should be 2211?
- NO 1211 in initial submissions
- confirm w/ Jackie - she will e-mail me

A-

TITLE OF THE INVENTION

does the HRV data go to the NVNS or just an activation command?

A System and Method for Transmitting Current HRV data to a Computer and A Non-Invasive Vagus Nerve Stimulator for Outputting Electromagnetic Wave

- Figures 3A + 3B? only mention Fig 3 in spec + they use the same #'s?
↳ Need to separate + use different #'s
- Figs 5A-C again - need to be broken out
↳ different #'s, though
- Missing some functionality WRT psychological measurements

CROSS-REFERENCE TO RELATED APPLICATION

- Overall, pretty good!

[0001] [Not Applicable]

- Missing non-responsive part
- Missing 24-hour limit

- claims are better, but still need work

BACKGROUND OF THE INVENTION

[0002] The present invention generally relates to a [invention]. More particularly, the present invention relates to a [invention, more specifically – but NOT PON].

[0003] [general background]

[0004] [describe prior art]

[0005] [DO NOT INCLUDE ANY OF – long felt need, anything relating to your invention or the motivation for making your invention.]

BRIEF SUMMARY OF THE INVENTION

[0006] One or more of the embodiments of the present inventions provide [describe inventions as claimed]

BRIEF DESCRITPTION OF THE DRAWINGS

[0007] Figure 1 illustrates a non-invasive vagus nerve stimulation system according to an embodiment of the present invention.

[0008] Figure 2A illustrates the server memory of the server according to an embodiment of the present invention.

[0009] Figure 2B illustrates the HRV memory of the heart rate variability detector according to an embodiment of the present invention.

[0010] Figure 2C illustrates the stimulator memory of the stimulator according to an embodiment of the present invention.

[0011] Figure 3A is a flowchart of the process of detecting a user's heartbeat and calculating a heart rate variability data using a single use heart rate variability detector according to an embodiment of the present invention.

[0012] Figure 3B is a flowchart of an alternative embodiment of the process of detecting a user's heartbeat and calculating a heart rate variability data using a continuous and wearable heart rate variability detector according to an embodiment of the present invention.

[0013] Figure 4 is a flowchart of the process of receiving HRV data and calculating an average HRV data for the purpose of other HRV data being compared to the average HRV data according to an embodiment of the present invention.

[0014] Figure 5A is a flowchart of the process of receiving a user's height data and default height data and calculating a stimulation intensity data according to an embodiment of the present invention.

[0015] Figure 5B is a flowchart of an alternative embodiment of the process of receiving a user's weight data and default BMI data and calculates a user's BMI data to then calculate a stimulation intensity data according to an embodiment of the present invention.

[0016] Figure 5C is a flowchart of an alternative embodiment of the process of receiving a user's gender data and default gender data and calculating a stimulation intensity data according to an embodiment of the present invention.

[0017] Figure 6 is a flowchart of the process of receiving a current HRV data and an average HRV data to calculate an HRV response data and then linearly calculate the stimulation duration data according to an embodiment of the present invention.

[0018] Figure 7 is a user interface presented to the user on the user interface on the computer to access their account according to an embodiment of the present invention.

[0019] Figure 8 is a user interface presented to the user on the user interface on the computer to create an account on the non-invasive vagus nerve stimulation application according to an embodiment of the present invention.

[0020] Figure 9 is a user interface presented to the user on the user interface on the computer to enter the user's physiological data according to an embodiment of the present invention.

[0021] Figure 10 is a user interface presented to the user on the user interface on the computer to select the user's psychological data according to an embodiment of the present invention.

[0022] Figure 11 is a user interface presented to the user on the user interface on the computer to display the user's current HRV reading and treatment time and allow the user to activate treatment on a non-invasive vagus nerve stimulator according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0023] Figure 1 illustrates a non-invasive vagus nerve stimulation system 100 according to an embodiment of the present invention. The non-invasive vagus nerve stimulation system 100 involves four main components: a heart rate variability detector 110, a computer 130, a server 150, and a stimulator 170. The heart rate variability detector 110 includes a heartbeat sensor 111, a heart rate monitor 113, a heart rate variability (HRV) processor 114, an HRV memory 116, an HRV transmitter 117, and an HRV receiver 118. The heartbeat sensor 111 includes an alternative to digital convertor (ADC) 112. The HRV processor 114 includes an HRV internal clock 115. The computer 130 includes a computer receiver 131, a computer processor 132, a computer transmitter 134, a network controller 135, and a user interface 139. The computer processor 132 includes a computer internal clock 133. The network controller 135 includes a Bluetooth network component 136, a Wi-Fi network component 137, and a cellular network component 138. The server 150 includes a server processor 151, a server memory 152, a server receiver 153, and a server transmitter 154. The stimulator 170 includes an electric node 171, an impulse generator 172, a stimulator receiver 173, a stimulator monitor 175, a stimulator processor 176, a stimulator memory 178, a power source 179, a stimulator transmitter 174. The stimulator processor 176 includes a stimulator internal clock 177.

[0024] In the preferred embodiment of the non-invasive vagus nerve stimulation system 100, the heart rate variability detector 110 is in communication with the computer 130 through a network connection 120. The heartbeat sensor 111 uses an optical sensor to detect a user's heartbeat by detecting changes in user's skin coloration. The heartbeat sensor 111 is electronically coupled with the ADC 112. The heartbeat sensor 111 is electronically coupled with the HRV processor 114. The HRV processor 114 is electronically coupled with the heartbeat monitor 113. The HRV processor 114 is electronically coupled with the HRV receiver 118. The HRV processor 114 is electronically coupled with the HRV transmitter 117. The HRV processor 114 is electronically coupled with the HRV transmitter 117. The HRV processor 114 is electronically coupled with the HRV internal clock 115. The HRV processor 114 is electronically coupled with the HRV memory 116. The HRV memory 116 is electronically coupled with the HRV transmitter 117. The HRV memory 116 is electronically coupled with the HRV receiver 118. The HRV memory 116 is electronically coupled with the heartbeat monitor 113. The computer receiver 131 is electronically coupled with the computer processor 132. The computer processor 132 is electronically coupled with the computer transmitter 134. The computer processor 132 is electronically coupled with the user interface 139. The computer processor 132 is electronically coupled with the network controller 135. The network controller 135 is electronically coupled with the user interface 139.

[0025] In addition, the computer 130 is in communication with the server 150 through network connection 140. The server processor 151 is electronically coupled with the server memory 152. The server processor 151 is electronically coupled with the server receiver 153. The server processor 151 is electronically coupled with the server transmitter 154. The server memory 152 is electronically coupled with the server transmitter 154. The server receiver 153 is electronically coupled with the server transmitter 154.

[0026] Additionally, the computer 130 is in communication with the stimulator 170 through network connection 160. The electric node 171 is electronically coupled with the impulse generator 172. The impulse generator 172 is electronically coupled with the stimulator processor 176. The stimulator receiver 173 is electronically coupled with the stimulator processor 176. The stimulator processor 176 is electronically coupled with the stimulator internal clock 177. The stimulator processor 176 is electronically coupled with the stimulator monitor 175. The stimulator processor 176 is electronically coupled with the stimulator memory 178. The stimulator monitor 175 is electronically coupled with the stimulator memory 178. The power source 179 is electronically coupled with the impulse generator 172. The stimulator transmitter is electronically coupled with the stimulator processor 176. The stimulator transmitter is electronically coupled with the stimulator receiver 173.

[0027] In operation, the non-invasive vagus nerve stimulation system 100 involves four main components: the heart rate variability detector 110, the computer 130, the server 150, and the stimulator 170. The heartbeat sensor 111 optically detects a user's heartbeat by detecting changes in user's skin coloration. The heartbeat sensor 111 creates an analog signal of the heartbeat data. The ADC component 112 of the heartbeat sensor 111 coverts the analog heartbeat data to a digital heartbeat data. The ADC component 112 of the heartbeat sensor 111 transmits the digital heartbeat data to the HRV processor 114. The HRV processor 114 retrieves the time data from internal clock 115. Then the HRV processor 114 retrieves the HRV time data 291 and calculates the current HRV data 250 (further discussed in figure 3A and 3B). The HRV processor 114 transmits the current HRV data 250 to HRV transmitter 117. HRV transmitter 117 transmits the current HRV data 250 to computer receiver 131. The computer processor 132 retrieves the current HRV data 250 from the computer receiver 131. The computer processor 132 retrieves the psychological data 230 from the server memory 152 (further discussed in Figure 4). The computer processor 132 calculates the current HRV data 250 by increasing or decreasing the current HRV data 250 by the psychological data 230. The computer processor 132 transmits the current HRV data 250 from the computer transmitter 134. The computer transmitter transmits the current HRV data 250 to the server receiver 153. The server processor 153 retrieves the current HRV data 250 from the server receiver 153. The server processor 153 stores the current HRV data 250 to the server memory 152.

[0028] Once there are more than five current HRV data stored in the server memory 152, the computer processor 132 receives the average HRV data 240 and the current HRV data 250 from the server memory 152. In particular the server transmitter 134 transmits the average HRV data 240 and the current HRV data 250 to the computer receiver 131. The computer processor 132 retrieves the average HRV data 240 and the current HRV data 250 from the computer receiver 131. The computer processor calculates the average HRV data 240 as the average of the current HRV data 250 and the average HRV data 240 (further discussed in Figure 4). The computer processor 132 transmits the average HRV data 240 to the computer transmitter 134. The computer transmitter 134 transmits the average HRV data 240 to the server receiver 153. The server processor 151 retrieves the average HRV data 240 from the server receiver 153. The server processor 151 stores the average HRV data 240 to the server memory 152.

[0029] Further describing the operation, the computer processor 132 receives the physiological input database 220 and the default intensity data 285 from the server memory 152. In particular the server transmitter 134 transmits the physiological input database 220 and the default intensity data 285 to the computer receiver 131. The computer processor 132 retrieves the physiological input database 220 and the default intensity data 285 from the computer receiver 131. The computer processor 132 calculates the stimulation intensity data 252 using the physiological input database 220 (further discussed in Figure 5A, 5B, and 5C) and the default

I see what you are relating the initial set up.
That's OK but one way that might have been simpler would
be to discuss regular operation in Fig / & setup later

intensity data 285. The computer processor transmits the stimulation intensity data 252 to the computer transmitter 134. The computer transmitter 134 transmits the stimulation intensity data 252 to the server receiver 153. The server processor 151 retrieves the stimulation intensity data 252 from the server receiver 153. The server processor 151 stores the stimulation intensity data 252 to the server memory 152.

[0030] Further describing the operation, the computer processor 132 receives the current HRV data 250, the average HRV data 240, and past HRV look up table 270 from the server memory 152. In particular, the server transmitter 134 transmits the current HRV data 250, the average HRV data 240, and the past HRV look up table 270 to the computer receiver 131. The computer processor 132 retrieves the current HRV data 250, the average HRV data 240, and the past HRV look up table 270 from the computer receiver 131. The computer processor 132 calculates the HRV response data 271 in past HRV look up table 270 as the difference between average HRV data 240 and current HRV data 250 (see discussion of Figure 6). The computer processor 132 receives the stimulation duration data 272 associated with HRV Response data 271 in past HRV look up table 270 and the stimulation intensity data 260 from the server memory 152. In particular, the server transmitter 134 transmits the stimulation intensity data 252 and the stimulation duration data 272 to the computer receiver 131. The computer processor 132 retrieves the stimulation intensity data 252 and the stimulation duration data 272 from the computer receiver 131. The computer processor 132 transmits the stimulation intensity data 252 and the stimulation duration data 272 to the computer transmitter 134. The computer transmitter 134 transmits the stimulation intensity data 252 and stimulation duration data 272 to the stimulator receiver 173. The stimulator processor 176 retrieves the stimulation intensity data 252 and stimulation duration data 272 from the stimulator receiver 173. The server processor transmits the stimulation intensity data 252 and the stimulation duration data 272 to the impulse generator 172. The impulse generator 172 converts the stimulation intensity data 252 and the stimulation duration data 272 to a digital activation signal to create an electromagnetic wave and transmits the digital signal to the electric node 171.

[0032] Once a digital activation signal is transmitted to the electric node 171, the stimulator processor 176 receives a stimulator time data 293 from the stimulator internal clock 177. The stimulator processor 176 calculates a stop time data as the sum of the stimulation duration data 272 and the stimulator time data. The stimulator processor 176 receives a stimulator time data 293 from the stimulator internal clock 177 and compares the stimulator time data 293 to the stop time data. When stimulator time data 293 is equal to the stop time data, the stimulator processor 176 transmits a deactivation signal to the impulse generator 172. The stimulator processor 176 sends the deactivation signal to the stimulator transmitter 176. The stimulator transmitter 176 sends the deactivation signal to the computer receiver 131. The computer processor 132 retrieves the deactivation signal from the computer receiver 131. The computer processor 132 transmits a message to the user interface 139 that the treatment has ended.

[0033] In an alternative embodiment of the present invention, the connection 120 is an LTE connection, a Bluetooth connection, a Wi-Fi connection, a LAN connection, a network connection, or other similar connection.

[0034] In an alternative embodiment of the present invention, the connection 140 is an LTE connection, a Bluetooth connection, a Wi-Fi connection, a LAN connection, a network connection, or other similar connection.

[0035] In an alternative embodiment of the present invention, the connection 160 is an LTE connection, a Bluetooth connection, a Wi-Fi connection, a LAN connection, a network connection, or other similar connection.

[0036] In an alternative embodiment of the present invention, the HRV transmitter 117 and HRV receiver 118 is a transceiver.

[0037] In an alternative embodiment of the present invention, the computer transmitter 134 and computer receiver 131 is a transceiver.

[0038] In an alternative embodiment of the present invention, the server transmitter 154 and server receiver 153 is a transceiver.

[0039] In an alternative embodiment of the present invention, the stimulator transmitter 174 and server receiver 153 is a transceiver.

[0040] In an alternative embodiment of the present invention, the server 150 includes more than one server.

[0041] In an alternative embodiment of the present invention, the server 150 is a computer memory unit.

[0042] In an alternative embodiment of the present invention, heart rate variability detector 110 is but not limited to an EliteHRV® or Oura Ring.

[0043] In an alternative embodiment of the present invention, the computer 130 is but not limited to a smartphone, tablet, or any other portable electronic device.

[0044] In an alternative embodiment of the present invention, the heart rate variability detector 110 communicates directly with the stimulator 170. In particular, the HRV transmitter 117 is able to transmit the current HRV data 250 to the stimulator receiver 173 without the need for a computer 130.

[0045] In an alternative embodiment of the present invention, when after an initial treatment and a deactivation duration of twenty minutes, the computer processor 132 determines whether the last current HRV reading to be stored in the current HRV data 250 is greater than the last current HRV reading to be stored in the current HRV data 250. If yes, then the user may activate treatment for a stimulation duration ranging from one minute to five minutes. If yes, the computer processor 132 transmits a message to the user interface 139 alerting the user to adjust the intensity setting to the highest level they can experience without pain. The computer processor 132 then sets the stimulation duration data 272 to five minute. The computer processor 132 transmits the stimulation duration data 272 to the computer transmitter 134. The computer transmitter 134 transmits the stimulation duration data 272 to the server receiver 173.

[0046] Figure 2 illustrates the server memory 152, the HRV memory 116, and the stimulator memory 178 of the server 150 that is part of the system 100 (see discussion of figure 1). The server memory 152 includes a user profile database 200 and a default database 280. The user profile database 200 includes a personal database 210, a physiological input database 220, a psychological data 230, an average HRV data 240, a current HRV data 250, a stimulation intensity data 260, and a past HRV look up table 270, a current HRV data 250, a default stimulation intensity data 270, and a default stimulation intensity data 280. The personal database 210 includes a first name data 211, a last name data 212, a date of birth data 213, a username data 214, and a password data 215. The physiological input database 220 includes a user height data 221, a user weight data 222, a user gender data 223, and a user body mass index data 224. The past HRV look up table 270 includes an HRV Response data 271 and a stimulation duration data 272. The default database 280 includes a default height data 281, a default weight data 282, a default gender data 283, a default BMI data 284, a default intensity data 285, and a default duration data 286. The HRV memory 116 includes an HRV time data 291 and an HRV data 292. The stimulator memory 178 includes a stimulator time data 293.

