IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 12, Issue 5, May 2023

DOI: 10.17148/IJARCCE.2023.125136

IOT based Anti-Poaching Alarm System for Treesin Forest

Meghana C V[1], Harshitha P R[2], Karthik Kumar Reddy.T. A[3], Pottipati Rakesh[4], Chandini A G[5]

SJCIT, VTU Chickballapura, Karnataka, India[1-4]

Assistant Professor, SJCIT, VTU Chikkaballapura, Karnataka, India[5]

Abstract— There are numerous episodes about carrying of trees like Sandal, Sagwan and so forth. Poaching of monetarily valuable trees has turned into a noteworthy dangerous to the estate of these trees, making an ecological irregularity and hazard the common assets. Distinctive activities have been taken world broadly including foundation of International Anti-Poaching establishment (IAPF). To confine their pirating and to spare woodlands around the world some preventive estimates should be made. We have built up a framework which can be utilized to confine smuggling. This task shows a framework for observing woodland and its region depends on IoT based remote sensor organize innovation. This paper proposes a microcontroller essentially based enemy of poaching framework utilizing WSN innovation. The fundamental thought displayed in this paper include utilizing a cutting edge and a modern innovation in which poachers will be deserted and being gotten effectively there by disposing of Poaching exercises. The framework propose three unique activities of reactions, right off the bat: passages constantly get information about trees area utilizing sensor. The second activity can be called perception where by various picture preparing methods of the got pictures encompassing a trees and in this manner give a sufficient help with understanding what makes sudden development of the trees. The last activity is to send messages to the officer's PDAs about the trees and the area through sensor. Backwoods authorities are told when any occasion happens so fitting move can be made. Remote sensor organize innovation can help build up a vitality effective framework for checking the poaching of trees.

Keywords—Antipoaching, Arduino -Uno, TemperatureSensor, Tilt Sensor, Sound Sensor.

I. INTRODUCTION

The planned a framework which can be utilized to keep away the sneaking of trees which would thus stop the deforestation and maintain the Environmental solidness, which would solve one of the issues with the Global Warming. Poaching is not only identified in India but also the countries like China, Australia and African nations are likewise battling with sameissue.Indian sandalwood costs 12000 to 13000 INR for everykg.

Where as inuniversal market Red Sandal costs INR 10 crore for each ton. These are generally helpful in the therapeutic sciences just as beautifying agents.institutes in the directions of patient diagnosis record access and control, payment and claims management, medical Internet of Things (IoT) security management, research data verification and exchange for financial audit and transparency. As a result of immense measure of cash associated with moving of such tree woods , bunches of occurrences are goingon of cutting of tree and their smuggling.

It's difficult to envision a world without trees, yet as of now there are just 2 genuine woodlands left on planet earth. The unstoppable force of life is progressively enduring an onslaught nowadays, on the off chance that not by industrialists and worldwide partnerships, at that point by generally conventional individuals who appear to have lost all association with nature. Carrying/burglary of most imperative trees, for example, sandal wood in woodlands, represents a genuine risk to timberland assets, causes critical financial harm and at last has a significant crushing impact on the condition everywhere throughout the world.

The Indian sandalwood tree has turned out to be uncommon as of late, trying to control its conceivable misfortune the Indian government is attempting to restrain the exportation ofsandalwood.

The primary target of the system is to build up a framework which can be utilized to limit sneaking of sandalwood trees. This paper proposes a microcontroller based anti poaching framework utilizing WSN innovation, which is fit for identifying robbery by checking the vibrations created by thecutting of trees or branches.

International Journal of Advanced Research in Computer and Communication Engineering
ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 12, Issue 5, May 2023
DOI: 10.17148/IJARCCE.2023.125136

Vibration information gathered by different tests on wood and simulated. The plan framework utilizes three sensors tilt sensor (to identify the tendency of tree when its being cut), temperature sensor (to distinguish woodland fires), sound sensor (for powerful identification of illicit logging, even thesounds produced while axing out the tree are detected).

