FIG. 1

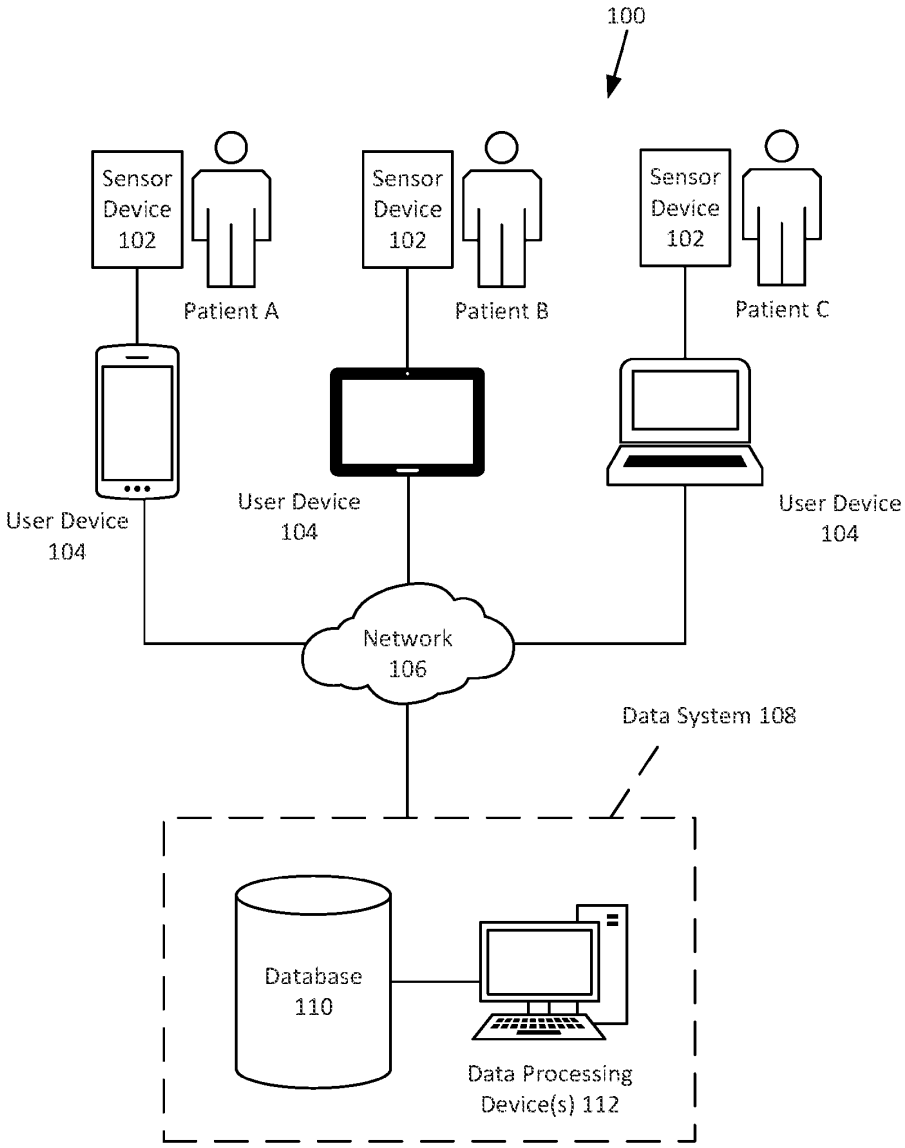

100
Sensor Device 102
Patient A
Sensor Device 102
Patient B
Sensor Device 102
Patient C
User Device 104
User Device 104
User Device 104
Network 106
Data System 108
Database 110
Data Processing Device(s) 112

