US 20090209309A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2009/0209309 A1

(43) Pub. Date: Aug. 20, 2009

WU et al.

(54) **RACING GAME SIMULATOR**

(75) Inventors: **YU-KUANG WU**, TAIPEI COUNTY (TW); **TIEN-JUNG HUANG**, TAIPEI COUNTY (TW)

Correspondence Address:
ROSENBERG, KLEIN & LEE
3458 ELLICOTT CENTER DRIVE-SUITE 101
ELLICOTT CITY, MD 21043 (US)

(73) Assignee: **INTERNATIONAL GAMES SYSTEM CO., LTD.**, TAIPEI COUNTY (TW)

(21) Appl. No.: **12/367,724**

(22) Filed: **Feb. 9, 2009**

(30) **Foreign Application Priority Data**

Feb. 18, 2008 (TW) 097105544

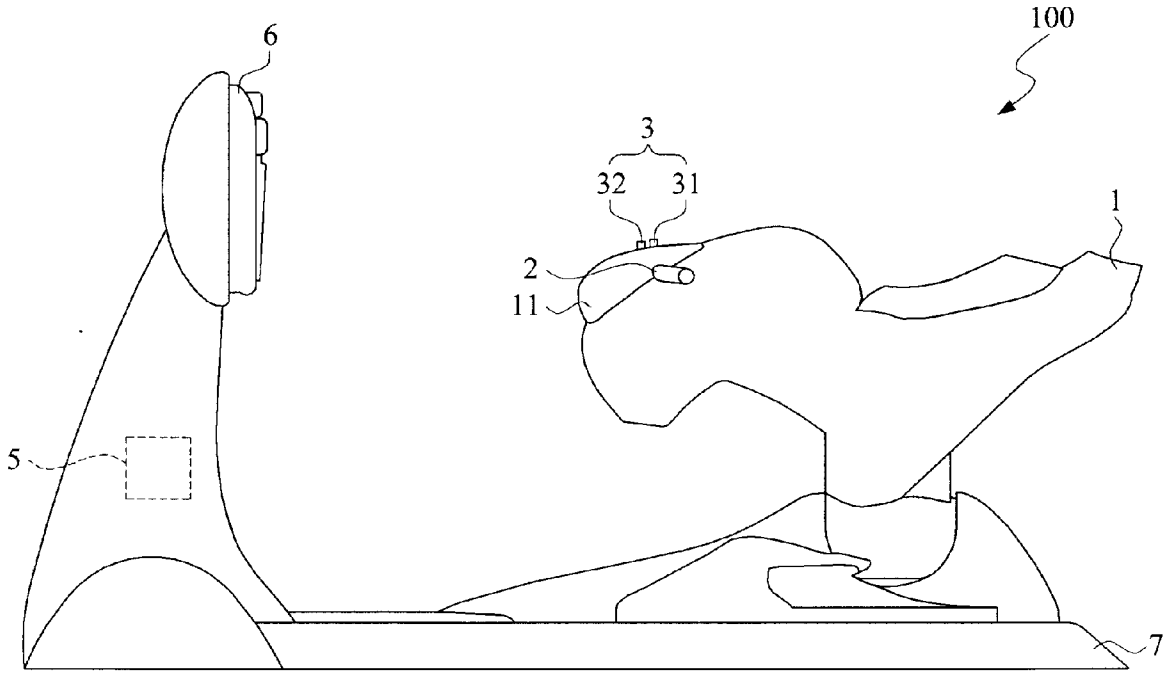
Publication Classification

(51) **Int. Cl.**
A63F 9/24 (2006.01)

(52) **U.S. Cl.** **463/6**

(57) **ABSTRACT**

A racing game simulator includes a driving seat, a detection module, a processing unit, and a display unit. The driving seat is to seat a rider, and the detection module is positioned at the driving seat to detect a rider's posture and thereby generate a detection signal responsive to rider's posture. The processing module receives the detection signal from the detection module and generates a responsive control signal to generate interactive simulation figures shown on the display unit.



