

Anti-smuggling Alarm System for Trees in Forest using WSN

Ms. Nithyapriya.A.P¹, Shalini.M², Sharmila.P³, Sneha.B⁴, Sowmya.R.R⁵

Assistant Professor, Department of ECE, Adhiyamaan College of Engineering, Hosur, Tamilnadu, India ¹

U.G. Student, Department of ECE, Adhiyamaan College of Engineering, Hosur, Tamilnadu, India ^{2,3,4,5}

ABSTRACT: Now a days there are many incidents about smuggling of bushes like sandal, sagwan and so forth.., and these timber are very high priced and meagre. They are utilized in scientific technological know-how, cosmetics and so on, to restriction their smuggling and to save forest around the world a few preventive measures has been evolved. The proposed machine uses digital devices which include controllers and sensors. Tree cutting can be sensed with the aid of steel detector and this statistics can be displayed on LCD that is positioned inside the primary server unit. Simultaneously buzzer may be activated and the statistics can be transmitted to the senior office using NRF receiver module. Communication among tree using NRF transmitter and receiver module. Trees are connected by using wireless sensor network, that's related with the main sensor unit. This challenge is likewise a try and save you forest mishaps and casting off manual energy to the highest possible enlarge.

KEYWORDS: RF module, temperature sensor, metal detector, AVR controller.

I.INTRODUCTION

Many information has been mentioned about smuggling of the bushes like sandal, sagwan etc.., these timber are very high priced additionally as much less available within the international. These bushes provide many uses inside the clinical sciences and the cosmetics discipline. Because of big amount of money involved in promoting of such tree woods, many incidents are happening, consisting of reducing of bushes and their smuggling. To limit such smuggling and to store forests round the globe some preventive measures got to be deployed. The growing of such a device which can be used to restrict this smuggling can also save you the smuggling to the extra extinct. The proposed approach gives safety to bushes and wildlife. Today's lifestyles need to understand the cost of timber. The surroundings is present due to bushes. The trees gives precious oxygen, so the safety of bushes could be very essential in these day's lifestyles. Concerning this, a mission is advanced on, "wsn based forest tree protection system" for that there will be two sections, they are tree segment and control segment. it consists of transmitter and receiver unit. Every tree might be prepared with one small electronics unit which includes microcontroller, sensors and NRFmodule. The main concept supplied on this task is to design a portable Wi-Fi sensor node that is a part of Wi-Fi sensor network.

A smart computerized unit has been devised to tackle these issues. The combination of latest wireless communication systems and embedded solutions provide us such modules. The module is intended to perform in a particular place and this module will consist of two units:

- 1) Tree Unit
- 2) Control Unit

Each Tree is meant to have one small Embedded System-Unit with: Renesas Microcontroller, Sensors, NRF and Solar power. The presence of above said components will send the present condition of the tree to the Base station, the use of NRF Module. The Base station has a server which continues the database of all such timber.

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The conversation to base station is based on technology the usage of NRF module. The abundance of solar electricity inside the woodland region can be harnessed by using having a Small Solar panel and enhance circuitry, which may charge the battery. The battery will in turn offer a back-up for the gadgets.

II.LITERATURE SURVEY

[2].The system consists three units which can be tree unit, place unit, major server unit, which can be wirelessly related. The connection is executed by way of SIM300 GSM module. The hammering of tree is sensed with the aid of flex sensor that allows you to feel the hammering by change in resistance. The 3 units is hooked up using zigbee transmitter and receiver module. The very big requirement for the device is electricity.

[8].The trees can have sensors which chat with their crucial server unit that is achieved by means of the GSM module and IOT. Tree call, longitude and latitude and so forth..., records' will be transferred to the principle server.

