# IoT BASED ANTI-POACHING ALARM SYSTEM FOR TREES IN FORESTS

[1]Mrs.P.Madhavi,[2],Sk.Razeena,[3]Sk.Nowshad,[4]Y.susmitha,[5].M.Sweety

[1]M.Tech, Assoc.professor, Department of Electronics and Communication Engineering, Geethanjali Institute of Science and Technology,Nellore,AP,India

[2,3,4,5] UG scholars, Department of Electronics and Communication Engineering, Geethanjali Institute of Science and Technology,Nellore,AP,India

*Abstract:* Now-a-days, there are many incidents happening about smuggling of trees like Sandalwood which are 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 deploy a system which can be used to restrict these kind of incidents like smuggling of sandalwood trees.This project designuses three different sensors namely, temperature sensor(to detect forest fires),Mems accelerometer(to detect the inclination of 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 of Thingspeak 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 violatedbut for temperature sensor a water pump is also activated to put off the forest fires.

*IndexTerms* - **Tilt Sensor, Temperature Sensor, Arduino Uno, Wi-Fi Module.**

## I. INTRODUCTION

Poaching refers to smuggling. Incidents like smuggling isn't related to India only, various countries like China, Australia and Africa are also struggling with same issue. Indian sandalwood'scost range from several lakhs of rupees to crores of rupees. The Indian sandalwood trees had become rare in thepast years. In order to control their possible loss, the Indian government is trying to limit the exportation of sandalwood as soon as possible. If the tree is already in government control, then its removal or its illegal exportation is prohibited. The main objective of this project is tointroduce a system which can be used to restrict smuggling of sandalwood trees by protecting them.

## II. 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. 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.

## III. LITERATURE SURVEY

1.Red sandalwood trees were seized from smugglers in Berhampur.

2. 200 teak trees were cut and timber was smuggled in lucknow.

3. Punjab News line Network -The situation has gone quite worse as the trees were being cut illegally and sold right under the nose of the forest department.

## IV. EXISTING SYSTEM

According to a journal, published in IJARCET Anti-poaching system was designed using Zigbee module.
Disadvantages of Existing system:

> ➢ Zigbee was used as wireless communication system which is very slow and has lesser range than Wi-Fi module.
> ➢ This existing system is not practically implemented.

## V.PROPOSED SYSTEM

This system will be consisting of two modules one involving the sensors and the other will be the controller module which will be at tree spot and the other one is Android phone or tablet.

The Thingspeak application will continuously receive sensor data. This is an IoT based project where the sensors data is continuously uploaded to the cloud over a Wi-Fi module. In case of tilt sensor and the sound sensor, the buzzer turns On and for temperature sensor, buzzer and the water pump is activated in case of forest fires through relay switch.
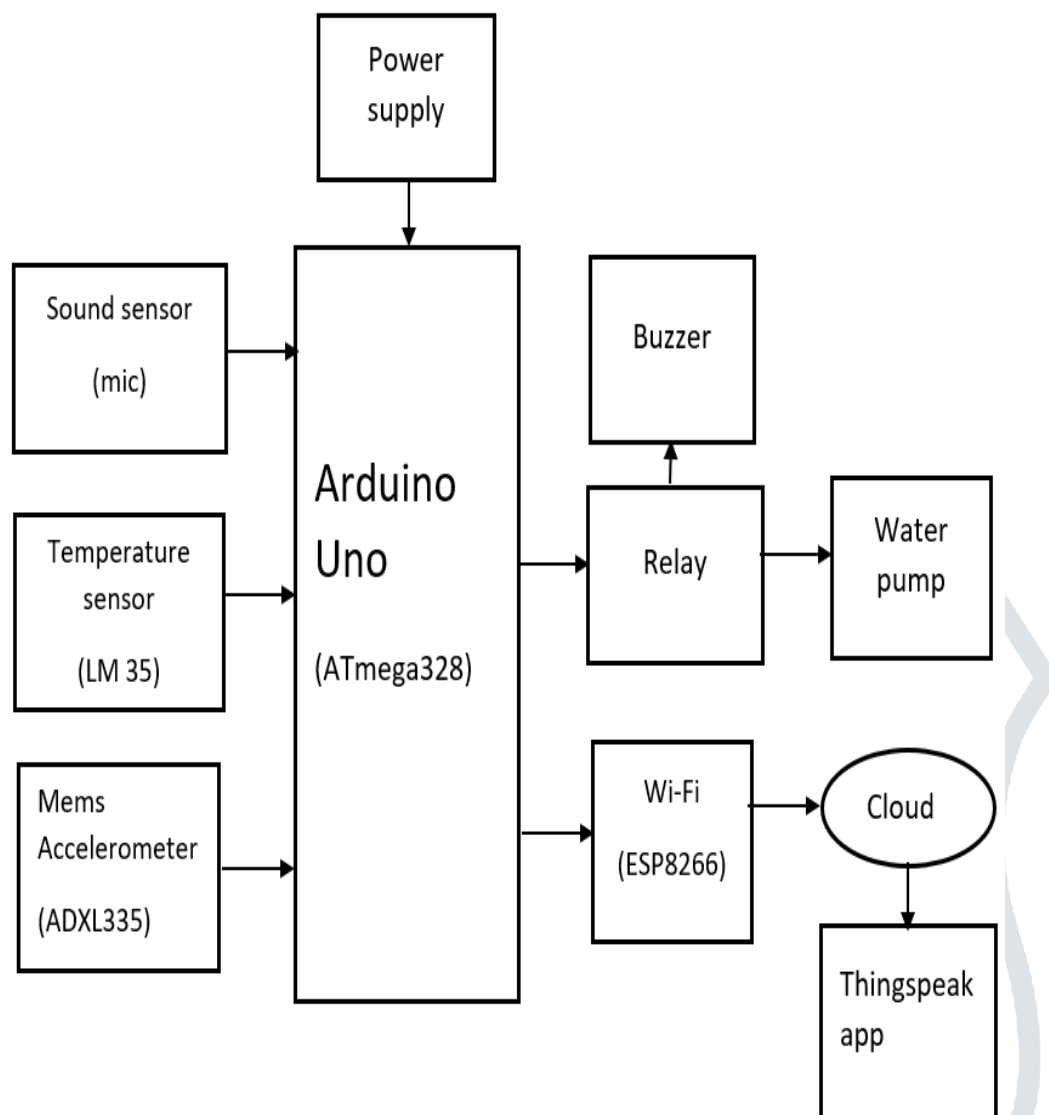
**VI.SYSTEM ARCHITECTURE**



