COPY RIGHT

Title: **FOREST MONITORING USING WIRELESS SENSOR NETWORK**

Paper Authors

PUSHPA M J, SANJAY R, DIVAKAR REDDY B, RAKESH L, GANESH MANAY V

RajaRajeswari College of Engineering

USE THIS BARCODE TO ACCESS YOUR ONLINE PAPER

To Secure Your Paper As Per UGC Guidelines We Are Providing A Electronic Bar Code

FOREST MONITORING USING WIRELESS SENSOR NETWORK

[1]PUSHPA M J,[2]SANJAY R,[3]DIVAKAR REDDY B,[4]RAKESH L,[5]GANESH MANAY V

[1]Assistant professor, Dept. of Electronics & Communication Engg., Rajarajeshwari College of Engg., Bangalore.

[2,3,4,5] VIII Sem, BE, Dept. of Electronics & Communication Engg.,Rajarajeshwari College of Engg., Bangalore.

ABSTRACT

Human life is always under threat for one's who travel near forest areas, spotting wild animals approaching towards the region where humans reside is done by night watch since installation of electric fencing is not covered in few regions. Itisimportanttosafeguardthe lifeofhumanby detectingthe presence ofanimalandtakenecessary actionstosafeguard humanlife. Itisalsoequallyimportanttosave life ofanimals from fire accidents occurring in forest regions naturally or by human errors and also hunting is a major threat to animal's also illegal deforestation is matter of concern, so inordertoovercomethe above situations a solution must be developed by technology.This articleinvolvesthe useofimage processing concept to detect thepresenceof humans at boundaries of restricted area. Cutting of trees can be detected by installing sensors on trees and also a region will be covered by smoke sensors to detect the fire accidents occurring at the particular region of forest. Travelers safety device is developed and given to people on check post who are entering the forest areas where mobile phone signals do not cover the area and communication is not possible but via safety device an emergency alert can be triggered during rescue situation to the control room, the safety device can also be used during trekking to locate in which part of forest the traveler is travelling.

KEYWORDS Safety Device, Wireless Module.

1. INTRODUCTION

Rapid growth in technology during years has made a remarkable changes in life style but we are lagging in conserving our forest from fire, hunting and cutting of trees, these information cannot communicate properly to the forest officer. In most of the places till date the wild animals are spotted by the night watch and the area is given alert by humans themselves so a technological solution is too developed to monitor the boundaries of restricted area and provide alert.Also highway route connecting between many places go through the reserved forest area where safety is nil and also mobile phone communication is not possible due to low signal coverage and in most places wild animals enter on the highways and create life threatening situation to the travelers. Most of the time travelers are lost in dense forest during trekking and fail to locate their rooton map hence a safety device is developed to help the travelers in all the aspects in forest area [2].It is also an responsibility of human to conserve the forest and protect the animals from illegal

International Journal for Innovative Engineering and Management Research
A Peer Reviewed Open Access International Journal
www.ijiemr.org

activities like deforestation and hunting animals, also protect the nature from fire accidents occurring naturally or by human errors, to overcome such situation fire and smoke sensor are installed and safety device is used to notify any illegal activities noticed by traveler during journey. Forests can be saved from fire and high temperature [1].Cutting of trees in the forest can be avoided by using image processing camera, where unauthorized person entering the forest can be identified [3].

All the above activities are under coverage of control room unit so that they will provide necessary security and facility on time.

2. RELATED WORK

M. Gor et.al [1] proposed a wireless communication-based smoke detection system design for forest fire monitoring. This concept is used for detecting the fire in the forest by using MQ-2 smoke sensor which has sensing range of 300ppm to 10,000 ppm is suitable for leak detection.

Tseng-Yi et.al [2] proposed an efficient routing algorithm to optimize the lifetime of sensor Network Using Wireless.This method is used for safety device (handheld device), where this is given to Travelling people and Trekking people where they can identify the particular zone (routing in forest) in which they are travelling and also they can send emergency message through Wireless.

