

IOT Based Anti-Poaching And Fire Alarm System

Dr. R.Pushpavalli ¹, S.Surendara Kumar ², B.Surendhar ³, R.Rajaganapathi ⁴

¹Department of Electronics and Communication Engineering,
Paavai Engineering College, Namakkal,
pushpasivaramanpec@paavai.edu.in

² Department of Electronics and Communication Engineering,
Paavai Engineering College, Namakkal,
ssurenderkumar73@gmail.com

³ Department of Electronics and Communication Engineering,
Paavai Engineering College, Namakkal,
surea1305@gmail.com

⁴ Department of Electronics and Communication Engineering,
Paavai Engineering College, Namakkal,
rioraj846@gmail.com

Abstract: Poaching has a huge imbalance in the ecosystem, due to poaching many endangered species are now on the brink of extinction. Even with all the addition of extra manpower to curb the poaching activities and safeguard the forest, it is still inefficient owing to the large and dense forest area. A framework of IoT based Anti- poaching and Fire alarm System (IAFS) is proposed with combining different types of sensors such as temperature sensor, smoke sensor and Light Dependent Resistors (LDR) sensor. The proposed IoT primarily based on IAFS includes Arduino board which collects all the parameters from those sensors and relays the facts to the cloud. The cloud platform continuously monitors unit's devices the statistics and sends an alert notification to the forest officials whenever there can be any intrusion detected. The aim of this proposed work is to be able to remotely monitor forest cover and poaching of wild animals. The proposed IAFS enables forest officials to monitor the forest area and collect data of any intrusion remotely. In addition to this, the proposed work shows better performance in the aspect of poaching than other existing system.

Keywords: Anti-Poaching, IAFS, Forest officials, Sensors.,

1. Introduction

In world, wooded area and agriculture are the primary manufacturers for generating food, fibre and many different preferred products, through the cultivation of sure plant life and elevating of domesticated animals But, the timber and flora on that locations are in risky scenario because of 3 fundamental reasons. Every year, forest fire destroys a huge part of forests. This has an adverse effect on our environment as well as the animals which live in those forests. Similarly, every year many animals, especially the endangered animals have been poached illegally by humans for various purposes. The forest fire not only burns the trees, but it causes the death of many wildlife animals and also pollutes the air and is also a major cause of global warming as tons of greenhouse gases are emitted. Forest and animals play a vital role in our ecosystem, and they should be taken care. Elimination of endangered species will have a myriad of implication for our food, water, environment and even health. Forest and animal protection is important for both humans and other living beings in the forest. Forest Fire: The report, "Strengthening Forest hearthplace control in India", jointly organized via way of means of the ministry of environment, Forest And weather change (MOEFCC) and the World Bank says Forest Fire are main reason of wooded area degradation in India. Smuggling of treasured trees Poaching of wild animals and forest fire have been a major concern in many countries. The latest hearthplace incident in Australia has highlighted the want of detecting wooded area hearthplace in its preliminary stages. In International market, there's a large call for such trees. Indian sandalwood charges 12,000 to 13,000 INR according to Kg while in global marketplace crimson sanders command excessive fee of INR 10 cores according to ton. Cutting of such timber ends in

woodland degradation. The exploration of **P.G. Salunkhe**, [1] The author extend the least cost and least power ZigBee based WSN knot to identify theft/ smuggling contributing to the safety of important & expensive species of tree. The research of **George Georgiades** [2] This paper presents a novel integrated system for automatic early detection of wild forest-fire. The proposed system consists of stationary optical and thermal cameras that monitors the designated survey area. The research of **Hanh Dang-Ngoc** [3] In summary, an aerial based forest fire detection method has been examined through a large database of videos of forest fires of various scene conditions. To enhance the detection rate, at first the chromatic and motion features of forest fire are extracted and then corrected using rule to point out the fire area. The research of **Parthiban M** [4] 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. The research of **Ajith. S** [5] Forest is a very important and grow in many places in around world. In a forest is piece of land with many trees. Many animals to live and survive the forest. Forest also used to prevent soil erosion, climate changes. This paper, a cloud based forest fire alert system using IOT technology.

