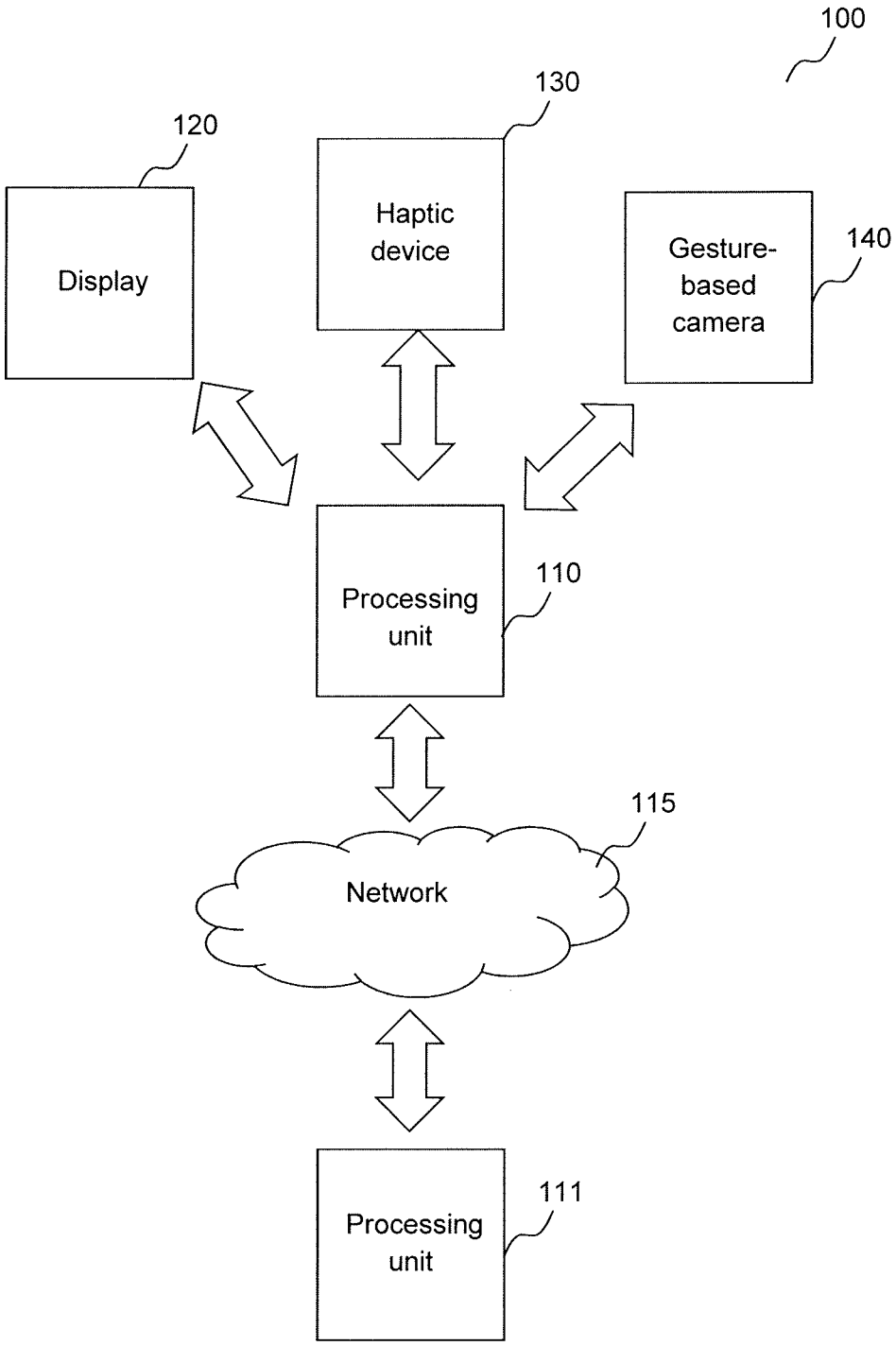
100
130
120
Haptic device
Display
Gesture-based camera
140
Processing unit
110
115
Network
Processing unit
111

Figure 1

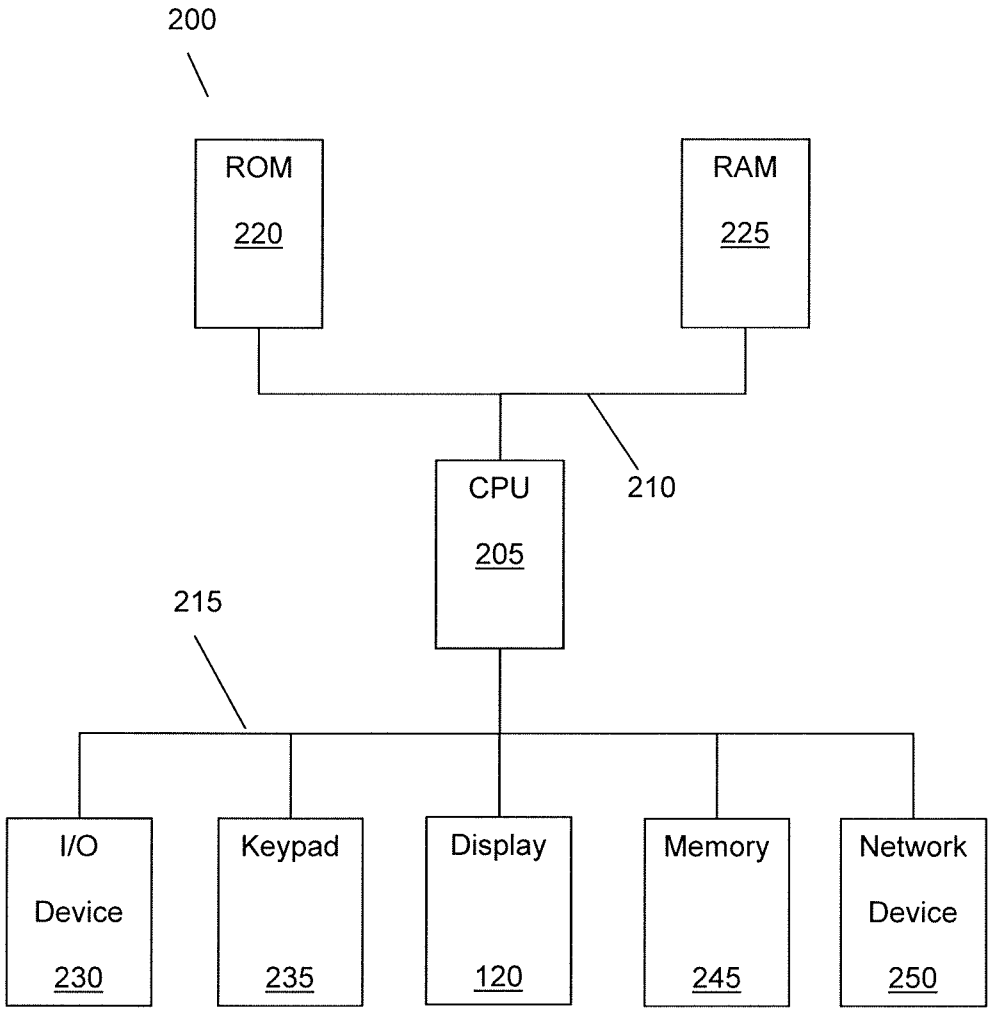
200
ROM
220
RAM
225
CPU
205
210
215
I/O
Device
230
Keypad
235
Display
120
Memory
245
Network
Device
250

