Movement Controlled Snake-Game

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Porter Doughty

Goal:

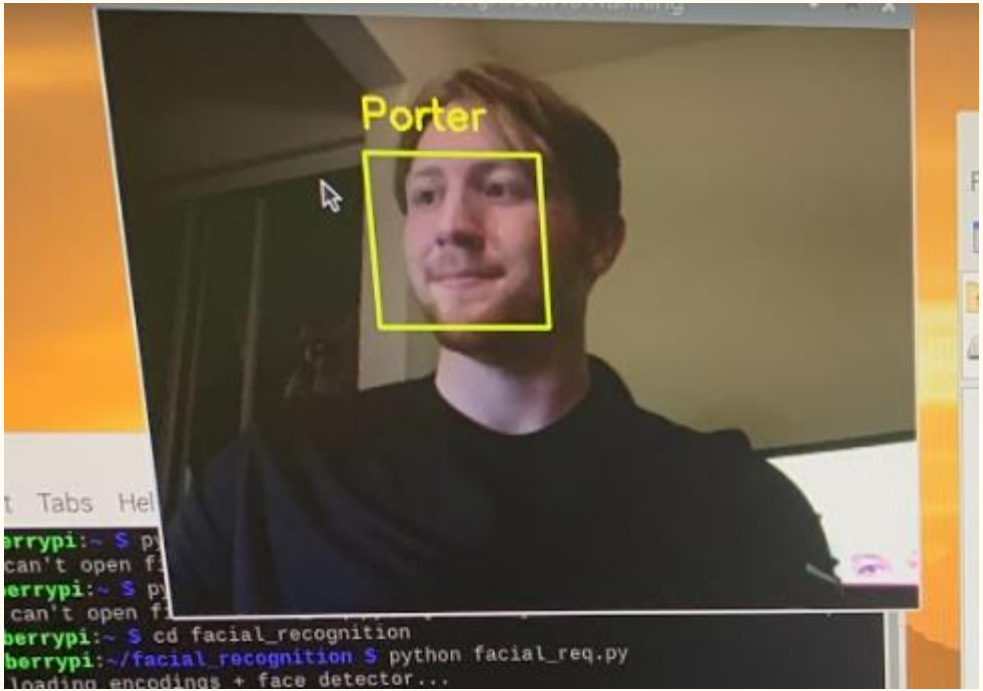
Utilize facial detection software to implement a system of control based on movement.

OpenCV

OpenCV

Open source computer vision, or OpenCV, is a python library that contains modules used for facial recognition, object detection, and various other camera related functions.

- Imshow
- Read
- Draw



Calculating Inputs Based on Movement

Bounding box and center point calculation

Once OpenCV was working on the raspberry pi with the raspberry pi camera module, the next task was to create the bounding box and calculate the center point based on the box drawn around the face.

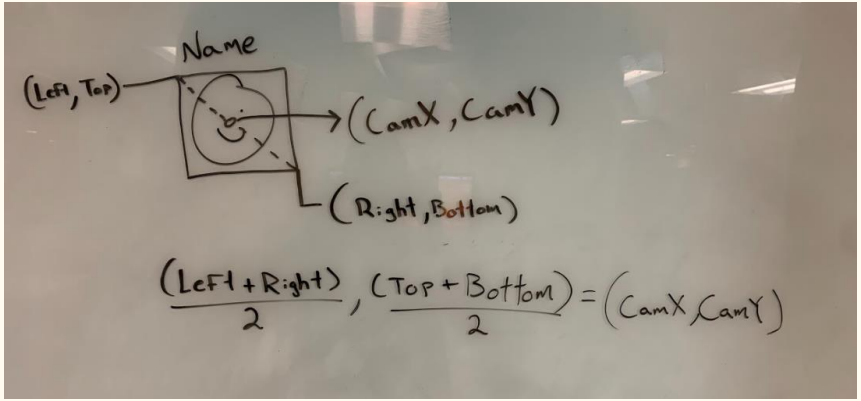
The formula being used is

L = X coordinate of left edge

R = X coordinate of right edge

T = Y coordinate of left edge

B = Y coordinate of right edge



$$\frac{(L + R)}{2} , \frac{(T + B)}{2} = (\text{CenterX} , \text{CenterY})$$

Inputs based off location of center

Now that we have the point, we have to divide the window into a grid system.

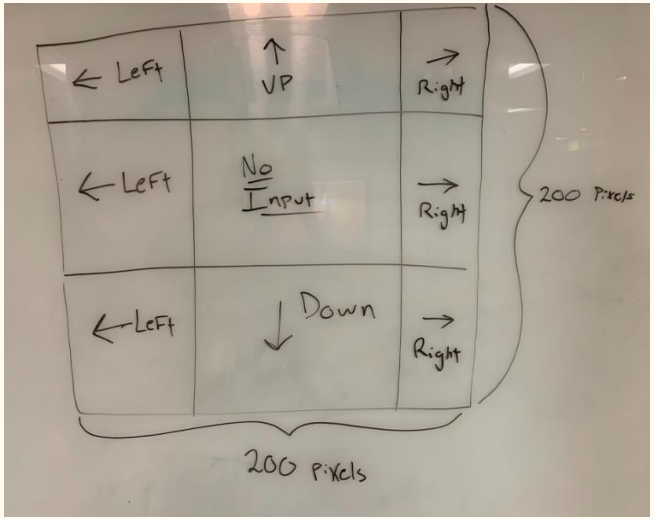
Depending on where the center point is, a different input will be written to the text file inputData.txt.

