

# Tracking of Jungle Bonfire by using IoT

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**Abstract:** The jungle bonfire in a check that losses lead to fire cut have been kept away from if the fire was identified swiftly. Node Mcu based IoT allow fire gauge and observing plan is the answer for this issue. In this task, massed fire finder appropriate Node Mcu which is interface with a temperature sensor, a smoke sensor and signal. The temperature sensor track the passion and smoke sensor tracks any smoke produced because of exhausting or bonfire. Buzzer identify with arduous gives us an alert sign. Bonfire activated, it exhaust protest and produces smoke. A fire caution can be activated because of little smoke from candlelight or oil light appropriate as a part of a family. Temperate force is high then additionally the alert goes on. Bell or alert is killed at whatever point the temperature goes to ordinary room temperature and smoke level decreases. Additionally interfaced LCD show to the Node Mcu board. With the assistance of IOT modernization. Node Mclubonfire checking serves for mechanical need and also for family unit sense. Recognizes fire or smoke then it immediately alarms the client about the fire through the ether-net module. For this sense, appropriate ES8266 which is from Arduous IDE. The Node Mcu interfacing with LCD show is done to show the status of the framework whether the smoke and overheat is identified or not. What's more Node, Mcu interfacing with ether-net module is done as such that client become more acquainted with about the prevailing condition message. It insinuate the client about the fire identification. This plan is extremely helpful at whatever point the client isn't in the closeness of control focus. At whatever point a fire happens, the plan naturally faculties and alarms the client by sending an alarm to an application introduced on user's android portable or page open through web.

**Keywords:** Jungle Bonfire, IoT

## 1. Introduction

Jungle bonfire is also called as wild bonfire or wild-land bonfire is an uncontrolled bonfire occurring in forest areas it is essential to distinguish these sorts of flames as ahead of schedule as conceivable in order to keep the harm from it to biological framework. Consistently a large number of section of land of timberland are burned to the ground. The land were woods is singed it winds up plainly difficult to develop vegetation over yonder. This is on account of soil moves toward becoming water repellent and acknowledges no more water, prompting lessening in ground water level. The global warming report 2008 says rapidly spreading fire as one of the real reason behind increment in an earth-wide temperature boost. In late year 2016 more than 4000 hectares uttarakhand. Common causes of wild fire are lighting, extreme hot and arid weather and human carelessness. The utilization of wireless sensor in

this paper presents one of the methods for early wild fire identification.

## 2. Literature survey

Numerous answers for identification of out of control fire are displayed and executed in recent years. Video surveillance system is most generally utilized for identification of world fire [1]. It lated into four classification: video cameras delicate in unmistakable range in light of acknowledgment of smoke amid sunlight and fire blazes at night, interface (IR) Thermal imaging cameras in view of discovery of warmth transition from the fire, IR spectrometer which distinguish unearthly attributes of smoke gases and light detection and ranging (LIDER) system which measures the laser light back scattered by smoke particles. The limitation of these systems was high false alert rate as a result of climatic condition, for instance, proximity of fog, shadows, clean particles etc. Another strategy is the utilization of visual cameras that take depictions of the forest to identify the fire. These cameras were mounted on the highest point of correspondence towers [2], [3].

A turning engine is introduced to give a full round perspective of the forest.

## 3. Proposed system

### A. Node

This node consists of microcontroller (ATMEGA 16), RF Modern, fire sensor, Accelerometer and DC supply. The controllers will be placed individually on the trees in a given required area which is highly prone deforestation, poachers or forest fires. Fire sensors will identify and send signal if any trace of forest fire is close to proximity. Accelerometer will determine any vibration on angular displacement of tree coordinate, which can be due to cutting of tree by poachers or landslide (Fig. 1).

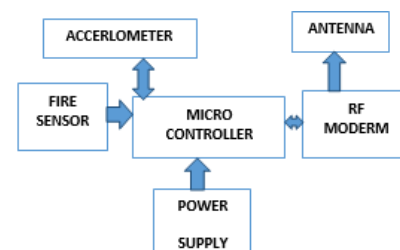


Fig. 1. Block diagram of node

**B. Head**

At mega 16 is the microcontroller which has been used in the head. The head will be placed in range of 1 km. In this the RF and GPS system will be helpful in determining the exact location of the given tree so that it is easy to send needed safety equipment's at the placed of emergency. The controller provide in the head will be sending signals to the control room, where every detail will be analyzed with the exact co-ordinates by the help of GSM Modem.

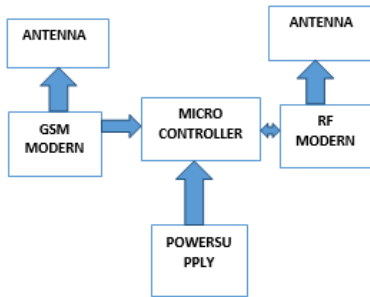


Fig. 2. Block diagram of head

**C. Main server**

The main server consists of microcontroller (At mega 16), Alarm ,RF Modem, GSM Modem,MAX232,DB9 and a pc which is going to analyze all the incidents going around the forest. The main server will receive collector data from the head through GSM Modem. From here the manager can take proper and early steps to control forest fire or can stop illegal trade of trees (Fig. 3).

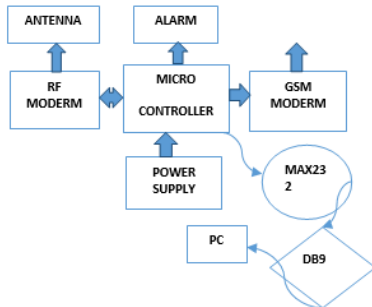


Fig. 3. Block diagram of main server

**4. System architecture**

To detect the forest fire as early possible by measuring level of temperature and CO<sub>2</sub> level, vibration level, humidity.