Figure 2

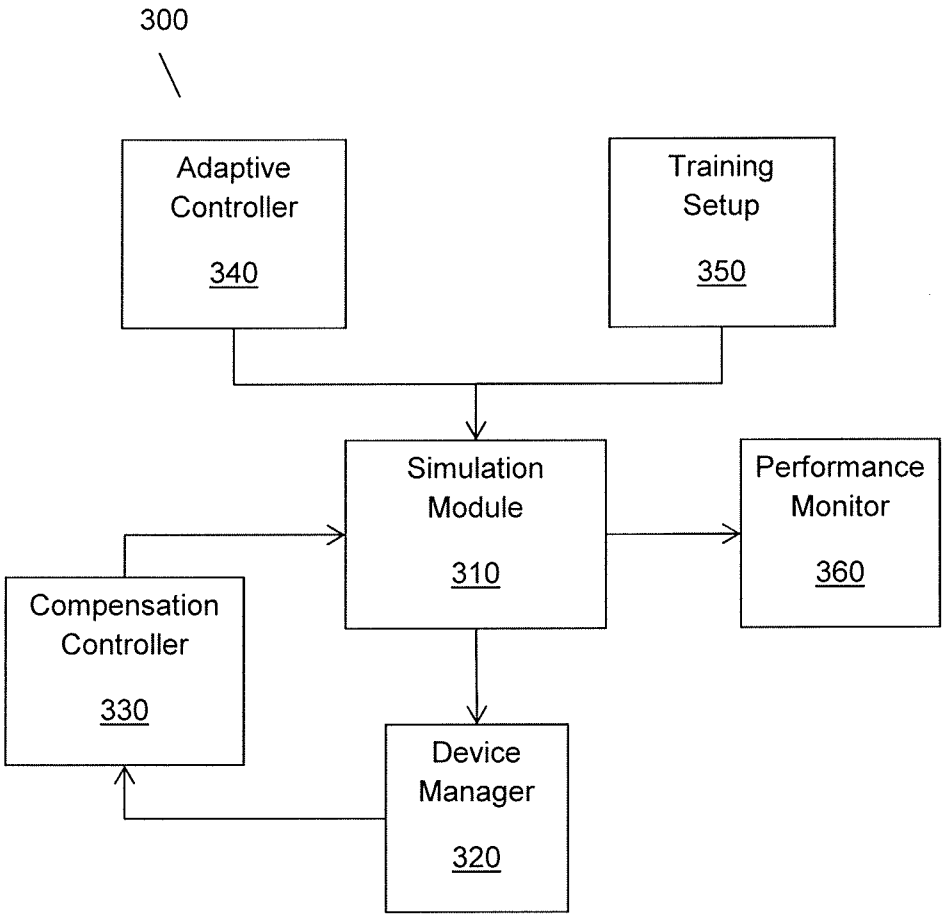
300
Adaptive Controller
340
Training Setup
350
Simulation Module
310
Performance Monitor
360
Compensation Controller
330
Device Manager
320

