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Lora Based Tree Poaching Detector using Arduino

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Abstract: ***These days there are numerous occurrences about pirating of trees like sandal, pinewood and so forth. These trees are in all respects exorbitant. They are utilized in the restorative sciences, beauty care products. To confine their sneaking and to spare timberlands around the world some preventive estimates should be conveyed. We have built up a framework which can be utilized to confine pirating. The structure framework utilizes three sensors PIR motion detector sensor, sound detection sensor, vibration sensor module. information created from these sensors is constantly checked with the guide of LCD 16*2 Alphanumeric display. Through GPS the location of the tree will be tracked easily. As for the sensors, their yield gadgets are actuated through transfer switch. For PIR sensor and sound sensor, a signal is enacted and for temperature sensor a water siphon is actuated. For PIR sensor and sound sensor, a signal is enacted and for temperaturesensor a water siphon is actuated. For further implementation we are using LoRa wan Wi-Fi module that covers around 10km to 15km for wide range of communication to receiver moduleand we can also use satellite communication (satcom) for longer range of communication. At present we are using a Wi-Fi module in our project.***

I. INTRODUCTION

In today's life the value of trees is very important, and the atmosphere is present because of trees. Valuable oxygen is obtained because of trees so the protection of trees is very important in our life. So, the project is introduced on, "WSN Based prevention of treesextinction and wildlife." For that there will be two systems, one is Master & other is Slave. Master is to transmit.

The present force of trees at present one force sensor is used between trees,because in jungle all trees are very near even one tree get cuter any other force exerted on tree will effect on other side trees. In the forest, rain is high so slave circuit is used which will receive the force & location signals. It consists of a transmitter and receiver unit. Every tree will be equipped with one small electronics unit which consists of a Micro Controller,3 Sensors and LoRa module. There will be one sub server unit for Particular area of jungle. The data of different tree units can be collected by this unit. The sub server unit will send the data to the main server using LoRa.

This project notifies when the trees are being logged and attacked by humans. Today internet application development demand is very high. So IoT is a major technologyby which we can produce various useful internet applications. Project aims to help in the monitoring of trees. A huge spread of forest is getting destroyed often because of illegal cutting of trees. A system will be deployed to detect the tree cutting and to prevent illegal smuggling of trees. It is critical to have a system to monitor the cutting of trees and report it to the forest officers immediately. Therefore, the project is implemented to monitor the trees.

