A NOVEL APPROACH TO PROTECT VALUABLE TREES FROM SMUGGLING USING GSM AND ZIGBEE TECHNOLOGY

Eruvaram Bhanusri[1], K N Dharanidhar[2], K. Prakash[3]

Assistant Professor, Computer Science & Engineering, Kuppam Engineering College, Kuppam, Andhrapradesh, India[1, 2, 3]

Abstract— In newspapers we are reading about smuggling of the trees like sandal, "Sagwan" etc. These trees are less available in the world and as well as costly also. These are use in the medical sciences as well as cosmetics. Because of large amount of money involved in selling of such tree woods smuggling is happened. To prevent such smuggling and to save the forests around the world some preventive measures need to be deployed. We are developing a system which can be used to restrict this smuggling. The suggested model will consist of two modules those are described below, 1) Tree Unit 2) Main Server Unit (base station).]Every tree having one small electronics division which consists of ARM 7, 3 Sensors and Zigbee module. There will be one area selected. The data of different tree units can be collected by this units. The each tree unit will give the information to base station using GSM module. At main server GUI using one authorized person whom received the message and he will taking action to provide security. This data can be used by concern forest authorities to take preventive action.

Index Terms—smuggling, sandal, zibbee, GSM.

I. INTRODUCTION

We are forming a system which can be used to avoid the smuggling of the trees which would in turn stop the de-forestation and uphold the Environmental stability, which would help to solve one of the issues with the Global Warming. Each tree is having with one electronic division, which consists of Micro Controller, Flex Sensor, accelerometer sensor, TEMP sensor, Zigbee and GSM module. Tree cutting will be detected by flex sensor, accelerometer sensor. Communication between the trees and server will be done by GSM modules. The system consisting of TWO stages:

A. Tree unit
B. Main server unit

A. Tree Unit: The Tree unit would be the primary unit for the implementation of the system. This unit would consist of three sensors to give the information of getting Cut Down the trees, Damage with fire, etc. The tree unit would be the primary unit for the implementation of the system. The tree unit consists of three sensors: 1.Accelerometer Sensor 2. Flex Sensor 3. Temperature Sensor.

These sensors would be responsible to send the data to the controller on the tree unit which would be then transmitted to the next stage i.e. Tree Unit to the tree unit which has GSM module, for further processing to Base station. This is the second and last stage of the system which would be responsible for gathering the data and facilitate the same to the Main-Server Unit. The tree unit 1 is responsible to host the information from multiple Tree Units. The each Tree unit would consist of Zigbee module and the Controller is accountable for data transmission from the primary stage to the Final Stage of the Project.

B. Main Server Unit: This unit is responsible for the user interface and displaying the data that was transmitted from the Stage 1 . Main server would consist of-
1. Storage Device 2. GSM Modem
The Tree unit 1 would send the information to the main server unit. The main server unit would consist of the GSM Module (authorized persons mobile phone).
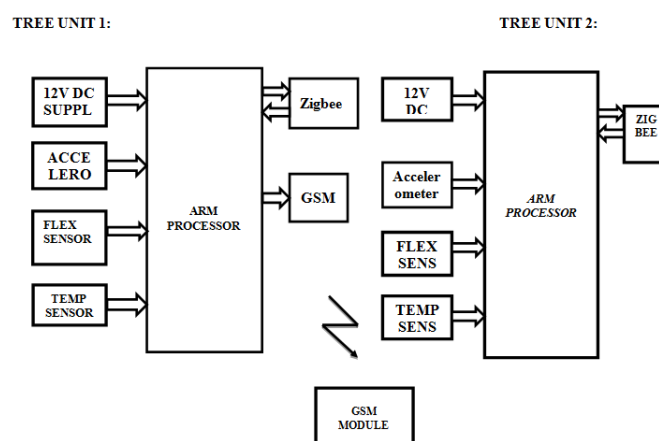
II. BLOCK DIAGRAM

Fig. 1 Block Diagram of Tree Unit

In the system, we are planning two different units that block diagram consisting various entities.

A. *. Tree Unit:*

In huge forest, each tree having sensors which is integrated on stem of tree. These are communicating with their main server unit. The communication between tree unit and main server unit taking place by using zigbee and GSM module. The flexible indication detected by the Flex sensor will allow the controller to transmit the signal to the main server via Zigbee and gsm module. The temperature sensor take place the surrounding temperature of the particular trees. The accelerometer sensor will detect the movement of the tree in which how many angles the trees are flexible and giving information to the controller.

- *Controller :*

The most effective principles for choosing controller is use area of the project, in our project the role of a controller is partial, which is Serially communicate with zigbee module and GSM modules. We can be used the ARM 7 processor as a controller.

- *Flex Sensor:*

Figure shows the flex sensor which is simple flex sensor 2 to 4.5" in length.. As the sensor is bent, the resistance across the flex sensor rises. The resistance of the flex sensor variations when the metal pads are on the outside of the turn.