FIG. 2

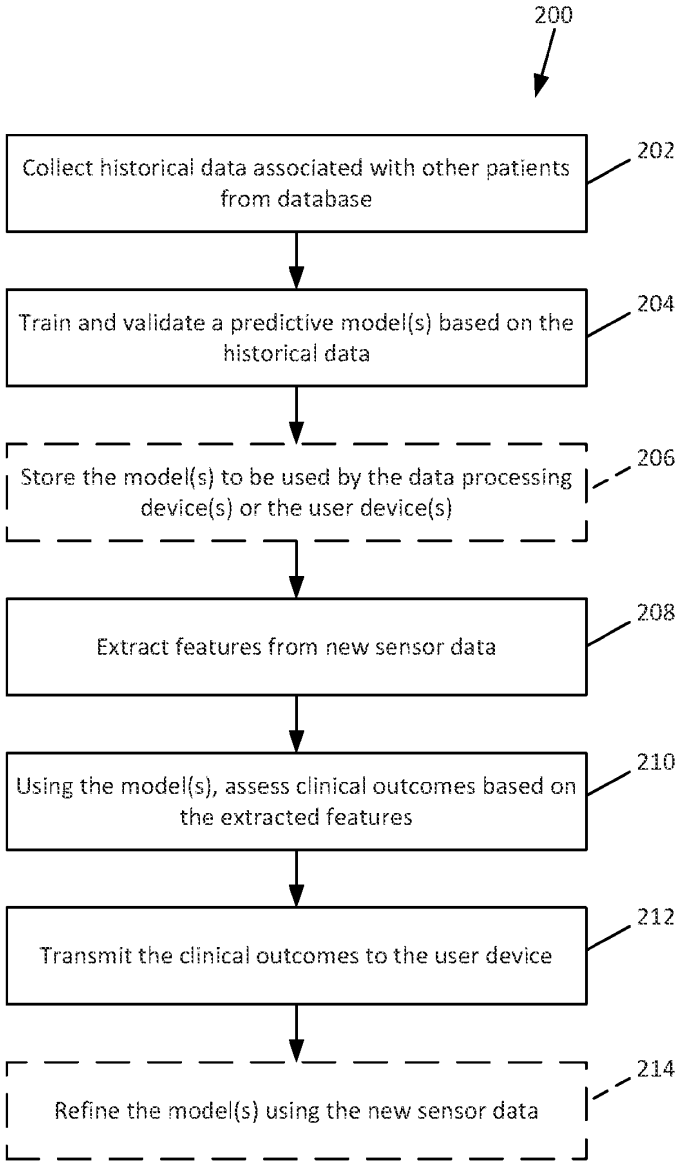

200
Collect historical data associated with other patients from database
202
Train and validate a predictive model(s) based on the historical data
204
Store the model(s) to be used by the data processing device(s) or the user device(s)
206
Extract features from new sensor data
208
Using the model(s), assess clinical outcomes based on the extracted features
210
Transmit the clinical outcomes to the user device
212
Refine the model(s) using the new sensor data
214

