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FIRE ACCIDENT SAFETY SYSTEMS

MINI PROJECT REPORT

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In partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

ELECTRONICS AND COMMUNICATION ENGINEERING

KPR INSTITUTE OF ENGINEERING AND TECHNOLOGY

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MAY 2022

BONAFIDE CERTIFICATE

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INTERNAL EXAMINER **EXTERNAL EXAMINER**

ACKNOWLEDGEMENT

We wish to express our deep sense of gratefulness to our beloved Chairman **Dr. K. P. RAMASAMY,** KPR Institutions for providing the facilities during the course of our study in the college.

We would like to ex press our sincere and heart full thanks to the Chief Executive **Dr. A. M. NATARAJAN** and the Principal **Dr. M. AKILA** of KPR Institute of Engineering and Technology for their kind patronage.

We profusely thank the Head of the Department **Dr. M. KATHIRVELU** who has helped in the success of the project by providing us with the necessary sustenance and facilities required.

We express our heartfelt thanks to our project coordinator **Mr. N. SATHISHKUMAR** Assistant Professor (Sr.G.) for his guidelines and suggestions to enhance our project.

We sincerely thank our project supervisor **Dr.M.KALAMANI** Associate Professor, Department of Electronics and Communications Engineering for her guidance and encouragement all through the progression of the project.

Finally, we thank all the faculty members and non-teaching staffs of Electronics and Communications Engineering Department, who have been a source of assistance in our endeavor.

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ABSTRACT

Nowadays, fire accident causes a huge losses in both economically and human life's. Occurrence of natural disasters is unpredictable and needs very high attention. There is no effective precaution measure for an fire accident. So effective postcautions make the fire accident losses to be smaller. This project has been implemented to detect fire accidents in industries, houses etc. This project uses flame sensor to detect the fire. Flame sensor detects the fire. If fire detected, led light is blinked and buzzer give an alert. Alert message with some text is triggered through blink app. DC Pump motor gives an immediate water supply to reduce the spreading of fire. Experiment was carried out in industry and the performance was evaluated. By implementing this project, it is easy to monitor the current status and thereby it useful to take immediate postcautions to reduce the losses and to avoid the fire accident to be huge one. In addition to that, the spreading of fire also controlled.

LIST OF COMPONENTS

S. NO	COMPONENTS	QUANTITY
1	Node MCU	1
2	Flame IR Sensor	1
3	Adapter	1
4	LM 7805(Voltage Regulator)	1
5	Relay Module	1
6	DottedPCB	1
7	Pump DC Motor	1
8	LED	1
9	Buzzer	1
10	Connecting Wires	As required

LIST OF FIGURES

LIST OF ABBREVIATION

FASS	FIRE ACCIDENT SAFETY SYSTEMS

CHAPTER 1
INTRODUCTION

1.1 OBJECTIVES

The main objectives of fire accident safety module include

- To take effective postcautions during fire accident.
- Design a circuit to detect fire in the range of 760nm to 1100nm.
- To trigger an alert during a fire accident.

1.2 OVERVIEW OF FIRE ACCIDENT SAFETY MODULE

With the advancements in the day to day life, safety has become one of the primary problems. Fire hazards are fatally dangerous and denigrating regarding business and home security, furthermore devastating regarding human life.

The obvious way to minimize the kind of loss is to respond to these emergency situations as quickly as possible. Thus, at present there is a huge demand and requirement for standalone autonomous flame detection techniques.

In these fatal predicaments, earlier detection effectively combined with quick warning system will probably produce lesser loss regarding property and life. Some sort of flame or smoke alarm system

is observed in our neighbourhoods, especially inside the property or even remote places with a faraway spot depending on need.

- Consequently in particular task, overview of the current flame-detectors is conducted, after which, making use of those sensors along with brisk responsive flame/smoke detection equipped with alert system have been planned and applied.

- The developed system will be efficient in sending alert messages through blink application.

1.3 BENEFITS

The implementations of fire accident safety systems leads to the following benefits.

- Improve efficiency in effective postcautions
- Reduce economic losses
- Avoiding spreading of fire
- Immediate alert to an owner of industry/house.

1.4 DRAWBACKS

- Range of distance is minimum to detect the fire by sensor
- Unpredictable location where fire accident happens
- Huge fire flow can damage the sensitivity of sensor.