Information created from these sensors is constantly checked with the guide of Blynk App. As for the sensors, their yield gadgets are initiated through relay switch. For tiltsensor and sound sensor a buzzer is actuated and for temperature sensora water siphon is initiated. Created information is put away inBlynk Server over the WiFi module.

Old redwoods in California are being disfigured, as poachers cutting tool off their burls to move the uncommon wood on the bootleg market.As the National Parks Service (NPS) expressed in a 2014 discharge, the end of the burls can fundamentally debilitate the tree, abandoning them powerless against winds and floods, just as creepy crawly pervasion in their uncovered heartwood. Also, the misfortune can successfully separate a tree's hundreds of years long life expectancy, as the burl keeps becoming even after a redwoodfalls.

As NPS expresses: "A burl from a 2,000-year-old coast redwood can start development of another tree that can live for an additional 2,000 years, in this manner the Latin name for coast redwoods, Sequoia simpervirens, which signifies 'everlastingly living.'"

Tree poaching in the Redwood National Forest and other State Parks in the foggy area of Western United States between Northern California and Oregon is spreading, and park officers are finding that burlwood culprits are accomplishing progressively imperative components of mischief to these old trees, that are from time to time are over 2000 years old. Old advancement waterfront Redwood trees are one of earth's remaining basic fortunes, and after the outrageous logging of the latest couple of hundreds of years, relatively few remain. It's stunning by then to see that such an expansive number of trees are being attacked and denied of their burls, which are captivating improvements of wood that structure on the trunks of Redwoods, and confuse specialists. Burlwood is a baffling blend of bud tissue that conveys a remarkably superb dull red precedent, yet cutting into the burls from the trees can slaughter the tree or shield it from imitating.

Poachers are using evermore bold procedures, and park specialists trust this is the result of an economy in rot similarly as taking off rates of methamphetamine use in this region of the nation. 'Midnight burlers,' is the name they've been given by nearby individuals who are very exasperates about the rising example. In 2014, a tremendous, multi yearold Redwood was felled by midnight burlers just to cut a 500-pound burl that was at least 60 or more feet up, addressing the main event when that an entire tree had been killed for a singular burl.

II. RELATED WORK

Prithvi Raj Patil et al. proposed a system which is all about smuggling of the trees like sandal, red sandal, “Sagwan” essential medicinal. These trees are very costly as well as less available in the world. These areuse in the medical sciences as well as cosmetics and medicines.Because of huge amount of money involved in selling of such tree woods lots of incidents are happening of cutting of treesand their smuggling. To restrict such smuggling and to save the forests around the globe somepreventive measures need tobe deployed.

Mrs P Madhavi S K et al.Now-a-days, there are many incidents happening about smuggling of trees like Sandalwood whichare very expensive and rare in nature.Smuggling of sandalwood has created many law and order problems in India. Also, India’s economy has been greatly effected through these incidents. The main objective of our project is to deploya system which can be used to restrict these kind of incidents like smuggling of sandalwood trees.This project distinguishes three different sensors namely, temperature sensor(to detect forest fires),Mems accelerometer(to detect the inclinationof tree which is being cut),sound sensor(for effective detection of illegal logging of trees i.e.the sounds generated while axing the tree is sensed).Data generated from these three sensors is continuously monitored by the forest officials with the help ofThingspeak server and app. With respect to the sensors, their output devices are activated through relay switch. For all these sensors,a buzzer is activated when their conditions are violated but for temperature sensor water pump is also activated to putoff the forest fires.