[0047] In operation, upon receiving the personal data from the computer 130 including the first name data 211, the last name data 212, the date of birth data 213, the username data 214, and the password data 215 through the network connection 140 from a computer transmitter 134 of the computer 130 to the server receiver 153 on the server 150 , the received data is stored in the personal database 210 within the user profile database 200. In particular, the computer processor 132 retrieves the first name data 211, the last name data 212, the date of birth data 213, the username data 214, and the password data 215 from the user interface 139. The computer processor 132 transmits the first name data 211, the last name data 212, the date of birth data 213, the username data 214, and the password data 215 to the computer transmitter 134. The computer transmitter 134 transmits the first name data 211, the last name data 212, the date of birth data 213, the username data 214, and the password data 215 to the server receiver 153. The server processor 151 retrieves the first name data 211, the last name data 212, the date of birth data 213, the username data 214, and the password data 215 from the server receiver 153. The server processor stores the first name data 211, the last name data 212, the date of birth data 213, the username data 214, and the password data 215 to the server memory 152 in the personal database 210.

[0048] In the preferred embodiment, the first name data 211 is in string format and input in to first name field 810 and the last name data 212 is in string format 215 and input in to last name field 820 (further described in Figure 8). In the preferred embodiment, the date of birth data 213 is selected from a scroll down menu in the date of birth field 830 and in the format of a month, followed by a day, and then followed by a year (further described in Figure 8). In the preferred embodiment, the username data 214 is the user's email address and input into the username field 840 and the password data 215 is a self-selected text that is in string format and input into the password field 850 (further described in Figure 8).

[0049] In further operation, upon receiving the physiological input data from the computer 130 including the user height data 221, the user weight data 222, the user gender data 223, and the user BMI data 224, through the network connection 140 from a computer transmitter 134 of the computer 130 to the server receiver 153 on the server 150, the received data is stored in the physiological input database 220 within the user profile database 200. In particular, the computer processor 132 retrieves the user height data 221, the user weight data 222, and the user gender data 223 from the user interface 139. The computer processor 132 calculates the user BMI data 224 using the user height data 221 and the user weight data 222. The computer processor 132 transmits the user height data 221, the user weight data 222, the user gender data 223, and the user BMI data 224 to the computer transmitter 134. The computer transmitter 134 transmits the user height data 221, the user weight data 222, the user gender data 223, and the user BMI data 224 to the server receiver 153. The server processor 151 retrieves the user height data 221, the user weight data 222, the user gender data 223, and the user BMI data 224 from the server receiver 153. The server processor 151 stores the user height data 221, the user weight data 222, the user gender data 223, and the user BMI data 224 to the server memory 152 in the physiological input database 220.

[0050] In the preferred embodiment, the height data is an integer data in inches input into height field 910 and the weight data is an integer data in pounds input into weight field 920 (further described in Figure 9). In the preferred embodiment, the gender data is characterized as either male or female and selected in the gender field 930 (further described in Figure 9).

[0051] In further operation, upon receiving the psychological data from the computer 130 including the user height data 221, the user weight data 222, the user gender data 223, and the user BMI data 224, through the network connection 140 from a computer transmitter 134 of the computer 130 to the server receiver 153 on the server 150, the received data is stored in the psychological data 230 within the user profile database 200. In particular, the computer processor 132 retrieves the psychological data 230 from the user interface 139. The computer processor 132 transmits the psychological data 230 to the computer transmitter 134. The computer transmitter 134 transmits the psychological data 230 to the server receiver 153. The server processor retrieves the psychological data 230 from the server receiver 153. The server processor 151 stores the psychological data 230 to the server memory 152.

[0052] In the preferred embodiment, the psychological data 130 is a number associated with the user's psychological input. In the preferred embodiment, the user selects one of five drop down options to identify their psychological state from either "really relaxed" 1020, "relaxed" 1030, "neutral" 1040, "stressed" 1050, and "really stressed" 1060. When the user selects "really relaxed" 1020, the psychological data is set to -6. When the user selects "relaxed" 1030, the psychological data is set to -3. When the user selects "neutral" 1040, the psychological data 230 is set to 0. When the user selects “stressed” 1050, the psychological data 230 is set to 3. When the user selects “really stressed” 1060, the psychological data 230 is set to 6.

[0053] In further operation, upon receiving the average HRV data, through the network connection 140 from a computer transmitter 134 of the computer 130 to the server receiver 153 on the server 150, the received data is stored in the average HRV data 240 within the user profile database 200. In particular, the computer processor 132 receives the current HRV data 250 and calculates the average HRV data 240 (further described in Figure 4). The computer processor 132 transmits the average HRV data 240 to the computer transmitter 134. The computer transmitter 134 transmits the average HRV data 240 to the server receiver 153. The server processor 151 retrieves the average HRV data 240 from the server receiver 153. The server processor 151 stores the average HRV data 240 to the server memory 152.

[0054] In the preferred embodiment, the average HRV data 240 is calculated as an average of every HRV reading that user takes with a heart rate variability detector 110 summed with the psychological data 230 (further described in Figure 4).

[0055] In further operation, upon receiving the current HRV data, through the network connection 120 and the network connection 140, from the HRV transmitter 117 of the heart rate variability detector 110 to the server receiver 153 on the server 150, the received data is stored in the current HRV data 250 within the user profile database 200. In particular, the HRV transmitter 117 transmits the current HRV data 250 to the computer receiver 131. The HRV transmitter 117 transmits the current HRV data 250 to the computer receiver 131. The computer processor 132 retrieves the current HRV data 250 from the computer receiver 131. The computer processor 132 transmits the current HRV data 250 to the computer transmitter 134. The computer transmitter

134 transmits the current HRV data 250 to the server receiver 153. The server processor 151 retrieves the current HRV data 250 from the server receiver 153. The server processor 151 stores the current HRV data 250 to the server memory 152.

[0056] In the preferred embodiment, the current HRV data 250 includes a user's HRV reading that user takes with a heart rate variability detector 110 (further described in Figure 3A and 3B).

[0057] In further operation, upon receiving the stimulation intensity data, through the network connection 140, from the computer transmitter 134 of the computer 130 to the server receiver 153 on the server 150, the received data is stored in the stimulation intensity data 260 within the user profile database 200. In particular, the computer processor 132 receives the default stimulation intensity data 285, the user height data 221, the default height data 281, the user weight data 222, the default weight data 282, the user gender data 223, the default gender data 283, and the default BMI data 284 and calculates the stimulation intensity data 260 (further described in Figure 5A, 5B, and 5C). The computer processor 132 transmits the stimulation intensity data 260 to the computer transmitter 134. The computer transmitter 134 transmits the stimulation intensity data 260 to the server receiver 153. The server processor 151 retrieves the stimulation intensity data 260 from the server receiver 153. The server processor 151 stores the stimulation intensity data 260 to the server memory 152.

[0058] In the preferred embodiment, the stimulation intensity data 260 is calculated as the sum of the default intensity data 285 and the quotient of the difference of the user height data 221 and the default height data 281 by two, when the user height data 221 is not equal to the default height data 281 (further described in Figure 5A, 5B, and 5C). The stimulation intensity data 260 is further calculated as the sum of the stimulation intensity data 260 and the quotient of the difference of the user BMI data 224 and the default BMI data 284 by five, when the user BMI data 224 is not equal to the default BMI data 284 (further described in Figure 5A, 5B, and 5C). The stimulation intensity data 260 is further calculated as the difference of the stimulation intensity data 260 and five, when the user gender data 223 is not equal to the default gender data 283 (further described in Figure 5A, 5B, and 5C).

[0059] In further operation, upon receiving the stimulation intensity data, through the network connection 140, from the computer transmitter 134 of the computer 130 to the server receiver 153 on the server 150, the received data is stored in the stimulation intensity data 260 within the user profile database 200. In particular, the computer processor 132 receives the default stimulation intensity data 285, the user height data 221, the default height data 281, the user weight data 222, the default weight data 282, the user gender data 223, the default gender data 283, and the default BMI data 284 and calculates the stimulation intensity data 260 (further described in Figure 5A, 5B, and 5C). The computer processor 132 transmits the stimulation intensity data 260 to the computer transmitter 134. The computer transmitter 134 transmits the stimulation intensity data 260 to the server receiver 153. The server processor 151 retrieves the stimulation intensity data 260 from the server receiver 153. The server processor 151 stores the stimulation intensity data 260 to the server memory 152.

[0060] In the preferred embodiment, the stimulation intensity data 260 is calculated as the sum of the default intensity data 285 and the quotient of the difference of the user height data 221 and the default height data 281 by two, when the user height data 221 is not equal to the default height data 281 (further described in Figure 5A, 5B, and 5C). The stimulation intensity data 260 is further calculated as the sum of the stimulation intensity data 260 and the quotient of the difference of the user BMI data 224 and the default BMI data 284 by five, when the user BMI data 224 is not equal to the default BMI data 284 (further described in Figure 5A, 5B, and 5C). The stimulation intensity data 260 is further calculated as the difference of the stimulation intensity data 260 and five, when the user gender data 223 is not equal to the default gender data 283 (further described in Figure 5A, 5B, and 5C).

[0061] In further operation, upon receiving the past HRV data from the computer 130 including the HRV response data 271 and the stimulation duration data 272 through the network connection 140 from a computer transmitter 134 of the computer 130 to the server receiver 153 on the server 150 , the received data is stored in the past HRV look up table 270 within the user profile database 200. In particular, the server processor 151 retrieves the average HRV data 240 and the current HRV data 250 from the server memory 152. The server processor 151 transmits the average HRV data 240, current HRV data 250, and the default duration data 286 to the server transmitter 154. The server transmitter 154 transmits the average HRV data 240, current HRV data 250, and the default duration data 286 to the computer receiver 131. The computer processor 132 retrieves the average HRV data 240, current HRV data 250, and the default duration data 286 from the computer receiver 131. The computer processor 132 calculates HRV response data 271 as the difference between average HRV data 240 and the current HRV data 250 (further described in Figure 3A and 3B). The computer processor 132 calculates stimulation duration as the multiplication of the HRV response data 271 by the quotient of the difference of the two HRV response data 271 (closest to HRV response data 271) and the difference of the two stimulation duration data 272 associated with the two HRV response data, when there is not a stimulation duration data associated with the HRV response data 271 (further described in Figure

3A and 3B). The computer processor 132 transmits the HRV response data 271 and the stimulation duration data 272 to the computer transmitter 134. The computer transmitter 134 transmits the HRV response data 271 and the stimulation duration data 272 to the server receiver 153. The server processor 151 retrieves the HRV response data 271 and the stimulation duration data 272 from the server receiver 153. The server processor 151 stores the HRV response data 271 and the stimulation duration data 272 to the server memory 152 in the past HRV look up table 270 in server memory 152.

[0062] In the preferred embodiment, the HRV response data 271 is calculated as the difference between average HRV data 240 and the current HRV data 250 (further described in Figure 3A and 3B). In the preferred embodiment, the stimulation duration is calculated as the multiplication of the HRV response data 271 by the quotient of the difference of the two HRV response data 271 (closest to HRV response data 271) and the difference of the two stimulation duration data 272 associated with the two HRV response data, when there is not a stimulation duration data 272 associated with the HRV response data 271 (further described in Figure 3A and 3B). In the preferred embodiment, the HRV response data 271 and stimulation duration data 272 are stored on a past HRV look-up table. In particular, each HRV response data 271 is associated with one stimulation duration data 272.

[0063] In further operation, upon receiving the default data from the computer 130, including the default height data 281, the default weight data 282, the default gender data 283, the default BMI data 284, the default intensity data 285, and the default duration data 286 from the server 110, through the network connection 140 from a computer transmitter 134 of the computer 130 to the server receiver 153 on the server 150, the received data is stored in the default database 280. In particular, upon installation of the application, the computer processor 132 transmits the default height data 281, the default weight data 282, the default gender data 283, the default BMI data 284, the default intensity data 285, and the default duration data 286 to the computer transmitter 134. The computer transmitter 134 transmits the default height data 281, the default weight data 282, the default gender data 283, the default BMI data 284, the default intensity data 285, and the default duration data 286 to the server receiver 153. The server processor 151 retrieves the default height data 281, the default weight data 282, the default gender data 283, the default BMI data 284, the default intensity data 285, and the default duration data 286 from the server receiver 153. The server processor 151 stores the default height data 281, the default weight data 282, the default gender data 283, the default BMI data 284, the default intensity data 285, and the default duration data 286 to the server memory 152 in the default database 280.

[0064] In the present embodiment, the default height data 281, the default weight data 282, the default gender data 283, the default BMI data 284, the default intensity data 285, and the default duration data 286 are constants stored in the default database 280. The user may not modify or delete the data in the default database 280. In the present embodiment, the default height data 281 is set to 68 inches, the default weight data 282 is set to 150 pounds, the default gender 283 is set to male, the default intensity data 285 is set to 20, and the default duration data is set to 2 minutes. In the present embodiment, the default BMI data is represented as a range of numbers from 20 to 25.

[0065] In operation, upon receiving the time data from the heart rate variability device 110 including the HRV time data 291 from the HRV internal clock 115 of the heart rate variability device 110 to the HRV memory 116 on the heart rate variability device 110, the received data is stored in the HRV time data 291. In particular, the HRV processor 114 retrieves the HRV time data 291 from the HRV internal clock 115. The HRV processor 114 transmits the HRV time data 291 to the HRV memory 116.

[0066] In the preferred embodiment, the HRV time data 291 is in hours, minutes, seconds, and milliseconds.

[0067] In further operation, upon receiving the heart rate variability data from the heart rate variability device 110 including the HRV data 292 from the HRV processor 114 of the heart rate variability device 110 to the HRV memory 116 on the heart rate variability device 110, the received data is stored in the HRV data 292. In particular, the HRV processor 114 retrieves the HRV time data 291 from the HRV memory 116 and calculates the HRV data 292. The HRV processor 114 transmits the HRV data 292 to the HRV memory 116.

[0068] In the preferred embodiment, the HRV data 292 is calculated by, but not limited to, the time-domain method, geometric method, frequency-domain method, and other means of calculating heart rate variability.

[0069] In operation, upon receiving the time data from the stimulator 170 including the stimulator time data 293 from the stimulator internal clock 177 of the stimulator 170 to the stimulator memory 178 on the stimulator 170, the received data is stored in the stimulator time data 293. In particular, the stimulator processor 176 retrieves the stimulator time data 293 from the stimulator internal clock 177. The stimulator processor 176 transmits the stimulator time data 293 to the stimulator memory 178.

[0070] In the preferred embodiment, the stimulator time data 293 is in hours, minutes, seconds, and milliseconds.

[0071] In an alternative embodiment of the present invention, the server memory 150 includes, but is not limited to, a public encryption key protocol or other types of encryption services.

[0072] In an alternative embodiment of the present invention, the server 150 includes more than one user profile database 200.

[0073] Figure 3 illustrates a flowchart 300 of a process for calculating heart rate variability by using a non-wearable heart rate variability sensor 110. The process shown in the flowchart 300 involves steps at the heart rate variability sensor 110, the computer 130, and the server 150.