FIG. 3

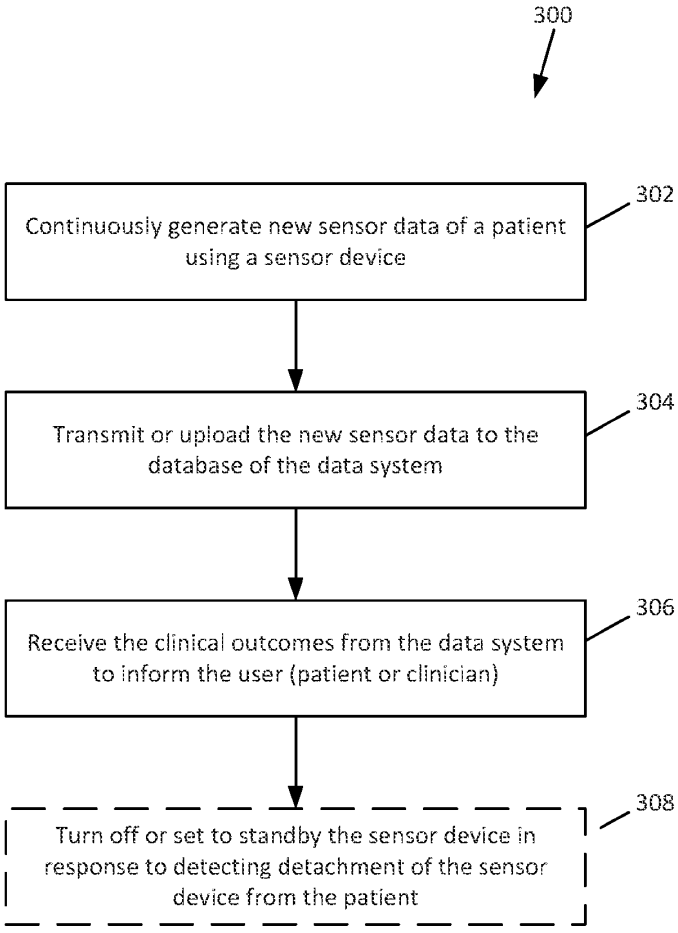
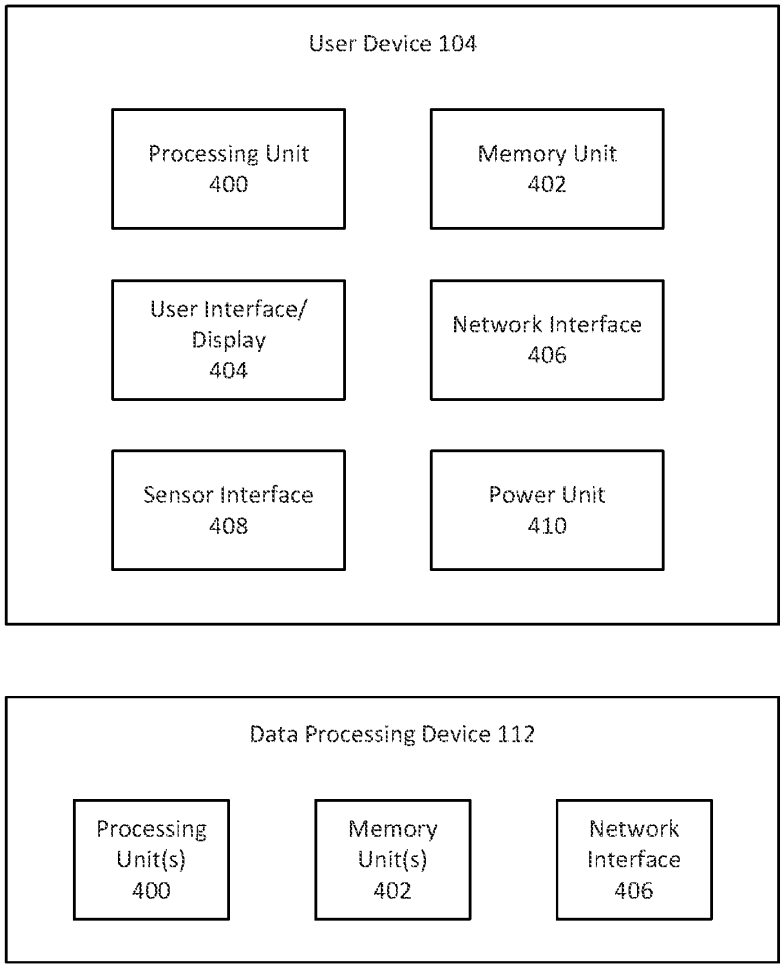

300
Continuously generate new sensor data of a patient using a sensor device
302
Transmit or upload the new sensor data to the database of the data system
304
Receive the clinical outcomes from the data system to inform the user (patient or clinician)
306
Turn off or set to standby the sensor device in response to detecting detachment of the sensor device from the patient
308

FIG. 4


User Device 104
Processing Unit
400
Memory Unit
402
User Interface/
Display
404
Network Interface
406
Sensor Interface
408
Power Unit
410
Data Processing Device 112
Processing
Unit(s)
400
Memory
Unit(s)
402
Network
Interface
406

