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IOT BASED ILLEGAL TREE CUTTING PREVENTION AND MONITORING WITH WEB APPLICATION

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Abstract:

The trafficking of trees is a very long and regretful issue. Cutting of trees like Red sanders, Teak wood, Sandal wood are still a great difficult. In spite of increasing technology, safety for trees in a large area like forest is hard. It is also luxurious to implement. We are making a system that can avoid the trafficking of trees in forest. The systems comprise of Raspberry pi interfaced with flex sensor, fire sensor, and Relay. In case of problems the tree unit module along with the particular geographical location using GSM. And also real time data is being reorganized from the tree unit to the monitoring section using IOT. This safeguards data security and provides privacy.

Keywords: **trees, accessible, smuggling, woods, forest.**

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I. INTRODUCTION

We are emerging such a system which can be used to limit this trafficking. Every tree will be armed with one small electronics unit which consists of Micro Controller, Flex Sensor and IOT modem Interfaced with Raspberry Pi module. Tree cutting will be noticed by flex sensors. At server unit cutting trees will be shown in web app. Communication among the trees and server will be done by IOT modem. In case of any variation the App will get updated with location and attentive message.

The impartial of the scheme is to shapesafe and protected forests to prevent smuggling and anti-social activities against unlawful cutting of the tress for Environment safety and pollution switch. The plan moves a step head to protection the living of birds on Trees and animal defense bychecking the cutting of tree.

We have intended a system which can be used to avoid the trafficking of the trees which would in turn stop the deforestation and support the Environmental stability, which would help to solve one of the problems with the Global Warming. Each tree is having with one electronic division, which consists of Raspberry pi, Micro Controller, Flex Sensor, accelerometer sensor, Fire sensor, and GSM/GPRS module. Forest trees cutting will be detected by accelerometer sensor [2]. Message between the trees and server will be done by GSM/GPRS modules.

Every tree will be prepared with one small electronics unit which contains of Micro-controller, flex sensor and Zigbee module. There will be one sub server unit for specific area of forest. The data of different tree units can be collected by this unit. The sub server unit will send the data to main server using GSM modem. At main server GUI using VB will be created to alert about gossamers with exact tree location. This data can be used by worry forest authorities to take preventive action. The whole process will take maximum of few seconds or a minute. This will surely reduce trafficking and illegal logging to a greater extent.

II. RELATED WORK

In "Preventive System for Forests", Prasad R. Khandar, K. Deivanai [1] A very long before, when earth was forming its inner core and environment, it obviously had a very good plan of each area, part of nature should fit in cycle together so it would behave and work like a well-kept machine like todays embedded systems are working continuously. But from past few years we have been reading in the newspapers about cutting and smuggling of the trees like sandal, Teak etc. These trees are very costly as well as important in the world. These are used in the medical sciences as well as cosmetics. Because of immense quantity of cash concerned in commercialism of such tree woods, several incidents square measure happening of cutting of trees and their importation. .In India also in the

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forests of Karnataka and Tamilnadu some notorious Smugglers are doing the smuggling of such trees for so many years. The sandalwood trees of India have become endangered in past few years, and in an attempt to save it from outside sources, the Indian government is trying to set a limit the exportation of sandalwood.

Three distinct units are placed in proper places for performing experimental test. Fully setup of system is established. Stroke has been given and it is being detected by tree unit. Further processing of signal is done by sub server unit. For understanding purpose LCD display we have attached. At control station where main unit is fixed and detected.

In "Real Time Forest Anti-Smuggling Monitoring System based on IOT using GSM", Mr.Rohan Solarpurkar, Prof.Suvarna L. Kattimani,[2] From many years we are getting news about smuggling of the trees such as sandal, Sagwan etc. These trees are very expensive and less obtainable in the market. To avoid such type of smuggling and to save and monitor the forests, around the globe some preventive systems need to be developed. We are forming a   system which may be accustomed prohibit this importing.