1.5 ORGANIZATION OF THE REPORT

Chapter 2 summarizes the review of related background pertaining to FASS.

Chapter 3 outlines the system implementation including problem statement, overview and proposed methodology.

Chapter 4 deliberates the results of the proposed system and gives inference about the results.

Chapter 5 discusses the conclusion and future outlooks.

CHAPTER 2

LITERATURE REVIEW

2.1 RELATED BACKGROUNDS

Recently, several contributions have been proposed for FASS System. Every one of these endeavors concentrates on a few diverse examinations in the context of FASS. Hence, it is necessary to survey the existing methodologies in different aspects. This section deliberates the detailed literature review of various methods used for FASS system.

S. Harika(2017) presented the concept of Fire Accident Detection System in Industries. Occurrence of natural disasters is unpredictable and needs very high attention. This system mainly focuses on fire accident detection in Industries and houses and to reduce their severities. Fire accidents in industries which occur due to increase in temperature, decrease in humidity, release of hazardous gas like methane, butane, propane. DHT 11 sensor to detect temperature and humidity. MQ-2 sensor is to detect gas leakage. GSM module is used as a mode of communication for this method**.** Temperature and humidity is monitored by LCD. We have introduced GSM module for Communication purpose. Whenever the Pre-set values are exceeded GSM module is activated through AT Commands sends the alert messages to mobile phones which we have already pre-loaded in the program. So that it can detect the fire accident occurred at particular location where we place the sensors. The inference from this method is

temperature and humidity measurements are monitored and the problem can be detected very easily. Necessary precautions has been taken to reduce the fire accident.

M.Samarasimha Reddy and K.Raghava Rao(2016) presented the concept of Fire Accident Detection and Prevention monitoring System using Wireless Sensor Network enabled Android Application**.** To minimize the kind of loss is to respond to these emergency situations as quickly as possible. At present there is a huge demand and requirement for standalone autonomous flame detection techniques. System is alerting the far off property proprietor accurately also rapidly through sending Short Message (SMS) by means of GSM network and transmitter values to the Central server using GPRS. On successful detection of fire, the device transmits the data to the central server with GPS co-ordinates which helps us out to locate the exact location using the maps application in android mobile, based on the link received through the SMS.

Ritesh Kumar Ojha, Gaurav Sharma(2021) proposed the FIRE ACCIDENT DETECTION SYSTEM. System measures and records the parameters like temperature, humidity, and gas levels using appropriate sensors like DHT11 and MQ2 without any human intervention. The data is collected by ARDUINO and displayed on the liquid crystal display continuously. We used ARDUINO UNO

development board because of its simple programming, low cost, less power consumption, memory, on chip ADC, on chip PWM, In System Programming (ISP). The communication between Arduino and PC is done through serial communication using serial communication port of the computer. GSM module for remote monitoring and sensing purpose due to which we can attain maximum automation of system. The MQ2 gas sensor is used for sensing the concentration of gases in the air such as LPG, propane, methane, hydrogen, alcohol, smoke and carbon monoxide.

CHAPTER 3
SYSTEM IMPLEMENTATION

3.1 PROBLEM IDENTIFICATION

In the day to day life, safety has become one of the primary problems. Fire hazards are fatally dangerous and denigrating regarding business and home security, furthermore devastating regarding human life. In these fatal predicaments, earlier detection effectively combined with quick warning system will probably produce lesser loss regarding property and life.

3.2 HARDWARE COMPONENTS

3.2.1 Node MCU

Node MCU is an open source firmware for which open source prototyping board designs are available.

Figure 3.1 Node MCU

The figure 3.1 shows the Node MCU. It acts as a controller. The prototyping hardware typically used is a circuit board functioning

as a dual in-line package (DIP) which integrates a USB controller with a smaller surface-mounted board containing the MCU and antenna.

3.2.2 Flame IR Sensor

The IR flame sensor is used to detect the presence of fire or other infrared source. Flame or a light source of a wavelength in the range of 760 nm to 1100 nm can be detected. It can be used in fire fighting robot or heat seeking robot. The figure 3.2 shows the flame IR sensor.

