

# Automatic Fire Fighting Robot

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**Abstract:** In today's commercial, industrial and domestic world, Automation plays an important role, it is actually an arrangement of different elements in order to regulate, direct, sense and command itself to achieve a desired result. "Automatic Fire Fighting Robot" project employs the electrical thermostat technology for the controlling the fire 24 hrs. The system is cost effective, has a wide applications which when implement can show good and effective result. It can be use deliberately in industrial applications, commercial and in domestic sectors where the requirement of automatic work demands. Synchronization of various equipment involve in the system i.e Thermostat Sensor, water jet, wireless remote and wireless android device WiFi enabled Camera. This is mean to simulate the real world operation of Robot performing a fire extinguishing function. Fuzzy logic provided an appropriate solution to the otherwise complex task of mathematically deriving an exact model for the non-linear control system upon which conventional control techniques could then be applied. Making Robot wireless increases the effective area of operation, thereby making it possible to control the robot from remote location. Keeping all above factors in mind the Robot is capable of being remotely controlled and live video buffering i.e possessing a multimedia interface was convinced and developed.

**Keywords:** Thermostat Technology, Modern Fire Extinguisher, WiFi Camera Technology, Wireless navigation.

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## I. INTRODUCTION

Robotics is one of the fastest growing engineering fields of today. Robots are designed to remove the human factor from labor intensive or dangerous work and also to act in inaccessible environment. The use of robots is more common today than ever before and it is no longer exclusively used by the heavy production industries. The need Fire extinguisher Robot that can detect and extinguish a fire on its own is long past due. With the invention of such a device, people and property can be saved at a much higher rate with relatively minimal damage caused by the fire. Our task as engineers was to design and build a prototype system that could autonomously detect and extinguish a fire. Also aims at minimizing air pollution. In this Project we design a wireless controlled Robot. It is the Robot that can move through a model structure, find a burning and then extinguish it with help of a Water Jet.

Robots are intelligent machines that can be controlled according to need. If a multimedia interface is provided, it further aids in navigation of the robot. Making the robot wireless increases the effective area of operation, thereby making it possible to control the robot from a remote location. Keeping all the above factors in mind the, a robot capable of being remotely controlled through the Internet and possessing a multimedia interface, was conceived and developed. I have used very basic concept here, easy to understand from the prospective of beginners or for the masters of this field. The need for a device that can detect and extinguish a fire on its own is long past due. Many house fires originate when someone is either sleeping or not home. With the invention of such a device, people and property can be saved at a much higher rate with relatively minimal damage caused by the fire.

In this Project we design a Fuzzy based Microcontroller controlled Robot. It is the Robot that can move through a model structure, find lit candle and then extinguish it with help of a Blower. This is meant to simulate the real world operation of a Robot performing a fire extinguishing function in an oilfield. Fuzzy logic provided an appropriate solution to the

otherwise complex task of mathematically deriving an exact model for the non-linear control system upon which conventional control techniques could then be applied. Keeping all above factors in mind the Robot is capable of being remotely controlled and live video buffering i.e. possessing a multimedia interface was convinced and developed.

## II. RELATED WORK

To make an Automatic Fire extinguisher Robot that can detect and extinguish a fire on its own is assembling of various components. A Thermostat Sensor, sometimes called an optical sensor, Detects visually sense the fire, usually in a narrow range, in order feature in forest operations, at industrial check points in undeveloped villages, to momentarily distract an fire, to helpful fire covered area at much less time and useful from dangerous hazardous the environment using fire extinguisher robot. A dazzler, sometimes called an optical distracter, transmits a visually intense light, usually in a narrow beam, in order to 1) attract the attention of a person and to make them alert to heck points in non-combat land operations, to momentarily distract an assailant, to alert drivers in vehicles approaching a check point, and to alert civilian traffic to approaching forces.

Developing manual control for a automatic fire fighting robot: These navigation schemes may vary from as simple and cheap as IR sensors circuits to as complex and expensive as vision circuits. The choice of which kind of navigation scheme is to be employed depends fully on the requirements of the user. From industrial point of view these Automatic Fire Fighting robots are employed as goods carrier to Stop the fire and work as the Fire extinguisher another where manpower are not possible to be reached. A simple Automatic Fire Fighting robots sense the fire using simple Thermostat sensors but when it is on out of sense range it have to make a proper range for sensing the fire.

