Fire Fighting Robot

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Abstract:- In this growing advanced world the importance of security of home, laboratory, office, factory and building in human life remains the same. We have developed a securitysystem that contains a firefighting robot in our daily life. There is a risk of life in extinguishing the fire. Users may take a late time to extinguish fire like finding the water source to extinguish fire when they want to extinguish the fire. The fire has difficulties to detect the small burnt area and location that is hard to be reached by the user Sometimes tough fire to the fire. Fire accidents are one of the biggest problems. Use robots instead of humans which perform better functions as compared to humans. In this projectwe are making a robot using Arduino which willself-detect and extinguish fire. Fire disasters canoccur any time and result in high losses, such disasters cannot be controlled by firefighters. as well so we are able to use robots for that purpose. This project focuses on the safety ofthe person extinguishing fire through the Automation system.

Keywords:- Arduino UNO, Breadboard, L293DMotor Driver, Sensors, Water pump.

I. INTRODUCTION

Nowadays, machinery and robotic design have become important in helping humans. The Fire Fighting Robot is designed to help peoplein any burnt out situation using an autonomous system. People don't want their homes, laboratories, offices, factories, buildings to be compromised in any way. We develop a securitysystem that contains a fire protection robot using sensors. The security system can detect abnormal and dangerous situations and notifyus. First, we develop a fire protection robot witha fire extinguisher for the smart building.Besides, humans had difficulties detecting small burns caused by electrical appliances. The late time the user takes to extinguish the fire. Users may take a late time to extinguish fire like finding the water source to extinguish fire when they want to extinguish the fire. The fire has difficulties detecting the small burnt area and location that is hard to be reached by the user. For this we are making a firefighting robot that will help people in the above situation.

II. METHODOLOGY/EXPERIMENTAL

Arduino is an open-source electronics platform, which is a combination of bothhardware and software, which is easy to use andhandle, where the Arduino intakes the inputsand gives out the output. Flame sensors are connected to Arduino at the pin no. 8-10 then there is a motor driver connected to Pin no.2-5. Servo motor is connected to pin no.11 of the Arduino and the whole circuit is driven by the Lithium-ion battery (3.7V*2). This contains the input from flame sensors. There are three flame sensors connected to the digital input pins (Pin no.8-10). After processing the signal of the flame sensor Arduino checks for the conditionin programming and if there is fire, executes a block of the code which will drive the motor driver to desired place and extinguish fire. In this way, on giving power supply the wholesystem works.

1. Arduino UNO

Fig 1 Arduino UNO

Arduino UNO board. It is basically a microcontroller kit that is used to get data from peripheral devices (sensors, motors, etc.). The Arduino UNO Microcontroller board is basedon the ATmega328P IC. The ATmega328P is a good platform for robotics applications which makes a robot to extinguish fire in real time. Arduino UNO boards consist of sets of digital and analog pins that may act as an interface to various expansion boards and other circuits. It contains everything needed to support the microcontroller

2. Flame Sensor

Fig 2 Flame Sensor

The module is based on the IR receiver and basically detects the presence of flammable and harmful gasses like nitrogen, hydrogen, carbon monoxide. The signal detection capacity is adjustable. The robot contains three flamesensors.
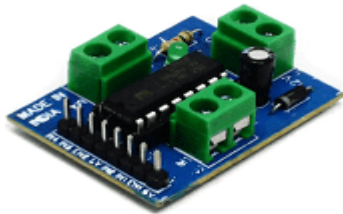
3. Motor driver

Fig 3 Motor driver

L293D Motor Driver. L293D is a Motor Driver or Motor Driver IC which is responsible for the movement of a DC motor in either direction. We can run two DC motors simultaneously by using L293D which is a 16-pin IC.

4. Servo Motor

Fig 4 Servo Motor

We used electronic devices servo motors which mainly provide specific velocity and acceleration.

5. Water Pump

Fig 5 Water Pump

Submersible Water Pump. The Submersible Water Pump is ideal for making an automatic watering system using Arduino. The waterpump plays an important role in our project, it pumps water and extinguishes fire.