Figure 3.2 Flame IR Sensor

It is used to detect fire and provide a HIGH signal upon the detection.

3.2.3 LM 7805(Voltage Regulator)

Figure 3.3 LM 7805(Voltage Regulator)

The figure 3.3 shows the Voltage regulator. A LM7805 Voltage Regulator is a voltage regulator that outputs +5 volts from a varied input voltage supply to Node MCU. It provide a constant output voltage.

3.2.4 Relay Module

The relay module is an electrically operated switch that can be turned on or off deciding to let current flow through or not. The figure 3.4 shows the relay module.

Figure 3.4 Relay Module

Relays use electromagnetism to convert small electrical currents into larger currents.

3.2.5 Pump DC Motor

Figure 3.5 Pump DC Motor

The figure 3.5 shows the Pump DC Motor. DC powered pumps use direct current from motor, battery, or solar power to move water. Pump Motor that can be operated from a 2.5 - 6V power supply. It can take up to 120 liters per hour with a current consumption of 220mA**.**

3.2.6 Buzzer

An audio signaling device is a electromechanical device. The main function of this is to convert the signal from audio to sound. It is powered through DC voltage and used in timers, alarm devices, printers, alarms. The figure 3.6 shows the buzzer.

Figure 3.6 Buzzer

3.2.7 LED

Figure 3.7 LED

The figure 3.7 shows the LED. A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons.

3.2.8 BLOCK DIAGRAM OF FASS

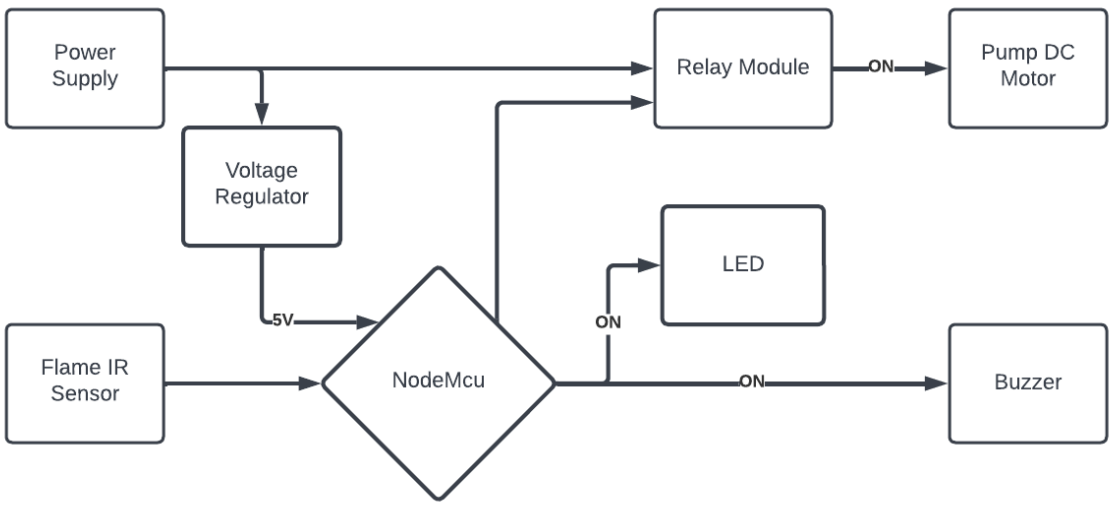

Figure 3.8 Block diagram of FASS

The figure 3.8 shows the implementation of hardware components of entire FASS circuit.

Remote alert framework offers the proprietor of the reason, the principle favourable position of checking faraway district along with catching quick reaction as soon as unexpected crisis message is trigerred.

