Title: A VIDEO GAME CONTROLLER

Fig. 1
Abstract: A video game controller has a main portion that can receive a person that interacts with the controller. The main portion has a support that enables tilting of the main portion relative to a ground face in any direction towards which the person shifts his weight, and the controller is adapted to provide a report representative of the tilt to a video game that it is controlling.
A VIDEO GAME CONTROLLER

TECHNICAL FIELD

[001] Embodiments of the invention relate to a video game controller for interacting with a video game.

BACKGROUND

[002] A video game controller may be designed to permit a person to perform a simulated physical exercise with the video game he is interacting with. Such a physical exercise may include aerobic exercise, anaerobic exercise, balance (etc.); and the video game with which the person interacts may be used to promote the physical exercise.

[003] US Patent No. 5645513 describes an exercise apparatus that can be used in conjunction with a personal computer or television video game. The exercise apparatus is designed to provide entertainment and a positive mental distraction from the indoor physical exercising experience, by enabling multi-sensor feedback between the exerciser and a video game.

SUMMARY

[004] The following embodiments and aspects thereof are described and illustrated in conjunction with systems, tools and methods which are meant to be exemplary and illustrative, not limiting in scope.

[005] In an embodiment there is provided video game controller that comprises a main portion that is adapted to receive a person interacting with the controller, the
main portion comprises a support that is adapted to facilitate tilting of the main portion relative to a ground face above which it is located and the controller being adapted to provide a report representative of the tilt to a video game being controlled, wherein the tilting of the main portion is in any direction towards which the person shifts his weight.

Typically, the support tilts together with the main portion.

Preferably, the full weight of the person interacting with the controller bears on the main portion of the controller.

Optionally, the controller comprises a biasing mechanism that is adapted to apply at least one biasing force that urges the main portion of the controller towards a normal position relative to the ground face and the tilt of the main portion is in any direction away from the normal position.

Further optionally, the person received upon the main portion is located substantially above the support when the main portion is in the normal position.

Typically, the main portion comprises a seat on which the person received upon the device can sit, the seat being adapted to be tilted together with the support and being located substantially above the support when the main portion is in the normal position.

Optionally, the support comprises at least a partially spherical face culminating in an apex, and the support engages with its face a surface upon which it is adapted to rock in order to facilitate the tilting of the main portion.

If desired, the support engages the surface with its apex when the main portion is in the normal position.

Optionally, the biasing mechanism comprises an adjuster that is adapted to adjust the at least one biasing force that is applied upon the main portion of the controller.

Further optionally, the adjustments of the at least one biasing force includes increasing or decreasing the at least one biasing force.
If desired, the controller comprises foot levers for interaction with the feet of the person using the controller, the foot levers being adapted to be tilted together with the support of the main portion and being adapted each to perform a movement relative to the support, and the controller being adapted to provide a report representative of the movement of the foot levers to the video game being controlled.

Typically, the foot levers are pedals and the movement one pedal urges a corresponding movement of the other pedal.

Optionally, the controller comprises hand levers for interaction with the hands of the person using the controller, the hand levers being adapted to be tilted together with the support of the main portion and being adapted each to perform a movement relative to the support, and the controller being adapted to provide a report representative of the movement of the hand levers to the video game being controlled.

If desired, the movement of one hand lever is independent of the movement of the other hand lever.

Optionally, equal movement of the hand levers in a similar direction towards or away from the person interacting with the controller is adapted to urge a vertical change in a position of an object or the point of view of an object that exists in a video game virtual environment that is controlled by the controller.

In addition to the exemplary aspects and embodiments described above, further aspects and embodiments will become apparent by reference to the figures and by study of the following detailed descriptions.

