

# Prediction and Prevention of Forest Fire Using Cloud

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**ABSTRACT:** We all know that forest is the backbone of our Earth. Nowadays the fire produced in the forest cause lots of damages. It can be detected and predicted based on the cloud. In this project, a temperature sensor, DHT11 humidity sensor are interfaced to the cloud which detects the temperature and humidity produced from the fire. The values are taken from the sensor and are uploaded to the cloud i.e. in Thing-Speak. Using threshold value, the change in temperature and humidity are found out taken into consideration and an analysis is made to detect the fire. When it is detected an e-mail triggered with an alert message with the sensor values thus the fire is predicted.

**KEYWORDS:** Humidity, Temperature, Soil Moisture, Thing-Speak, Cloud.

## I. INTRODUCTION

Economic growth in modern industrialized societies has increased. Associated gas stations and oil reservoirs, which are all vulnerable to fire due to the flammable substances they house, are also found in these areas. When a fire occurs in such places, firefighting is hindered by the mazes of crowded buildings, high temperatures, smoke, and the danger of explosions Current firefighting systems are based on humans.

## II.OBJECTIVE

The main aim is to protect the forest from fire. Also to decrease the falling of trees from fire. Animals are also saved from the fire. Creates an Awareness of nature.

## III.LITERATURE SURVEY

A survey<sup>[1]</sup> found that 80% of losses should be avoided if a fire occurs was detected. The Arduino platform based IoT enabled fire detector and monitoring system is the solution to this problem. In this project, we built a fire detector using the Arduino UNO integrated with a temperature sensor, smoke sensor and buzzer. The temperature sensor absorbs heat and the smoke sensor absorbs any smoke generated by burning or fire. The buzzer connected to the Arduino gives us an alarm indication. Whenever a fire is triggered, it burns nearby objects and generates smoke. A fire alarm can also be triggered by smell smoke coming from the candlelight or the use of homemade oil lamps. Also, the alarm goes off when the heat intensity is high. The buzzer or alarm is turned off whenever the temperature goes back to normal room temperature and the smoke level decreases. We have interfaced the LCD to the Arduino board. With the help of IoT technology, we tried to make the entire monitoring process smarter by linking to webpage naming - the "fire security system" created by the PHP tool. After applying the Connected Component Labeling, the first criterion is applied, which eliminates all objects with more than 10000 and the filled area over 8000. Another criterion, the main axis length, is used to retain only the text area. All objects between 20 and 3000 of the main axis length are considered text. To eliminate small objects, the connected component labelling is applied to the resulting image and the second criterion is applied, which eliminates all objects with less than 300 and the filled area less than 500.

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Human advances in technology<sup>[2]</sup>, man-made and natural disasters are growing exponentially. It is essential to protect our environment and nature. In this modern age, technology can be used to provide a conducive environment to live by preventing catastrophic failure. One such natural event is wildfire. This work aims to create an autonomous IoT-based device to detect forest fires as quickly as possible and take rapid action before the fires are spread out and spread over a large area. The main goal of the system is to detect fires and protect our entire system from fire hazards. Also, the proposed model is designed to be integrated with autonomous features such as self-monitoring and self-healing so that the ubiquitous environment created for a specific goal can be accessed with a rigid and fault-tolerant system, by embedding analytics and providing intelligence at the edge of the network.

#### IV. DESIGN OF THE MONITORING SYSTEM

The design part of the event monitoring system is divided into two modules namely hardware and the software part. Before the software part can be developed, the hardware part is first worked to provide a base for the software to function. In the hardware phase, the process of the node MCU's setup configuration will be briefly described below.

##### A. HARDWARE SPECIFICATION OF THE SYSTEM

The hardware used in this project so far consists of only 5 components which are: The block diagram of the device is shown in Fig 1

