

# Anti-Smuggling Alarm systems for Trees in Forest

Pruthviraj P Patil  
Dept. of ECE,AIeMS Bangalore

Manoj Kumar s  
Dept. of ECE,AIeMS Bangalore

Sahana H N  
Dept. of ECE,AIeMS Bangalore

Geetha B  
Dept. of Electronics and Communication Engineering  
Amruta Institute of Engineering and Management Sciences  
Bidadi, Karnataka, India

**Abstract**— The proposed system is all about smuggling of the trees like sandal, red sandal, “Sag wan” essential medicinal. These trees are very costly as well as less available in the world. These are use in the medical sciences as well as cosmetics and medicines. 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.

**Keywords**—smuggling; microprocesser; sensor; Arduino; insert (key words)

## 1. INTRODUCTION

The system is developed which can be used to restrict this rustling which would in turn stop deforestation and maintain the Environmental balance which would help to solve one of the issues with the Global Warming. The system consists of tree unit with three sensors, and this unit is fixed to tree, The Tree unit would be the primary unit for the implementation of the system. This unit would consist of three technologies to protect the tree from getting Cut Down, Damage with fire, etc.

The goal of this paper is to develop the system that alarm the smuggling of most valuable trees such as sandal, red sandal, sag wan and other expensive medicinal plants. The proposed system employs techniques to protect the tree from getting Cut Down; Damage with fire, etc. this system transmits the location information to higher authorities to take immediate actions in case of smuggling and fire catch.

## II. LITERATURE SURVEY

International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 3, Issue 9, September 2014 Anti-Smuggling System for Trees in Forest using Sensors and at mega pu 328 controller. The proposed system is about smuggling of the trees like sandal, “Sagwan” etc.

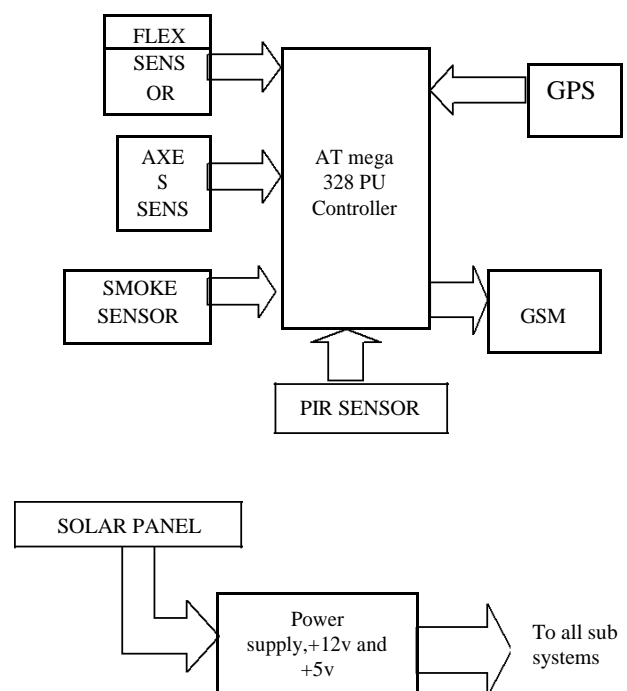
These trees are very costly as well as less available in the world. These are use in the medical sciences as well as cosmetics. Because of huge amount of money involved in selling of

such tree woods lots of incidents are happening of cutting of trees and their smuggling. To restrict 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.

Since the forest is considered as one of the most important and indispensable resources, the prevention and detection of the forest fire, have been researched hotly in worldwide forest fire prevention departments. Based on the deficiencies of conventional forest fire detection on real time and monitoring accuracy, the wireless sensor network technique for forest fire detection was introduced, together with satellite monitoring, aerial patrolling and manual watching, an Omni-bearing and stereoscopic air and ground forest-fire detection pattern was found so that the decision for fire-extinguishing or fire prevention can be made rightly and real-timely by related government departments. A cluster-based wireless sensor network paradigm for forest fire real-time detection was put forward in this paper. Some key questions were discussed emphatically, such as the ad hoc network related technology, the node hardware designing, the forest-fire forecasting model and the propagation characteristic of UHF wireless signal and so on.

