Motion/Gesture Controlled Computer Interface

Introduction

Interacting with technological interfaces generally requires peripherals to perform tasks. With advanced gesture analysis software, a person could be able to control a machine with just their bodies. Modern society is currently blessed with the ability to control everything in their household, from lights to appliances, with their phone, but with improvements to gesture analysis software we could be controlling our home with hand and eye motions and gestures.

Method

For this problem, I am going to start simple with just detection of certain hand motions including hand acceleration/velocity and whether the hand is open or closed. I will create an interface for the user to interact with that performs basic computer interactions such as dragging and dropping icons, opening and closing these icons, and other tasks related to directly interfacing with the computer via their motion.

Resources

https://github.com/sashagaz/Hand_Detection - Finger detection
https://github.com/lzane/Fingers-Detection-using-OpenCV-and-Python
https://github.com/erichare/Hand-Tracking - Hand detection
https://www.intorobotics.com/9-opencv-tutorials-hand-gesture-detection-recognition/

Results

I plan on creating an interface in which a user can interact with using their hands (think normal computer functions like dragging and dropping). I also want to create a sort of “game” where one or two users can play catch with a ball on the screen. This ball would be affected by gravity but if a hand closes its fist it can catch the ball, and then open their hand while accelerating their hand upwards to throw the ball. I will evaluate my results by how easy it is to drag and drop icons, how easy it is to open and close the icons, and how comfortable the “game” is to play. I realize that I will face the same problem that weather people deal with on a day to day basis where they have to coordinate their body in an artificial plane. While I work on this project, I would assume I will get coordinated enough to handle it appropriately, but I feel if I get a person's first look at it, it will feel very clunky to them. This first time use clunkyness is something I would like to try and remedy as well.

References

https://arxiv.org/abs/1602.04124
https://www.cv-foundation.org/openaccess/content_cvpr_2014/papers/Qian_Realtime_and_Robust_2014_CVPR_paper.pdf