MONITORING AND CONTROLLING OF FOREST ENVIRONMENT USING IOT AND WIRELESS SENSOR NETWORKS

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Abstract - *Now-a-days most important tress such as sandal wood. Teak in forest are pirating, leads to serious threat to forest resources, causes significant impact like economic damage and ultimately devasting effect on the environment all over the world. These trees are utilized in medicinal sciences, beautifying agents which make it as expensive and pitiful. So, we need to limit pirating by carrying some preventive estimates. As a part of preventive measures we have built up a framework, ensure limit sneaking. The microcontroller based on anti-poaching system employing WSN technology, which is capable of detecting theft by monitoring the vibrations produced by the cutting of trees/branches. Using a three axis MEMS accelerometer. Info can be uploaded by using microcontroller along with PC. In remote monitoring applications. Widely used technology is WSN.*

*Key Words***: IOT, WSN

1. INTRODUCTION

Over the last few years drastically increased poaching/smuggling of environmentally and economically important species of trees in forested areas – such as sandalwood, teakwood, pine and rosewood. To overcame this issue several initiatives undertaken by different stakeholders and in particularly by Government of India, to mitigate these problems. These include the recruitment, training and deployment of anti-poaching watchers either by put or Government security guards across forests. To eradicating the possible danger, as a part of 12th 5 years 2012-2017 implemented strict punishment for convicted offenders, as well as giving special incentives for anti-poaching activities as a reward/recognition.

The main theme introduced in this paper is to design a portable wireless sensor node which is a part of wireless sensor networks. It helps us to detect theft as well as automatically initiate and send alarm signals if any to remote terminal through wireless media we need to mounted wireless sensors on trunk of each tree.

Forests are one of the key factors for a country economy. It covers approximately around 30% of world's land area. Forests spread in large area where it is dominated by trees and animals. It helps human beings to make huge profit through medical materials, household requirements and other human requirements. Forests not only helps human beings financially but also non-financially, it protect earth from overheating and pollution made by us reduced to the greater extent.

Currently one more issue forest is facing i.e., poaching is not only identified in India, but also China, Australia and African nations are battling with same issue. The Indian sandalwood and trees has turned out to be Uncommon as of late, trying to control its conceivable misfortune, the Indian government is attempting to restrict the exploration of sandalwood.

In order to protect these huge stretches of land and biodiversity. There is an important want to have a immense surveillance and early caution structures for the forest fire whilst in its establishing diploma of spreading shall be managed which will save you its unfold.

2. METHODOLOGY

The monitoring system is done in the nearby area like in forest office or in the nearby fire stations. The details about the system is connected with a computer system in the office which can be monitored by the officer. The additional features that can be added to the system are like measuring the system are like measuring the rainfall in the forest, humidity in the forest, etc. Here the systems are connected in a chain reaction, if there is any problem in one system the damage can be noticed as the reaction breaks.
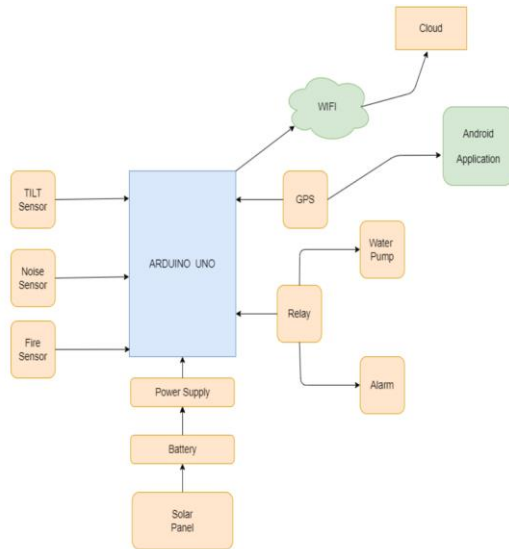
2.1 MODELING AND ANALYSIS

Fig 1: Block Diagram

Figure 1 Shows the connections of the proposal model. Arduino uno module is the processor that is interfaced with tilt sensor, fire sensor, noise sensor, wi-fi module, GPS, relay transfer, power supply connected with a battery and the solar panel is used for source to the battery. At any real-time the tilt sensor senses the angle of tree which has bent. The fire sensor detects while the temperature is high or when the forest is on fire. The noise sensor detects the noise while the threshold frequency increases. The Arduino Uno sends the data to the cloud through wi-fi module. The relay are switches that open and close circuits electronically the relay has a connected to water pump used while the forest on fire and has a buzzer to alert. The GPS will send data to the android utility. The coding for processor is done by using embedded C language. The real time data is sent to the cloud and the user can access the data on android application.