[0074] At the first step 305, the heartbeat sensor 111 uses an optical sensor to detect a user's heartbeat by detecting changes in user's skin coloration. Next, at step 310, the heartbeat sensor 111 creates an analog signal of the heartbeat data. Next, at step 315, the ADC component 112 of the heartbeat sensor 111 coverts the analog heartbeat data to a digital heartbeat data. Next, at step 320, the ADC component 112 of the heartbeat sensor 111 transmits the digital heartbeat data to the HRV processor 114. Next, at step 325, the HRV processor 114 retrieves time data from internal clock 115. Next, at step 330, the HRV processor 114 stores time data as the HRV time data 291 in HRV memory 116. Next, at step 335, the HRV processor 114 determines whether there are more than two HRV time data 291 stored in HRV memory 116. If no, then the HRV processor 114 sends a signal to the heartbeat sensor 111 to repeat step 305 through step

330. If yes, then HRV processor 114 proceeds to step 340. Next, at step 345, the HRV processor 114 retrieves the HRV time data 291 from the HRV memory 116. Next, at step 350, the HRV processor 114 calculates the HRV data 292 using the HRV time data 291. Next, at step 355, the HRV processor 114 stores the HRV data 292 to the HRV memory 116. Next, at step 360, the HRV processor 114 retrieves the HRV data 292 to the HRV memory 116. Next, at step 365, the HRV processor 114 transmits the HRV data 292 to the HRV transmitter 117. Next, at step 370, the HRV transmitter 117 transmits the HRV data 292 to the computer receiver 131. Next, at step 375, the computer processor 132 retrieves the HRV data 292 from the computer receiver 131. Next, at step 375, the computer processor 132 transmits the HRV data 292 to the computer transmitter 134. Next, at step 380, the computer transmitter 134 transmits the HRV data 292 to the server receiver 173. Next, at step 385, the server processor 176 retrieves the HRV data 292 from the server receiver 173. Next, at step 390, the server processor 176 stores the HRV data 292 to the server memory 152 as the current HRV data 250.

[0077] In an alternative embodiment of the present invention, at step 355, the HRV processor 114 stores the HRV data 292 to the HRV memory 116. Next, at intermediate step 395, the HRV processor 114 determines whether the heart rate variability device is connected through network connection 120 to the computer 110. If no, then HRV processor 114 sends signal to heartbeat sensor 111 to perform step 305. If yes, then HRV processor 114 proceeds to intermediate step 396. Next, at step 360, the HRV processor 114 retrieves the HRV data 292 to the HRV memory 116.

[0078] In an alternative embodiment of the present invention, at step 325, the HRV processor 114 retrieves time data from internal clock 115. Next, the HRV processor 114 transmits the HRV time data 291 to the HRV transmitter 117. Next, the HRV transmitter 117 transmits the HRV time data 291 to the computer receiver 131. Next, the computer processor 132 retrieves the HRV time data 291 from the computer receiver 131. Next, the computer processor 132 calculates the current HRV data 250 using the HRV time data 291. Next, the computer processor 132 transmits the current HRV data 250 to the computer transmitter 134. Next, the computer transmitter 134 transmits the current HRV data 250 to the server receiver 153. Next, the server processor 151 retrieves the current HRV data 250 from the server receiver 153. Next, the server processor 151 stores the current HRV data 250 in server memory 152.

[0079] Figure 4 illustrates a flowchart 400 of a process for calculating average HRV data from a plurality of HRV data. The process shown in the flowchart 400 involves steps at the computer 130 and the server 150.

[0080] At the first step 405, the computer processor 132 determines whether there are more than five current HRV data in server memory. In particular, the computer processor 132 transmits a signal to search the server memory 152 to the computer transmitter 134. The computer transmitter 134 transmits a signal to search the server memory 152 to the server receiver 153. The server processor 151 retrieves signal to search the server memory 152 from the server receiver 153 and searches server memory 152. If there are five or more datum in the current HRV data 250, the computer processor 132 proceeds to step 475. Next, at step 475, the computer processor 132 enables an activate treatment field 1130 on user interface 139. If there are not more than five datum in the current HRV data 250, then the computer processor 132 proceeds to step 410. Next, at step 410, the computer processor 132 transmits a message to the user interface 139 to alert the user to take an HRV reading. Next, at step 415, the user takes an

HRV reading on a heart rate variability detector 110. Next, at step 420, the computer processor determines if a valid HRV reading was obtained. If no, the computer processor 132 proceeds to step 410. If yes, the computer processor 132 proceeds to step 425. Next, at step 425, the computer processor 132 retrieves the HRV data 292 from the computer receiver 131. Next, at step 430, the user interface 139 prompts the user to choose a psychological input. Next, at step 435, the computer processor 132 retrieves the psychological data 230 from the user interface 139. Next, at step 440, the computer processor 132 calculates the current HRV data 250 as the summation of the HRV data 292 and the psychological data 230. Next, at step 445, the computer processor 132 determines whether there is already an average HRV data 240 in server memory 152.

[0081] If no, then the computer processor 132 proceeds to step 450. Next, at step 450, the computer processor 132 sets the average HRV data 240 as the current HRV data 250 and stores the average HRV data 240 in server memory 152 and proceeds to step 405. In particular, the computer processor 132 transmits the average HRV data 240 to the computer transmitter 134. The computer transmitter 134 transmits the average HRV data 240 to the server receiver 153. The server processor 151 retrieves the average HRV data 240 from the server receiver 153. The server processor 151 stores the average HRV data 240 in server memory 152.

[0082] If yes, then the computer processor 132 proceeds to step 460. Next, at step 460, the computer processor 132 retrieves the average HRV data 240 from the server memory 152. In particular. Next, at step 465, the computer processor 132 calculates the average HRV data 240 by averaging the average HRV data 240 and the current HRV data 250. Next, at step 470, the computer processor 132 stores the average HRV data 240 in server memory 152 and proceeds to step 405. In particular, the computer processor 132 transmits the average HRV data 240 to the computer transmitter 134. The computer transmitter 134 transmits the average HRV data 240 to the server receiver 153. The server processor 151 retrieves the average HRV data 240 from the server receiver 153. The server processor 151 stores the average HRV data 240 in server memory 152.

[0083] In an alternative embodiment of the present invention, at step 405, the computer processor 132 determines whether there are more than a preset minimum number of current HRV data in server memory, wherein the preset minimum number could be any number other than five.

[0084] Figure 5 illustrates a flowchart 500 of a process for calculating stimulation intensity data from the user height data 221, the user weight data 222, the user gender data 223, and the user BMI data 224. The process shown in the flowchart 500 involves steps at the computer 130 and the server 150.

[0085] At the first step 505, the server processor 151 retrieves the default intensity data 285, the user height data 221, and the default height data 281from server memory 152. Next, at step 502, the server processor 151 transmits the default intensity data 285, the user height data 221, and the default height data 281 to the server transmitter 154. Next, at step 503, the server transmitter 154 transmits the default intensity data 285, the user height data 221, and the default height data 281 to the computer receiver 131. Next, at step 504, the computer processor 132 retrieves the default intensity data 285, the user height data 221, and the default height data 281 from the computer receiver 131. Next, at step 505, the computer processor 132 determines whether the default height data 281 is equal to the user height data 221. If yes, the computer processor 132 sets the stimulation intensity data 260 equal to the default intensity data 285 and the computer processor 132 proceeds to step 509. If no, the computer processor 132 calculates the stimulation data 260 as the sum of the default intensity data 285 and the quotient of the difference of the user height data 221 and the default height data 281 by two. The computer processor 132 then proceeds to step 509. Next, at step 509, the computer processor 132 transmits the stimulation intensity data 260 to the computer transmitter 134. Next, at step 510, the computer transmitter 134 transmits the stimulation intensity data 260 to the server receiver 153. Next, at step 511, the server processor 151 retrieves the stimulation intensity data 260 from the server receiver 153. Next, at step 512, the server processor 151 stores the stimulation intensity data 260 in the server memory 152.

[0086] Next, at step 513, the server processor 151 retrieves the stimulation intensity data 260, the user height data 221, the user weight data 222, and the default BMI data 284 from server memory 152. Next, at step 514, the server processor 151 transmits the stimulation intensity data 260, the user height data 221, the user weight data 222, and the default BMI data 284 to the server transmitter 154. Next, at step 515, the server transmitter 154 transmits the stimulation intensity data 260, the user height data 221, the user weight data 222, and the default BMI data 284 to the computer receiver 131. Next, at step 516, the computer processor 132 retrieves the stimulation intensity data 260, the user height data 221, the user weight data 222, and the default BMI data 284 from the computer receiver 131. Next, at step 517, the computer processor 132 calculates user BMI data 224 using the user height data 221 and the user weight data 222. Next, at step 518, the computer processor 132 determines whether the default BMI data 284 is equal to the user BMI data 224. If yes, the computer processor 132 sets the stimulation intensity data 260 equal to the stimulation intensity data 260 and the computer processor 132 proceeds to step 519.

If no, the computer processor 132 calculates the stimulation data 260 as the sum of the stimulation intensity data 260 and the quotient of the difference of the user BMI data 224 and the default BMI data 284 by five. The computer processor 132 then proceeds to step 519. Next, at step 519, the computer processor 132 transmits the stimulation intensity data 260 and the user BMI data 224 to the computer transmitter 134. Next, at step 520, the computer transmitter 134 transmits the stimulation intensity data 260 and the user BMI data 224 to the server receiver 153. Next, at step 521, the server processor 151 retrieves the stimulation intensity data 260 and the user BMI data 224 from the server receiver 153. Next, at step 522, the server processor 151 stores the stimulation intensity data 260 and the user BMI data 224 in the server memory 152.

[0087] Next, at step 523, the server processor 151 retrieves the stimulation intensity data 260, the user gender data 223, and the default gender data 283 from server memory 152. Next, at step 524, the server processor 151 transmits the stimulation intensity data 260, the user gender data 223, and the default gender data 283 to the server transmitter 154. Next, at step 525, the server transmitter 154 transmits the stimulation intensity data 260, the user gender data 223, and the default gender data 283 to the computer receiver 131. Next, at step 526, the computer processor 132 retrieves the stimulation intensity data 260, the user gender data 223, and the default gender data 283 from the computer receiver 131. Next, at step 527, the computer processor 132 determines whether the default gender data 283 is equal to the user gender data 223. If yes, the computer processor 132 sets the stimulation intensity data 260 equal to the stimulation intensity data 260 and the computer processor 132 proceeds to step 528. If no, the computer processor 132 calculates the stimulation data 260 as the difference of the stimulation intensity data 260 and five. The computer processor 132 then proceeds to step 528. Next, at step 528, the computer processor 132 transmits the stimulation intensity data 260 to the computer transmitter 134. Next, at step 529, the computer transmitter 134 transmits the stimulation intensity data 260 to the server receiver 153. Next, at step 530, the server processor 151 retrieves the stimulation intensity data 260 from the server receiver 153. Next, at step 531, the server processor 151 stores the stimulation intensity data 260 in the server memory 152.

[0088] In an alternative embodiment of the present invention, the stimulation intensity data 260 may be calculated using only the user height data 221, the default height data 281, and the default intensity data 285.

[0089] In an alternative embodiment of the present invention, the stimulation intensity data 260 may be calculated using only the user weight data 222, the default weight data 282, and the default intensity data 285.

[0090] In an alternative embodiment of the present invention, the stimulation intensity data 260 may be calculated using only user BMI data 224, default BMI data 284, and default intensity data 285. The computer processor 132 determines whether the default BMI data 284 is equal to the user BMI data 224. If yes, the computer processor 132 sets the stimulation intensity data 260 equal to the default intensity data 285. If no, the computer processor 132 calculates the stimulation data 260 as the sum of the default intensity data 285 and the quotient of the difference of the user BMI data 224 and the default BMI data 284 by five.

[0091] In an alternative embodiment of the present invention, the default BMI data 284 is a range of data between 20 and 25. The computer processor 132 determines whether the user BMI data 224 is within the range of the default BMI data 284.

[0092] In an alternative embodiment of the present invention, the stimulation intensity data 260 may be calculated using only user gender data 223, default gender data 283, and default intensity data 285. The computer processor 132 determines whether the default gender data 283 is equal to the user gender data 223. If yes, the computer processor 132 sets the stimulation intensity data 260 equal to the default intensity data 285. If no, the computer processor 132 calculates the stimulation data 260 as the difference of the default intensity data 285 and five.

[0093] In an alternative embodiment of the present invention, the user may input a stimulation intensity data 260 in the user interface 139 of the computer 130.

[0094] Figure 6 illustrates a flowchart 600 of a process for calculating stimulation duration data using the past HRV look up table 270. The process shown in the flowchart 600 involves steps at the computer 130, the server 150, and the stimulator 170.

[0095] At the first step 605, the server processor 151 retrieves the current HRV data 250, the average HRV data 250, and the default duration data 286 from server memory 152. Next, at step 610, the server processor 151 transmits the current HRV data 250, the average HRV data 250, and the default duration data 286 to the server transmitter 154. Next, at step 615, the server transmitter 154 transmits the current HRV data 250, the average HRV data 250, and the default duration data 286 to the computer receiver 131. Next, at step 620, the computer processor 132 retrieves the current HRV data 250, the average HRV data 250, and the default duration data 286 from the computer receiver 131. Next, at step 625, the computer processor 132 calculates the HRV response data 271 as the difference of the average HRV data 250 and the current HRV data 260. Next, at step 630, the computer processor 132 determines whether the HRV response data 271 is greater than zero. If no, the computer processor 132 proceeds to step 635. Next, at step

635, the computer processor 132 transmits a message to the user interface 139 to alert the user that a treatment is not needed. If yes, the computer processor 132 proceeds to step 640. Next, at step 640, the computer processor 132 transmits a signal to search in server memory 152 for an associated stimulation duration data 272 to the HRV response data 271 to the computer transmitter 134. Next, at step 645, the computer transmitter 134 transmits the signal to search in server memory 152 for an associated stimulation duration data 272 to the HRV response data 271 to the server receiver 153. Next, at step 650, the server processor 151 retrieves the signal to search in server memory 152 for an associated stimulation duration data 272 to the HRV response data 271 from the server receiver 153. Next, at step 655, the server processor 151 searches the past HRV look up table 270 in server memory 152 for an associated stimulation duration data 272 to the HRV response data 271. Next, at step 660, the server processor 151 determines whether there is a stimulation duration data 272 associated with the HRV response data 271.

[0096] If yes, the server processor 151 proceeds to step 665, Next, at step 665, the server processor 151 retrieves the stimulation duration data 272 from the server memory 152. Next, at step 670, the server processor 151 transmits the stimulation duration data 272 to the server transmitter 154. Next, at step 675, the server transmitter 154 transmits the stimulation duration data 272 to the computer receiver 131. Next, at step 680, the computer processor 132 stimulation duration data 272 from the computer receiver 131 and proceeds to step 698.

[0097] If no, the server processor 151 proceeds to step 697. Next, at step 697, the server processor 151 retrieves the two HRV response datum from the HRV response data 271 and associated stimulation duration data 272 from the server memory 152. Next, at step 696, the server processor 151 transmits the two HRV response datum from the HRV response data 271 and associated stimulation duration data 272 to the server transmitter 154. Next, at step 695, the server transmitter 154 transmits the two HRV response datum from the HRV response data 271 and associated stimulation duration data 272 to the computer receiver 131. Next, at step 685, the computer processor 132 calculates the stimulation duration data 272 as the multiplication of the HRV response data 271 by the quotient of the difference of the two HRV response datum from the HRV response data 271 and the difference of the two associated stimulation duration data 272 and then proceeds to step 698. Next, at step 698, the computer processor 132 transmits the stimulation duration data 272 to the computer transmitter 134. Next, at step 699, the computer transmitter 134 transmits the stimulation duration data 272 to the stimulator receiver 173.

[0098] In an alternative embodiment of the present invention, at step 685, the computer processor 132 calculates the stimulation duration data 272 as the multiplication of the HRV response data 271 by the quotient of the difference of the two HRV response datum from the HRV response data 271 and the difference of the two associated stimulation duration data 272. The computer processor 132 calculates an initial duration data as the quotient of the stimulation duration data 272 in step 685 and two. The computer processor 132 transmits the initial duration data to the computer transmitter 132. The computer transmitter 134 transmits the initial duration data to stimulator receiver 173. The stimulator processor 176 retrieves the initial duration data from the stimulator receiver 173. The stimulator processor then sends an activation signal to the impulse generator 172 for the duration of the initial duration data (see discussion in Figure 1). The computer processor 132 retrieves the user's updated HRV data and calculates the HRV response data 271. The computer processor 132 determines whether the HRV response data 271 is greater than zero. If yes, the computer processor 132 calculates the initial duration data as the summation of the initial duration data and thirty seconds. The computer processor 132 then transmits the initial duration to the stimulator receiver 173. If no, the computer processor 132 transmits a message to the user interface 139 to alert the user that a treatment is not needed.