3.2.9 PROCESS FLOW DIAGRAM

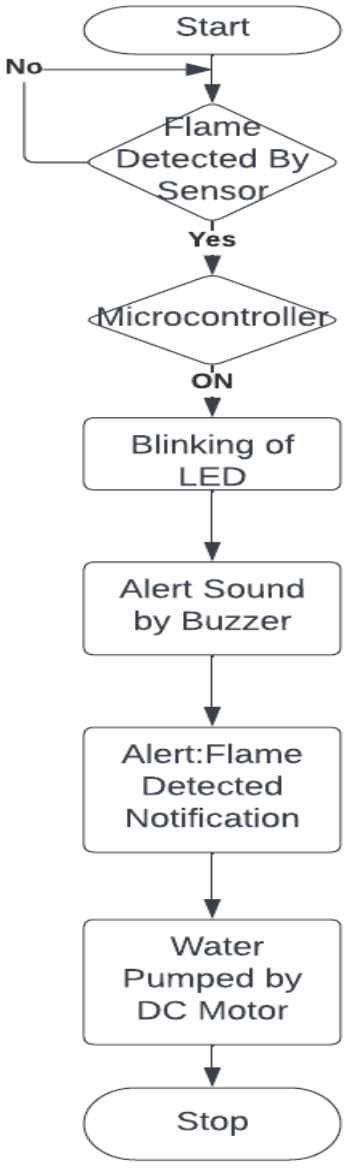

Figure 3.9 Process flow of FASS

The figure 3.9 shows the processing flow of an entire FASS system. Here Node MCU acts as a controller, perform all the operations when fire is detected.

CHAPTER 4
RESULTS AND DISCUSSION

4.1 EXPERIMENT RESULTS

The experiment was tested multiple times and successfully worked. After, project completion, the entire code is deployed in Node MCU. The functionality of the entire system is tested and performance evaluated. It is inferred that the system improve efficiency in effective postcautions of a fire accident.

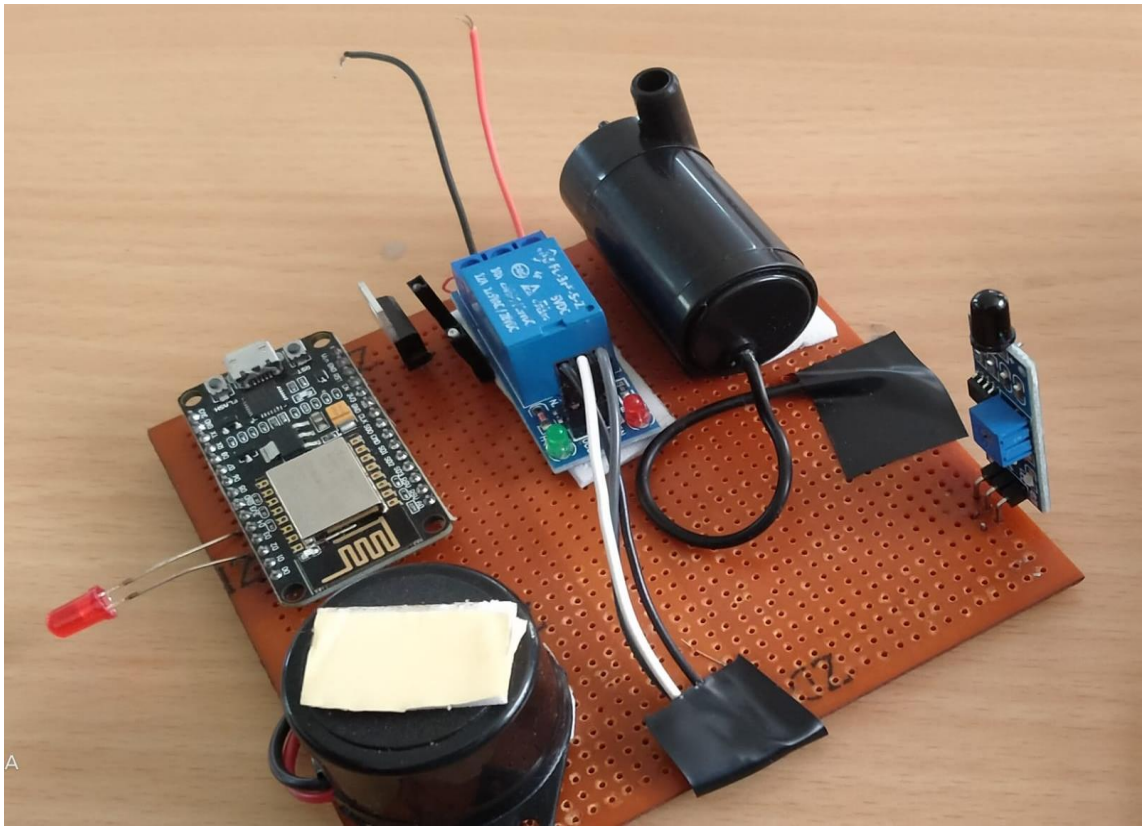

Figure 4.1 Hardware Implementation

The figure 4.1 shows the hardware implementation of the FASS system.

