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IOT Based Forest Fire Protection Network

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Abstract:- The forest destruction through fire creates huge losses to our environment system which used to happen time to time in the different countries. The major key solution is the data transfer of forest fire from one position to another within the forest through internal network system based on radio frequency as the cell tower networks are not possible to remain available many times. The central network point where IOT hardware along with other communication networks facilitates the signals to the concerned authorities where concerned data is to be transferred to take appropriate action.

Keywords:- *Internal RF Network for Data Transfer, IOT Facilitates the Data to the Application, Android Application for Data.*

I. INTRODUCTION

Four billion hectare of Earth's land is used in forest. Forest cover a great percentage in total worlds land area. Due to the different nature of forest in different countries, unseen condition fire can destroy large area of land in a very short span of time. It usually spoils the entire ecological system and endangers wild life. This fire creates imbalance in the ecosystem in particular area. Forest fire occurs It happens due to different reasons which turns into disaster. It happens frequently around the World. This fire in the forests, farmlands and industries are owed to either natural or man-made disasters. Lightening becomes one of the major reasons of forest fire in the natural reasons of forest fire or manmade reasons may include smoking near dry vegetation and burning butt and without putting out it. And this thing is increasing day by day we can call it as carelessness or some factor, increasing population or industrialization can be the reason to it which results in causing greater destruction to floras and faunas. This IOT (INTERNET OF THINGS) based system creates an organized data transfer technique for the faster transfer of information towards the remote areas as the internal information is carried out by the internal RF based network where the mobile networks do not work inside the dense forest . In previous times different researches have been carried out by the scientists of different areas across the World. This problem is so big that many researchers around the world tends to develop a significant solution to this problem. We can't control the forest fire at its peak we can only extinguish it before spreading over a vast area after sensing it as early as possible and alerting the authorities. In order to sense fire at beginning and for early alarm automatic fire detection system has been proposed. The outcome of such a scenario destructs the environment and atmosphere causes irremediable damage to the ecology. It is critical to perceive the fire and its location quickly and also alerting the fire units

Data according to National Institute of Space Research (INPE) 76,000 fires were happened in the world's largest Rainforest Brazilian Amazon. During January-October 2019 nearly 906,000 hectares of land were burnt completely. It took very short time duration to create such a destruction. Due to the feeding of fuel by ignitable materials, the fire at the central spot has increased drastically and spreads faster over large areas. Therefore timely detection of forest fire is necessary before the fire spreads over large area.

At present, there are many methods available to measure the causes or detect the forest fire at the earliest moment but that too is not sufficient because the method that we implement to keep our eye including watch towers monitoring using satellite images fails when that comes under complex infrastructure, which require experienced, trained officer to deal in such situations. So in order to protect this precious gift of nature i.e. Forest (land and biodiversity). And we can do it only when we will setup the tremendous surveillance tools not somewhere around km above the forest but in the middle of the forest itself so that we can follow the early caution structure.

An efficient mechanism would be that, when it will prove to be beneficial to humans and plants both, its true that we can't control forest fire every time to happen but we can control or stop its catastrophic effects as early as possible. For this purpose, sensing environment will prove to be satisfactory medium with a large vast range of wireless sensor nodes.

II. LITERATURE SOURCES

Many researchers all around the globe have come in front to present their solutions over this worldwide problem of Forest Wildfire.

Fire alarming, alerting, forecasting using Wireless Sensor Networks (WSN) network to save much of our biodiversity.

Md Saifudaullah Bin Bahrudin invented a fire monitoring system that observe smokes fire that is the harmful product of fire . There he has placed a camera to capture the fire image whenever a fire took place or happens. The system automatically sends the fire image to the control room or telecast it to the web page and alerts the nearest fire fighter squad through SMS.

Sowah invented a fire system using Fuzzy logic mainly for vehicle. Many sensors namely temperature , flame and smoke sensors were used. And the output is arranged like that it will extinguished the fire within 20-25 seconds of duration when fire occurs.