Tilt Sensor: The tilt sensor is a phase which could become aware of the tilting of an editorial. Anyway, it's far simply the akin to a pushbutton actuated through an alternate physical tool. This type of sensor is the ecological inviting shape of a mercury-switch. It consists of a steel ball interior with a purpose to drive the two pins of the gadget from directly to off and the opposite way round if the sensor achieves a selected point.
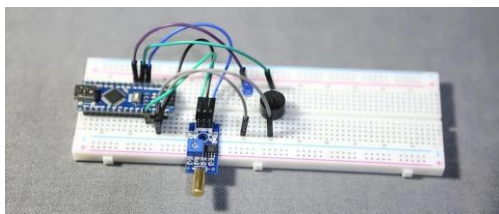

Fig 2:Tilt Sensor

Temperature sensor: Temperature sensors are instruments used to measure the temperature of a medium. There are 2 kinds on temperature sensors: 1) contact sensors and 2) noncontact sensors. Nevertheless, the three critical types are thermometers, restrict temperature locators, and thermocouples. All the 3 of those sensors degree a physical belongings (for example extent of a liquid, modern-day through a twine), which changes as a phase of temperature. Despite the 3trendy kinds of temperature sensors, there are one-of-a-kind different temperature sensors open for use. Temperature sensor used in our endeavor is LM35.It's is an exactness IC temperature sensor with its yield in appreciate to the temperature (in °C). With LM35, the temperature can be assessed extra really than with a thermistor. The operating temperature pass is from -55°C to 150°C.
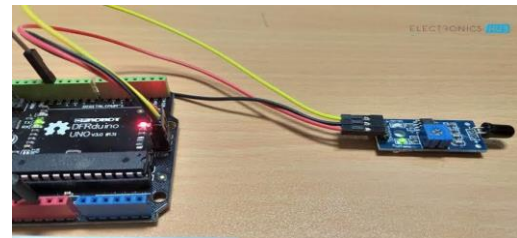

Fig 3: Temperature sensor

Sound sensor: The sound sensor module gives a fundamental approach to understand sound and is commonly used for recognizing sound energy. This module may be used for security, switch, and checking applications. Its precision may be efficaciously adjusted for the convenience of usage. It uses a mouthpiece which materials the dedication to a speaker, top marker and help. Exactly whilst the sensor acknowledges a valid, it shapes a yield banner voltage that is dispatched to a microcontroller then plays important taking care of

Fig 4: Sound Sensor

Relay switch: High voltage electronic devices can be controlled using exchanges. A Relay is a switch which is electrically labored through an electromagnet. The electromagnet gets instituted with a low voltage, for instance 5 volts from a microcontroller and it pulls a touch to talk to the important factor in time a high voltage circuit. A standout among the most desired standpoint is you may do with an Arduino is controlling higher voltage (120-240V) gadgets like enthusiasts, lighting fixtures, heaters, and other circle of relatives unit apparatuses

3. RESULTS AND DISCUSSION

Arduino UNO is the microcontroller connected with and solar panel is used to charge the battery and tilt senor which shows the acceleration in blynk Application when angel varies normal position to bending position. And noise sensor works when sound occurs in forest we will get the notification in blynk application so that we can switch the relay button then buzzer will on. And fire sensor detects when temperature goes on increases then we came to know that forest is on fire then we can switch on water pump. The Arduino uno sends the information to the cloud through wi-fi module. The relay are switches that open and close circuits electronically the relay has connected to water pump used when the forest on fire and it has a alarm which get alert when anything happened in forest. The GPS will send location to the android application which shows longitude and latitude of it so that we can reach to current location.

4. CONCLUSION

Science and technology is panacea for all our growing problems. Predicting the natural processes are highly complex and our system needs to be tested against real time conditions. Though our system is self- sustaining and standalone, other factors which would affect the hardware were tested against time. It shall be implemented in small forest areas where chances of occurrence of forest fires were high. The system needs to be robust to withstand all the climate changes which may affect its functioning. However, our system will play a crucial role in curbing the forest fires which would prevent loss of huge resources and financial losses. We have tested in forest like conditions, but real hardship which we may face is during implementation in large area in real time.

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