

[0058] FIGS. 47A and 47B are diagrams showing the display of the image corrected with the shooting video game machine pertaining to the second embodiment;

[0059] FIGS. 48A and 48B are diagrams showing the display of an ordinary image;

[0060] FIGS. 49A, 49B and 49C are diagrams for explaining the image correction parameter set in the shooting video game machine pertaining to the second embodiment;

[0061] FIG. 50 is a diagram for explaining the rotation control of the mirrors corresponding respectively to the two areas in which one stage is divided with the first modified example of the shooting video game machine in the second embodiment;

[0062] FIG. 51 is a diagram for explaining the detection of the player's position with the player detection sensor with the second modified example of the shooting video game machine in the second embodiment; and

[0063] FIG. 52 is a diagram showing the image correction parameter set in the shooting video game machine of third modified example in the second embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0064] (First Embodiment)

[0065] The shooting video game machine pertaining to the first embodiment of the present invention is explained below. FIG. 1 is a diagram showing the shifting of the projected image on the screen 121 of the shooting video game machine. FIG. 1A shows the display of the projected image 122 at the lower part of the screen 121, and FIG. 1B shows the display of the projected image 123 at the upper part of the screen 121. FIG. 5 is a diagram showing the change in the displayed image accompanying the movement of the player 300 to the left and right. FIG. 2 and FIG. 4 are diagrams showing an example of the projected image 122 at the lower part and FIG. 3 is a diagram showing an example of the projected image 123 at the upper part.

[0066] As shown in FIG. 1A and FIG. 1B, the player 300 standing in the play area PE of a prescribed area set in front of the game machine operates the gun unit 10 and virtually shoots the dinosaur as the game character displayed in the projected images 122, 123 on the screen 121. The dinosaur having a 3D shape and which moves and shifts with the elapse in time within the game space (virtual three-dimensional space) is displayed in the projected image 122 as shown in FIG. 2 when existing afar as an image captured from the virtual viewpoint (which corresponds to the position of the reference viewpoint of the player 300 set in advance), and is displayed in the projected image 123 as shown in FIG. 3 or in the projected image 122 as shown in FIG. 4 when nearby.

[0067] Particularly, with the present game machine, the displayed contents of the projected image 122 (FIG. 1A) displayed at the lower part of the screen 121 changes to the projected image 123 (FIG. 1B) in accordance with the virtual viewpoint moving within the game space and position of the dinosaur while shifting continuously toward the arrow A₁, and, pursuant to this type of shifting of the projected image on the screen 121, the visual line of the player 300 changes naturally from the lower part of the

screen 121 to the upper part of the screen 121 (from the direction of arrow A₂ of FIG. 1A to the direction of arrow A₃ of FIG. 1B).

[0068] Further, with the present game machine, it is envisioned that the dinosaur within the game space is to attack the player, and displayed on the upper part of the screen 121 is an image where the dinosaur is trying to bite the player on the play area PE from the state within the projected image 123 of FIG. 3, and an image where the dinosaur is trying to kick (or whipping its tail against) the player is displayed on the lower part of the screen 121 from the state within the projected image 122 of FIG. 4.

[0069] The player 300 may avoid these attacks by the dinosaur by moving to the left and right on the play area PE. When the player 300 who is shooting toward the head of the dinosaur as shown in FIG. 1B moves to the left and right (direction of arrow A₄) on the play area as shown in FIG. 5 upon sensing that the dinosaur will begin its attack, with the present game machine, this movement is detected, the coordinates are set such that the virtual player (virtual viewpoint) moves away from the dinosaur within the game space, and a projected image 123 showing the player 300 moving away from the dinosaur (the dinosaur moves outward toward the direction of arrow A₅) is displayed.

[0070] Although the upper and lower parts of the enormous dinosaur approaching the virtual viewpoint are displayed on the upper and lower parts of the screen 121 in FIG. 3 and FIG. 4, a flying dinosaur (pterosaur) afar from the virtual viewpoint may be displayed on the lower part of the screen 121, the displayed contents thereof may be continuously changed and continuously shifted in accordance with the flying dinosaur with respect to the virtual viewpoint in order to display the flying dinosaur approaching the virtual viewpoint on the upper part of the screen 121.

[0071] FIGS. 6 to 11 will now be explained in this order regarding the structure of the present game machine for performing the overall operation described above. FIG. 6 and FIG. 7 are diagrams relating to the structure for projecting images and performing imaging with the gun unit 10, FIG. 8 and FIG. 9 are diagrams relating to the structure of the light source unit (marker) which is the detection subject for detecting the muzzle 16 direction, and FIG. 10 and FIG. 11 are diagrams relating to the structure for protecting the rotation and the like of the mirror 43.

[0072] The structure for projecting images is now explained. FIG. 6 is a diagram showing the appearance of the present game machine, and FIG. 7 is a typical cross section for explaining the shifting of the projected image on the screen 121.

[0073] With the present game machine, as shown in FIG. 6, the projected image 124 projected from the projector 31 (FIG. 7) on the screen 121 retained with the screen retention table 120 shifts in the arrow A₆ direction, and the gun unit 10 and gun unit 20 are connected to the main body control unit 100 (explained later at FIG. 13) via the gun cable 17. The projected image 124 contains a shooting target such as a dinosaur as described above, and the 1P player standing on the play area PE operates the gun unit 10 (or the 2P player operates the gun unit 20) to virtually shoot the shooting target, and points are scored in accordance with the skill of shooting such as the shooting position and shooting timing.