COMP 437 - Game Controller Development Part Report

In this project, I used the snake game as a game. With the help of pygame, I coded a snake that moves up and down, left and right very simply.. I added two fruits to the random locations on the game canvas. When the snake eats these fruits, it takes the colors of the fruits and the snake grows in length after each eaten fruit and scores updates. Fruits are 10 by 10 squares. There is also a poisonous mushroom in the game. Poisonous mushrooms are larger than fruits and red in color. There are two ways to finish the game. One is to touch the poisonous mushroom and the other is to use the q key on the keyboard. When the game is over, an end screen appears where the score can be seen and the game can be closed.

Afterwards, I wanted to use voice recognition to make this game intelligent. However, the model I trained by using tenseerflow's speech command dataset and the Google api were not very successful in recognizing commands such as right and left consisting of one word. It did not seem possible to achieve high accuracy with voice recognition. Also, since the voice recognition part took some time, the snake's movements were not smooth and required the player to wait. For this reason, I decided to play this game using hand gestures.

I used opencv and mediapipe libraries for hand gesture recognition. I encoded the right, left, up and down commands by looking at fingertip and wrist landmarks in real time frames. This is how I made the snake game playable without the help of a keyboard. After extracting the frames with the help of opencv, I got the landmarks with the medipipe hand gesture recognition and estimated the orientation for the hand from the coordinates I obtained, this way the game can be played much faster.

But I think users may find this speed a bit too much and it is a little difficult to show the right hand to make the snake go to the right. I used my right hand for hand gestures. Guiding the movement with the front or back of the hand has no effect on the result, but the hand must always be open when giving commands. This makes it difficult to steer to the right. Based on comments from users, I think maybe the gesture can be encoded just based on the thumb sign. The speed is inversely proportional to the size of the snake, so the snake has grown. It becomes easier to play the game.

Instruction for Snake Game:

- Make sure your hand is visible from the camera when you start the game, otherwise hand recognition will not work and the game will end before it starts.
- You can continue the game without worrying about hitting the walls.
- Avoid the red mushroom, it's the only thing that can cause you to lose the game.
- Make sure your hand is open when giving commands with your hand.

P.S. I'm submitting an executable because I coded the game with python. But in order to run the exe, some folders which have dynamic binding must be in the same folder as this exe. For this reason, I am sending the folder containing the necessary files. You can find exe in 'snake-game/dist/main/main', when you double click for the first time you need to give permission for camera access, then you can play the game.