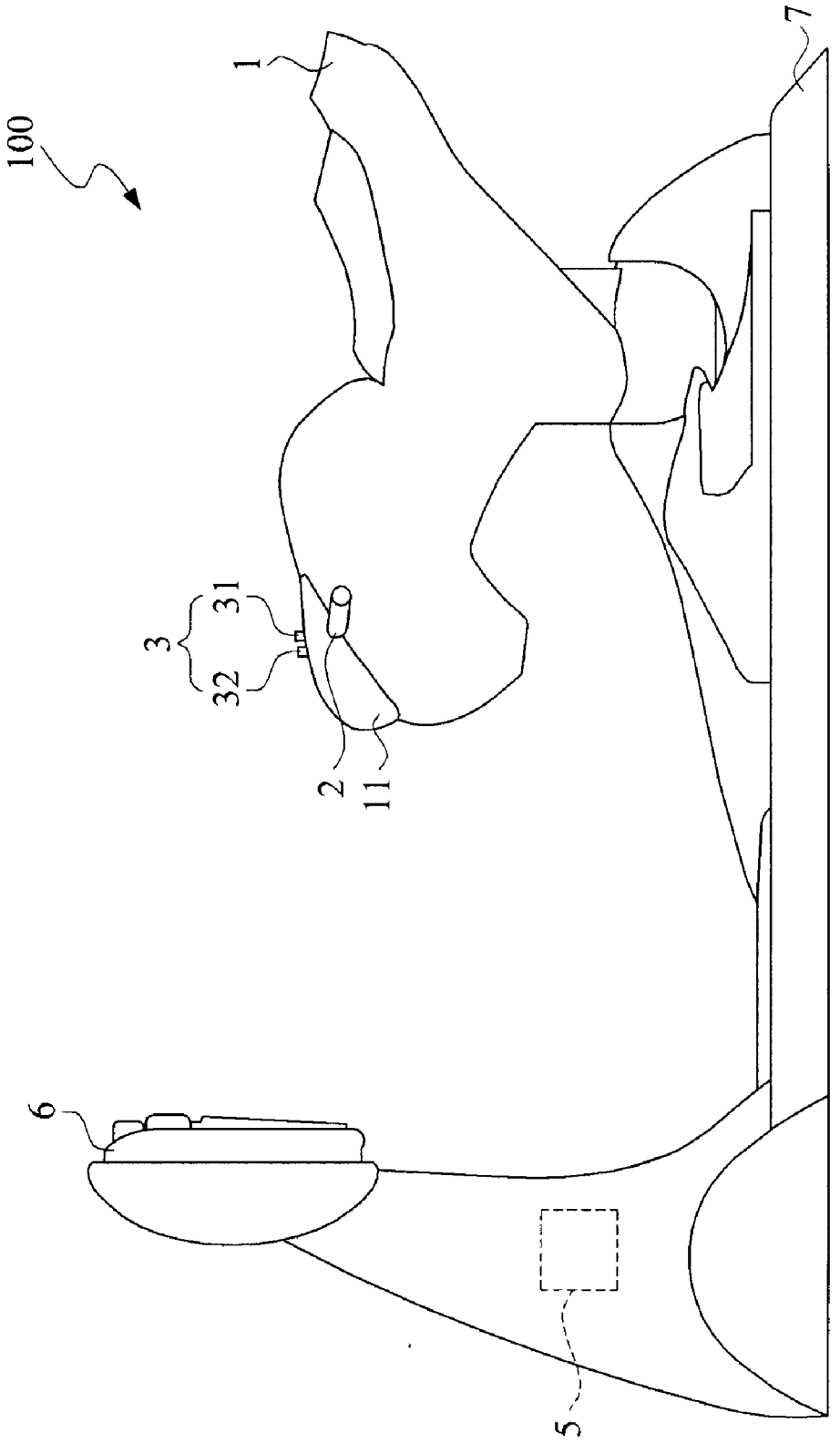


FIG.1

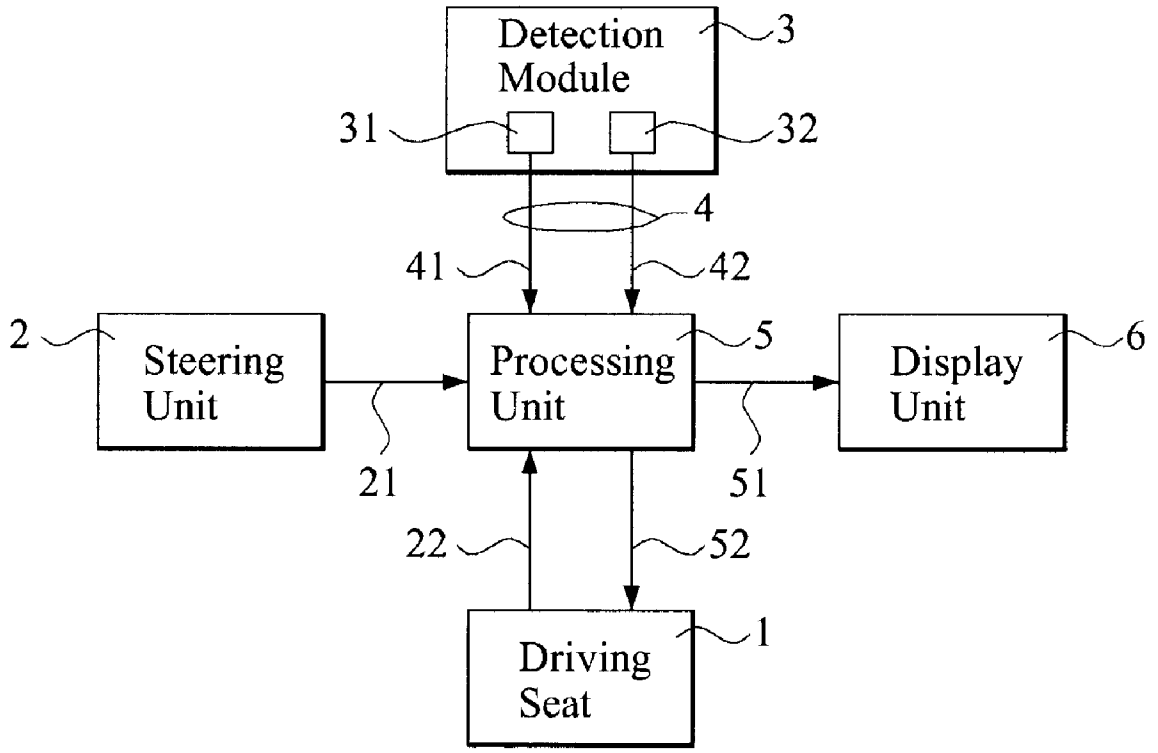

Detection Module
3
31
32
4
41
42
2
Steering Unit
Processing Unit
5
Display Unit
6
21
51
22
52
Driving Seat
1

