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Department of ECE, Adhiyamaan College of Engineering, Hosur, Tamilnadu, India

Real-Time Forest Anti-Smuggling Alarm Monitoring System for Trees in Forest Using WSN

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ABSTRACT: Now a days there are many incidents about smuggling of trees like sandal, sagwan etc. These trees are very costly and meagre. They are used in medical science, cosmetics etc., To restrict their smuggling and to save forest around the globe some preventive measures have been developed. The proposed system makes use of electronic devices such as controllers and sensors. Tree cutting will be sensed by metal detector and this information will be displayed on LCD which is placed in the control unit. Simultaneously buzzer will be activated and the data will be transmitted to the control unit using RF module. Trees are connected by using cluster networks interfacing, which are linked with the control unit. This project is also an attempt to prevent forest mishaps using wireless sensor technology and eliminating manual power to the highest possible extent.

I. INTRODUCTION

Many news have been noted about smuggling of trees like teakwood, sandalwood, sagwan etc., These trees are very costly and meager. These trees provide many uses in the medical science and the cosmetics field because of huge amount of cash involved in selling of such tree woods, many incident are happening, such as cutting of trees and their smuggling. To restrict such smuggling and to save forest's around globe some preventive measures got to be deployed. This project is said to provide protection to trees and wild life. Today life should understand the value of trees. The atmosphere is present because of trees which gives valuable oxygen, so the protection of trees is very important. Concerning this, a project is developed on WSN based forest tree protection system. It consist of transmitter and receiver unit where every tree will be equipped with one small electronics unit which consist of microcontroller sensor and NRF module.

II. OBJECTIVE

The proposed work has been designed to implement an anti-smuggling alarm system for trees in forest using wireless sensor network, which aims to restrict smuggling and to save trees which are in meagre condition. The work in this paper is divided in two stages.

III. EXISTING SYSTEM

The system contains three units which are tree unit, area unit, main server unit, which are wirelessly connected. The connection is carried out by SIM300 GSM module. The hammering of tree is sensed by flex sensor which will sense the hammering by change in resistance. The three units is connected using Zigbee transmitter and receiver module. The very big requirement for the system is power.

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IV. PROPOSED SYSTEM

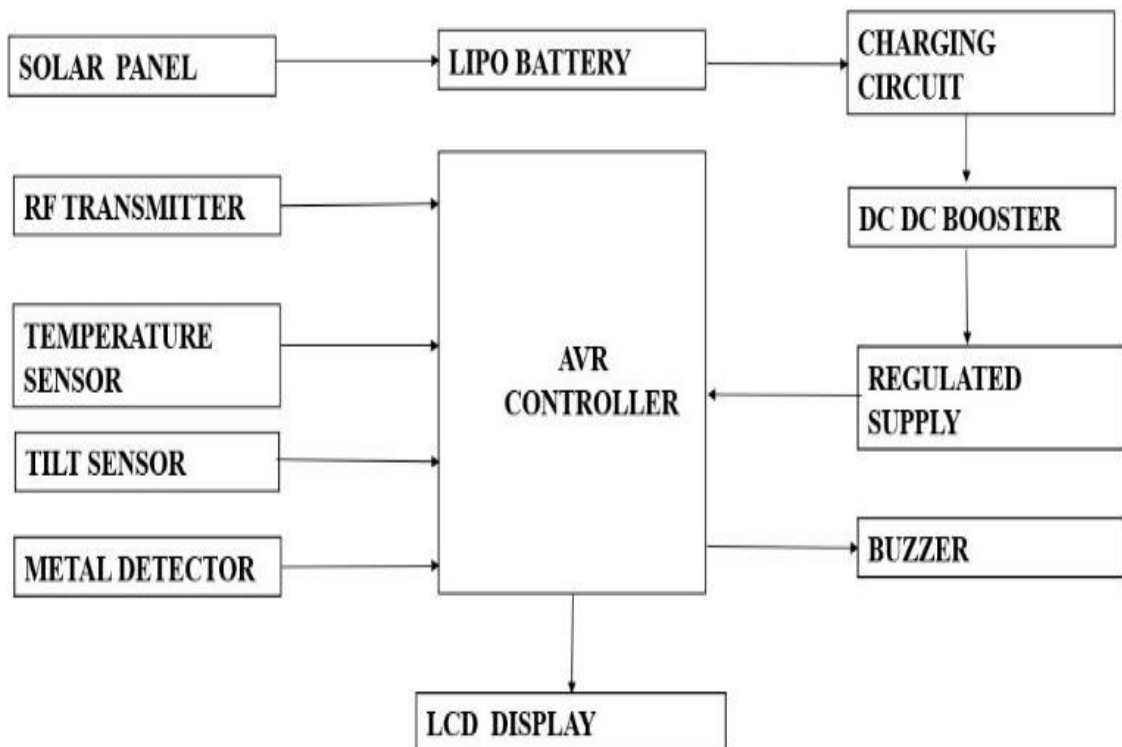
The specially designed anti-poaching alarm system operates on the concept of wireless communication. To avoid the smuggling of trees such as sandalwood, teak, sagwan etc., which are in rare condition. The proposed system consists of two sub-sections namely, tree unit and control unit. The RF transmitter and receiver module helps in transferring the data from the tree unit to control unit. The AVR microcontroller controls the overall communication. The temperature sensor notes the surrounding temperature. The metal detector is used to sense the metallic elements nearby.