Latha et.al [3]Unmanned aerial vehicle based forest fire monitoring and detection using image processing technique. This concept is used for detecting the unauthorized person entering into the forest through image processing technique and

information can send to the control room. The image processing camera is placed at forest boundaries to detect the person entering into the forest

3. PROPOSED METHOD

The basic idea of the proposed techniqueis:

Boundary monitoring system:

Boundaries of restricted area is monitored throughimage processing concept. Detection of human is implemented via image processing by analyzing the captured images from the camera which is installed on the boundaries, any trespass found during monitoring process an alert is triggered to the control room to take necessary action.
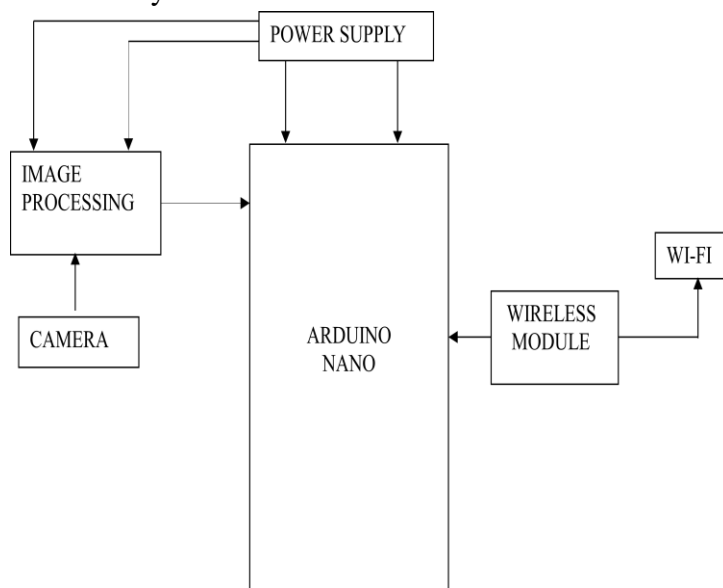

Fig 3.1: Intruder alert

The Fig 3.1 is the Intruder alert Block Diagram where it contains Power supply, Image processing camera, Arduino Nano Microcontroller, Wireless module.This module is installed at the boundaries of the forest. Basically 5V power supply is given to the Arduino Nano Microcontroller through Solar Panel, and to identify the

unauthorized person entering into the forest Image processing Camera is used.And when the camera captures the person entering into the forest, this information can be sent to control Room through Wireless Module.

Fire detection unit, Tree cutting detection unit:

Forest is virtually divided into various zones and installation of fire and smoke sensors are done. Continuous monitor of smoke and fire parameters is conducted and if any of the parameter is triggered then an alert is sent to the control room unit to send a fire and emergency services to that particular zone for rescue.

Deforestation being a major issue, so to monitor tree fall an accelerometer or tilt sensor is installed on trees so that tree cutting can be monitored.

Fire in the forest can be detected by MQ-2 smoke sensor and an alert can be triggered to the control room unit.

Fig 3.2 shows the Tree protection System Block Diagram where it contains Sensors (Smoke, Temperature, and Accelerometer), Arduino Nano Microcontroller, Power Supply, Wireless Module and Wi-Fi.This Module is installed in Zones, and can detect the fire using smoke sensor, Trees falling using Accelerometer sensor.And this information can send to the Control Room through Wireless Module .So, immediate action can take to avoid Deforestation.

Traveler's safety device:

In many parts of forest mobile phone communication is not possible due to low signal coverage, travelers might have high risk of life threat when no communication is possible when they needs help. So to overcome this problem a travelers safety device is developed and is handed to the traveler at the entrance check post of the forest so that under any life threat situation encountered, one can press the button and alert the control room for help.

The device can also be used to notify the control room by pressing button if any illegal activity likes tree cutting or hunting etc., being noticed by the traveler on his journey. Also the device has a trekking mode to help the traveler locate himself on which zone of forest he is traveling in.
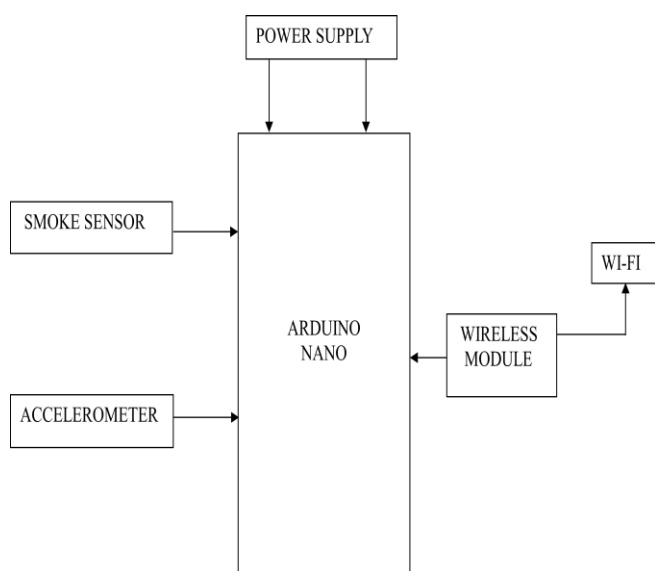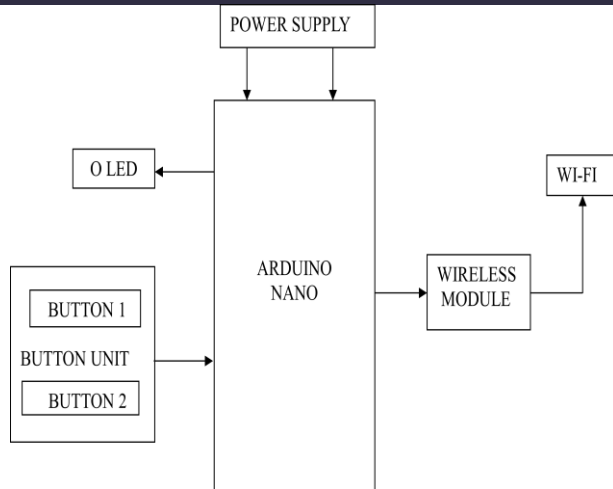

