Fastest Line Follower Robot

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Abstract- In this project we have designed the fastest line follower robot in which the speed of robot is increased more than our normal line follower robot. The robot speed depends on the battery and rotation per minute of the motor. The IR sensor detects the black line and follows the path according to it. When the light falls on the black path it reflects and if there is any other color surface, then the light is absorbed. Therefore the difference of rotation speed makes it possible to turn. For instance, if the sensor somehow senses a black line, the wheel on that side slows down and the robot will make a right turn. The control action is taken by the microcontroller which controls overall robot. The IR sensor output is in both analog and digital form and the digital output is given to the microcontroller. According to the program and digital output of IR sensor the motor will rotate.

Keywords- Microcontroller, Infrared Sensor, motor driver IC ,battery, motor

I. INTRODUCTION

In this project it is aimed to control the robot path using the IR sensors. There are groups of eight IR sensors in this project. If all the sensors fall on black line, then the robot will stop automatically. The length of the sensor strip is eight centimeters. The total speed depends on the rpm of motor. The microcontroller is the main unit in this project which is 8051.The motor is driven by motor driver IC LM293D which provides 12V supply to the motors. The motors used in this project are of 200 rpm.

In this project we will controlled the line follower robot using electronic circitary. This type of robot can be used in some of the application such as in manufacturing or assembly in industrial purpose.

This project can be also used in hotel to provide the requirement to customers.

In this project we face some problems such as speed. Because of less R.P.M. the speed of the robot is limited. Sometimes due to high speed the robot slip at the corner.

The path of robot should of eight centimeter. The path should be black.

II. REVIEWS OF LITERATURE

• In this project the speed of robot is greater than normal line follower robot
• We design this project using microcontroller 8051
• We went to robo racing competition in orchid college of engineering at solapur. There are so many robots came for robo racing exhibition.
• We observed all the robot but the speed is the limitation of every robot and then we got ideas from robo racing exhibition to make fastest line follower robot.
• Our project co-coordinator also gives the idea to make fastest line follower robot using microcontroller.
• We got information also from the you tube video about the programming. we got the information from mohammad ali mazidi. From various books we got the information about the programming instruction and IR sensor information according to that we build it.

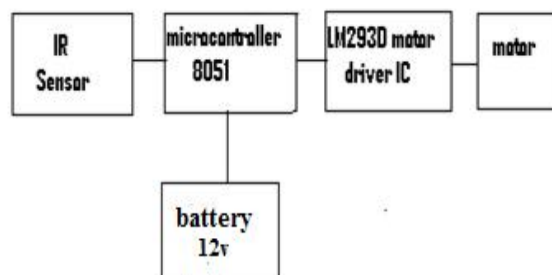## III. PROPOSED SYSTEM REQUIRED HARDWARE

a. Basic block diagram:-

Fig.1

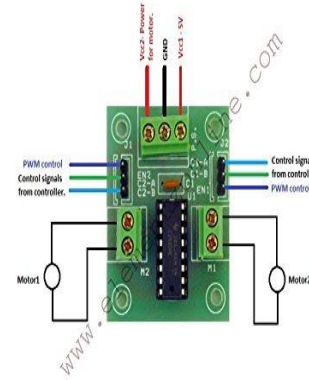Figure 1 above shows the complete block diagram of fastest line Robot. The above blocks are explained as follows:

IR sensors: In this project it is aimed to control the robot path using the IR sensors. There are groups of eight IR sensors in

this project. The IR sensor detects the black line and follow the path according to it.IR sensor output is in both analog and digital form and the digital output is given to the microcontroller. The sensor works by looking for reflected light, It is possible to have a sensor that can return the value of the reflected light. The range of IR sensor is about 100cm to 200cm.

IR sensors

Microcontroller:

The main heart of this project is the Microcontroller. It acts as control unit which controls overall robot. The microcontroller provides 5v output power. The program is burned in microcontroller. A microcontroller is a VLSI IC that contains a CPU along with some other peripherals like memory, I/O ports, timer/counter, communication interface, ADC etc. It has the advantages of low power consumption, smaller size and simple architecture.

Pin diagram of 8051

LM293D Motor driver IC:

LM293D is a typical motor driver which allows DC motor to drive on either direction.LM293D is a 16 pin package which can control the two DC motors. It means that we can control two dc motor with the help of motor driver IC. The microcontroller provides 5v supply but it is not sufficient to drive the motor, So the motor driver IC is required in this project.
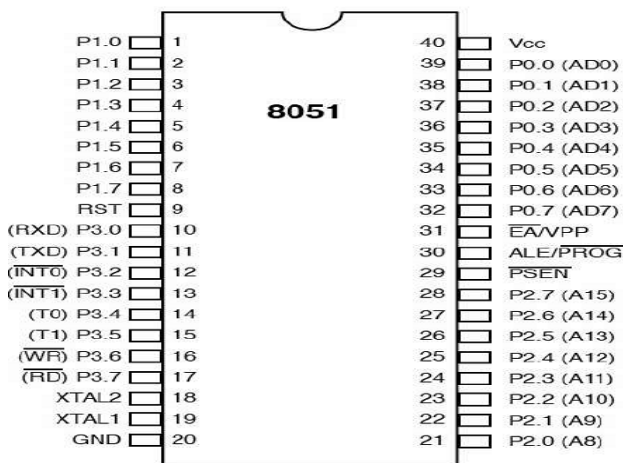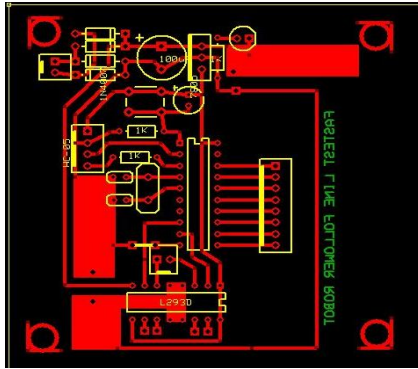

Motor driver IC

Motor and Battery: The motor used is 200r.p.m. According to the program and digital output of IR sensor the motor will rotate. The motor driver IC drives the motor with 12v dc supply. Both the motors used are DC motors. A 12V dc battery is used. The adapter is used to charge the battery.

DC Motor

b. PCB Layout:

The following is the layout of printed circuit board [Fig.2] designed for the above project using Proteus software.

Fig.2

IV. IMPLEMENTATION AND RESULTS

The implementation of this project showed the following results. The path length is 500cm. The robot can complete total path in 11 seconds for straight line path. According to that following calculations are obtained: 1. Normal line follower Robot yields- Path length=500cms,speed=1.2feet/sec2.Fastest line follower robot yields-Path length=500cms,speed=1.5feet/sec

V. CONCLUSION

This project work was implemented as the fastest line follower robot. This project can be used in the industrial purpose for various applications. It can also be used in robo racing exhibitions, which will follow only the black line and it will stop on white line. It was found that the motor must be sized and placed correctly, or it will not provide the required torque for the selected path. We also learned that a dead zone in a motor can have a significant impact on the robot behavior. It can be concluded that this research proves that all problems cannot be solved by control theory alone some problems have to be faced during the manufacturing of these projects.

VI. ACKNOWLEDGEMENT

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