III.ARCHITECTURE

Fig.1and 2 explains the transmission and receiving technique of RF community. The Module created is a becoming a member of system and programming. The device is created utilizing sensors consisting of, Temperature Sensor, Tilt Sensor and metallic detector. AVR microcontroller is the middle of the framework, located at the focal point of the square graph and controls each sports of the framework

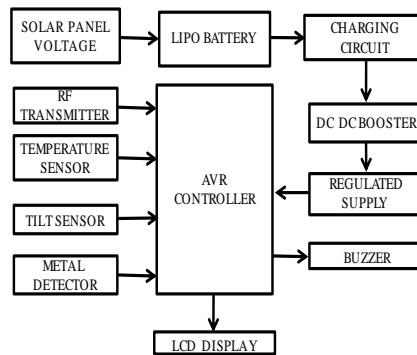


Fig1: Transmitter Block

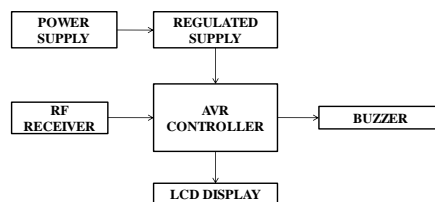


Fig2: Receiver Block

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A LCD is utilized to expose each tasks going in advance within the microcontroller, this unit would contain of three sensors to give the facts of getting Cut Down the timber, Damage with flame, and so on. The tree unit could be the usual unit for the utilization of the structure. The tree unit joins three sensors; tilt Sensors, steel detector, LM35 Sensor. Tree cutting could be diagnosed via metallic detector and any tree limbs are twist at a developing time it send the information to controller unit, and temperature sensor is applied to ship the encircling of the temperature to controller unit. Tilt sensor sense the tilting position and sends the statistics to the primary controller unit. Whereas the sun panel lipo battery, charging circuit, and the booster provide the required energy deliver to the device.

IV. MATERIAL USED

The sensors resemble an organ association of this unit due to the fact that they may be ones which expect or educate about the tree's circumstance. In spite of the fact that little in length their capacity to come across the earth round them like temperature, dampness and so on, cause them to maximum imperative piece of any unit. Thus we require sensors which are stable and hard, in the meantime they want to be sparing. For the Hardware structure here three sensors has been selected.

- A. Temperature sensor-LM35 □
- B. Tilt sensor □
- C. Metal detector

A. TEMPERATURE SENSOR-LM35



Fig3: Thermistor

The LM35 arrangement are accuracy incorporated circuit temperature devices with a yield voltage without delay relative to the Centigrade temperature. The low-yield impedance, straight yield, and accurate natural association of the LM35 Contraption makes interfacing to readout or manage system particularly fundamental. The LM35 temperature sensor is utilized to identify actual centigrade temperature. The yield of this sensor changes depicts the linearity. The output voltage of this IC sensor is straight relative to the Celsius temperature. The working voltage scope of this LM35 TIERS.

From -55° to +a 150°C and it has low-self warming. This is laboured underneath 4 to one hundred thirty volts. Temperature sensor circuit has terminals as an example, assets of data like non-scary (+) and enhancing (-) and only a single yield pin. This LM35 temperature sensor circuit beautify the contrast among its data terminals. The advantages of temperature sensor contain. It has no effect at the medium, extra specific, It has an correctly moulded yield and It reacts in a cut up 2d. Whereasthe temperature sensor is hooked up with the correct pins of the AVR controller

B. TILTSENSOR

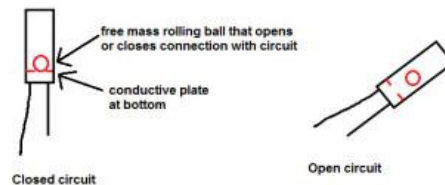


Fig4: Tilt sensor

Tilt sensors let you to locate orientation or inclination. They are small, inexpensive, low-energy and smooth-to-use. If used nicely, they may not put on out. They are referred as “mercury switches”, “tilt switches”, or “rolling ball sensor” for obvious motives. These sensors incorporate a rolling ball with a conductive plate beneath them. When the sensor gets power, the rolling ball falls to bottom of the sensor to make an electrical connection. When the sensor is tilted, the rolling ball doesn’t fall to bottom just so the existing cannot glide the two give up terminals of the sensor. When the device receives power and is in its upright role, then the rolling ball settle at rock bottom of the sensor to make an electrical connection among the 2 cease terminals of the sensor. Next the circuit turns into quick and consequently the LED gets sufficient current. If the circuit gets tilted in order that the rolling ball doesn’t settle at rock bottom of the sensor with the conduction route, then the circuit becomes open. This is about the circuit operation.

