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Automatic Monitoring of Deforestation using Arduino

Aladalli Sharanabasappa[1], Aishwarya Um[2], B Shravani[3], Dharani T[4], Megana Pl[5]
Assistant Professor, Department of Electrical and Electronics Engineering[1]
BE Students, Department of Electrical and Electronics Engineering[2,3,4,5]
Rao Bahadur Y Mahabaleswarappa Engineering College Bellary, Karnataka, India

Abstract: *The manual monitoring of the forest to prevent unauthorized activities is practically difficult job. The three major operations that are essential in monitoring the forest are developed in this work, namely tree cutting detection, fire detection and contaminated water detection using metal sensor, vibration sensor, firesensor and pH sensor respectively. An Arduino Uno is used along with GSM to communicate to central server from remote place. The sensed data from sensors is collected and sent to the authorized person via GSM. In addition, this system uses Wi-Fi router module through which employee and forest officer can communicate with each other in case of network is disabled.*

Keywords: Forest, Monitoring

I. INTRODUCTION

Forest is very important in our life; all the living creatures depend on forest for survival. Trees help the living organisms to breathe by pumping out the oxygen and absorbing the carbon dioxide. Therefore, vegetation is very important for removing the carbon dioxide from the air. But, over the past two decades, poaching and smuggling of tress as increased dramatically. The illegal activities along with the natural fire and the fire due to human being in forest has decreased the total area of forest from 45% to 28.95% on our planet. In order to reduce the deforestation, the system that detects the illegal activities and natural fire at their earlier stage has to be installed and it can be designed using the latest technology with advanced components such as wireless sensor networks. Automatic monitoring is the solution for decreasing the deforestation. This project aims to maintain the forest by preventing the tree cut, fire prevention and detecting pH level of water in forest.

1.1 Objective

- Protection and conservation of flora, fauna, forest and wildlife.
- Protection of the environment in order to promote sustainable development.
- To promote and maintain long term forest.

II. LITERATURE SURVEY

Sr. No.	Paper Name	Author Name	Remarks
1	Wireless sensor based Conservation of illegal Logging of forest trees.	L.K. HEMA, Dr. D. Murugar, R. Mohan Priya.	This system is suitable for large scale forest monitoring from illegal logging. Here the cluster of sensor nodes are used to monitor the cutting of tree.
2	GPS-Arduino based tracking and alarm system for protection of forest. Forest Fire monitoring system.	M. Gor, J. Vora, S. Tanwar, S. Tyagi	Location tracking system of fire accident and illegal logging of trees in the forest.
3	Forest Fire monitoring system.	V. N. Vasyukov, A. Yu. Zait seva	Detection of fire in the forest in order to minimize deforestation.
4	Smart pH sensor.	Pabitra Mohan Khilal, Rajesh Patil	Monitoring the quality of water in forests.

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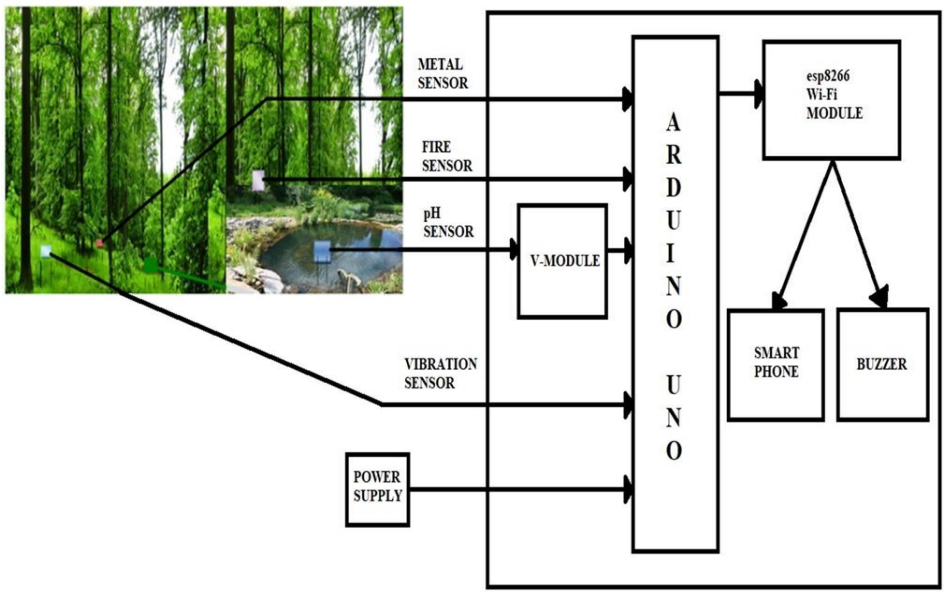
II. BLOCK DIAGRAM



III. COMPONENTS

- Fire sensor: A sensor used to detect the presence of fire which provides early warning notification to forest officer in order to prevent the fire accidents. The fire sensor goes ON when the temperature reaches 50 degree and above. This system can limit the emission of toxic products created by combustion.
- **Vibrator sensor:** Vibrator sensor is used to detect the vibration and send an alerting message to the employee when someone tries to cut the tree in a given particular area of the forest.
- Metal sensor: Metal detector is an electronic device specially used to detect metal objects during logging of forest such as chainsaw, chopping Axe, crosscut saw, pruning saw etc.
- pH sensor: pH sensor is used to determine the quality of water in forest which is very essential for trees and animals. It indicates the contamination of water by the pH meter.
- Arduino Uno: An Arduino consists of analog and digital pins that are input and output ports which processes the data from sensors and sends the alerting message to forest officer and the same will be displayed on LCD (Liquid crystal display).
- GSM and GPS: GSM and GPs are the wireless sensor infrastructures. GSM is used to track the sensed region and the GPS provides the shorter way for the forest officer to reach the sensed region.
- Wi-Fi Router: Wi-fi router is a wireless technology used to send the alerting message to the officer which uses a radio frequency of the range 3GHz-30GHz when there is an network issue.