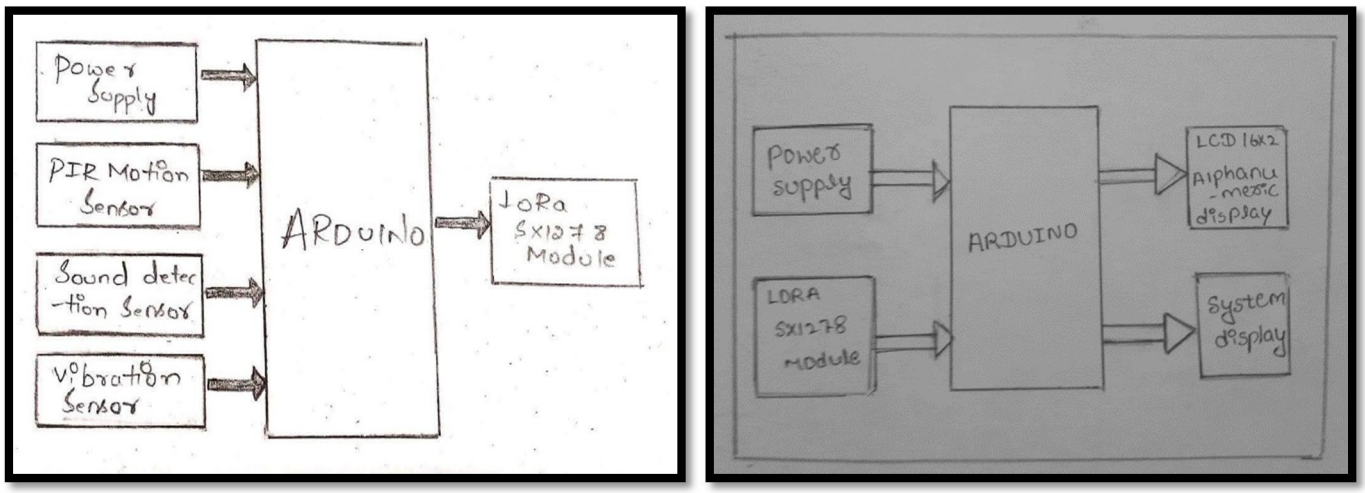


Fig: block diagram of Transmitter and Receiver module

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II. WORKING PRINCIPLE

Every one of the sensors and the controller will be set up at the tree. At the point when tree logging happens, the sound created due to cutting out the tree is detected by the sound sensor. Arduino through the hand-off switch enacts the ringer advising the security work force. Additionally, if the tree twists past the limit edge, the ringer is actuated. If there should be an occurrence of backwoods fires, when the temperature of the surroundingsbuilds it's detected by the temperature sensor, through the handoff switch the water siphon is turned on.

At the point when the temperature goes down underneath the set esteem, the water siphon quits working. If there is any motion like cutting of trees for various purposes and the vibration caused due tocutting of trees, then it is detected by using PIR motion and vibration sensor.

The information produced by every one of the sensors is constantly transmitted to the cloud which in our task is the Lora Module as a server or Wi-fi. Each motion detected by sensors is displayed on the LCD display. If all the sensors are detected,then the buzzer will start ringing its alarm to protect the trees. It thus sends most of the information to Lora Application, by which at the workplace backwoods authorities know the status of the trees and their condition. Programming is done for reading the sensor values and displaying the alert messages on LCD and send the same to Lora module.

III. SYSTEM DESCRIPTION

1) *Arduino Microcontroller:* The Arduino microcontroller is used to sense the signals and provides the same signals to the transmitter lora and then the transmitter signals are received by receiver lora which intern gives an alert message to the user.
2) *PIR Motion Sensor:* This sensor is used to detect any motion on particular tree or surroundings and gives the signals to the lora module.
3) *Vibration Sensor:* if there is any vibration of weapons used for cutting trees then such vibrations are detected by vibration sensor.
4) *Sound Sensor:* This sensor is used to detect the heavy sound of cutting a tree.
5) *Lora Module:* LoRa is a wireless technology developed for long-range, low-power, low-bit rate. It is a widespread spectrum which covers maximum area.
6) *LCD 16*2 Display:* liquid crystal display is used to display the alert signals provided by the sensors and lora module.

IV. APPLICATIONS

1) Forest officers will use this system to protect trees and illegal activities.
2) Farmers will use this system to protect sandalwood trees and their expensive crops.

V. CONCLUSION

In this project, it has proven to work to save forest trees or in private farming places such as teak farming, sandalwood farming and it reduces the human guard, always guarding the area for long time. The system involves simple sensors like PIR Motion Sensor, Vibration Sensor, Sound Sensor. These sensors data is sent to Arduino microcontroller. The concept of IOT is implemented to make the monitoring efficient.

The regular updates can be provided to the users through Wi-Fi module (LORA). Then it transmits input signals to the receiver and the alerts can be sent to the users through system display to the authenticated users when suspicious activity is notified. For designing one, there is need to consider so many things just like adjusting present, assigning address pins of Lora Modules, in the receiver section address pin must match with transmitter section. The main motto of this project is to provide cost efficient and reliable monitoring of trees with the help of Lora design and IOT technology. The project has had promising results.

VI. FUTURE SCOPE

Although the design was successful there are improvements that could be made in future adaptations of this project. The future scope of work is implementation of multi-node network and incorporation of buzzer to give the alert signal for users so that we can make systems more effective to acquire data such as human or animal interference.