Parthiban M,Dharani et al. introduced Iot based anti-poaching sensor system. This task shows a framework for observing woodland and its region depends on IoT based remote sensor organize innovation. This paper proposes a microcontroller essentially based enemy of poaching framework utilizing WSN innovation. The fundamental thought displayed in this paper include utilizing a cutting edge and a modern innovation in which poachers will be deserted and be the framework proposethree unique activities of reactions, right off the bat: passages constantlyget information about trees

DOI: 10.17148/IJARCCE.2023.125136

area utilizing sensor. The second activity can be called perception where by various picture preparing methods of the got pictures encompassing a trees and in this manner give a sufficient help with understanding what makes sudden development of the trees.

K Gowreswar Reddy et al. The day we are developing an embedded system device of hardware parts which can be used to avoid and to restrict the smuggling of sandal wood trees from smugglers. So that from the beginning we observed that in the newspapers with an headlines of about smuggling of the trees like Red sandal wood(sagwan) . The trees which was stolen by the smugglers were very costly and by the way their were less available in the world. So that such trees are used for medical sciences as well as cosmetics for that reason the scandal wood trees may costs high in the world.Where the huge amount of money was involved in selling of Red scandal woods lots of incidents happening by cutting the trees and stolen by the smuggler's in the forest areas. So to avoid and to restrict such smuggling of trees and to save the forests and not to prevent the deforestation around the globe for some preventive measures tobe like global warming need to be deployed.

III. MOTIVATION

The main objective of this project is to introduce a system with various sensor and alerting system which can be used to restrict smuggling of sandalwood treesby protecting them and to protect from forest fires.

1. To provide live data of forests to protect from smuggling /animals using buzzeralerts using Wi-Fi.

2. To prevent forest fires automatically using water pumps at several points using relay systems through android application or automatic.

3. To provide the location details of incidents/faultshappening in forests through GPS module.

4. The data and alerts will be monitored from nearest forestauthorities through Iot application.

IV. PROBLEM STATEMENT

In current scenario, there is no system that detects illegal exportation of trees. A design or a system should be installed such that the forest officials must know what is happening with the trees around them.

Since the animal population is harmed, the whole ecosystem is affected, meaning everything from the animals, to the plants, and even the people in a specific place are negatively affected.Such system should be in such a way that it should detect the illegal logging and must alert the officials to take proper action regarding them. Keeping the above things in mind, we are introducing a system to achieve our goal.

PROPOSED SYSTEM

The system is proposed to detect the fire in the forest and also to alert the forest officer about thefire in the forest and we use relay system to turn on water pump automatically.

A microcontroller is used to control the system activities, some sensors are used to detect the firein the forest, with detecting the fire the exact location of the fire is detected andis sent to the nearby forest officer.

Vibration sensors ,tilt sensors are used to detect valuable trees which are stealing by smugglers or if any tree has been fall down accidently ,an alert will be sent automatically throughbuzzers.

The details are stored as data and this data can be viewed at any time. Since the system isdesigned to implement in the forest it is not possible to provide power supply through transmission line an external power supply is provided.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 12, Issue 5, May 2023

