

[0030] FIG. 3 is a flow chart for a method of generating a game of chance of the present invention.

[0031] FIGS. 4A-4D are block diagrams describing a few rendering issues in a 3-D gaming environment.

[0032] FIGS. 5A-5B are block diagrams describing the rendering of 3-D text objects in a 3-D gaming environment of the present invention.

[0033] FIG. 6A is a block diagram showing the creation of a font file.

[0034] FIG. 6B is a diagram of font properties.

[0035] FIG. 6C is a diagram of character properties.

[0036] FIG. 6D is a diagram of a font texture.

[0037] FIG. 7 is a diagram showing the creation of 3-D text characters.

[0038] FIGS. 8A-8B are diagrams of 3-D text objects displayed using embodiments of the present invention.

[0039] FIG. 9 is a perspective drawing of a gaming machine for one embodiment of the present invention.

[0040] FIG. 10 is a flow chart depicting a method for generating a game of chance using a virtual gaming environment.

[0041] FIG. 11 is a block diagram of gaming machines that utilize distributed gaming software and distributed processors to generate a game of chance for one embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0042] FIG. 1 is a perspective drawing of a 3-D virtual gaming environment 100 implemented on a gaming machine for one embodiment of this invention. The 3-D virtual gaming environment may be used by the master gaming controller on the gaming machine to present a game of chance. The game of chance played on the gaming machine may include: 1) a wager selected by a player playing a game on the gaming machine, 2) an initiation of the game of chance on the gaming machine by the player, 3) a determination of an outcome for the game of chance by the gaming machine and 4) a presentation on the gaming machine of the game outcome to the player. In the present invention, the 3-D gaming environment may be used to present a game outcome to the player, describe operating functions of the gaming machine and provide an interface for obtaining gaming information and services. In particular, methods and apparatus of displaying a text string in a 3-D gaming environment, such as a text string used in a credit meter displayed on the gaming machine or a text string used to provide game information for a game of chance displayed on the gaming machine, are described. The text strings may be generated using textures that are applied to a 3-D object in the 3-D gaming environment. Apparatus and methods implementing these features are described with respect to FIGS. 1-11

[0043] In particular FIGS. 1-11 provide the following information. In FIG. 1, a 3-D gaming environment of the present invention is described. In FIG. 2, 3-D reels in the 3-D gaming environment are described. In FIG. 3, a method of generating a game of chance in a 3-D gaming environ-

ment is described. In FIGS. 4A-4D, a few issues relating to text rendering from a 3-D gaming environment are presented. In FIGS. 5A-5B, methods of generating text in a 3-D gaming environment are illustrated. In FIGS. 6A-6D, methods of generating fonts, characters and textures used in a 3-D text rendering for one embodiment of the present invention are described. In FIG. 7, one method of generating a 3-D text object in a 3-D gaming environment is presented. In FIGS. 8A-8B, video displays displaying text objects generated using different methods of the present invention are described. In FIG. 9, one embodiment of a gaming machine of the present invention is described. In FIG. 10, a method of generating a game of chance or bonus game using the 3-D gaming environments of the present invention is presented. In FIG. 11, a gaming network of the present invention is described.

[0044] Prior to describing FIG. 1, some general aspects of 3-D virtual gaming environments and their relationship to 2-D environments are discussed. To utilize a virtual 3-D gaming environment for a game presentation or other gaming activities on a gaming machine, a 2-D view of the virtual 3-D gaming environment is rendered. The 2-D view captures some portion of the 3-D surfaces modeled in the virtual 3-D gaming environment. The captured surfaces define a 3-D object in the 3-D gaming environment. The captured surfaces in 2-D view are defined in the 3-dimensional coordinates of the virtual 3-D gaming environment and converted to a 2-dimensional coordinate system during the capturing process. As part of a game presentation, the 2-D view may be presented as a video frame on a display screen on the gaming machine. In some ways, the two-dimensional view is analogous to a photograph of a physical 3-D environment taken by a camera where the photograph captures a portion of the physical 3-D surfaces existing in the physical 3-D environment. However, the photograph from a camera is not strictly analogous to a 2-D view rendered from a virtual 3-D gaming environment because many graphical manipulation techniques may be applied in a virtual 3-D gaming environment that are not available with an actual camera.

[0045] In the present invention, the 2-D view is generated from a viewpoint within the virtual 3-D gaming environment. The viewpoint is a main factor in determining what surfaces of the 3-D gaming environment defining a 3-D object are captured in the 2-D view. Since information about the 3-D gaming environment is stored on the gaming machine, the viewpoint may be altered to generate new 2-D views of objects within the 3-D gaming environment. For instance, in one frame, a 2-D view of an object modeled in the 3-D gaming environment, such as a front side of a building (e.g. the viewpoint captures the front side of a building), may be generated using a first viewpoint. In another frame, a 2-D view of the same object may be generated from another viewpoint (e.g. the backside of the building).

[0046] A disadvantage of current gaming machines is that the 2-D views used as video frames in game presentations are only rendered from 2-D objects and information about the multi-dimensional nature of the objects rendered in the 2-D views, such as the viewpoint used to generate the 2-D view, are not stored on the gaming machine. Historically, due to the regulatory environment of the gaming industry, gaming software used to present a game of chance has been designed to "run in place" on an EPROM installed on the