FIG.2

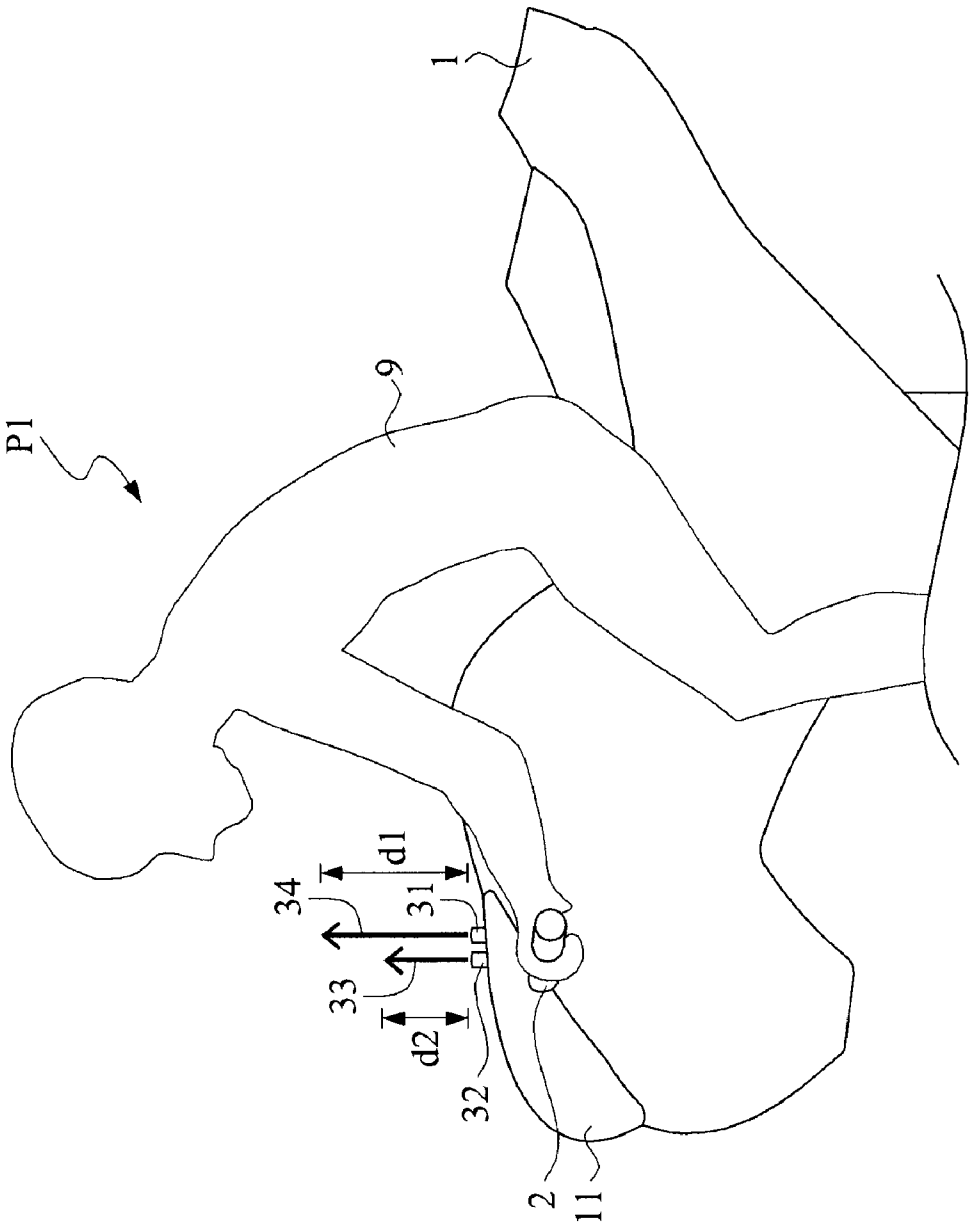


FIG.3

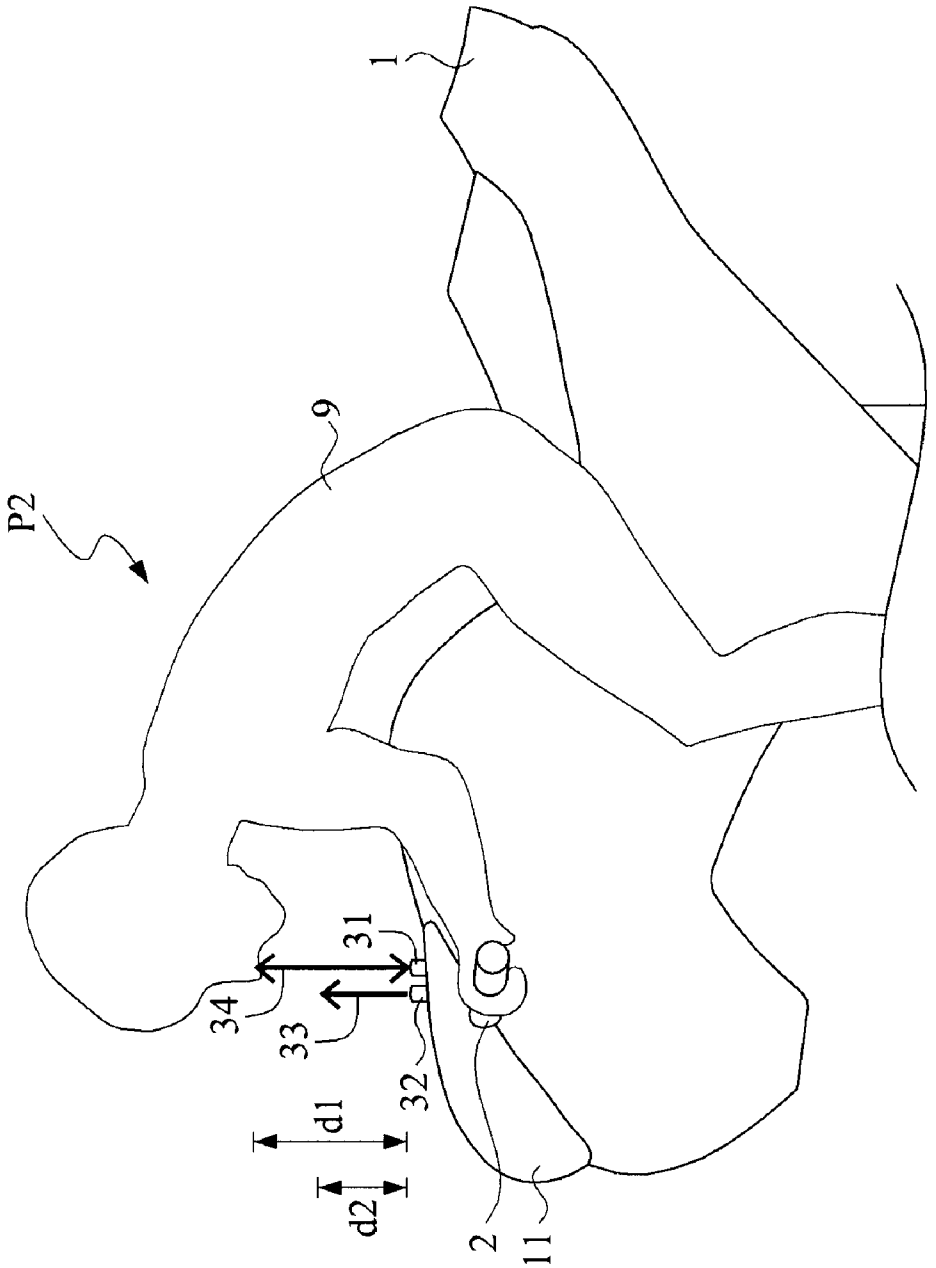


FIG.4

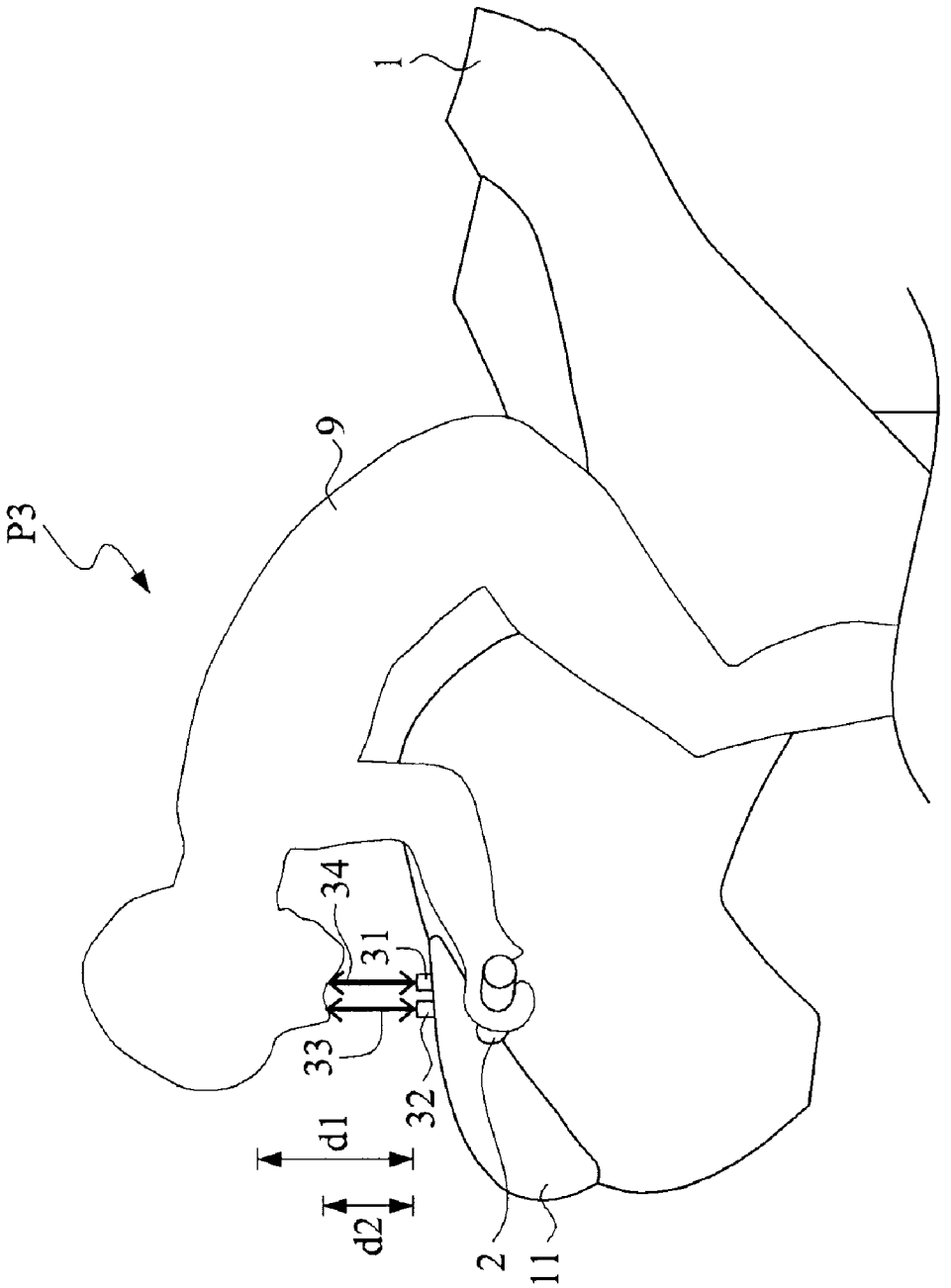


FIG.5

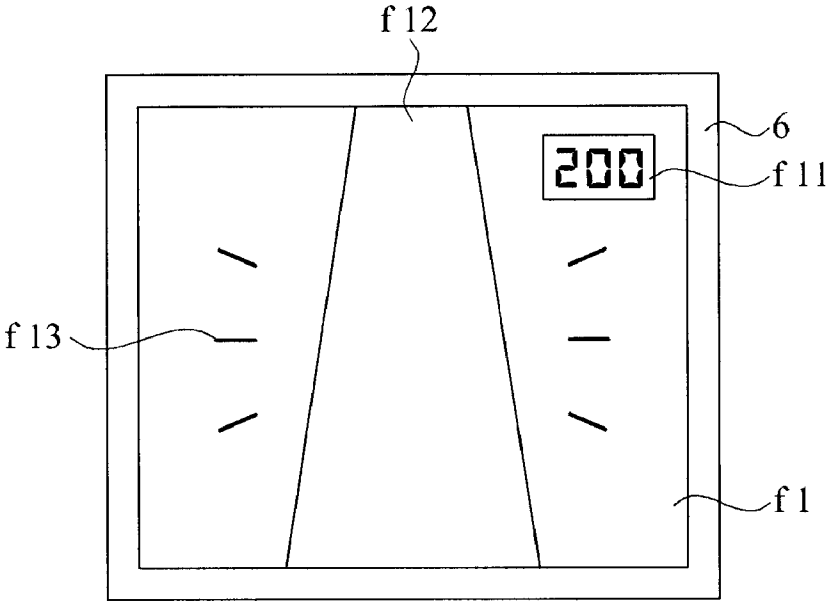


FIG.6

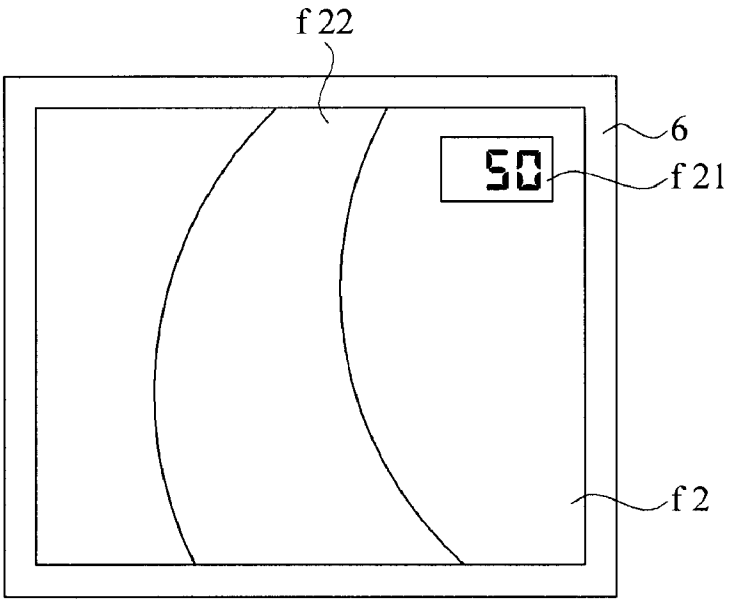


FIG.7

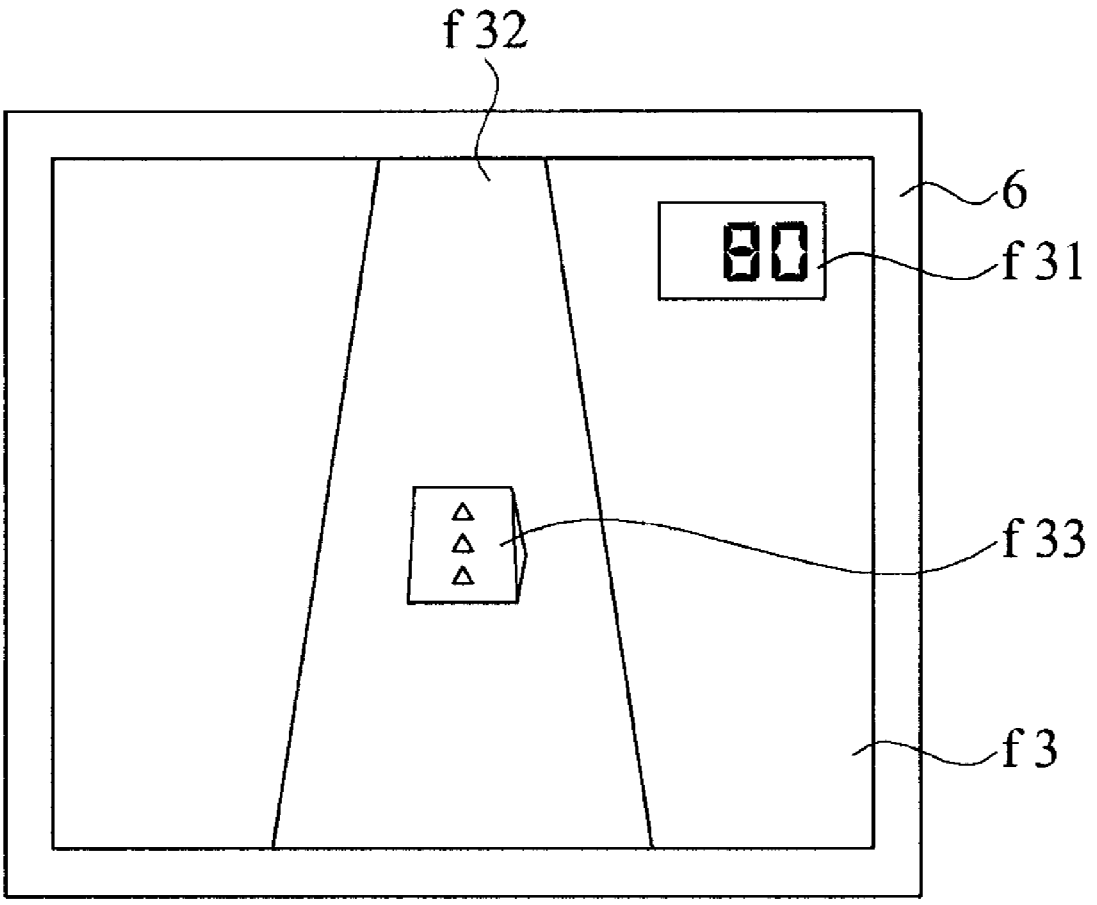


FIG.8

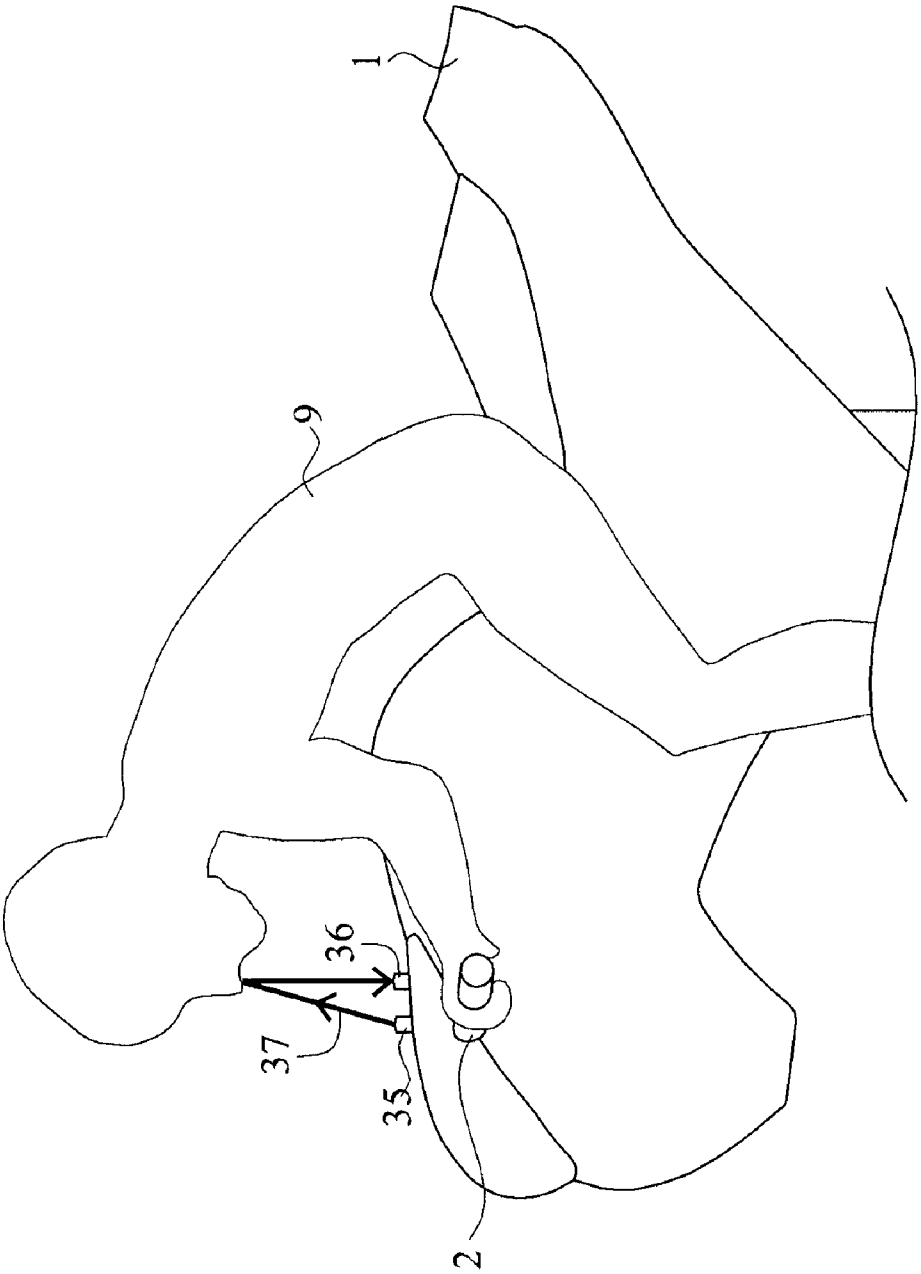


FIG.9

RACING GAME SIMULATOR

[0001] This application claims the benefit of Taiwan Patent Application Serial No. 097105544, filed Feb. 18, 2008, the subject matter of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a racing game simulator, and in particular to a simulator which uses a detection module to detect user's various postures so as to generate relevant responses accordingly.

[0004] 2. Description of Related Art

[0005] A conventional racing game simulator is known as a system which can simulate substantially a real vehicle with a similar driving seat and a similar steering unit. The racing game simulator generates a steering signal according to a change in a steering unit to a processing unit for progressing a simulation figure on a display unit accordingly.