BRIEF DESCRIPTION OF THE FIGURES

Exemplary embodiments are illustrated in referenced figures. It is intended that the embodiments and figures disclosed herein are to be considered illustrative, rather than restrictive. The invention, however, both as to organization and method of operation, together with objects, features, and advantages thereof,
may best be understood by reference to the following detailed description when read with the accompanying figures, in which:

[022] **Fig. 1** shows a perspective view of a person seated on a video game controller in accordance with an embodiment of the present invention with his feet engaged with pedals of the controller and his hands engaged with hand levers of the controller;

[023] **Fig. 2** shows a perspective view of the video game controller;

[024] **Figs. 3A to 3C** show side views of different tilted states of the video game controller;

[025] **Figs. 4A to 4C** show front views of different tilted states of the video game controller;

[026] **Figs. 5A to 5D** show perspective views of various orientations that the hand levers of the controller can be manipulated to;

[027] **Figs. 6A and 6B** show embodiments of toggles that are located on the hand levers of the controller;

[028] **Fig. 7** shows a perspective top view of a lower part of the video game controller including an embodiment of a support and a base of the controller;

[029] **Fig. 8** shows a perspective bottom view of the support;

[030] **Fig. 9** shows a perspective top view of the base;

[031] **Figs. 10 and 11** show perspective top views of the lower part of the video game controller exhibiting an embodiment of a biasing mechanism of the controller;

[032] **Fig. 12** schematically shows exemplary changes in vertical and horizontal positions or points of view of an object in a video game virtual environment that is being controlled by a controller in accordance with an embodiment of the invention;

[033] **Fig. 13** schematically shows a perspective view of a video game controller in accordance with another embodiment of the present invention;

[034] **Fig. 14** schematically shows a front view of the video game controller of Fig. 13;
Fig. 15 schematically shows a side view of the video game controller of Fig. 13;

Fig. 16 schematically shows an exploded view of a portion of the video game controller of Fig. 13 that facilitates its tilting relative to the ground;

Figs. 17 to 19 schematically show various non exploded views of the portion of the video game that is seen in Fig. 16;

Fig. 20 schematically shows a front view of the video game controller of Fig. 13 with its main portion tilted to one of its sides;

Fig. 21 schematically shows a front view of the video game controller of Fig. 13 with its main portion tilted to its other side;

Fig. 22 schematically shows a side view of the video game controller of Fig. 13 with its main portion tilted forwardly;

Fig. 23 schematically shows a side view of the video game controller of Fig. 13 with its main portion tilted backwards; and

Figs. 24A and 24B schematically show other embodiments of the video game controller.

It will be appreciated that for simplicity and clarity of illustration, elements shown in the figures have not necessarily been drawn to scale. For example, the dimensions of some of the elements may be exaggerated relative to other elements for clarity. Further, where considered appropriate, reference numerals may be repeated within the figures to indicate like elements.

DETAILED DESCRIPTION

Attention is first drawn to Figs. 1 and 2. A video game controller 10 in accordance with an embodiment of the invention has a main portion 12 that is adapted to receive a person 14 using the controller 10. The person 14 can interact with the controller 10 to produce output signals that are read and/or reported to a computerized device (not shown), and a visual feedback can for example be generated on a video display 16 that is in communication with the computerized
device. The computerized device can be a video game console, a personal computer (etc.) and the video display 16 can be a television, a monitor (etc.) that displays for example a video game that is run by the computerized device and controlled by the controller 10.

[045] The main portion 12 of the video game controller 10 has a seat 18, a pair of foot levers 20 in the form of pedals and a handlebar 22; and the person 14 using the controller 10 can engage the handlebar 22 with his hands and the foot levers 20 with his feet while sitting on the seat 18 (or standing up) as part of his interaction with the controller 10. In an embodiment of the invention, such interaction of the person 14 with the controller 10 may urge the person 14 to undergo a physical exercising experience that includes feedback between the exercising person 14 and the video game he is controlling.

[046] It should be noted that directional terms appearing throughout the specification and claims, e.g. "forward", "rear", "up", "down" etc., (and derivatives thereof) are for illustrative purposes only, and are not intended to limit the scope of the appended claims. In addition it is noted that the directional terms "down", "below" and "lower" (and derivatives thereof) define identical directions.

