

Project Name: **Rubik's Cube Solver**

Team Name: **The Decepticons**

Team Members:

Savyaraj Deshmukh (150100041)

Akhilesh Somani (150100040)

Tejas Adsul (150100028)

Ritesh Burde (150040028)

Project Description:

The project will be executed in parts, the next part being worked upon with the success of the previous one. The main task would be the construction of the framework of the bot. This will mainly include assembly of the motors and arms for the rotation of the cube. We will research and decide most efficient design of the arms.

Following this will be the coding part of Arduino, which we've to comprehend from the very basics. This code will be the one which is most suitable for our chosen design of the bot. First we will learn the coding required for working of servo motors and stepper motors. Then we will move on to

coding for actual solution of the cube. We will also work on motor drivers of the stepper motors.

If above things go as planned, we will move on to Image Processing part of the project. This will include capturing all the faces of the cube and sending the data to the processor as an input. We will consider this part as success if we get output as expected.

Our primary focus is on minimizing the time required to unscramble the cube, by using an optimal algorithm and efficient mechanism. If 3x3x3 cube is a success, we plan to make necessary upgrades for making the same bot a 4x4x4 cube solver too.

Timeline:

- Week 1: Finalizing the mechanical structure
- Week 2: Learning functioning of stepper and servo motors and its linking with Arduino and motor drivers
- Week 3: Completing the mechanism by calibrating motor arms and supports and finding most efficient algorithm for the solver

- Week 4: Coding for Arduino and assembling the whole system
- Week 5: Image processing
- Week 6: Work on 4x4x4 cube solver upon success of the 3x3x3 one.

Components:

- i. Rubik's cube
- ii. Arduino
- iii. Stepper motors
- iv. Servo Motors
- v. Motor Drivers
- vi. Camera
- vii. Plywood
- viii. Other electrical components (jumper wires, screws, breadboard etc.)

Estimated cost: Rs. 10,000 to 12,000.

Learning Objectives:

- Learning Rubik's cube solving methods
- Image processing

- Programming for the algorithms
- Applications of Arduino
- Assembly of servo and stepper motors
- Working on mechanical structures