Fire Monitoring and Controlling System based on Iot

Nitin Galugade
(Author)
Dept. Instrumentation Engineering
Vidyavardhini's college of Engineering and Technology
Mumbai, India

Mahesh Jakkar
(Author)
Dept. Instrumentation Engineering
Vidyavardhini's college of Engineering and Technology
Mumbai, India

Devika Nair
(Author)
Dept. Instrumentation Engineering
Vidyavardhini's college of Engineering and Technology
Mumbai, India

Prof. Deepti Patne
(Guide)
Dept. Instrumentation Engineering
Vidyavardhini's college of Engineering and Technology
Mumbai, India

Madhur Gawas
(Author)
Dept. Instrumentation Engineering
Vidyavardhini's college of Engineering and Technology
Mumbai, India

Abstract— **Fire is a very dangerous situation and it is very much necessary to monitor and give warning before anything untoward happens. In many developing countries, houses do not come fitted with fire alarm system as seen in developed countries like Singapore, USA etc. This results in fire being unattended and leading to lot of losses like property, human. This is the IOT (internet of things) based fire monitoring and controlling system which not only gives the real time information about the situation on the monitor but also takes the corrective action as per the need. In this system the sensors transfer data wirelessly with the help of MQTT (message queuing telemetry transport) networking protocol which is designed for constrained with low-bandw-idth. MQTT allows us to send commands to control output, read and publish data from sensors nodes and much more. The first concept is the publish and subscribe system. In a publish and subscribe system, a device can publish a message on a topic, or it can be subscribed to a particular topic to receive message. Also it is perfect solution for internet of things application. Due to this all data can be stored in server and this data can be access by the Application program interface which we can display on the monitor and with the help of software the operator can visualize the condition at the time of fire accident.**

Keywords—*IoT alarm, Nodemcu, DHT11, Monitoring, Controlling, web page*

I. INTRODUCTION

At present, safety is still attracting the attention of world. And in th-e all kinds of disaster, the fire occurrence frequency of fire is hig-h rate and damages more. With the rapid development of science and technology, late-model fire monitor and alarm systems are me-rged new semiconductor technique and artificial intelligent theoryAlthough traditional fire detect and alarm system may be satisfied either fire detection in a certain extent, there are some defects, such as uncertainty sensitivity of fire detector, deficiency ability in self-diagnosis and self-elimination which fire detection syst em is adopted in structure. There is some scarcity in trans port and comm-unication fire signal in real system is not s atisfied with fire detecti-on in modern time.

Intelligent fire detect and alarm control system is of fire sig nal detected, transmitted, processed and controlled system. And smoke fog, temperature, and flame of fire detect and al arm system is proposed based on IOT. Fire is very dangero us situation and it's very much necessary to monitor and gi ve warning before anything unwanted happens. In many de veloping countries, houses do not come fitted with fire alar m system This results in fire being attended and leading to l ot of loss of property, human and so also in developing cou ntries like India we do not have strict laws pertaining to ins tallation of Fire Alarm system So there is an urgent need to wards developing an automated fire monitoring and warnin g system.

Fig1. Basic layout of web page

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II. METHODOLOGY

We are developing a fire monitoring and controlling device which sense the fire and display the message on monitor screen and if the value of sensor will cross a specific threshold value it will take action autonomously.

A basic web page has been designed for displaying the temperature, humidity value. It also has some other buttons to take control action regarding relay which will turn on and off different AC equipment of the building. We are storing the reading of sensor in the database for further analysis of the system.

ESP8266 Wifi module has used in our project. All devices with specific IP address are connected to router this connection gives us best result for local operation purpose through XMLHTTP request we are handling the webpage with the help of set interval function for reading the value of Temperature and Humidity.