[047] Attention is additionally drawn to Figs. 7 to 9. In an embodiment, the main portion 12 of the controller 10 has a support 24 at its lower side and the controller 10 has a base 26 below the support 24 that the support 24 is adapted to engage. The base 26 has at its upper side a planar floor 28 that is surrounded by a plurality of limits 30 and the support 24 has at its lower side a partially spherical pivot face 32 that culminates in an apex 34. The pivot face 32 of the support 24 is adapted to rock upon the floor 28 of the base 26 in order to facilitate tilting of the main portion 12 of the controller 10 relative to the base 26 and to the ground face 35 above which it is located and such tilting is limited up to the limits 30 which the pivot face 32 may engage if tilted to a certain level.

[048] A normal axis N of the controller 10 is defined perpendicular to the floor 28 of the base 26 and thereby also perpendicular to the ground face 35 upon which
the base 26 is located, and an operative axis O of the controller 10 that is fixed to the portions of the controller 10 that are adapted to be tilted is defined as passing through the apex 34 of the support 24 with the pivot face 32 of the support 24 being symmetrically formed thereabout.

Attention is additionally drawn to Figs. 10 and 11. In an embodiment, the controller 10 has a biasing mechanism 36 that is adapted to apply biasing forces that urge the support 24 and thereby the main portion 12 of the controller 10 towards a normal position relative to the ground face 35 in which the operative axis O and the normal axis N are aligned. The biasing mechanism 36 is optionally located at a top side of the support 24 and is adapted to be tilted together with the support 24 and therefore the biasing mechanism 36 will be described herein below with reference to the operative axis O that is fixed to the tilting parts of the controller 10.

The biasing mechanism 36 has a central circular core 38, a plurality of arms 40 and a plurality of biasing means 42 in an optional form of springs that are associated each with a respective one of the arms 40. The core 38 has an optional lever 44 attached to its upper side that is adapted to enable rotation of the core 38 about the operative axis O and the core 38 has a serrated lower side that includes a series of saw-teeth shaped recesses 46 that are symmetrically distributed about the operative axis O. Each recess 46 is bound at its upper side by an upper wall 47 that ramps down from one side of the recess 46 where the depth of the recess 46 along the operative axis O is maximal to another side where the depth of the recess 46 has diminished. Each arm 40 of the biasing mechanism 36 extends radially outwardly away from the operative axis O with an inner end 48 thereof being located in a respective one of the recesses 46 and an outer end 50 thereof being coupled by its biasing means 42 to an associated respective anchor 52 on the base 26 of the controller 10.

Each arm 40 is pivotally fixed to the support 24 in such a way that it can be pivoted about a respective axis R that facilitates its inner and outer ends 48, 50 to
be shifted upwards and downwards. In the controller 10 the core 38 may be rotated
about the operative axis O between an initial state and a terminal state.

[052] In the initial state (as seen in Fig. 10) each recess 46 is positioned in
relation to its arm 40 in such a way that the inner end 48 of the arm 40 is located in
an area of the recess 46 that has maximal depth. Each arm 40 is constantly biased to
pivot about its respective axis R by its biasing means 42 to a position where its inner
end 48 engages the upper wall 47 of the recess 46. As a result, in the initial state of
the core 38 each arm 40 is able to pivot about its respective axis R to a position
where its outer end 50 is most proximal to its associated anchor 52 on the base 26.

[053] On the other hand, in the terminal state (as seen in Fig. 11) each recess 46
is positioned in relation to its arm 40 in such a way that the inner end 48 of the arm
40 is located in an area of the recess 46 that has minimal (or no) depth. As a result,
by rotating the core 38 towards the terminal state the upper wall 47 of each recess 46
engages the inner end 48 of its associated arm 40 and urges the arm 40 to pivot
about its respective axes R towards a position where the outer end 50 of the arm 40
is located more distal of its associated anchor 52 on the base 26.

[054] In the initial state of the core 38, the short distance between the outer end
50 of each the arm 40 and its associated anchor 52 result in each biasing means 42
applying a first biasing force upon the support 24 (and thereby the main portion 12
of the controller 10). In the terminal state of the core 38, the larger distance between
the outer end of each the arm 40 and its associated anchor 52 result in each biasing
means 42 applying a second biasing force that is greater than the first biasing force.

