Project Report

Line Follower Robot

Group Members:- Ayush, Suchith, Abhinav

Subject:- Control Systems Laboratory

Goal:- To design an Arduino based Line Follower Robot.

Components:-

Arduino UNO, Arduino Motor Shield, L293D Motor Driver IC, Geared Motors, Robot Chassis, Infrared (IR) Sensor Module.

Theory:-

Block Diagram

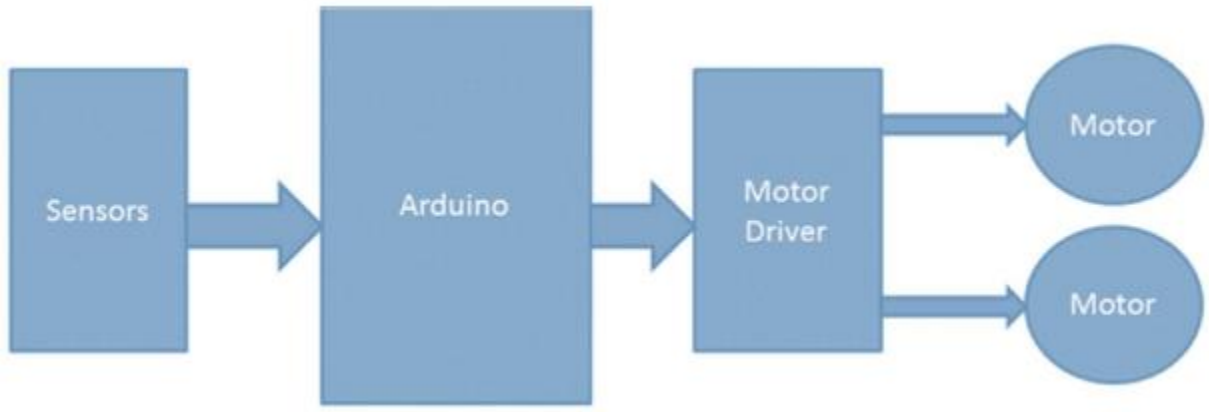

Fig:1 – Line following robot control system.

