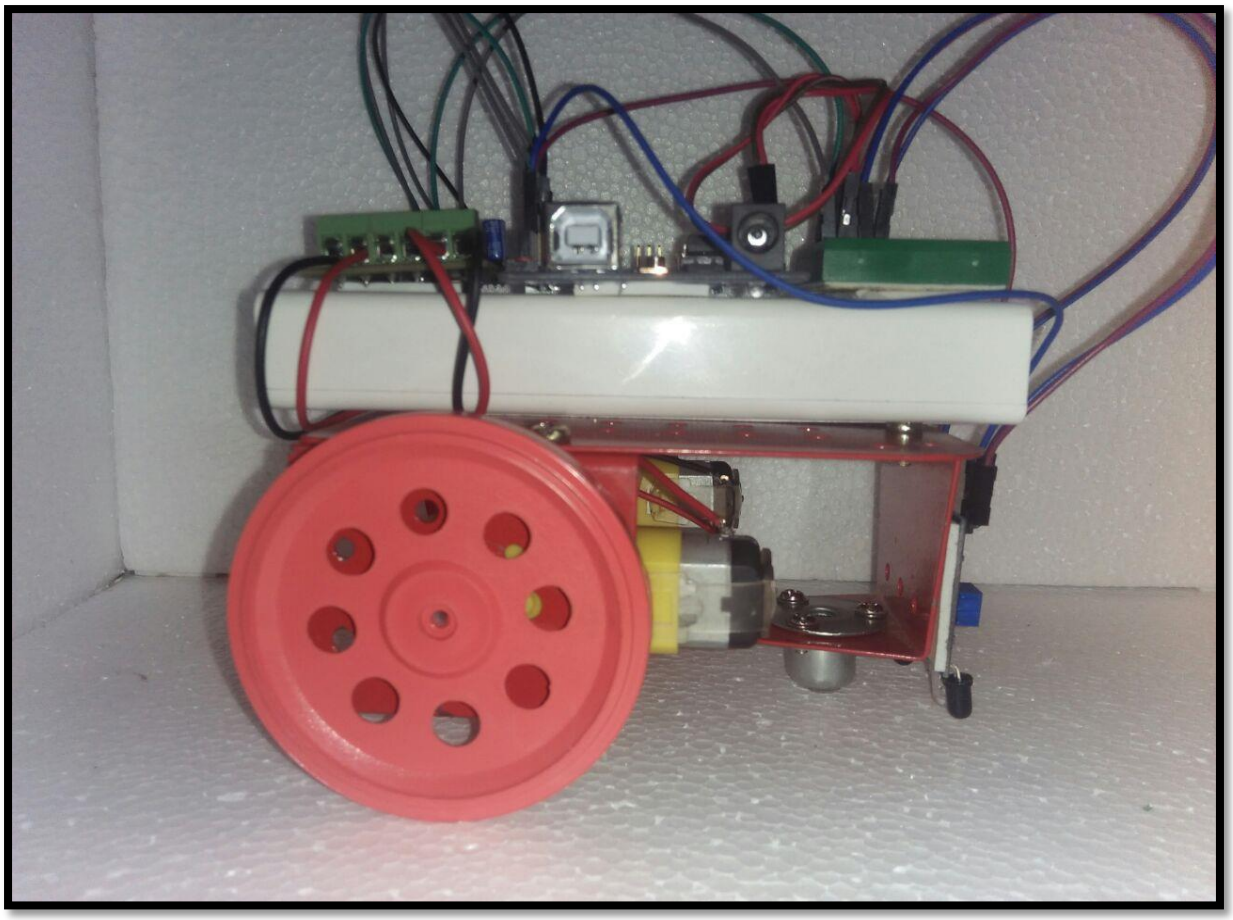
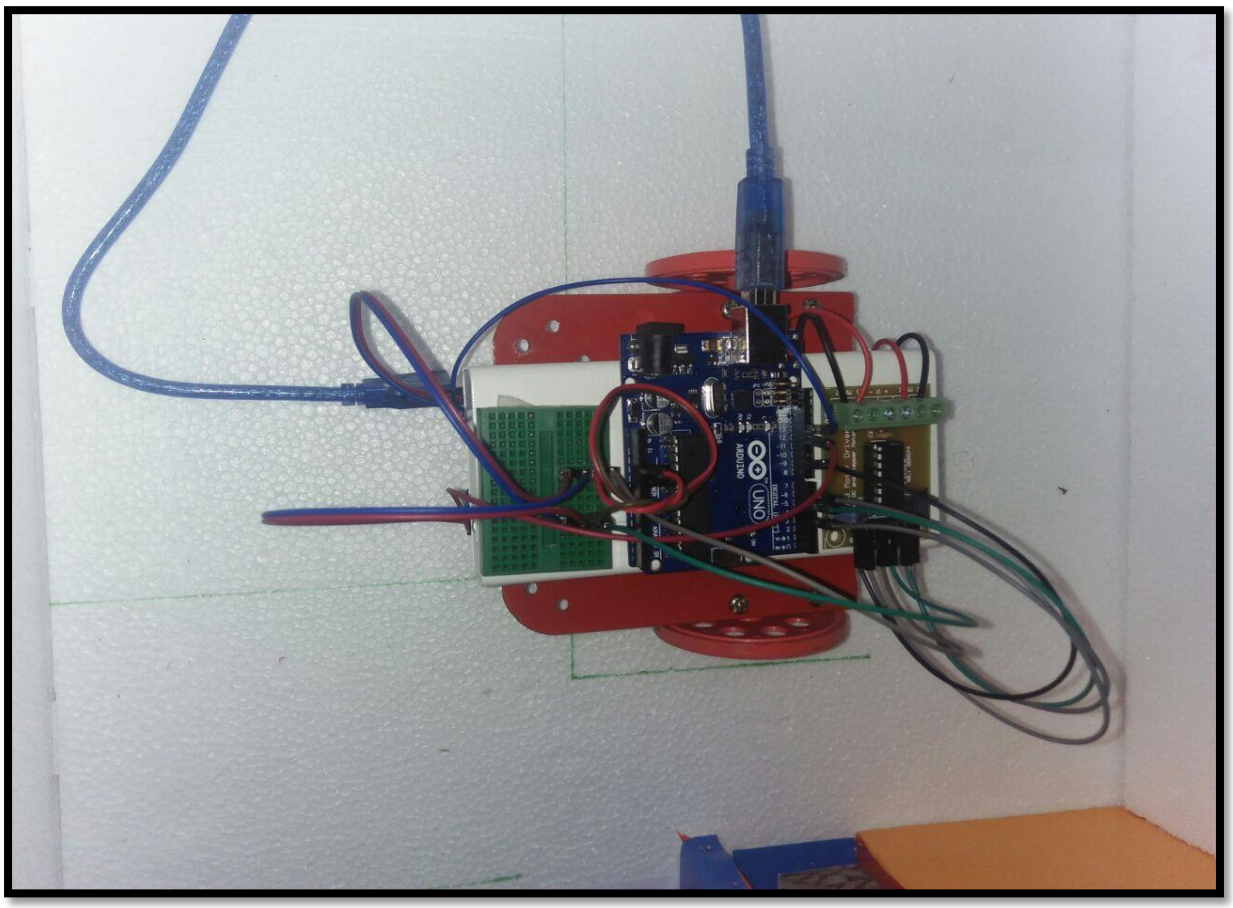
Line Follower Robot