Left = “L” written to file

Right = “R” written to file

Down = “D” written to file

Up = “U” written to file

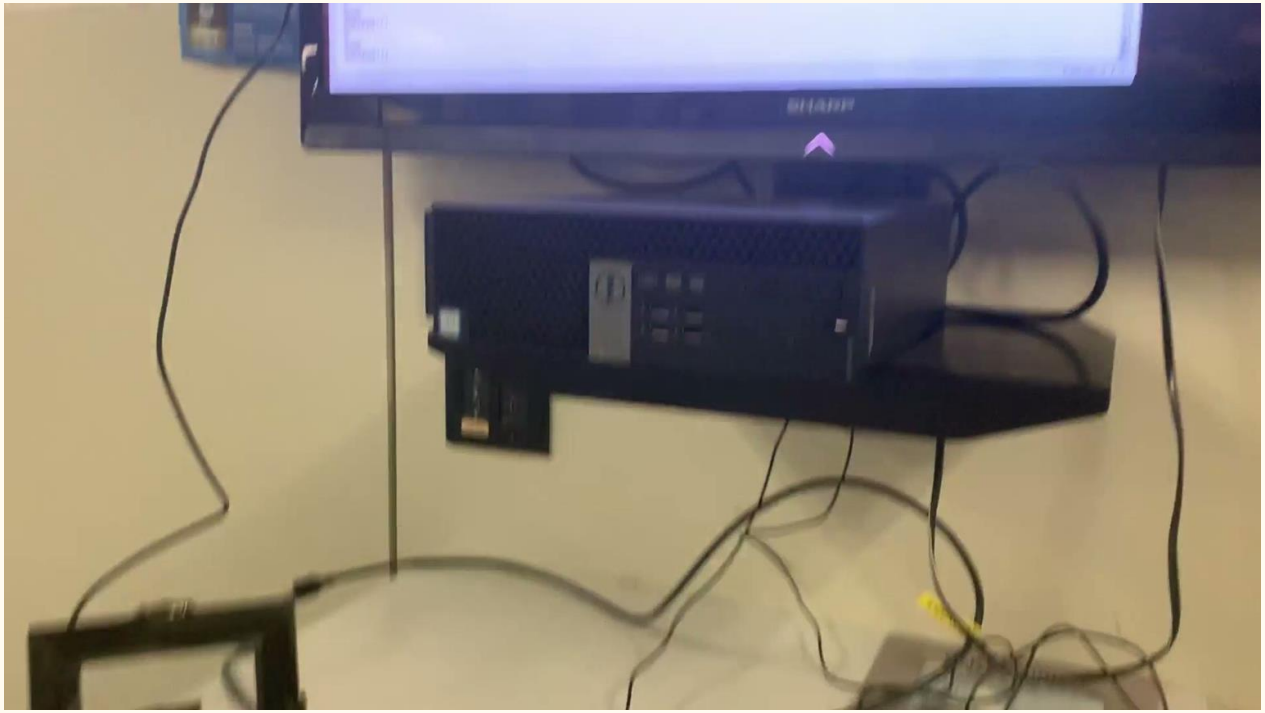


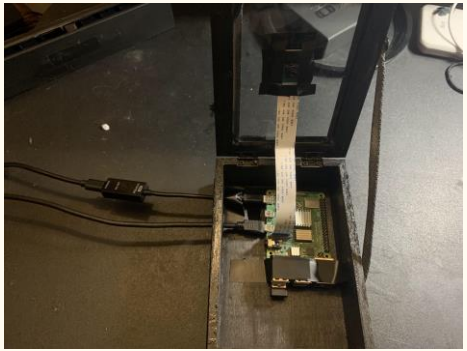
Controlling the snake!

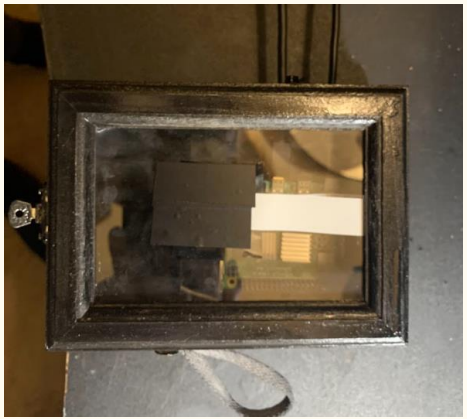
With a real time, constantly updating text file. We have to adjust the code in the game script to take the characters written to the text file as an input.

Ex: inputData.txt = “L” / (inside of game script) if getline of inputData is “L”, go left

Presentation







Future implementations and projects

There are an abundance of applications utilizing OpenCV. Some future projects I would love to partake in include but are not limited to...

- Full Body tracking
- Automatic Facial recognition of unknown users and creating new profiles.
- Different games, (I was thinking specifically of something like red light, green light...)
- Possible implementation with robotics and drones.
- Facial recognition based cloud server, no passwords, only verified users.

References and Acknowledgements

"https://forum.core-electronics.com.au/t/facial-recognition-with-raspberry-pi-and-opencv/10845" - Tim, blog posts, accessed December 15, 2021

"https://www.pyimagesearch.com/2018/09/24/opencv-face-recognition/" - Adrian Rosebrock, accessed December 8, 2021

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