Circuit Diagram:-

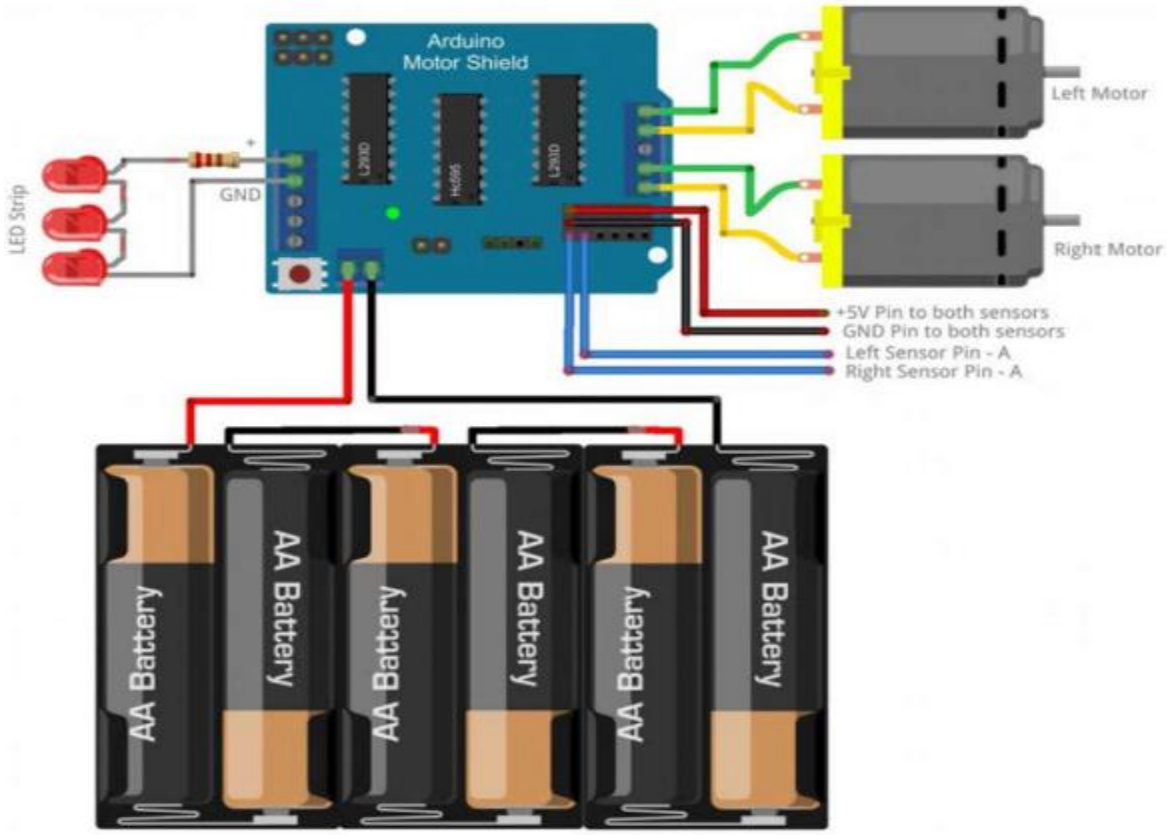

Fig:2(a) – Control Circuitry using Arduino motor shield.

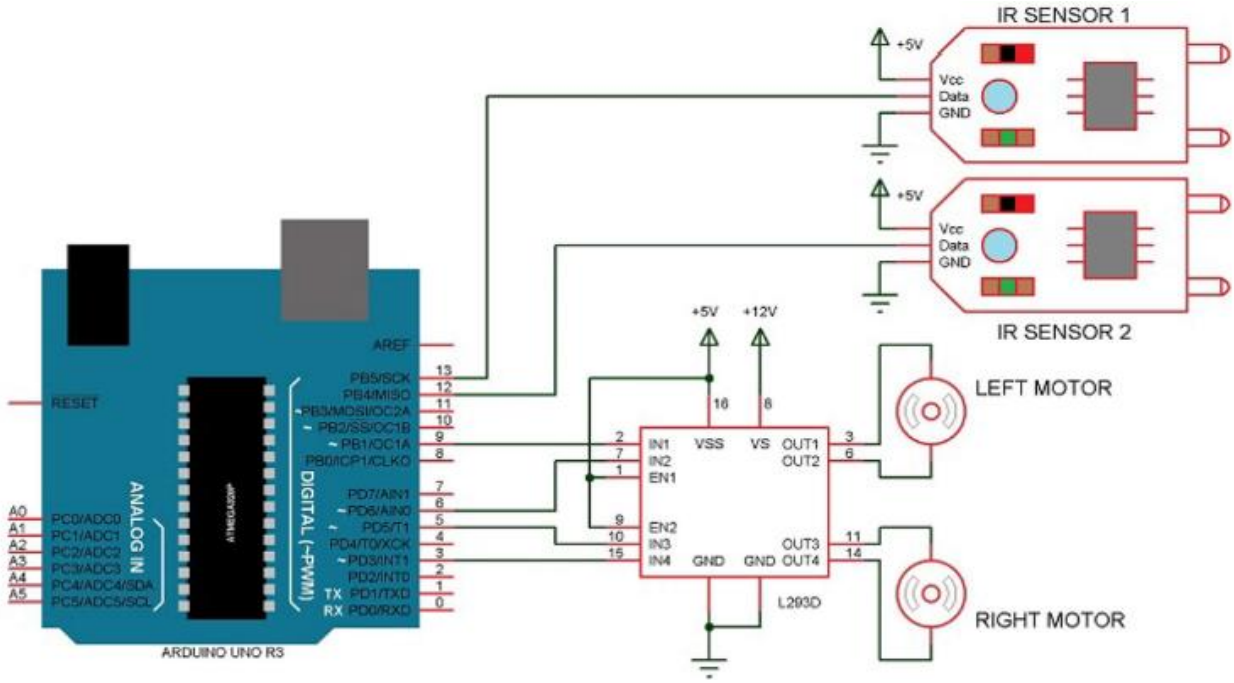

Fig:2(b) – Control Circuitry using Arduino motor shield.

Point to remember:-

1. For the robot to clearly detect white or black region, first calibrate the potentiometer positioned on the IR sensor.
2. Keep the IR sensors as close to the axle of the wheels as possible. This will reduce the error and also improves the response of the robot.
3. Test the speed of both the motors as it may be possible that one rotates little faster than the other. In order to resolve this problem, change the speed of rotation in the Arduino code accordingly.
4. While turning the robot, make the wheel on the same side of turn to rotate in opposite direction to that of the other wheel. This will help in assist in quicker and accurate turning.
5. One drawback of the line follower robot is that it continues moving if it is kept on the white surface until both the sensors detect a black strip.