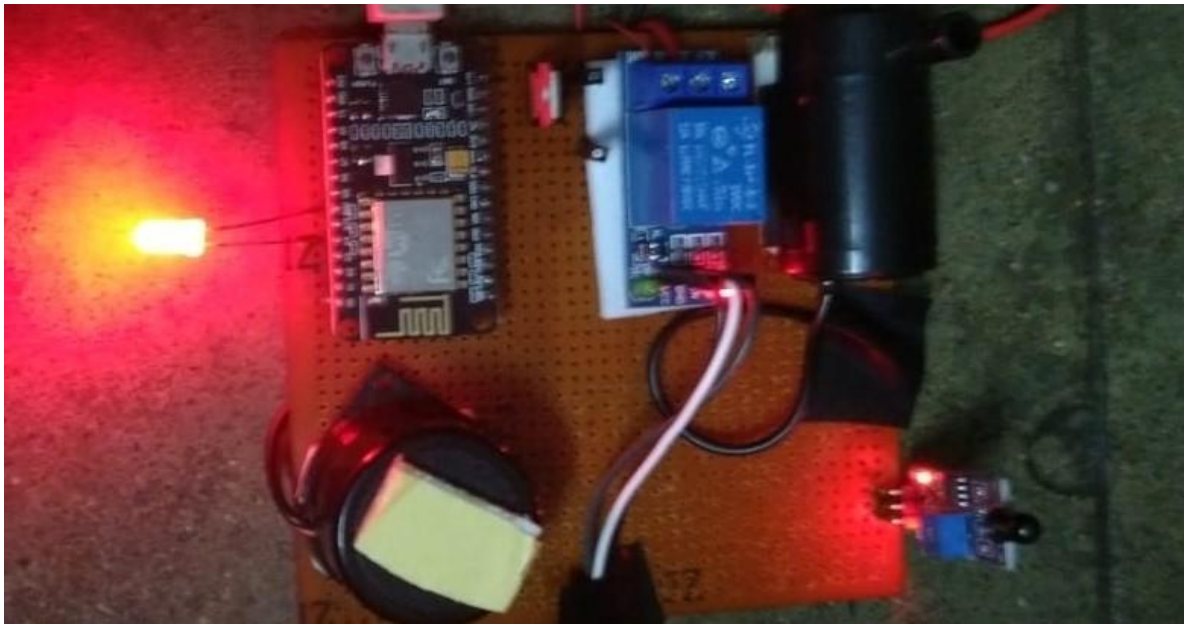

Figure 4.2 Led Output

The figure 4.2 shows the LED output of FASS systems.