Figure 3

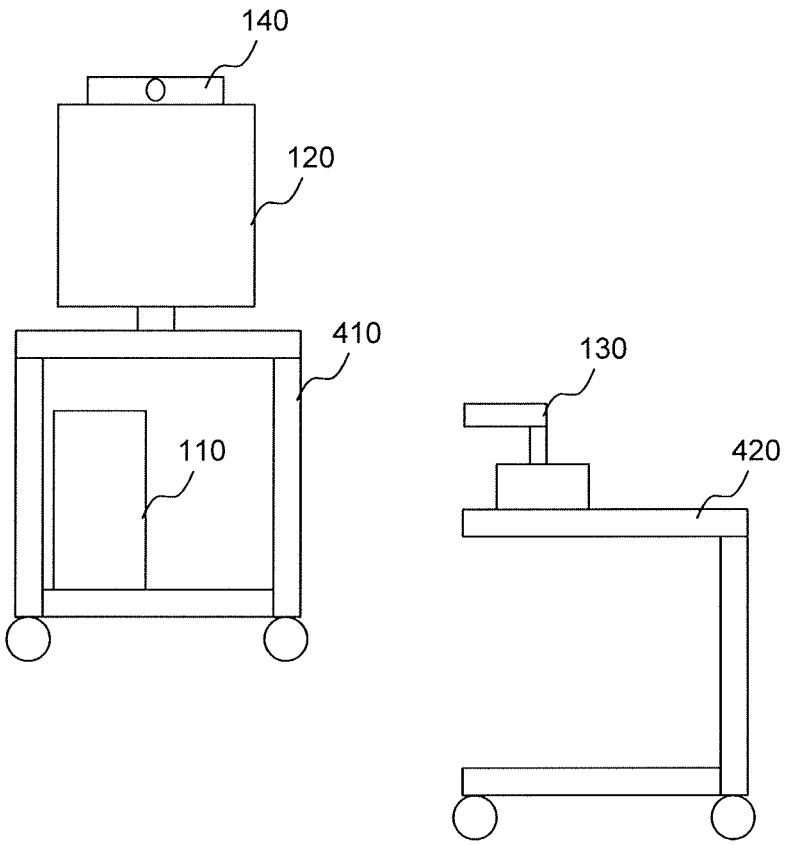

Figure 4

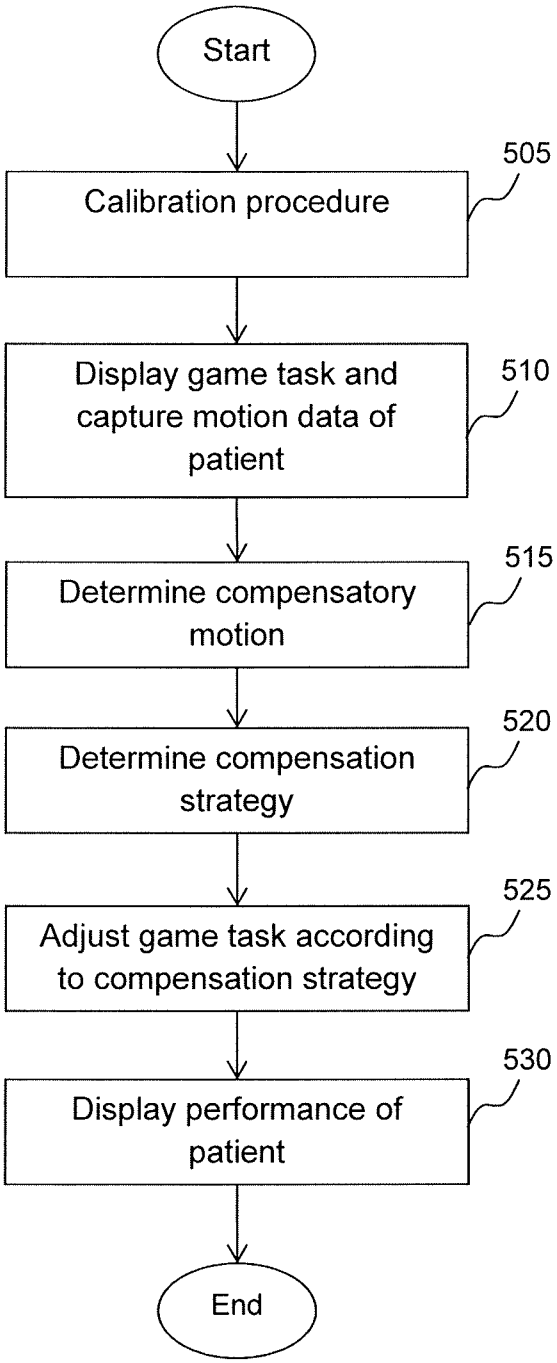
Start
500
505
Calibration procedure
Display game task and capture motion data of patient
510
Determine compensatory motion
515
Determine compensation strategy
520
Adjust game task according to compensation strategy
525
Display performance of patient
530
End

Figure 5

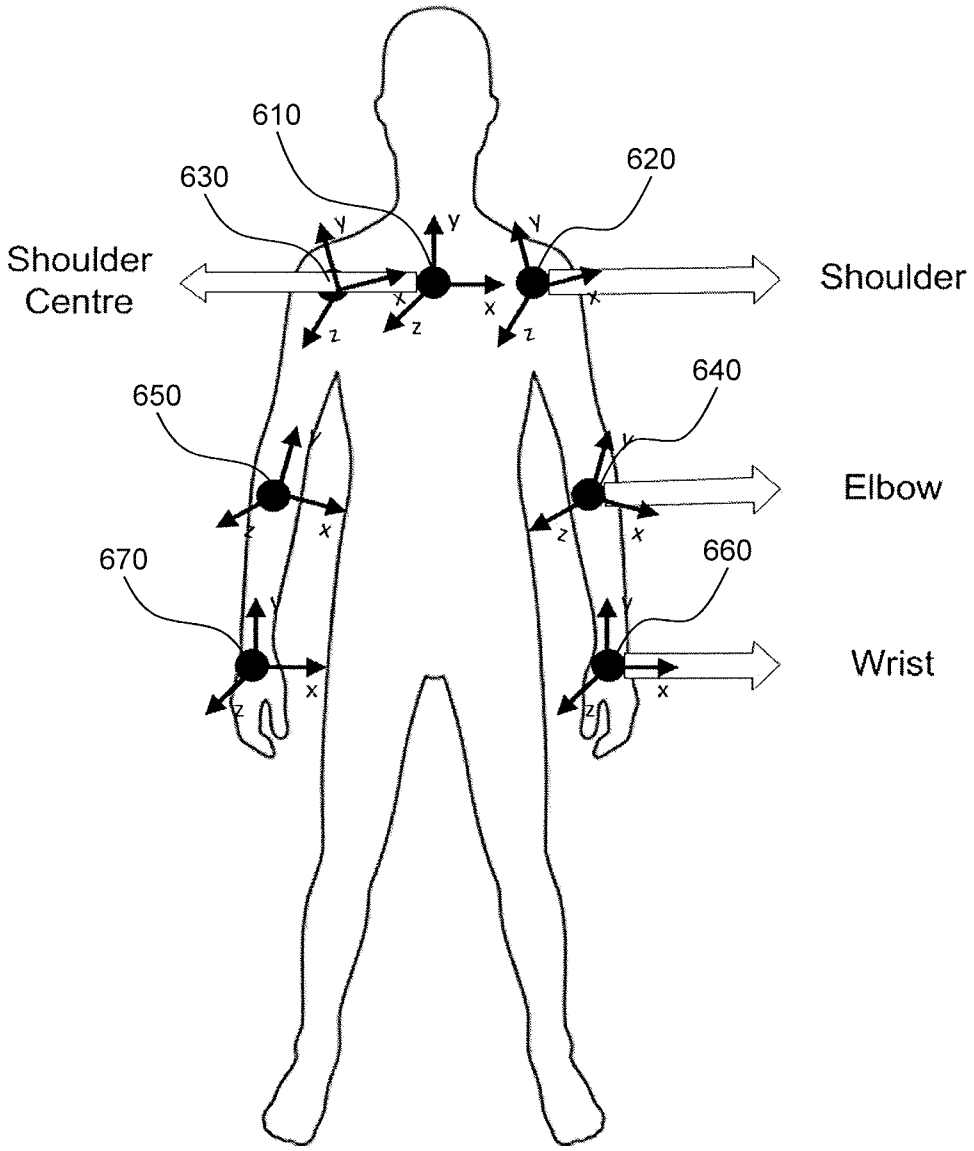
610
630
620
Shoulder Centre
Shoulder
640
650
Elbow
670
660
Wrist