The suggested system will consist of two modules which are described below, 1) Tree Unit 2) Main Server Unit (base station). Every tree will be having one small electronics division which will consist of Renesas controller, Sensors and Solar power. The data of different tree units is collected by these units. Each tree unit will give the information to base station using GSM module. At main server GUI using one authorized person who received the message and he/she will be taking action to provide security

In future the system can be implemented using Wireless Fidelity support which will be extended scalability up to 5 km radius in the Forest Area. This Work can also be extended by new research area as video processing with the help of Infrared Cameras and Arial Surveillance using UAV.

In "Prevention of Illegal logging of Trees using IOT". Harshita Jain and Abhijith H V [3] Smuggling of the trees such as sandal, Sagwan etc. is one of the major national issue. These trees are very expensive and less obtainable in the market. To avoid such type of smuggling and to save the forests around the globe some preventive systems need to be developed. In this paper we are proposing a system based on Internet of things which can be used to detect the illegal cutting of tree and restrict the tree smuggling. This system can be used by government to protect the trees.

The test bed is created using Renesas 64 pin microcontroller, Accelerometer sensor, Flex sensor and temperature sensor. All these modules are assembled. We considered a tree model and fixed the tree unit to it. We considered a Renesas Flash Programmer software package to program the on-chip flash memory of Renesas microcontrollers. We used MySQL at the server and Maria DB database servers. Android application is created using eclipse. Figure 4 shows the data gathered by the server.

In "Anti-Smuggling System for Trees in Forest using Flex Sensor and Zigbee" Narhari R. Kotkar M.E [4]. Many days we are reading in the newspapers about smuggling of the trees like sandal, "Sagwan" etc. These trees are very costly as well as less available in the world. These are used in the medical sciences as well as cosmetics. Because of huge amount of money involved in selling of such tree woods lots of incidents are happening of cutting of trees and their smuggling. To restrict such smuggling and to save the forests around the globe some preventive measures need to be deployed. We are developing such a system which can be used to restrict this smuggling. We are developing such a system which can be used to restrict this smuggling. Every tree will be equipped with one small electronics unit which consists of Micro Controller, Flex Sensor and Zigbee module. Tree cutting will be detected by flex sensors. At server unit cutting trees will be shown in VB front end .Communication between the trees and server will be done by Zigbee modules.

In this way we are developing the system which able to restrict the smuggling of tree in forest where the human being not able to provide security. Such system we are developing in the forest where the tree are costly and their protection is important fact. In this area we are provide such kind of system

In "Forest Monitoring System Based On Gprs and Powered By Iot" Prof. Suma V. Shetty, Ms. Manasa J. Ms. Harshitha R.[5] This project presents the prototype of a system for detection of any uncontrolled anthropogenic activities, smoke or fires in forests using sensors. The data from the sensors is processed in the microcontroller and is transmitted to the receiver unit through Zigbee network. The abnormalities alert the receiver unit and the pictures taken through camera are mailed. This Forest Monitoring system prototype is designed and developed in an effort to improve the security level for valuable trees which have high demand in market like teak, Sandalwood, etc. This prototype is tested and demonstrated successfully for its functionality.

The prototype of the system can be implemented in places where precious trees are planted, to prevent forest fires and other illegal activities. 2. The transmitter and receiver units are placed at proper places for performing

experimental tests. 3. The LCD displays the message indicating the situation to the control station where the receiver unit is placed. 4. This message received at the receiver unit is used by the forest officer to take preventive action. 5. With improvements in hardware and firmware the system can be implemented in a large scale that will help forest officials.

In "PREVENTION OF TREE SMUGGLING USING IOT" V. Nivas Prabu, J. Gowtham Kumar [6] in recent days we are often heard in the news that trees like Red wood, Sandal, "Sag wan" etc. are being smuggled. These trees are very costly as well as less available in the world. To restrict such smuggling and to save the forests around the globe, a device is designed to report such irregular and illegal activities to the forest authorities. When the tree is being cut and carried, the change in location is sensed by the GPS module and transmitted to the master control unit through the wireless transmitter. The master unit receives this location through the wireless receiver connected to it. This location is shared to the nearest forest department by a GSM module. Once the tree is being cut and smuggled, an SMS along with the location of the corresponding tree is sent to the registered phone number of the forest control officer.

