reels, and a number of reel drivers in which the reel controller uses spin profiles to manage the operation of the number of reels, according to the teachings of the present invention.

[0016] **FIG. 6** depicts a block diagram of an embodiment of a gaming machine having a gaming module and a central processing unit in which the gaming module operates dynamically in response to spin profiles correlated to various games associated with the gaming machine, according to the teachings of the present invention.

DETAILED DESCRIPTION

[0017] In the following detailed description of the invention, reference is made to the accompanying drawings which form a part hereof, and in which are shown by way of illustration, specific embodiments in which the inventions may be practiced. These embodiments are described in sufficient detail to enable those skilled in the art to practice the present invention. Other embodiments may be utilized and structural, logical, and electrical changes may be made without departing from the scope of the invention. The various embodiments disclosed herein are not necessarily mutually exclusive, as some disclosed embodiments can be combined with one or more other disclosed embodiments to form new embodiments. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the embodiments of the present invention is defined only by the appended claims, along with the full scope of equivalents to which such claims are entitled.

[0018] As used herein, the term "gaming machine" refers to a machine into which a coin or token is deposited, and/or which is activated by a card or token associated with data regarding non-monetary chattel, to play a game that uses a video display and/or an electromechanical device with a spinning reel. The gaming machines include slot machines and push button machines. The gaming machines include coin operated machines and machines having a serial interface. Gaming machines also include gaming tables capable of being initiated by a card or token.

[0019] **FIG. 3** depicts a block diagram of an embodiment of a gaming machine **300**. Gaming machine **300** includes a reel controller **310**, a reel **320**, and a reel driver **330**. Reel controller **310** manages reel driver **330** to drive reel **320** based on motion parameters assigned to a time period associated with a spin profile for reel **310**. These motion parameters may be assigned to the start and finish of a selected time period.

[0020] Motion parameters for a reel spin include those parameters that are used to control, manage, or establish motion of the reel spin according to a spin profile. The motion parameters may include velocity or acceleration values at a given time or times selected from points on a spin profile. In an embodiment, reel controller **310** provides a set of paired motion parameters, where each paired motion parameter is correlated to a start and a finish of one of a set of time periods. These paired motion parameters may include a velocity at the start of the time period and a velocity at the finish of the time period along with an acceleration. The set of paired motion parameters may be associated with endpoints of line segments that approximate the desired spin profile for the reel. In an embodiment, the motion parameters are associated with a set of curves that approximates a desired profile for a reel spin in which for each curve a velocity is assigned from the curve, an end time or time length for the curve is assigned. The set of curves may be realized as a set of linear segments. However, the set of curves is not limited to linear segments, but may be any set of curves that approximates the desired profile and provides for ease of determination of reel motion from a set of motion parameters assigned from this set of curves. For example, Bezier curves or splines may be used.

[0021] In an embodiment, a spin profile is provided for each game or game mode that is played, or run, on the gaming machine. Motion parameters may be provided dynamically through calculations as game play progresses or provided from memory and fetched as the game play progresses. In an embodiment, each reel **320** of a number of reels is controlled or managed by reel controller **310** and driven by its associated reel driver **310**. Reel controller **310** may control each of a number of reels independently.

[0022] **FIG. 4** shows an embodiment of a reel spin profile **400** that may be implemented using an embodiment of a gaming machine **300** as discussed with respect to **FIG. 3**. Reel spin profile **400** is shown as two curves, a desired reel control profile **410** and an approximate reel profile **420**. The desired reel control profile **410** is substantially smooth and represents the desired profile for controlling the reel according to a specified game for the gaming machine. In various embodiments, at some points or intervals in time, the velocity may be negative. The negative velocity represents a change in rotational direction. Such a profile as that of desired reel control profile **410** shown in **FIG. 4** would be very difficult to attain by manually creating a typical lookup table containing delay values that would cause the reel to behave in the manner as desired reel control profile **410**. Further, the amount of data could easily become prohibitively large for the typical table lookup approach. An embodiment using approximate reel profile **420** to approximate or represent the curve of desired reel control profile **410** with line segments may provide a dynamic approach that avoids the data intensive approach of typical table lookup scenarios.

[0023] In the embodiment shown in **FIG. 4**, desired reel control profile **410** is effectively realized using approximate reel profile **420** that includes a number of line segments. Each line segment is completely defined by two points according to the equation of a line: y=mx+b, where m is the slope of the line and b is the y-intercept. This equation allows all points along the line to be derived. For each line segment of approximate reel profile **420**:

[0024] y→v, where v is velocity,

[0025] x→t, where t is time,

[0026] m=a, where a is acceleration, and

[0027] $b=v_0$, where v_0 is velocity at time t=0, where the equation for each line segment becomes $v=at+v_0$. The slope given by the acceleration, a, is related to the velocity, v, as a=dv/dt, that is, the acceleration is equal to a change in velocity with respect to time. This slope for a given velocity vs. time line segment can be calculated as,

$$a=(v_f-v_i)/(t_f-t_i),$$

[0028] where v_f is final velocity, v_i is initial velocity, t_f is the time when the final velocity is reached, and t_i is the time