The data of temperature and humidity has been collected by GET method and stored in targeted variable %temp for temperature and %humidity for humidity. Asyncwebserver has been used for updating specific parameters only the value of temperature and humidity get updated regularly at an interval of 10 seconds.The function has been called by getElementbyid("temp") for temperature readings and getElementbyid("humidity") function for humidity readings

Interfacing of DHT11 has been done with Nodemcu ESP8266 a three floor model will have sensors placed in it which will work as optical and ionisation. The working principle of optical sensor is the transmitting and receiving light in optical sensor the object to be detected reflects light beam sent by emitting diode on the basis of this the interruption or reflection of light beam is calculated

The working principle of ionisation smoke detector is that they have small amount of radioactive material between two electrically charged plates, which ionizes the air and cause current to flow, when is disrupts the flow of ions the flow of current reduces and the alarm activates

For accessing web page we will introduce a security feature of login id and password so any unknown random person can't access the webpage thus making it fully secure.

Drives will be used for handling high voltage AC devices for turning them on and off. A software program related control action of relay has been uploaded in device so that by clicking button on webpage we can turn it on/off. This action is highly essential for controlling different equipments of the model a backup inverter can be provided in case if the power supply fails so that the system doesn't fail to work.

Fire extinguishing elements can be selected based on our choice here we are using water which will be sprinkled by sprinklers for putting off the fire the sprinklers are installed on top of floor for putting of the fire if the floor contains to many electric appliances it is not advisable to use water we can use Carbon dioxide gas in sprinklers this will not damage the electric appliance
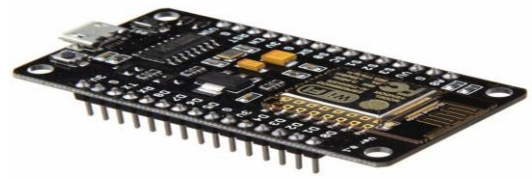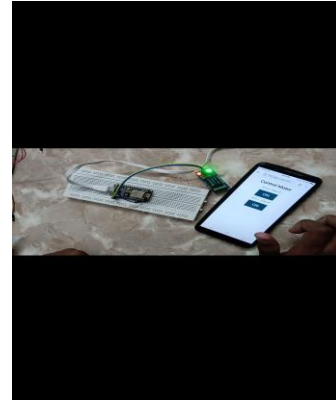

Fig 2. Nodemcu

Fig 3 Control action using relay

III COMPONENT DETAILS

DHT11: DHT11 is a low-cost digital sensor for sensing temperature and humidity. This sensor can be easily interfaced with any micro-controller such as Arduino, Raspberry Pi etc… to measure humidity and temperature instantaneously. DHT11 humidity and temperature sensor is available as a sensor and as a module. The difference between this sensor and module is the pull-up resistor and a power-on LED. DHT11 is a relative humidity sensor. To measure the surrounding air this sensor uses a thermistor and a capacitive humidity sensor.

NODEMCU: Nodemcu is an open source development board and firmware based in the widely used ESP8266 - 12E Wifi module. It allows you to program the ESP8266 Wifi module with the simple and powerful LUA programming language or Arduino IDE. With just a few lines of code you can establish a Wifi connection and define input/output pins according to your needs exactly like Arduino, turning your ESP8266 into a web server and a lot more. It is the Wifi equivalent of Ethernet module.

RELAY: A relay is a form of electrical switch that is operated by electromagnet which changes over the switching when current is applied to the coil. These relays may be operated by switch circuits where the switch cannot take the high current of the electrical relay, or they may be operated by electronic circuits, etc. In either circumstance they provide a very simple and attractive proposition for electrical switching.

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IV. RESULT

The amount of temperature and humidity is sensed by the sensor and control action is taken automatically to turn off the fire generated.

V. CONCLUSION

Fire monitoring and controlling system plays an important role in Industries, malls, residential areas, parking etc. They help in detecting fire or smoke at an early stage and can help in saving lives. Commercial fire detecting system usually have an alarm Signaling, with the help of a buzzer or siren. We have designed an IOT based Fire Alerting system using Temperature and a smoke sensor which would not only signal the presence of fire in a particular premise but will also send related information through IOT.

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