Figure 6

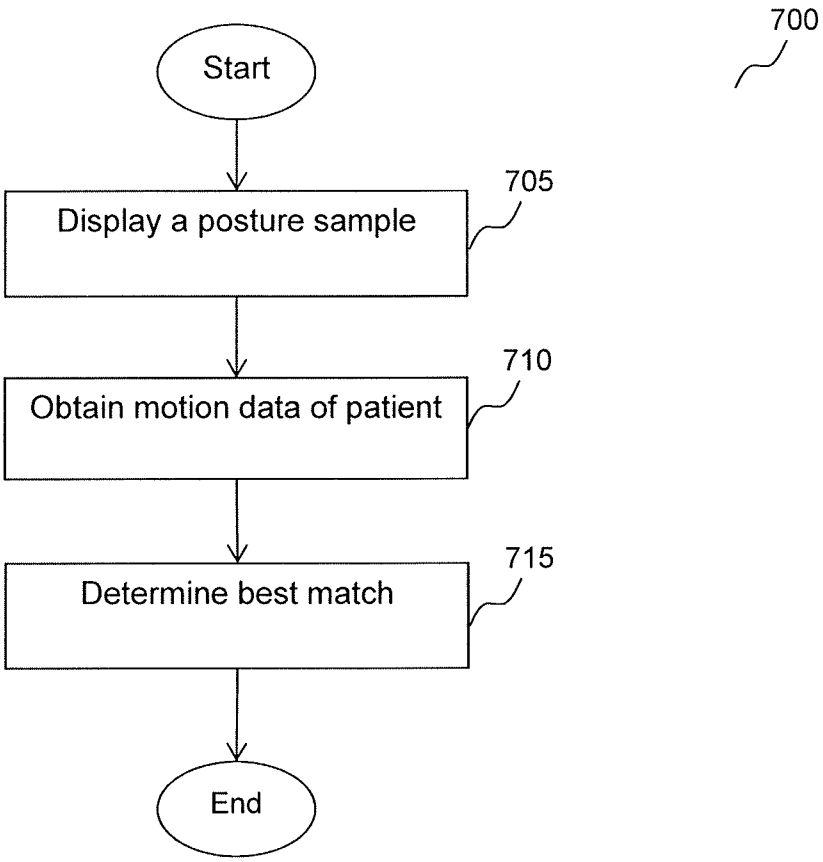
700
Start
705
Display a posture sample
710
Obtain motion data of patient
715
Determine best match
End

