DESIGN AND ANALYSIS THE FIRE FIGHTING ROBOT

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ABSTRACT
The aim of the project is to design a robot which is used to an extinguisher fire. This firefighting robot is to produces small but it is very powerful and versatile robot. It is a dangerous one and there have been numerous and devasting losses. We design this project with the help of NODE MCU board. It controls and detects fire automatically. We can control our project manually with the help of the IOT. We use the switch between these two modes i.e. automatically or manually in either way as we want.to apply. The firefighting robot overcomes the problems of hitting all the obstacle and moves into the direction where it is obstacle.

Keywords- Component; Formatting; Style; Styling, Insert

I. INTRODUCTION
Fires are the most important aspects of all these problems. Robot industry is available and has a lot of work in this area. Some of the industries are to be fixed mobile robots with different features, structures and which are equipped with different sensors that detect before the fire is out. These robots are used for the fire extinguishers by various sensors.

This article first introduces the integrated system which is the heart of the robot. Then the mobile platform and the actuation, they are combined together to make the robot move. Special sensors are the most important parts. For AR-4, there are sonar sensors, sharp IR sensors measuring the distance, flame sensor detecting the fire, and bump sensors in case of an extreme situation. After introduction to these special sensors, the behavior of the robot, including obstacle avoiding, wall following, fire extinguishing, etc. will be discussed.

II. LITERATURE REVIEW
The existing system proposes a novel hose type robot, which can fly directly into the fire source via a water-jet. First, to control the reaction force for stable flying, we developed a nozzle module. By combining two nozzles whose outlet direction can be controlled, the resultant reaction force can be controlled. Finally, we developed a robot with a nozzle module and conduct experiment. The experiment demonstrates that a robot with a length of approximately 2 m can fly stably in the air by leveraging the water jet. In addition, the head direction can a scope controlled. A single longitudinal arm suspension structure for fire-fighting robot is proposed, which has good adaptability to the ground.

The structure of the suspension is introduced in detail, and the strength calculation of the suspension structure is carried out for the application of the fire-fighting robot, and the ground performance of the robot is verified by the experiment. The applications like guide dogs for visually impaired people and potential robotic counterparts providing haptic feedback via reins
to assist indoor fire-fighting. Since proprioceptive sensors like spindles and tendons are part of the muscles involved in the perturbation, haptic perception becomes a coupled phenomenon with spontaneous reflex muscle activity. The nature of this interplay and how the model-based sensory-motor integration evolves during haptic based guiding is not well understood yet.

III. PROPOSED SYSTEM

Figure 1: Firefighting Robot

The main component of this project is the NODE MCU, in these order we use the Fire sensor module (flame sensor). When these fire burns, it emits a very small amount of Infra-red light, this light will be received by the IR receiver on the sensor module. So, we place such a three sensors in three directions of the robot to sense on which the direction of fire is burning. To detect the direction of the fire we can use the motors to near the fire by driving our motors through the L293D module.

We have to put it near a fire by using water. Small container is used to carry a water, a 5V pump is also placed in the container and the whole container is to be placed on top of a servo motor. So that, we can control the direction in which the water has to be sprayed.

3.1 HARDWARE IMPLEMENTATION

The output from transformer is given to the rectifier circuit. In this rectifier circuit, the AC voltage is converted to DC voltages. The rectified DC voltage is given to the regulator circuit. The output of the regulator is depends upon the regulator IC chosen in the circuit. The Node Muc is an open-source firmware and the development kit that helps you to Prototype your IOT product within a few Lua script lines.

Figure 2 NodeMcu

The ESP8266 WiFi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give a any microcontroller.

Figure 3 Node MCU Pin diagram

A gas sensor detects the attentiveness of gas in the air and an analog voltage is an output reading. The sensor can activated at a temperatures ranging from -10 to 50° C with a power supply is less than 150 Ma to 5V.

Figure 4 GAS SENSOR
The most frequently measured environmental quantity is “Temperature”. This is to be expected since most of the systems are affected by temperature like physical, chemical, electronic, mechanical, and biological systems. The LM35 is a kind of commonly used temperature sensor that can be used to measure temperature with an electrical o/p comparative to the temperature (in °C). It can be measured more correctly than compared with a thermistor. A fire detector is a sensor designed to detect and respond the presence of a flame or fire, allowing flame detection.

**Figure 5 Fire sensor**

Whenever fire is detected by IR sensor LED glows, and out pin is set to be high. The out pin can be given as input to the microcontroller and can be used for any fire detection applications. Whenever the LED is ON it indicates that fire is detection. The L293D motor driver is available for providing User with ease and user friendly interfacing for embedded application. L293D motor driver is mounted on a good quality, single sided non-PTH PCB.

**Figure 6 L293D**

### IV. RESULT AND DISCUSSION

The project firefighting robot was designed in such that the robot can be operated using smoke detection sensor, temperature sensor detects the temperature and smoke and when the fire burns it emits a small amount of infrared light, this light will be received by the IR receiver on the sensor module. We detect the direction of the fire we can use the motors to move near the fire by driving our motors through the L293D module. When near a fire we suppress it by using water.

**Figure 7 Front View of Robot**

### V. CONCLUSION

Here we successfully approached of modular design strategy was a good solution in implementing the firefighting robot to help people at the critical condition. The proposed robot can move in forward, backward, left, right and can stop also. Robot detects temperature, smoke and flame at the site where the robot exists. This robot is helpful in those areas where natural calamity and bomb explosions occurred. Robot detects fire and extinguishes the fire with the help of sprinkler pump. For extinguishing that fire robot has to reach up to there and it moves towards the target with the obstacle avoidance property. In this way robot can detects obstacle. If fire is detected with the help of sensors, MCU operates the water pump mechanism through relay circuit.
REFERENCES


