

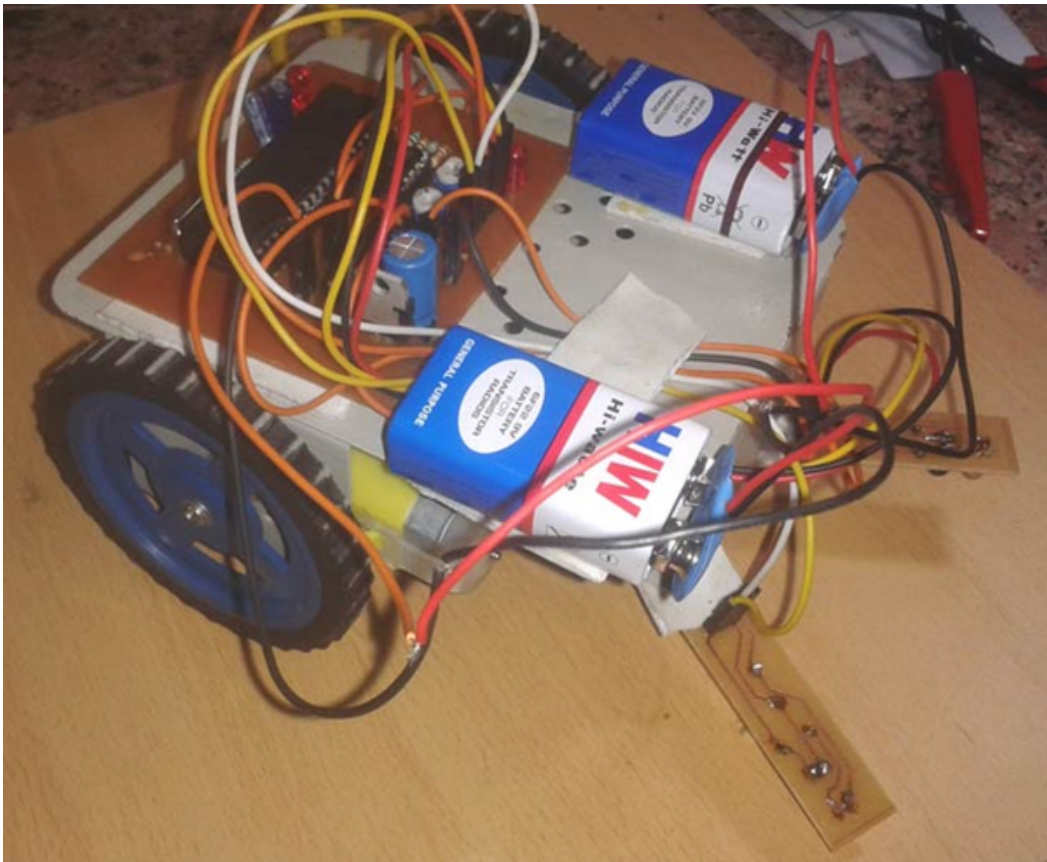
Major Project

- **Project Name:**

Embedded System Major September

- **Project Description:**

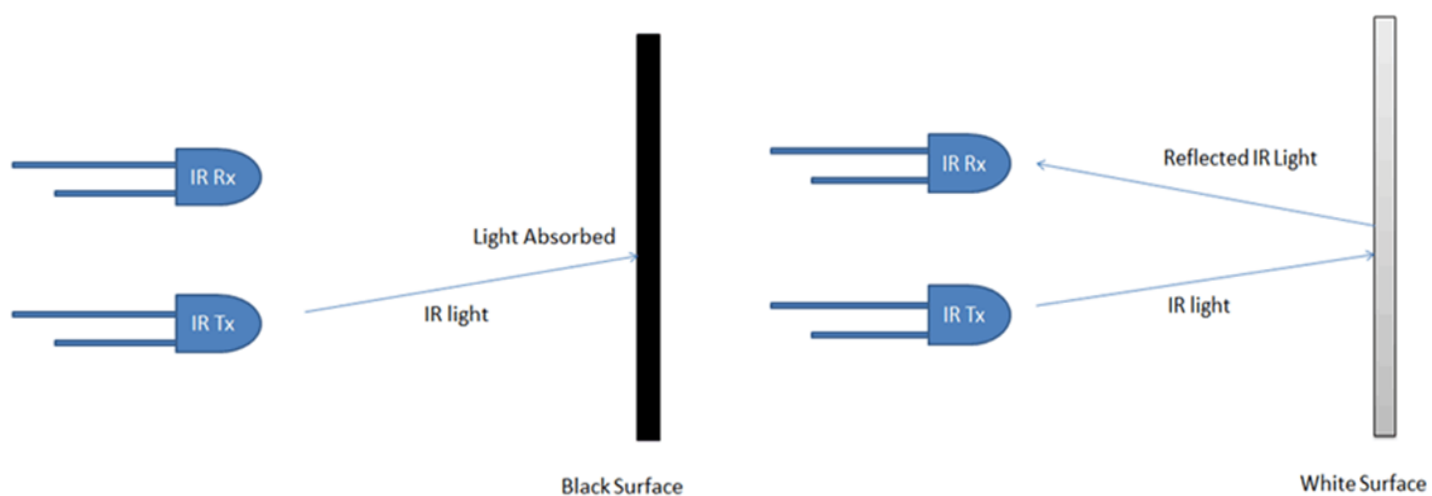
Edge Avoiding Robot Using 8051



This 8051 microcontroller based robot detects an edge and avoids it by turning or stopping. Let us see how can we design a edge avoider robot easily.

Concept of Edge Avider Robot

Concept of Edge Avider robot is same as line follower. In these types of robots, we generally use behaviour of light at black and white surface. When light fall on a white surface it will almost full reflects and in case of black surface light is absorbed by black surface. This behaviour of light is used in an line follower robot as well as edge avoider robot.

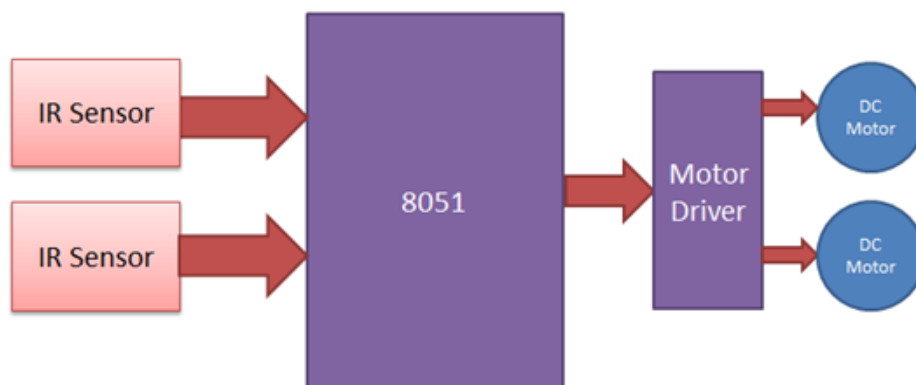


Here we have used IR transmitter and receiver also called photo diodes are used for sending and receiving light. IR transmits infrared lights. When infrared rays falls on any surface except black or much dark surfaces, it's reflected back and caught by photodiode and generates some voltage changes. When IR light falls on black surface, light is absorbed by the black surface and no rays reflect back, resultantly photo diode doesn't receive any light or rays.

Here in this Edge Avider robot when sensor senses white surface then microcontroller gets 0 as input and when senses black line controller gets 1 as input.

Circuit Diagram and Working Explanation

We can divide the Edge Avoider Robot project into three different sections that are sensor section, control section and driver section.