[0099] In an alternative embodiment of the present invention, the user may input a stimulation duration data 272 in the user interface 139 of the computer 130.

[0100] Figure 7 illustrates the user interface 139 of the computer 130 according to an embodiment of the present invention. Each input field represents data that ~~will be~~ associated with the personal database 210. The input fields include a username field 710, a password field 720, a forgot password field 730, and a submit button 740. The username field 710 represents the username data 214 associated with the user. In the preferred embodiment the username data is in string format. The password field 720 represents the password data 215 associated with the user. In the preferred embodiment the password data is in string format. In the preferred embodiment the user enters the email associated with the user's account into the username field 710. The user enters the unique text associated with the email into the password field 720. The forgot password field 730 represents the field selected by the user when there is an incorrect entry in the password field 720. The submit button 740 represents the field selected by the user to associate the input data with the personal data 210.

[0101] In operation, as described with respect to the non-invasive vagus nerve stimulation system 100 in Figure 1, a user is presented with this screen to access their account. The user inputs their self-selected username in the username field 710 and inputs their self-selected password in the password field 720. Once the user presses the submit button 740, they are able to access their account information. Additionally, the user may press forgot my password in which the user would get a link to reset their password in the user's email. The username data 214 and the password data 215 is transmitted from the user interface 139 to the computer processor 132. The computer processor 132 transmits the username data 214 and the password data 215 to the computer transmitter 134. The computer transmitter 132 transmits the username data 214 and the password data 215 to the server 150 through network connection 140.

[0102] In an alternative embodiment of the present invention, the username field 710 allows for the username data 214 to be in other string formats that are not a user's email

[0103] In an alternative embodiment of the present invention, the user is able to use facial recognition systems or fingerprint recognition systems to login.

[0104] Figure 8 illustrates the user interface 139 of the computer 130 according to an embodiment of the present invention. Each input field represents data that will be associated with the personal database 210. The input fields include a first name field 810, a last name field 820, a date of birth field 830, a username field 840, a password field 850, and a "go" button 860. The first name field 810 represents the first name of the user. In the preferred embodiment the first name data is in string format. The last name field 820 represents the last name of the user. In the preferred embodiment the last name data is in string format. The date of birth field 830 represents the date of birth of the user. In the preferred embodiment the date of birth is selected from a scroll down menu to prevent users from inputting an invalid entry. The username field 840 represents a unique text that the user creates. In the preferred embodiment the username data is the user's email address. The password field 850 represents the unique text and number combination that a user creates. In the preferred embodiment the password data is in string format. The "go" button 860 represents the field selected by the user to associate the input data with the personal data 210.

[0105] In operation, as described with respect to the non-invasive vagus nerve stimulation system 100 in Figure 1, a user is presented with this screen to create an account on the non-invasive vagus nerve stimulation application. The user inputs their first name in the first name field 710, inputs their last name in the last name field 820, and selects their date of birth from a scroll down menu in the date of birth field 830. Additionally, the user creates and inputs their self-selected username in the username field 840 and creates and inputs their self-selected password in the password field 850. Once the user presses "go" 860 on their keyboard then the user creates an account. The first name data 211, the last name data 212, the date of birth data 213, the username data 214, and the password data 215 is transmitted from the user interface 139 to the computer transmitter 134. The first name data 211, the last name data 212, the date of birth data 213, the username data 214, and the password data 215 is transmitted from the user interface 139 to the computer transmitter 134. The first name data 211, the last name data 212, the date of birth data 213, the username data 214, and the password data 215 is transmitted from the computer transmitter 134 to the server 150 through network connection 140.

[0106] In an alternative embodiment of the present invention, the date of birth field 830 is, but not limited to, a textbox input.

[0107] Figure 9 illustrates the user interface 139 of the computer 130 according to an embodiment of the present invention. Each input field represents data that will be associated with the physiological database 220. The input fields include a height field 910, a weight field 920, a gender field 930, and a submit button 940. The height field 910 represents the height of the user in inches. In the preferred embodiment the height data is an integer. The weight field 920 represents the weight of the user in pounds. In the preferred embodiment the weight data is an integer. The gender field 940 represents the gender of the user. In the preferred embodiment the gender data is characterized as either male or female. The submit button 940 represents the field selected by the user to associate the input data with the physiological input database 220.

[0108] In operation, as described with respect to the non-invasive vagus nerve stimulation system 100 in Figure 1, a user is presented with this screen to enter the user's physiological data. The user inputs their height in the height field 910, inputs their weight in the weight field 920, and selects their gender in the gender field 930. Once the user presses the submit button 940, their physiological data gets stored in the server memory 152. In particular, the user height data 221, the user weight data 222, and the user gender data 223 is transmitted from the user interface 139 to the computer transmitter 134. The user height data 221, the user weight data 222, and the user gender data 223 is transmitted from the user interface 139 to the computer transmitter 134. The user height data 221, the user weight data 222, and the user gender data 223 is transmitted from the computer transmitter 134 to the server 150 through network connection 140.

[0109] In an alternative embodiment of the present invention, the height field 910 accepts an input including, but not limited to, feet, meters, or any unit of measurement recognized by the international system of units or U.S customary units.

[0110] In an alternative embodiment of the present invention, the weight field 920 accepts an input including, but not limited to, kilograms, or any unit of measurement recognized by the international system of units or U.S customary units.

[0111] In an alternative embodiment of the present invention, the gender field 930 allows user to not select an option.

[0112] In an alternative embodiment of the present invention, the user interface 139 includes a text input for a user to input their body mass index.

[0113] Figure 10 illustrates the user interface 139 of the computer 130 according to an embodiment of the present invention. Each input field represents data that will be associated with the psychological data 230. The input fields include a dropdown menu box 1010 that allows the user to self-select how stressed they are feeling including "really relaxed" 1020, "relaxed" 1030, "neutral" 1040, "stressed" 1050, and "really stressed" 1060, and a submit button 1070. The submit button 1070 represents the field selected by the user to associate the input data with the psychological data 230.

[0114] In operation, as described with respect to the non-invasive vagus nerve stimulation system 100 in Figure 1, a user is presented with this screen to enter the user's psychological state relating to how stressed they are feeling. The user selects one of five drop down options to identify their psychological state from either "really relaxed" 1020, "relaxed" 1030, "neutral" 1040, "stressed" 1050, and "really stressed" 1060. When the user selects "really relaxed" 1020, the psychological data is set to -6. When the user selects "relaxed" 1030, the psychological data is set to -3. When the user selects "neutral" 1040, the psychological data 230 is set to 0. When the user selects "stressed" 1050, the psychological data 230 is set to 3. When the user selects "really stressed" 1060, the psychological data 230 is set to 6. Once the user presses the submit button 1070, the psychological data 230 gets stored in the server memory. In particular, the psychological data 230 is transmitted from the user interface 139 to the computer transmitter 134. The psychological data 230 is transmitted from the user interface 139 to the computer transmitter 134. The psychological data 230 is transmitted from the computer transmitter 134 to the server 150 through network connection 140.

[0115] In an alternative embodiment of the present invention, the dropdown menu box 1010 may indicate a particular level of stress by the number of icons displayed on the dropdown field.

[0116] In an alternative embodiment of the present invention, the dropdown menu box 1010 may indicate a particular level of stress by a number displayed on the dropdown field.

[0117] In an alternative embodiment of the present invention, the dropdown menu box 1010 may include more than five dropdown fields.

[0118] In an alternative embodiment of the present invention, the dropdown menu box 1010 may include less than five dropdown fields.

[0119] In an alternative embodiment of the present invention, "really relaxed" 1020 may equal a psychological data other than -6, "relaxed" 1030 may equal a psychological data other than -3, "neutral" 1040 may equal a psychological data other than 0, "stressed" 1050 may equal a psychological data other than 3, and "really stressed" 1060 may equal a psychological data other than 6.

[0120] Figure 11 illustrates the user interface 139 of the computer 130 according to an embodiment of the present invention. Each output field represents data that will be associated with the stimulation duration data 272 in the past HRV look up table 240 and the current HRV data 250. The output fields include an HRV reading field 1110, a time recommended field 1120, and an alert field 1140. The input button includes a activate treatment button 1130. The HRV reading field 1110 represents the user's current HRV reading when connected to the heart rate variability detector 110. The time recommended field 1120 represents the recommended treatment time for the user and how long the stimulator 170 will be activated. In the preferred embodiment the stimulation duration data is in minutes and seconds. The alert field 1140 represents a message displayed on the user interface 139 that tells the user that an HRV reading cannot be found. In the preferred this alert would disable the activate treatment button 1130. The activate treatment button 1130 represents the field selected by the user to send the stimulation intensity data 252 and stimulation duration data 272 to the stimulator 170.

[0121] In operation, as described with respect to the non-invasive vagus nerve stimulation system 100 in Figure 1, a user is presented with this screen to display the user's current HRV reading and treatment time and allow the user to activate treatment on a non-invasive vagus nerve stimulator. The server processor 151 retrieves the stimulation duration data 272 associated with the HRV response data 271 (see discussion of figure 6) and the current HRV data 250 from server memory 152. The server processor 151 transmits the stimulation duration data 272 and the current HRV data 250 to the server transmitter 154. The server transmitter 154 transmits the stimulation duration data 272 and the current HRV data 250 to the computer receiver 131. The computer processor 132 retrieves the stimulation duration data 272 and the current HRV data 250 from the computer receiver 131. The computer processor 132 transmits the stimulation duration data 272 and the current HRV data 250 to the user interface 139. In particular, the stimulation duration data 272 is outputted to the time recommended field 1120 and the current HRV data 250 is outputted to the HRV reading field 1110. When the current HRV data 250 is null (see discussion of figure 3A and 3B), the computer processor 132 sends a message to the user interface 139 to alert the user that they need to take an HRV reading and activate treatment button 1130 is disabled. When the current HRV data 250 is not null, the activate treatment button 1130 is enabled. Once the user presses the activate treatment button 1130, the stimulation intensity data 252 and stimulation duration data 272 to the stimulator 170. In particular, the stimulation intensity data 252 and stimulation duration data 272 is transmitted from the computer processor 132 to the computer transmitter 134. The stimulation intensity data 252 and stimulation duration data 272 is transmitted from the user interface 139 to the computer transmitter 134. The stimulation intensity data 252 and stimulation duration data 272 is transmitted from the computer transmitter 134 to the stimulator 170 through network connection 160.

[0122] In an alternative embodiment of the present invention, the user interface 139 includes another output field to show stimulation intensity data 252 of the treatment.

add boilerplate ¶

CLAIMS

1. An initial intensity system, said system including:

a computer, said computer further including a computer processor, a memory, and a computer transmitter,

wherein said computer processor receives a physiological input data;

wherein said memory stores an intensity data and receives said physiological input data from said computer processor and stores said physiological input data; and

wherein, said computer processor retrieves said physiological input data and said preset intensity data from said memory and calculates an initial intensity data, wherein said initial intensity data is stored in said memory.

2. The system of claim 1, wherein said system further includes a computer receiver, wherein said computer receiver receives said initial intensity data from said memory.
3. The system of claim 1, wherein said system further includes a non-invasive vagus stimulator, wherein said non-invasive vagus stimulator receives said initial intensity data from said computer transmitter.
4. The system of claim 1, wherein said physiological input data includes a height data.
5. The system of claim 1, wherein said physiological input data includes a weight data.
6. The system of claim 1, wherein said physiological input data includes a gender data.
7. The system of claim 1, wherein said physiological input data includes said height data and said weight data and calculates a user Body Mass Index (BMI) data.
8. The system of claim 7, wherein said computer processor compares said user BMI data to a default BMI data and calculates a modified intensity data; wherein said modified intensity data is stored in said memory.

9. A method of controlling a non-invasive vagus nerve stimulator, said method including:

receiving current HRV data from a heart rate detector, wherein said receiving is performed by a computer processor;

comparing an average HRV data to said current HRV, wherein said average HRV data is retrieved from a memory, wherein said comparing is performed by said computer processor;

calculating a target HRV response data from a difference in said average HRV data and said current HRV, wherein said calculating is performed by said computer processor;

determining a duration time data by calculating a desired HRV response data, wherein said determining is performed by said computer processor; and

transmitting said duration time data to a non-invasive vagus nerve stimulator (NVNS) receiver, wherein said transmitting is performed by a computer transmitter.

10. The method of claim 9, wherein said method further including

determining said duration time data by calculating said desired HRV response data when said current HRV data is less than said average HRV data, wherein said determining is performed by said computer processor.

11. The method of claim 9, wherein said method further including

storing a treatment file, wherein said treatment file includes an HRV response data, said HRV response data linking to a duration time data and an intensity data, wherein said storing is performed by said memory.

12. The method of claim 9, wherein said duration time data is set, by a computer processor, to a default duration time data.

13. The method of claim 9, wherein said method further including storing a treatment file, wherein said treatment file includes an HRV response data, said HRV response data linking to a duration time data and an intensity data.

14. The method of claim 11, wherein said method further including:

receiving said duration time data and said intensity data when said target HRV response data equals HRV response data in said treatment file, wherein said receiving is performed by the computer processor; and

transmitting said duration time data and said intensity data to said NVNS receiver, wherein said transmitting is performed by said computer transmitter.

15. The method of claim 14, said method further including

calculating a projected duration time data, wherein said projected duration time data is linearly modeled from said HRV response data from said treatment file, wherein said calculating is performed by the computer processor; and

transmitting said projected duration time data to said NVNS receiver, wherein said transmitting is performed by said computer transmitter.

16. The method of claim 11, wherein said method further including:

calculating a projected duration time data, wherein said projected duration time data equals product of said duration time data and the quotient of said target HRV response data and linked said HRV response data, wherein said calculating is performed by the computer processor; and

transmitting said projected duration time data to said NVNS receiver, wherein said transmitting is performed by said computer transmitter.

17. A non-invasive vagus nerve stimulation system, said system including:

a heart rate sensor, wherein said heart rate sensor transmits a heart rate variability (HRV) data to an HRV transceiver;

wherein said HRV transceiver transmits said HRV data to a memory; wherein said memory stores said HRV data;

a computer processor, wherein said computer processor receives said HRV data from memory and calculates a duration time data and an intensity data;

a computer transmitter, wherein said computer transmitter transmits said duration time data and said intensity data to a non-invasive vagus nerve stimulator (NVNS) receiver;

a NVNS processer, wherein said NVNS processer receives said duration time data and said intensity data, wherein said duration time data and said intensity data is used to calculate an electrical frequency; and

a nerve stimulation device, wherein said nerve stimulation device receives said electrical frequency and generates an electromagnetic wave.