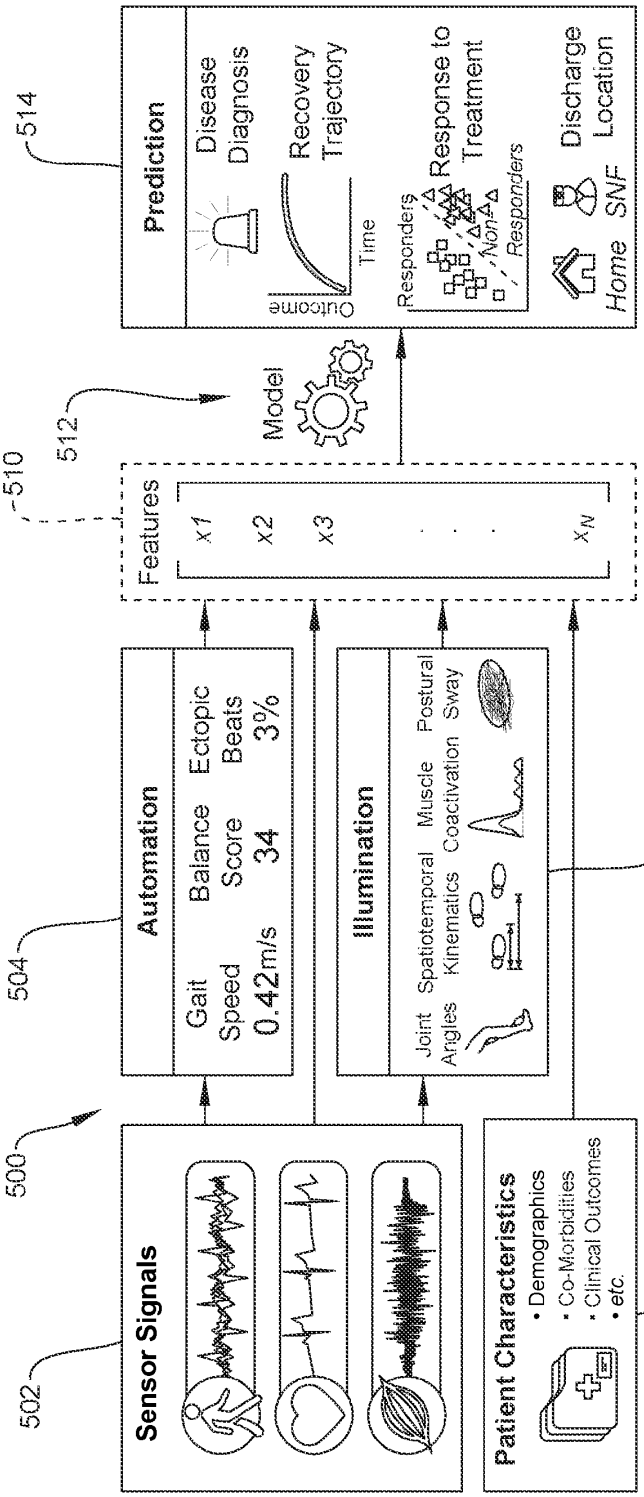

Sensor Signals
Patient Characteristics
• Demographics
• Co-Morbidities
• Clinical Outcomes
• etc.
Automation
Gait Speed
0.42 m/s
Balance Score
34
Ectopic Beats
3%
Illumination
Joint Angles
Spatiotemporal Kinematics
Muscle Coactivation
Postural Sway
Features
x1
x2
x3
xN
Model
Prediction
Disease Diagnosis
Recovery Trajectory
Outcome
Time
Responders
Non-Responders
Response to Treatment
Discharge Location
Home
SNF
500
502
504
506
508
510
512
514

