615**E provides a measurement scale that indicates the amount of pressure on portions of the user's spine.

Computing System Architecture

[0060] FIG. **7** is a block diagram illustrating physical components of an example computer **700**. All or parts of the components of example computer **700** may be configured for the integrated online system **105**, in accordance with an embodiment. Illustrated are at least one processor **702** coupled to a chipset **704**. Also coupled to the chipset **704** are a memory **706**, a storage device **708**, a graphics adapter **712**, and a network adapter **716**. A display **718** is coupled to the graphics adapter **712**. In one embodiment, the functionality of the chipset **704** is provided by a memory controller hub **720** and an I/O controller hub **722**. In another embodiment, the memory **706** is coupled directly to the processor **702** instead of the chipset **704**.

[0061] The storage device **708** is any non-transitory computer-readable storage medium, such as a hard drive, compact disk read-only memory (CD-ROM), DVD, or a solid-state memory device. The memory **706** holds instructions and data used by the processor **702**. The graphics adapter **712** displays images and other information on the display **718**. The network adapter **716** couples the computer **700** to a local or wide area network.

[0062] As is known in the art, a computer **700** can have different and/or other components than those shown in FIG. **7**. In addition, the computer **700** can lack certain illustrated components. In one embodiment, a computer **700**, such as a host or smartphone, lacks a graphics adapter **712**, and/or display **718**, as well as a keyboard **710** or external pointing device **714**. Moreover, the storage device **708** can be local and/or remote from the computer **700** (such as embodied within a storage area network (SAN)).

[0063] As is known in the art, the computer **700** is adapted to execute computer program modules for providing functionality described herein. As used herein, the term "module" refers to computer program logic utilized to provide the specified functionality. Thus, a module can be implemented in hardware, firmware, and/or software. In one embodiment, program modules are stored on the storage device **708**, loaded into the memory **706**, and executed by the processor **702**.

Additional Considerations

[0064] The disclosed configuration has benefits and advantages that include combining hardware and software components of the integrated wellness system **100** in a manner that reduces the user's risk of injury and improves overall well-being by making real-time recommendations and adjustments of the integrated stationary unit **125** based on biometric sensor data. Additionally, by storing sensor data and recommended configurations associated with a user, the system **100** can automatically adjust one or more components of the integrated stationary unit **125** responsive to determining that the user is interacting with the integrated stationary unit, thus obviating the need for repeated manual adjustments each time the user interacts with the integrated stationary unit **125**.

[0065] Some portions of above description describe the embodiments in terms of algorithmic processes or operations. These algorithmic descriptions and representations are commonly used by those skilled in the data processing arts to convey the substance of their work effectively to others skilled in the art. These operations, while described functionally, computationally, or logically, are understood to be implemented by computer programs comprising instructions for execution by a processor or equivalent electrical circuits, microcode, or the like. Furthermore, it has also proven convenient at times, to refer to these arrangements of functional operations as modules, without loss of generality.

[0066] As used herein, any reference to "one embodiment" or "an embodiment" means that a particular element, feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. The appearances of the phrase "in one embodiment" in various places in the specification are not necessarily all referring to the same embodiment.

[0067] Some embodiments may be described using the expression "coupled" and "connected" along with their derivatives. It should be understood that these terms are not intended as synonyms for each other. For example, some embodiments may be described using the term "connected" to indicate that two or more elements are in direct physical or electrical contact with each other. In another example, some embodiments may be described using the term "coupled" to indicate that two or more elements are in direct physical or electrical contact. The term "coupled," however, may also mean that two or more elements are not in direct contact with each other, but yet still co-operate or interact with each other. The embodiments are not limited in this context.

[0068] As used herein, the terms "comprises," "comprising," "includes," "including," "has," "having" or any other variation thereof, are intended to cover a non-exclusive inclusion. For example, a process, method, article, or apparatus that comprises a list of elements is not necessarily limited to only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. Further, unless expressly stated to the contrary, "or" refers to an inclusive or and not to an exclusive or. For example, a condition A or B is satisfied by any one of the following: A is true (or present) and B is false (or not present), A is false (or not present) and B is true (or present), and both A and B are true (or present).

