IOT BASED FOREST TRACKER USING LORA MODULE

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ABSTRACT

Currently, Millions of hectares of timber worldwide are affected annually by fires. Due to which it beget loss in mortal lives, beast lives, coffers and causes air pollution. The problem is indeed lesser in timbers that aren't guarded and don't have communication systems available. therefore, in recent times, have been proposed colorful systems that use bias grounded on Internet of Things(IoT) for real- time timber fire discovery.
The technology of the Internet of Things(IoT) has flourished in colorful diligence and request around the world. The agrarian is one of the areas to profit from IoT technologies. LoRa is one of the most habituated network radios in the IoT network technology structure. LoRa is frequently used in agrarian IoT not only for its long- range but also due to veritably low power operation and significant cost advantage. It's able of snappily detecting timber fires on long wide distance. The utmost of the system are using LoRa(Long Range) technology grounded on LoRaWAN(Long Range Wide Area Network).

Keyword : - *IoT, Sensors, LORA Module, Fire.*

1. INTRODUCTION

The technology has developed so important that it's come more and more sophisticated, making wireless. Transmissions really readily the network of wireless detectors, named WSN(Wireless Sensors Network), grounded on the LoRa Module. Module, can be a great volition for detecting timber fires in specific areas. This system consists of detector- bumps and a single gateway. The detector- bumps are located at each area collecting environmental data. Each knot uses temperature and moisture detectors, a light detector, A real- time timepiece(RTC) module, and a microSD module. The data is transferred to a gateway that is attached to and transmitted to a database garçon. timber fires that take place in the warm season can be caused by natural events or mortal negligence. Natural events similar as burning branches or dry leave appear due to the heat generated by the sun.

1.1 PROBLEM STATEMENT

Catching of fire in numerous of the timber is being detected recently. Which leads to damage in Wildlife, humans, property, and terrain. The major Causes Are Lightning. Sparks from Rock falls. stormy Eruption or any other homemade Ignition from the Humans. Which principally causes wide quantum of disaster to nature. The problem is that when the timber gests a fire, there will be a lot of detriment to humans, ranging from air pollution and the destruction of natural. In ecosystems in the timber itself, starting from creatures that will die a lot and to living creatures can lose. Another thing that becomes a problem is that in the event of a timber fire, the authorities are slow in handling the timber fire, one of the reasons is the lack in information of timber fire.

2. LITERATURE SURVEY

A literature survey is a check of scholarly initiators (similar as printed work, research papers, and so on) connected to a determined content or survey question. It is frequently written as part of a thesis, discussion, or exploration paper, in order to stick your work in relation to being knowledge. It shows beyond doubt of the authors' in- depth apprehension and knowledge of their department concern. It gives the surroundings of the research. Portrays the scientific penmanship plan of testing the research result. Make Brighter on how the comprehension has converted within the department. So, basically thorough below research papers we have created our project. In which May 2020 is the our base paper and also the June 2018.

YEAR OF PUBLICATION	PAPER TITLE	PUBLICATION PAPER/ CONFERENCE	AUTHOR	WORK DONE
Nov 2020	Forest Fire Detection System using LoRa Technology	IJACSA	Nicoleta Cristina Gaitan , Paula Hojobota	In This Paper decision of using LoRa technology in the proposed system is due of it capabilities to connect low power devices distributed on large geographical area. Used For Long Distance purpose.
Aug 2020	Forest Detection System Using Lora By Extension Of Iot	IRJET	Mrs.S.Sandhya, Nivedha A.P, Kavitha T S, Bhuvanehwari R, Nirmala M	Basically in this if fire is detected then a water sprinkler will be turned on and it has a monitoring system that can alert the user remotely using IOT.
May 2020	FOREST FIRE DETECTION USING Lora	JETIR	K.Mahesh Babu, R. Priyakanth, G. Roshini, V. Saisri, BH. Keerhi priya, N. Srujana, M.Taruni	The existing model presents an Integrating feature of all the hardware components which has been Used In this Project For Transmitter and Receiver Purpose.
JUN 2018	Forestry Monitoring System using LoRa	Novi Sad, Serbia. ACM, New York, NY, USA,	Sunnyeo Park Kaist, Ryunhwan Kwon, John Ganser, Shinhye Yun, Smith Anthony, Hyunjin Kim	In This Information to the gateway Using Lora Module that Monitor Status of All sensors And Lora Communication Of one To many Nodes Work as well as the coverage of Lora Module.