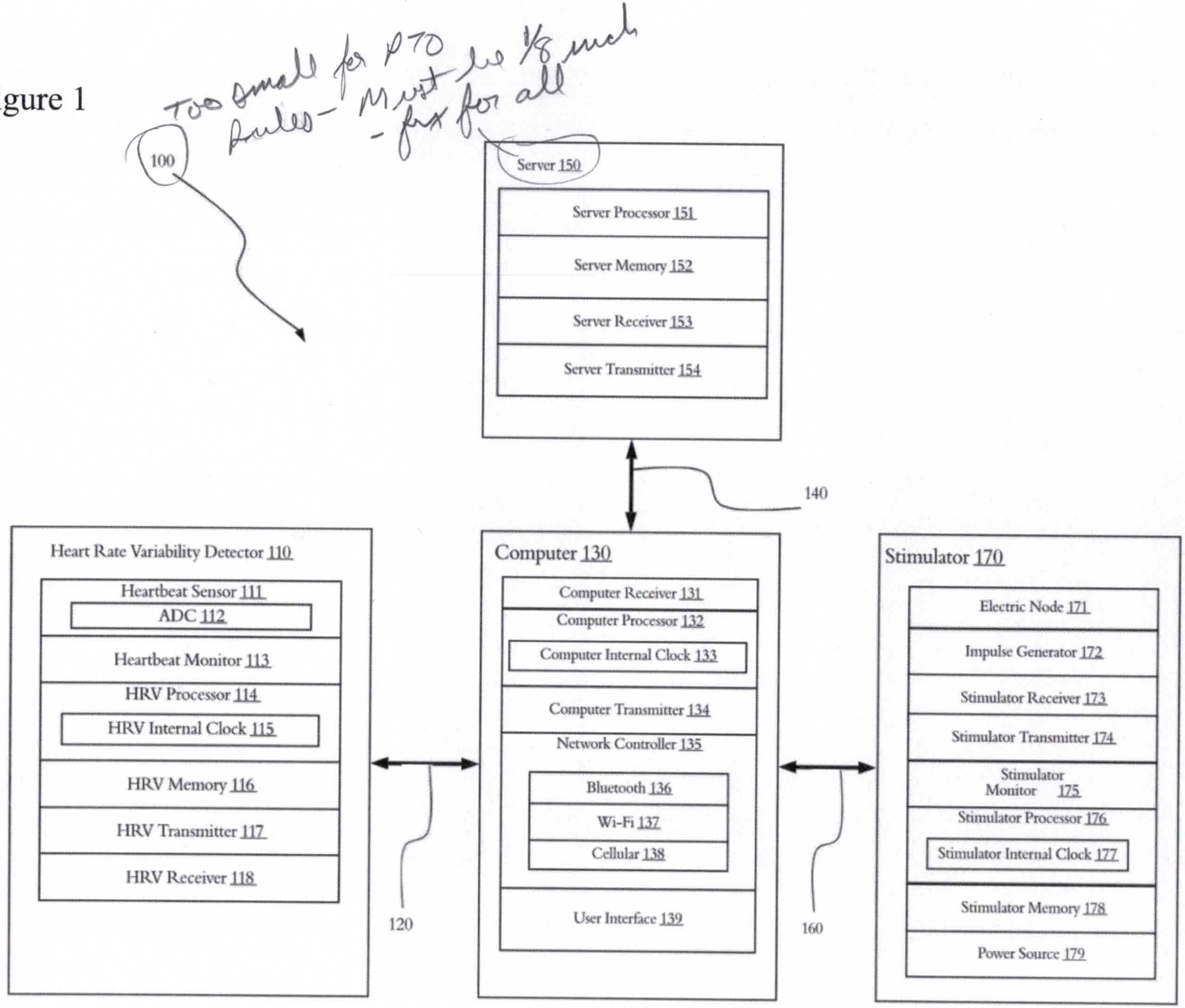
18. The system of claim 17, wherein said computer processor receives a psychological level data.

19. The system of claim 18, wherein said computer processor calculates a modified HRV data by adding or subtracting a preset data, wherein said modified HRV data is stored in a memory.

ABSTRACT

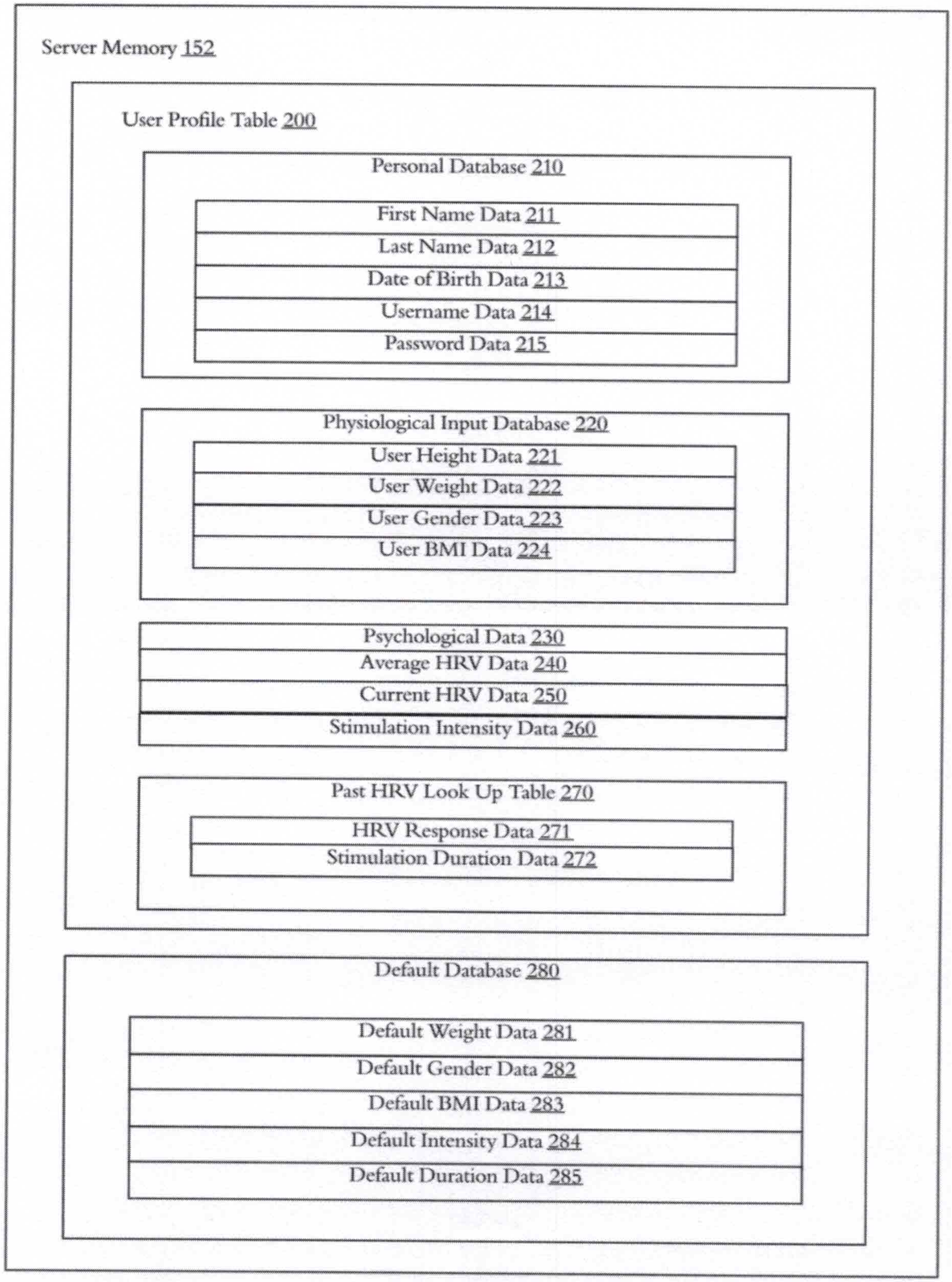
A [method and/or system] is provided which [describe invention as claimed]

Figure 1



Too small for PTO rules- Must be 1/8 inch - fix for all
100
Server 150
Server Processor 151
Server Memory 152
Server Receiver 153
Server Transmitter 154
140
Heart Rate Variability Detector 110
Heartbeat Sensor 111
ADC 112
Heartbeat Monitor 113
HRV Processor 114
HRV Internal Clock 115
HRV Memory 116
HRV Transmitter 117
HRV Receiver 118
120
Computer 130
Computer Receiver 131
Computer Processor 132
Computer Internal Clock 133
Computer Transmitter 134
Network Controller 135
Bluetooth 136
Wi-Fi 137
Cellular 138
User Interface 139
160
Stimulator 170
Electric Node 171
Impulse Generator 172
Stimulator Receiver 173
Stimulator Transmitter 174
Stimulator Monitor 175
Stimulator Processor 176
Stimulator Internal Clock 177
Stimulator Memory 178
Power Source 179

Figure 2A



Server Memory 152
User Profile Table 200
Personal Database 210
First Name Data 211
Last Name Data 212
Date of Birth Data 213
Username Data 214
Password Data 215
Physiological Input Database 220
User Height Data 221
User Weight Data 222
User Gender Data 223
User BMI Data 224
Psychological Data 230
Average HRV Data 240
Current HRV Data 250
Stimulation Intensity Data 260
Past HRV Look Up Table 270
HRV Response Data 271
Stimulation Duration Data 272
Default Database 280
Default Weight Data 281
Default Gender Data 282
Default BMI Data 283
Default Intensity Data 284
Default Duration Data 285

Figure 2B

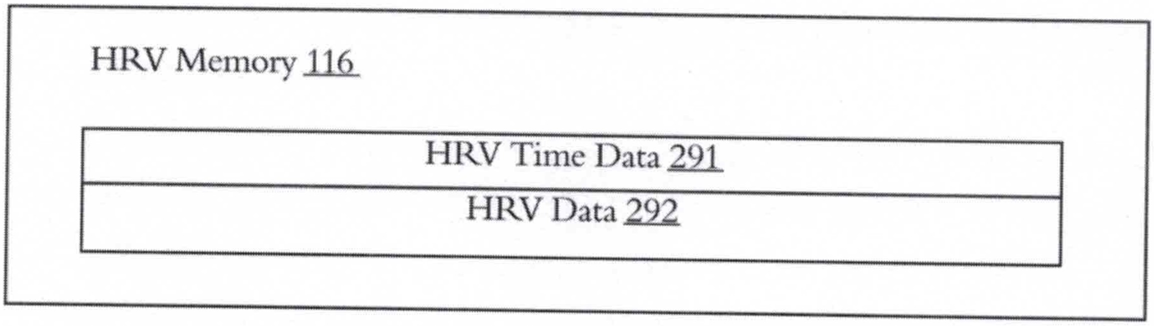


Figure 2C

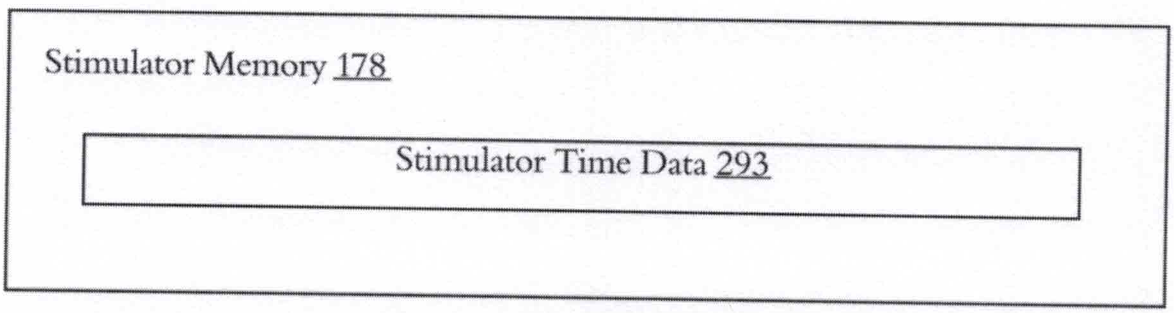


Figure 3B

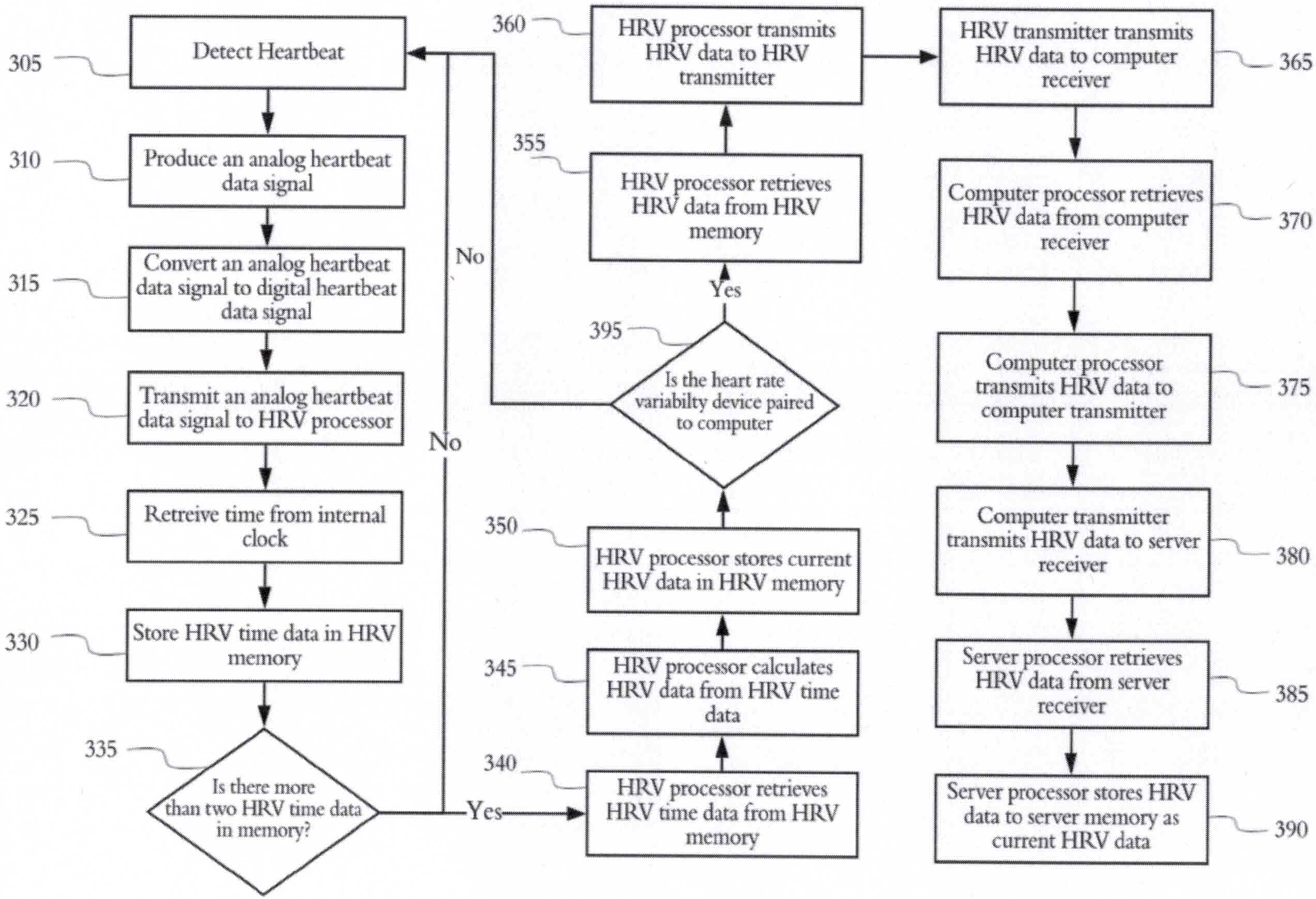
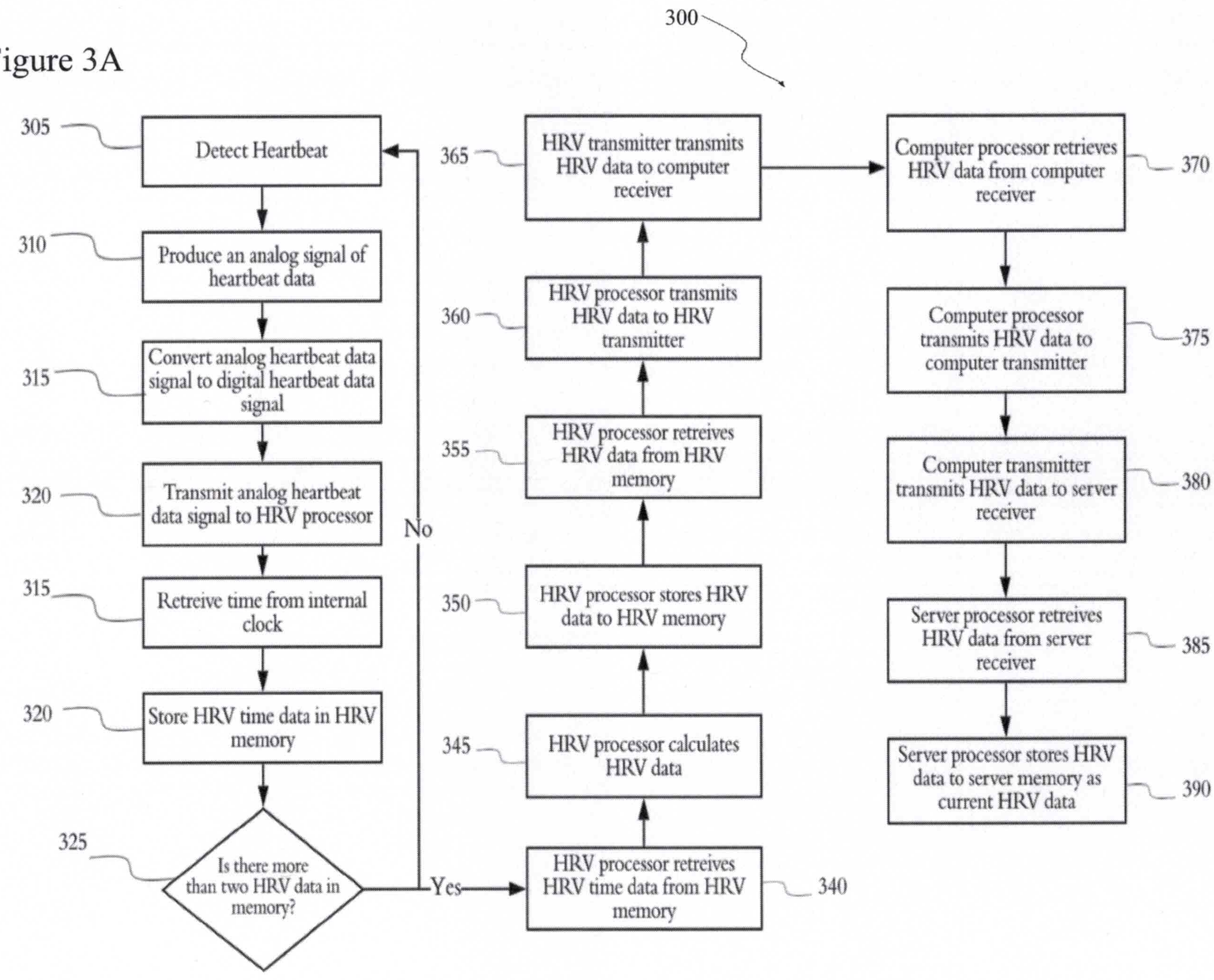