Fig 3.2: Tree protection System

International Journal for Innovative Engineering and Management Research
A Peer Reviewed Open Access International Journal
www.ijiemr.org

BUTTON 1 – Emergency Alert
BUTTON 2 – Illegal Activity
Fig 3.3: Safety Device unit

Fig 3.3 is the Safety Device (Handheld Device) unit. Where it consist of Power supply, Arduino Nano microcontroller, Remote switch (two button), O LED.

This unit is given to the People who Travel nearby forest region and Trekking people for their safety. OLED is used to display particular zone in which they are travelling. And if they need an Emergency they can press Button 1 and Button 2 is used to inform the illegal activity message. This information can send to Control Room through Wireless Module.
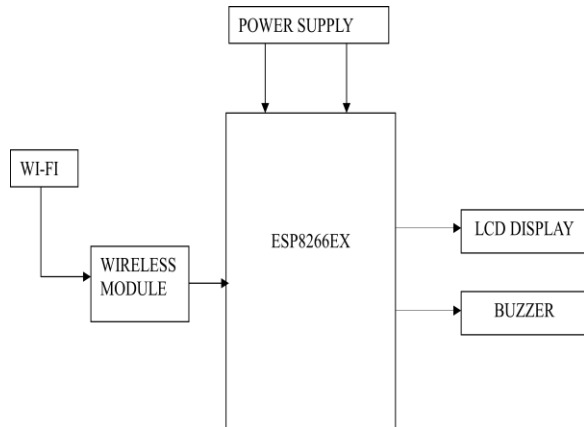
Control Room:

Fig 3.4: Control Station unit

Fig 3.4 shows the Control Room Block Diagram where it contains ESP8266EX, Power Supply, Wireless Module and Wi-Fi, LCD Display, Buzzer.Where ESP8266EX operates as Wi-Fi as well as Controller in 3.3V. Information send through the Intruder alert, Tree protection system and safety device can display in LCD and can inform through Buzzer with the help of Wireless Module.

