

IOT Based Anti-Poaching Alarming System for Forest Trees

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Abstract: For 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 use 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. In India also in the jungles of Karnataka and Tamilnadu notorious Smuggler “Virrappan” did the smuggling of such trees for so many years. 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. Smuggling of sandalwood has created socio economic and law and order problems in areas bordering the state of Tamil Nadu and other regions in India. The purpose of this project is to save valuable trees which have high demand in market like teak, Sandalwood, etc. Monitor & control of parameters like Tilt of Tree, Cutting of Tree, burning of tree is done through the IOT and can be accessed on the Android app installed in android smartphone.

I. INTRODUCTION

For many days we are reading in the newspapers about smuggling of the tress. These trees are very costly. These are mostly useful in the medical sciences as well as cosmetics. Because of huge amount of money involved in selling of such tree woods and lots of incidents are happening of cutting of tree and their smuggling. This problem isn't related to India only, in China, Australia and African countries are also struggling with same issues. Putting cost in mind, Indian sandalwood costs 12000 to 13000 INR per kg whereas in international market Red Sanders command a high price of INR 10 core per ton. The Indian sandalwood tree has become endangered in recent years, and in an attempt to curb its possible extinction the Indian government is trying to limit the exportation. But even though some corner of

newspaper shows us the same title. The problem what observed is there is no system or any medium to detect illegal logging and cutting of trees. A mean by which, at your workplace, you will know what's happening with my trees should be installed. Such system will help you to detect and will alert you so that you can take actions. Putting this problem in mind, a system is designed which help us to achieve our goal. Database is a structured format. So if we store in the database, we can retrieve that particular information by giving a command directly. There is no process for installing database for mobile-phone applications. Whenever the database is needed, then only the database is created through coding. In this project there is a feasibility to change and delete the data which is not required. The primary target of the system is to build up a framework which can be utilized to limit sneaking of sandalwood trees.

II. PROBLEM STATEMENT

Illegal logging refers to what in forestry might be called timber theft by the timber mafia. It refers to the harvesting, transportation, purchase or sale of timber in violation of laws. Selective logging almost often diseased or malformed trees. As a preventive measure to the above problems, we have come up with a system based on IoT that can be used to avoid the smuggling of the trees which would stop the deforestation.

III. LITERATURE SURVEY

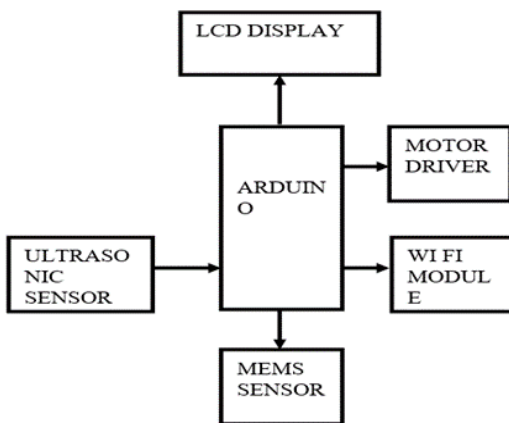
- 1.iot based ant-poaching alarm system for tress in forest using wireless sensor networks.
2. The Times of India, Ahmadabad. Plan to curb interstate smuggling of forest woods.
- 3.200 teak trees cut and timber smuggled in Lucknow.
4. Punjab News line Network (18th December 2010)- The situation has gone quite worse as timber and lakhs

or Rupees are criminally being sold right under the nose of department.

