Joshua Gleason
gleaso22@gmail.com

October 25, 2010

1   Video Slot Machine

The purpose of this paper is to propose a new design for a casino style video slot machine, and attempt to resolve possible implementation issues. The pay-back rate for the slot machine must be approximately 85%. This means that for every $1.00 that a patron inserts into the machine, about $0.85 will be returned.

Before implementing a slot machine, the design must be carefully determined by weighing different design choices and choosing the one that seems right. There are a few major decisions that need to be made in order to develop a good slot machine. The first decision is the type of slot to be used. From personal observation, it seems that the most enjoyed slot games are those that use spinning reels and those that use playing cards. This can be verified by observing that most video slot machines are in one of these two categories. The second factor is the how well the odds can be controlled in the game. A few other factors such as the number of credits to be used and the slot's theme need to be carefully choosen in order to attract the most players possible.

The type of game in which the odds can be controlled the best, is the spinning reel type games. Virtual reel games can very easily be controlled by telling the machine what combination to produce; Even before the reels are spun. Games with playing cards like blackjack, can be very difficult to control the true odds on. The odds are generally more difficult to calculate on these games because they are generally more interactive. Furthermore, people can easily tell if the deck has been being shuffled correctly by keeping track of which cards come out. There have also been problems with card games in the past. For example when the book "Beat the Dealer" came out, it actually showed that the player could put the odds in their own favor by simply keeping track of previous cards and varying bets. Because of this risk, the game is to be implemented using a spinning reel design.

Because the reel type design was chosen, a few key decisions specific to this type of machine have to be considered. These decisions include determining the number of reels on the slot machine, the types of symbols to be used, and the pay-out combinations.

For choosing the number of Reels on the machine, the following train of though was used. A machine with too many reels will confuse and frustrate the player, causing them to lose interest quickly. Conversely, a slot with too few reels will be cause the player to become bored. Because of this, the ideal number of reels on the machine was chosen to be four. Four reels seems to be non too few, but also not enough to be confusing.

The next choice is to choose the number of credits allowed to play per hand. While only allowing a single credit to play would turn away most players, allowing too many credits would turn away people who only play the maximum credits. To determine the correct number of credits in the machine, a small verbal survey was conducted. The survey asked the participants the following questions, "Would you be willing to play the maximum credits on a quarter machine if the maximum was X credits" where X was 3, 5, 7, and 10. The number that most people stopped at was five. Using this information the maximum credits to play was determined to be five. As with most slot machines of this nature, a "maximum credits" bonus will be given so that playing the max bet will have a higher pay-out for the jackpot.

Determining which symbols to use on the reels is more of a personal choice, but they must still be chosen carefully in order to attract as many people as possible. If the symbols are bland and boring, it seems reasonable that not a great deal of people would be attractted. For example, if the reels had plain black numbers with no other values, most people would not be want to play such a game for an extended amount of time. To make this decision

easier, the choice was made to pick all the symbols out of two groups, the first group should be something that slot players associate with. Obviously the thing that slot players have in common is that they like money, therefore the first group of symbols will be derived from money. Most successful slot machines also have a role playing theme, such as Ancient Egyptian king, or a game show contestant. Because most people want to be famous, the role playing theme used in this game will be classic Hollywood(1920s through early 1960s). The reels on the machine will have famous people like Bette Davis, James Dean, and Katharine Hepburn. Another reason this category works well is because because there are enough famous people of old Hollywood to make a good number of symbols for combinations.

The symbols that will be used are the following.

1. James Dean
2. Marilyn Monroe
3. Katharine Hepburn
4. Humphrey Bogart
5. Bette Davis
6. Cary Grant
7. Judy Garland
8. Clark Gable
9. Spencer Tracy
10. Charlie Chaplin
11. Gold Bars
12. Pearl Necklace
13. Bag of Money
14. Rolls Royce
15. $

2 Pay-outs

The pay-outs will be calculated using the following table.

Reels	1 Credit	2 Credit	...	5 Credits	Starting Odds
4x Famous Person!	2500	5000		**50000**	1:500,000
Any 3 Famous Person	1000	2000		**10000**	1:100,000
4x Gold Bars	250	500		**2000**	1:20,000
4x Pearl Necklace	50	100		**250**	1:8,000
4x Bag of Money	25	50		**150**	1:6,000
4x Rolls Royce	20	40		100	1:500
4x $	17	34		85	1:500
Any 4 not $	15	30		75	1:200
Any 3 $	8	16		40	1:50
$ $ * *	4	8		20	1:20
$ * * *	1	2		5	1:10
Charlie Chaplin	N/A	N/A		Mini-game	1:50

The pay-outs in bold in the five credit column are better than five times the one credit pay-out. This is the incentive to play maximum credits mentioned earlier. For some extra fun, if the Charlie Chaplin symbol is hit, a mini-game will start that allows the player to choose a face-down card from a virtual deck. They will then receive the value displayed on the card. Every card will pay something, however most will pay only 20 credits. There will be a few high paying cards that pay amounts up to 1000 credits, but the player is very unlikely to pick these cards. The mini-game gives the player a sense of control, that if they choose correctly they could win big.

To ensure the odds stay around 85%, the starting odds of each pay-out will be multiplied by a value that will be determined dynamically. This value will force the odds to adjust to the correct pay-back rate of 85%. Basically, if the pay-back is above 85% then the odds will get worse, while if the pay-back is below 85% then the odds will become better.