Sensor section: This section contains IR diodes, potentiometer, Comparator (Op-Amp) and LEDs. Potentiometer is used for setting reference voltage at comparator's one terminal and IR sensors are used to sense the line and provide a change in voltage at comparator's second terminal. Then comparator compares both voltages and generates a digital signal at output. Here in this circuit we use two comparators for two sensors. LM 358 is used as comparator. LM358 has inbuilt two low noise Op-amp.

Control Section: 8051 microcontroller is used for controlling whole the process of line follower robot. The outputs of comparators are connected to pin number P0.0 and P0.1 of 8051. 8051 reads these signals and send commands to driver circuit to drive line follower.

Driver section: Driver section consists motor driver and two DC motors. Motor driver is used for driving motors because microcontroller does not supply enough voltage and current to drive the motor. So we add a motor driver circuit to get enough voltage and current for motor. Microcontroller sends commands to this motor driver and then it drive motors.

In programming first of all we have defined input and output pins. And then in main function we checked inputs and sends output accordingly to output pins for driving motor. There are four conditions in this edge avoider that we read by using 8051 microcontroller. We have used two sensors namely left sensor and right sensor.

Conditions:

Input		Output				Movement Of Robot
Left Sensor	Right Sensor	Left Motor		Right Motor		
LS	RS	LM1	LM2	RM1	RM2	
0	0	1	0	1	0	Forward
0	1	1	0	0	0	Stop/back/Turn Right
1	0	0	0	1	0	Stop/back/Turn Left
1	1	0	0	0	0	STOP/back/turn left

We have written program according to above table conditions.

Note: You can do a design on Proteus and do the coding in either embedded c or assembly level language.

No physical hardware required.

Circuit and program screenshots can be taken and pasted on the word file for evaluation.

Date for submission will be given by the team.