[0069] In addition, use of the "a" or "an" are employed to describe elements and components of the embodiments. This is done merely for convenience and to give a general sense of the disclosure. This description should be read to include one or at least one and the singular also includes the plural unless it is obvious that it is meant otherwise.

[0070] Upon reading this disclosure, those of skill in the art will appreciate still additional alternative structural and functional designs for a system and a process for using biometric sensor data from a stationary unit to generate user-specific wellness mappings and to automatically make physical configuration adjustments of the stationary unit. Thus, while particular embodiments and applications have been illustrated and described, it is to be understood that the described subject matter is not limited to the precise construction and components disclosed herein and that various modifications, changes and variations which will be apparent to those skilled in the art may be made in the arrangement, operation and details of the method and apparatus disclosed. The scope of protection should be limited only by the following claims.

1. A computer-implemented method of automatically configuring an integrated stationary unit based on received biometric sensor data, the method comprising:

receiving, at an integrated online system, biometric sensor data from an integrated stationary unit having a plurality of biometric sensors;

identifying, using the received biometric sensor data, a user of the integrated online system currently interacting with the integrated stationary unit;

inputting the biometric sensor data for the identified user into a trained configuration model, the configuration model configured to generate, using the biometric sensor data, a recommended configuration of one or more components of the integrated stationary unit; and

transmitting, to the integrated stationary unit, an instruction to configure one or more components of the integrated stationary unit according to the recommended configuration.

2. The computer-implemented method of claim **1**, further comprising:

receiving, from the integrated stationary unit, a notification that the one or more components of the integrated stationary unit have been configured according to the recommended configuration; and

providing for display on a client device associated with the identified user, a notification of the recommended configuration.

3. The computer-implemented method of claim **2**, further comprising:

receiving, from the client device, user input comprising an instruction to modify the recommended configuration; and

transmitting, to the integrated stationary unit, an instruction to further modify one or more components of the integrated stationary unit based on the user input.

4. The computer-implemented method of claim **1**, further comprising modifying, based on the received biometric sensor data, a wellness mapping associated with the identified user, the wellness mapping including a data visualization generated based on historical biometric sensor data associated with the identified user.

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

computing, based on the received biometric sensor data and the historical biometric sensor data associated with the identified user, one or more wellness statistics for the identified user;

generating, by the configuration model based on the computed wellness statistics, one or more wellness recommendations for the identified user; and

providing the one or more wellness recommendations for display on the client device.

6. The computer-implemented method of claim **1**, wherein the plurality of biometric sensors include one or more of: ballistocardiograph (BCG) sensors, a pulse oximeter, and electrocardiogram (ECG) sensors.

7. The computer-implemented method of claim **1**, further comprising:

receiving user input comprising an indication of a specified user activity; and

instructing the integrated stationary unit to adjust one or more components of the integrated stationary unit according to a preset configuration associated with the specified user activity.

8. An integrated wellness system, comprising:

an integrated stationary unit having a plurality of biometric sensors and configured to transmit biometric sensor data to an integrated online system responsive to determining that a user of the integrated online system is interacting with the integrated stationary unit;

the integrated online system communicatively coupled to the integrated stationary unit, the integrated online system configured to compute, based on the received biometric sensor data, a recommended configuration of the integrated stationary unit and to instruct the integrated stationary unit to adjust one or more components of the integrated stationary unit based on the recommended configuration; and

a wellness application executing on a client device and configured to display configuration information of the integrated stationary unit and to receive user input from the client device to further modify one or more components of the integrated stationary unit.

9. The integrated wellness system of claim **8**, wherein the integrated online system is configured to generate the recommended configuration of the integrated stationary unit by inputting the received biometric sensor data into a trained configuration model.