## III. METHODOLOGY

### 2.1 Block diagram



DESCRIPTION OF THE BLOCKS

At mega 328 PU controller



Mega 328 PU Controller

Arduino which has at mega is a core of this system. It will accept signal from various sensor which are attached to it and controls the operation of the system according to the software. It is also used to interface the components like sensors, GSM, GPS etc. to the kit

Applications

Today the ATmega328 is commonly used in many projects and autonomous systems where a simple, low-powered, low-cost micro-controller is needed. Perhaps the most common implementation of this chip is on the popular Arduino development platform, namely the Arduino Uno and Arduino Nano models.

A. Flex sensor



Fig A Flex Sensor Bending Movement

The flex sensor is fixed to the trunk of the tree it is used to detect the bending of a tree due to natural tree fall. The output is Analog which is proportional to the tree bend. . The output is connected to pinno.3 of ADC.Flex sensor are passive resistive devices that can be used to detect bending or flexing .The flex sensor shown in this article is a bidirectional flex sensor. A simple flex sensor 4.5" in length. Fig 2.3 indicate the flex sensor. As the sensor is flexed, the resistance across the sensor increases

B. Accelerometer sensor

It is used to detect the vibration due to tree cutting and it is also called triple axis motion sensor. We use two axis, X-axis and Y-axis. When it detect vibration the output will be changing. The output is analog and is given to 0, 1, and2 pins of ADC.It works with 3.3volts

C. Smoke sensor

This is used to detect the smoke due to fire catch in forest. It is digital sensor and the input is given to pin no.4 of ADC and the output is digital output i.e. (either 1 or 0) is seen using on board LED.

D .PIR Sensor

This is used to detect the motion of animal or human in the forest. This is interfaced with Arduino pin no.6.the output is the digital output (i.e. 1 or 0) if there is movement of animal or human then output is1 otherwise 0. The movement is indicated by LED connected to the pin no.8 of ADC.

E .GPS

It is used to collect the location information such as latitude, longitude of the particular location of the system. It is connected to the pin no.2 which acts as Rx pin and pin no.3 which acts as Tx pin.it sends the location information to the Arduino.

F .GSM

The GSM collects the information from Arduino and transmit the location information through the link to the concerned authority via RF link. It is interfaced to the board using pin no.0 and pin no.1.

G. Solar Panel

Since this is a standalone unit & runs with battery this may get discharged over a period, so it is required to charge battery for efficient operation of a system. Energy harvesting essential, solar panel is used for energy harvest

H. Power Supply

The power supply consist of Battery unit in which 4v batteries are connected in series to construct 8v power supply. To convert 8v to 5v LM317 voltage regulator has been used.

Working Principle

Functional block diagram

We are developing such a system which can be used to restrict this smuggling. Every tree will be equipped with one small electronics unit which consists of atmega 328 pu controller,



Flex Sensor and GSM and GPS module. Tree cutting will be detected by flex sensors. At server unit cutting trees will be shown in VB front end. Communication between the trees and server will be done by GSM and GPS modules. This works based on WSN (wireless sensor node) Technology. The kit is fixed to the tree and continuously monitor the output signal from the sensors. In case of human or animal moment PIR sensor will detect the moment and send the location information to the authorised person and LED will glow. The flex sensor has threshold value minimum of 700 and maximum of 860. If the tree bend beyond this values then fallen tree is detected and the location information is send to the authorised person. The accelerometer sensor has threshold value minimum of 315 and maximum of 325. if the if the tree vibrate beyond this values then vibration of the tree is detected along X and Y axis and the location information is send to the authorised person. If the forest catches the fire then the sensor will sense the smoke and output of the sensor will be high in case of fire and the location of information is send to authorised person.

- A. Hardware and Software Components
- Used Hardware Components ATmega328
- PU controller
- GSM SIM300/900
- GPS
- Flex/strain Sensor
- Accelerometer sensor/Tilt sensor
- Temperature sensor
- Android mobile phone. 12v, 1.2 amps
- batteries Voltage regulators 7805, 7812
- Diodes 1N4007.
- Software Components
- Operating system: Windows 7/8
- Software tool: Arduino IDE 1.6 version
- Programing language: C programming.