[055] Therefore, by maneuvering the core 38 between the initial and terminal
states it is possible to adjust the biasing forces that are applied by the biasing
mechanism 36 to urge the support 24 (and thereby the main portion 12 of the
controller 10) towards the normal position. Such adjustment may be used for
example to adjust the controller 10 for use with people 14 that have different
weights and that would like to enjoy a generally similar sensitivity of the controller
10 to tilting.
Attention is now drawn to Figs. 3A to 3C and Figs. 4A to 4C. The person interacting with the controller 10 may shift his weight in a sideways direction away and towards the normal axis N in order to tilt the main portion 12 of the controller 10 in that direction in relation to the base 26 of the controller 10 and the ground face 35. Such tilting may be defined by variations of an angle α that is formed between the operative and normal axes O, N wherein when the axes O, N are aligned (as seen in Figs. 3A and 4A) α is zero.

Tilting of the main portion 12 of the controller 10 may be used to form a value representative of the tilt that is read or reported to the computerized device with which the controller 10 is used so that a person 14 using the controller 10 may tilt the main portion 12 of the controller 10 similarly to a conventional joystick in order to interact with and control a video game that is run by the computerized device. In addition to tilting (or in place of tilting), the person 14 using the controller 10 may in an embodiment of the invention also pedal with his feet the optional foot levers 20 of the controller 10 and such pedaling may also be used to form a value representative of the pedaling that is read or reported to the computerized device with which the controller 10 is used in order to interact with and control a video game that is run by the computerized device.

Attention is now drawn to Figs. 5A to 5D. In an embodiment of the invention, the person 14 interacting with the controller 10 may also manipulate the handlebar 22 of the controller 10 with his hands. Optionally, the handlebar 22 is made of two portions 21 that can be moved independently in relation to each other. The two portions 21 of the handlebar 22 may be moved in opposing direction as seen in Figs. 5A and 5B or may be moved in similar directions as seen in Figs. 5C and 5D and the movement of each portion 21 of the handlebar 22 may be used to form a value representative of the movement that is read or reported to the computerized device with which the controller 10 is used in order to interact with and control a video game that is run by the computerized device.
[059] As seen in Figs. 6A and 6B the handlebar 22 may include toggles 54 in the form of push-buttons and/or finger-operated joysticks whose state can be read by the computerized device or can be reported to the computerized device with which the controller 10 is used in order to interact with and control a video game that is run by the computerized device. In an embodiment, the toggles 54 are positioned on portions 23 of the handlebar 22 that extend generally parallel to the ground face 35 above which the controller 10 is located.

[060] Attention is drawn to Fig. 12. The controller 10 can be operated by the person 14 in order to control a display of the computerized device that is used with a video game. Such use of the controller 10 can be used for example to control a position of an object and/or a point of view of an object in a virtual environment of the video game, and this will be now described with reference to exemplary locations Pm, Pu, Pur, Pul, Pd, Pdr, Pdl that are shown on the video display 16.

[061] In an embodiment, the handlebar 22 alone can be used to control the aforementioned locations that are associated with the object. From an exemplary initial location Pm, vertical changes can be achieved by either equally pulling or pushing both portions 21 of the handlebar 22 respectively towards the user 14 or away from the user 14. By equally pulling both portions 21 of the handlebar 22 towards the user (as seen in Fig. 5C) the position of the object and/or the point of view of the object can be vertically shifted upwardly towards location Pu on the video display 16, and by equally pushing both portions 21 of the handlebar 22 away from the user (as seen in Fig. 5D) the position of the object and/or the point of view of the object can be vertically shifted downwardly towards location Pd on the video display 16.

[062] From exemplary positions Pu or Pd, horizontal changes in the location associated with the object can be achieved by for example pulling or pushing only one of the portions 21 of the handlebar 22 respectively towards the user 14 or away from the user 14. In an embodiment, by pulling the right portion 21 of the handlebar 22 towards the user 14 the position of the object or the point of view of the object
can be horizontally shifted for example to the right towards locations Pur or Pdr, and by pulling the left portion 21 of the handlebar 22 towards the user 14 the position of the object and/or the point of view of the object can be horizontally shifted for example to the left towards locations Pul or Pdl.

