Rubik's Cube Solver Robot

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Project Aim

To make a robot that solves Rubik's Cube

Project description:

The cube should be placed in position and the Robot when switched on and the pattern is given as input from the Android app, the servos actuate and solve the cube to get the same color pattern on each side, to do this the robot is preprogrammed to calculate the number of twists and turns required to solve the cube. Depending on this calculation the servo motors actuate to solve the Rubik's cube.

Hardware Used:

- **Arduino Uno:** The digital and analog input/output pins equipped in this board can be interfaced to various expansion boards and other circuits. The serial communication interface is a feature in this board, including USB which will be used to load the programs from computer.
- **Servo motor:** Servo motor is a rotary or linear actuator which allows for precise control of angular positions. These motors are used as a high-performance alternative for DC motors, you can use the servo motors to actuate the twist and turn of the Rubik's cube.
- **L293D Motor driver:** You will need a motor driver to run the motors, L293D is a typical motor driver IC which allows the motor to run in both the directions and you can control two motors with one IC.
- **Robot chassis:** You have to build a robot which can twist or rotate the cube, the robot should also be able to hold the cube while rotating it.
- **ESP8266:** ESP8266 is a WI-FI module which uses 802.11 b/g/n protocol, and has an Integrated TCP/IP protocol stack, which offers a complete and self-contained WI-FI networking solution.

Software Used:

- **Arduino IDE Version 1.8.5 :** You will be needing Arduino IDE software for writing and uploading the program into the Arduino Uno board.

- **MIT app inventor 2:** This software is an online based android app development platform you can use MIT app inventor 2 to create your app.

Approach

1. Build the robot such that the cube when placed on the robot is inclined at an angle of 40 degrees and the cube should be placed on one of the servos for twisting so that it changes the pattern.
2. An arm should be used to turn the cube to change its side, this arm should be actuated by another servo motor.
3. The arm should also hold the cube while twisting it.
4. Develop an android app from which you can select the pattern of the Rubik's cube and this pattern you select is the input for the robot.
5. Program the robot such that it takes the color pattern of each side as the input and depending on the input the robot has to calculate the possible ways to move the servo motors and twist the Rubik's cube to solve it.

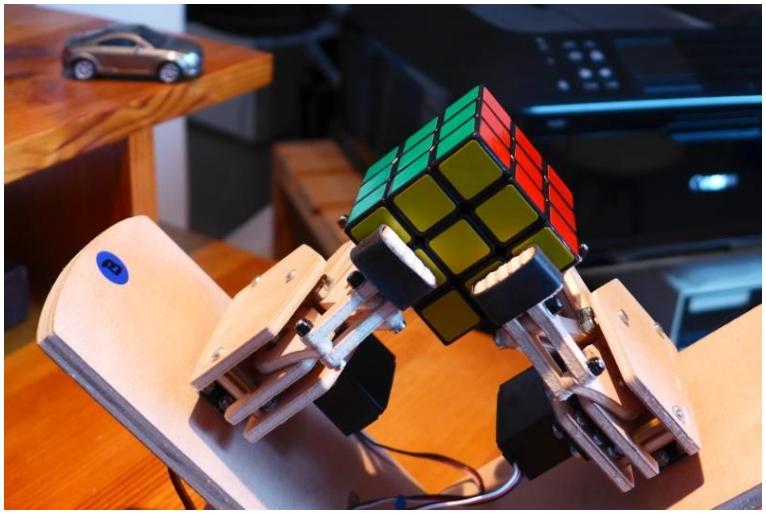

Figure 1: 3D simulation