*Fig: Block diagram of Anti-poaching alarm system*

*Module 1: Arduino-The Microcontroller*

- ➢ The Arduino Uno is a microcontroller board which is based on the ATmega328 microcontroller.
- ➢ It has 14 digital I/O pins, 6 analog Input pins, 16 MHz crystal oscillator, a USB connection and a power jack. Arduino is an open-source platform i.e each and every user can read, modify the source code and its simplicity makes it ideal to use. In order to use it,simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter to get started.

*Module 2: Mems Accelerometer*

Here we are using ADXL335 Mems Accelerometer.
- ➢ ADXL335 is an analog accelerometer which is used for sensing the tilt of the tree in our project.
- ➢ It simply works on the principle of capacitive sensing.

*Module 3: Sound sensor(Mic)*

The sound sensor module or mic is generally used for detecting sound intensity. This sensor can be used for security and monitoring applications. When this sensor detects a sound above the set value, it processes an output signal voltage that is sent to a microcontroller and then the microcontroller performs necessary processing required.

*Module 4:Temperature sensor*

➢ In this system we use LM35 as Temperature sensor.The prefix LM stands for *linear monolithic*, which is nothing but all the analog components are integrated onto a single piece of silicon.
➢ The LM35 has an advantage over the linear temperature sensors. Generally the linear temperature sensors are calibrated in Kelvin. By using the LM35 temperature sensor, the users are not required to subtract a large constant value from their output value to obtain convenient Centigrade scaling. It is rated for full −55˚ to +150˚C range .

*Module 5: Relay switch*

A Relay is a switch which is electrically operated by an electromagnet.High voltage electronic devices can be controlled using relays. One of the most advantage of the relay switch we can do with an Arduino is to control higher voltage of 120-240V.

*Module 6: Thingspeak App*

Thingspeakis an open-source IoT application used to store and extract the data from the things over the internet or via a Local Area Network using the HTTP protocol .
ThingSpeak app enables user, the sensor logging applications,status updates of all the things connected to the app.
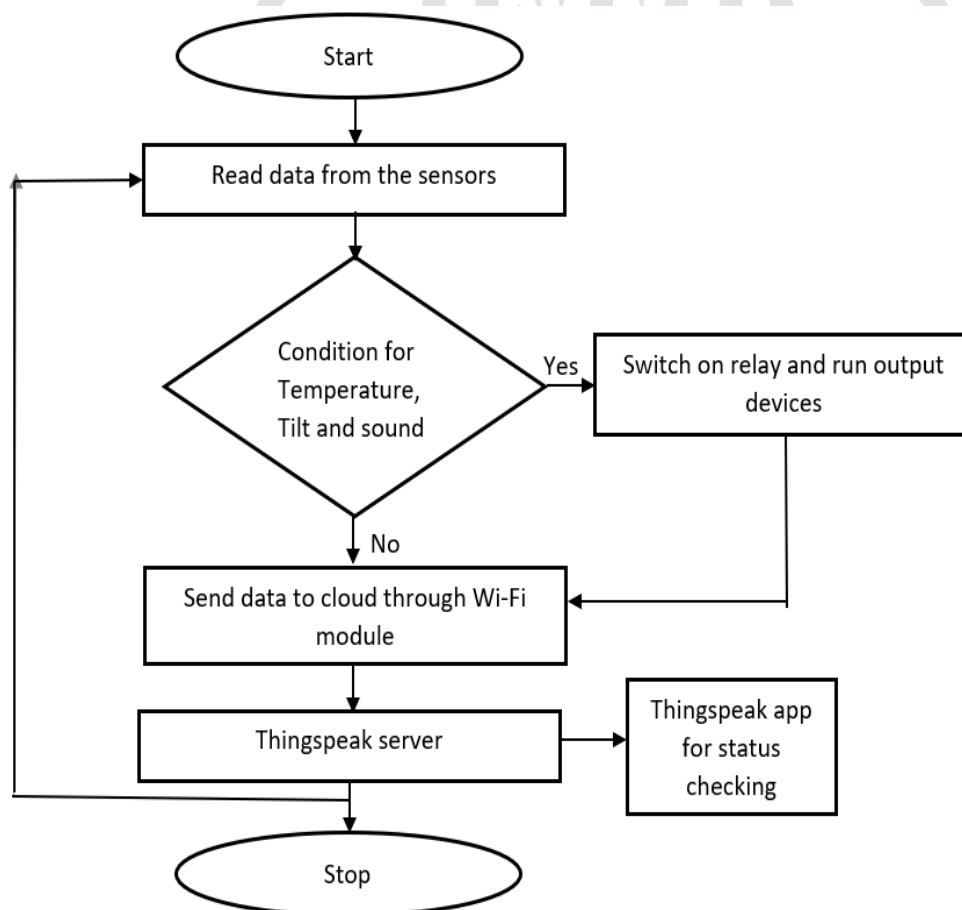It also enables location tracking applications to the user.