**HARDWARE DESCRIPTION**

At mega 328 Pu Controller:  
The Atmega328 is a very popular microcontroller chip produced by Atmel. It is an 8-bit microcontroller that has 32K

of flash memory, 1K of EEPROM, and 2K of internal SRAM. The Atmega328 is one of the microcontroller chips that are used with the popular Arduino Duemilanove boards. The Arduino Duemilanove board comes with either 1 of 2 microcontroller chips, the Atmega168 or the Atmega328. Of these 2, the Atmega328 is the upgraded, more advanced chip. Unlike the Atmega168 which has 16K of flash program memory and 512 bytes of internal SRAM, the Atmega328 has 32K of flash program memory and 2K of Internal SRAM. The Atmega328 has 28 pins.

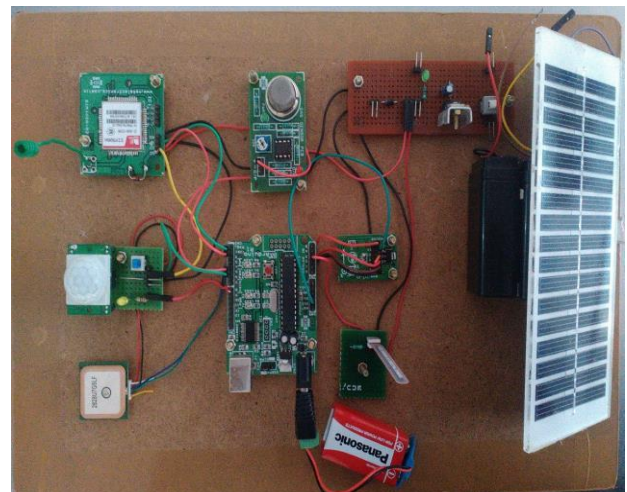
It has 14 digital I/O pins, of which 6 can be used as PWM outputs and 6 analog input pins. These I/O pins account for 20 of the pins.

The Atmega328 chip has an analog-to-digital converter (ADC) inside of it. This must be or else the Atmega328 wouldn't be capable of interpreting analog signals. Because there is an ADC, the chip can interpret analog input, which is why the chip has 6 pins for analog input

The pinout for the Atmega328 is shown below.