FIG. 5

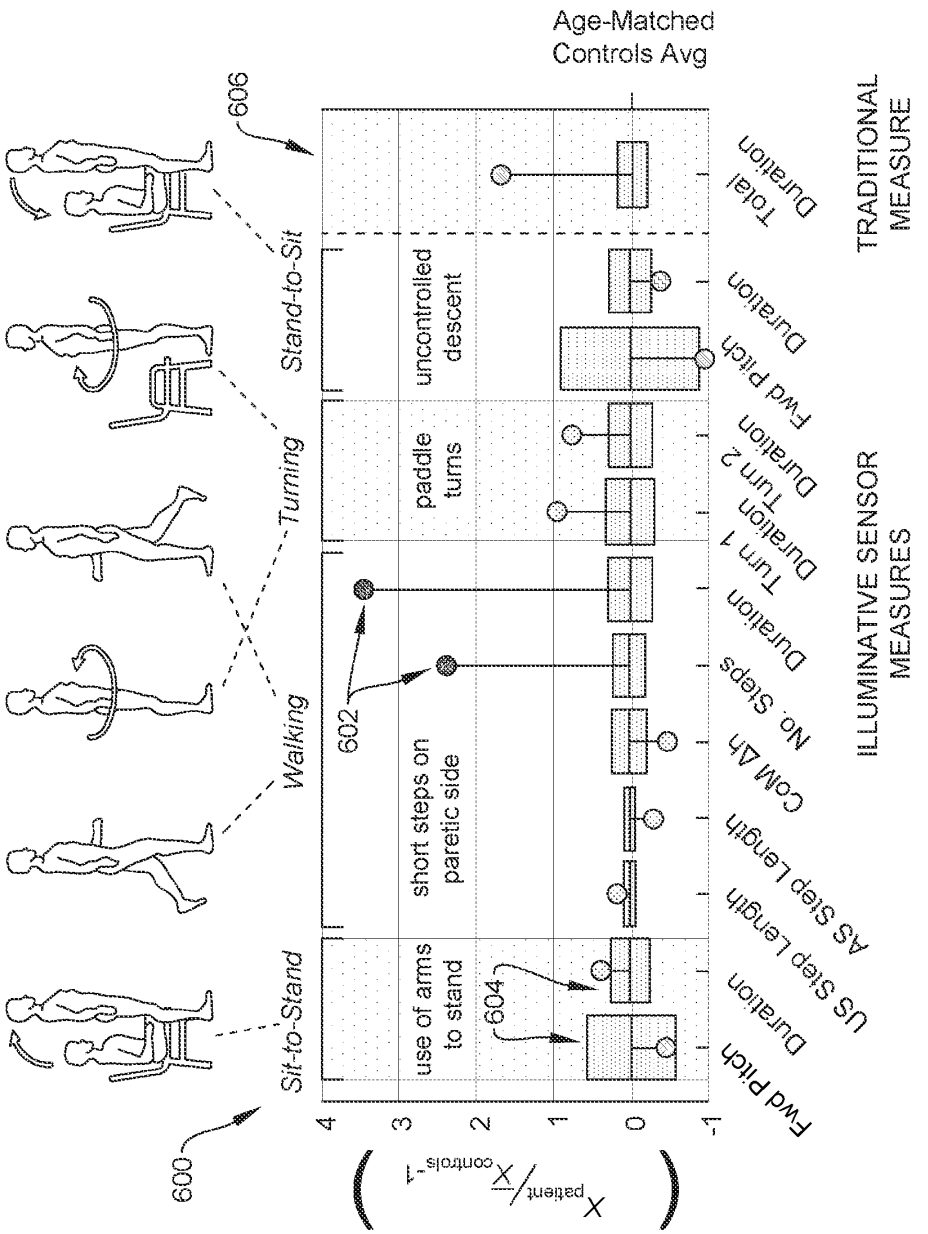

Age-Matched Controls Avg
606
600
602
604
Sit-to-Stand
Walking
Turning
Stand-to-Sit
use of arms to stand
short steps on paretic side
paddle turns
uncontrolled descent
Fwd Pitch Duration
US Step Length
AS Step Length
Com Δh
No. Steps
Turn 1 Duration
Turn 2 Duration
Fwd Pitch Duration
Total Duration
TRADITIONAL MEASURE
ILLUMINATIVE SENSOR MEASURES
4
3
2
1
0
-1
$\left(x_{patient} / \bar{x}_{controls} - 1 \right)$