[063] In an embodiment of the invention, the tilting of the main portion 12 of the controller 10 can be also used alone or in conjunction with the handlebar 22 in order to shift and control the position of the object or the point of view of the object on the video display 16. In addition, in an embodiment, the user by pedaling the foot levers 20 can urge change in a property associated with the position of the object or the point of view of the object such as a speed or acceleration of progress of the object in the virtual environment of the video game.

[064] Attention is drawn to Figs. 13 to 15. In another embodiment of the present invention a main portion 112 of an embodiment of the video game controller 110 has a seat 118, a pair of foot levers 120 in the form of pedals and a handlebar 122; and a person using the controller 110 can engage the handlebar 122 with his hands and the foot levers 120 with his feet while sitting on the seat 118 (or standing up) as part of his interaction with the controller 110. The video game controller 110 also has a base 126 in the form of a frame that is positioned on the ground face 135 and the main portion 112 of a controller 110 has a support 124 that is located adjacent below the seat 118 where it engages the base 126. It is noted that the support 124 is located close to the seat 118 and between the seat 118 and a lower part 119 of the main portion 112 where the foot levers 120 are fitted.

[065] Attention is additionally drawn to Figs. 16 to 19 to describe the interaction between the support 124 and the base 126 which is in the form of a set of two "gimbals", one mounted on the other with pivot axes that are orthogonal one to the other. The base 126 has at it upper end two anchors 156 with an aperture extending through each anchor 156 and both apertures are formed about a pivot axis T1 that is parallel to the ground face 135. The support 124 has a first part 158 and a second part 160. The first part 158 has two pins 162 that extend along a line LI and
two holes 164 that are both formed about a pivot axis T2 that extends perpendicular to line LI. The second part 160 has two rods 166 (only one is clearly seen) that extend along a line L2 and a shaft 168 that extends along an operative axis O of the controller 110 that is perpendicular to line L2.

[066] In the controller 110 each pin 162 of the first part 158 of the support 124 is fitted into a respective aperture of one of the anchors 156 of the base 126 so that line LI is brought to be aligned with axis T1 to form the first "gimbal". The pins 162 can rotate within the apertures of their anchors 156 and as a result the first part 158 of the support 124 can pivot about axis T1 relative to the base 126 and to the ground face 135. In addition, each rod 166 of the second part 160 of the support 124 is fitted into a respective hole 164 of the first part 158 of the support 124 so that line L2 is brought to be aligned with axis T2 to form the second "gimbal". The rods 166 can rotate within their holes 164 and as a result the second part 160 of the support 124 can pivot about axis T2 relative to the first part 158 of the support 124.

[067] With attention to Figs. 18 and 19 it can be seen that biasing means 125 in the optional form of springs are fitted to the "gimbals" in order to urge them back to return to a "center" state each time the main portion 112 is tilted away from the "center" state relative to the ground face 135. The "center" state is defined as the position where axes O and N are aligned and the main portion 112 of controller 110 is not tilted relative to the ground face 135. This spring return to "center" of the main portion 112 has been found by the inventors to increase the ability to successfully control for example video games with the controller 110. Slight tilts of the main portion 112 that may be required when playing a game can be easily damped and stopped by the biasing means 125 that accordingly act to return the main portion 112 to its "center".

[068] The shaft 168 of the second part 160 of the support 124 extends up to the seat 118 and down to the lower part 119 of the main portion 112 where the foot levers 120 are fitted so that the seat 118 the lower part 119 of the main portion 112 are rigidly fixed to each other. The seat 118 of controller 110 is rigidly fixed via a
bar 170 to the handlebar 122 of controller 110 and an optional counter weight 172 is 
fixed to the main portion 112 of controller 110 at a position below the lower part 
119 of the main portion 112. The counter weight 172 is adapted to urge the main 
portion 112 of the controller 110 back towards its "center" state relative to the 
ground face 135 (bar 170 and counter weight 172 are indicated in Fig. 13) each time 
the main portion 112 it tilted away from this state. The interaction between the 
support 124 and the base 126 of controller 110 facilitates tilting of the main portion 
112 about pivot axes T1 and/or T2 that are orthogonal one to the other.

