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IOT BASED FOREST FIRE DETECTION AND CONTROL SYSTEM

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ABSTRACT

The forest fire 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 track smoke produced because of exhausting or fire. Buzzer identify with arduous gives us an alert sign. Fire 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 Mcu fire 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 faculty sandal arms the cline by sending an alarm to an application introduced on user's android portable or page open through web.

***Keywords*: zigbee, Fire sensor, PIR sensor, Accelerometer, GPRS, IoT**

Introduction

Forest fire is also called as wild fire or wild-land forest fire is an uncontrolled forest fire 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 sections of land of timber land are burned to the ground. The land were woods is singed it winds up plainly difficult to develop vegetationoveryonder.Thisisonaccountofsoilmovestoward becoming water repellent and acknowledges no more water, prompting lessening in ground water level. The global warming repot 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 wire lessens or in this paper presents one of the methods for early wild fire identification.

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 lasted into four classification: video cameras delicate in unmistakable range in light of acknowledgment of smoke a mid sun light and fire blazes at night ,interface(IR)There camera sin view of discovery of warm the 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.

Existing system

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).

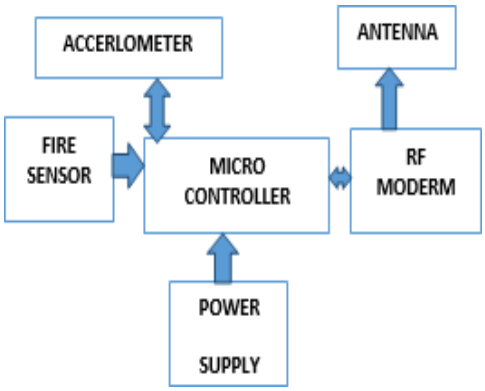

Fig.1. Block diagram of node

Head:

Atmega16 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 trees of the it is easy to send needed safety equipment' sat 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 GSMModem.

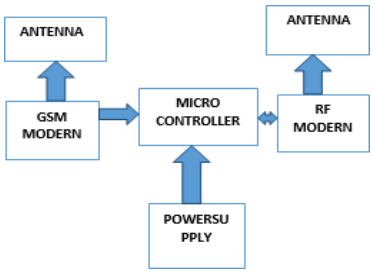

Fig.2.Block diagram

The Uno board contains 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.

Flowchart

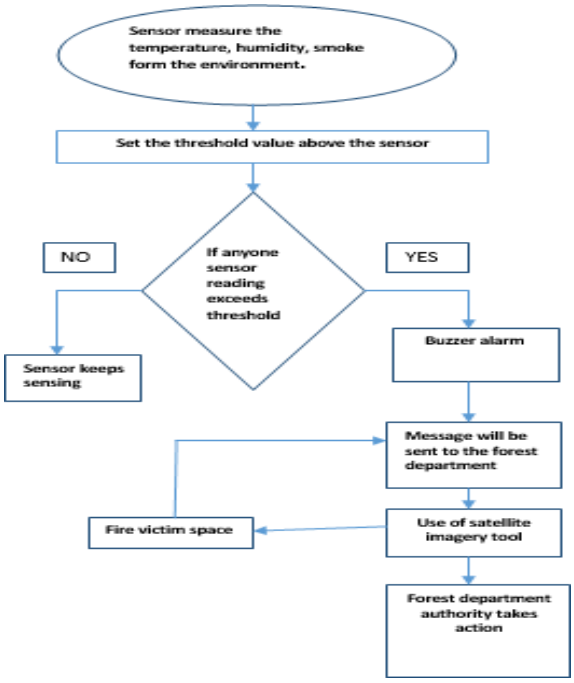

Fig.3.Flowchart

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 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_2 level in site page available through privately made system:

- At the point when the information in regard to the temperatureandtheCO2levelarepreparedinIC.

Main server:

The main server consists of microcontroller (At mega 16), Alarm ,RF Modem, GSM Modem,MAX232,DB9 and arc 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.4).

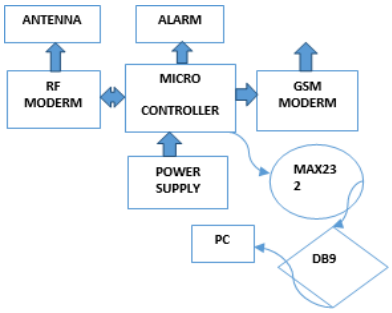

Fig.4.Block diagram of main server

System architecture:

To detect the forest fire as early possible by measuring level of temperature and CO_2 level, vibration level, humidity.