Fig. 2 Flex Sensor

- *Accelerometer sensor:*

An accelerometer is an sensor that used to measures acceleration forces. These services may be static, like the constant energy of gravity pulling at our feet or they might be dynamic - caused by moving or vibrating the accelerometer. Practically an accelerometer works as a checked mass on a spring. When the accelerometer experiences acceleration, the mass is moved to the point that the spring is capable to accelerate the mass at the same rate as the casing.

Fig. 3 Accelerometer Sensor

- *Temperature sensor :*

We are utilizing temperature sensor here to sense the encompassing temperature and consequently to spare the trees from getting blazed. The temperature sensor is utilized known extraordinarily LM 35 is utilized. The LM35 arrangement are accuracy coordinated circuit temperature sensors whose yield voltage is directly identified with the Celsius high temperature. The LM35 temperature has leverage past direct temperature sensors aligned in ° Kelvin, as the client is not required to subtract a vast steady voltage from the sensors yield to get helpful Centigrade scaling. The LM35 does not require any outer adjustment or trimming to be in charge of run of the mill exactnesses of ±1⁄4°C at room temperature and ±3⁄4°C over a full −55 to +150°C temperature range. The Low cost is ensured by trimming and adjustment at the wafer level. The LM35's low yield impedance, straight yield and exact inborn remedy make interfacing to data or control hardware particularly simple. It can be utilized with single force supply.
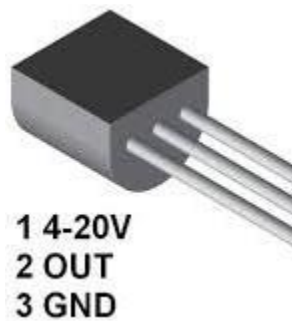
Fig. 4 Temperature Sensor LM35

- *Zigbee module:*

Fig. 5 ZigBee Module

It is a IEEE 802.15.4-based specification for a suite of high-level communication protocols which are used to create personal zone networks through small, low-power radios. The knowledge defined by the Zigbee requirement is intended to be modest and less costly than other wireless personal area networks (WPANs), such as Bluetooth or Wi-Fi. Applications contain wireless light switches, electrical meters through in-home-displays, traffic management systems and other user and industrialized equipment that requires short-range low-rate wireless data transfer.

- *Global System for Mobile (GSM):*
This module will send the coordinates received from GPS to the preferred number of a relative of visually impaired person.

Fig. 6 GSM Module 900

B. *Main Server Unit:*
   The server will be having GSM module. This unit nothing but the authorized person's mobile phone which will display the information on the mobile phone. With the help of GSM modem whenever any tree will get scratch down then we get the SMS on our registered mobile phone which contains information regarding Tree Name, temperature of the tree and movement of the trees by accelerometer sensor. Since this information we are able to alert and control the smuggling.
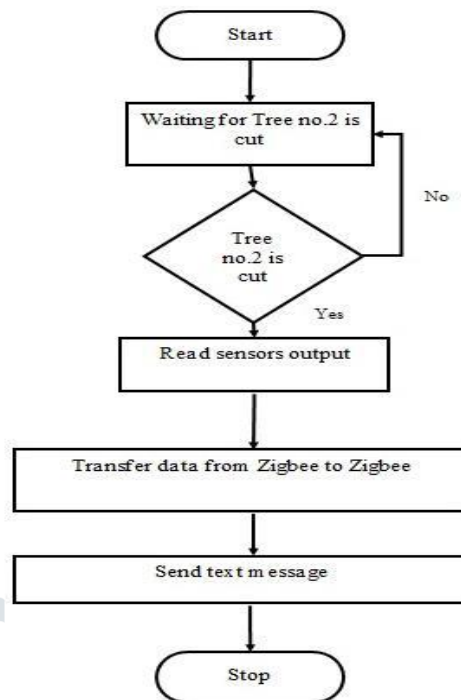
Ⅲ. **FLOW CHART**

Fig. 7 System Flow Chart

IV. ALGORITHM

- ➢ Start
- ➢ Initialize
- ➢ Check sensors output, if Tree no.2 is cut it gives signal to the microcontroller.
- ➢ If Tree no.2 is not occur then it goes its original position
- ➢ After the Tree no.2 cut microcontroller output to Zigbee and to next Zigbee of Tree unit no.1.
- ➢ Using GSM it indicates the movement of 'tree no.2 is cut' to base station.
- ➢ The data of Tree no.2 from GSM is transmitting by using GSM to base station.
- ➢ Stop.

V. CONCLUSION

In this way we are increasing the system which able to control the smuggling of trees in forestry where the human being not capable to provide security. Such system we are developing in the forest where the tree are costly and their safety is important fact. By using "**A NOVEL APPROACH TO PROTECT VALUABLE TREES FROM SMUGGLING USING GSM AND ZIGBEE TECHNOLOGY**" will control the smuggling.

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