[069] With attention to Figs 20 and 21 it can be seen how tilting about axis T1 
can facilitate tilting of the main portion 112 of controller 110 in a forward or an 
opposing backward direction to form an angle between the operative axis O that is 
fixed to the tilting main portion 112 and an axis N that is normal to the ground face 
135. With attention to Figs 22 and 23 it can be seen how tilting about axis T2 can 
facilitate tilting of the main portion 112 of controller 110 to opposing lateral sides of 
the controller 110 to similarly form an angle between the operative axis O that is 
fixed to the tilting main portion 112 and axis N that is normal to the ground face 
135.

[070] Tilting of controller 110 by use of the two "gimbal" mechanism described 
above ensures that a person using the controller 110 undergoes a physical experience 
in which he always faces substantially the same forward direction. This has been 
found in some cases to reduce miss orientation that may occur while tilting such a 
controller in order to control a game. In addition, the tilting together of the seat 118, 
handle bar 122 and lower part 119 of the main portion 112 with which the person 
using the controller 110 interacts, has been found by the inventors to impart to the 
person using the controller a physical experience that resembles the experience he 
may encounter when riding for example a real bike in changing terrain. These 
physical experiences that are provided in controller 110 have been found by the 
inventors to impart to a person using controller 110 a more intuitive feel which 
resembles "real life" experiences he is already familiar with.
[071] Also it is noted that the location of the support 124 in controller 110 adjacently below the seat 118 forms a pivoting point in controller 110 for its tilting which is located close to the center of mass of the person using the controller 110 which is generally at the belly of the person. This close proximity of the support 124 to the person's center of mass has been found to ease the ability to of a person using the controller 110 to tilt the main portion 112 to desired angels when using the controller 110 to play a game.

[072] Tilting of the main portion 112 of the controller 110 may be used to form a value representative of the tilt that is read or reported to a computerized device with which the controller 110 is used so that a person using the controller 110 may tilt the main portion 112 of the controller 110 similarly to a conventional joystick in order to interact with and control a video game that is run by the computerized device. In addition to tilting (or in place of tilting), the person using the controller 110 may in an embodiment of the invention also pedal with his feet the optional foot levers 120 of the controller 110 and such pedaling may also be used to form a value representative of the pedaling that is read or reported to the computerized device with which the controller 110 is used in order to interact with and control a video game that is run by the computerized device.

[073] Attention is drawn to Fig. 24A. In an embodiment, a video game controller 1200 similar to the one described with respect to Figs. 13 to 23 has an adjuster 121 that is located between the seat 118 and the lower part 119 of the main portion 112 where the foot levers 120 are fitted. The adjuster 121 is adapted to adjust the distance between the seat 118 and the lower part 119 of the main portion 112 so that the controller 1200 can be adjusted for use with people having different heights. Notably, the adjuster 121 is located below the support 124 (and not between the support 124 and the seat 118) so that the distance between the seat 118 and the center of mass of the person using the controller 1200 won't be affected when such a height adjustment is made. As a result, adjusting the controller 1200
with the adjuster 121 will not affect the ability of a person "riding the controller 1200 to successfully control a video game with which he interacts.

[074] Attention is drawn to Fig. 24B. In an embodiment, a video game controller 1100 generally similar to the controllers described herein above can be fitted with a tablet personal computer 1200 that can function as the computerized device that communicates with the controller 1100. Values representative of the tilt of the controller's main portion or of the pedals or hand levers of the controller can be read or reported to the computerized device and a game being controlled by the controller can be displayed on the screen of the tablet 1200. In an embodiment, a tablet 1200 incorporating a gyroscope may be fitted to the controller 1100 and the values representative of the tilt of the controller's main portion may be directly used by the tablet to affect for example a game being played and viewed on the tablet.

