



An Approach Behind fire Fighting Robot

Author1: Sunil Kumar-IIT2012184 Author2: Vibhay Shahi-IIT2012144

Abstract:

Fire detecting robot is a robot that detects fire from a particular distance which is better than being given a false alarm by other devices. It can also be used to stop the fire by using other functions of the robot in future. This robot detects IR rays for a particular frequency of fire then its buzzer automatically turns on and we can easily know where the fire is on.

Introduction:-

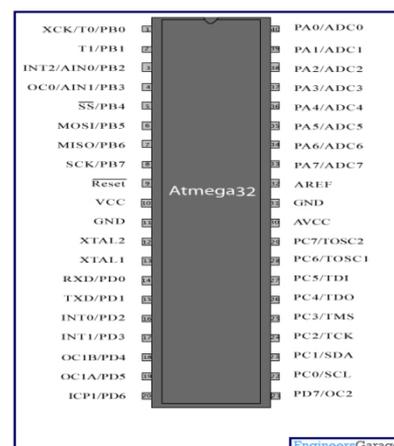
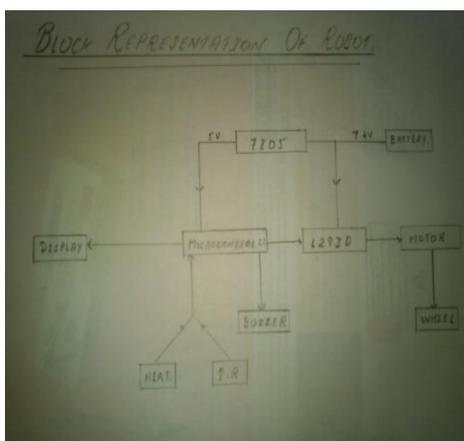
The aim of the project is to make a robot which can follow a black strip on a white floor and can extinguish the fire on the path. The robot can be used in the rescue operation. Thus the robot can act as a path guider in normal case and as a fire extinguisher in emergency.

Design Specifications:-

1. For proper functioning of the robot needs a voltage supply of about 5.3V and current about 0.7A.
2. The robot should be able to distinguish between the white and the black surface.
3. If the black surface suddenly ends, the robot should keep on moving in the direction it last moved until the black line is again there.
4. This could not be run using the dry cells because of the current requirement.

Block Diagram:-

Pin Configuration for-



Working of the Robot:-

The circuit implemented consists mainly of two different sub-circuits. The first part comprises of making the robot follow a black strip. This was done using a comparator circuit using the LDR whose reference voltage was fixed using the potentiometer. This was based on the phenomenon that the resistance of the LDR decreases as the intensity of light falling on it increases. In our case, the light reflected from the white surface is more than that from the black surface. Therefore, the voltage in positive terminal of the comparator remains high as long as the robot is moving on white surface. If the black surface come under one of the two LDR's the motor corresponding to that LDR stops, the other making it move away from the black line. But as the other LDR crosses the black line, its motor stops, the other forcing it in other direction, resulting in it's following the black line. Thus, the output voltage of the Op-Amp has been varied according to the need, but the current flowing through the output of Op-Amp is in some mA .Thus there was need for current amplification. The resistance of the motor was 5-10ohms, thus source follower circuit was used.

The second part comprised of using LDR's and IR-receivers to detect flame .The dual Op-Amp LM358 was used for the same. The two comparator circuits were used .For LDR, the working was same, but for IR receiver the voltage and not the resistance vary according to the intensity of light. Thus the two ends of IR-receiver were connected to ground and positive terminal.

Applications:-

1. The robot can be used as a guide to guide the visitors from the entrance to the main office.
2. It can help doctors to carry the medicines from one ward to another.
3. The main purpose is to rescue the people by extinguishing fire in a building.

Limitations and future Extensions:-

In the present condition it can detect fire only in the way and not in all the rooms. It can be extended to a real fire extinguisher and it to extinguish fires of all the room using microprogramming.

References:-

1. <http://www.instructables.com/id/Autonomous-Fire-Fighter-Robot/>
2. <http://www.8051projects.info/proj.asp?ID=50>
3. <http://www.edgefxkits.com/fire-fighting-robotic-vehicle>
4. <http://www.popsci.com/watch-navys-new-robot-firefighter-action>



An Approach behind Fire detecting Robot