Journal Report 6
10/7/19-10/11/19
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Daily Log

Monday October 7

I continued debugging, and found out that the problem originated from the rotation methods. Those methods aren't just shifting the order of the arrays in the big cube array. They also include circulating some of those subarrays, since it's hard to keep things symmetric when working with a 2-d representation of a 3-d object. I fixed the x rotation method.

Tuesday October 8

I fixed the rest of the rotation methods: x', y, y', z, z'. I the whole cube, but noticed that I forgot to circulate the two arrays (sides) not in the plane of rotation. I added that code in. I tested full scrambles for the whole cube including all the moves coded, and everything seems to work. I changed the colors of the cube slightly to make it more appealing.

Thursday October 10

Went over my partners code for edge detection. Researched how to make the edge detection algorithm better and more defined. This way, the edge detected version of the cube will work even for faces that are not facing the camera. A lot of times the person solving the cube will turn the cube around during the solve, and the program must be able to handle those bad camera angles.

Timeline

Date	Goal	Met
Today minus 2 week	Finish updating the GUI for the cube moves so that the live T-display works for the whole cube. Review edge detection in opencv, and upload a sample image of me holding a cube onto the python program to test the edge detection.	Yes, but realized that there are more moves that change the orientation of the centers. These should be a quick add next week though.
Today minus 1 week	Begin coding edge detection to eventually determine which frames of the video the cube are in the shape of a cube (not in the middle of turning),	No, didn't start this since I realized that there are more moves I need to code, so was coding those.
Today	Finish the fully working cube GUI with all the moves, and begin coding edge detection to eventually determine which frames of the video the cube are in the shape of a cube (not in the middle of turning),	Yes, finished the fully working cube GUI and started researching and coding edge detection.
Today plus 1 week	Upload a sample image to program, and be able to get a picture of just the edges on the image. Possibly, zone out everything but the cube outline and the lines separating the squares.	
Today plus 2 weeks	Identify the colors of the centers of the squares in the visible edge detected image. Use this to determine the orientation of the cube in the image.	

Reflection

This week, I completely finished the cube GUI part, and began the CV part of the project. The problem with the cube GUI originally was with the indexing of the 2-d representation of the 3-d array. Instead of a rotation method being just switching the order of the six side arrays, I had to tweak some of the orders of the subarrays (stickers on a face). At first, I forgot that the sides along the axis of rotation would actually change since everything I tested was too simple with solid colors on those two sides. After realizing this, it was a tedious but easy fix. I began the next step of the project with opencv edge detection. Overall, this week went pretty smoothly, as I was able to fix my problems from last week and move on to the next part of the project.

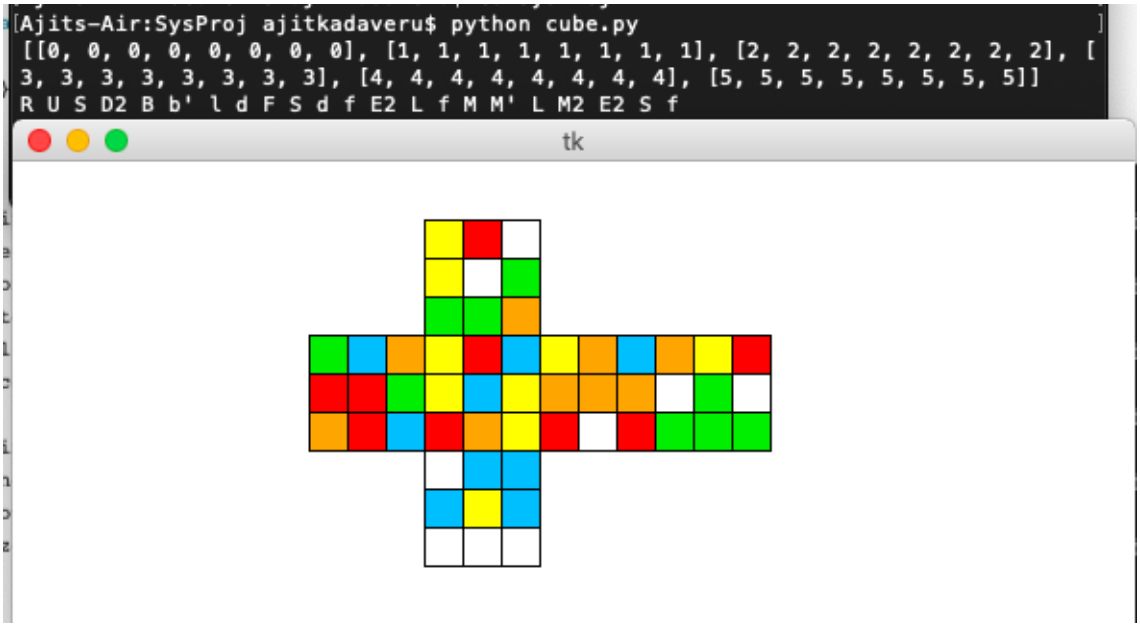

Figure 1: An image of the fully working cube GUI