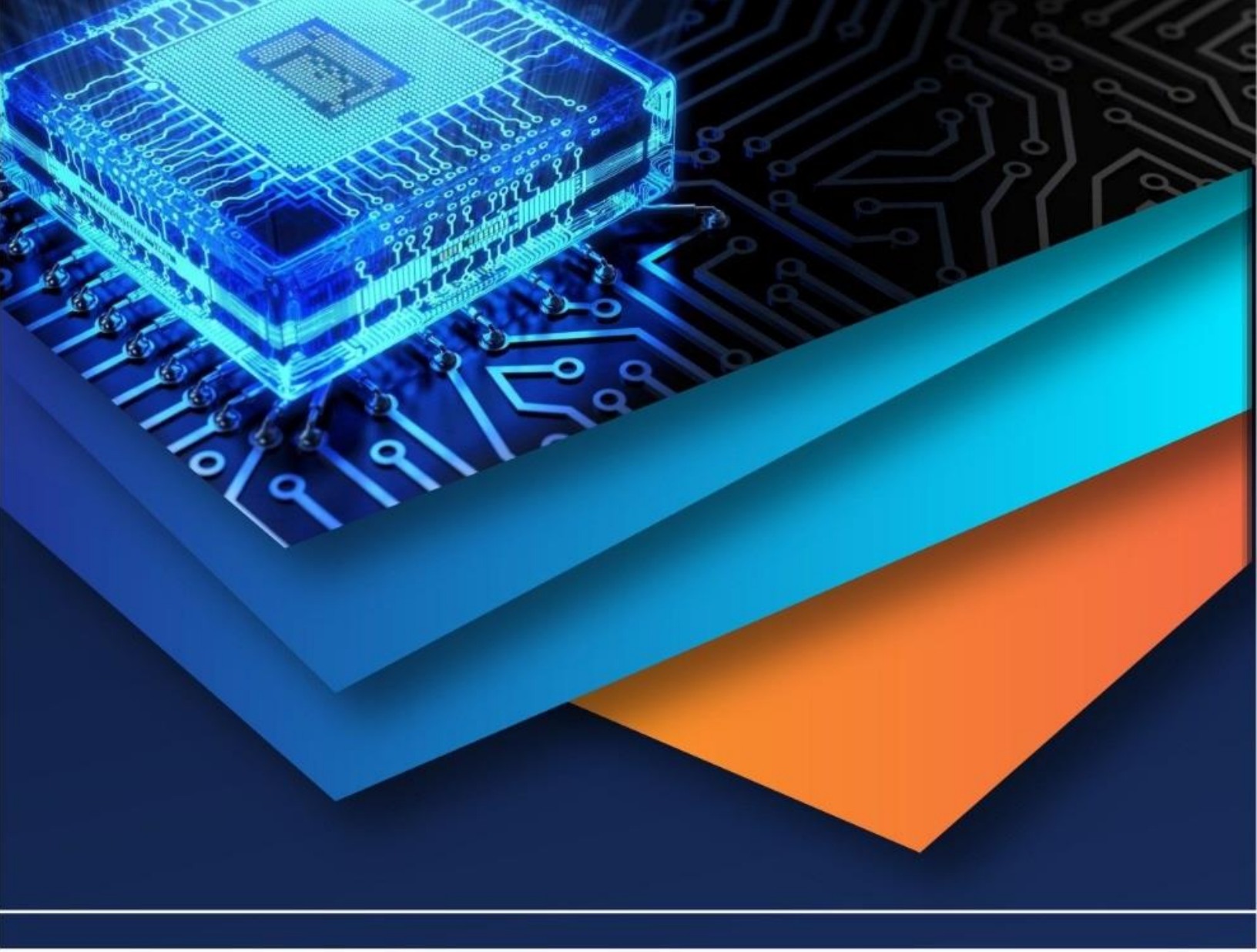
In future we should make the use of batteries for better and effective performance of the system, and if possible, by using improved technologies in future we can try to remove all the frequent errors of the LCD so that all the alert messages can be directly displayed on the LCD screen.

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