Efficient in preventing endangered species from being smuggled. Master-Slave setup of the device promotes cost efficiency. Efficient in providing tracking information at all the time and fast in alerting the forest admin.

In "Prevention of Illegal tree cutting using IOT" Harshita Jain and Abhijith H V [7]. Smuggling of the trees such as sandal, Sagwan etc. is one of the major national issues. These trees are very expensive and less obtainable in the market. To avoid such type of smuggling and to save the forests around the globe some preventive systems need to be developed. In this paper we are proposing a system based on Internet of things which can be used to detect the illegal cutting of tree and restrict the tree smuggling. This system can be used by government to protect the trees. In this paper we are proposing a system based on Internet of things that can be used to avoid the smuggling of the trees which would in turn stop the de-forestation and uphold the Environmental stability, which would help to solve one of the issues with the Global Warming. Each tree is having with one electronic division, which consists of Micro Controller, Flex Sensor, accelerometer sensor, TEMP sensor, and GSM module. Tree cutting will be detected by accelerometer sensor. Communication between the trees and server will be done by GSM modules.

Through the proposed system we can prevent the tree cutting in forest and control the smuggling of trees in forest where the human being not capable to provide security. This is also helping the government or the authorized person concern where the smuggling is happening and who owns that the forestry or tree and how it is happening like cutting of tree, fire or because of the high temperature around the surroundings of the forest. As a future scope we can enhance this model to detect the illegal plucking of coconut and various fruits.

In "iot based anti-poaching alarm system for trees in forest using wireless sensor networks" Ghousia Sultana B, Jagdish R,[8] Nowadays there are many incidents about smuggling of trees like Sandal, Sagwan etc. These trees are very costly and meagre. They are used in the medical sciences, cosmetics. To restrict their smuggling and to save forests around the globe some preventive measures needs to be deployed. We have developed a system which can be used to restrict smuggling. The design system uses three sensors tilt sensor(to detect the inclination of tree when its being cut),temperature sensor(to detect forest fires),sound sensor(for effective detection of illegal logging i.e. even the sounds generated while axing the tree are also sensed).Data generated from these sensors is continuously monitored with the aid of Blynk App. With respect to the sensors, their output devices are activated through relay switch. For tilt sensor and sound sensor a buzzer is activated and for temperature sensor a water pump is activated. Generated data is stored in Blynk Server over the Wi-Fi module. Forest officials are no

Tified when any event occurs so that appropriate action can be taken.

This paper consist of a low cost and low power IOT based system to detect the smuggling of trees, where the human beings are not able to provide security. The forest is monitored under IOT system. Here the multiple sensors are placed in different places in forest. If there is any undesirable things occurred in any location of the forest. The sensor detects and updates that information to the Arduino microcontroller and these sensor values are continuously updated in the IOT system. The information which is updated also stored in the cloud server and it is also monitored by the authorized person through website. By this the forest officer can take necessary steps against those kinds of undesirable activities.

