

DESIGN OF FIRE FIGHTING ARDUINO VEHICLE WITH OBSTACLE DETECTION SYSTEM

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Abstract – The advanced firefighting robotic system independently detects the fire, it also extinguishes it. The main requirement of this project is to create a robot that is fully autonomous. This means that once the robot is started by the user, it navigates and extinguishes the fire on its own, with no assistance or input from the user. To make this possible a number of sensors, fire extinguishing mechanical parts and normal design for the robot came up. As far as to reach the requirements of the robot which is quick and accurate this robot is designed.

Key Words: Arduino chip system, DC motor (300 RPM), Fire sensors, Chasis.

1. INTRODUCTION

In general the fire accidents occurring in industries like chemical factories, gas tanks, refineries, petrol pump or in common households which results in serious consequences. Through the advancement in field of robotics human intervention is becoming less everyday and robots are widely used for purpose of safety. This project uses auto technology for autonomous operation and uses Arduino chip system or Arduino micro controller.

1.1 BLOCK DIAGRAM DESCRIPTION

The below figure shows how the circuit works. In this diagram ultra-sonic sensors are mainly used to focus on obstacle detection. Flame sensors are used to detect the flames or heat, therefore autonomously reaching the place and extinguishing the fire. The Arduino micro controller has 10-bit ADC channels, so the readings ranges from 0-1023. Here the flame or fire sensors detects the fire from range of 1 meter.

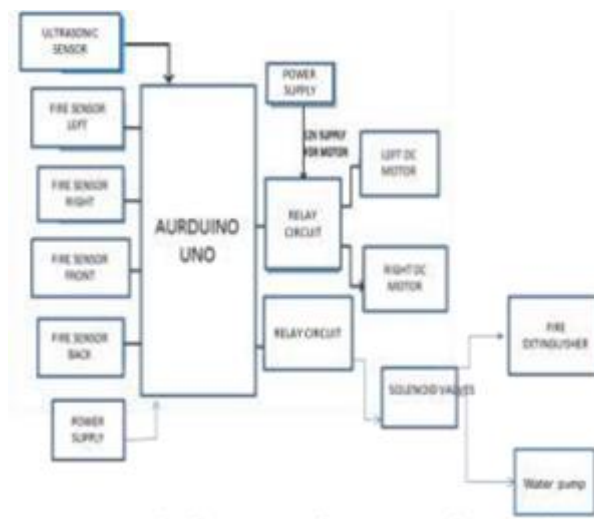


Fig -1: Block Diagram

1.2 WORKING

The general components are flame sensor, ultra-sonic sensor water pump and DC motors are connected to the heart of the system which is Arduino micro controller or Arduino chip system. Microcontroller recognizes the digital output and controls the motion of the robot. The robot movement is done with the help of DC motors which are available with wide range of RPM and torque. This allows the robot to move based on the control signals autonomously. The robot firstly moves to the direction where the intensity of fire is most and after extinguishing it, it moves in another direction.

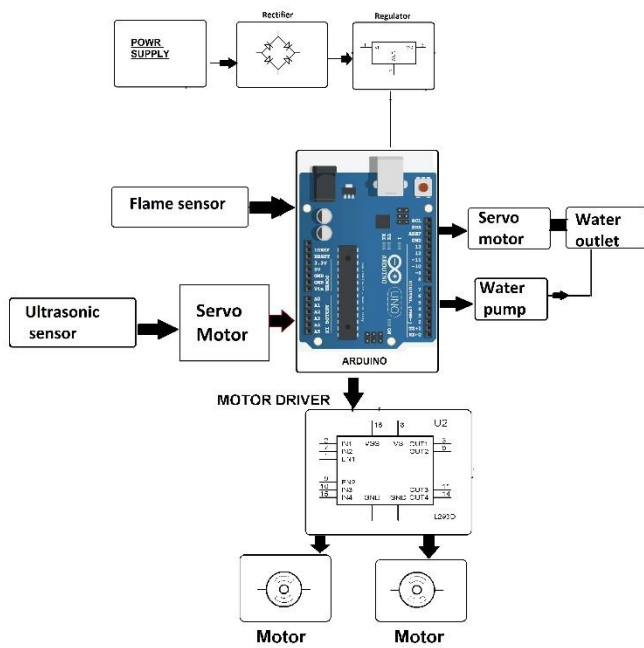


Fig -2: Flow Chart

3. OBJECTIVES

- This can be used in server rooms.
- Less maintenance required.
- Disaster area monitoring and rescue.
- Usable in power plant control rooms.
- Durability & Long Life.
- Less environmental impact.

Action	RHS Motor	LHS Motor	RHS Motor		LHS Motor	
			Pin-2	Pin-7	Pin-10	Pin-15
Move forward	Clockwise rotation	Anti-clockwise rotation	LOW	HIGH	HIGH	LOW
Move backward	Anti-clockwise rotation	Clockwise rotation	HIGH	LOW	LOW	HIGH
Turn right	Stop	Anti-clockwise rotation	LOW	LOW	HIGH	LOW
Turn left	Clockwise rotation	Stop	LOW	HIGH	LOW	LOW
Stop	Stop	Stop	LOW	LOW	LOW	LOW

Fig -3: Direction of movement of robot.

4. RESULTS AND CONCLUSION

4.1 RESULT

Moving on its own the robot autonomously detects the fire. The motor is being controlled by Arduino micro controller or Arduino chip system. The two motors here controls the left and right or front or backwards motion of the robot. The sensors here will automatically detects the fire and the robot extinguishes it.



4.2 CONCLUSION

After considering all the above results we come to a conclusion that the robot detects the obstacle on its own and the sensors help in detecting the heat in different situations. The robot can be used in a small area also. The robot can be used in a large reserving capacity with improving sensing unit which can earlier detect fire at any situation.

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