[075] The tilting of the main portion of the various embodiments of the controller of the present invention relative to the ground face may be detected by one or more potentiometers and an electrical sensor may be used for detecting the velocity and direction of rotation of the pedals of the controller. A program running on a processor of the controller may be used to transform the values read by the potentiometers or sensors to values that are reported to the video game console with which the controller is used. In an embodiment, the controller can also be fitted with a transmitting unit for transmitting signals to the video game console with which the controller is interacting. In addition, in some embodiments the controller can be equipped with a WIFI device for updating for example: the software program transforming values read by the potentiometers or sensors to those reported, for transmitting scores of games played and/or for transmitting physiological parameters that are measured from the person using the controller.

[076] The controller of the various embodiments of the present invention may be used to control and interact with a video game console that may be initially configured to interact with a game controller that is designed to be held in the hand. A non binding example of such a game controller may be the gamepad game
controller. Typically, joysticks of such handheld game controllers are designed to tilt to angles which are larger than the angles to which the main portion of the controller of the present invention is designed to tilt. The main portion of the controller may be limited to tilt for example to about 15° relative to a normal to the ground face which has been found to be a range in which the person being tilted still feels comfortable. A joystick of the handheld controller on the other hand may easily tilt to angles of about 45° relative to its normal position.

[077] Therefore, in an embodiment of the present invention, a software program implementing an algorithm is used to transform the angle of tilt of the main portion of the controller of the present invention to a larger value that is transmitted to the video game console so that the range of tilt angles of the main portion will substantially cover the range of tilt angles of the joystick of the handheld controller.

[078] In an embodiment, the algorithm used for transforming the read angle of tilt to that transmitted to the video game console may be implemented to function in a non linear manner. For example, the first 5° of tilt of the main portion may be transformed to a transmitted angle of tilt of 15° and a subsequent tilt of an additional 5° of the main portion may be transformed to a transmitted tilt of more than 15°. This non linear transformation of the angle of tilt of the main portion has been found to provide a smoother sense of movement in video games being controlled by the controller of the present invention.

[079] In an additional embodiment, the algorithm used for transforming the values detected by potentiometers or sensors of the controller of the present invention to those transmitted to the video game console may be implemented in the following manner. Values representative to the rate of change in the direction of tilt of the main portion or to the rate of change in the direction of the rotation of the pedals may be transformed to larger values that are transmitted to the video game console. This has been found to compensate for the speed of response of the body of the person using the controller which is slower than the speed of response of the digits or thumbs of a hand using a handheld controller.
In some embodiments of the present invention, the controller may be fitted as mentioned above with a tablet personal computer that incorporates a gyroscope that can detect the angle of tilt of the main portion. In cases where the game being controlled runs also on the tablet personal computer the following transformation may be required so that the game will run properly. In some cases, when playing a game on such a tablet personal computer the tablet is first placed parallel or vertical to the ground face and from that position the tablet can be moved for interacting with the game. In the controller of the present invention the tablet as seen in Fig. 24B is oriented at an angle to the ground face so that the person using the controller can conveniently view its display. Therefore, in some cases, it may be required to transform and/or fix the values at which the tablet is oriented relative to the ground face when the main portion is not tilted, to values that represent placement of the tablet at a parallel or a vertical position relative to the ground face so that the game that is run on the tablet will function properly.

In the description and claims of the present application, each of the verbs, "comprise" "include" and "have", and conjugates thereof, are used to indicate that the object or objects of the verb are not necessarily a complete listing of members, components, elements or parts of the subject or subjects of the verb.