V. WORKING PRINCIPLE

Solar panel and booster produce the charge, which is able to be hold on within the battery. a lift convertor is additionally referred to as as change of magnitude convertor, since it "steps up" the supply voltage. Since power $P=VI$ should be preserved, the output current is less than the supply current battery 3volts into 5volts. Boost convertor is connected to AVR microcontroller and it offers ac voltage. The low-power Atmel 8-bit AVR RISC-based microcontroller combines 8KB of programmable nonvolatile storage, 1KB of SRAM, 512K EEPROM, and a vi or eight channel 10-bit A/D convertor. The device supports outturn of sixteen unit of measurement at sixteen megacycle per second and operates between two.7-5.5 volts. It controllers the connections. The RF module give the cluster affiliation to the trees that helps in transferring the info from the transmitter to receiver.

VI. BLOCK DIAGRAM

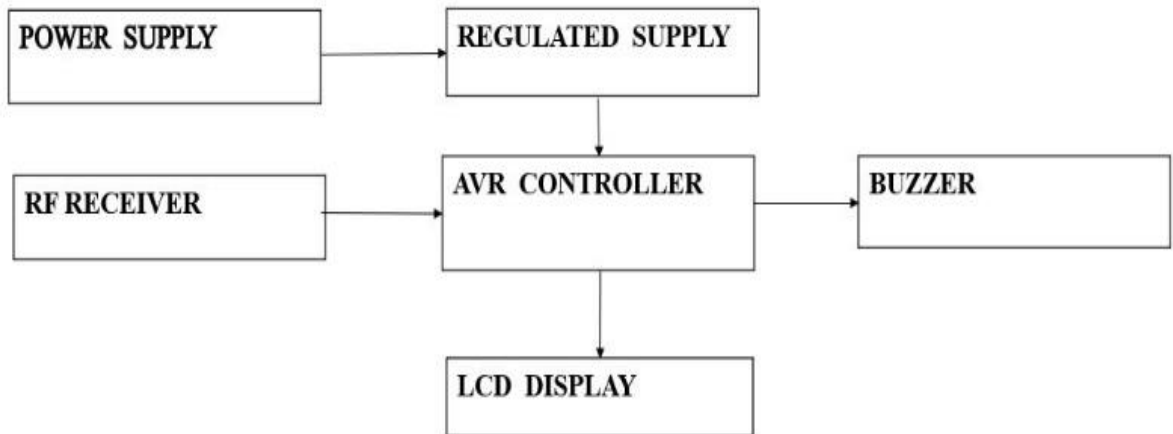
Transmitter Circuit:



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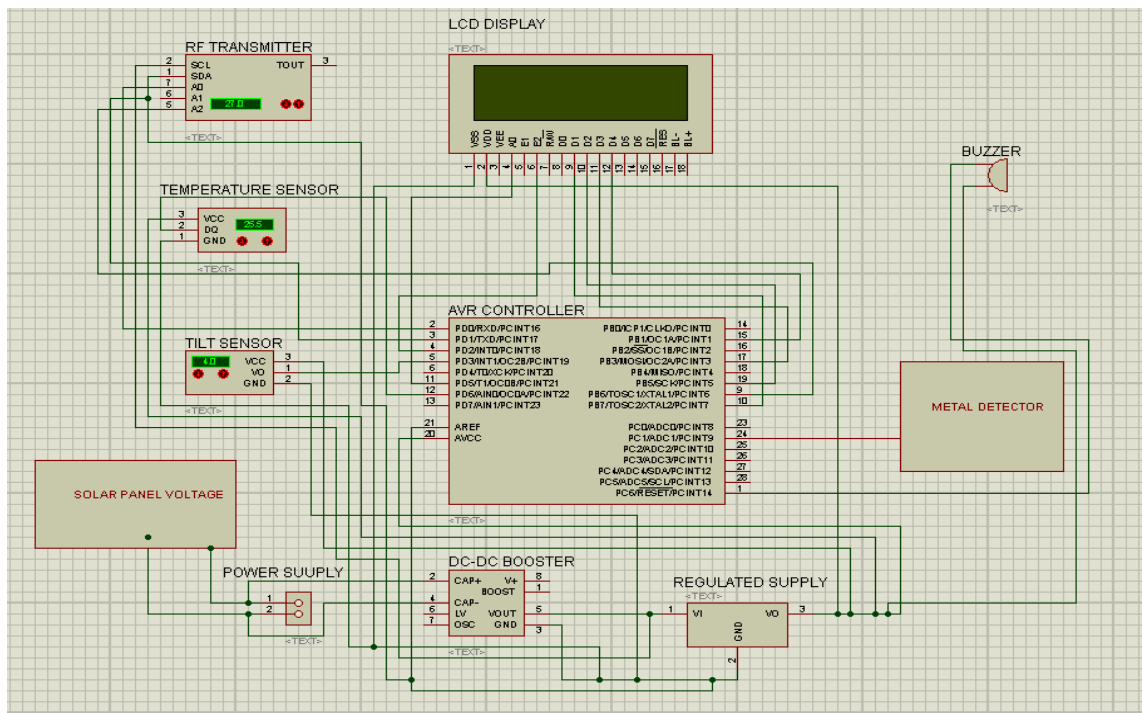
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Receiver Circuit:

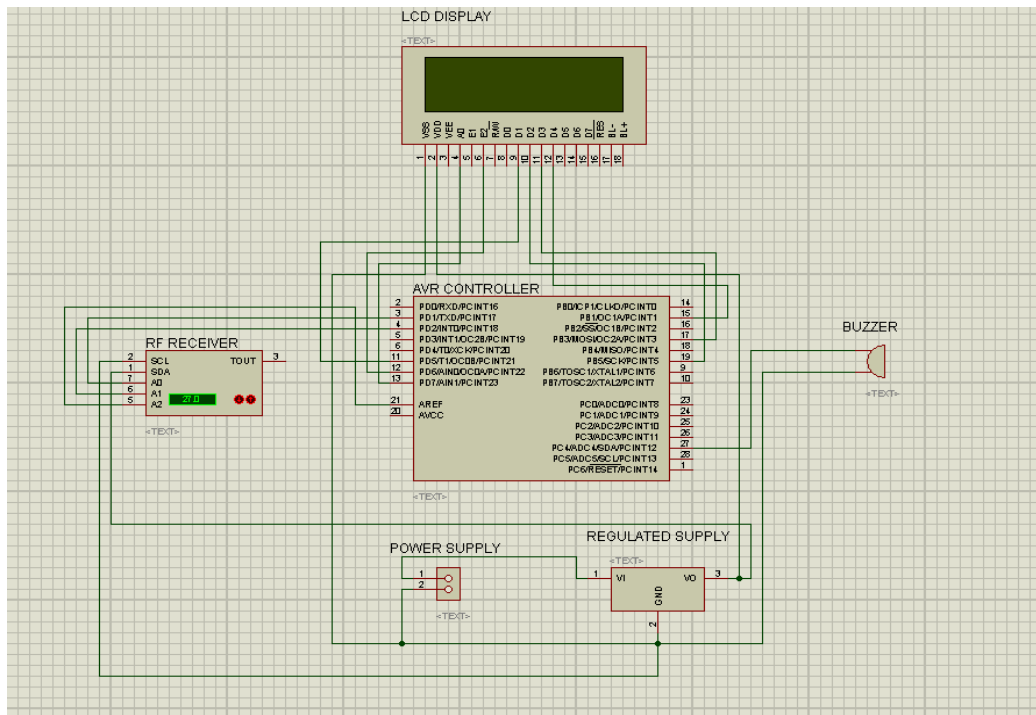


VII. CIRCUIT DIAGRAM

Transmitter Circuit:



Receiver Circuit:

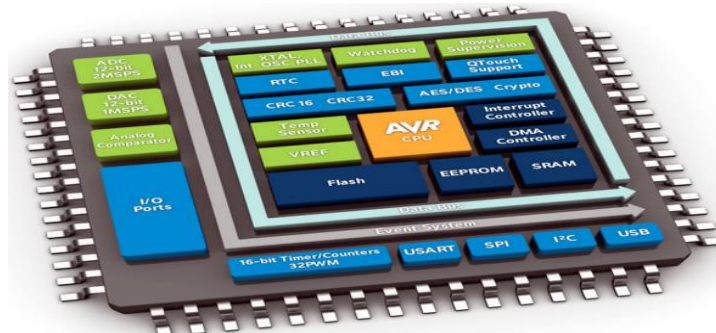


VIII. COMPONENTS

1. AVR microcontroller

The AVR microcontroller is based on the advanced RISC architecture which can execute 1 million instructions per second. ATmega 32 is a powerful microcontroller because of its self programming flash on a monolithic chip, which provides a high flexible and cost-effective solution embedded control applications.