IV. PROPOSED METHODS

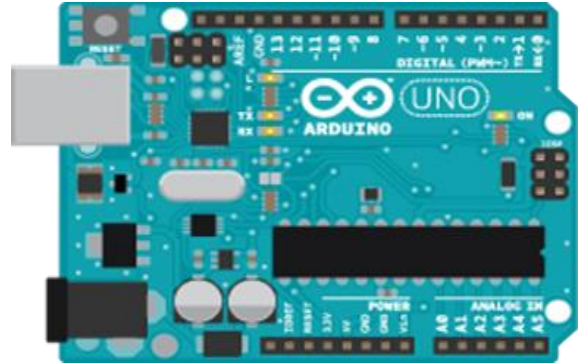
This involves the investigation of the existing system, which includes a vast level of interviews with the user and the concerned in sufficient depth. This also includes the collection and study of detailed information and literature regarding the complete existing procedure. The detailed initial study properly documented and the failing and problems are noted separately. The system is properly designed and proper outline of the proposed computerized system is prepared. The proposed design is brought against all the known facts and further proposals are made. Various resources including the software, hardware and manpower requirements are decided and are mentioned in the report. Actual user community participation and their requirements analysis are key to success of any new information system. To carry out this work, identification of users who will actually use the system is foremost. Users at every level were given opportunity to define their goals, objectives and their respective information needs. In addition to this exercise a critical through investigation of present reports and query generated, were carried out to define any other additional requirements that can be useful to the others. As input data is to be the directly keyed in by the user, the keyboard can be considered to be the most suitable input device. The outputs were needed to be generated as a hard copy and as well as queries to be viewed on the screen.

V. SYSTEM ARCHITECTURE



i. Arduino controller

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.



Arduino Controller

ii. LCD display

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being LCDs are economical, easily programmable, have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.



LCD Display

iii. Power supply circuit

Power supply is a reference to a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. In this project, a +5 V DC regulated power supply is derived from the power supply unit designed and implemented. The Figure shows the circuit diagram

designed to get the +5 V DC regulated power supply for the project. A full-wave rectifier is a device that has two or more diodes arranged so that load current flows in the same direction during each half cycle of the ac supply.

iv. Ultrasonic sensor

Ultrasonic waves are sounds with frequencies higher than 20 kHz which is not heard by humans. The theory is based on measuring the pulse reflection time. The ultrasonic transducer transmits wave pulse and receives a reflection signal called echoes as shown in Figure. When the transmitted wave pulse detects an object, the reflected wave echo wave, is bounced back to the transducer.



Ultrasonic sensor

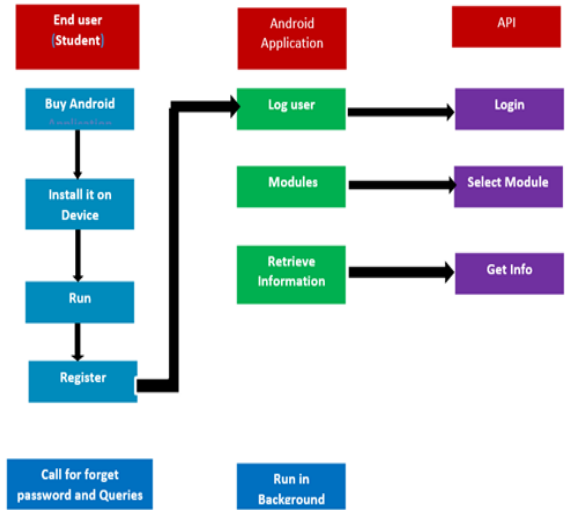
v. Tilt sensor

The tilt sensor is a component that can detect the tilting of an object. However it is only the equivalent to a pushbutton activated through a different physical mechanism. This type of sensor is the environmental-friendly version of a mercury-switch. It contains a metallic ball inside that will commute the two pins of the device from on to off and vice versa if the sensor reaches a certain angle.