Pratik HRohane
F.Y B.Tech




ARDUINO
UNO

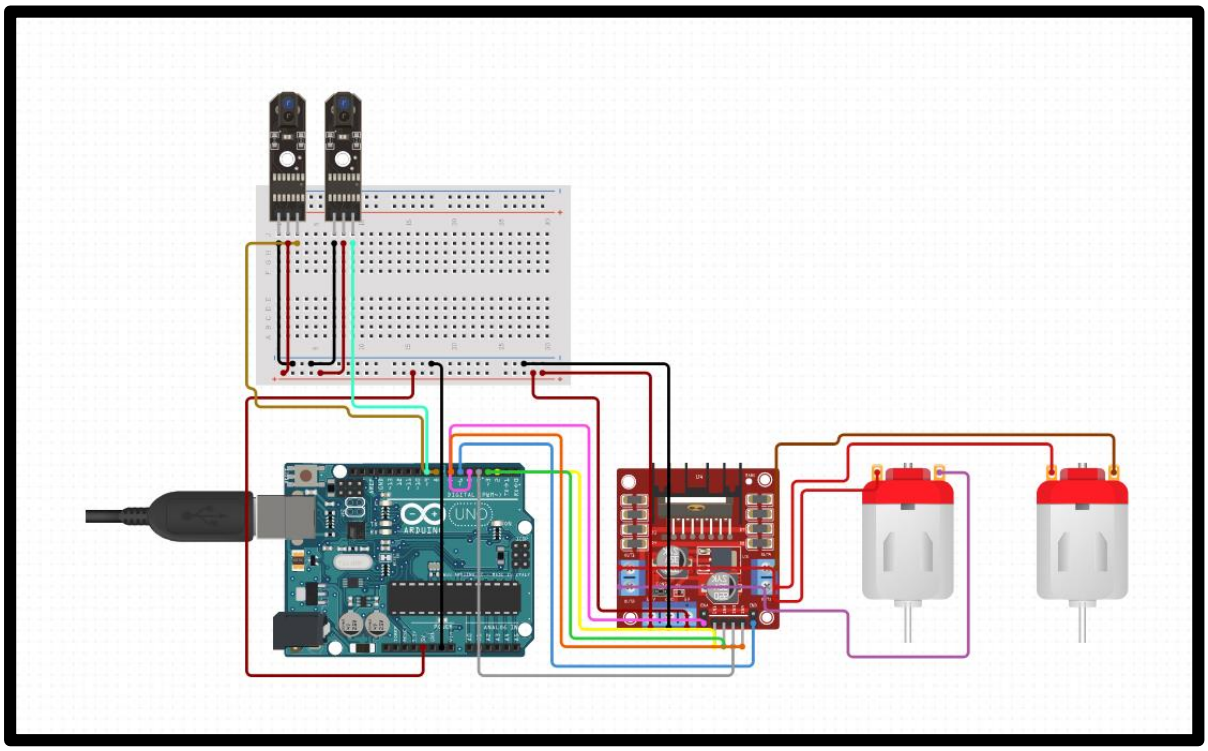
Line Follower Robot, is an autonomous robot which can follow the black line on white background and vice versa. This robot has microcontroller board, two infrared proximity sensors to detect black line and motor drive to control the motors.