FIG. 6

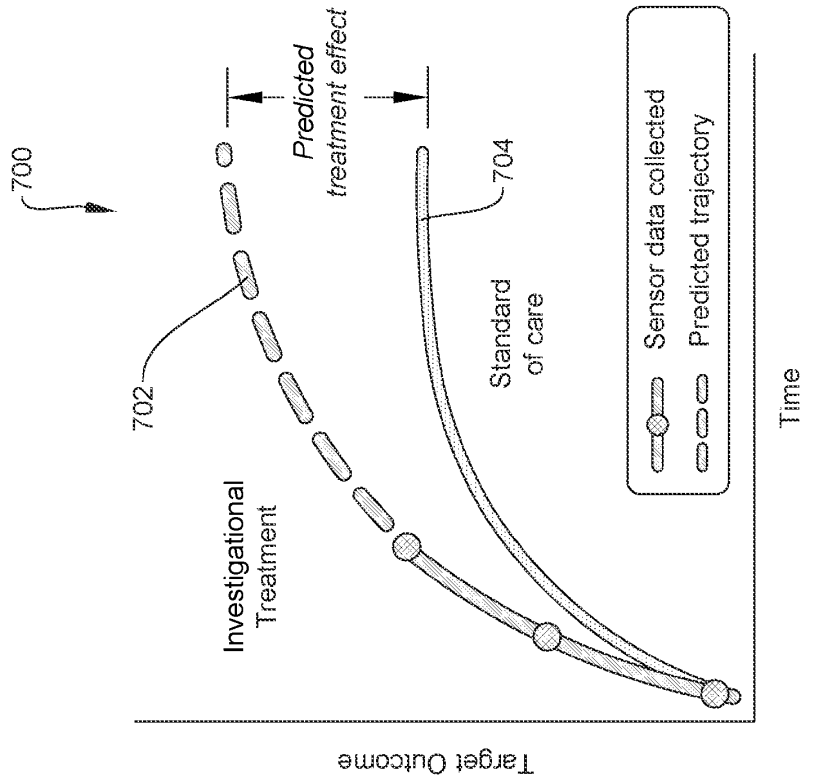

700
702
Predicted
treatment effect
704
Standard
of care
Investigational
Treatment
Sensor data collected
Predicted trajectory
Target Outcome
Time

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2025/019700

A. CLASSIFICATION OF SUBJECT MATTER

IPC: ***A61B 5/0205*** (2025.01); ***G16H 50/20*** (2025.01); ***G16H 50/70*** (2025.01); ***G16H 80/00*** (2025.01); *A61B 5/1455* (2025.01); *G16H 50/30* (2025.01)

CPC: ***A61B 5/0205; G16H 50/20; G16H 50/70; G16H 80/00;*** *A61B 5/1455; G16H 50/30*

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

See Search History Document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

See Search History Document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History Document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2012/0095352 A1 (TRAN) 19 April 2012 (19.04.2012) entire document, esp para [0017], [0020], [0027], [0170], [0177], [0186], [0193], [0205], [0206], [0221], [0289], [0313], [0409], [0437]	1-4, 17, 18
A	US 2017/0245759 A1 (Samsung Electronics Co., Ltd.) 31 August 2017 (31.08.2017) entire document	1-4, 17, 18
A	Dubkin et al. Wearable Sensors to Monitor, Enable Feedback, and Measure Outcomes of Activity and Practice. Current Neurology and Neuroscience Reports, 18(12) [online], pages 1-9, 01 December 2019 [retrieved on 2025.05.07]. Retrieved from the Internet: https://escholarship.org/content/qt0pb39933/qt0pb39933.pdf entire document	1-4, 17, 18
A	Smuck et al. The emerging clinical role of wearables: factors for successful implementation in healthcare. Digital Medicine [online], pages 1-8, December 20121 [retrieved on 2025.05.07]. Retrieved from the Internet: https://www.nature.com/articles/s41746-021-00418-3.pdf entire document	1-4, 17, 18

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
08 May 2025 (08.05.2025)	**16 May 2025 (16.05.2025)**

Name and mailing address of the ISA/US	Authorized officer
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