305
Detect Heartbeat
310
Produce an analog heartbeat data signal
315
Convert an analog heartbeat data signal to digital heartbeat data signal
320
Transmit an analog heartbeat data signal to HRV processor
325
Retreive time from internal clock
330
Store HRV time data in HRV memory
335
Is there more than two HRV time data in memory?
No
Yes
340
HRV processor retrieves HRV time data from HRV memory
345
HRV processor calculates HRV data from HRV time data
350
HRV processor stores current HRV data in HRV memory
395
Is the heart rate variabilty device paired to computer
No
Yes
355
HRV processor retrieves HRV data from HRV memory
360
HRV processor transmits HRV data to HRV transmitter
365
HRV transmitter transmits HRV data to computer receiver
370
Computer processor retrieves HRV data from computer receiver
375
Computer processor transmits HRV data to computer transmitter
380
Computer transmitter transmits HRV data to server receiver
385
Server processor retrieves HRV data from server receiver
390
Server processor stores HRV data to server memory as current HRV data

Figure 3A



300
305
Detect Heartbeat
310
Produce an analog signal of heartbeat data
315
Convert analog heartbeat data signal to digital heartbeat data signal
320
Transmit analog heartbeat data signal to HRV processor
315
Retreive time from internal clock
320
Store HRV time data in HRV memory
325
Is there more than two HRV data in memory?
No
Yes
340
HRV processor retreives HRV time data from HRV memory
345
HRV processor calculates HRV data
350
HRV processor stores HRV data to HRV memory
355
HRV processor retreives HRV data from HRV memory
360
HRV processor transmits HRV data to HRV transmitter
365
HRV transmitter transmits HRV data to computer receiver
370
Computer processor retrieves HRV data from computer receiver
375
Computer processor transmits HRV data to computer transmitter
380
Computer transmitter transmits HRV data to server receiver
385
Server processor retreives HRV data from server receiver
390
Server processor stores HRV data to server memory as current HRV data

Figure 4

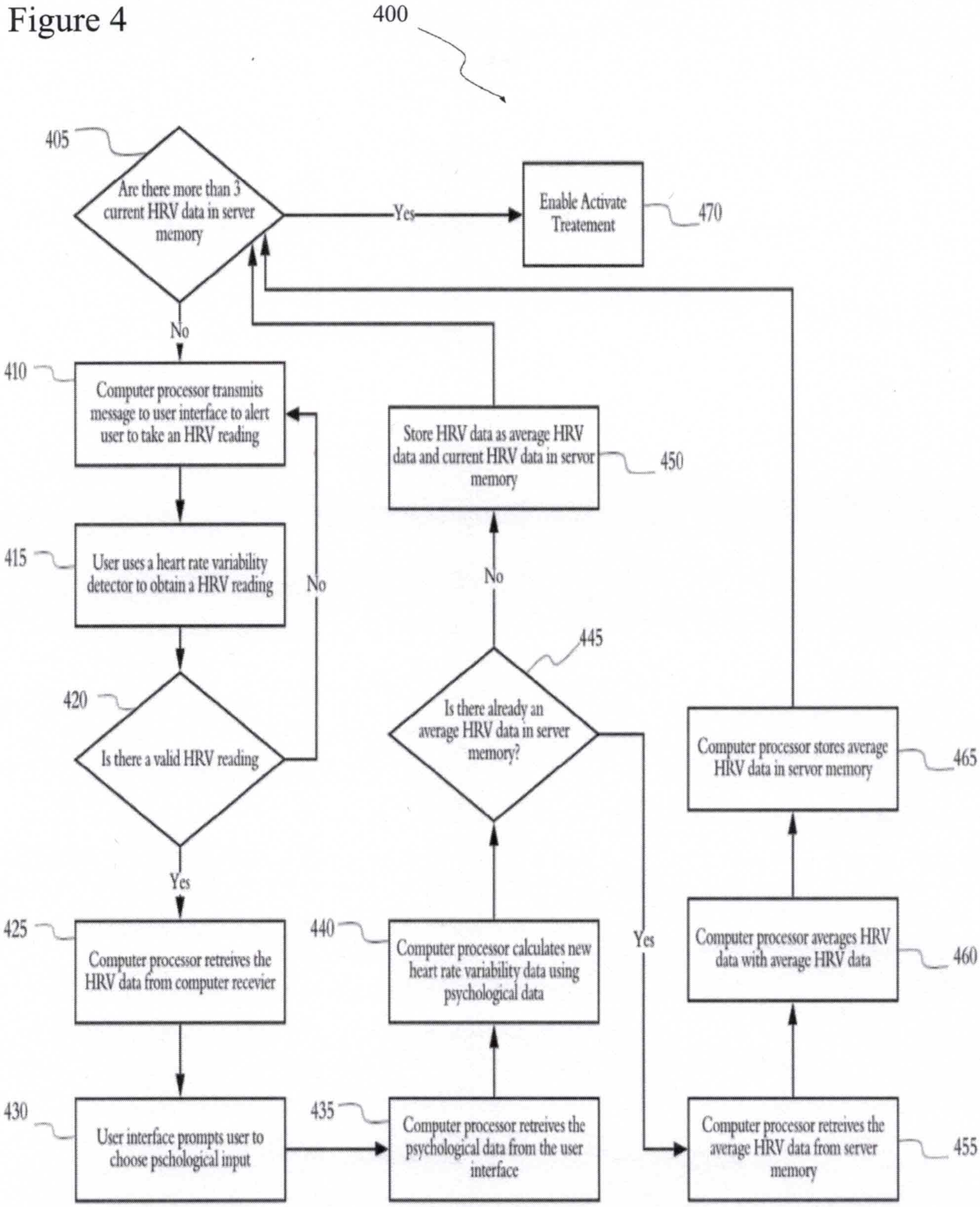

400
405
Are there more than 3 current HRV data in server memory
Yes
Enable Activate Treatement
470
No
410
Computer processor transmits message to user interface to alert user to take an HRV reading
415
User uses a heart rate variability detector to obtain a HRV reading
No
420
Is there a valid HRV reading
Yes
425
Computer processor retreives the HRV data from computer recevier
430
User interface prompts user to choose pschological input
435
Computer processor retreives the psychological data from the user interface
440
Computer processor calculates new heart rate variability data using psychological data
445
Is there already an average HRV data in server memory?
No
Store HRV data as average HRV data and current HRV data in servor memory
450
Yes
455
Computer processor retreives the average HRV data from server memory
460
Computer processor averages HRV data with average HRV data
465
Computer processor stores average HRV data in servor memory

Figure 5A

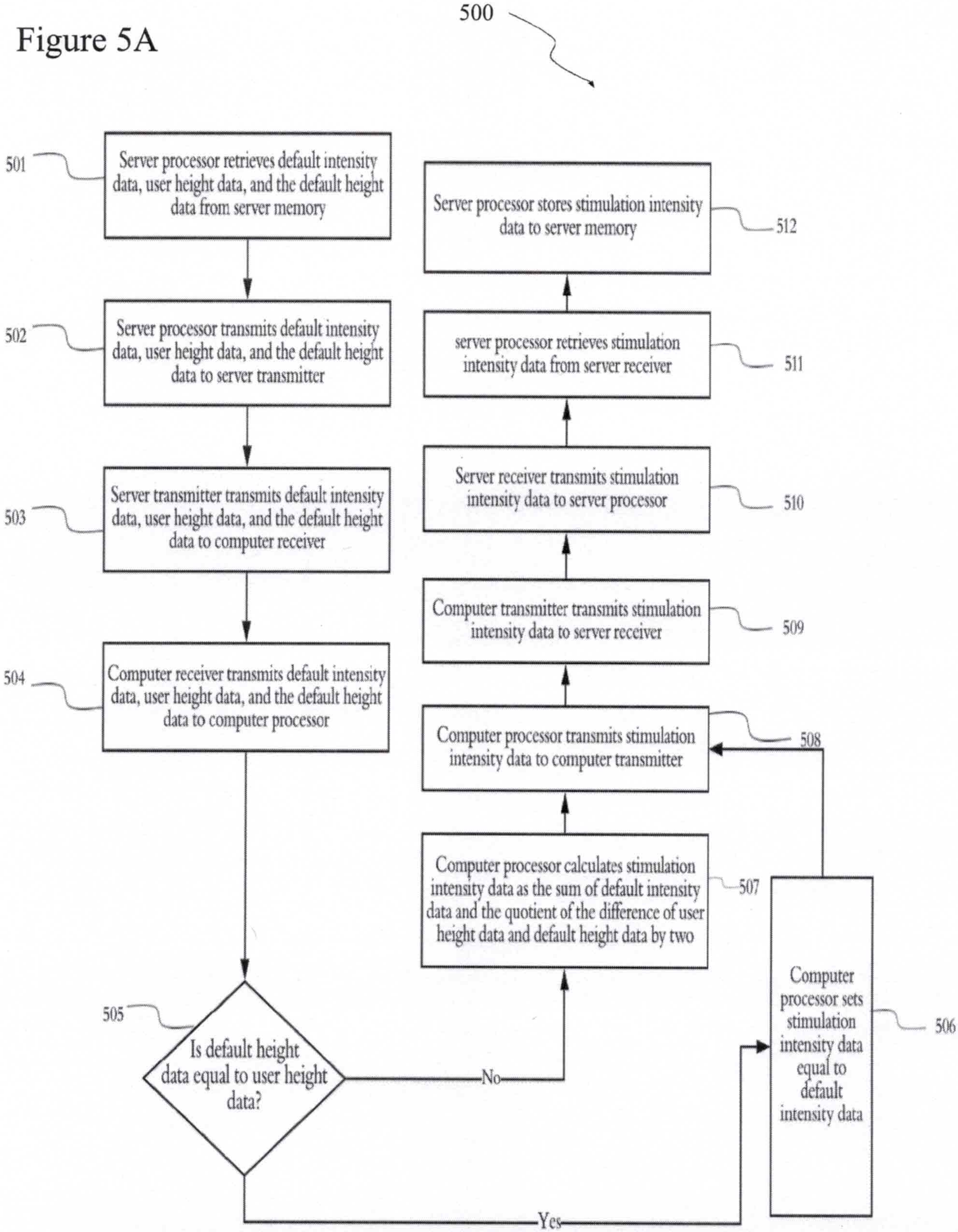
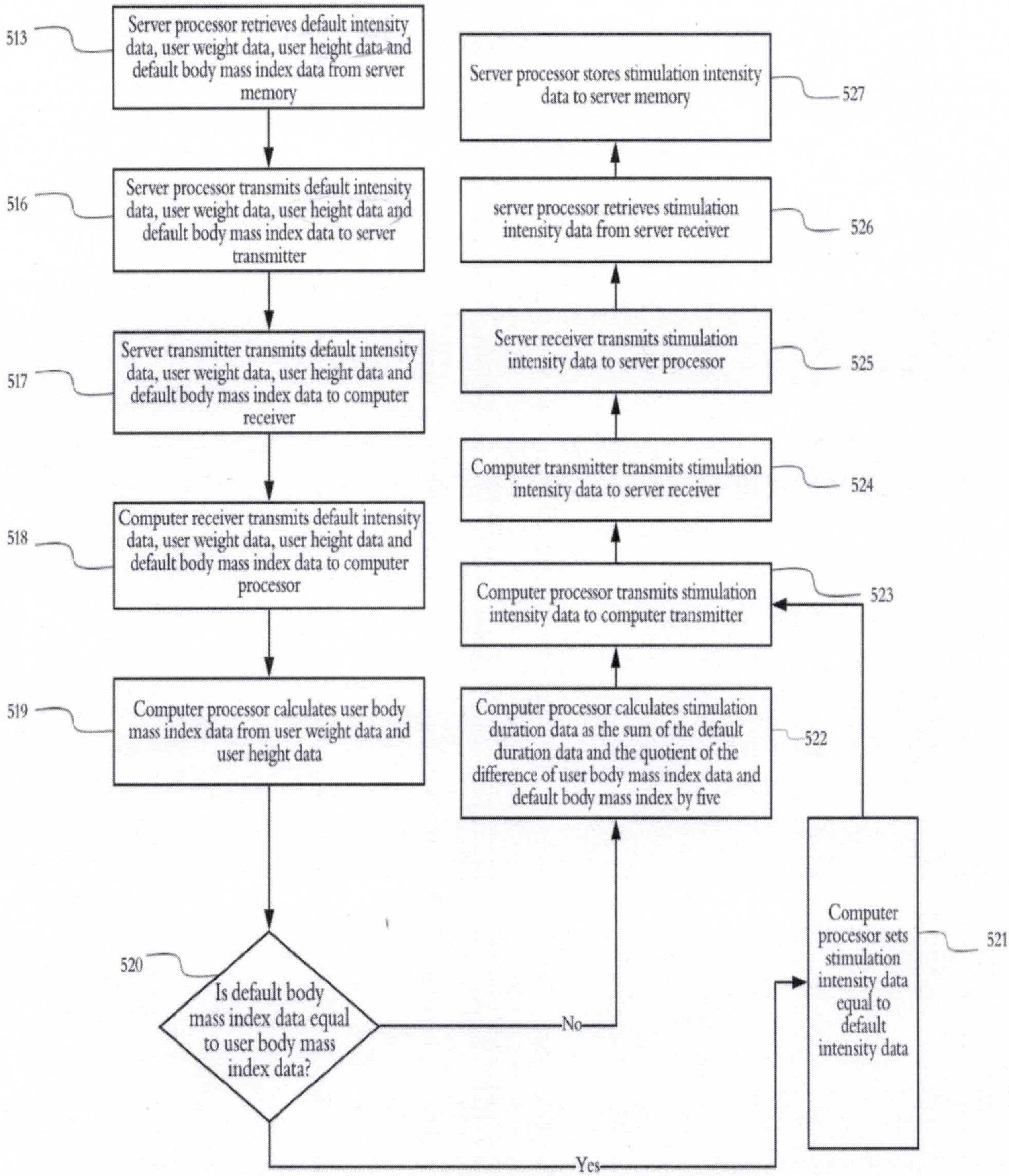