Figure 7

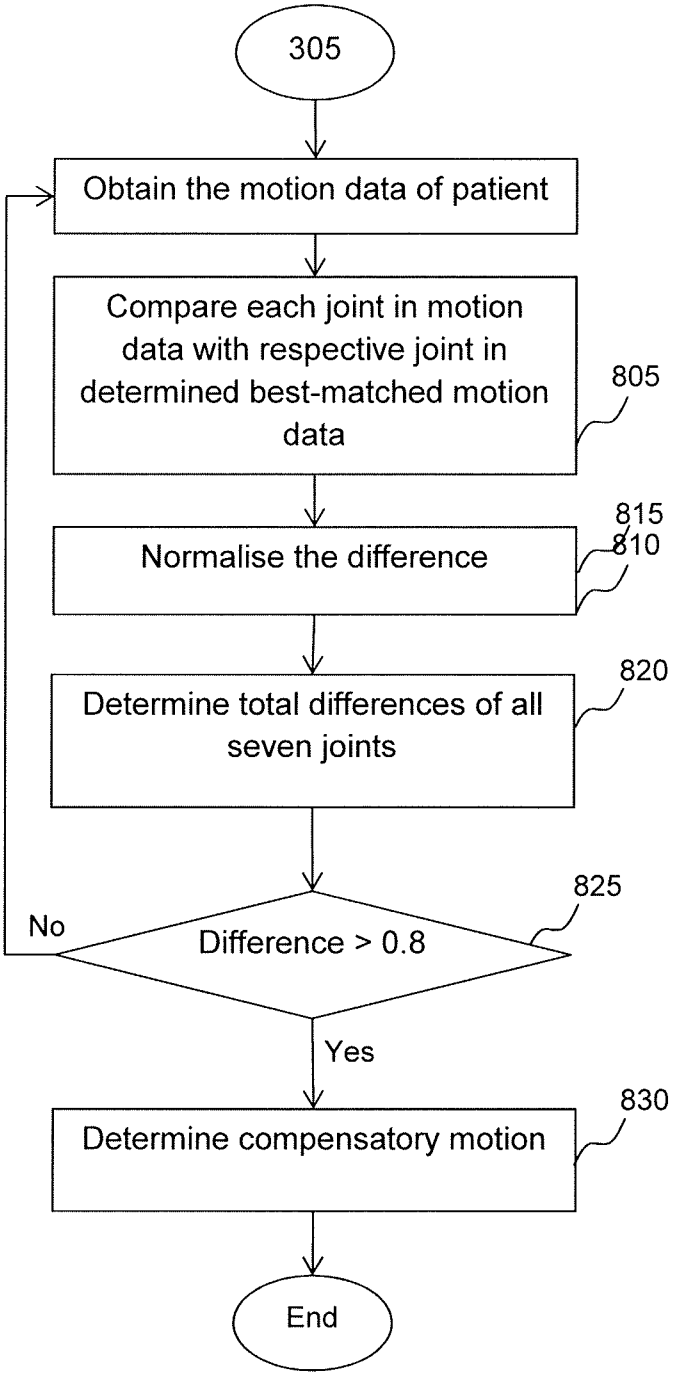
305
800
Obtain the motion data of patient
Compare each joint in motion data with respective joint in determined best-matched motion data
805
Normalise the difference
815
810
Determine total differences of all seven joints
820
825
No
Difference > 0.8
Yes
Determine compensatory motion
830
End

Figure 8

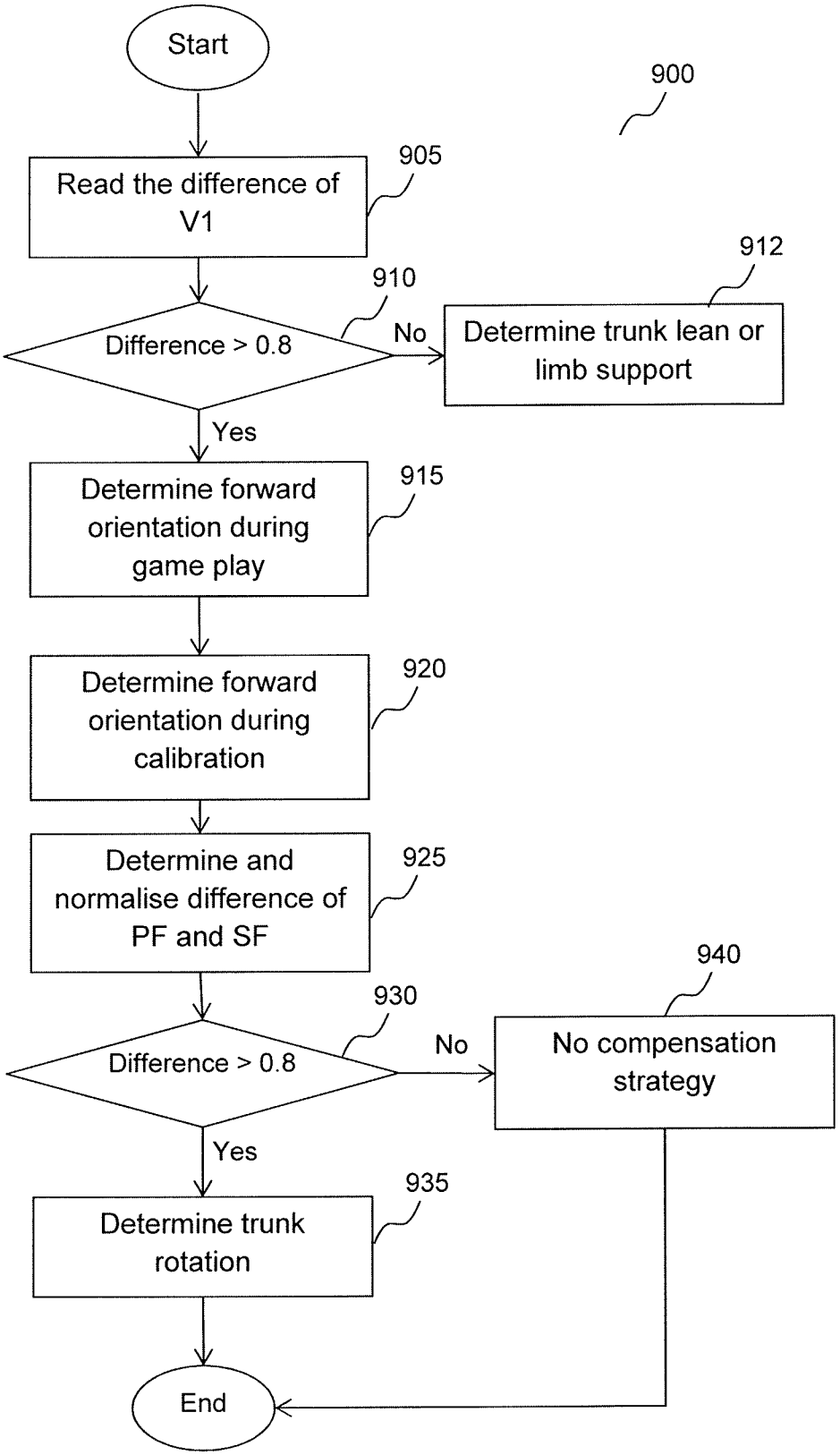
Start
900
Read the difference of V1
905
912
910
Difference > 0.8
No
Determine trunk lean or limb support
Yes
Determine forward orientation during game play
915
Determine forward orientation during calibration
920
Determine and normalise difference of PF and SF
925
940
930
Difference > 0.8
No
No compensation strategy
Yes
935
Determine trunk rotation
End