**IV. EXPERIMENTAL OBSERVATION**

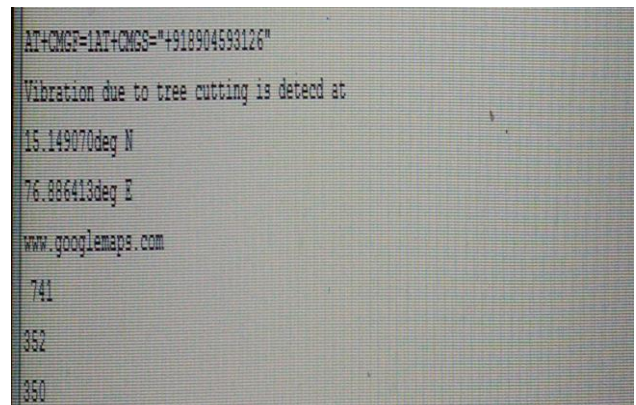
**Project Module**



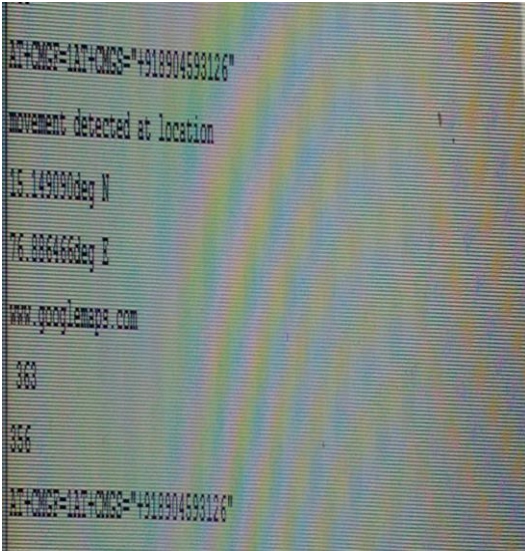
overview of the module

Results

**1.1. Result of PIR sensor**

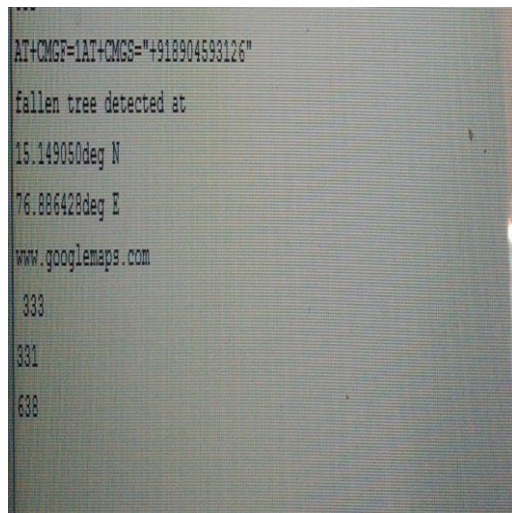




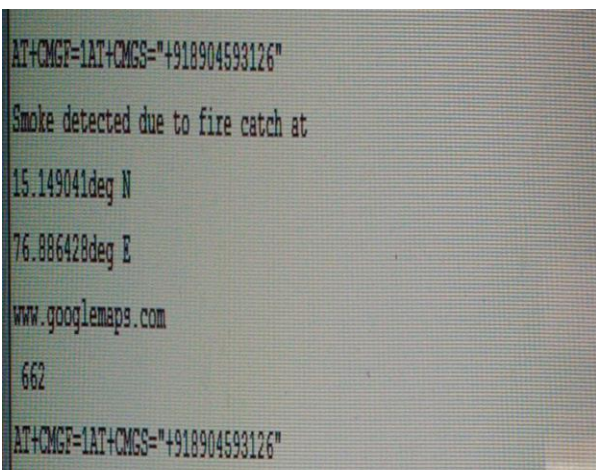


1.2. Output of PIR Sensor

2.1.Result of Flex sensor



2.2.Output of Flex Sensor



3.1.Output of Smoke Sensor

V. ADVANTAGES & DISADVANTAGES

Advantages

Effectively control smuggling.

It is a solar power, no need of drawing electric lines across the forest.

Disadvantages

GPS has to be placed in open space to get latitude and longitude values.

PIR sensor used in this project cannot differentiate between animal and human being exactly

VI. CONCLUSION & FUTURE SCOPE

Conclusion

In this way the system is developed which is able to restrict the smuggling of trees in forest where the human being are not able to provide security. Such system is developed in the forest where the trees are costly and their protection is important. So in the forest this kind of system is proposed.

Future Scope

PIR sensor detects the motion of animal or human but can't differentiate between them. In future, the enhancement has to be made to differentiate whether it is animal or human.

VII. REFERENCES

- [1] [1]Yichang, China; Guangyu He; Junli Wan —Research on Zigbee wireless communication technology Wei Wang, In Electr.Eng. & Renewable Energy Sch., China Three Gorges University.
- [2] Chong gang Wang, Tao Jiang, Qian Zhang —ZigBee®
- [3] Network Protocols and Applications
- [4] ZigBee specification version 2006, ZigBee document 064112, 2006.
- [5] ZigBee Alliance, ZigBee Specification. Version 1.0 ZigBee Document 053474r06.
- [6] Jiang, Y., Cao, J., & Du, Y. —Unmanned air vehicle landing based on Zigbee and vision guidancel WCICA 2006, 2, 10310 - 10314.
- [7] Muhammad Ali Mazidi, Roln D.Mckenley, "The 8051
- [8] Microcontroller and embedded system using assembly & C.
- [9] Hua Qian —API: GSM/GPRS Modem User Interfacel The
- [10] University of Texas at Dallas University of Texas at Dallas, 2007.
- [11] [8]http://timesofindia.indiatimes.com/city/lucknow/200-teak-trees-cut-timber- smuggled/article show/16804707.cms
- http://esl.fis.edu/learners/support/sci/text/stolenforest.htm.