III BLOCK DIAGRAM
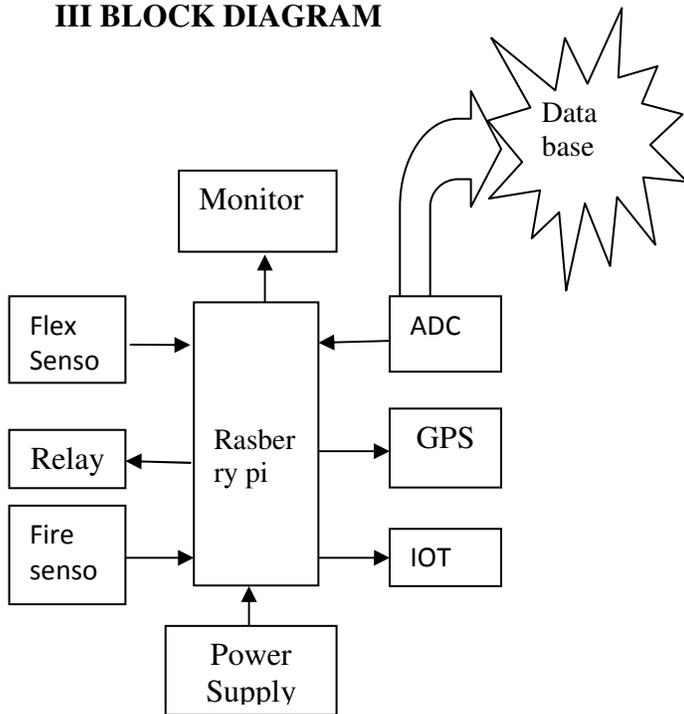
Tree Block

Fig1: Block diagram of iot based prevention of tree cutting using rasberry pi

The above fig1 shows the block diagram ofthe project mainly consists of three blocks a tree block, a server and controlling data base block and web App as shown in the block diagram. The tree block is connected to all the trees where it is having a centralized microprocessor interfaced with a flex sensor on the body of a tree. Whenever anybody tries to cut the tree then the sensor senses the variation and sends the information to processor. Upon receiving the signal the processor track the location of that tree and the predefined ID number and send the information to server using IOT modem which is inbuilt in Raspberry Pi. The server sends the data to web app provided to Govt. officials to keep the track of it. In addition with sending the data to nearest base station the information will also be sent the Web app.

Raspberry pi module process the data for further operations. Further operation involves operation of pump, bill generation, purity check, safety and updating the details of transaction on mobile app.The nearest base station is controlling and monitoring unit few meters away from the tree unit having a centralized mobile as receiver having a web ap. As soon as it receives the information from tree unit notification will turn on so as to get the attention of the officers so as to take necessary actions immediately.

Flowchart

The fig2 shows the flow diagram for proposed system illustrates that sensing module is divided into two streams:
1) Fire detection
2) Motion detection.
1) Starts the process and sense the sensor inputs. If the fire is detected (flame sensor) then it fetches the geographical location (latitude and longitude) using GPS tracker. Then sends the fire alert to forest officials in the form of text message to their mobile phones. It also updated in the IOT cloud server webpage for every 30 seconds. Then the process stops. If the fire is not sent to the mobile
2) If motion is detected (PIR sensor) then it works on the next step. It reports the tree status and also checks whether there is a vibration on the tree. Now with the exact geo location it sends the message alert to the mobile phone and also update the data in the IOT webpage
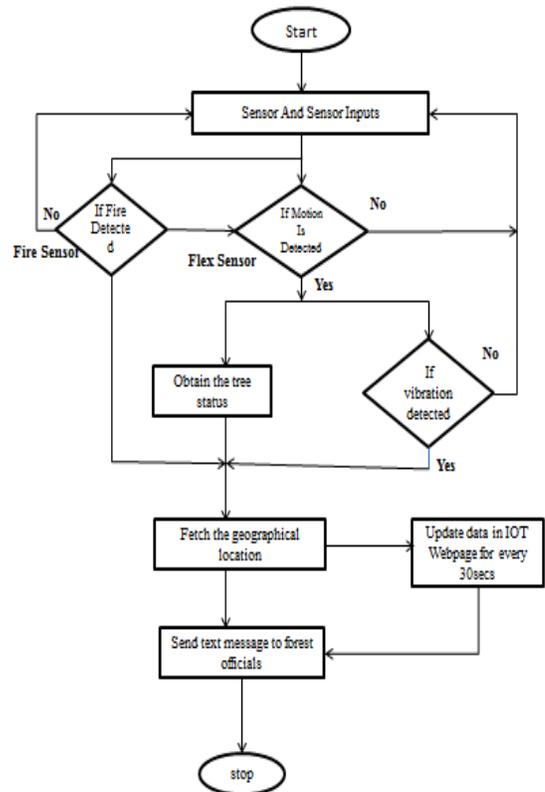

Fig 2: Flow Chart

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IV. SYSTEM REQUIREMENTS:

Raspberry Pi-Raspberry pi is a series of small single-board computer developed in United Kingdom by Raspberry Pi Foundation

Relay-A Rely is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal.