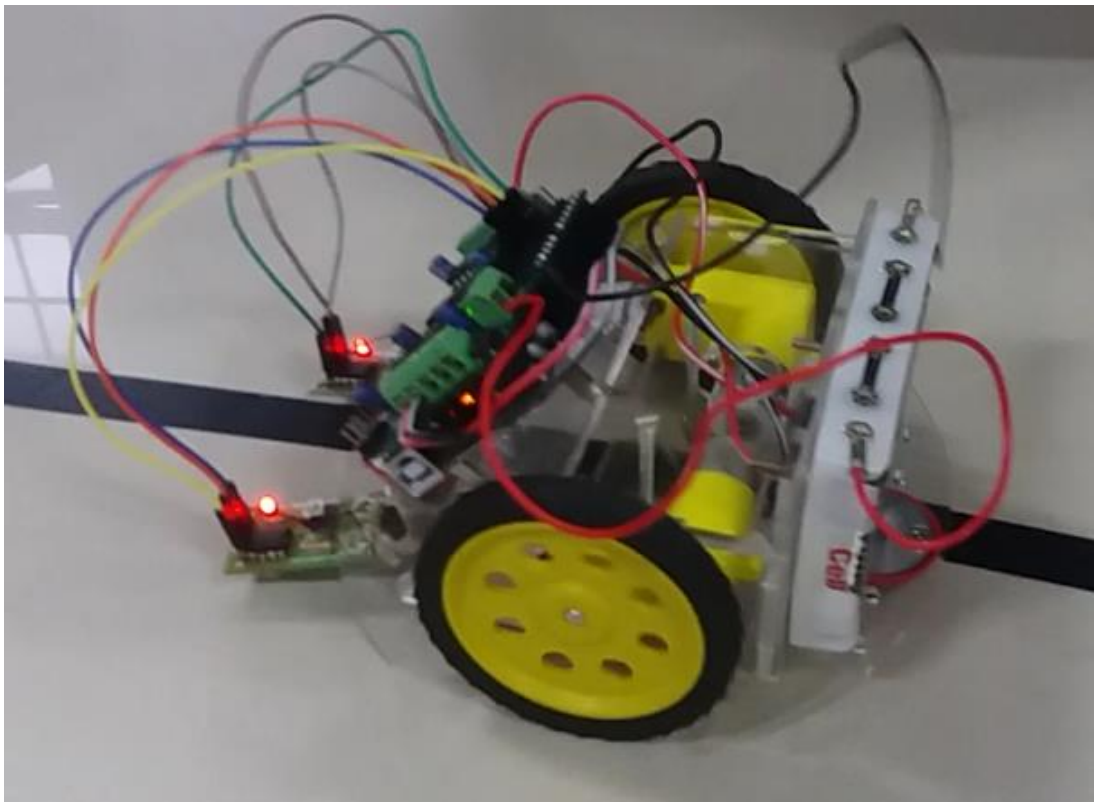

Fig:4 – Final Line Follower Robot Model.

Arduino Code:-

```
#include <AFMotor.h>

int pin1 = 0;
int pin2 = 1;
int ir_val1 = 0;
int ir_val2 = 0;

AF_DCMotor motor1(1, MOTOR12_64KHZ); // create motor #2, 64KHz pwm
AF_DCMotor motor2(4, MOTOR12_64KHZ);

void setup() {
  Serial.begin(9600);           // set up Serial library at 9600 bps
  Serial.println("Motor test!");

  motor1.setSpeed(200);     // set the speed to 200/255
  motor2.setSpeed(210);
}

void loop() {

  ir_val1 = analogRead(pin1);
  ir_val2 = analogRead(pin2);

  if (ir_val1>400 && ir_val2>110){
    motor1.run(FORWARD);      // turn it on going forward
    motor2.run(FORWARD);      // turn it on going forward
  }

  else if(ir_val1<400 && ir_val2>110){
      motor1.run(BACKWARD);      // turn it on going forward
      motor2.run(FORWARD);      // turn it on going forward
  }

  else if(ir_val1>400 && ir_val2<110){
      motor1.run(FORWARD);      // turn it on going forward
      motor2.run(BACKWARD);      // turn it on going forward
  }

  else if(ir_val1<400 && ir_val2<100)
  {
      motor1.run(RELEASE);      // turn it on going forward
      motor2.run(RELEASE);      // turn it on going forward
  }
 }
```