DOI: 10.17148/IJARCCE.2023.125136

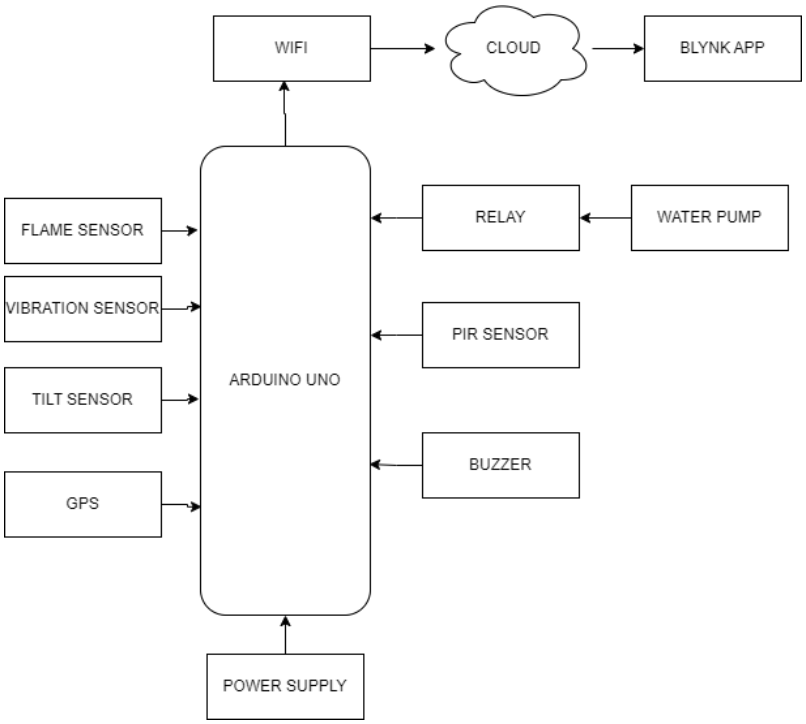

Fig. 1. Proposed block diagram

The plan framework utilizes three sensors:

1. TILT SENSOR: (to distinguish the tendency of tree when its being cut). TEMPERATURE SENSOR :(to recognize timberland fires).

2. SOUND SENSOR :(for powerful recognition of illicit logging for example indeed, even the sounds produced whilecutting out the tree is additionally detected).
Information produced from these sensors is consistently checked with the guide of Blynk App.

ARDUINO UNO:

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

ESP8266 WI-FI MODULE:
ESP8266 wifi module is low cost standalone wireless transceiver that can be used for end-point IOT developments. ESP8266 wifi module enables internet connectivity to embedded applications. It uses TCP/UDP communication protocol to connect with server/client.

TILT SENSOR:

Tilt sensors play a vital role in numerous applications. Diversely popular in multiple fields, tilt sensors are needed in: At the core of the module is a small, low-power, low-noise triple axis MEMS accelerometer from Analog Devices – ADXL335. It can measure not only static acceleration caused by gravity, but also dynamic acceleration caused by motion, shock, or vibration.This breadboard friendly module breaks out every pin of the ADXL335 to a 6-pin, 0.1″ pitch header, including 3 analog outputs for X, Y, andZ axis measurements, 2 supply pins, and a self-test pin. The below figure 2.6 showsTilt sensor.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 12, Issue 5, May 2023

DOI: 10.17148/IJARCCE.2023.125136

FLAME SENSOR:

A flame-sensor is one kind of detector which is mainly designed for detecting as well as responding to the occurrence of a fire or flame. The flame detection response can depend on its fitting. It includes an alarm system, a natural gas line, propane & a fire suppression system. This sensor is used in industrial boilers. The main function of this is to give authentication whether the boiler is properly working or not. The response of these sensors is faster as well as more accurate compare with a heat/smoke detector because of its mechanism while detecting the flame.

PIR Sensors:

A PIR Sensor is an electronic sensor that measures infrared light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications.Technically, PIR is made of a pyroelectric sensor, which is able to detect different levels of infrared radiation.

VIBRATION SENSOR:

Vibration Sensors are vibration monitoring equipment used widely by plant maintenance teams to find insight regarding equipment or piping performance. Using vibration sensors and studying the data from these devices, engineers can predict possibilities of equipment failure and they can safeguard major equipment from breakdown by taking proper action. Vibration Sensors are also known as vibration transducers. In this article, we will explore the importance of vibration sensors, their types, working, and selection procedures. Let's dive into the subject starting with the definition of vibration sensors.

BUZZER:

An audio signaling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren.It includes two pins namely positive and negative.

The positive terminal of this is represented with the '+' symbol or a longer terminal. This terminal is powered through 6Volts whereas the negative terminal is represented with the '-'symbol or short terminal and it is connected to the GND terminal.