Flex sensors-Flex sensor is a sensor that measures amount of deflection or bending. As the sensor is flexed, the resistance across the sensor increases. Patented technology by Spectra Symbol - they claim these sensors were used in the original Nintendo Power Glove. I love the Nintendo Power Glove. It's so bad!

GSM-GSM(global system for mobile) is a digital mobile network that is widely used by mobile phone users in Europe and other parts of the world.

Power Supply-A power supply is a component that supplies power to at least one electric load.A power supply is an electrical device that supplies electric power to an electrical load. The primary function of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load. As a result, power supplies are sometimes referred to as electric power converters...

Python-Python is simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance.

Technical specifications:
➢ Operating voltage of embedded circuitry is 3.3vdc
➢ Current consumption of device in active mode 200mill amp
➢ Operating frequency of device is 10MHZ to 60MHZ

V.ADVANTAGES

• Trees can be prevented by getting robbed.
• In case anybody tries to cut the tree the location will be tracked and information will be sent to control room immediately.
• Since all the trees are connected to sensors individual attention is given on all the trees.
• Sensors work accurately so it is easier to install and operate with good results.
• Data base of all the trees can be maintained.

• Web application shows the every tree with location and any fluctuations caused to it.

VI.APPLICATIONS
• This project can be applied in Forests to save the tree.
• It can be used in all the parks for providing security.
• The concept can be used in saving the Sandal trees.
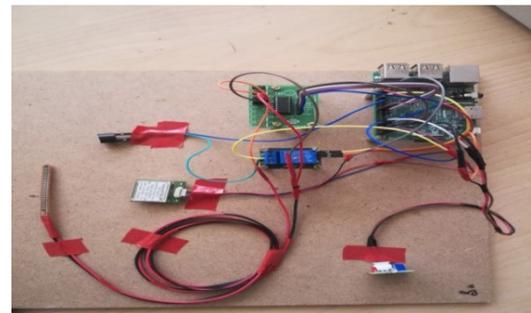• It can be used in plantations and estates.

VII. RESULT.

Fig3: model of the system

The fig.3 shows that test bed is created using Raspberry pi microcontroller, fire sensor, flex sensor and temperature sensor and these modules are assembled. The tree unit is fixed to the model. An open source server, the blink server is used. Flex sensor, fire sensor & GSM should be inserted in the stem of tree. The control unit of all the sensors will be provided to the forest officers through the mobile application. If any mismatch happened in the forest area then the message will be given to the control room. The message will be given as shown in the below figure.

Fig4. Android application

The above fig.4 shows the Android application is created using eclipse. Above figure shows the data gathered by the server. Different cases like tree may fall due to natural events like rain or through fire are also considered. If someone is trying to cut the tree using weapons, someone may try to fire the tree base. Certain minimum angle will be set into the flex sensor, above which if the tree rotate more than that the message will be sent to the control room. If any fire catches to the forest then the information will be directly given to the control room by the fire sensor. Even they can trace the exact location. So we can reach the destination as soon as possible to protect the forest.

VIII. CONCLUSION

Through this system we can stop the tree cutting in forest and regulate the trafficking of trees in forest where the human being not gifted to offer security. This is also serving the government or the authorized person concern where the trafficking is happening and who owns that the forestry or tree and how it is happening like cutting of tree, fire or because of the high temperature around the surroundings of the forest.

Preventing smuggling of trees is a major challenge. This idea also helps the government or the authorized concerned person to know where the Smuggling is happening with the help of GPS and how it is happening like cutting of tree, by fire or because of the high temperature around the surroundings of the forest.

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