

driven reel slot machine may also include contributions from other sources. The gaming machine may include a combination of audio, video and/or physical adaptations.

[0038] Audio adaptations may include: stereo audio that varies output audio based on video reel position in the gaming machine (e.g., audio for a left video reel is output and increasingly heard on a left side of a digital machine, while audio for a right video reel is increasingly heard on the right side of the machine), stereo recording and playback of actual mechanical sounds in a real mechanical reel machine, randomization of the actual mechanical sounds to avoid repetition of the same sounds, etc. Other audio adaptations are also suitable for use.

[0039] Physical adaptations may include the use of layered video displays with a set distance between the displays. Traditional mechanical reel gaming machines arranged the mechanical reels behind a glass layer, which included screen printing or printed decals attached to the glass. The printing indicated rules for the game, pay tables, and various game graphics. In this multiple video display embodiment, a proximate display device, such as an LCD, includes video data that mimics the glass layer and information typically printed on the glass layer. To increase realism, the video information may also include glare lines and other depictions of interaction of the stickers with an environment around a gaming machine. Video data for stickers may also include video fraying and video discoloration (e.g., dirt that simulates age) to add the realistic simulation of aged and actual stickers. A second video display device, behind the first, which may also be an LCD, then includes video data that simulates the mechanical reels. Physical separation of the two video displays mimics the same separation seen between the glass and reels in a tradition mechanical gaming machines, and significantly adds to the illusion of a real mechanical system. FIGS. 4A-4C describe the use of layered video displays to simulate this mechanical arrangement. Other physical adaptations may be used.

[0040] In addition to the video techniques described below, a gaming machine as described herein may use other video adaptations to emulate a mechanical machine. In a specific embodiment, the video data simulates a visible mechanical imperfection of a mechanical reel in a gaming machine. The visible mechanical imperfection refers to visible actions, attributes or behavior of a mechanical reel or one or more parts in a mechanical reel or gaming machine. In one embodiment, the visible mechanical imperfection is dynamic, meaning that the mechanical reel is moving when it displays the visible imperfection. Genesis of the visible imperfections often stem from peculiarities, realities or imperfections in the mechanical device or system, such as loose machining tolerances, random variations which are characteristic of real systems, etc. For example, a simulated video reel may wobble or show lateral jitter in a direction orthogonal to the direction of spin to emulate this common occurrence in a real mechanical reel system. In another specific embodiment, the visible mechanical imperfection includes video reel kick-back, which emulates the dynamic bounce that a real mechanical reel commonly produces when stopped. Video reels may also spin at slightly different speeds to emulate their imperfect mechanical counterparts.

[0041] Individually, each of these audio, video and physical adaptations may not create a full illusion of a mechanical reel machine. Cumulatively, however, when multiple of these adaptations are provided in a processor-based gaming

machine, senses for a person near the gaming machine process numerous indications of a real mechanical reel machine, and the person may be at least partially or temporarily fooled into perceiving a real mechanical reel machine.

[0042] While digital simulation as described herein is not an exact replacement for a truly mechanical machine, it is believed to be a reasonable match that preserves some or most of the "look and feel" of mechanical reel-based machines. These digital machines may satisfy many players looking for a mechanical reel-based machine, while avoiding the associated costs and complexities of old mechanical machines, and permitting the benefits of digital machines. For example, processor-based display devices permit easy reconfiguration of video output, including remote reconfiguration. The digital nature of the video display devices permits the reel game on a gaming machine to be changed using digital techniques. This allows symbols on the video reels to be changed to present a different reel game, if desired, or enables the number of reels depicted on the video display devices to be changed. Wireless or wired connection to the gaming machine also permits remote changes to games by downloading instructions for the changes to the gaming machine.

[0043] In one embodiment, a gaming machine described herein adds perspective to the visual display of video reels on a gaming machine. Perspective provides an approximate representation, on a flat surface (such as a video screen), of an image as it is perceived by the eye in three dimensions. Two characteristic features of perspective include: 1) objects appear smaller as their distance from the observer increases; and 2) objects appear distorted when viewed at an angle (spatial foreshortening).

[0044] FIG. 1A shows a simple depiction of perspective viewing of a gaming machine with mechanical reels. When a person stands or sits laterally central to the horizontal width in position **21a**, inner sides **74a** of the outer reels **74** are visible. This adds perspective: the person may see portions **74a** of reels **74** other than the symbols and reel strips directly facing the person, such as structural components of a reel rotation mechanism, side portions of a mechanical reel, etc. FIGS. 2A-2C show perspective video information added between video reel strips in accordance with a specific embodiment.

[0045] In another embodiment, a gaming machine described herein adds parallax to the visual display of video reels on a gaming machine. Parallax refers to the effect whereby the positions of objects relative to each other appear to shift due to changes in the relative angular position of an observer attributable to motion of the observer. In other words, it is a perceived shift of an object relative to another object caused by a change in observer position. If there is no parallax between the two objects, then a person perceives them as side by side at the same depth. This addition of parallax helps the video adaptations described herein better emulate their mechanical counterparts.

[0046] FIG. 1A also illustrates parallax. A change in position from **21a** to **21b** changes the view of mechanical reels **74** due to parallax. When person **21** moves laterally in front of the gaming machine to a position **21b** that is not laterally perpendicular to the axis of rotation for reels **74**, side portions of different reels **74** become visible. In addition, glass plate **72** includes screen printing or printed decals attached to glass **72**. Transparent windows in the screen printing were bordered by opaque sections **75** that partially blocked view of reels **74**. A blind spot **77** spot results from an opaque section **75** blocking a portion of the person's field of view. The change in position