Flow Chart:
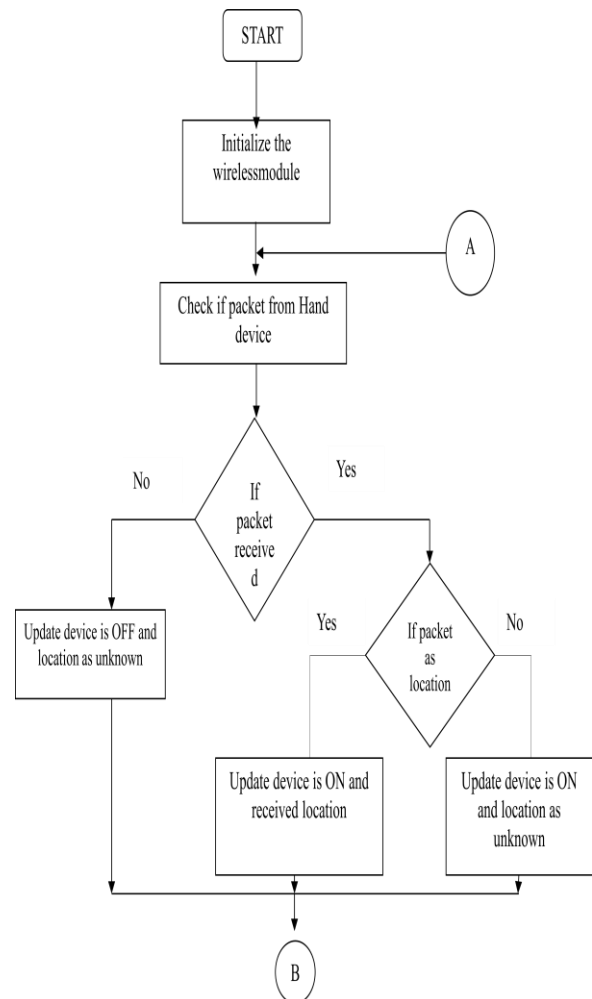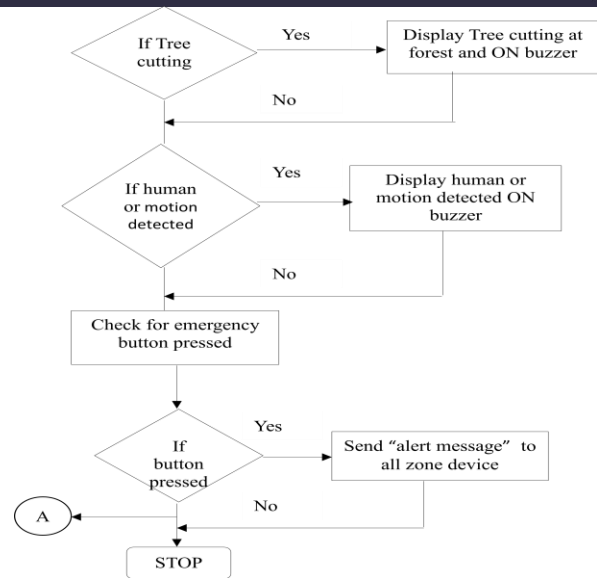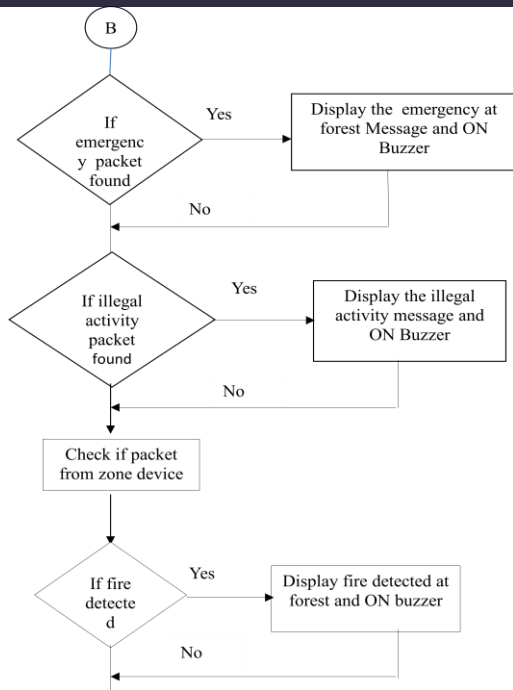
4. RESULT

This Project is successfully conducted and performed by:

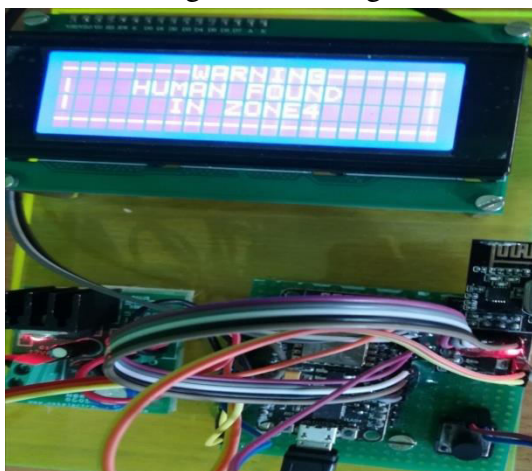> ➢ Detecting unauthorized person entering to Forest Regions.

