# FIRE FIGHTING ROBOT

**Project**
**for**
**PHY 1999 Introduction to Innovative Projects**
***Submitted by***

Vibhuti Srivastava(18BCI0111)
Rakshit Singh Bisen(18BCI0149)
Raj Anand(18BCI0130)
Borule Rahul(18BIT0211)
Raghav Talwar(18BCE0948)
Pasumarthy Radha Krishna Kasyap(18BCE0016)
Vundela Venkata Siva Sai Charan Reddy(18BCE0964)
Thunga Sai Teja(18BIS0120)

**To**
Dr. Dhritiman Gupta
**In**
**TC1 – SLOT**


**School of Advanced Sciences**
**VIT University, Vellore**
**Tamil Nadu - 632 014**
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**SCHOOL OF ADVANCED SCIENCES**
**Project**
**Introduction to Innovative Projects (PHY 1999)**

It is certified that the project entitled "**FIRE FIGHTING ROBOT**" is the bonafide work for Project component of Introduction to Innovative Projects by the following students

**Vibhuti Srivastava(18BCI0111)**
**Rakshit Singh Bisen(18BCI0149)**
**Raj Anand(18BCI0130)**
**Borule Rahul(18BIT0211)**
**Raghav Talwar(18BCE0948)**
**Pasumarthy Radha Krishna Kasyap(18BCE0016)**
**Vundela Venkata Siva Sai Charan Reddy(18BCE0964)**
**Thunga Sai Teja(18BIS0120)**

of branch under my supervision in **TC1** slot during the Winter Semester -2019 at V.I.T. University, Vellore-632 014.

Faculty Signature:
Date:

# INTRODUCTION

According to survey in india nearly 25,000 people die every year due to fire and related causes and the loss due to these fire incidents is more than Rs.100 crores. Even though there are lot of precaution taken to prevent the fire there are accidents happening everywhere, so we have to kill the fire before it kills us. In a fire breakout the firefighters are restricted to go near the fire as the intensity of the fire is high in some cases, In order to overcome this we can build an autonomous firefighting robot which can help the firefighters in reducing the heat of the fire.

You will need NODE MCU board to act as the brain of the robot, and fire detecting sensor  which is basically DHT11 TEMPERATURE SENSOR modules. You will also need a chassis for the robot with two DC motors, one water pump and a can for storing water.

You have to program the robot such that when the robot detects the fire it should moves towards it, this is done using temperature and humidity Sensors. We will be fitting one DHT11 temperature sensors in our robot one at the front facing forward direction. When any substance is burning it emits some amount if infrared radiation and heat , the temperature sensors detects this heat using a DHT 11 SENSOR,
The robot starts to move and when it senses heat grater than 37 degree it stops and starts sprinkling the water until the temperature which is sense by sensor is below 37 degree and the bot again starts moving. This process repeats after  6-7 seconds.

## OBJECTIVE:

- In this project, we will learn how to build a simple robot using wifi module that could move towards the fire and pump out water around it to put down the fire

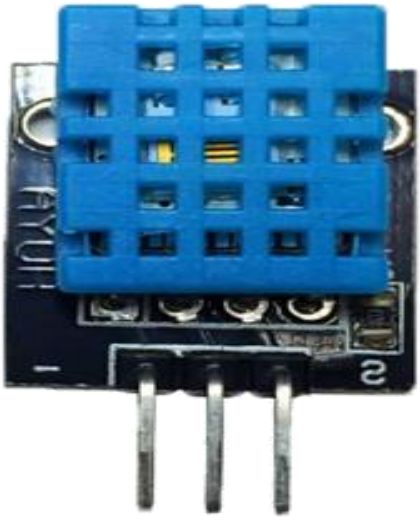
## Definition of the Problem

- According to National Crime Records Bureau (NCRB), it is estimated that more than 1.2 lakh deaths have been caused because of fire accidents in India from 2010-2014. Even though there are a lot of precautions taken for Fire accidents, these natural/man-made disasters do occur now and then. In the event of a fire breakout, to rescue people and to put out the fire we are forced to use human resources which are not safe. With the advancement of technology especially in Robotics it is very much possible to replace humans with robots for fighting the fire. This would improve the efficiency of firefighters and would also prevent them from risking human lives. Today we are going to build a Fire Fighting Robot using node mcu module, which will automatically sense the fire and start the water pump

# Methodology & Experiment

## ➢ MATERIALS USED-

### DHT 11 (TEMPERATURE AND HUMIDITY SENSOR



- ultra low-cost
- Its fairly simple to use
- Outstanding long-term stability
- Low power consumption

### NODE MCU MOTOR SHIELD

The Node MCU Motor Shield is a driver module for motors that allows you to use to control the working speed and direction of the motor .

### DC MOTOR

A DC motor (Direct Current motor) is the most common type of motor. DC motors normally have just two leads, one positive and one negative. If you connect these two leads directly to a battery, the motor will rotate. If you switch the leads, the motor will rotate in the opposite direction.