RELAY:

Relay that is used with a microcontroller like the Arduino to control either high-voltage or low-voltage devices. Actually, a relay is a switch that is operated electrically through an electromagnet. This electromagnet is simply triggered through a low voltage like 5V from a microcontroller & it pulls a relay contact to connect or disconnect a high voltage-based circuit.

WATER PUMP:

The water pump is a portable device and can be applied in several household applications. These pumps are used for pumping the huge amount of water from one place to another. The main purpose of a water pump is versatile. A quality pump which can be selected carefully may be perfect for draining water from a low flooded region, refilling the swimming pool,and bathtub, circulating pesticides other wise fertilizers.

EXPECTED RESULT:

First the microcontroller reads the data from all the sensors. Then it checks for the sensor conditions written in Arduino software which is dumped in Arduino board. All the three sensors and the controller will be placed at the tree. When the tree cutting or logging occurs, the sound generated due to the axing is sensed by the sound sensor. Then the Arduino activates the Buzzer through Relay switch. Also, if the tree bends beyond the threshold angle which is given in the program the buzzer gets activated.

ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 12, Issue 5, May 2023

DOI: 10.17148/IJARCCE.2023.125136

In the case of any forest fires, the temperature will be sensed by the flamesensor and then the water pump is activated through the relay switch. When the temperature goes down below the set value, then the water pump gets de-activated automatically. If the conditions satisfy, then it switches ON the relay and runs the output devices. Also it sends the data continuously to the BLYNK IOT server If the conditions doesn't satisfy then also the data is continuously sent to the BLYNK IOT app for the status checking through BLYNK server.

CONCLUSION

This paper comprises of an ease and low power IOT based framework to identify the smuggling of trees. There are numerous approaches to secure trees, however here a brilliant technique for interfacing a few sensors around trees with a microcontroller was done. On the off chance that there are any unfortunate things happened in any area of the woodland. Thesensor identifies and refreshes that data.

The framework can be actualized utilizing Wireless Fidelity bolster which will be stretched out versatility up to 5 km range in the Forest Area. That is to imply the Forest experts about the tree's condition on 24x7 premise. This was conceivable in light of the fact that the installed unit has GPRS. Anyway the Tree's condition is under consistent observing in light of sensors. Thus it's an amalgamation of IoT, WSN and AWS to secure the Nature.

We have designed a system which can be used to avoid the smuggling of the trees. Future Scope Though the claim has been made that a Smart module has been developed to protect trees, future enhancements are required to make the system more rugged. - The Units / Hardware / Sensors have to be rugged. The Module should be placed in untraceable place ontrees, not easily accessible to tree-destructors. Forest Authorities has to be suitably educated.