3. PROPOSED SYSTEM

The hardware part is the main section of the development of a system. Different types of detectors like flame detectors for detecting fire, Smoke detectors for discovery of bank and moisture detectors for measuring humidity and air temperature of the girding terrain. Soil Detector for Measuring the loss of humidity over time due to evaporation and factory uptake.ESP 32866 For the ESP8266 module enables microcontrollers to connect to2.4 GHz Wi- Fi, using IEEE802.11. It can be also handed down with ESP- AT firmware to give Wi- Fi relatedness to outermost host.

One further main part in this we are adding one point that's Lora Module in which it's long ways Wi- Fi Module Communication with all the detectors fluently way. Single Gateway detector knot located at each area collecting environmental data. Each knot uses Bank detector, fire detector, moisture detector, and temperature detector.

3.1 BLOCK DIAGRAM

The description block illustration is as followed:
The block starts as of the left side the LORA Transmitter is connected to colorful detectors similar as Temperature detector, fire detector, bank detector, moisture detector, soil humidity, these detectors work contemporaneously to shoot data, in this design we're using ESP32 as the microcontroller to reuse the data and further it to LORA module to shoot it via wireless communication to the receiver module.
In the receiver section there's the receiver LORA module which is connected to ESP32 which process the incoming data and dissect it as per the limitations kept it'll keep tracking, if the readings crosses the limit it'll the sound the buzzer and show it on the display, after that the data will be logged in excel distance, every data received will be logged in the excel after that the information will be disclosed on the web site.
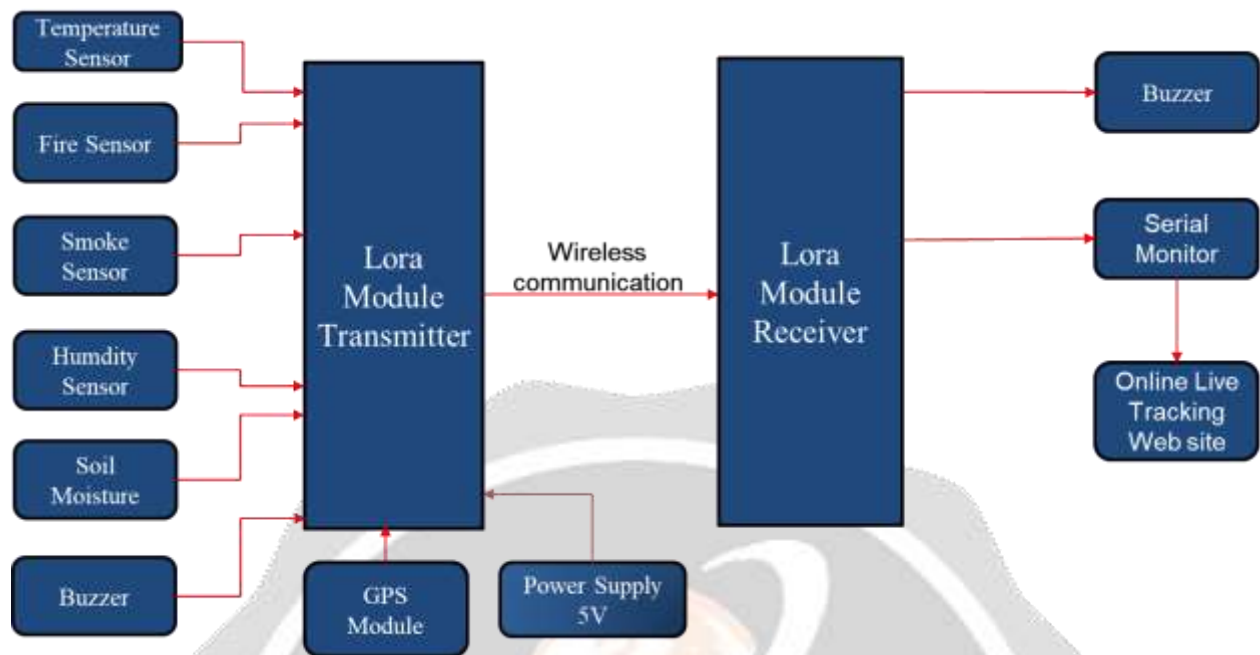
Fig -2: Block Diagram