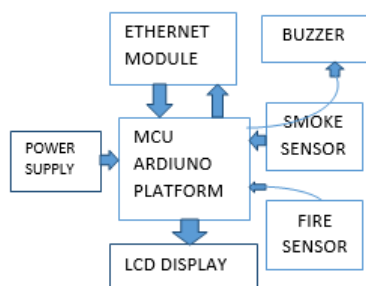


Fig. 4. Block diagram of system architecture

The Uno board contain a trace that can be cut to disable the auto reset. The pads on either side of trace can be soldered together to re-enable.

**A. Hardware**

- Node Mcu
- RF Module (Receiver, Transmitter) Gas sensor(MQ6) Temperature sensor (NTC) Ethernet shield LCD (16\*2)
- PCB (Printed Circuit Board)
- Vibration sensor
- PIR sensor
- Ultrasonic sensor
- Transformer
- Voltage regulator
- Battery
- Accelerometer
- Buzzer

**B. Flowchart**

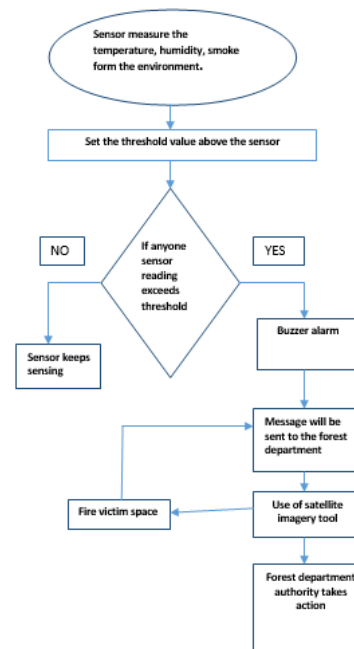


Fig. 5. Flowchart

Explained in 5 steps employee sensors.

Gathering of information by the IC installed in the Arduino of the transmitter circuit:

- The IC at mega 328-P (Microcontroller) inserted in Arduino stage display in the transmitter circuit get the information deleted and gathered by the temperature plays out the customized activity to it and pass them to the transmitter for transmitting the information to the accepting station.
- *Transmitting of the information by the transmitter:* On getting the information from the controller, transmitter to transmit the information to a specific

range where the beneficiary station is enhanced to be utilized. Microcontroller is the focal piece of the whole circuit; it controls and empower the working of the whole circuit, here transmitter circuit for this situation.

- **Accepting of the information by the getting station:**  
 On accepting the information from the transmitter circuit, the recipient sends the information to the controller IC of the appended Arduino Uno installed in the beneficiary circuit in the conceivable to do the modified activities for the flame identification.

Show of the levels of temperature and CO<sub>2</sub> level in site page available through privately made system:

- At the point when the information in regard to the temperature and the CO<sub>2</sub> level are prepared in IC of the recipient circuits node Mcu which is modified with various library elements of the Ethernet shield interfacing making it conceivable to make a page in the privately made system naming fire security system by the assistance (collected) permits an node Mcu board to interface with the web. It depends on the wiz net W5100 Ethernet chip (datasheet).The Wiz net W5100 gives a system (IP) stack equipped for both TCP and UDP.Arduino Ethernet shield 2 interfaces your node Mcu to the web in negligible minutes. Simply plug this module onto your node Mcu board, interface it to your system with RJ45 link with highlights likes.
  - Working voltages 5V (provided from the node Mcu board)
  - Ethernet controller:W5500 with interior 32K
  - Associationspeed:10/100Mb
  - Association with esp8266 om SPI port

A side from the over, a caution circuit has been made just to encourage the fire security group to find the defenseless part at the earliest opportunity. This fire caution circuit will give alert just when the levels of the temperature will cross the preset esteem.

**C. Stages of design**

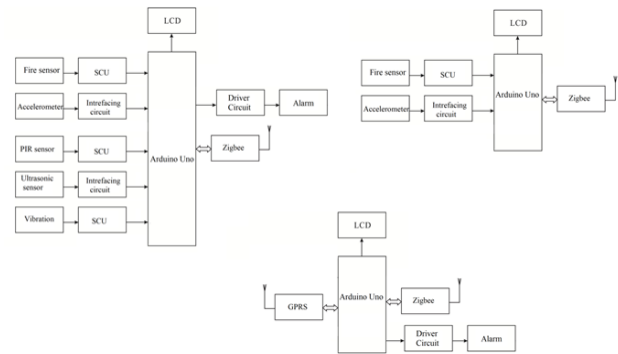


Fig. 6. Block diagram

The entire outlining of this IOT empowered woodland fire location and observing framework has been the most part classified into four section:

- Interfacing and programming of LCD with Arduino.
- Interfacing and programming of collectors and transmitter with Arduino.
- Interfacing of sensors with transmitter.

**5. Conclusion**

Early cautioning and quick reaction to a bonfire breakout are the main approaches to device incredible misfortunes and natural and social legacy harms. Hence, the most critical objectives in flame observation are fast and solid identification and restriction of the fire. It is substantially less demanding to silence a bonfire when the beginning periods. Data about the advance of flame is likewise profoundly profitable for dealing with the fire admit every one of the stages. In light of this data, the bonfire before it achieves social legacy destination and to smother it rapidly by using the required putting out bonfires hardware and vehicles.

**References**

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