1. Soil Moisture Sensor
2. MQ-2 Sensor
3. LDR Sensor
4. DHT11 Sensor
5. NODEMCU ESP8266

The pin diagram of MCU is shown in fig.2

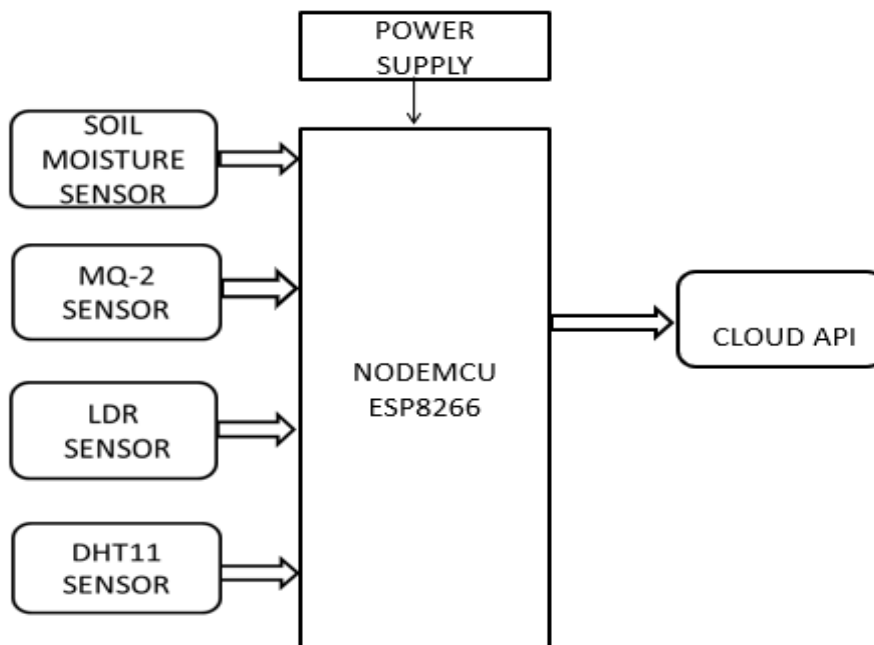


Fig.1 Block diagram for the proposed system.

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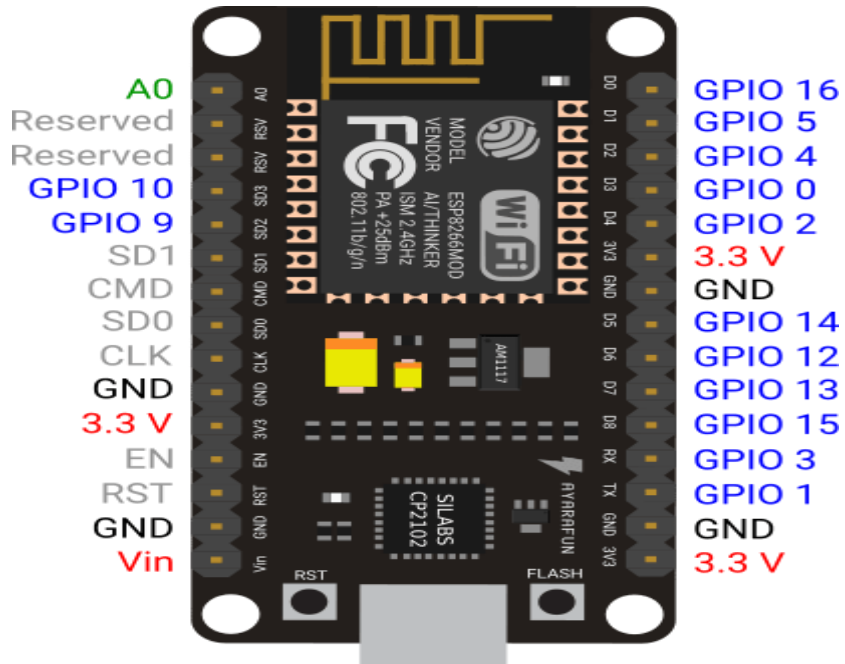


Fig.2 Pin diagram for node MCU esp8266

The soil moisture sensor is shown in the Fig-3  
The MQ-2 sensor is shown in the fig-4

