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Independent Study Fall 2008 Summary

This independent study focused on the accessibility of slot machines by people with disabilities. This is a really important issue because generally people who play slot machines are older, and with age comes diminishing vision, hearing, and mobility. Traditionally, gambling with slot machines as been a particular personal experience, and many gamblers choose to keep their habits to themselves. This makes it difficult for a person with a disability to ask for help once inside a casino. The main goal of this study is to develop and implement a protocol for gaming devices that will allow players of all disabilities to enjoy slot machines. In a more general sense, this protocol (P2G - Player To Game) will define how an end user can use a player owned device on a slot machine in a casino which has the potential to benefit all players, not just disabled players.

The protocol has been designed such that a firewall type device will filter communications from the player owned device to the slot machine itself. This will hopefully avoid all the security concerns involved with a project like this. Even though it will appear to the player that he is plugging in a device to the slot machine, there is actually a mediator between the device and the slot machine itself. This device will have the ability to determine what information/messages can be passed on to the slot machine, and will thus be able to prevent attacks from the outside world. This feature was implemented with a gumstix computer running linux. The cost of this computer is around $100 and would be needed to be placed in every slot machine that will talk the P2G protocol. The cost of this could be dropped when purchasing in bulk or doing more research on a cheaper board, but for the prototype, this is sufficient. It contains two serial ports, one is connected to the slot machine, and the other is connected to the device. The device and the slot machine both talk through their serial ports through the serial firewall. To ease development, the protocol was also implemented across a TcpIp socket.

This study focused on the 4 basic types of disabilities: Auditory, Visual, Physical, and Cognitive. Each of these areas will be studied to show exactly how people with these specific types of disabilities are effected in a negative way when trying to play slot machine games. It will then be demonstrated how these are implemented in the P2G protocol (if possible).

For a player with a auditory disability, it will be difficult to play games or parts of games that rely only on vocal clues. Also, sounds add a great deal to the enjoyment of the game. Anticipation sounds create the feel to the player that he "almost" won something. Players thrive on that feeling and without it in the game, the play will suffer. The sounds in general give a player a sense that people in the casino are winning. It would be nice to be able to reproduce these feeling created by sound for players that cannot hear. For this project, the auditory disabilities were not addressed in detail.

Slot machines are primarily a visual device, so for people that are visually impaired, a slot machine may not be that appealing. For example, the player will have no idea how much money he has won, or how much money is remaining on the slot machine. He will not be able to tell if he is getting paid correctly or not. He will not be able to see how much the jackpots are. Large jackpots attract certain types of players, and without knowing what they are, a visually impaired person may not want to try to play. A visually impaired player has a hard time knowing what he is betting, or what the bet options are. He also has no ability to read the written instructions that are printed on the slot machine video screen, or on the cabinet surrounding it. The P2G protocol was implemented such that the game

would send the device the current credits on the machine as well as the current win amount after each game cycle. The device can also request the credit and win amount at any moment. In the example device, when it received any update for the credit or win, it would display it on the screen, as well as use a text to speech conversion to announce the current credits and win amount out loud. This allows the visually disabled player to know the state of the game without seeing the screen. Another assistance to a visually impaired player was to audibly announce what is on the screen. In this mode, a player will drag his fingers over the touch screen of the slot machine, and if an active touch area is below the player's fingers, an audio clue will be announced indicating what is beneath a player's fingers. For example, the clue might say "Cash Out" indicating if the player presses in that area, the machine will cash out the players credits.

For people with physical disabilities, it is hard for them to actually press the buttons on the slot machine itself. Games are not geared towards people in wheel chairs. A person in a wheel chair will have a difficult time pressing the buttons on a slot machine, which can convert the enjoyment of gaming to the embarrassment of struggling to press buttons. Also a person with a shaky hand will have a difficult time getting money into the gaming device. To address physical disabilities, several functions were implemented. First off, a mouse pointer was added such that a player could control a slot machine from a mouse type device. The protocol indicated the coordinates to place the cross hairs on the slot machine screen. The protocol also allows for a "click" command, and when the slot machine receives it, it simulates a touch on the touch screen. This would allow a person who cannot move his arms, but can move his fingers to control the slot machine. For a person who can move his had in an up and down motion, but cannot reach the slot machine screen or the button panel, another mode was added. In this mode, the slot machine flashes a semi-transparent box on the screen. The player utilizes a large button, and times the press of the button with the semi transparent box on the screen. If the area the player wishes to touch is beneath the semi transparent box, the player presses the button. As the series of presses continues, the gaming device "zeroes" in on the actual area the player wants to touch, and eventually simulates a touch on the touch screen in the area the player is interested in. One last mode is to flash the button panel physical buttons in sequence. If the player wishes to touch one of the buttons, he will press the button on the P2G device when the desired button on the slot machine is lit.

And finally, people with cognitive disabilities can have issues understanding the games. Maybe they have dyslexia and transpose numbers, or they have language issues and need things translated. Although not implemented, all of the information is being sent to the P2G device such that a simple translation could occur and either display the information in the desired language, or audibly announce the information in the language. The conversion could be done using any off the shelf language conversion program if the P2G device is running Microsoft Windows.

This study demonstrated a prototype of how the Player To Game protocol could function. It was written for a simulated environment to ease development and was also implemented on a standard slot machine, with the intent to be as less intrusive to the gaming device software as possible.