The Line follower Robot does the good real time application in industries, which can perform a lot of tasks, including the material handling, to automate the material handing process. It can be used in the assembly line for moving the chassis, moving packed Goods to the transportation era. This Robots can also provide the services in the Restaurant for delivering the Food to the customers table.

Table of Contents

1. Circuit Diagram
2. Components Required
3. Block of Diagram of the Robot
4. Working of Robot
5. Code

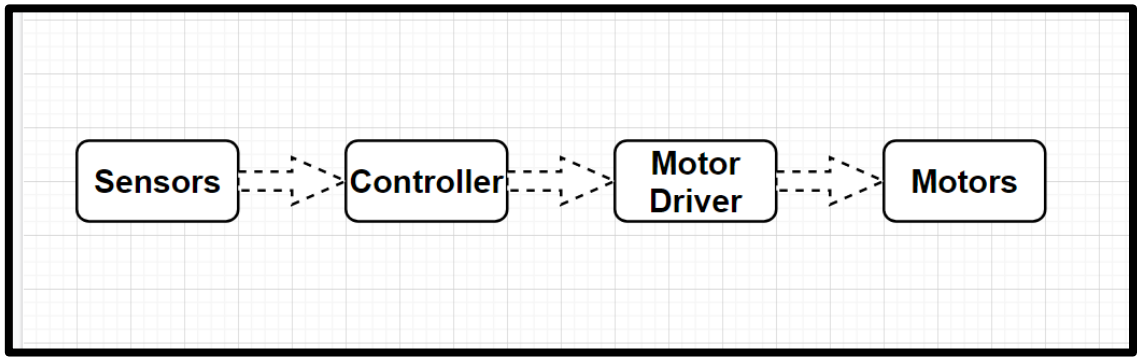
Circuit Diagram



Component Required

- Arduino UNO
- L293 Motor Driver
- DC Motors
- IR Sensor Module
- Wheels
- Chassis

Block Diagram



Sensors (IR Sensors)

Two IR sensor are attract to the front of robot to detect the lines. This sensors will give us the 1 value on black surface and 0 in the white.

Controller (Arduino)

The controller will making the decision on the data received from the sensor modules and send the control signal to the Motor Driver to direct the motors.

Motor Driver (L298)

The signal coming from the Arduino is at 5V, motor driver Amplify these signal by external power to supply the sufficient power to the motors.

Motors (DC Motors)

Two DC motors are used to provide motion to the robot. These motors provide more torque that can be carry load of robot.

Working

While tracking the line, there are four possible conditions will come:-

Case 1)

Both Sensor not Detect the Line >> Move Forward

Both Motor rotate in the Forward direction at same Speed

Case 2)

Only Left sensor Detect the Line >> Required to turn in the left direction

The left motor rotates backward and right motor rotates forward in direction, as a result robot will turn left

Case 3)

Only Right sensor Detect the Line >> Required to turn in the right direction

The right motor rotates backward and left motor rotates forward in direction, as a result robot will turn right.

Case 4)

Both Sensor detect the line >> Stop Motors

When both the sensor detect line we need to stop the rotation of motors, as a result Robot will Stop.

Code

Click To View Code

Improvement

A line follower essentially needs to have a control loop that maintains the error value from the IR sensors to be zero to be able to follow a line (where the line being at the centre of the IR sensor array is the reference value).

To achieve this objective, a robot has a simple controller, which is usually a PID (Proportional-Integral-Derivative) controller that generates an appropriate value from the calculated error to be applied to the motors.