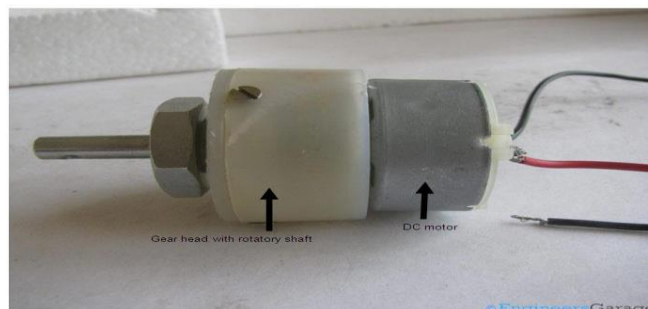
## III. METHODOLOGY

A thermostat is a component of a control system which senses the temperature of a system so that the system's temperature is maintained near a desired-set-point.



**Fig. 1: Thermostat Sencer**

The thermostat does this by switching heating or cooling devices on or off, or regulating the flow of a heat transfer fluid as needed, to maintain the correct temperature. The name is derived from the Greek words *thermos* "hot" and *status* "a standing".



**Fig 2: DC Gear Motor**

Modern DC motors are often controlled by power electronics systems which adjust the voltage by "chopping" the DC current into on and off cycles which have an effective lower voltage.

Following are the specifications of the Motor we used:

- 200RPM 12V DC motors with Gearbox
- 3000RPM base motor
- 6mm shaft diameter with internal hole
- 125gm weight
- Same size motor available in various rpm
- 0.5kgcm torque
- No-load current = 60 mA(Max), Load current = 300 mA(Max)



Fig. 3: DC Operated Pump

A **water tank** is a container for storing water. A **pump** is a device that moves fluids by mechanical action. Pumps can be classified into three major groups according to the method they use to move the fluid: *direct lift*, *displacement*, and *gravity* pumps. Among these we are using Direct Lift Pump whose specifications are as follows:

Table: Components Direct Lift Pump

<b>Operating Voltage</b>	<b>12V</b>	<b>6V</b>
<b>Power Consumption</b>	14.5W	4.8W
<b>Max Flow</b>	2 liters/minute	1 liter/minute
<b>Self Priming Height</b>	2'	10"
<b>Inlet/Outlet Width</b>	6mm	
<b>Compatible Tubing</b>	3/16" Airline Tubing for Aquariums	
<b>Operating Temperature</b>	-10°C - 100°C (Does not account for frozen liquids)	
<b>Weight</b>	.5 lbs	

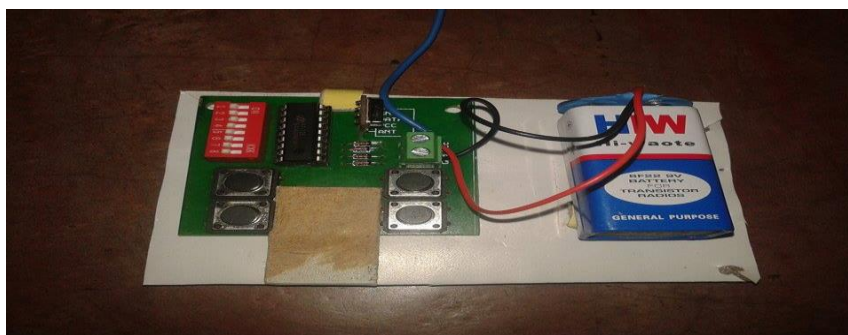
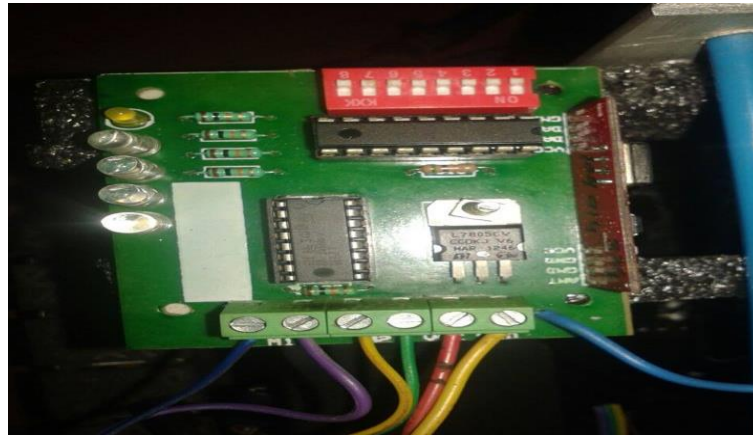