3.2 CIRCUIT DIAGRAM
Transmitter LORA Connection:
In this Circuit diagram, first we take ESP8266 Module in that all Sensor are connected In that Sensor like HumiditySensor & Temperature Sensor, Smoke Sensor, Fire Sensor, Soil Sensor.it is Humidity sensor are connected in ESP pin no 13. For data transfer Purpose, vcc is connected to pin 30. Smoke Sensor is connected pin 14, and vcc is connected to ESP Pin 30. And as based on the circuit diagram every vcc of sensors are connected to pin no 26 for 3.3V and the ground pins are connected on pin no 29 or pin no 2. The data pins which transmit readings are for fire sensor the data pin is connected to pin no 12 of ESP8266 , for the smoke sensor the data pin is connected to pin no 16 , and for the soil moisture sensor the data pin is connected to pin no 113,the temperature and humidity sensor data pin is connected to pin no 14 ,as for the LORA module it is connected to ESP8266 on pin no 1,2,5,6,7,8,13,15.as for the pins 1,2 are vcc and gnd, the rest are used to control the working of LORA module.
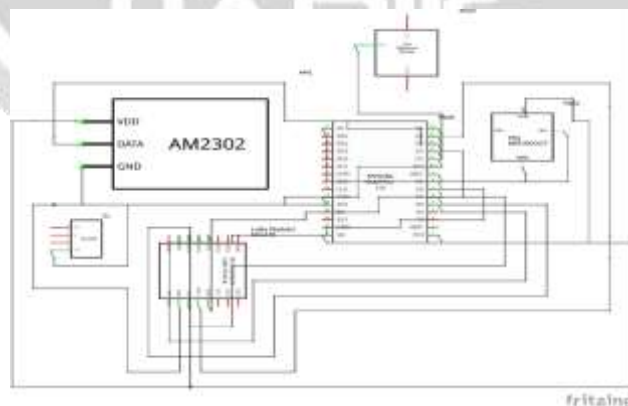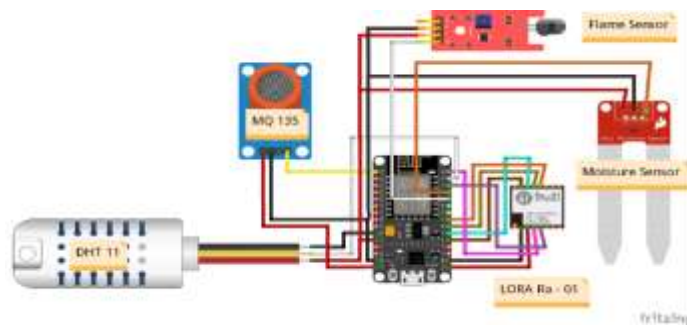

Fig 3.2.1

Fig 3.2.2

Receiver LORA Connection:

In this part of the circuit diagram the pins of ESP32s on no 1 is vcc on 3.3V and 2,29 are GND pins which are connected to Oled Display and LORA module for the rest of the connections the SCK and SDA pins of Oled display is connected to pin no 9 and 11 and SCK of LORA module is connected to pin no 9 as well,for the rest the pin no 4,8,10,15 are connected to LORA module for control purposes.
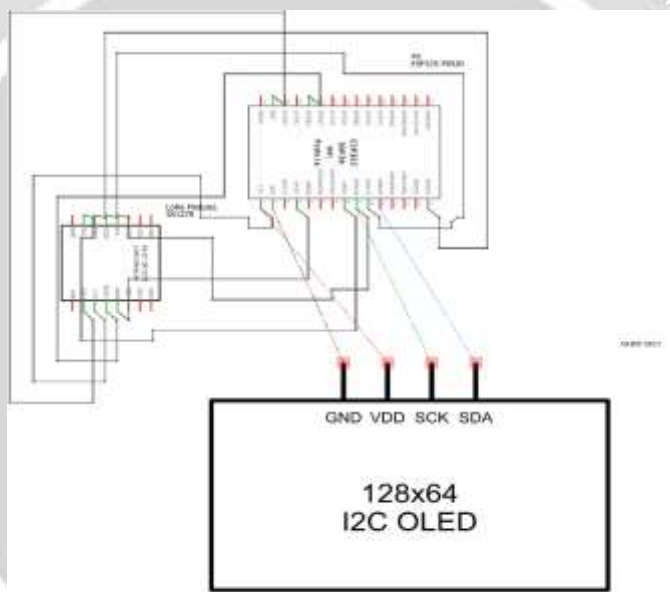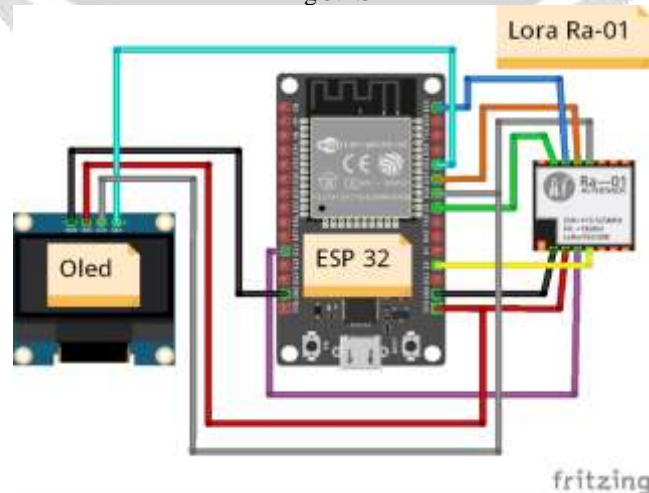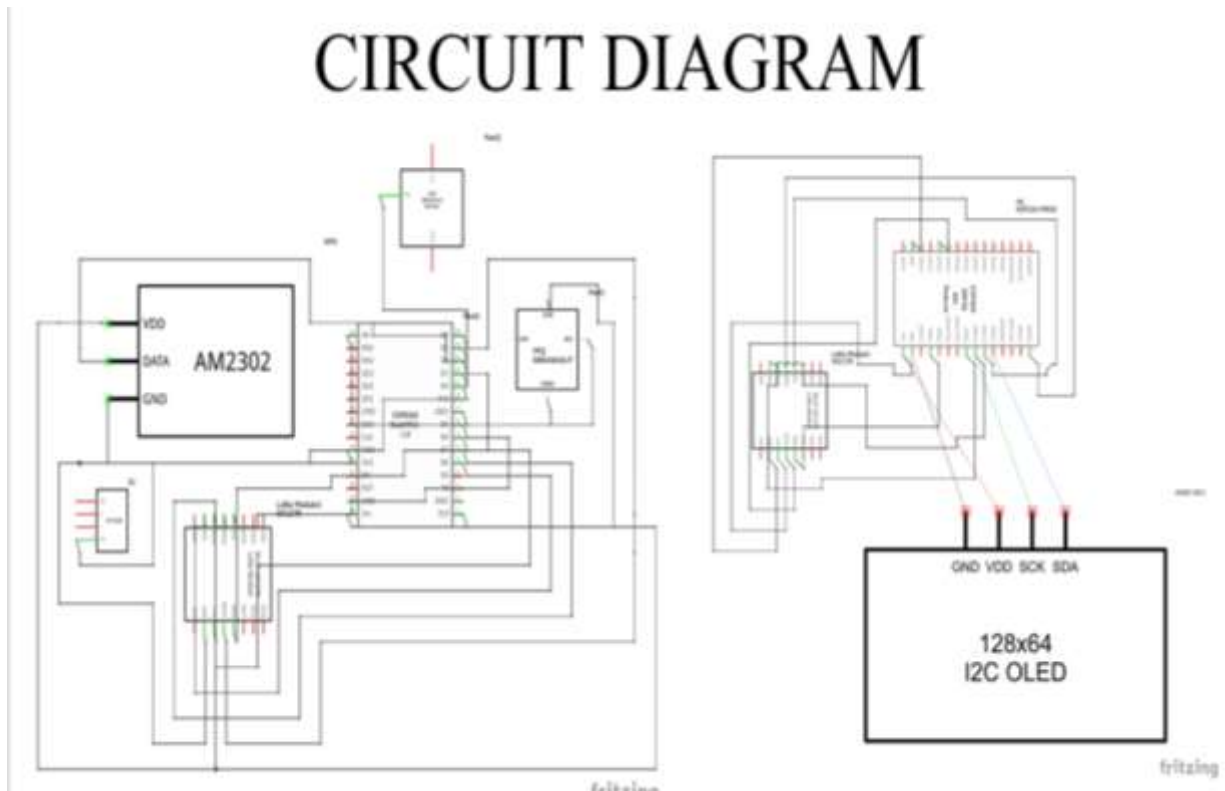

