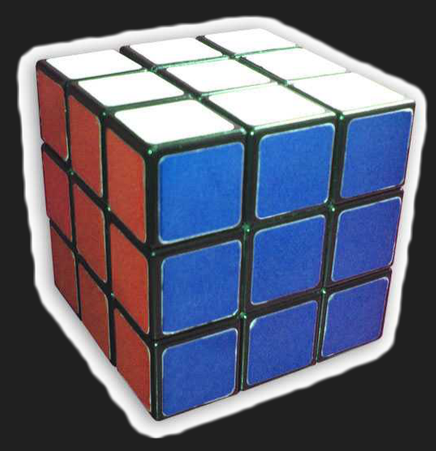
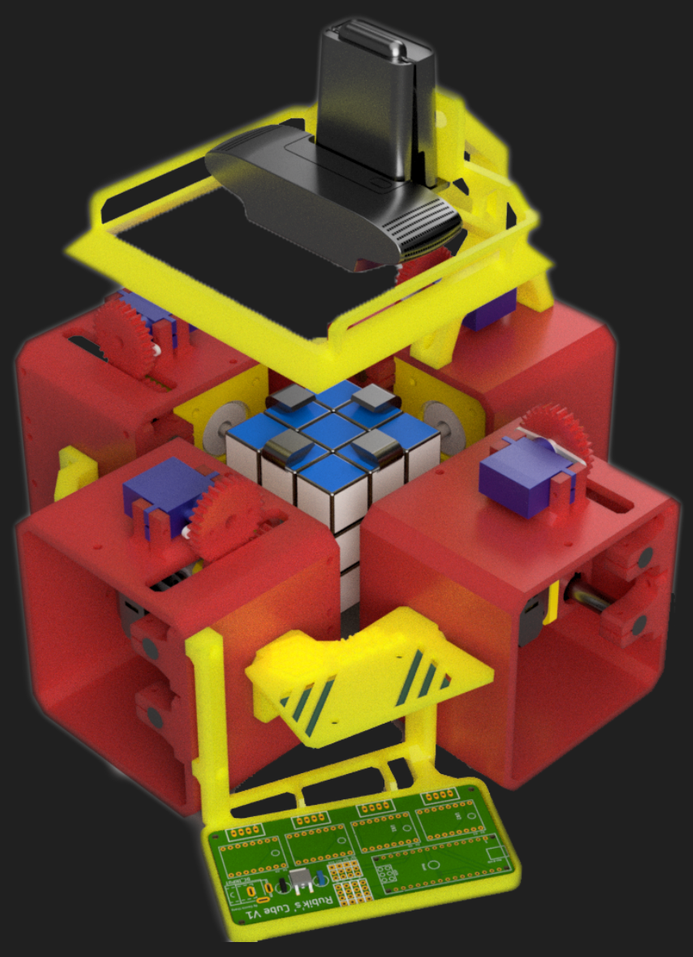
RUBIK'S CUBE SOLVER

Rubik's Cube



Rubik's Cube, a 3-D combination puzzle invented by Ernő Rubik in 1974, is the World's top-selling puzzle game and best-selling toy. Rubik's Cube is surprisingly complex, there are 43,252,003,274,489,856,000 permutations of a standard 3×3×3 Rubik's Cube.



How this Cube Solver works?

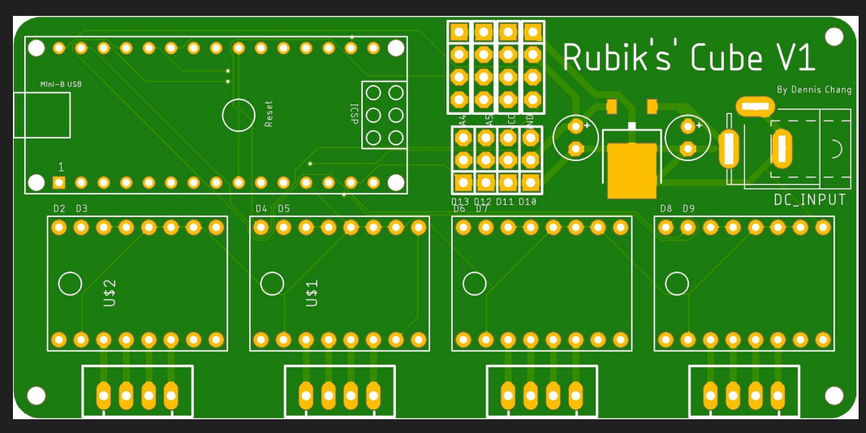
Step 1: First of all, the camera is going to capture the image of each face of the cube. These images will then send to the computer.

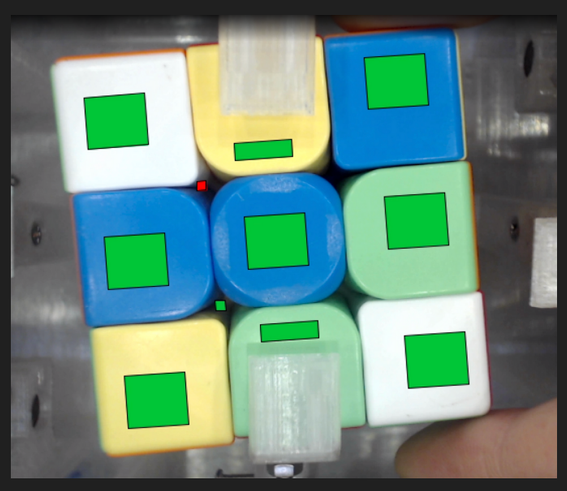
Step 2: The computer will then process these images and found out the color arrangement of the cube.

Step 3: Once the initial state of the cube is determined, the computer can then compute the sequence of moves and send these moves to the microcontroller of the Cube Solver, the Solver will then solve the cube by twisting the Cube using Servo motor and Stepper motor.

Design

I design this Cube Solver using Fusion 360 and Eagle from scratch. This robot consists of 4 stepper and Servo motors, 4 pairs of 3d-printed clamp and frame, a camera and a PCB board.





Programming

In order to determined the position of the Cube inside these images, I implemented a Computer Vision algorithm that will track the position of the Cube.