2. Proposed system

2.1 Block Diagram

Thus, on noticing all the exciting problem, a new system is developed to prevent smuggling of trees, forest fire using IOT. This system will be cheap, effective and will provide a real time monitoring of forest area. Every unit will be

installed with a small unit which consists of Arduino UNO that is interfaced with flame sensor, passive infrared sensor (PIR), tilt sensor, vibration sensor, temperature sensor, buzzer, LCD. We make use of GSM and IOT module. If there is a problem the system will send an alert message to the forest officers using GSM and also real time data is updated from the system to the monitoring system using IOT. This data will be used by the forest officer to take a necessary action.

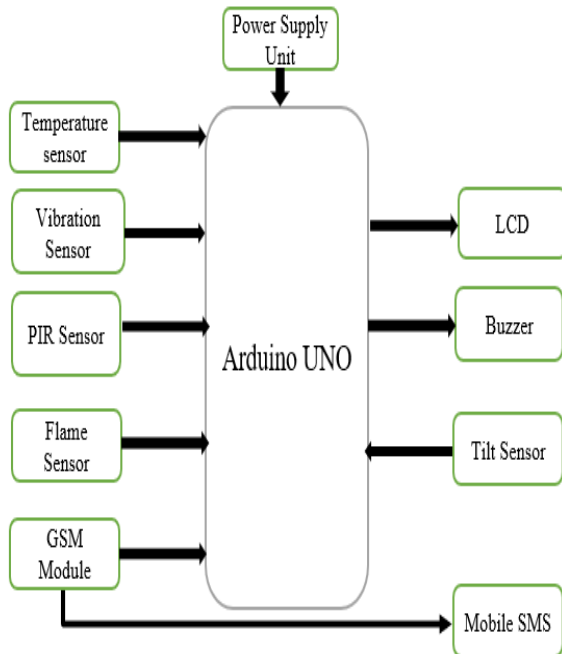


Figure 1: Block Diagram

2.2 Hardware Requirements

- Arduino AT Mega 328P
- Temperature Sensor
- Vibration Sensor
- Flame Sensor
- PIR Sensor
- Buzzers
- Tilt Sensors
- GSM Module
- LCD display

2.3 Specifications:

Table 1: Margin specifications

Sensors	Working voltage	Range	Threshold
Temperature sensor	-0.2 to 35V	-55 ° C to 150°C	100 ° C
Vibration sensor	3.3 V to5 V	1 Hz to 1000 Hz	109 Hz
PIR sensor	4.5 to 12V	10 m to 150 m	100 m
Tilt sensors	3.3 V to5 V	±50°	25°
Flame sensor	4.5 to 5V	1m	1m

2.4 Software Requirements

- Arduino Software (IDE)

2.5 Working Principle

The fire in the forest to prevent unauthorized activities is practically difficult job. The four major operations that are essential in monitoring the forest are developed in this work, namely tree cuttingdetection, fire detection, human detection and contaminated animal detection using vibration sensor, fire sensor, Passive Infrared Sensor (PIR) and Temperature sensor respectively. A micro controller is used along with GSM to communicate to central server from remote place. The sensed data from sensors is collected and sent to the authorized person via GSM. GSM is a widely used technology in forest monitoring application. In addition, this project uses GSM module through which employee and forest officer can communicate with each other in case if network is disabled.

3. Result and Discussion

In cases when humans are unable to provide security, this study presents a low cost and cheap electricity IOT-based device to find tree smuggling. The IOT technology is used to monitor the forest. Here, several sensors are positioned throughout the forest in strategic spots. If any undesirable incidents might have occurred near the forest. The sensor picks up information and sends an update to the Arduino microcontroller, keeping the sensor values current inside the IOT system. The cloud server's updated records are also saved there, and they are also monitored. The coverage area of our system is 150 square meters. This allows the forest officer to take significant action against those kinds of undesirable actions.

