Project Proposal

Parkinson’s disease is a chronic movement disorder which progresses over time. There is no cure for Parkinson’s disease but some research has suggested that exercise can decrease the rate of advancement of the disease. Additionally, a lot of Parkinson’s patients feel very rigid with the advancement of the disease and exercise helps them feel flexible. For my term project, I would like to use a combination of Kinect and pygame to come up with a fun way to make the Parkinson’s patients move.

The program will consist of several mini games where each game targets a different motion. The games I would like to include are fruit ninja, soccer, and boxing. More games can be added later if time permits. One of the features of the program will be to detect if the person is losing the game too quickly because he/she is not flexible for the game. If that is the case, the screen will pop up with a type of stretch they should do to make them more flexible before moving on to the next game in the series of mini games. This can be done by using timer fired and the number of times the person has missed the goal of the game (kicking the ball for soccer, slicing the fruit for fruit ninja, etc). If the number of misses is greater than 10 in a certain amount of time measured by time delay, then the screen can pop up. In addition to the stretch screen popping up, I would also like to include a way for the Kinect to detect if they are doing the stretch correctly. The body part detection capabilities of Kinect will be able to help with this feature. I can calculate the slope between two body parts to determine if they are stretching enough.

Another feature I would like to add is that the game switches automatically after several minutes of playing the game if the person hasn’t had enough misses. This is because it highlights that the person is already doing well with the motions that the game is targeting so he/she needs to move on to other games to target other motions. This can be done by using timer delay and the number of misses again. If the number of misses is less than 10 in a certain amount of time, then the game can show a “Good Job” message and move on to the next game. A “soccer.isGameOver” Boolean value in init can be changed easily to force the game to be over without the person actually losing the game.

The last feature I would like to add is for the program to remember the data of the person from the last time they played the games. With this data, the program will know which games the person did not do so well and hence which movements the person has to improve. So the next time he/she plays the game, more time will be spent on the games he/she did not do so well the last time. This can be done by keeping track of the number of misses in each game and saving just the number of misses at the end of all the games as a 1D list. Each element in the list correlates to the number of misses and the column would keep track of the game (0th column is soccer, 1st column is fruit ninja etc.). The amount of time each game will be played is by multiplying the number of misses from the game by a certain amount of times (ex 30 seconds per miss) so more time will be spent on the games with more misses. And if the person improves at this game, then the previous feature will be able to detect if they are doing really well and switch to the next game.