



## An Efficient Approach For Forest Fire Detection Using IOT

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**Abstract:** Now a days, wild animals and forest department are facing so many problems. Wild animals move towards urban area. Since forest woods has destroyed from human being day by day in the forest. The forest area reduced, so animals struggle for their existence in the forest. A survey found that 75% of forest burns due to fire. This loss of forest is very dangerous for wild animal lives. In early time, if the forest fire detected, forest area makes very safe and secured. Our proposed experiment conducted for safe guard of forest and wild life's against fire. IOT based device and sensors uses to monitoring of the heat of environment in the atmosphere and amount of moisture in atmosphere. In our paper, Arudino UNO a fire detector is used. Arudino UNO connected with heat sensor, smoke sensor and buzzer. By the help of GSM, which send SMS to registered mobile numbers. Temperature Sensor used to know the temperature variation in the forest area, value of temperature display on LCD screen. Flame sensor indicates higher or lower flame. Higher flame indicates fire is spreads in the forest otherwise not. When the fire attacks the forest, various sensors send notification to the authorities, and make alert messages to application through android mobile or access the webpage through internet.

**Index Terms - IoT, LCD, GSM, Arudino UNO, Sensors.**

### I. INTRODUCTION

Expected forest fire is a very hot point all over the world in standard assurance each step, to drop out the fire, few convince methods are required to put the wood fire away. So many experiments are conducted in different papers, to get some sensible knowledge. A very large burning area of forest (Backwoods) is the clarification behind, so many and irreversible damage made to nature and economic related things. For example, a different kind of genus is closely connected with man life and characteristics are undermined etc. although this is not control the disaster of wood land fire. A loss of assets is more which is not coming under calculation.

By human awareness by observing, the wood fire an exact report is influenced by different supposed parts of world. Therefore this shows clearly, the spreading of fire in the forest area, hence take necessary action to minimize the spreading of fire. So many scientists conducted trails about fire expanding model and they duplicating the spread of fire, animal collision and cost contained things. For instance business growth leads to be destroying very large burning forest area in way of damage. It causes the loss of vegetable items of the existing systems [1].

Fire spreading is a steady risk to common frameworks of human security and backcountry. These things are causes to a warm atmosphere in a particular district. Expected future local fire may have happens after timber land fire rating, evaluating the forest fire in many districts in a theoretical way. [2]. Activities by human being to destroy the forest area for cultivation, charcoal collecting etc., it leads not to control the fire existence in forest area.

Normal perception prevents by broken glasses, fire can be in the light of midyear day light in a small place for some time, this happens to influence the flame [3].

So many experiment conducted by experts all over the world, frame works in order to consider frameworks fitness for looking at and perceiving of fire control. The result of experiment conducted by Bolourchi and Uysal in 2013 concludes that by the help of remote sensor compose ( WSN) they collect gathering data. Those unrefined data used as to control system data[4]. They select fire acknowledgement to talk about to the intelligent decision making [IDM]. This frame structure having some restriction and use fuzzy logic images. The limits will taken of Temperature, smoke, light, Moistring and detachment. Fleecy rules adopting for fire spreading limits showing by images structuring on Mat lab programming. It is only a theoretical explanation only confident on existence of Mat lab programming to find out expected fire at certain time being. This frame work is not really good on understanding on how it will continue [5].

In 2009, a project work conducted by scientist Lloret et.al the result of project came out , that by deploying the remote sensor networks throughout the country and forest area fire spread across forest area will be accepted[6]. The model of experiment includes IP (Internet Protocol) cameras in remote area to catch up fire in the country and forest zone. This frame work contains many sensors they can send alert messages to the central server. Near remote cameras of sensor will be selected by the central server to go through the particular fire accident. The selected sensor will be send continuous images of the particular forest zone or place. This frame work needed a good web page in entire country and wood land zone.

## II. RELATED WORK

A structure designed using sensors and an Arduino, based on fire spread area and color of the fire they identified the fire affected area. [7]. But in this method the main disadvantage of this system is it cannot identify the long range of fire spread area and it requires monitoring for efficient usage. A model proposed by E.Saraswathi [8], they implement a system with the help of efficient sensors and Arduino. Networks of sensors are programmed and connected to many user interfaces. These interfaces are having different capacities, users can easily handle this system. Users can interact with a friendly user system. The main disadvantage of this system reminded that energy usage is very much. Hence a wrong alarm will be received in some time.

In this paper, we have to use a Temperature sensor, smoke sensor and buzzer are interfaced with Arduino as a fire detector. This web page designed by PHP tool commanded by Arduino Programming. This system gives accurate readings and also works effectively because of modified sensor technology. By using the modified technology, this will help us to minimize the disaster of forest when fire attacks forest. By using the improved version of IOT based sensor system we can get efficient and accurate results [10]. In this type of model we come to the conclusion that early forest fire detection can exist to find out by observing the temperature level measure and carbon Dioxide level.

## III. EXISTING SYSTEM

The forest is that a thick group of trees are in interior place of forest, they have not managed properly in the forest. A forest zone contains with thick group of trees and dry woods and leaves are used as fuel sources. These pieces of trees, leaves, wood lands are used as ignitable materials. Fire can be started by man mistakes like smoking or fire cooks, for example, the mid year's day high temperature. When fire starts, the burnable things in forest region may use as fuel to the fire, then flame can be spread over the entire forest area uninterruptedly.