C. METALDETECTOR

In our lifestyle, we have got to witness many detectors that detect metallic devices like guns, bombs, etc. To prevent any unlawful entry of guns and bombs in public places, a security system is developed by designing various electronics projects by using a proximity sensor. So, a detector is employed to sense any existing metal which is nearby. A simple detector circuit diagram project is meant using IC 555, as you'll see within the 555 timer circuits, these circuits detect the metals and magnets. When a magnet is almost the 10mH choke, the o/p frequency changes. This circuit are often powered from an influence supply, which may provide an o/p DC voltage between 6V to 12V. If a metal is almost the coil L1, it produces a change of o/p oscillation frequency, then generate a buzzingsound. Here the buzzer is connected with the AVR controller whenever a metal is sensed nearby the buzzer starts its intimation in the control unit.

V. SOLARPANEL



Fig5: Solar panel

The manner of creating strength starts whilst the silicon atoms soak up some mild from the solar. The mild strength knocks some electrons out of the atoms. The electrons waft among the 2 layers. The go with the flow makes an electric powered modern. Almost all the sun panels have conversion performance as much less as 15%. A sun ray that is rated at 17 volts will put out its rated energy. When utilized in a charging battery

machine, that's because the operating voltage can be among 12 - 15 volts. An unmarried easy photovoltaic cellular makes handiest a touch strength. For maximum functions more is wanted. For this motive, cells are frequently related collectively in organizations referred to as solar modules. A solar module features a frame that holds the cells. Some modules are several feet long and wide. They normally can produce up to multiple hundred watts of strength. If greater electricity is needed, modules are frequently joined collectively to make an oversized sun battery. Modules are known as sun panels.

VI. LIPO BATTERY



Fig6: Lipo battery

Lithium polymer battery, or more efficaciously lithium-polymer battery (abbreviated as Li Po, LIP, Li-poly, lithium-poly and others), is a chargeable battery of lithium-ion technology employing a polymer electrolyte instead of a liquid electrolyte. It works at the principle of intercalation and de-intercalation of lithium ions from high-quality and negative electrode cloth, with the liquid electrolyte providing a conductive medium. To save you the electrodes from touching one another a micro porous separation is hired, which lets in best the ions and not the electrode debris. The voltage varies from 2.7-three.0V to approximately 4.2V.

VII. CHARCHING CIRCUIT

Sample circuit of a Li-Ion charger can have the functionality to fee any three.7V Li-Ion battery employing a 5VDC (USB, Solar Panel...) electricity supply. At the heart of the circuit is one microchip MCP73831, available in SOT-23-5 package. MCP73831 can be a enormously advanced linear price management controller for use in area-restricted, fee-sensitive packages. This IC employs a persevering with modern-day/steady voltage fee algorithm with selectable. The charging circuit is hooked up with the DC-DC booster which allows in doubling the voltage which it received from the source