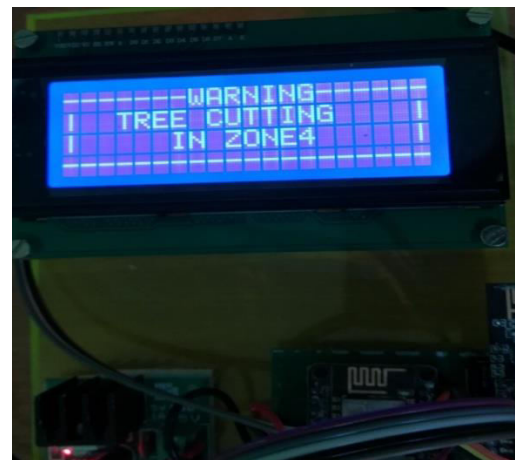Fig 4.1: Displayed Human Found in Zone 4

> ➢ Cutting of trees in a particular zone can be detected.

Fig 4.2: Displayed Tree Cutting in Zone

> ➢ We can also avoid catching fire in forest.

International Journal for Innovative Engineering and Management Research
A Peer Reviewed Open Access International Journal
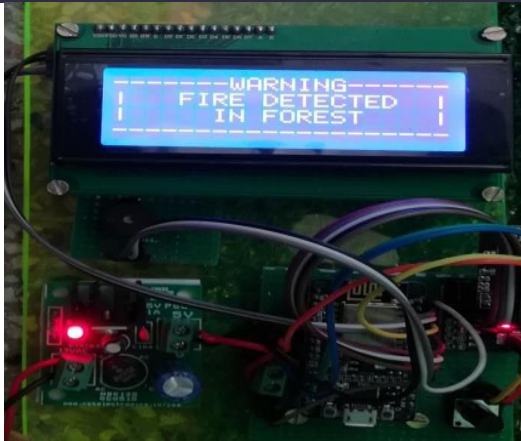www.ijiemr.org

Fig 4.3: Displayed Fire Detected in Forest

> Trekking peoples can identify forest zone and also travelling people safety.
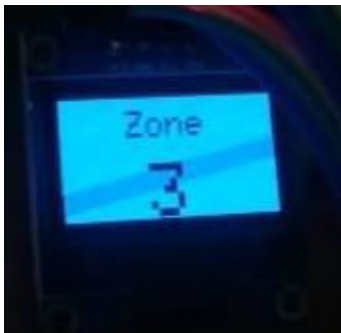

Fig 4.4: Displayed Zone 3

> Monitoring by Control Room

Fig 4.5: Control Room Display

> Message send through Safety device to control room

Fig 4.6: Emergency alert message

Fig 4.7:Illegal activity message

5. CONCLUSION:

Many forests catches fire due to high temperature and human errors, by use of this paper, cutting of trees and catching of fire can be detected in forest by using sensors and we can save animals, trees. People can gotrekking with more safety and can identify in which zone they are travelling. Peoples can visit to the natural park with safety remote and also for traveler's safetynearby forest.Image processing concept can develop to avoid illegal activity in forest and can take necessary action who trying to do illegal activity.

6. REFERENCES:

[1] "Wireless communication-based smoke detection system design for forest fire monitoring". M. Gor ; J. Vora ; S. Tanwar ; S. Tyagi ; N. Kumar ; M. S. Obaidat ; B. Sadoun 2017, IEEE.

[2] "An Efficiency Routing Algorithum to Optimize the Lifetime of Sensor Network Using Wireless". RaminNaghdi,Razieh, 2010, IEEE,

[3] "Unmanned aerial vehicle based forest fire monitoring and detection using image processing technique". Prof.LatheVenkatesan,S.OmarFarooq, J.FaisalImraan,K.JeganKumar,J.NaveenKumar,2017,IEEE.

[4] "Fault-tolerant cooperative control of multiple UAVs for forest fire detection and tracking mission" ,u'DavidAkopian, u'Daniel J. Pack, IEEE Transactions on Instrumentation and Measurement, 2018

[5] "Integrated Foreground Segmentation and Boundary Matting for Live Videos". Minglun Gong,Member, IEEE, YimingQian and Li Cheng, 2015, IEEE

[6] "Trajectory visualization by using Global Positioning Systems (GPS)" ,R.A. Curtis ; D.L. Evans ; J.G. Rathmell ; R.J. Rose IEEE SoutheastCon, 2005.

[7] Animal Detection Using Thermal Images and Its Required Observation Conditions Yu Oishi ,HiroyukiOguma , Ayako Tamura , Ryosuke Nakamura and Tsuneo Matsunaga ,2018.

[8] "Study of porous silicon gas sensor" ,u'P. G. Wan,u'author_order': 6, u'full_name': u'H. Wong, Proceedings 2016 IEEE.

[9] Kaplan A. M., Haenlein M. Users of the world, unite! The challenges and opportunities of social media [J]. Business Horizons, 2010, 53(1): 59-68.