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Anti-Poaching Detection System For Forests

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Abstract : Trees have been utilised in numerous ways across the world, such as in medications and cosmetic goods, but there are a few valuable trees that contribute a lot of value. Protection of valuable trees around the world has been a failure as poaching has become more rigid. We cannot afford to lose valuable trees, so we propose a system that uses various sensors such as tilt, fire, and vibration sensors to detect damage and communicate via IoT to ensure poaching prevention.

INTRODUCTION:

As we know prevention of poaching and preserving precious trees has been an important task for mankind because forests, our system proposes to use IoT based unit attached to each tree with flame sensor to detect thermal signatures, tilt sensors to study inclination off the tree all the sensors will be connected to Arduino Uno board and other than sensors our system also proposes to use water pump attached to take immediate action on fire accidents, the whole unit will be a part of a large network of nodes in the Blynk server communicate through, so each tree will be capable of detecting fire accidents inclinations and communicate wirelessly and send alerts this will help in the preventions of illegal cutting

RELATED WORKS:

The paper[1] a self-contained IoT infrastructure for forest fire detection and notification Several sensors will be used by the system to identify fire symptoms. After conducting surveys, the sensors will be positioned in appropriate locations. The sensor will be triggered when the ideal locations for installing the sensors have been determined. Sensor data will be relayed to Arduino microcontrollers that will be installed in various locations. The data will then be processed by the microcontroller. At the same moment, the system will send an SMS to a neighbouring fire station using a GSM module, telling them At the same moment, the system will send an SMS to a neighbouring fire station using a GSM module, telling them of the Using the GPS module, the system will also notify the administrator of the fire's position. A variety of sensors will be employed, including temperature sensors, gas sensors, smoke sensors, and flame sensors.

The paper[2] proposes that Wireless sensor networks (WSNs) are one of the fastest-growing wireless network technologies in recent years, according to the author, and they are experiencing increased network traffic. Thousands of small sensor nodes make up wireless sensor networks. The amount of data traffic is growing by 50%. The wireless spectrum is limited, and there is a lot of waste in spectrum resources. With the aid of a technology known as cognitive radio, underutilised frequency bands may be used more efficiently (CR). The phrase "cognitive radio" is derived from the software-defined radio idea.

The paper[3] proposes an implementation of a Forest Monitoring and Alerting System. In this model a sensor node that can be attached to a tree is developed. This sensor node comprises four sensors namely LM393 (Sound Sensor), ADXL345(Accelerometer), DHT11 (Humidity and Temperature Sensor), SW520D (Tilt Sensor), and a controller (NodeMCU) with a Wi-Fi chip ESP8266 (NodeMCU) embedded on it, Using these four sensors ensures that various observations while cutting a tree i.e. chopping sound, a vibration of the trunk, fire, and tilting of the tree, can generate an alarm. The sensors are interfaced with the NodeMCU and all the data from the sensors is collected at the NodeMCU. The NodeMCU then transmits the data to the Raspberry Pi 4 Model B controller at the central station. The Raspberry Pi is placed at the central station due to its high-speed processing and large memory among other benefits. The transmission of data between NodeMCU and Raspberry Pi is done using the MQTT (Message Queue Telemetry Transport) Protocol. This protocol is mostly used for remote area monitoring and provides a guarantee of message delivery. It is also an easily scalable and cost-efficient method. MQTT also ensures security by checking and rechecking the authorization of thesubscribers and publishers.

Once the data is processed if any abnormal values are identified from the sensors, then an alert needs to be sent to

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1. In [8] the final alerting message is displayed on an LCD screen. Alarm through SMS messages using a GSM system is preferred in work [3]. In [2] a webpage is used to display the information regarding the total tree count of the
2 . The proposed model in this paper alerts via E-mail
that is sent to the concerned mail ids. An alarm is also generated if the node or a particular sensor stops working. In addition to this, a webpage has been created to view and analyze the values at the nodes.

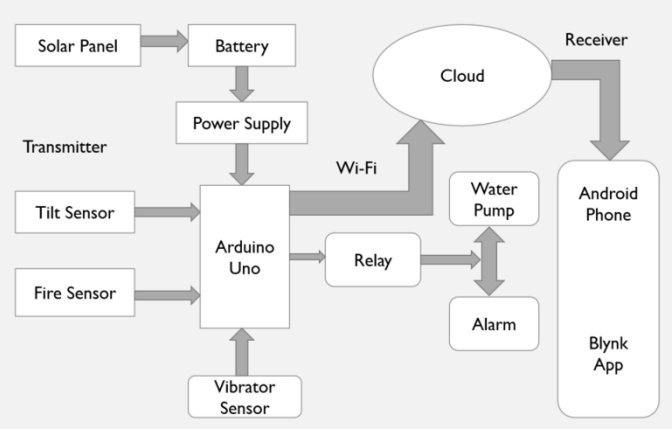
OBJECTIVES:

- To detect illegal poaching of tree
- To detect fire accidents of tree
- To detect location of the tree in case of emergency
- To build a rigid unit to protect from regular damage

METHODOLOGY:

This proposal to use, we have developed an IoT-based solution to protect trees from poaching and major accidents such as fire. Every tree will be equipped with a unit consisting of tilt, flame sensors to detect inclination and thermal signatures, a solar panel for electricity, and a battery to ensure consistency. All sensors and devices will be connected to an Arduino UNO board and programmed according to the specifications.

Block Diagram



1. **Power Supply:** This System will contain a solar panel for the power supply but in case of emergency it has an additional battery for continuous power supply
2. **Sensors:** The system proposes to use a tilt sensor to detect the tree's inclination; this sensor will be set to a certain threshold and will send an analog signal if the threshold is exceeded; a fire sensor to detect unusual thermal activities around the tree; this sensor detects fire accidents and sends a digital signal to the Arduino Uno board; and a vibrator sensor to detect abnormal vibrations around the tree.
3. **Aurdino Uno Programming:** The Arduino Uno receives the input from the sensors and the threshold for the sensors will be set accordingly the board will be connected to the relay switch to choose between sending an alarm or activating the water pump whenever the signals are from tilt and vibration sensor the relay switch chooses to activate the alarm else it activates the water pump to protect from fire accidents
4. **Blynk Server:** The blynk app will continuously upload to the server cloud in real-time the data can be accessed remotely from a device as its cloud-based system

All the above-mentioned components will be part of single set Multiple sets of nodes will be part of the network and each node communicate to the cloud in real-time

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