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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Artificial Intelligence

Project Synopsis
"Rubik Cube Color Detection & Solving Assistant"

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Rubik Cube Color Detection & Solving Assistant

Using Image Processing to detect the colors of Rubik's Cube, and then solving it step by step

Introduction

Rubik Cube is probably one of the sought-after toys for most of the people with a problem solving attitude and is definitely, the one that helps to build the problem solving attitude in a novice.

There are more than **43 Quintillion** ways (> 43×10^{18} ways) to scramble a 3×3 Rubik's cube. There are many programs to have the solution of a scrambled cube, but for that conventionally, we have to provide the total permutation of all 6 faces manually, which is a very hectic job, to eliminate the job, we are scanning all sides of the cube to generate a virtual vision of the cube to generate the solution.

Objective

Objective of the project is to scan and extract the colors from all the faces of the Rubik's cube to generate its solution.

Proposed Methodology

We will extract the colors from all the faces of the Rubik's Cube using the camera frame by frame, and face by face by applying the Edge detection and the color detection techniques.

Once the orientation and color patterns of each faces are recognized, we will aim at generating the step by step solution for the provided scrambled Rubik's cube, using the dedicated algorithm for solving the cube.

We will follow the Layer by Layer approach in solving the cube, and not messing up with the pieces already in place.

The output will be the list of steps to be followed to solve the cube puzzle. The output will be represented in form of the universal notations used to denote the rotations of faces of cube, along with the digital images of the cube orientation after each step.

Expected outcome

Steps to be followed to solve the Rubik's Cube using the images of the faces of the cube captured by the camera.