[0006] To better mimic a real motorcycle, the conventional simulator usually has a driving seat and the steering unit resembling integrally to a frame structure and a handgrip of a genuine motorcycle. When a rider takes on the racing game simulator, the rider uses the handgrip to simulate accelerating, decelerating, turning and so on. However, in a real riding of the motorcycle, the rider usually poses different postures to accompany operations of accelerating, decelerating and turning. Because a conventional structuring of the conventional simulator provides only fixed frame structures, the posture changes due to various operations can only happen to the rider himself/herself, not to possibly rotate or shake the simulator. Therefore, to the rider, the riding on the simulator is always way far from a realistic riding on the road.

[0007] Thus, there is a need for the racing game simulator to overcome above disadvantages.

SUMMARY OF THE INVENTION

[0008] It is an object of the present invention to provide a racing game simulator which uses a detection module to detect rider's posture so as to generate a response in accordance with the rider's posture. Thus, the rider can feel a much more realistic driving environment.

[0009] The racing game simulator of the present invention includes a driving seat, a detection module, and a processing unit. The driving seat is to seat the rider, and the detection module is positioned at the driving seat and used to detect at least one position at where the rider is seated. The processing module which is electrically coupled with the detection module receives a detection signal from the detection module and further generates a control signal responsive to the detection signal so as to manipulate the racing game simulator. The detection module includes a plurality of infrared detection apparatuses to determine the posture of the rider and thus generate various detection signals.

[0010] Because the detection module can detect rider's posture through plural infrared detection apparatuses, a simulation figure on a display unit can be changed responsive to the detection signals. The rider can handle the racing game simulator in a much more realistic way and can feel himself within a more realistic simulated environment.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The present invention can be fully understood from the following detailed description and preferred embodiment with reference to the accompanying drawings, in which:

[0012] FIG. **1** is a lateral view of a racing game simulator according to the present invention;

[0013] FIG. **2** is a block diagram of a first embodiment of the rider simulator in accordance with the present invention;

[0014] FIG. **3** is a lateral view of a rider seated at position P**1** on the racing game simulator of FIG. **1**;

[0015] FIG. **4** is a lateral view of a rider seated at position P**2** on the racing game simulator of FIG. **1**;

[0016] FIG. **5** is a lateral view of a rider seated at position P**3** on the racing game simulator of FIG. **1**;

[0017] FIG. **6** illustrates a first embodiment of a simulation figure on the display unit of the racing game simulator according to the present invention;

[0018] FIG. **7** illustrates a second embodiment of the simulation figure on the display unit according to the present invention;

[0019] FIG. **8** illustrate a third embodiment of the simulation figure according to the present invention; and

[0020] FIG. **9** is a drawing showing a further embodiment of the detection module of the racing game simulator in accordance with the present invention, in which the detection module is an ultrasonic detection module.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] The following detailed description is of the best presently contemplated modes of carrying out the invention. This description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating general principles of embodiments of the invention. The scope of the invention is best defined by the appended claims.