Figure 9

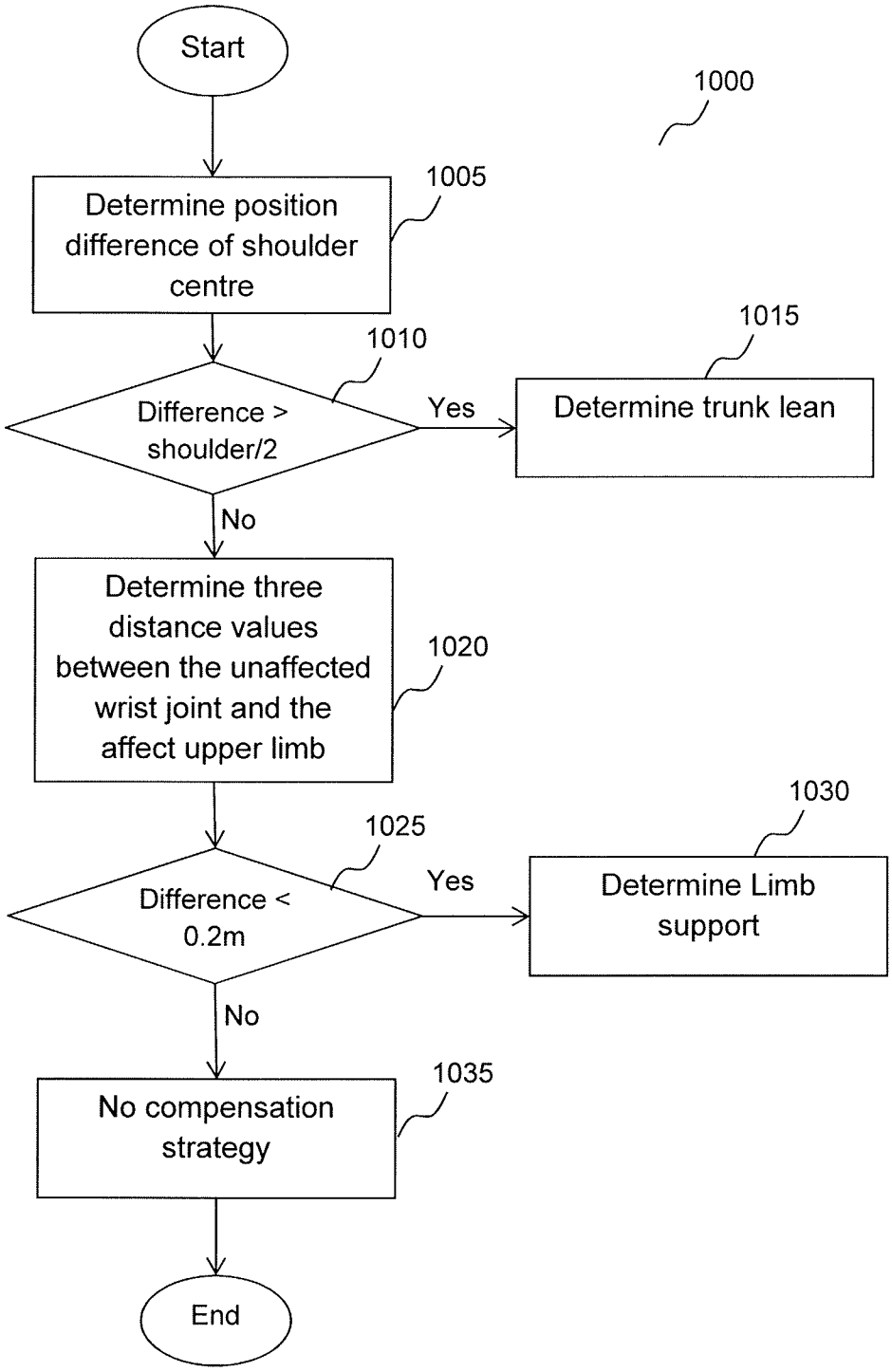
Start
1000
Determine position difference of shoulder centre
1005
1010
Difference > shoulder/2
Yes
1015
Determine trunk lean
No
Determine three distance values between the unaffected wrist joint and the affect upper limb
1020
1025
Difference < 0.2m
Yes
1030
Determine Limb support
No
No compensation strategy
1035
End