500
501
Server processor retrieves default intensity data, user height data, and the default height data from server memory
502
Server processor transmits default intensity data, user height data, and the default height data to server transmitter
503
Server transmitter transmits default intensity data, user height data, and the default height data to computer receiver
504
Computer receiver transmits default intensity data, user height data, and the default height data to computer processor
505
Is default height data equal to user height data?
No
Yes
506
Computer processor sets stimulation intensity data equal to default intensity data
507
Computer processor calculates stimulation intensity data as the sum of default intensity data and the quotient of the difference of user height data and default height data by two
508
Computer processor transmits stimulation intensity data to computer transmitter
509
Computer transmitter transmits stimulation intensity data to server receiver
510
Server receiver transmits stimulation intensity data to server processor
511
server processor retrieves stimulation intensity data from server receiver
512
Server processor stores stimulation intensity data to server memory

Figure 5B



513
Server processor retrieves default intensity data, user weight data, user height data and default body mass index data from server memory
516
Server processor transmits default intensity data, user weight data, user height data and default body mass index data to server transmitter
517
Server transmitter transmits default intensity data, user weight data, user height data and default body mass index data to computer receiver
518
Computer receiver transmits default intensity data, user weight data, user height data and default body mass index data to computer processor
519
Computer processor calculates user body mass index data from user weight data and user height data
520
Is default body mass index data equal to user body mass index data?
No
Yes
521
Computer processor sets stimulation intensity data equal to default intensity data
522
Computer processor calculates stimulation duration data as the sum of the default duration data and the quotient of the difference of user body mass index data and default body mass index by five
523
Computer processor transmits stimulation intensity data to computer transmitter
524
Computer transmitter transmits stimulation intensity data to server receiver
525
Server receiver transmits stimulation intensity data to server processor
526
server processor retrieves stimulation intensity data from server receiver
527
Server processor stores stimulation intensity data to server memory

Figure 5C

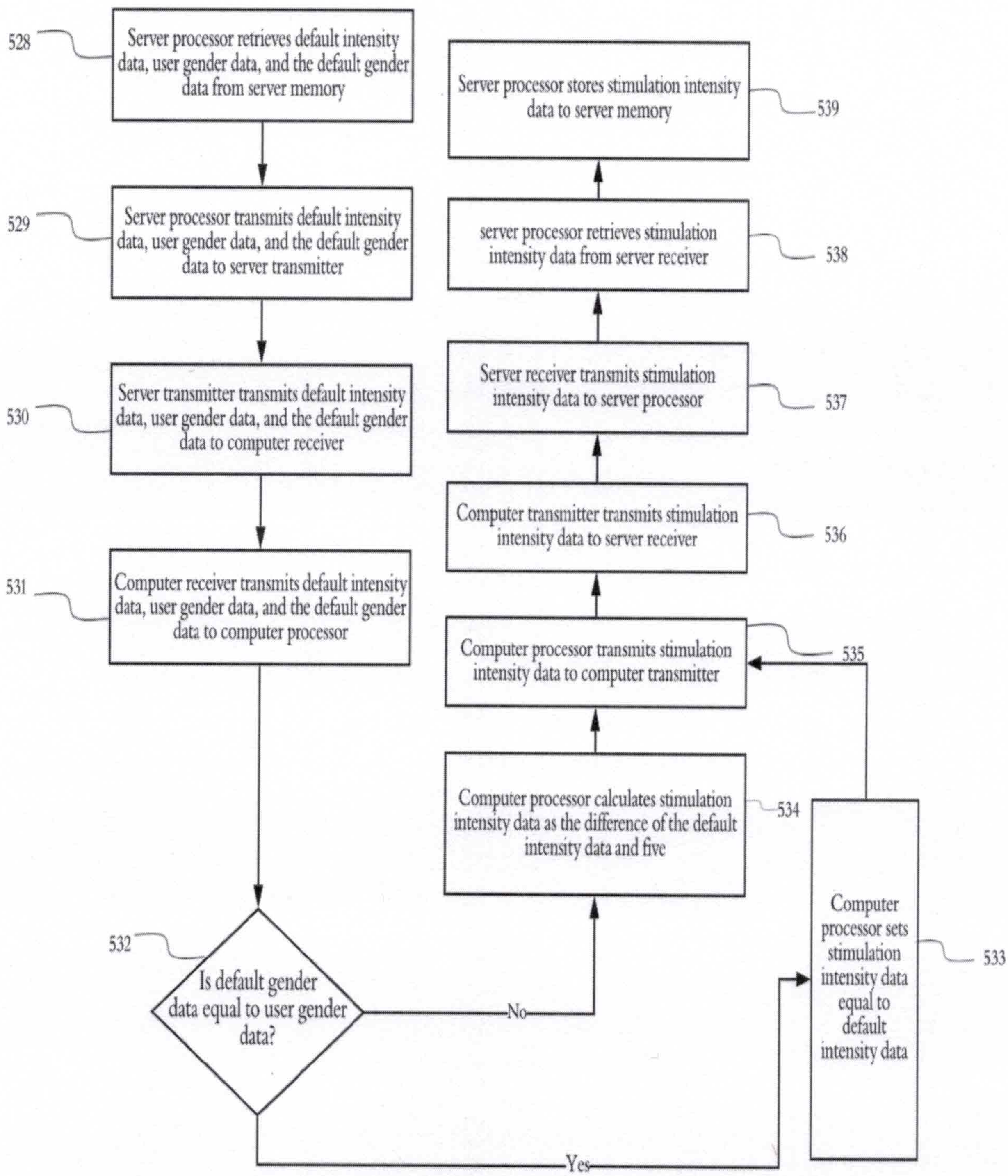

528
Server processor retrieves default intensity data, user gender data, and the default gender data from server memory
529
Server processor transmits default intensity data, user gender data, and the default gender data to server transmitter
530
Server transmitter transmits default intensity data, user gender data, and the default gender data to computer receiver
531
Computer receiver transmits default intensity data, user gender data, and the default gender data to computer processor
532
Is default gender data equal to user gender data?
No
Yes
533
Computer processor sets stimulation intensity data equal to default intensity data
534
Computer processor calculates stimulation intensity data as the difference of the default intensity data and five
535
Computer processor transmits stimulation intensity data to computer transmitter
536
Computer transmitter transmits stimulation intensity data to server receiver
537
Server receiver transmits stimulation intensity data to server processor
538
server processor retrieves stimulation intensity data from server receiver
539
Server processor stores stimulation intensity data to server memory

Figure 6

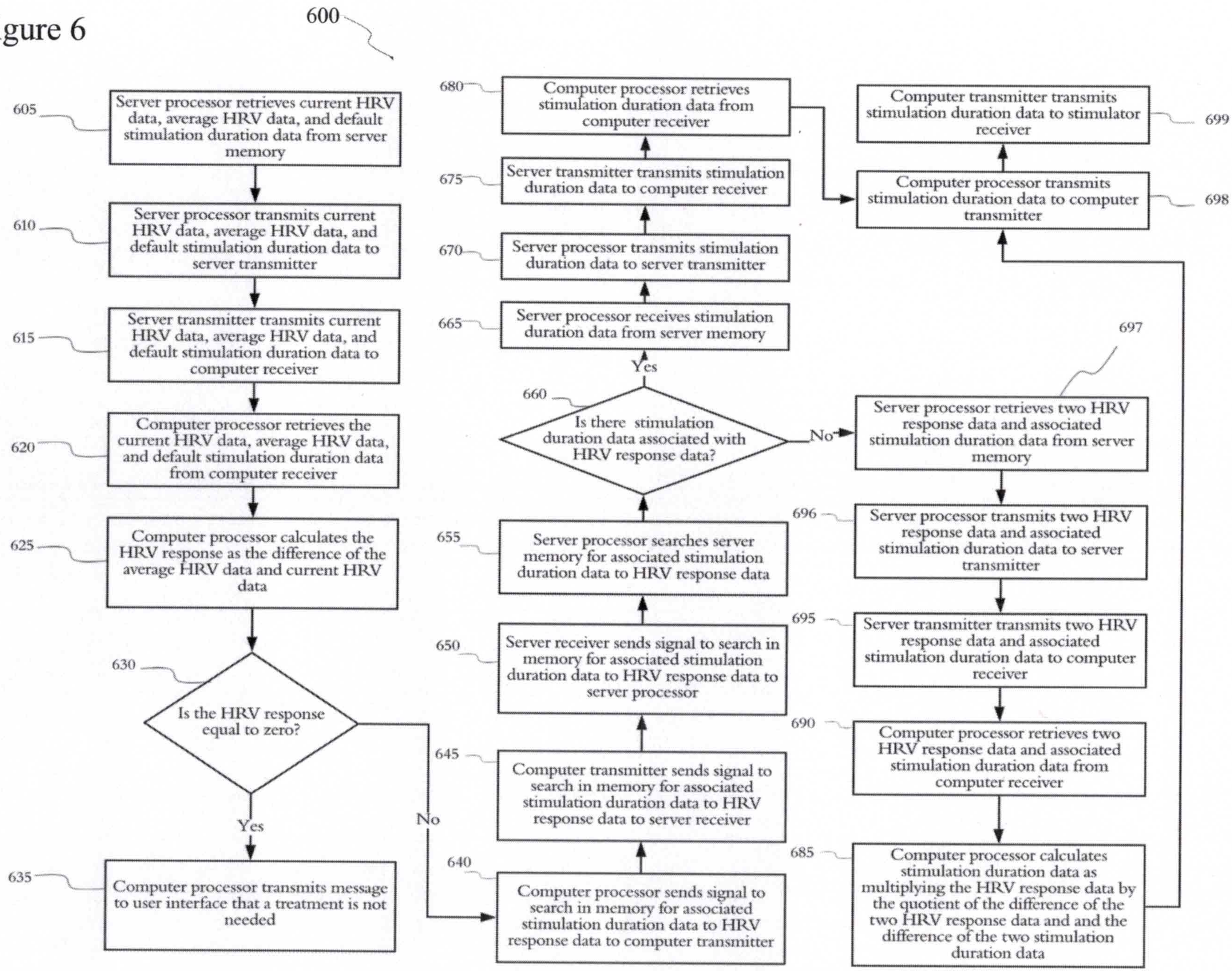

600
605
Server processor retrieves current HRV data, average HRV data, and default stimulation duration data from server memory
610
Server processor transmits current HRV data, average HRV data, and default stimulation duration data to server transmitter
615
Server transmitter transmits current HRV data, average HRV data, and default stimulation duration data to computer receiver
620
Computer processor retrieves the current HRV data, average HRV data, and default stimulation duration data from computer receiver
625
Computer processor calculates the HRV response as the difference of the average HRV data and current HRV data
630
Is the HRV response equal to zero?
Yes
No
635
Computer processor transmits message to user interface that a treatment is not needed
640
Computer processor sends signal to search in memory for associated stimulation duration data to HRV response data to computer transmitter
645
Computer transmitter sends signal to search in memory for associated stimulation duration data to HRV response data to server receiver
650
Server receiver sends signal to search in memory for associated stimulation duration data to HRV response data to server processor
655
Server processor searches server memory for associated stimulation duration data to HRV response data
660
Is there stimulation duration data associated with HRV response data?
Yes
No
665
Server processor receives stimulation duration data from server memory
670
Server processor transmits stimulation duration data to server transmitter
675
Server transmitter transmits stimulation duration data to computer receiver
680
Computer processor retrieves stimulation duration data from computer receiver
697
Server processor retrieves two HRV response data and associated stimulation duration data from server memory
696
Server processor transmits two HRV response data and associated stimulation duration data to server transmitter
695
Server transmitter transmits two HRV response data and associated stimulation duration data to computer receiver
690
Computer processor retrieves two HRV response data and associated stimulation duration data from computer receiver
685
Computer processor calculates stimulation duration data as multiplying the HRV response data by the quotient of the difference of the two HRV response data and and the difference of the two stimulation duration data
698
Computer processor transmits stimulation duration data to computer transmitter
699
Computer transmitter transmits stimulation duration data to stimulator receiver