fig 3.2.3

Fig 3.2.4

fig 3.2.5

4. CONCLUSIONS

In conclusion, the Forest Fire Detection System using LoRa technology offers a promising solution for early detection and prevention of forest fires. The use of LoRa technology allows for long-range communication with low power consumption, making it suitable for remote and outdoor environments like forests. The system can detect forest fires in their early stages, enabling prompt response and mitigation measures to minimize the risk of extensive damage.

The Forest Fire Detection System using LoRa technology offers several advantages, including early detection, remote monitoring, low power consumption, scalability, and cost-effectiveness. However, there are also limitations to consider, such as potential signal interference and limited bandwidth in LoRa networks, which may affect the system's performance.

Despite these limitations, the Forest Fire Detection System using LoRa technology has significant potential and can be further enhanced through integration with other technologies, such as data analytics, artificial intelligence, real-time alert and response mechanisms, and collaborative efforts among stakeholders.

5. REFRENCES

[1] "Design and Implementation of LoRa Based Wireless Fire Detection and Alarm System" by Anusha M. Patil and S. S. Alegaonkar, International Journal of Engineering Research & Technology (IJERT), Vol. 8 Issue 2, February 2019. This paper provides a detailed description of a LoRa based fire detection and alarm system and its implementation.

[2] "IoT Based Fire Detection and Alerting System Using LoRa Technology" by Priyanka R. Nikam, S. S. Alegaonkar, and G. S. Mane, International Journal of Engineering Research & Technology (IJERT), Vol. 8 Issue 9, September 2019. This paper describes an IoT based fire detection and alerting system using LoRa technology.

[3] "Wireless Fire Detection System Using LoRa Technology" by Arun Kumar Singh and Prasun Chakrabarti, International Journal of Advanced Research in Computer Science and Software Engineering (IJARCSSE), Vol. 8 Issue 2, February 2018. This paper provides a comprehensive description of a wireless fire detection system using LoRa technology.

[4] "Development of Wireless Fire Detection System Based on LoRa Technology" by S. S. Alegaonkar and Anusha M. Patil, International Journal of Recent Technology and Engineering (IJRTE), Vol. 7 Issue 6S4, March 2019. This paper presents the development of a wireless fire detection system based on LoRa technology and its performance analysis.

[5] "Design of Fire Detection and Alarm System Based on LoRa Technology" by Zhenyu Li and Cheng Li, International Journal of Emerging Technology and Advanced Engineering (IJETAE), Vol. 7 Issue 12, December 2017. This paper describes the design of a fire detection and alarm system based on LoRa technology.

BIOGRAPHIES (Not Essential)

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