## IV. PROPOSED SYSTEM

The objective of this system is that early observe the forest fire in the wood land region by observing the level of carbon dioxide and temperature to prevent the fire.

Early observe and removal of the fire is the main intention to prevent fire and damages occurs in the forest and save the wild life. This proposed IOT based system, by continuously monitoring the level of temperature and CO<sub>2</sub> in atmosphere to detect the forest fire.

## V. MODEL DETAILS

### 5.1 Arduino UNO

Arduino UNO is an open source electronic device. It is a microchip ATmega 328P based microcontroller boards. The board contains digital and analog input/output pins. These pins are interfaced with different circuit boards. It contains 14 digital I/O pins. (6 can be used as PWN (pulse with modulation)) and other 6 can be connected to analog I/O pins. It is programmed with Arduino IDE software. Power supply can be done through USB cable. Otherwise 9 volts external power supply will be required from battery. It will run in the range of 7 to 20 volts.

### 5.2 Temperature Sensor

An electronic device used as temperature sensor to measure the atmosphere temperature of its surroundings. Input data can be converted into electronic data. This electronic data can be recorded. By using this data we can monitor the temperature variations of the surroundings. LM35 is one of the good sensors used as temperature sensor that can be used to measure the temperature in Degree centigrade.

### 5.3 LCD

It is an electronic device 16x2 module. It is available in large range. These LCD's are economical and easily programmable. It contains 2 lines display on the screen. Each line contains 16 characters display. It has two types of registers such as command and data register. When instructions given to LCD the command register execute the instructions given to LCD and displayed LCD data will be transferred to data register for storing purpose which is in ASCII value displayed on LCD.

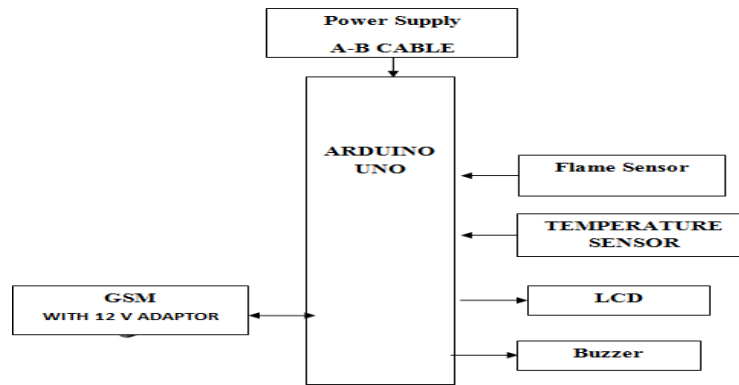
### 5.4 GSM

GSM modem looks like mobile phone. It receives and transmits the message by using transmission and reception pins. A PC or Microcontroller connected to the GSM modem. A signal received from sensors. These sensors are integrated with RPI. If any value finds to be high suddenly an alert message will transfer to the concerned forest authorities. Then the concerned person takes necessary step to detecting the fire in forest area.

### 5.5 Arduino IDE

It is an application working on windows and MAC operating system. C and C++ functions are uploaded in Arduino IDE. It is open source software mainly used for writing and compiling the code into Arduino module. Different range of Arduino models are available including Arduino UNO, Arduino Mega, Arduino Leonardo, Arduino Micro, each module having microcontroller on the board, each are programmed and accepts information in the form of code.

## VI. ARCHITECTURE DIAGRAM



In figure which we use a 3 pin temperature sensor. One pin goes to power supply of 5 volts. This power supply connected to Arduino and another connected to analog side of Arduino and 3rd pin goes for ground. Buzzer contains two pins, one goes to power supply of 5 volts and other for ground. A flame sensor contains 3 pins, one goes for power supply of 5 volts. And another connected to output and 3rd pin uses for ground which are connected to digital mode of Arduino. This give outputs in digital sensor display in 0's & 1's. An LCD of 16x2, it has 16 columns (0-15) and 2 rows (0&1). Arudino we using here it has 2 sides. One connected to analog pins that are connected to temperature sensor, another one digital mode connected flame sensor. The figure shows the Connections.

## VII. RESULTS AND DISCUSSIONS

When temperature goes to high level or low level in forest area, sensor will record the readings in real time values. When temperature will extremely increase that will display on LCD and alert message will send by buzzer to the closest staff, and also registered mobile number to get information from the Buzzer. Then authorities will alert and take necessary action.

Similarly flame sensor is use to remove the flame or fire which creates a big problems to timberland and wild life. If Flame may get value high, message will reach to nearby staff indicating that something will happens in a specific area. That indicates the fire will spread drastically

## VIII. CONCLUSION

An IOT based in this project, we use an Arduino for implementing of early detection of forest fire. When temperature rises in the environment the values are shown on LCD screen. This will intimate to the forest authorities through registered mobile number. Same procedure will be happens for forest fire detection. The increase in the flame, the buzzer will start beeping and message will goes to forest authorities. They take necessary action to remove the fire in the forest area. In this way we can save the forest and wild life followed by the technique.

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