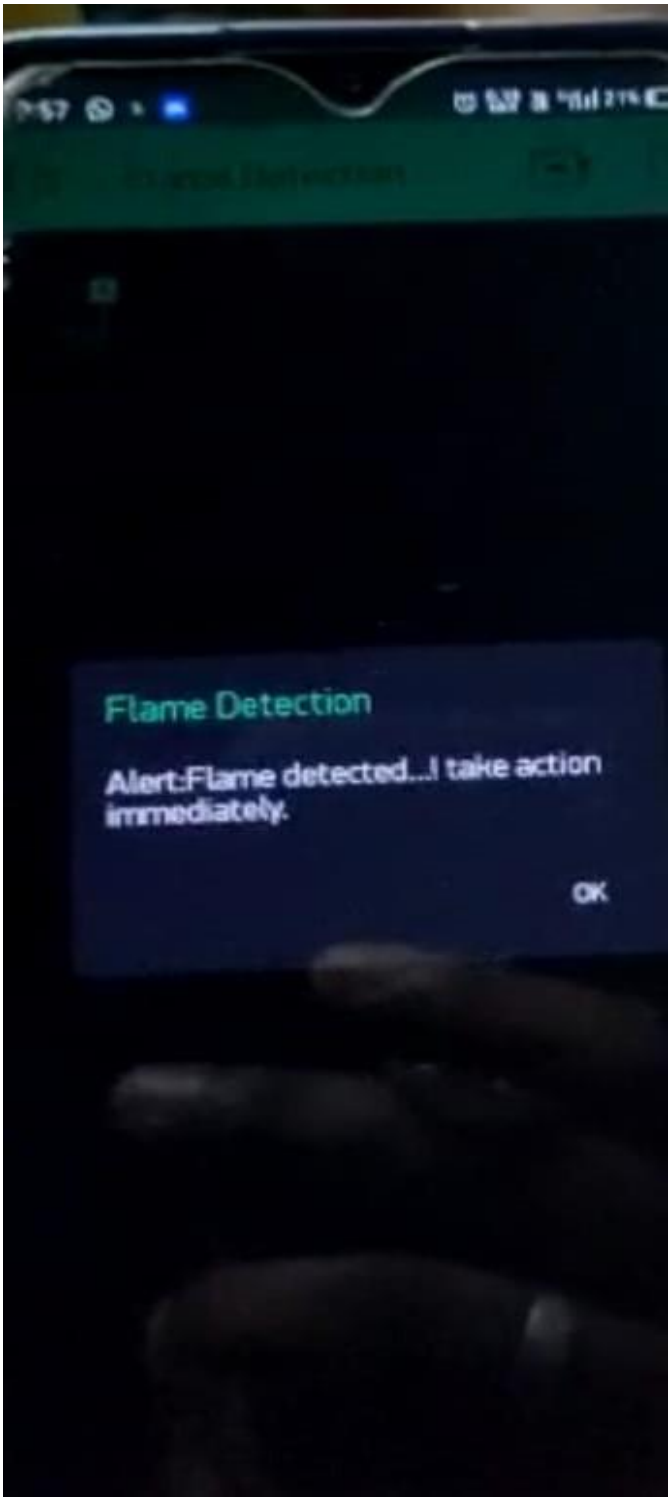

Figure 4.3 Alert Message Output

The figure 4.3 shows the alert message output through a blink application.

CHAPTER 5

CONCLUSION AND FUTURE TRENDS

5.1 CONCLUSION

The fire accident safety systems is proposed to produce fast and also reputable warnings can be performed for us to trigger preventative methods to avoid risk associated with flame dangers and also reduce losses associated with life and also property. This alert framework is less expensive fires that performs dependably to guarantee fire wellbeing way and can be introduced in homes, businesses, rehearses, home articles and so forth effectively. This system offers vast division of App in residence and also manufacturing basic safety.

5.2 FUTURE TRENDS

In future, FASS will further be extended to use it or all kind of industries. It can also be further enhanced to houses, textiles. By the way, it will reduce the economic losses and improve the effective postcautions to avoid a huge fire accident.

APPENDIX 1

SOURCE CODE

```
#define BLYNK_PRINT Serial
#include<ESP8266WiFi.h>
#include<BlynkSimpleEsp8266.h>
BlynkTimer timer;
char auth[]="NgEdJeJWtlegMyPUb1Dm3zvIuKbxhSZf";
char ssid[]="node";
char pass[]="12345678";
int flag=0;
int relay = D2;
int led = D4;
int buzzer = D3;

void notifyOnFire(){
  int isButtonPressed=digitalRead(D1);
  if(isButtonPressed== 1 && flag==0){
    Serial.println("Flame detected...! take action immediately.");
    Blynk.notify("Alert:Flame detected...! take action immediately.");
    digitalWrite(relay, LOW);
    digitalWrite(led, LOW);
    digitalWrite(buzzer, LOW);
    flag=1;
  }
```

```
  else if(isButtonPressed==0){
    flag=0;
    digitalWrite(relay, HIGH);
    digitalWrite(led, HIGH);
    digitalWrite(buzzer,HIGH);
  }
}
void setup(){
  Serial.begin(115200);
  Blynk.begin(auth,ssid,pass);
  pinMode(D1,INPUT_PULLUP);
  pinMode(relay, OUTPUT);
  pinMode(led, OUTPUT);
  pinMode(buzzer, OUTPUT);
  timer.setInterval(1000L,notifyOnFire);
}
void loop(){
  Blynk.run();
  timer.run();
}
```

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