Figure 10

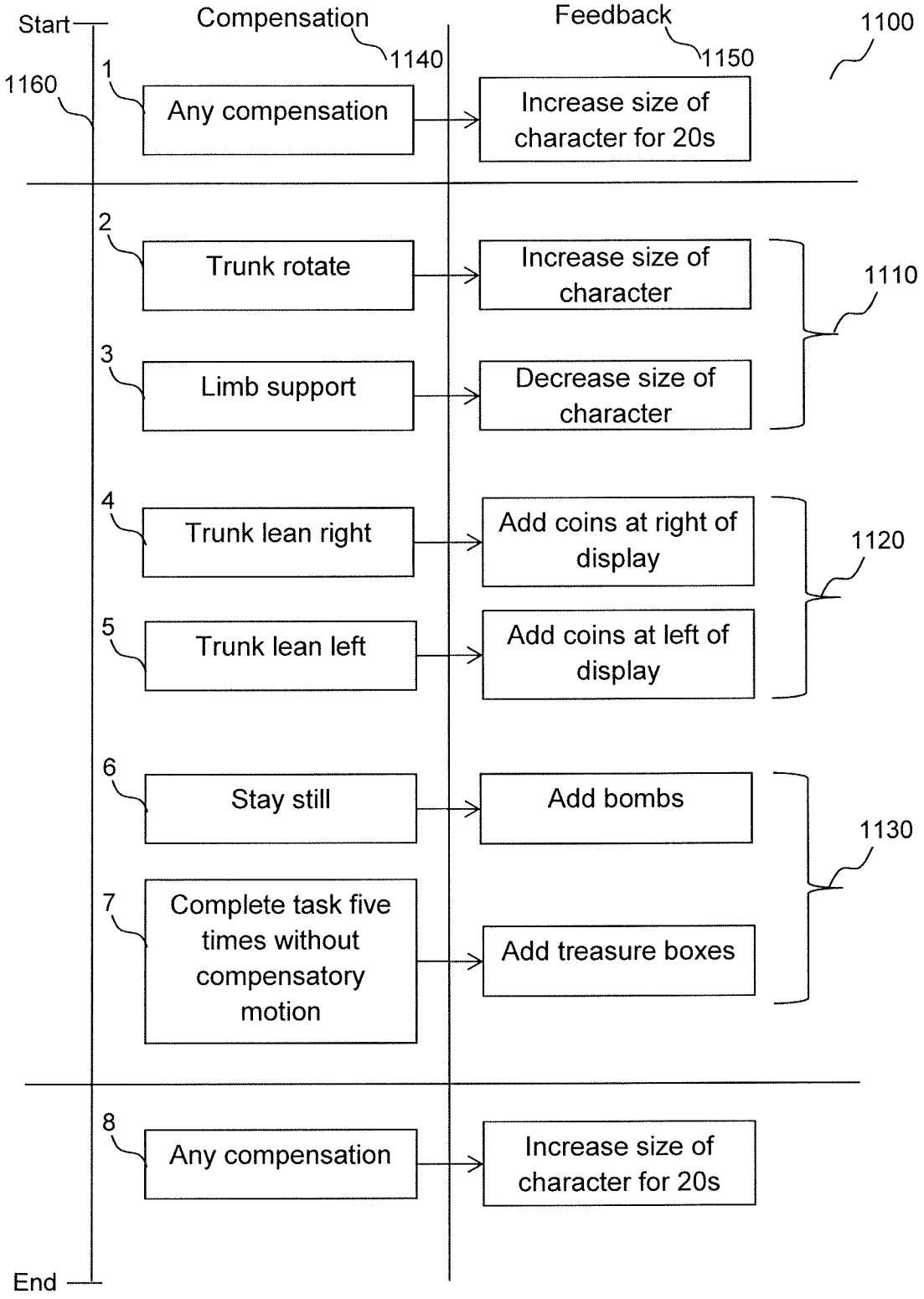
Start
Compensation
1140
Feedback
1150
1100
1160
1
Any compensation
Increase size of character for 20s
2
Trunk rotate
Increase size of character
1110
3
Limb support
Decrease size of character
4
Trunk lean right
Add coins at right of display
1120
5
Trunk lean left
Add coins at left of display
6
Stay still
Add bombs
1130
7
Complete task five times without compensatory motion
Add treasure boxes
8
Any compensation
Increase size of character for 20s
End

Figure 11

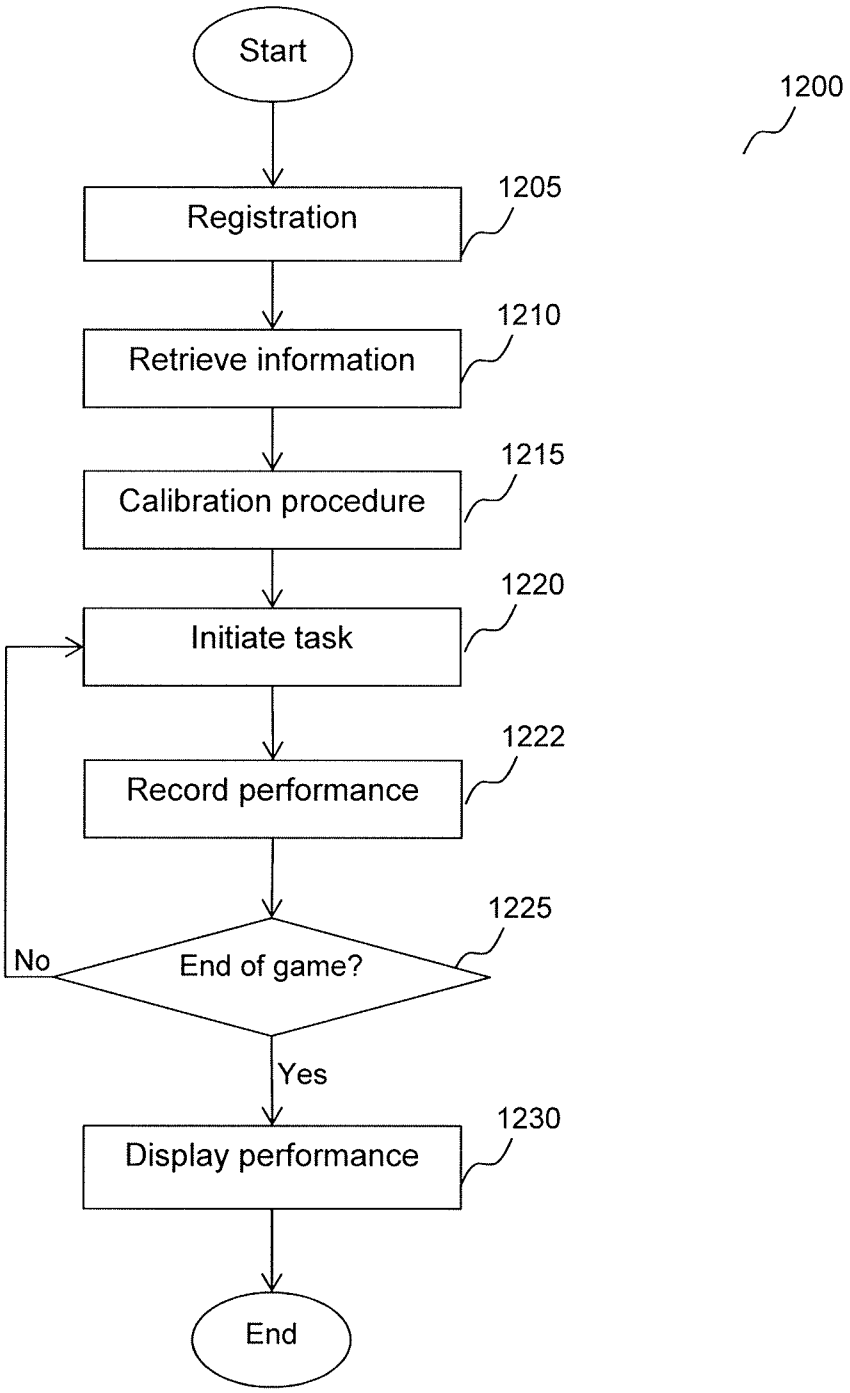
Start
1200
Registration
1205
Retrieve information
1210
Calibration procedure
1215
Initiate task
1220
Record performance
1222
End of game?
1225
No
Yes
Display performance
1230
End