VIII. AVR CONTROLLER

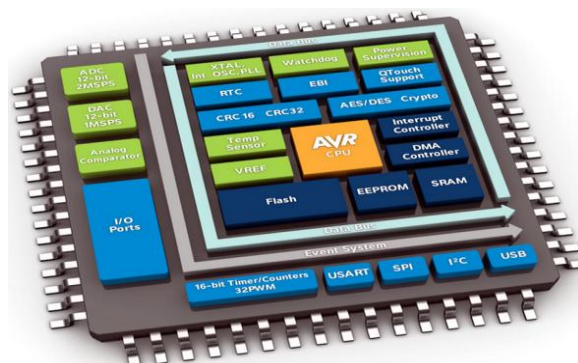


Fig7: AVR Controller

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AVR microcontroller is an electronic chip manufactured by means of Atmel, The low-power Atmel 8-bit AVR RISC-primarily based microcontroller combines 8KB of programmable non-unstable storage , 1KB of SRAM, 512K EEPROM, and a 6 or 8 channel 10-bit A/D converter. The tool supports throughput of sixteen MIPS at sixteen MHz and operates among 2.7-five.5 volts. In this proposed approach the AVR controller acts as the coronary heart of the machine, controlling the general operation of each the transmitter and the receiver block.

IX. RF MODULES

The NRF module, as the call indicates, operates at Radio Frequency. The corresponding frequency variety varies among 30 kHz & 300 GHz. In this NRF machine, the digital statistics is represented as versions in the amplitude of service wave. This type of modulation is thought as Amplitude Shift Keying (ASK). This NRF module incorporates of an NRF Transmitter and an NRF Receiver. The transmitter/receiver (Tx/Rx) pair works at a recurrence of 434 MHz. A NRF transmitter gets sequential records and transmits it remotely through NRF through its receiving wire associated at pin4. The transmission happens at the speed of 1Kbps - 10Kbps. The transmitted data is gained with the guide of a NRF beneficiary working at a proportional recurrence as that of the transmitter. The NRF module is every now and again utilized related to a couple of encoder/decoder.

X. BUZZER



Fig8: Buzzer

A buzzer or beeper is a signalling tool, usually digital first of all this tool to guide and electromechanical device which become much like an electrical bell without the steel gong. It most on the whole consists of form of switches or sensors connected to an impact unit that determines if and which button became driven or a present time has lapsed, and normally illuminates a light-weight at the ideal button or instrument panel , and sounds a caution inside the sort of endless or intermittent humming or beeping sound. The proposed approach makes use of the buzzer in the receiver module of the RF. According to the microcontrollers command buzzer starts off evolved its intimation.

XI. LCD DISPLAY



Fig9: LCD Display

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A LCD, or Liquid Crystal Display, is a form of display this is utilized in several PCs, TVs, automated cameras, capsules, and PDAs. LCDs are thin but are really constituted of some layers. Those layers comprise two spellbound forums, with a fluid gem arrangement among them. Light is anticipated through the layer of fluid treasured stones and is colored, which creates the noticeable photograph. The LCD that's interfaced to the microcontroller. It works under +5V deliver. The Panel of this LCD has 2 strains and sixteen segments.

XII. WORKING TECHNIQUE

The proposed device works on the idea of Wi-Fi conversation the usage of the NRF module (transmitter and receiver block). In the transmitter block, sensors such as tilt sensor, temperature sensor, and a steel detector have been used to sense the temperature, tilting role and the metals close by. These sensors are related with the AVR controller with the best pin connections. The power supply can be supplied by way of the usage of the solar panel and the lipo battery with the charging circuit and booster. The booster is used to double the voltage from the supply. The receiver block include the AVR controller, RF receiver, LCD show and a buzzer. If any illegal activity occurs then the AVR controller the transmitter block sends the facts to the receiver block and the buzzer can be activated with the information displayed within the LCD.

XIII. CONCLUSION

This become finished to keep away from smuggling of treasured timber in forests. There are many methods to defend bushes but here a smart method of interfacing a few sensors around trees with a microcontroller turned into completed. The cutting-edge technique of wi-fi gadgets turned into applied which acts as a server for obtaining the tree reputation. That is to intimate the Forest government about the tree's circumstance on 24x7 basis. This was viable due to the fact the embedded unit has NRF module. Idea was to deal with each tree as a clever tree and bringing many such bushes under network nodes. However the Tree's circumstance is underneath continuous monitoring due to sensors. Hence it's miles a WSN to shield the Nature.

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