



# Development of Fire Extinguisher Robot

**Dr. Mahadeo Narke**

**Principal, Dr. D. Y. Patil Polytechnic, Kolhapur**

**Mr. Niteen Mali**

**Lecturer in Mechanical, Dr. D. Y. Patil Polytechnic Kolhapur**

**Mr. Shambhuraj Bhosale**

**Student Second Year Mechanical Engineering, Dr. D. Y. Patil Polytechnic Kolhapur**

## Abstract

Spread of fire is very hazardous which is not only causes economical loss but also sometime may cause damage to human life. We cannot control the reason for fire, it maybe because of short circuit, overheating, human mistakes and so on. Early detection of the fire is key most important thing to control the loss. People uses normal practices to control the fire but in some cases humans are not able to enter in fire zone it leads towards spread of fire. In this paper we have developed a prototype of robot fire extinguisher which detects the fire and after detection water pump is started and it controls the fire.

**Keyword-** Robot, Fire Extinguisher, Photo Diode, Robo car

## 1.0 Introduction

Robot is a machine which is capable of carrying out various operations automatically. Robot can be guide by using external devices also by using sensors we can modify the robot for various tasks. According to 4<sup>th</sup> industrial revolution there is need of single system which can operate, connect and integrate multiple tasks and this single system is robot (1). There are many types of robot such as fixed base robot, mobile robot, underwater robot, space robot, medicine robot, packing robot, industrial robot and so on (2). Fire cause by gas leaking and petroleum industry cause an explosion, it is very dangerous for human to enter in such situations as it may cause his life. The use of the firefighting robot maybe the solution to save the lives of human (3). The robot can be used as path finder towards fire in emergency before the fire get out of control and can be work with fireman by early detection of area by saving his life (4). By considering the stated problems we can design fully automated fire extinguisher but the cost of project will be high and the lack of ability to produce desired result are major concern (5). So in this paper we have developed a prototype model of fire extinguisher and this prototype model is tested in project competition.

## 2.0 Development of Robot Car

We have use following components to make robot car,

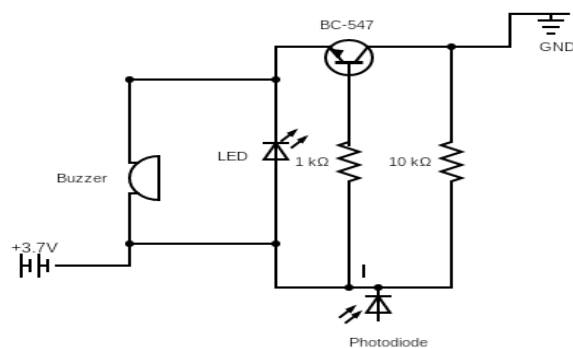
1. **Arduino UNO:** - Arduino UNO board which is a microcontroller it has 14 digital input/output pins, 6 analogue inputs, 16 MHz quartz crystal, usb connection and a power jack.
2. **L298N Motor Drive:** - We have use L298N motor drive which drives our motors at 4 location.
3. **Motor:** - We have use four DC motors of specification 12 Volt 300 RPM. This 4 Motors are used to rotate the wheels of robot car.
4. **Transmitter and Receiver:** - 6 Channel transmitter and receiver is used to transmit and receive the signals. By using this we can forward, reverse, left, right and angular direction.
5. **Battery:** - Battery is used for the purpose of supplying the power to various parts. Lithium polymer 12 Volt battery is used.
6. **Frame:** - We have used foam board as a base like chassis of vehicle to mount all the parts together which will make as a single unit to run the car.



**Fig. No. 1 Robot car with remote controller**

## 3.0 Development of Fire Extinguisher Module

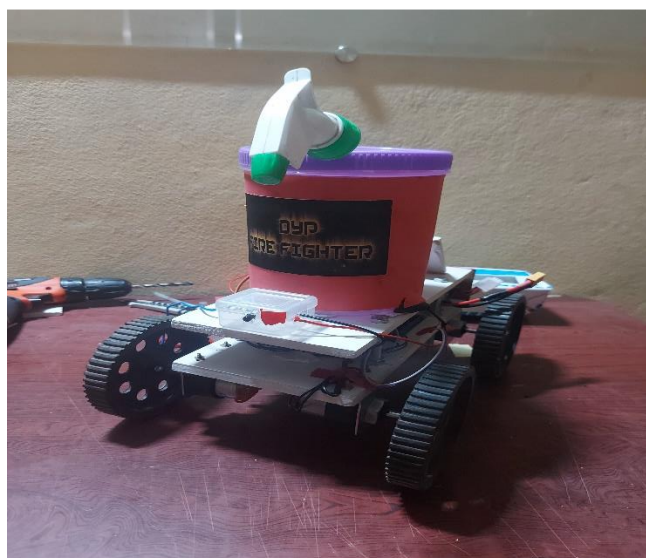
To detect the fire, photodiode is used and the range of the photodiode is approximately 2 feet. Along with Photodiode, 2 resistors of 1 K $\Omega$  and 10 K $\Omega$  are used. BC-547 transistor is used to operate the circuit. For indication of detection LED is used. The output of the circuit is given to submergible pump which is inside the water tank, and the tank is made up of plastic round container.



**Fig. No. 2 Circuit diagram of Fire Extinguisher Module**

#### 4.0 Working

The fire extinguisher model is mounted over the robot car. The robot car is operated by using remote control. When the robot reaches towards fire the sensor detects thermal radiation and it closes the circuit. Once the circuit is closed the signal is pass to pump and pump sprays the water on fire and extinguish it.



**Fig. No. 3 Firefighting Robot**

#### 5.0 Conclusion

In this paper we develop the prototype of fire extinguisher, this fire extinguisher is used in the areas where human cannot reach as well as areas where sudden explosion take place. This remote controlled firefighting robot may play a vital role in such a situation and we can reduce risk of the human life.

#### References:

1. Kiran, Keerthana Krishnan, Meghana M, Nikitha Mallasure, Sindhu S, " A Review on Fire Fighting Robot", IRJET, Volume: 09 Issue: 04 | Apr 2022.
2. Nagesh MS, Deepika T V, Stafford Michahial, Dr M Shivakumar, " Fire Extinguishing Robot", IJARCCCE, Vol. 5, Issue 12, December 2016.
3. Mr. Sarthak Dharmik, Mr. Pankaj Rawat, Mr. Suryakant Singh, Mr. Gitesh Wankhede, Dr. F.B. Sayyad, " Fire Extinguisher Robot", IJRASET, Volume 10 Issue VI June 2022.

4. Sahil S. Shah, Vaibhav K. Shah, Prithvish Mamtora and Mohit Hapani,” FIRE FIGHTING ROBOT”, IJETTCS, Volume 2, Issue 4, July – August 2013.
5. Mr.Kishor Wane, Dhananjay More, Shravani Balki, Saurabh Shikhare,” Fire Extinguisher Robot”, June 2021| IJIRT | Volume 8 Issue 1 | ISSN: 2349-6002.