Figure 12

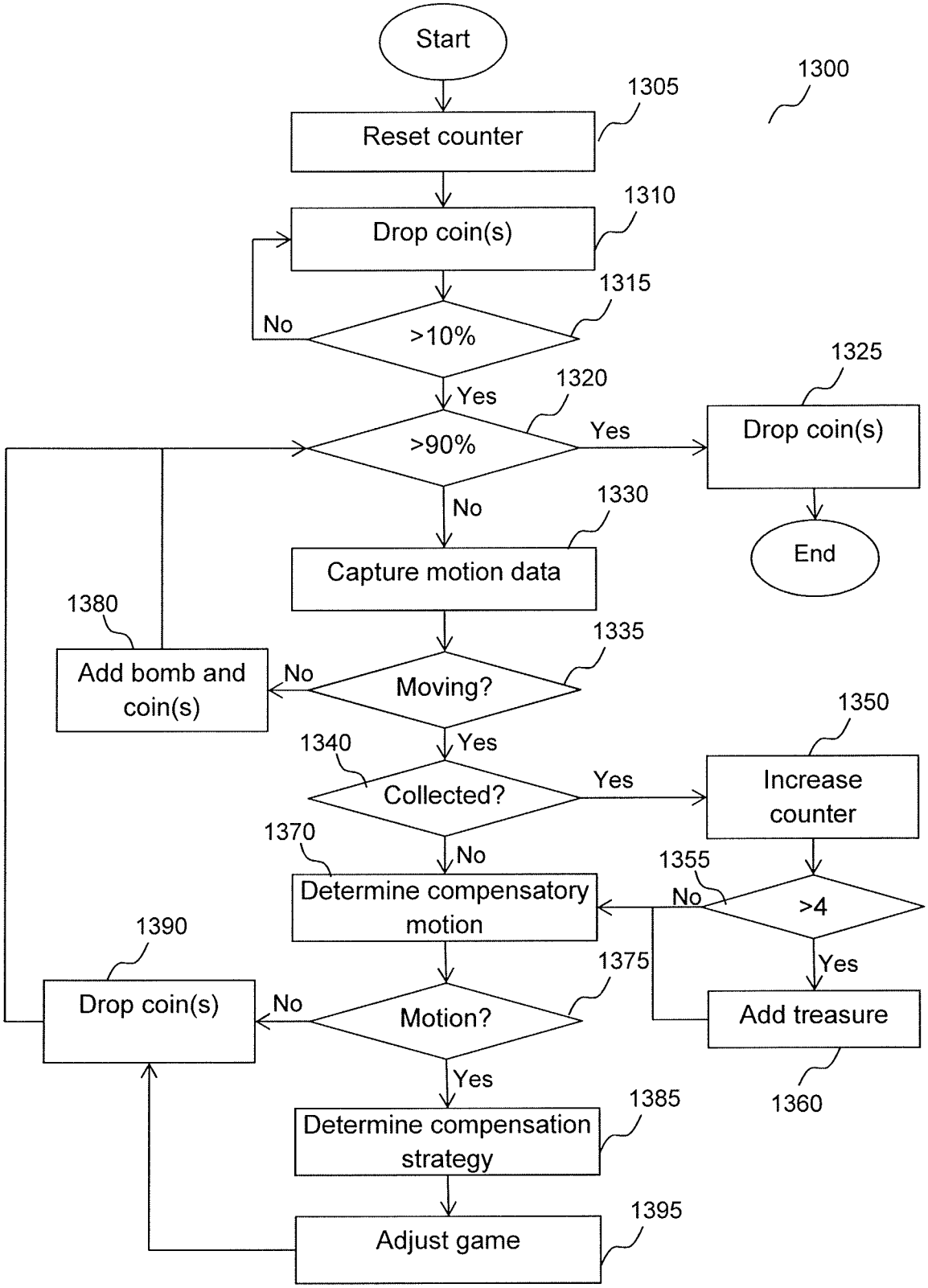
Start
1300
1305
Reset counter
1310
Drop coin(s)
1315
No
>10%
Yes
1320
>90%
Yes
1325
Drop coin(s)
End
No
1330
Capture motion data
1380
Add bomb and coin(s)
No
1335
Moving?
Yes
1340
Collected?
Yes
1350
Increase counter
1370
No
Determine compensatory motion
1355
No
>4
Yes
1390
Drop coin(s)
No
1375
Motion?
Add treasure
1360
Yes
1385
Determine compensation strategy
1395
Adjust game

Figure 13