Fig 4(a): Wireless Remote

We are using this wireless remote for the navigation from remote places . It control on 9Volt battery. It has 4 buttons for moving Forward, Backward, Left and Right. also having Transmitter antennae to transmit signals to the robot.



**Fig 4(b): Wireless Tran receiver**

Above figure shows the receiver circuit and Driver IC 7442. IC 7442 is used to drive robot Forward, Backward, Left & right. DC Gear motors connections are also connected to this circuit. Circuit has given a power supply of 12V DC battery.



**Fig 5: Wireless Camera**

The wireless camera is used for making live demonstration of fire place where human is not available to give services for stopped the burning place. We are using Android Device WiFi enabled camera rather than normal wireless camera. It is possible to see live video buffering using various WiFi camera applications on any android device or directly on web. That's the reason we had used the mini wireless camera for watched live the place of extinguishes the fire in the screen at over distance and hence it's very useful in buildings, factories, hospitals.etc.

#### **IV. FEATURE EXTRACTION**

In future we can implement following factors:

1. Use of Co2 Gas Cylinders.
2. Use of Dry Chemical Powder.
3. Use of Foam.
4. Use of Wet Chemical.
5. Can use Higher Resolution zooming Camera.
6. Increasing the range of Wireless Remote

## V. SYSTEM ARCHITECTURE OF PROPOSED SYSTEM

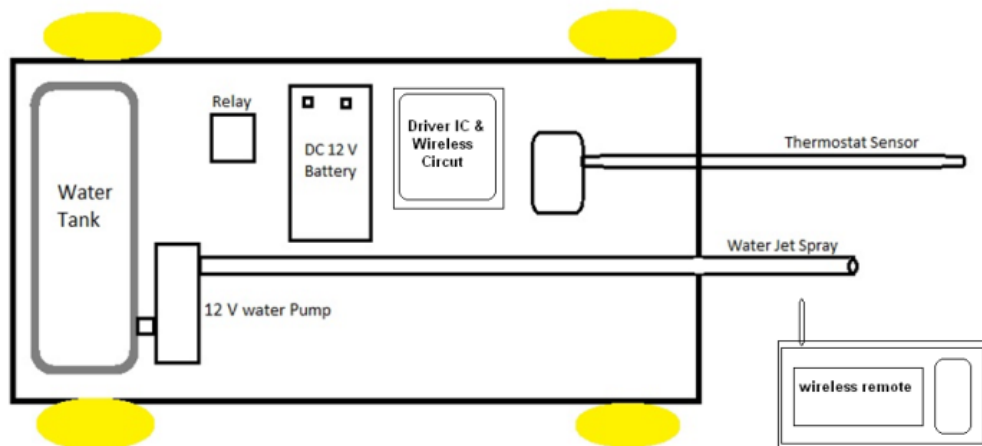


Fig. 8: System Architecture

## VI. RESULT

- Less cause of accident cases. Even Working is carried out automatic mode.
- Human control required is less.
- Maintenance cost is less.
- Easily repairable.
- Improved safety.
- Protection of property from loss.
- Simple in construction.

## VII. CONCLUSION

Through this we can conclude that a robot can be used in place of humans reducing the risk of life of the firefighters. We can use them in our homes, labs, offices etc. They provide us greater efficiency to detect the flame and it can be extinguish before it become uncontrollable and threat to life. Hence, this robot can play a crucial role.

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