IV. WORKING

In this project we are going to use a 4 wire less sensors which are placed in the different areas of the forest based on the range of sensitivity. They are fire Sensor, metal Sensor, vibrator Sensor, pH Sensor. If a fire happens by high temperature or by human, fire sensor will detect that fire when the temperature reaches beyond 50°c and send the alerting signal to the Arduino Uno. the program is written in the Arduino in such a way that there are two outputs from the Arduino. One output is given to the LCD module placed in the control room of a forest office which displays the alerting message and the another output is sent as the alerting message to the forest officer smart phone through GSM module so that they can take necessary action immediately. If the network connectivity is disabled the Arduino sense the alerting message to the forest officer through Wi-Fi router. Hence, Wi-Fi router is considered as a backup protection system. the GPS is also provided with a system which tracks the sensed location and the Google map provides the shorter way to reach location. If thief enters to a forest with a tree cut machine the metal sensor detects the metal and send signal to

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the Arduino Uno than it will send tree cut information to the and also it sends same information to GSM module, and it send alerting message to the forest officer and also location tracking system facility also provided to android application. So that they can take necessary action to prevent the tree cut.

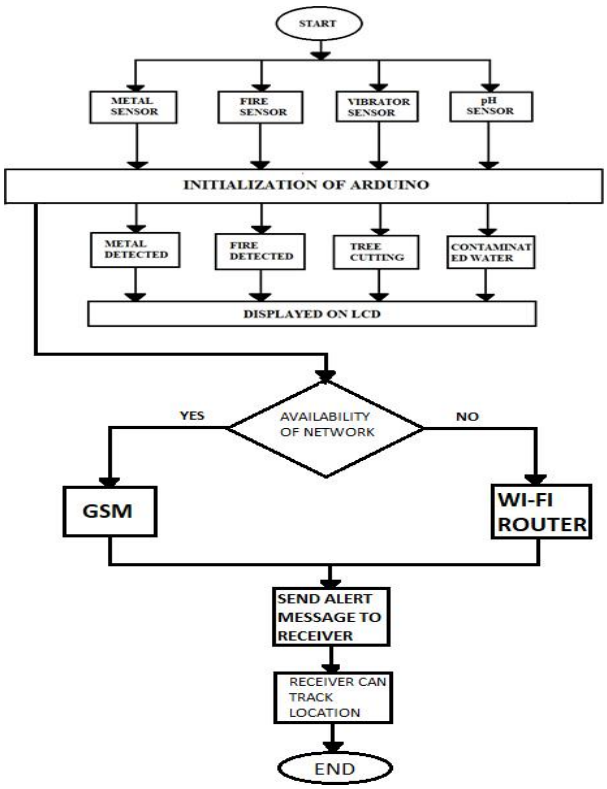

Fig: Flow Chart LCD module which is placed in control room of forest office

The roaming of human in the forest and also moving of heavy vehicles carrying illegal goods then the vibrator sensor will detect that vibration and send signal to the Arduino Uno. The Arduino will send the alerting message to the LCD module which is placed in the control room of a forest office and also alerting message to the forest officer through GSM module and forest officer can take necessary action to control the transport of illegal goods through forest. Here to measure the water quality of the forest we are going to use the Ph sensor if the Ph level is above 8 then it is good for animal, birds and aquatic organisms. If the Ph level is below 8 then the water is contaminated so the Ph sensor will the Ph level and send the signal to the Arduino. The Arduino will send the alerting message to the control room of the forest office and also the same message is sent to the forest officer through GSM module and the location can be tracked by the GPS and google map will show the direction to the forest officer so that he can take necessary action.

4.1 Applications

- Safeguarding of forest.

4.2 Advantages

- Assists smarter control for deforestation.
- Reduces the requirement of man power.
- More reliable than man.
- Time saving and avoids illegal logging.
- Environmental friendly and pollution free.

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4.3 Disadvantages

- Protection of sensor will be an issue.

REFERENCES

[1]. Sakib Abdullah, Sandor Bertalan, Stanislav Masar, Adem Coskun and Izzet Kale "A wireless Sensor Network for Early Forest Fire Detection and monitoring as a Decision Factor in the context of a complex Integrated Emergency Response System" 2017 IEEE.

[2]. https://www.minelab.com/knowledge-base/getting-started/how-metal-detectors-work

[3]. https://www.upkeep.com/maintenance-glossary/vibration-sensor#:~:text=By%20far%20the%20most%20common,to%20produce%20an%20electrical%20signal

[4]. Santoshinee Mohapatra, Pabitra Mohan Khilar" Forest Fire Monitoring and Detection of Faulty Nodes using Wireless Sensor Network"2016 IEEE.

[5]. L.K. HEMA 1,Dr D. MURUGAN, R. MohanPriya "Wireless Sensor Network based Conservation of Illegal logging of Forest Trees" 20 14 IEEE.