Wen-Bing Hang , Jim-Wenpeg - discovered a innovative method of identifying the flame is produced if. They used Hue Intensity saturation colour model to differentiate or discriminate between the regions of low intensity and low saturation in segmented fire regions. There degrees of fire flames is measured by binary counter images . this method detects the fire flames from test videos in a few moment .

➢ *Other Major Contributions are Listed Below.*

Fire forecasting is one of the critical research challenges of the Wireless Sensor Networks (WSN). In this system sensor nodes are installed inside the woods or dense forest where the rate of forest fire is high. The main function of this system is to transmit audible information to the station below, which is located by the forest department.

The other system can be called as primitive.The fire alarms and alarm systems have been introduced that support a combination of smoke sensor and alarm device to create a life safety system style. But we cannot believe on this system because such fire alarms are sometimes flawed and may respond to unrealistic fire signals that are classified as false alarms.

So to avoid this malfunction or confusion new system with better nodes and sensors brought to use can be called as high- quality and intelligent fire systems to detect real fire incidents.

The Internet of Things means connecting everything to everything through the help of internet web .It is about connecting things to other people through the internet, Its main motive is to create a quick and effective response in real time, IoT improves the process and provides emergency management with the necessary information and communication to use the information of images and then to create or provide a better response to avoid hazardous situations .here we are talking about fire. Forest Fire which proves to be one of the major causes of accidental death in the world. To make the proposed program we use gas detection sensor, Flame sensor, alarm buzzer and temperature sensors (LM- 35). The sensors detect and alert the local emergency with information collected by the system, and alert organizations such as fire departments, police stations and hospitals by sending accurate location to both users and users using the module all connected. Thus reducing the risks

III. COMPONENTS USED

- ESP 8266
- RF Modules
- RF Transmitter and Receivers
- Android Application
- Relays
- Transistors
- PCB
- Zener Diode
- Mosfet
- Capacitors

➢ *Block Diagram—*

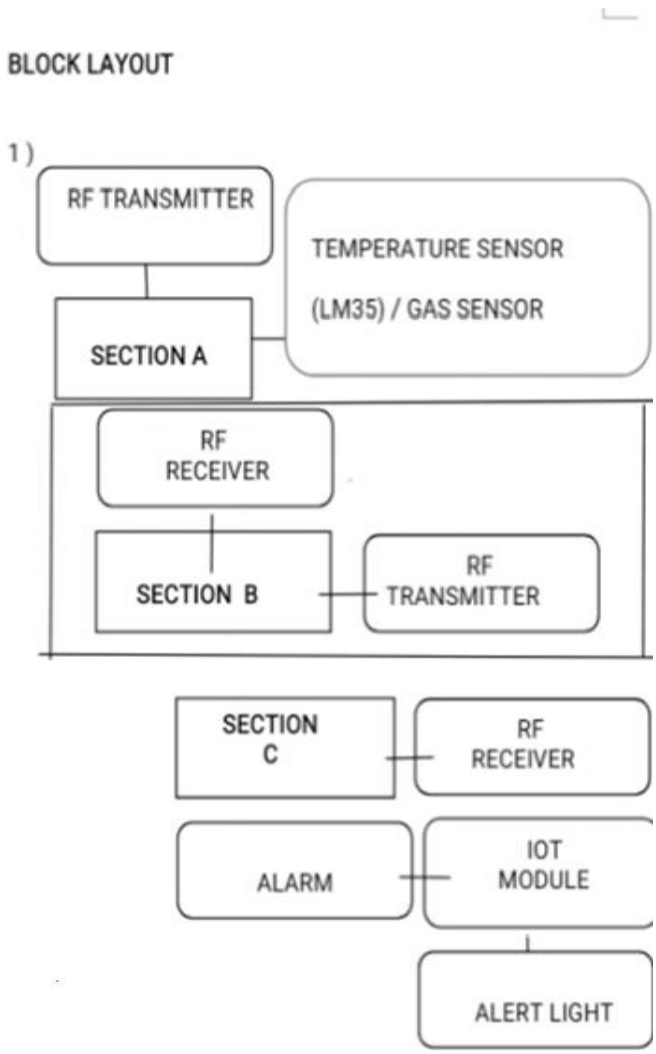

Fig 1. Shows the arrangement of different components placed section wise

Here the sections namely A, B and C represents the Forest Layout Model.