Figure 7

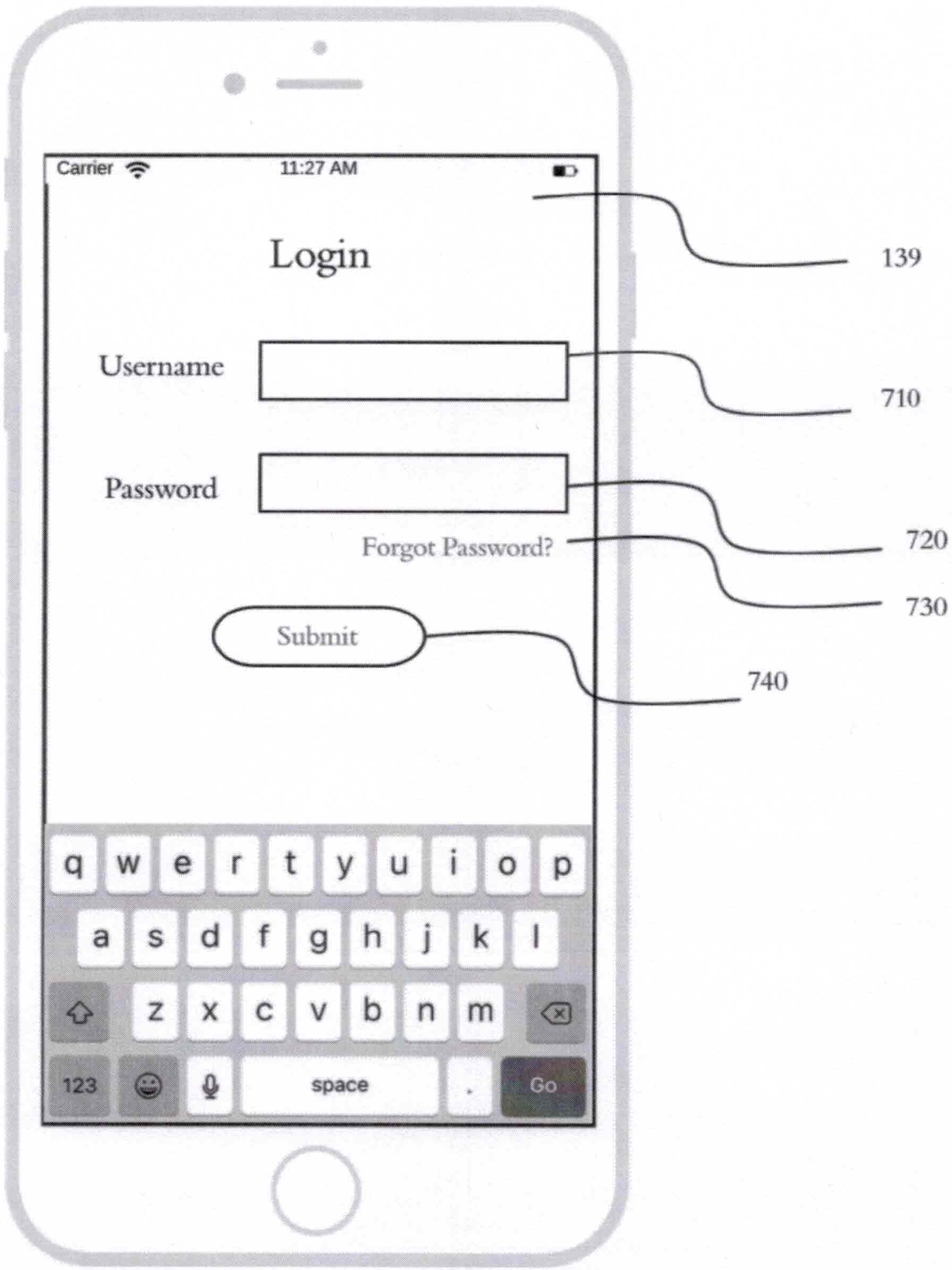
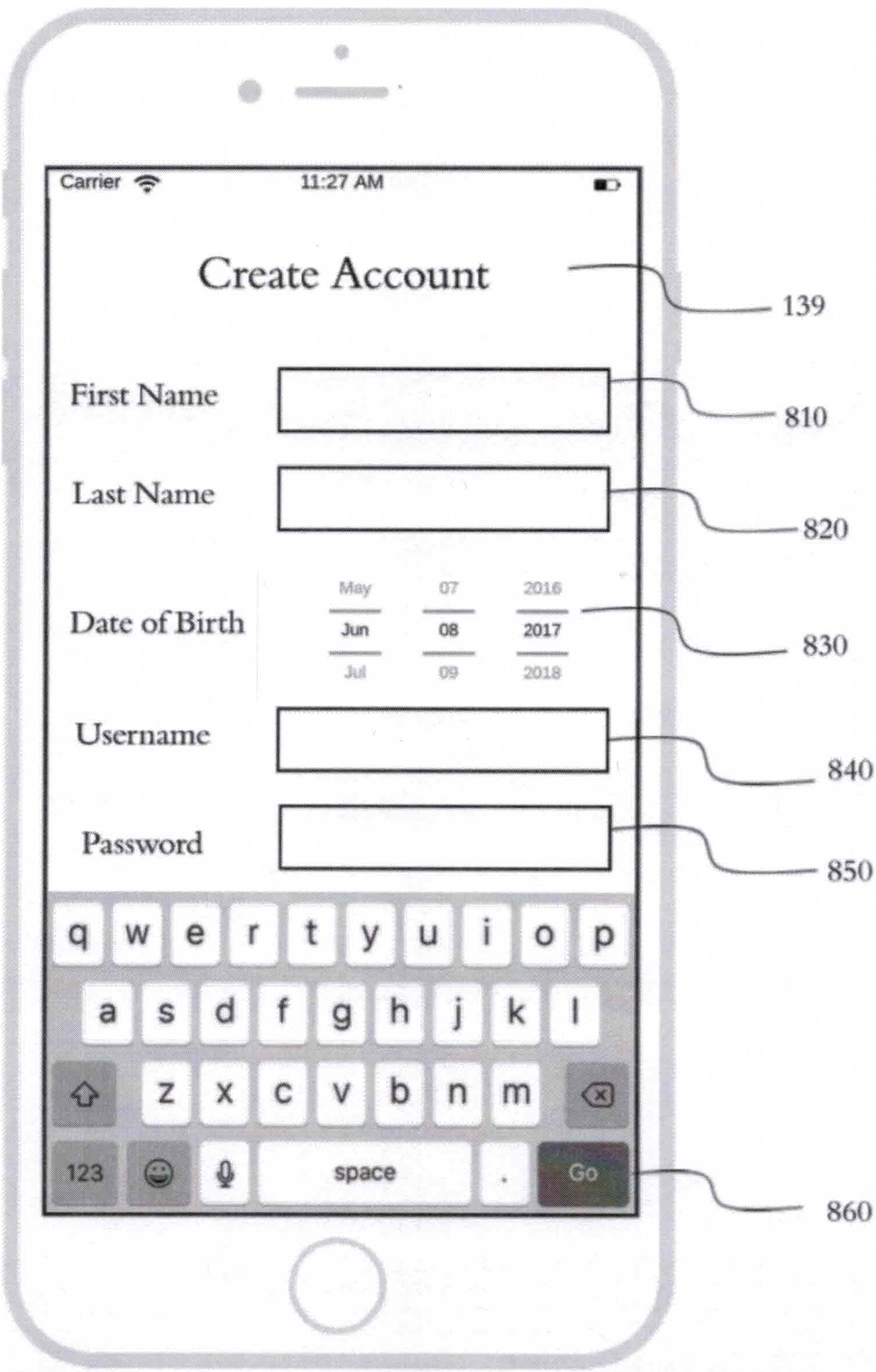
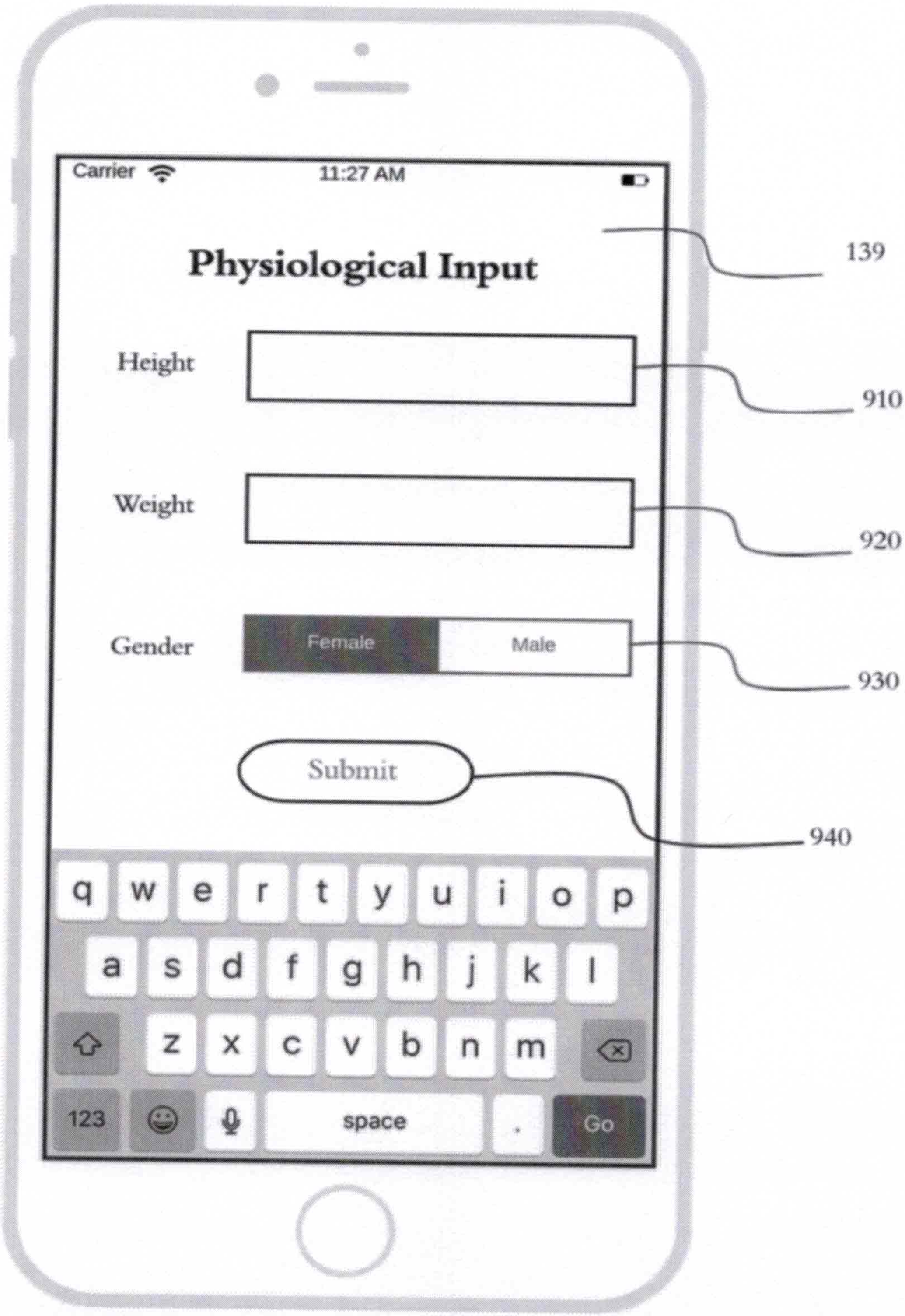

Carrier
11:27 AM
Login
Username
Password
Forgot Password?
Submit
139
710
720
730
740
q w e r t y u i o p
a s d f g h j k l
z x c v b n m
123
space
.
Go

Figure 8



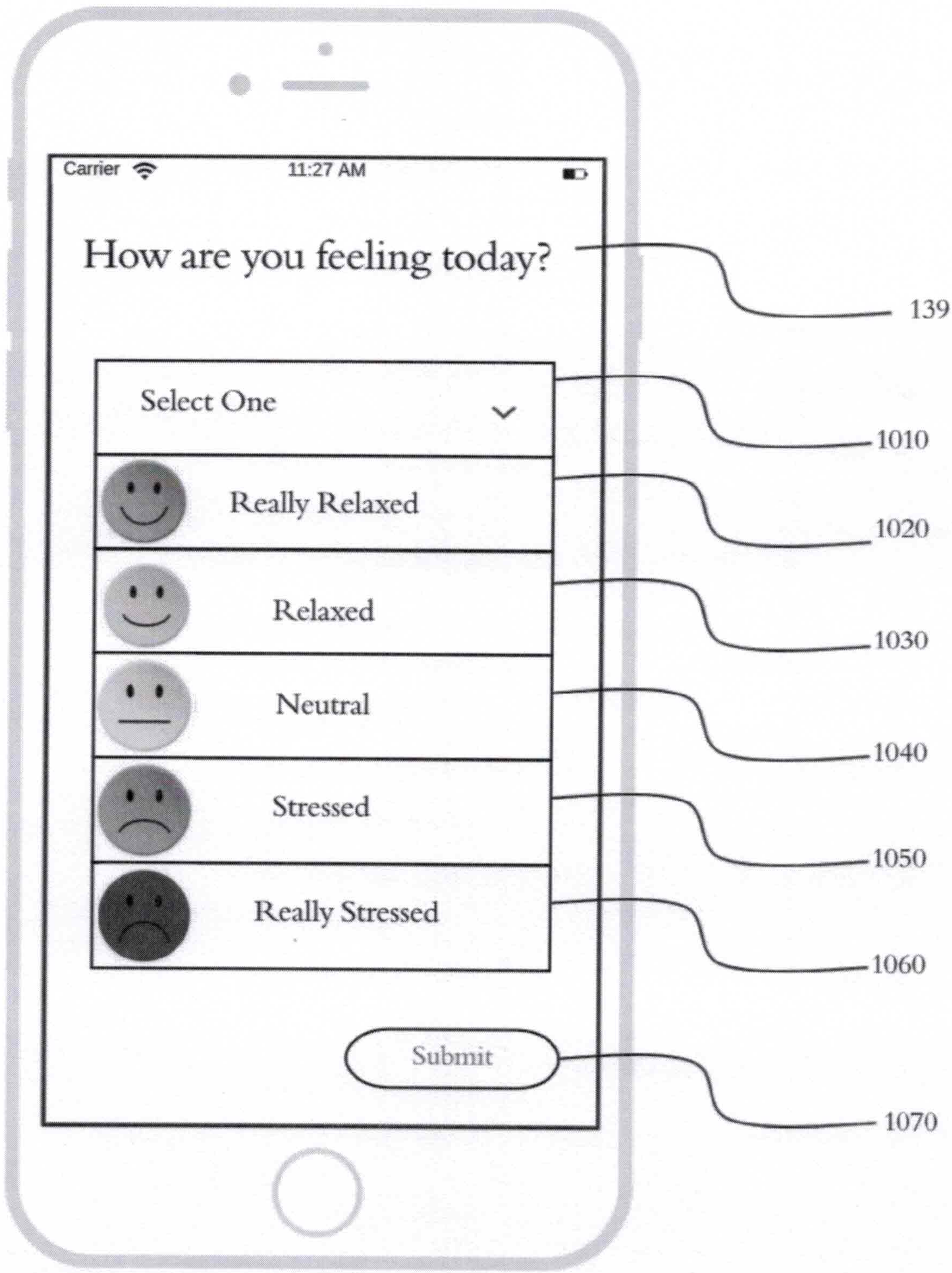
Carrier
11:27 AM
Create Account
First Name
Last Name
Date of Birth
May
07
2016
Jun
08
2017
Jul
09
2018
Username
Password
q w e r t y u i o p
a s d f g h j k l
z x c v b n m
123
space
.
Go
139
810
820
830
840
850
860

Figure 9



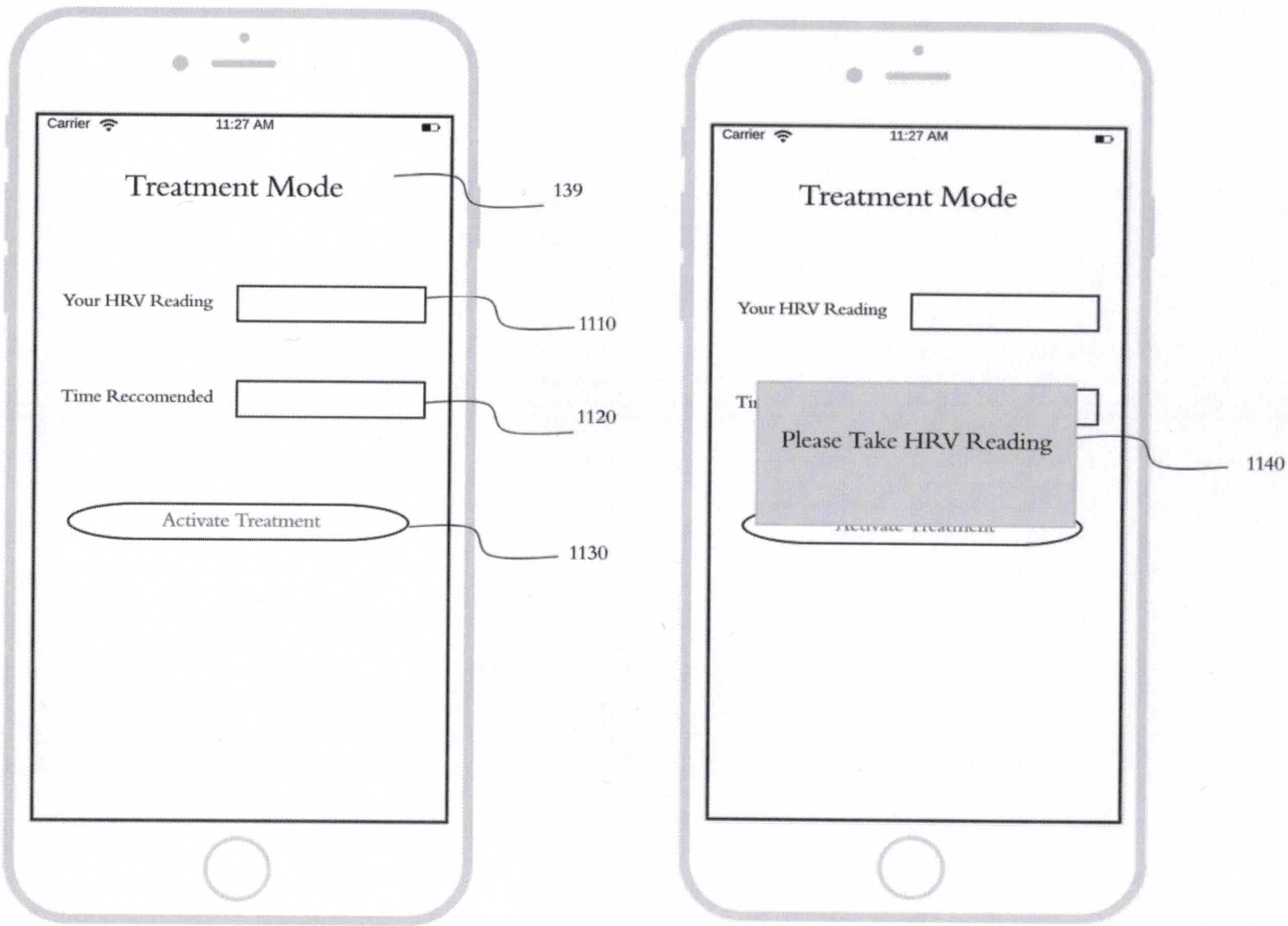
Carrier
11:27 AM
Physiological Input
139
Height
910
Weight
920
Gender
Female
Male
930
Submit
940
q w e r t y u i o p
a s d f g h j k l
z x c v b n m
123
space
.
Go

Figure 10



Carrier
11:27 AM
How are you feeling today?
Select One
Really Relaxed
Relaxed
Neutral
Stressed
Really Stressed
Submit
139
1010
1020
1030
1040
1050
1060
1070

Figure 11


Carrier
11:27 AM
Treatment Mode
139
Your HRV Reading
1110
Time Reccomended
1120
Activate Treatment
1130
Carrier
11:27 AM
Treatment Mode
Your HRV Reading
Please Take HRV Reading
1140