Anti-Poaching of Trees and Animal Monitoring

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Abstract: Forests are part of the important and indispensable resources for human survival and social development that protect the balance of the earth ecology. However, because of some uncontrolled anthropogenic activities and abnormal natural conditions, Forest Fires occur frequently. These fires are among the most serious disasters to forest resources and the human environment. The prevention and monitoring of Forest Fires has become a global concern in Forest Fire prevention organizations. Many days we are reading in the newspapers about smuggling of the trees like sandal, etc. 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 Another major problem in forest is monitoring of wild animals. Often wild animals wander into farm lands destroying the crops or into regions where humans reside and pose a threat to mankind.
Keywords: IOT, Forest fire detection, Anti-poaching of trees and Animal monitoring

I. INTRODUCTION

These we talk about IoT and how it is changing our day to day lives. The IoT is creating a new world, a quantifiable and measurable Environment where people can manage their assets in best informed ways, and can make more timely and better informed decisions about what they need or want to do several important issues are affecting the forest environment due to deforestation and natural disasters (for example forest fires, or increased gas emissions).

They are monitored with sensors and the user's accessibility to the collected data is ensured via Wi-Fi and a mobile application that allows the user to receive notifications, whenever fire, movement of animal near boundary or illegal deforestation are detected. This project, addressed to authorities.

Forests are part of the important and indispensable resources because of some uncontrolled activities and abnormal natural conditions, Forest Fires occur frequently, so with temperature sensors we will be able to detect it. Few trees are very costly as well as less available in the world. Lots of incidents are happening of cutting of trees and their smuggling. To restrict such smuggling and to save the forests we are developing such a system which can be used to restrict this smuggling. The animal tracking is the main topic in monitoring animal locomotive behaviour and its interaction with the environment. By tracking the animal movements, it helps human to have a better understanding on living creatures on earth, especially on how the animal interacts with its environment.

II. LITERATURE SURVEY

A. *Animal Monitoring Based on IoT Technologies,2018.*
Luis Nobrega, Andre Tavares, Antonio Cardoso, Pedro Gonçalves. Includes IoT local network to gather data from animals and a cloud platform to autonomously shepherd animals within vineyard areas. Also incorporates machine learning features. Limitations are the platform is scalable only for small amounts of data and requires evaluation in terms of scalability and performance for larger amounts of data.

B. *Forest Fire Detection System Based on a Zigbee Wireless Sensor Network,2015*
Junguo Zhang, Wenbin Li, Ning hang ,Jiangming Kan. This Presents a wireless sensor network paradigm based on ZigBee. Environmental parameters such as temperature and humidity in the forest region is monitored in real time. Limitations are to improve the proposed system problems of energy consumption and nodes location need to be addressed.

C. *An Autonomous IoT Infrastructure for Forest Fire Detection and Alerting System,2017.*
R. Niranjana, Rd. T. HemaLatha. The objective of this work is to design an IoT based device with autonomic features like self-monitoring and self-alerting to detect forest fires. The whole monitoring process is connected to a web page. Limitations is the power of raspberry pi is closer to a mobile device and the memory is limited.

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D. A Practical Animal Detection and Collision Avoidance System using Computer Vision Techniques,2016.

S. Sharma 1, D. Shah The system is trained on more than thousands of images consisting of positive and negative images. Proposed method can alert driver only when the driver speed is up to 35kmph and detect animal up to distance of 20 meters only. Mobile device and the memory are limited.

E. Anti-Smuggling System for Trees in Forest with Solar Power Generation,2017

Sidesway Yadav S 1, Dr. M. MEENAKSHI 2 A smart solar based Module has been devised which operates in a particular area and maintains database of the identified trees. Trees are made smart with sensors embedded in them, forming a sensor network that communicates using GPRS with the server, based on Internet of Things (IoT) concept. The Server uses the latest technology of Amazon Cloud Web Services. The forehand information about the trees, avoids theft and also any other damage to trees can be prevented.

F. Innovative Protection of Valuable Trees from Smuggling using RFID and Sensors,2017

Suguvanam K R, Senthil Kumar R, Partha Sarathy S 3, Karthick K 4, Raj Kumar S . A vibration sensor is used to sense the vibration created during cutting down the tree and continuity sensor is used to check the continuity between neighbouring trees. In existing system, RFID is used to identify the missing tags in the tree. The main feature of this project is to protect these trees from smuggling by using GSM module along with RFID. In addition to GSM we use ZigBee protocol. RFID is used to identify the tag of the tree. GSM sends alert using satellite communication.

III. ARCHITECTURE DIAGRAM

A. Arduino Board

It is an open source electronics platform or a board. It is designed to make electronics more accessible to artist or designers and anyone interested in creating interactive objects or environment. It is programmed in Arduino programming language.

B. Flex Sensor

It is a sensor that measures the amount of deflection or bending. There is a certain threshold value set if the tree bends beyond the threshold value then it is detected.

C. Global Positioning System (GPS)

It is used to track the location of the animal after it crosses the boundary. GPS receiver shows where it is.

D. Radio Frequency Identification (Rfid)

It uses electromagnetic fields to automatically identify and track tags attached to object. Tag contains electronically stored information.

E. Zigbee

It is used as a communication device between the modules. It is low cost, low power consumption and two-way wireless communication.

F. Fire Sensor

It is designed to detect and respond to the presence of flame or fire.

G. Max 232

It is an integrated circuit. It is used to convert to data to binary form.

H. Liquid Crystal Display (LCD)

An LCD is a small low-cost display device used to display the message.

Fig. 1 Architecture of each section

IV. METHODOLOGY

A. Tree Module/ Boundary Module:

In order to detect fire in the forest caused due to forest fire, unattended campfires etc we use a flame sensor which consists only receiver and is used to detect the brownish coloured flames.

For detection of tree cutting, flex sensors are used. They are used to check the amount of bending of trees. There is a certain threshold value set, if the bending crosses this threshold value then the tree is considered to be falling or cutting. These are the sensors that change in resistance depending on the amount of bend in the sensor.

B. Animal Module

In this module, we monitor animals in order keep them from crossing the forest boundary area. There are IR sensors at the boundary. It consists of both transmitters. It is used to detect any object crossing the boundary.

In order to identify the species of an animal RFID tags and readers are used.

Each animal is given a RFID tag with a unique code for each animal. The RFID reader is used in the boundary. Whenever the RFID tag comes in contact with the reader the animal is detected.

C. Server Module

The animal module and the boundary module communicate with the server module by means of ZigBee. When the animal crosses the boundary the location of the animal is tracked using the GPS (Global Positioning System).

The various mishaps happening in the forest that is forest fires, and tree smuggling are intimated to the concerned forest officer using GSM (Global System for Mobile Communication).

V. CONCLUSION

In this project we develop an animal health monitoring system (AHMS) which is capable to the measuring of body temperature, and heart rate and we can also detect animals in boundaries and giving mild shock to animals if incise they cross border , here real time monitoring of animal locations is been done and tree cutting detection using Flex Sensors. Fire Detection and with flame sensors fire can also be detected and intimated. So, we can see that we have used multiple features using portable devices. And as we have both animal and tree sections there are less chances of missing the communication or data.

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