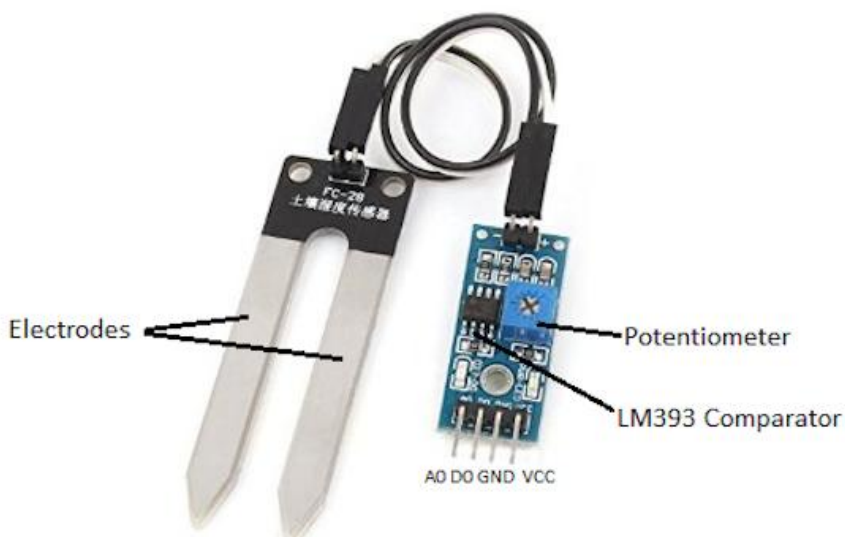


Fig 3:SOIL MOISTURE SENSOR

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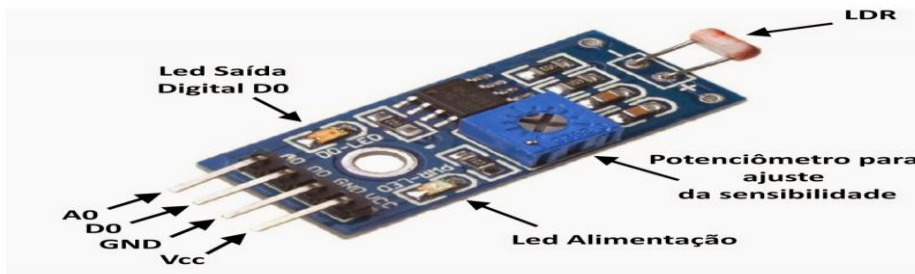
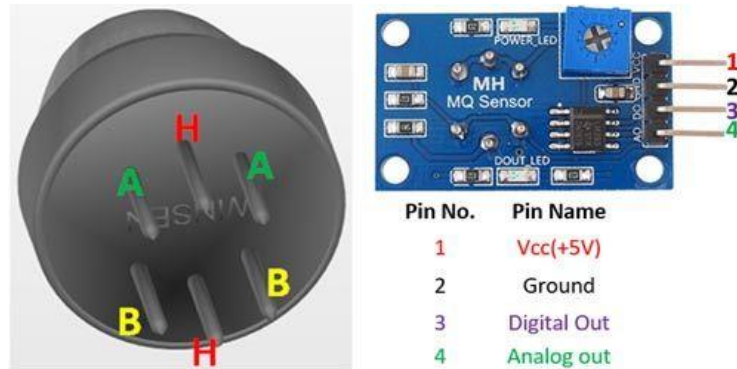


Fig.4 MQ-2 SENSOR PIN DIAGRAM

The circuit diagram is shown in the fig-5

**IV. CIRCUIT DIAGRAM**

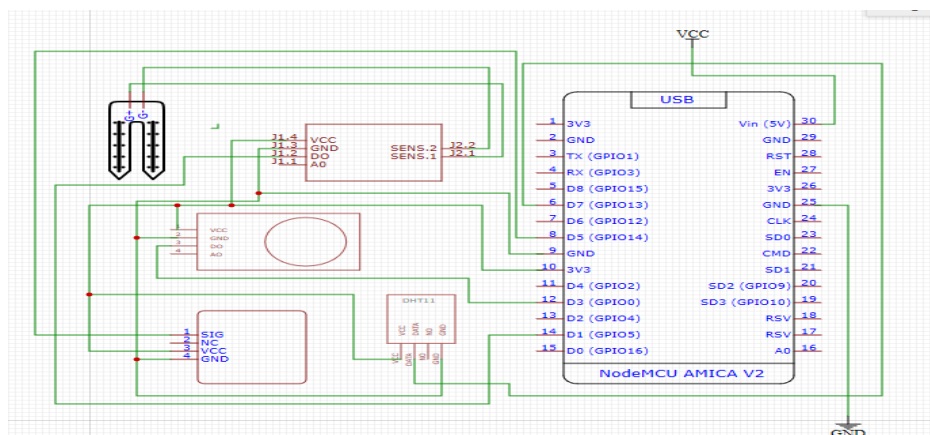


Fig.5 Circuit diagram for the proposed system.