## VII.SYSTEM DESIGN



Fig: Flowchart

## VIII.WORKING

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. If the conditions satisfy, then it switches ON the relay and runs the output devices. Also it sends the data continuously to the Thingspeak server.
If the conditions doesn't satisfy then also the data is continuously sent to the Thingspeak app for the status checking through Thingspeak server.

## IX.IMPLEMENTATION

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. In the case of any forest fires, the temperature will be sensed by the temperature sensor 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. The data generated by all the sensors is continuously sent to the cloud which is Thingspeak server in our project. This server inturn sends the data to the thingspeak app through which the forest officials get notified.

## X.RESULT



Fig *a): Sound sensor(mic)  output*

The above result shows that the sound value  is continuously monitored by the forest officials through Thingspeak app.
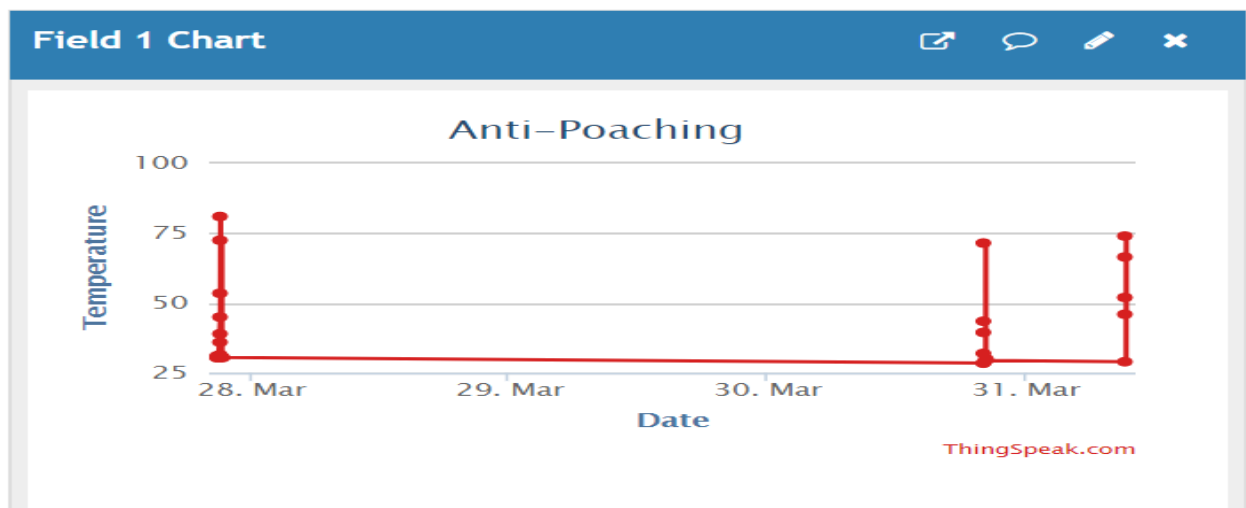


Fig b): Temperature sensor output

The above result shows the continuous temperature values near the tree through Thingspeak app.

*Fig c): Accelerometer output*

From the above figure we can monitor that if the tree is still, then the value in the graph is zero and if the tree bends above certain value, the value is one.

## XI.CONCLUSION

Currently there is no system to detect illegal logging and cutting of trees. This system would help forest officials in detecting and alerting so that proper actions could be taken.

## XII.REFERENCES

[1] Narhari R. Kotkar, "Anti Smuggling System for Trees in Forest using Flex Sensor and Zigbee" IJARCET, September 2014

[2] https://www.quora.com/How-much-does-1kg-of-sandalwood-cost-in-India

[3]http://envfor.nic.in/legis/forest/forest4.html

[4]http://timesofindia.indiatimes.com/city/lucknow/200-teak-trees-cut-timber-smuggled/articleshow/16804707.cms