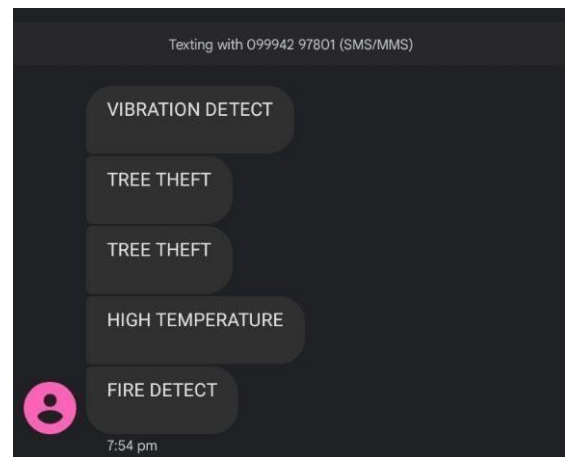


Figure 2: Message sent to user

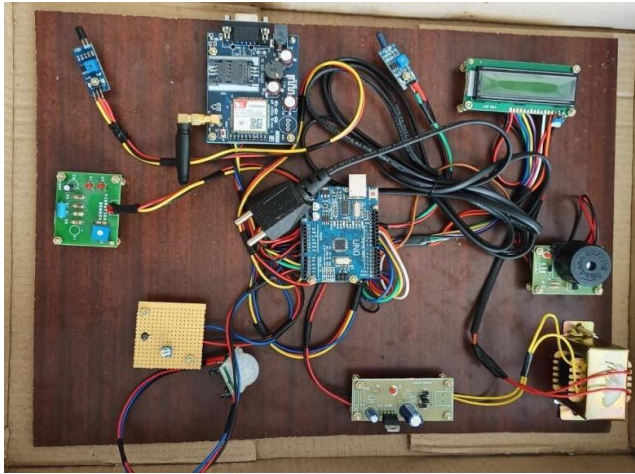


Figure 3: Prototype

4. Conclusion

Through this framework we will forestall the tree slicing in timberland and manage the dealing of timber in backwoods in which the man or woman now no longer gifted to provide security. This is moreover serving the general public authority or the permitted character difficulty wherein the dealing is going on and who possesses that the ranger provider or tree and the manner matters are taking place like cutting of tree, hearthplace or attributable to the exceptional temperature across the environmental factors of the backwoods. Forestalling sneaking of trees is a significant test. This concept moreover allows the general public authority or the authorised involved character to realize in which the Smuggling is occurring with the assistance of GSM and the way things are going on like cutting of tree, by fire or due to the high temperature around the environmental factors of the forest.

References

- [1] Angeline.R, Aditya.S, Abhishek Narayanan,” Fire Alarm System Using IOT”, International Journal of Innovative Technology and Exploring Engineering (IJITEE) Volume- 8, Issue-6S3, April 2019.
- [2] Dr.S.Praveen chakkaravarthy, J.Nancy, V.S.NaveenKumar.” Forest Fire Detection System”, International Journal of Recent Trends in Engineering & Research (IJRTER) Conference on Electronics, Information and Communication Systems (CELICS’17) Special Issue; March – 2017.
- [3] George Georgiades, Xanthi S. Papageorgiou, Savvas G. Loizou, “Integrated Forest Monitoring System for Early Fire Detection and Assessment,” in Proc (CoDIT’19) Paris, France / April 23-26, 2019.
- [4] Hanh Dang-Ngoc, Hieu Nguyen-Trung “Aerial Forest Fire Surveillance – Evaluation of Forest Fire Detection Model using Aerial Videos”, IEEE Access 2019 International Conference 978-1-7281-2392-9/19
- [5] Kiran Kumar.D, Kishore, T.V.Suresh Kumar,” Fire Monitoring System for Fire Detection Using ZigBee and GPRS System”, IOSR Journal of Electronics and

Communication Engineering (IOSR-JECE) Volume 12, Issue 1, Ver. III.

- [6] Pallavi C. Jamdhade, Ashwini D. Kawate, ShitalS.Lachake,” Forest Fire Detection Using Optimized Solar Powered Wireless Sensor Networks”, International journal of Advance search in science and engineering, Volume NO.07, Issue NO.02, Feb 17.
- [7] Parthiban M, Dharani M, Kathiga S, Keruthika M, “IOT Based Anti-Poaching Sensor System for Trees in Forest”, IJITEE Volume-8, Issue-6S4, April 2019.
- [8] Prof. P. G. Salunkhe, Poonam U. Chaudhari, “Design WSN Node for Protection of forest Trees Against Poaching Based MSP430,” in Proc. Amrutvahini College of Engineering, Sangamner, Ahmednagar, India. Feb 8-9, 2018
- [9] S.Varunkumar, P.V Yokeshraj, V.Vignesh,” Implementation of Wireless Sensor Network and IOT for Real Time Forest Fire Warning System”, International Journal of Engineering and Techniques - Volume 4 Issue 1, Jan – Feb 2018.
- [10] T. Sai Kumar, P. Sriramya,” Iot Enabled Forest Fire Detection and Altering the Authorities”, International Journal of Recent Technology and Engineering (IJRTE) Volume-7, Issue-6S4, April 2019.