Fig.3.1 AVR microcontroller ATmega 32



2. Tilt Sensor

Tilt sensors are devices that produce an electrical signal which varies with the angular movement. These sensors are used to measure slope and tilt within a limited range of motion. These sensors consist of a rolling ball with a conductive plate beneath them. When the sensors get power, the rolling ball falls to the bottom of the sensors to

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forms an electrical connection. When the device gets power and is in its upright position, then the rolling ball settle at the bottom to form electrical connection between the two end terminals of the sensor.



Fig.3.2 Tilt Sensor

3. Temperature Sensor

The LM35 series are precision integrated circuit temperature sensor, whose output voltage is linearly proportional to the Celsius temperature. The operating temperature range of this LM35 ranges from -55° to $+150^{\circ}\text{C}$ and it has low-self heating.

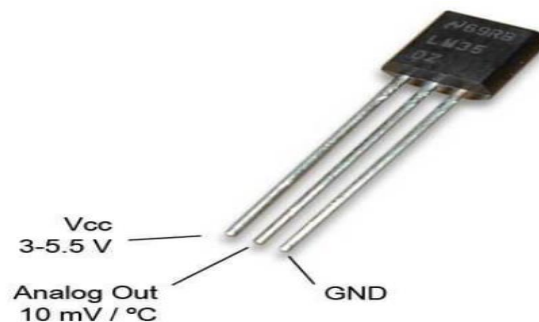


Fig.3.3 Temperature Sensor

4. Metal Detector

Metal detectors use electromagnetic fields to detect the presence of metallic objects. They exist in a variety of walk-through, hand held modules. The operation of metal detectors is based upon the principle of electromagnetic induction. Metal conductors contain one or more inductor coil that are used to interact with the metallic elements.

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Fig.3.4 Metal Director

5. 2x16 LCD display

A liquid crystal (Liquid Crystal Display) screen is associate degree electronic display module and incorporates a wide selection of applications. A 16x2 liquid crystal display is extremely basic module and is extremely normally employed in numerous devices and circuits. A sixteenx2 liquid crystal suggests that it will display 16 characters per line and there are a unit two such lines. during this liquid crystal display every character is displayed in 5x7 component matrix. The sixteen x two intelligent character set matrix show is capable of displaying 224 completely different characters and symbols. This liquid crystal display has 2 registers, namely, Command and information.



Fig.3.5 2x16 LCD Display

IX. LITERATURE SURVEY

1. International Journal of Innovative Research Technology

Overview

The system uses three units which are tree unit, power unit, control unit. Here the temperature sensor, PIR sensor, ARM microcontroller, LCD Display, Power supply, GSM module have been used. Whenever there is any

2. International Journal of Computer Science Trends and Technology (IJCTST)

Overview

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The system contains three units which are tree unit, area unit, main server unit, which are wirelessly connected. The connection is carried out by SIM300 GSM module. The hammering of tree is sensed by flex sensor which will sense the hammering by change in resistance. The three units is connected using zigbee transmitter and receiver module. The very big requirement for the system is power. Movement in the tree, the sensor starts sensing and then transfer the message to the microcontroller. The message will be displayed in the LCD. With the help of GSM, the information will be transferred to the person in the control unit.

3. International Journal of Advanced Research in Computer and Communication Engineering

Overview

simulation results show that compared with the normal LEACH clump algorithmic program and also the improved LEACH-M algorithmic program, the new algorithmic program are able to do the aim of leveling the energy loss of every node, effectively cut back the general energy loss of the device network, and so extend the network life cycle.

4. Energy economical clump Protocol supported Binary urochordate Swarm algorithmic program for Heterogeneous Wireless device Networks

Author: Qiang Tu; Loloishtong Liu; Yi Xie; Xingcheng Liu Year: 2020

Overview

The trees will have sensors which chat with their essential server unit, which is carried out by the GSM module and IOT. tree name, longitude and latitude etc..., datas will be transferred to the main server.

X. RESULTS



Fig.4.1 Output

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Fig.4.2 Output

XI. CONCLUSION

The proposed system implements a smart method of interfacing some sensors around the trees with the microcontroller and a buzzer, which helps to restrict the smuggling of trees and reduce the manual power to a greater extent.

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