REFERENCES

[1] Jack Burkett, Pablo Orozco Ter Wengel, Benoit Gossens omer Rana,Charith Perera,Low costsms driven location tracking platform towards anti-poaching efforts,October 2022.
[2] N.S Vijay, Sandeep Kumar, Pullur Pavan Kumar, Anti- poaching detectionSystem for forests, volume 9,Issue 3,March 2022.
[3] N.Shilpa, ch.Sundharani, "IOT Based Antipoaching of Trees", International Journal of Engineering and Advanced Technology (IJEAT), ISSN : 2249-8958, volume-8 Issue-5, June 2019, India.
[4] Prof.Dr.M.C.Hingane, vadana Datta Ingale, Sneha choudhari, sonal Awachare, Pune India. International Journal of Engineering Development and Research (IJEDR) 2019, volume-7 Issue-4, ISSN: 2321-9939
[5] V.Zope, T. Dadlani,A. Matai, P. Tembhurnikar and R. Kalani, "IoT Sensor and Deep Neural Network based Wildfire Prediction System," 2020 4th International Conference on Intelligent Computing and Control Systems (ICICCS), Madurai, India, 2020, pp. 205-208, doi: 10.1109/ICICCS48265.2020.9120949
[6] A divya, T. Kavithanjali, p. Dharshini "IOT enabled forest fire detection and early warning system" in 2019 proceedingof international conference on systems computation automation and networking (ICSCAN) pondicherry, India,2019, pp1-5 DIO:10.1109/ICSCAN 2019.8878808.
[7] Jayaram K, Janani K, Jeyaguru R, kumaresh, Muralidharan N " Forest fire alerting system with GPS co- ordination using IOT"in 2019 5th international conference on advanced computing and communication systems (ICACCS)combaore, India, 2019 pp.488-491, DIO: 10.1109/ICACCS2019.8728383.
[8] Mrs.P.Madhavi, SK. Razeen, SK. Nowshad, Y. Susmitha,M. Sweety" IOT based Anti-poaching alarm system for trees in forests".International Journal of Emerging Technologies and Innovative Research (JETIR), ISSN:2349-5162, Volume- 6, Issue 4, April 2019.
[9] Gurumurthy, S., Yu, L., Zhang, C., Jin, Y., Li, W., Zhang, X., & Fang, F. (2018). Exploiting Data and Human Knowledge for Predicting Wildlife Poaching. Proceedings of the 1st ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS) - COMPASS '18.
[10] ANTI-POACHING IN AND AROUND PROTECTED AREAS: Training Guidelines for Field Rangers. InternationalRanger Federation, Best Practice Protected Area Guidelines Series No. 01.
[11] Bondi, E., Fang, F., Hamilton, M., Kar, D., Dmello, D., Choi, J., Hannaford, R., Iyer, A., Joppa, L., Tambe, M., & Nevatia, R. (2018). SPOT Poachers in Action: Augmenting Conservation Drones With Automatic Detection in Near RealTime. AAAI.
[12] Fazle Karima, Somshubra Majumdarb, Houshang Darabia, Samuel Harforda (2019). Multivariate LSTMFCNs for Time Series Classification. arXiv:1801.04503
[13] A. Shahroudy, J. Liu, T.-T. Ng, and G. Wang(2019). NTU RGB+D: A large scale dataset for 3D human activity analysis. In CVPR, 2016. arXiv:1905.04757v2
[14] N.S Vijay, Sandeep Kumar, Pullur Pavan Kumar, Anti- poaching detectionSystem for forests, volume 9,Issue

DOI: 10.17148/IJARCCE.2023.125136

3,March 2022.

[15] D O Chinmaye Reddy,N Bhuvana,Amar Kamble,G Keerthana,A survey paper on techniques used for anti-poaching of trees,volume 7,Issue 11,2021.

[16] Pooja Baraddi Nanda Hanchinal, Ritika Jadhav, Shushma, Rajeshwari Banni, IOT based Anti-poaching alarm system for valuable trees,Volume 09,Issue 05,May 2020.

[17] Rohan solarpurkar,Real-time Forest Anti-smuggling monitoring system based on IoT using GSM.International Journal for research in engineering application andmanagement,ISSN 2454-9150,2018.

[18] V.Zope, T.Dadlani A Matai ,P.Tembhurnikar and R.Kalani, "IOT Sensor and Deep NeutralNetwork based Wildfire Prediction System."4th international Conference on intelligent Computing and Control Systems (ICICCS) Madurai India, 2020.

[19] Mrs P.Madhavi, SK Razeen, Nowshad Y.Susmitha, M Sweety. "IOT Based Anti-poachingAlarm system for trees in forests" International Journal of Emerging Technologies and Innovative Research (JETIR), ISSN:2349-5162, Volume6,Issue 4, April 2019.

[20] Jayaram K, Janani K, Jeyaguru R, Kumaresh Muralidharan N "Forest fire alerting System with GPS Co- ordination using IOT." 5TH international conference on Advanced computing and communication systems (ICACCS) India , 2019.

[21] M Parthiban ,M Dharani ,S Kathiga ,M Keruthika ,IOTbased Anti-poachingSensor system for trees in forest,Volume 08,Issue 64,April 2019.