10. The integrated wellness system of claim **8**, wherein the plurality of biometric sensors include one or more of: ballistocardiograph (BCG) sensors, a pulse oximeter, and electrocardiogram (ECG) sensors.

11. The integrated wellness system of claim **8**, wherein the integrated stationary unit is configured to periodically transmit biometric sensor data to the integrated online system, the integrated online system using the transmitted biometric sensor data to update a wellness mapping associated with the identified user.

12. The integrated wellness system of claim **11**, wherein the wellness mapping includes a data visualization generated based on historical biometric sensor data associated with the identified user.

13. The integrated wellness system of claim **8**, wherein the integrated online system is configured to identify a user interacting with the integrated stationary unit by comparing the received biometric sensor data with historical biometric sensor data associated with users of the integrated online system and the integrated stationary unit.

14. The integrated wellness system of claim **8**, wherein the integrated online system is configured to identify a user interacting with the integrated stationary unit based on user input through the client device.

15. A non-transitory computer-readable storage medium configured to store instructions, the instructions when executed by a processor causing the processor to:

receive, at an integrated online system, biometric sensor data from an integrated stationary unit having a plurality of biometric sensors;

identify, using the received biometric sensor data, a user of the integrated online system currently interacting with the integrated stationary unit;

input the biometric sensor data for the identified user into a trained configuration model, the configuration model configured to generate, using the received biometric sensor data, a recommended configuration of one or more components of the integrated stationary unit; and

transmit, to the integrated stationary unit, an instruction to configure one or more components of the integrated stationary unit according to the recommended configuration.

16. The non-transitory computer-readable storage medium of claim **15**, wherein the instructions further comprise instructions that, when executed, cause the processor to:

receive, from the integrated stationary unit, a notification that the one or more components of the integrated stationary unit have been configured according to the recommended configuration; and

provide for display on a client device associated with the identified user, a notification of the recommended configuration.

17. The non-transitory computer-readable storage medium of claim **16**, wherein the instructions further comprise instructions that, when executed, cause the processor to:

receive, from the client device, user input comprising an instruction to modify the recommended configuration; and

transmit, to the integrated stationary unit, an instruction to further modify one or more components of the integrated stationary unit based on the user input.

18. The non-transitory computer-readable storage medium of claim **15**, wherein the instructions further comprise instructions that, when executed, cause the processor to modify, based on the received sensor data, a wellness mapping associated with the identified user, the wellness mapping including a data visualization generated based on historical sensor data associated with the identified user.

19. The non-transitory computer-readable storage medium of claim **18**, wherein the instructions further comprise instructions that, when executed, cause the processor to:

compute, based on the received sensor data and the historical sensor data associated with the identified user, one or more wellness statistics for the identified user;

generate, by the configuration model based on the computed wellness statistics, one or more wellness recommendations for the identified user; and

provide the one or more wellness recommendations for display on the client device.

20. The non-transitory computer-readable storage medium of claim **15**, wherein the instructions further comprise instructions that, when executed, cause the processor to:

receive user input comprising an indication of a specified user activity; and

instruct the integrated stationary unit to adjust one or more components of the integrated stationary unit according to a preset configuration associated with the specified user activity.

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专利名称(译)	固定式设备综合健康系统		
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摘要(译)

集成的健康系统使用从集成的固定单元接收的生物传感器数据来生成用户特定的健康映射并自动调整固定单元的一个或多个组件。 响应于检测到用户正在与集成固定单元交互，集成固定单元中的传感器将生物传感器数据传输到集成在线系统。 在线系统的模块将接收到的传感器数据输入到训练有素的配置模型中，该模型为用户输出集成式固定单元的推荐最佳配置，并指示集成式固定单元根据推荐配置配置一个或多个组件。 在一些实施例中，在线系统指示集成的固定单元基于通过在客户端设备上执行的健康应用的用户输入来进一步修改一个或多个组件。