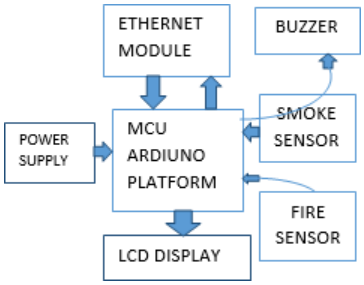

Fig.5. Block diagram of system architecture

Proposed system

Node 1 diagram

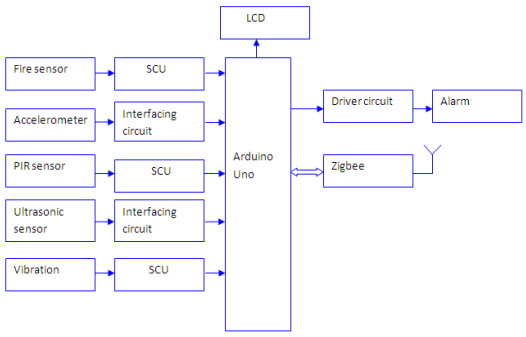

Fig.6.Node1 diagram

Node 2 diagram

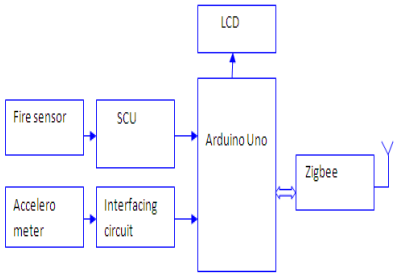

fig.7.Node2 diagram

Receiver diagram

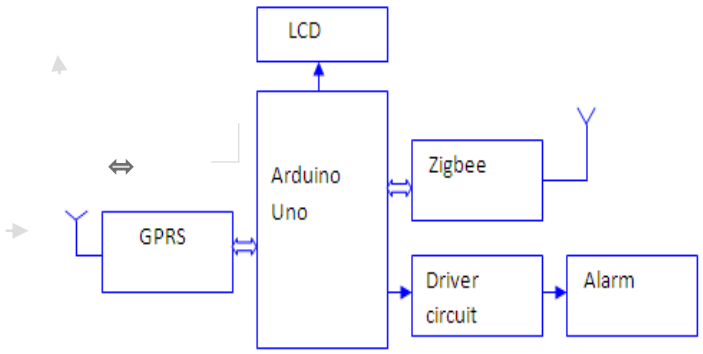

Fig.8 .Receiver diagram

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(data sheet).The wiz net w5100 gives a system (IP) Stack equipped for both TCP and unoArduino Ethernet shield 2 interface your node Mcu to the your system with RJ45 link with highlights likes.

- Working voltages 5V (provided from the node Mcuboard)
- Ethernet controller:W5500 with interior32K
- Associationspeed:10/100Mb

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 esteems

Vibration sensor

A piezoelectric sensor is a device that uses the piezoelectric effect of measure pressure, accleration, strain, or force by converting them o an electrical signal.

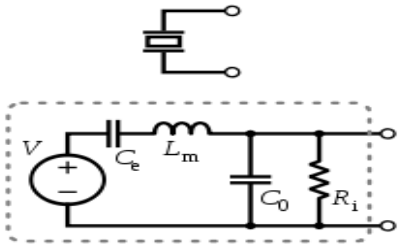

Fig.8.vibration sensor

In the flat region, the sensor can be modeled as a voltage source in series with the sensor's capacitance or a charge source in parallel with the capacitance

Fire sensor

Disclosed herein is a fire alarm system for connecting a plurality of fire sensors to sensor lines, and giving an alarm in response to fire information output from the fire sensor in a line unit. The fire alarm system includes a current modulation section and an address specification section.

PIR sensor

PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are small, inexpensive, low-power, easy to use and don't wear out. They are often referred to as PIR, "Passive Infrared", "Pyro electric", or "IR motion" sensors.

Ultrasonic sensors

It's also known as **transceivers** when they both send and receive work on a principle similar to radar or sonar which evaluate attributes of a target by interpreting the echoes from radio or sound waves respectively. Ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor.

Hardware

- Node Mcu
- Remodel(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

Conclusion

Early cautioning and quick reaction to a forest fire 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 forest fire 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 forest fire before it achieves social legacy destination and to smother it rapidly by using the required putting out forest fire hardware and vehicles.

REFERENCE

- D. Stipanicev, D. Vukot. Krstinic, M. Stela, and L. Borzoi, “Fire production by advanced video Detection system.”
- M. Ghanem,Yugo and J.Hassared, "Air pollution Monitoring and mining Based onsensor.”
- T.J.Lyneham,C.W.Dull, andA.Singh,"Requirementsforspace-based observation in fire.”
- T.Celik,andH.Demirel,2009,“Firedetectioninvideosequenceusinga generic color model, Fire Safety Journal, vol. 44, no. 2,pp.147-158
- JivanS .Parab, “Exploring C for Microcontroller:AHandsonapproach.”