Aerial Robotics Kharagpur Task 2.2

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I. INTRODUCTION

The task was to create a game of making a virtual football respond to the user's head movement via computer vision.

II. PROBLEM STATEMENT

"You have to make a game environment where you can play a similar game. Your face will replace Tom's face. For that you have to detect and track your face, assume your face to be a perfect circle. You'll have to keep a track of the ball as well. The ball should follow the laws of physics and the collisions can be assumed to be perfectly elastic. The game ends if the ball drops to the floor. "

III. RELATED WORK

I had to learn OpenCV from scratch and I had no previous knowledge of computer vision. I had to learn all the basics of CV programming and face detection in it. A motor problem was installing the required softwares for the task. My computer was not responding correctly to python in openCV and I tried to reinstall all the necessary components again and again. This took a lot of my time and after 1 week I gave up and started doing the programming in C++ trying to install all the necessary components. This again was a very difficult task to do in Mac environment but after 2-3 days finally the openCV was installed and ready to code. But again there was a problem since there was plenty of content for openCV on the internet BUT only in python and I had to basically scourge the internet for C++ resources. But at the end after many failed attempt the task was done, not in a very high-end fancy graphics way but very much functional.

IV. INITIAL ATTEMPTS

The first of my attempts was to just take the distance from the users face's centre point and the ball's center point including the wall's exceptions.

V. FINAL APPROACH

The distance method worked fine I added a circle around the users face to confirm that the program was detecting it. For elastic collision I designed a simple yet roughly accurate algorithm which changed the direction of the ball in opposite sense from where it came from both horizontally and vertically. An end screen was also added to the program instead of just terminating.

VI. RESULTS AND OBSERVATION

The result was a fairly working game with not many aesthetically pleasing aspects but working. Instead of a football an circle with thick borders was used. I have attached an image of a snapshot.
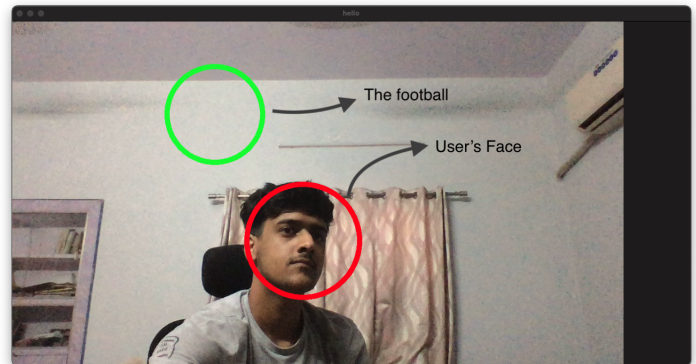
VII. FUTURE WORK

Write about the problems in your algorithm / approach and limitations in testing (if any due to hardware or otherwise) and how to tackle them and any future work which can be done to improve the results further.

CONCLUSION

The problem made me learn openCV basics and I learned the fascinating concept of Compute Vision which earlier had a less interesting image in my mind. This also evidently helped me in understanding many concepts of my OS and terminal which is not very significant but I would like to mention it. Overall the problem had many critical thinking and learning aspects and it was my first project in which I could see the outcome of my coding as until now I had only done coding in PDS Labs and CC competitions and it was a very nice experience to see your code working in a real life application for the first time.

REFERENCES

[1] https://github.com/opencv/opencv/tree/master/data/haarcascades - for the face detection algorithm
[2] for learning the basics of openCV and installing - https://www.youtube.com/watch?v=2FYm3GOonhkt=4177s https://www.youtube.com/watch?v=WQeoO7MI0Bst=357s. https://www.youtube.com/watch?v=o62iO8SssZk