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**V.RESULT AND DISCUSSION**

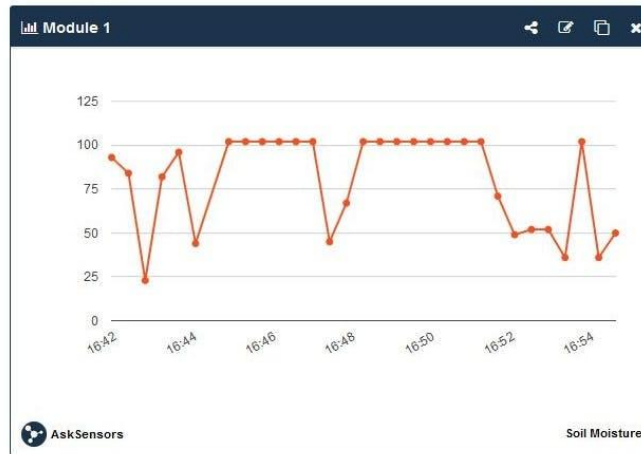


Fig.6 Soil moisture level.

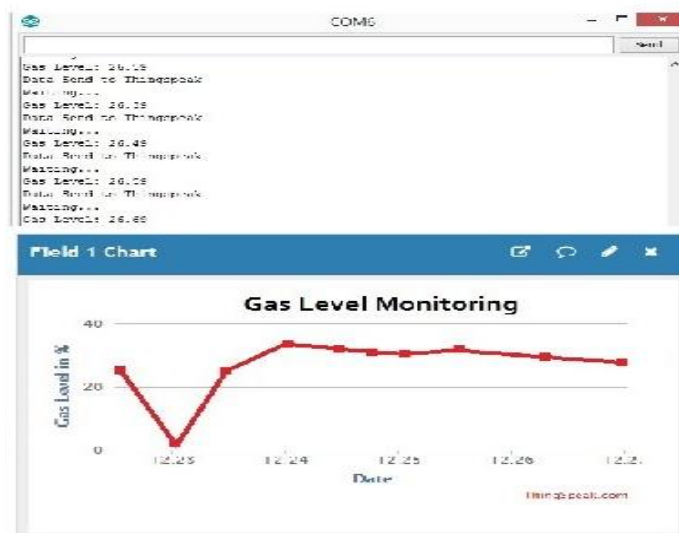


Figure.7 GAS level.

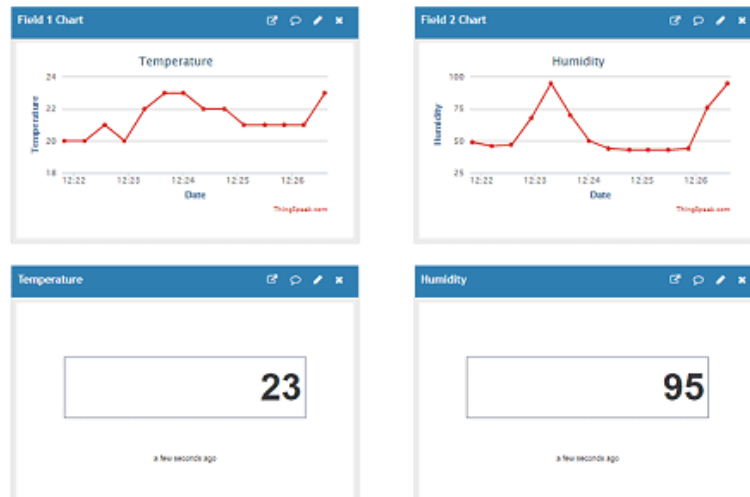


Fig.8 Temperature and Humidity level.

## VI. CONCLUSION AND FUTURE ENHANCEMENTS

In this paper, an IOT based forest fire detection was implemented using the Arduino. So when the temperature is increased it will display in the thing-speak and also gives message to authorities by using the registered email ID. The same process is implemented for fire detection when the flame gets increased intimation will be conveyed to the authorities. So by using this technic, we can protect the forests and we can save wild animals.

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