Here to demonstrate the Forest fire protection system firstly we will create a false Artificial Fire just for demonstration near to Section A that will sense the heat and gas through the Temperature and Gas Sensor and will transmit this information to the Section B of the forest through the RF Transmitter whose main function is to transmit the information further in absence of any network that is to function in NO SIGNAL AREA.

Now when we come to Section B of the forest the RF Receiver will receive the information signal transmitted from A and this receiver will further transmit the signal to RF Transmitter of collectively these RF RECEIVER AND TRANSMITTER of Section A and B also called as REPEATERS.

And finally when the RF receiver of Section C will receive the incoming signal from B will activate or actuate the Section C which will turn the Alarm, the Alert Light and the IOT MODULE which will send the notification to the officer's Cabin or MOBILE APPLICATION.

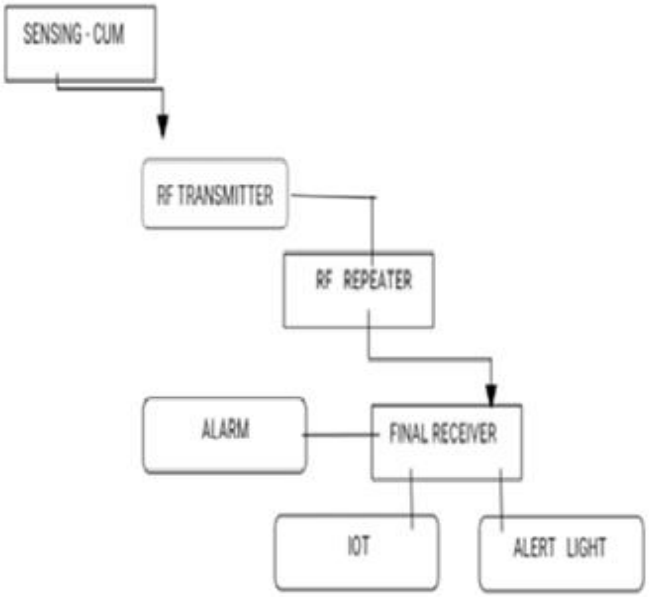

Fig 2. Depicts the interconnection between different Section namely A, B and C.

This second block diagram throws the light on the INTERNAL RF NETWROK of Data Transfer.

IV. CONCLUSION

The measures which took place in this proposal are based on IOT and RF with their concerned utilities to overcome the proposed theories by the previous researchers. The IOT network provides the real time data from a position where the cellular networks are available where as the RF networks helps in carrying out the fire signal from the areas where the cellular networks are not present through the internal RF networks. So the real time information can be transferred through IOT network.

We know that we can never control the nature's power. But we can find the ways to decrease the harm or casualties that it brings or can dampen its ill effects.

As it is said that safety is not something that can happen on its own by Accident. We need to work towards it with the right measures tools and mindset.

And if that accident relates to forest fire it becomes more important and primary to take fast and solid identification of the outbreak and restriction of the fire .

By detecting a fire quickly and accurately and providing early warning notification, to limit the emission of toxic products created by combustion.

Wildfire which is one of the most powerful natural disaster As it is said " With grass, a little rain and it goes out "

Wildfires can wreck havoc and destruction if they are not controlled and extinguished quickly.

Worldwide wildfire or its smoke kills 3,39,00 people a year , mostly in Asia and sub Saharan Africa,

There is no doubt that forest fire causes great harm to the plants and the living creatures either animals or humans .This is a well known fact that when woods burns carbon stored in trees and other vegetation combusts and thus releases carbon dioxide and other potent greenhouse gases that collectively raise to global warming. Therefore it is important to understand the ways in which forest fires are measured and identified, along with enabling factors stimulating the spread of this type of disturbance.

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