[0022] Referring to FIGS. **1** and **2**, FIG. **1** illustrates a lateral view of a racing game simulator **100** according to the present invention, and FIG. **2** shows a block diagram implemented in the rider simulator **100** of the present invention. The rider simulator **100** includes a driving seat **1**, a detection module **3**, a processing unit **5**, and a display unit **6**.

[0023] The rider simulator **100** has a motor bike frame providing the driving seat **1** to seat a rider **9** thereon. The driving seat **1** has a forward position **11** which extends outward laterally two steering units **2** to two sides thereof. Preferably, the steering unit **2** can be a handgrip. The rider **9** uses the handgrips **2** to simulate turning, accelerating, and decelerating, from which a corresponding first handle signal **21** can be generated. The driving seat **1** is pivotally mounted on a frame **7** so that the rider **9** can make right lean or left lean. In addition, the driving seat **1** can be laterally tilted according to the rider's move, from which the driving seat **1** can generate a second handle signal **22**.

[0024] According to the first embodiment of the present invention, the detection module **3** is positioned at the top of the forward position **11** of the driving seat **1** and can also be an infrared detection module which emits infrared rays. The infrared rays of the detection module **3** are used to detect the

rider **9**. Responsive to distance between the detection module **3** and the rider **9**, the detection module **3** can generate a detection signal **4**.

[0025] The processing unit **5** is electrically coupled with the detection module **3**, the steering unit **2**, and the display unit **6**. The processing unit **5** is used to process simulation software and display an interactive simulator figure on the display unit **6**. As soon as the processing unit **5** receives the detection signal **4**, the first handle signal **21** or the second handle signal **22**, the processing unit **5** can accordingly generate a control signal **51** to control the rider simulator **100**. In addition, when the rider simulator **100** makes a turn or experiences an off-road, the processing unit **5** can generate the control signal **52** to move violently the driving seat **1** so as to meet these driving conditions.

[0026] Referring to FIGS. **3-5**, the detection module **3** in accordance with the first embodiment of the present invention also includes a first infrared detection apparatus **31** and a second infrared detection apparatus **32**. The first infrared detection apparatus **31** is used to generate a first infrared ray **33** and to detect a first distance d**1** between the first infrared detection apparatus **31** and the rider **9** (especially a predetermined area at the head of the rider). The second infrared detection apparatus **32** is used to generate a second infrared ray **34**, and can detect the second infrared ray **34** reflected from the rider **9** for being further utilized to generate a second detection signal **42** for determining a second distance d**2** between the rider **9** (especially another predetermined area at the head of the rider). As noted, d**1** is typically greater than d**2** in this embodiment. Well known in the art is that detection ranges of the d**1** and d**2** can be adjusted according to setups of the infrared detection apparatuses.

[0027] Referring to FIG. **3**, the rider **9** is seated by a posture P**1**, and the first infrared ray **33** and the second infrared ray **34** of the first infrared detection apparatus **31** and the second infrared detection apparatus **32** are upright emitted along the directions shown by the arrows, respectively. However, as shown, the head of the rider **9** is beyond the detection ranges of the first and second infrared detection apparatuses **31**, **32**, such that no reflected rays can be generated and thus both the first and second infrared detection apparatuses **31**, **32** detect no reflected signals to generate any detection signal.

[0028] Referring to FIG. **4**, the rider **9** is seated by a posture P**2** to hunch over the first infrared detection apparatus **31** and to lower his/her face into the detection range of the first infrared detection apparatus **31**, but still beyond the detection range of the second infrared detection apparatus **32**. By the posture P**2** of the rider **9**, the first infrared detection apparatus **31** can detect the rider **9** and generates the first detection signal **41**, while the second infrared detection apparatus **32** cannot detect the rider **9** so that no second detection signal can be generated.

[0029] Referring to FIG. **5**, the rider **9** is seated by a posture P**3** to hunch over both the first infrared detection apparatus **31** and the second infrared detection apparatus **32**. Apparently, the face of the rider **9** is within the detection ranges of the first infrared detection apparatus **31** and the second infrared detection apparatus **32**. Thus, the first infrared detection apparatus **31** and the second infrared detection apparatus **32** can detect the rider **9** so as to generate the first detection signal **41** and the second detection signal **42** respectively.

[0030] It is noted that the present invention is not limited to a racing game simulator with only two infrared detection apparatus, but the racing game simulator may be equipped with one or more than three infrared detection apparatus to meet requirement. According to description of the present invention, the first infrared detection apparatus **31** and the second infrared detection apparatus **32** may be implemented at different positions such as display unit or other frames instead of the driving seat **1**.

[0031] FIGS. **6-8** illustrate interactive simulator figures on the display unit **6** in accordance with the present invention. Referring to FIG. **6**, it shows an interactive simulation figure f**1** on the display unit **6** in accordance with the present invention. Referring also to FIGS. **1** and **2**, the interactive simulation figure f**1** has a speedometer f**11**, a road f**12**, and a special simulation effect f**13**. The speedometer f**11** illustrates a simulation speed of the rider simulator **100**, and the road f**12** is a straight road. The simulator effect f**13** can be a motion blur. It is presumed that an initial speed limit of the motorcycle in the racing game simulator **100** is 150 km/hr. When the rider **9** uses the steering unit **2** of the racing game simulator **100** to accelerate to reach a speedometer f**11** speed over 150 km/hr (170 km/hr for example) and hunches his/her body to a posture P**3** as shown in FIG. **5** so as to mimic a state of reducing drag cross the rider **9**, then the first infrared detection apparatus **31** and the second infrared detection apparatus **32** can detect the rider **9** and generate the first detection signal **41** and the second detection signal **42** respectively to the processing unit **5**. At this moment, the processing unit **5** can read the posture change of the rider **9** and his/her intent of acceleration, then speed limit of the motorcycle of the racing game simulator **100** can be elevated to a higher speed limit, such as 200 km/hr, and then a simulator effect f**13** for the rider **9** to feel a higher-speed riding can be simulated.