Table.1. Component of Project

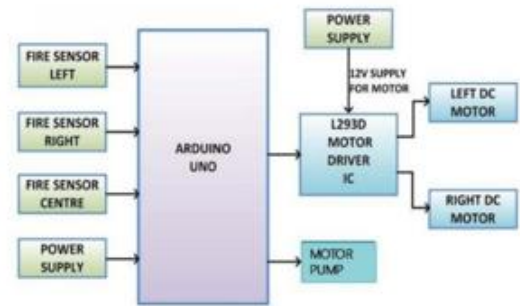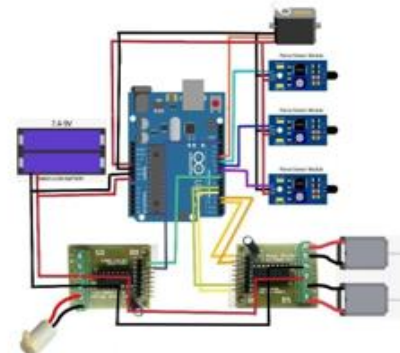| Equipment	Quantity
Sensor	3
Breadboard	1
Chassi	1
Arduino Uno	1
L293D Motor Driver	1
Bo Motor	4
Wheel	4
Servo Motor	1
Water Pump	1
Battery	1

Fig.6. Block Diagram

Fig. 7. Circuit Diagram

III. RESULTS and DISCUSSIONS

Fire Fighting Robot has been developed toreduce human life lost and to develop such a device that automatically senses fire and extinguishes it without human intervention. IR flame sensor detects the fire and it is connected to the arduino UNO that helps to control the movement of motor drive, because of this robot can find the fire and go near fire to extinguish it with the help of pumping mechanisms. Industryneeds a person to monitor and rectify fire accidents if any occurs but using fire fighting robot the work of monitoring and rectifying willget easy.
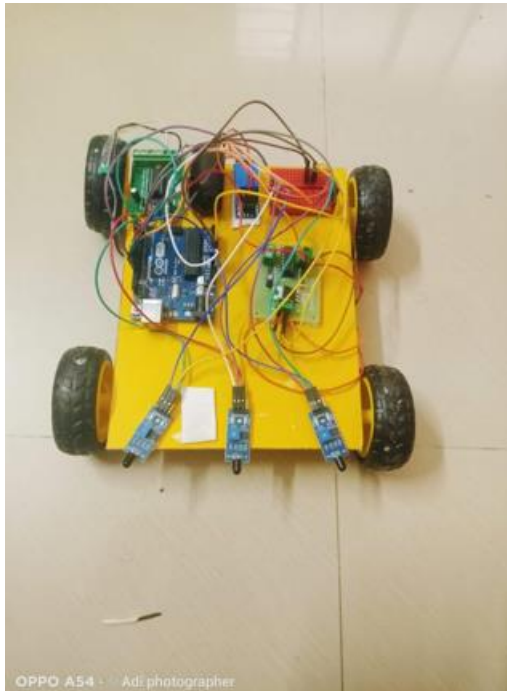
Fig . 8 Module of Fire Fighting Robot

IV. MATH

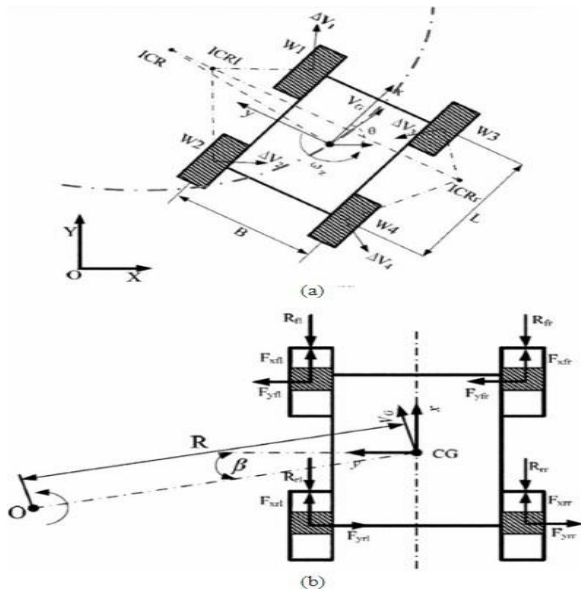
Fig 9. Mathematical Module

V. FUTURE SCOPE

We have created only the prototype of therobot. By using more powerful equipment and sensors we are able to extend this project also. Instead of the ground extinguishment of fire we can use drones to extinguish the fire which will be a better idea than this project. We can use the Bluetooth controller and Gem module to contactusers and not only fire by using MQ2 gas sensor, we can use this model in the gas detection systems also.

This can be done forfuture work. The conclusion summarizes the whole report by highlighting all the chapters and their significance and the importance of the project and about the achievements. Also discuss the constraints of the project.

VI. CONCLUSION

This model of Fire Extinguishing Robotreduces burden in firefighting tasks. Our project aims to build a real-time firefighting robot that moves at a constant rate, identifies fire and extinguishes it. The detection and extinguishing were done with the help of basic hardware components attached with the robot. First, IR flame detectors are used to detect fire. Second, BO Motors and rubber wheels are used to navigate the bot to reach the focus. Finally, the robot extinguishes the fire with the help of submersible water pumps and servo motors.

ACKNOWLEDGMENT

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