

# Use of the Embedded System for Forest Fire Monitoring and Detection

Mr. Nikhil Vishwas Ghag<sup>1</sup>, Mr. Rushikesh Dipak Sutar<sup>2</sup>, Miss. Pratibha Prakash Jumale<sup>3</sup>

<sup>1</sup>Student P.G. (M.Sc. I.T.), D.B.J. College, Chiplun, Ratnagiri, Maharashtra, India 415605.

<sup>2</sup>Student P.G. (M.Sc. I.T.), D.B.J. College, Chiplun, Ratnagiri, Maharashtra, India 415605.

<sup>3</sup>Asst. prof. of Department of I.T., D.B.J. College, Chiplun, Ratnagiri, Maharashtra, India 415605.

\*\*\*

**Abstract:-** This paper summarizes the most important problem in world. Is that many forests are burn due to some natural and man-made reasons.

In World Many time's forest are destroyed due to the forest fire. This problem has been the research interest for years, and there are a number of solution available to reduce this problem So that to reduce this problem by using some smart technology such as forest fire monitoring System.

The System Is the detection of forest fire initiates at any of the nodes planted on a tree inside the forest. The forest has a network of nodes placed at suitable distances from each other, the nodes have a capability to communicate through devices and by using Arduino. If any change above a threshold value is found in the atmospheric parameters such as temperature rise, contamination of air with smoke, etc. ear a node the information is passed to a nearest intermediate node until it reaches to the main terminal. The main terminal uses a GSM modem to pass the information to a cell phone to the forest fire monitoring centers.

**Key Words:** - Forest fire detection, forest fire monitoring, forest fire system, forest fire Behavior fire, early warning systems.

## 1] Introduction

Due to the innovation of Embedded System our daily work becomes easier and also fully automatic. An embedded system is an electronic/electro-mechanical system designed to perform a specific function and is a combination of both hardware and software. [1]

Forest Fires are a major problem occurring in wild areas and cause significant destroyed the natural and human resources are the extensive phenomenon in forests. Most forest fires are atmospheric temperature and occasional humidity which provide auspicious environments for a fire to begin Common causes of forest fire include human careless and some natural reason and exposure of fuel to extreme heat and aridity. It is significant to detect that if you want to manipulate

woodland fire, early caution schemes are essential. In India, there are normally conventional behaviors to reduce the impact of wooded area fire. Combating forest fires is normally performed in the usual way like fire lines and beating with branches.

## 2] Objective of System

- The aimed of the System detect the forest fire as early as possible by measuring the level of temperature and carbon dioxide level.
- Apart from the prevention measures, presently detection of the fire and suppression of the fire is the only way to maintain and reduce the damage and casualties.
- Forest fire monitoring and detection system is aimed to detect the fire by using temperature and humidity sensor

## 3] Components used in Proposed System

### 3.1] Hardware Used:-

- Arduino UNO Microcontroller.
- DHT11 Temperature and Humidity Sensor
- GSM Module
- Jumper wires
- Transmitter
- Receiver

### 3.2] Software Used:-

- Arduino IDE

## 4] Working Principle

- The main goal of this system is to monitoring and detection of forest fire especially design reduce the damage and casualties. This embedded system is designed with sensors, actuators and a microcontroller.
- If any fire flame or moisture is detected in the air then it passes the information to a cell phone to the forest fire monitoring centre.

## 5] THE BLOCK DIAGRAM OF PROPOSED SYSTEM

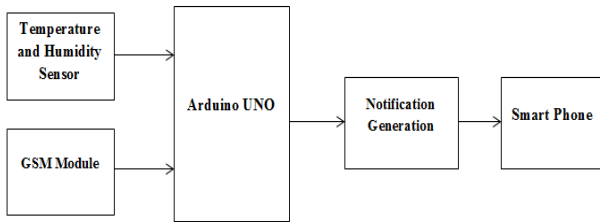


Fig. Block diagram of whole model

### 5.1] Working of Temperature and Humidity Sensor and GSM Module

The forest fire detection system works in the three stages. The first stage consists of reading some external environmental parameters like temperature and smoke. The first stage is done with the help of some sensors which are used to sense and convert analog data to digital data. The sensors read parameters like temperature, humidity, and air quality then send this information to the next nearest node. This process goes on until the information reaches the final node or the main terminal which is the second stage of the overall process. The third stage consists of the transmission of the information to the forest fire monitoring unit.

Each node has a temperature and humidity sensor, a smoke sensor and a microcontroller unit. The sensors interact with the Arduino and store the information for the comparison process. There is a predefined threshold value to each of these parameters. The microprocessor compares the sensor values at regular intervals of times with the threshold values. Based on the comparison if the input values of sensors exceed the threshold the node transmits the information to the next nearby node which again, in turn, transmits the information to the other nearby node. In this way, the message flow is regulated in this model.

### 6] Conclusions

The work is to design the model to predict and monitoring the forest fire at the time of disaster. This framework model gets the data and controlled using the system. Then the data is monitored through forest fire monitoring centers.

Further, if the sensor data reaches the threshold value it sends the information to the authorized person to take prevention of fire.

The developed system has many scopes that can be improved to take performance analysis of different strategy viz. temperature, humidity, smoke and ultrasonic. The result obtained helps us in deciding by differentiating between peaceful fire and potentially dangerous fire which requires immediate reaction.

## 7] References

### 7.1] Book References

[1] Shibu K. V. - Introduction to embedded systems

## 8] Biography:



Mr. Nikhil Vishwas Ghag  
Student P.G. [M.Sc. I.T.),  
D.B.J. College, Chiplun,  
Ratnagiri, Maharashtra,  
India 415605



Mr. Rushikesh Dipak  
Sutar Student P.G. (M.Sc.  
I.T.), D.B.J. College,  
Chiplun, Ratnagiri,  
Maharashtra, India  
415605



Miss. Pratibha Prakash  
Jumale Asst. prof. of  
Department of I.T., D.B.J.  
College, Chiplun,  
Ratnagiri, Maharashtra,  
India 415605