[0032] FIG. **7** illustrates another embodiment f**2** of the interactive simulation figure. Also referring to FIGS. **1** and **2**, the interactive simulation figure f**2** has a speedometer f**21**, a road f**22**, and a special simulation effect f**23**. The speedometer f**21** measures the simulation speed of the rider simulator **100**. The road f**22** ahead is a curved road. In general, while in turning right or turning left, the rider **9** should decelerate the racing game simulator **100** and have his/her body posed at a posture like the posture P**2** as shown in FIG. **4**. Thus, when the rider **9** rides under such a simulation environment illustrated in FIG. **7**, the rider **9** may turn and decelerate so that the rider's center of gravity can be properly shifted. Meanwhile, the first infrared detection apparatus **31** can detect the rider **9** but the second infrared detection apparatus **32** cannot detect the rider **9** so that only the first detection signal **41** is generated and transmitted to the processing unit **5**. By providing the present simulator, riding along the road mimicked by the interactive simulation figure f**2** will be much smoother when the first detection signal **41** is processed by the processing unit **5**.

[0033] FIG. **8** illustrates a third embodiment f**3** of the interactive simulation figure. Also referring to FIGS. **1** and **2**, the interactive simulation figure f**3** has a speedometer f**31**, a road f**32**, and a bump f**33**. The speedometer f**31** measures the simulation speed of the racing game simulator **100**. If the rider **9** wants to ride over the bump f**33**, he/she should accelerate, pull back his/her body a little bit (say, from posture P**2** to P**1**, FIG. **4** and FIG. **3** respectively), and pull up the head of the motorcycle (the racing game simulator **100**) so as to surpass the bump f**33**. In the detection of the simulation, as the simulator **100** detects that firstly (1) the rider **9** is shifted from posture P**2** to posture P**1**, (2) the motorcycle is accelerated and the head thereof feels a pull-up at the same time, and finally (3) the posture of the rider **9** is shifted back to posture

P2 again, then it can be defined by the simulator **100** that the riding surpassing the bump f**33** has been completed. Correspondingly, the interactive simulation figure f**3** can show the motorcycle of the racing game simulator **100** jumps up and down so as to simulate a surpassing maneuvering.

[0034] As described above and according to specification of different simulators, other applications are available and inferred from spirit of the present invention so that other applications are within the scope of the claims. The present invention provides a motorbike simulator, and can be applied to other simulators such as hang gliders, yachts, and sledges. The driving seat **1**, the steering unit **2**, and the detection module **3** of the present invention are modified in responsive to different simulators and within the scope of the present invention.

[0035] Referring to FIG. **9**, it illustrates another embodiment of the detection module in accordance with the present invention. Unlike the previous embodiment, the detection module **3** may be an ultrasonic detection module and includes an emitting module **35** and a receiving module **36** (to replace with the first infrared detection apparatus **31** and the second infrared detection apparatus **32** as shown in FIGS. **1** and **2**). The emitting module **35** is used to emit an ultrasonic wave **37**, and the receiving module **36** is used to receive the ultrasonic wave **37**. When the emitting module **35** emits the ultrasonic wave **37** and hits the rider **9**, the ultrasonic wave **37** is reflected by the rider **9** and received by the receiving module **36**. Because the speed of the ultrasonic wave **37** at air is known, a time duration between the receiving and the emitting of the ultrasonic wave **37** can be obtained, and thereby the distance between the face of the rider **9** and the detection module **3** can be also obtained.

[0036] Accordingly, by providing the racing game simulator of the present invention, the detection module to detect user's posture (especially the face position) can be applied so as to generate a response correspondent to user's posture during the simulation. Thus, a realistic driving environment can be better mimicked and also a more relevant simulator movement can be feedback to the rider.

[0037] While the invention has been described with reference to the preferred embodiments, the description is not intended to be construed in a limiting sense. It is therefore contemplated that the appended claims will cover any such modifications or embodiments as may fall within the scope of the invention defined by the following claims and their equivalents.

What is claimed is:

1. A racing game simulator, comprising:

a driving seat for seating a rider;

a detection module, positioned at the driving seat to generate at least an infrared ray for determining spacing between the detection module and the rider so as to generate at least a detection signal according to the spacing; and

a processing unit, electrically coupled with the detection module to receive the detection signal therefrom and thereby to generate a control signal for controlling the racing game simulator.

2. The racing game simulator according to claim **1**, wherein said detection module further comprising:

a first infrared detection apparatus for generating a first infrared ray of said at least a detection signal for determining a first distance of said spacing between the first infrared detection apparatus and the rider so as to generate a first detection signal according to the first distance; and

a second infrared detection apparatus for generating a second infrared ray of said at least a detection signal for determining a second distance of said spacing between the second infrared detection apparatus and the rider so as to generate a second detection signal according to the second distance.

3. The racing game simulator as claimed in claim **2**, wherein said first distance is longer than said second distance.

4. The racing game simulator as claimed in claim **2**, further comprising a steering unit positioned at said driving seat and coupled with said processing unit, the steering unit generating a steering signal to be handled by said processing unit.

5. The racing game simulator as claimed in claim **4**, wherein said steering unit is a handgrip.

6. The racing game simulator as claimed in claim **1**, further comprising a display unit electrically coupled with said processing unit for displaying an interactive figure according to said control signal from said processing unit.

7. A racing game simulator, comprising:

a driving seat for seating a rider;

an ultrasonic detection module, positioned at the driving seat, further comprising:

an emitting module for emitting an ultrasonic wave; and

a receiving module for receiving the ultrasonic wave to determine a distance between the ultrasonic detection module and the rider so as to generate a respective detection signal; and

a processing unit, electrically coupled with the ultrasonic detection module to receive the detection signal therefrom and thereby to generate a control signal for controlling the racing game simulator.

8. The racing game simulator as claimed in claim **7**, further comprising a steering unit positioned at said driving seat and coupled with said processing unit, the steering unit generating a steering signal to be handled by said processing unit.

9. The racing game simulator as claimed in claim **8**, wherein said steering unit is a handgrip.

10. The racing game simulator as claimed in claim **7**, further comprising a display unit electrically coupled with said processing unit for displaying an interactive figure according to said control signal from said processing unit.

* * * * *