## WIFI MODULE ESP 8266MOD

It is acting as a brain of our model. In this we have coded the working of our model. It is connected on motor shield.

## Single channel relay board


A relay is an electrically operated device. It has a control system and (also called input circuit or input contactor) and controlled system (also called output circuit or output cont actor). It is frequently used in automatic control circuit. To put it simply, it is an automatic switch to controlling a high-current circuit with a low-current signal

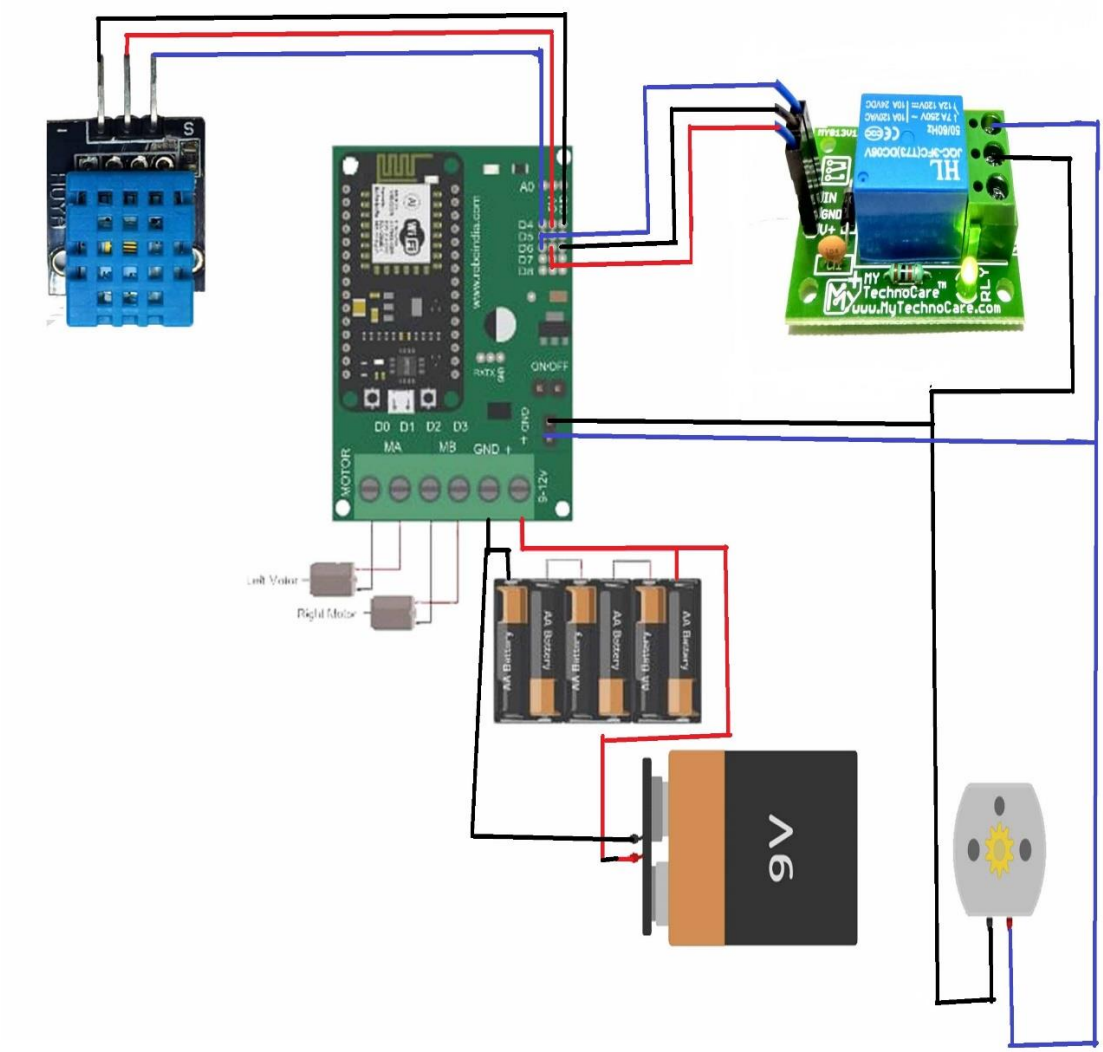
## Features

The features of 1-Channel Relay module are as follow:

1) Good in safety. In power system and high voltage system, the lower current can control the higher one.
2) 1-channel high voltage system output, meeting the needs of single channel control
3) Wide range of controllable voltage.
4) Being able to control high load current, which can reach 240V, 10A