Tilt Sensor

VI. SYSTEM DESIGN



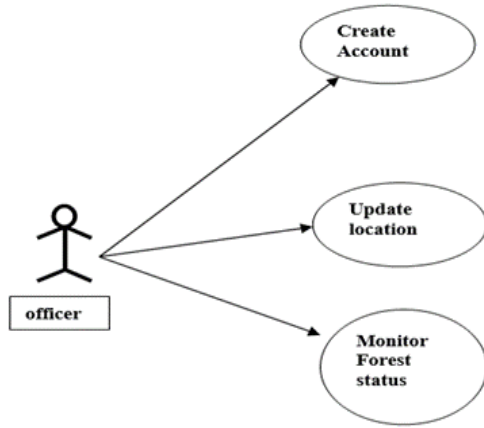
The main idea is to design a portable wireless sensor node which will be a part of a Wireless Sensor Network. This system will consist of two modules one involving sensors and controller module which will be at tree spot another one is android phone. This is an IOT based project, in case of tilt sensor and the buzzer turns on when tree bends and for temperature sensor water pump is turned on in case of forest fire through relay switch. Vibration sensors, tilt sensors are used to detect valuable trees which are stealing by smugglers or if any tree has been fall down accidentally, an alert will be sent automatically through buzzers. The details are stored as data and this data can be viewed at any time. Since the system is designed to implement in the forest it is not possible to provide power supply through transmission line an external power supply is provided:

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 while cutting out the tree is additionally detected). Information produced from these sensors is consistently checked.
3. UML (Unified Modelling Language):

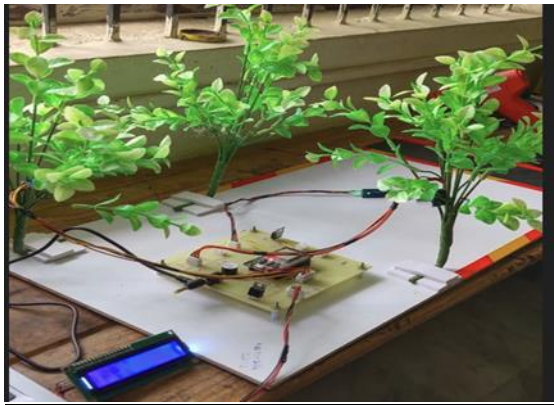
i. Algorithm

- Forest offer have to login into account to get information of forest trees.
- If smuggler try to cut tree the mems and ultrasonic sensor send signal to offer application.

- If smuggler try to apply the fire to tree the fire sensor send signal to offer application.



VII. MODEL



VIII. RESULTS

i. Result Analysis

Case i.

Function: To detect Tilt Angle threshold.

Purpose: To detect if the tree has fallen. Preconditions: The tree should be fallen.

Inputs: Readings from the tilt sensor. Expected Outputs: The notification should come to the Blynk application.

Postconditions: Fall has been detected.

Case ii.

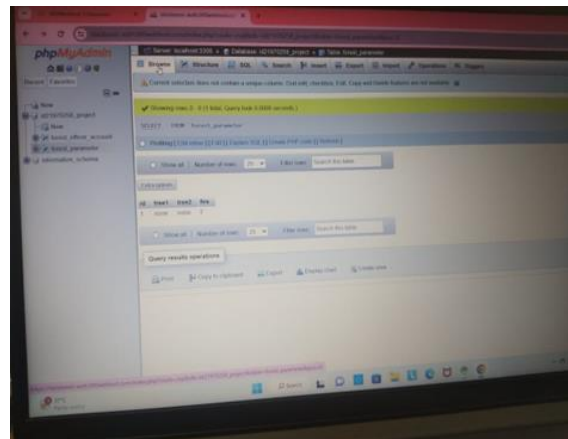
Function: To detect Temperature value threshold.

Purpose: To detect if the forest is on fire. Preconditions: The temperature should be more than the threshold value.

Inputs: Readings from temperature sensor. Expected Outputs: The notification should come to the Blynk application.

Postconditions: Forest fire has been detected.

ii. Result Snapshots



IX. FUTURE SCOPE

Basic idea of our application is to provide ease to software project management. Our application works on Android, a phone that adds the mobility feature. The application acts as a rich tool for sending predetermined message to the registered contacts including a call for any help. The user can access the data from anywhere anytime through the mobile phone. It can also estimate the cost of the project. It provides the facility to analyse and control the execution of project. Alerts are automatically sent to the users for the update in data. In future more functionality can be added to make this application more robust and more feature rich. With the advent of smart phones, this application, when developed to its fullest, would be able for all to use and make their information much more easily access able and comfortable.

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