Although the present embodiments have been described to a certain degree of particularity, it should be understood that various alterations and modifications could be made without departing from the scope of the invention as hereinafter claimed.
CLAIMS:
1. A video game controller comprising a main portion that is adapted to receive a person interacting with the controller, the main portion comprising a support that is adapted to facilitate tilting of the main portion relative to a ground face above which it is located and the controller being adapted to communicate values representative of the tilt to a video game being controlled, wherein the tilting of the main portion is affected by the shifting of the weight of the person interacting with the controller.
2. The video game controller according to claim 1, wherein the tilting of the main portion is such that the person interacting with the controller always faces substantially the same direction when the main portion tilts.
3. The video game controller according to claim 2, wherein the full weight of the person interacting with the controller bears upon the main portion of the controller.
4. The video game controller according to claim 3 and comprising a biasing mechanism that is adapted to urge the main portion of the controller to tilt towards a preliminary position and the tilting of the main portion in directions away from the preliminary position is by the shifting of the weight of the person interacting with the controller.
5. The video game controller according to claim 4, wherein the main portion can tilt about two axes that are orthogonal one to the other.
6. The video game controller according to claim 5, wherein the main portion comprises a seat on which the person received on the device can sit, the main portion comprising also a handlebar for interaction with the hands of the person using the controller, the seat and handlebar being rigidly fixed one to the other so that they are tilted together when the main portion tilts.
7. The video game controller according to claim 6 and comprising foot levers for interaction with the feet of the person using the controller, the foot levers being coupled to a lower part of the main portion that is rigidly fixed to the seat and
handle bar so that the lower part, seat and handle bar are tilted together when the main portion tilts, the foot levers being adapted each to perform a movement relative to the main portion, and the controller being adapted to communicate values representative of the movement of the foot levers to the video game being controlled.

8. The video game controller according to claim 7, wherein the support is located between the seat and the lower part of the main portion that is coupled to the foot levers, and at a position that is more proximal to the seat.

9. The video game controller according to claim 8, wherein the foot levers are pedals and the movement one pedal urges a corresponding movement of the other pedal.

10. The video game controller according to claim 9, wherein the values representative of the tilt are created by reading a value of actual tilt of the main portion and transforming it to a value that is communicated to the video game.

11. The video game controller according to claim 10, wherein the transforming includes increasing the value communicated to the video game relative to the value of actual tilt that is read.

12. The video game controller according to claim 10, wherein a maximal range of tilt of the main portion away from the preliminary position is divided into at least two equal consecutive parts and a value of the actual angle of tilt within the first part is transformed by increasing it by a first amount and a value of the actual angle of tilt within the second part is transformed by increasing it by a second amount that is different from the first amount.

13. The video game controller according to claim 12, wherein the second part of tilt is more distal from the preliminary position than the first part of tilt, and the second amount is larger than the first amount.

14. A method for controlling a video game comprising the steps of:

   providing a controller comprising a main portion that is adapted to receive a full weight of a person interacting with the controller, the main portion comprising a
support that is adapted to facilitate tilting of the main portion relative to a ground face above which it is located while maintaining the person interacting with the controller facing substantially the same direction,

reading a value of actual tilt of the main portion, and

transforming it to a value that is communicated to the video game which is different from the value of actual tilt that is read.

15. The method according to claim 14, wherein the value of tilt of the main portion that is communicated to the video game is larger than the value of actual tilt that is read.

16. The method according to claim 15, wherein a given range of tilt of the main portion is divided into at least two equal consecutive parts and a value of the actual angle of tilt within the first part is transformed by increasing it by a first amount and a value of the actual angle of tilt within the second part is transformed by increasing it by a second amount that is different from the first amount.

17. The method according to claim 16, wherein the controller comprises a biasing means that urges the main portion towards a preliminary position and the given range of tilt of the main portion is a maximal rage of tilt that the main portion can tilt away from the preliminary position.

18. The method according to claim 17, wherein the second part of tilt is more distal from the preliminary position than the first part of tilt, and the second amount by which the value of tilt in the second part is increased is larger than the first amount by which the value of tilt in the first part is increased.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

| INV. | A63F13 | A63F13/02 | A63F13/08 |

**ADD.**

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)

A63F

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

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

EPO-Internal, PAJ, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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"A" document defining the general state of the art which is not considered to be of particular relevance

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"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 of the theory underlying the invention

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"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.

"A" document member of the same patent family

Date of the actual completion of the international search

19 October 2011

Date of mailing of the international search report

04/11/2011

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040
Fax. (+31-70) 340-3016

Authorized officer

Garton, Paul
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