5) With a normally-open (NO) contact and a normally-closed (NC) contacts

## CONNECTION-

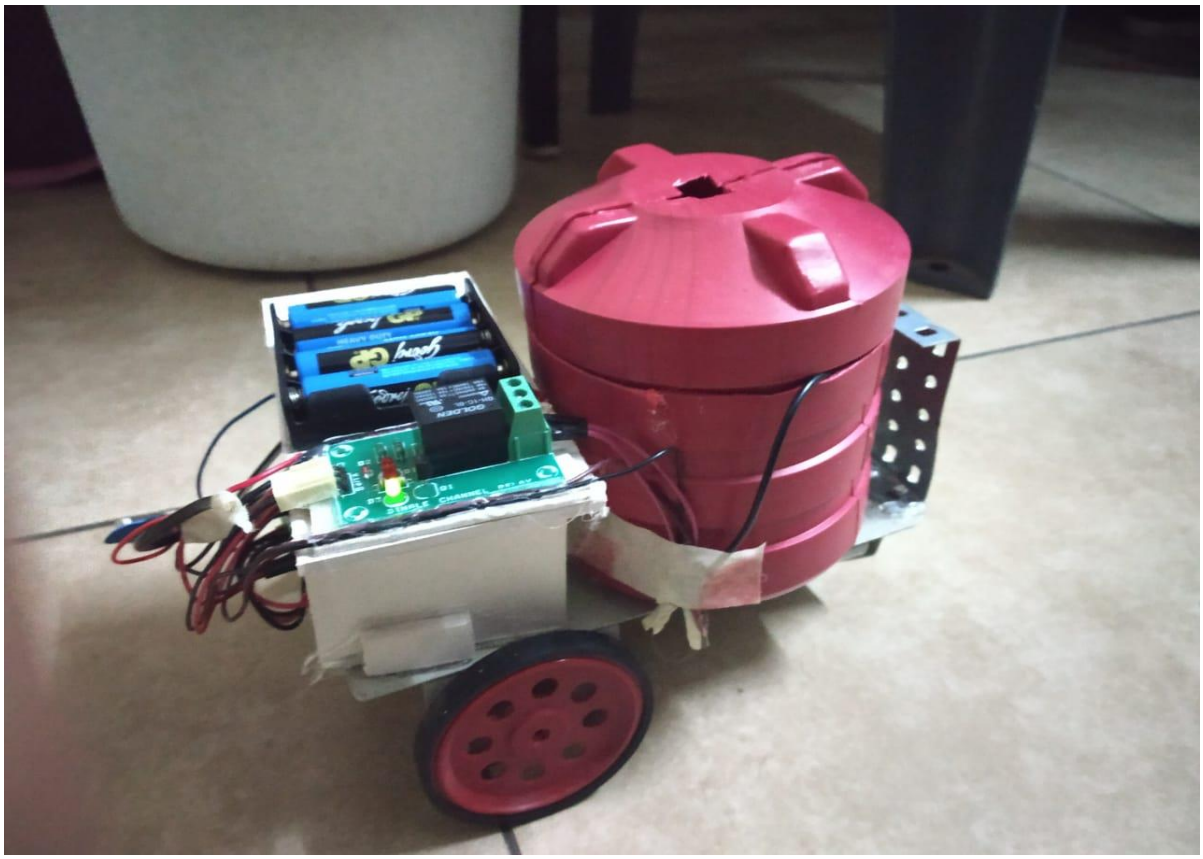



In this model we have used Node MCU module name ESP8266 which is further mounted over NODE MCU motor shield . Node MCU has multiple pins on either side of module and motor shield has ports designed such that NODE MCU can fit properly on its back. The whole module is powered by battries . Power sources are connected to motor shield by power pins(+ve and GND). To add mobility to the bot we have

used two DC motors which is further connected to the wheels on chasis. Since the primary objective of our bot is to detect rise in the temperature hence we have used temperature and humidity sensor DTH11 which will sense rise in temp and report it to node MCU by signal wire. Further for cooling purpose we have attached a tank on chasis which carry water and DC motor pump which spray water whenever temp received by sensor is raised by 37 degree C . The pump motor is connected to motor shield through a single relay board. The main purpose of relay is to operate the pump motor at constant rate and stable rate. Relay are used to operate high voltage device from low current supply . Thus pump motor will rotate at desirable speed without interruption.

We have GPIO and digital pins on motor shield. We have 4 GPIO pins on the motor shield to provide output to DC motor either low or high. Digital pins row D4 are connected to DHT SENSOR which will provide power to the sensor and receive signal from the sensor. Digital pins D6 are connected to relay board. The pins are connected to the input , output and ground pin of relay board. NC AND COM pins of relay board on other side of it are connected to the DC motor and also to the motor shield to draw power and operate motor pump.

# SNAPSHOT OF OUR MODEL



# Project conclusion

## Applications:-

1. The robot can be used as a guider to guide the visitors from the entrance to the main office .

2. It can help doctors to carry the medicines from one ward to another.

3. The main purpose is to rescue the people by identifying fire in a building.

## Limitations and future Extensions:-

1. Currently cannot be controlled remotely.

2. No camera

3.Not movable water piston

4.The circuits and connections are not properly protected.

# Acknowledgement

We would like to thank Krishna Kumar of Robovitics club who helped us in learning the coding of wifi module and also suggested some parts to be used in our circuit connections.

# Reference

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