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Protocol Implementation for Wireless Sensor Network for Anti-smuggling of Trees with Animal Detection

Monissha.S.E [1] , Suganthipriya.K[2] , Divya.J [3] , Saraswathi.K[4] , Mekala.D[5]

[1]Departmentt of ECE, Sengunthar Engineering College, Tiruchengode, (INDIA)
[2]Departmentt of ECE, Sengunthar Engineering College, Tiruchengode, (INDIA)
[3]Departmentt of ECE, Sengunthar Engineering College, Tiruchengode, (INDIA)
[4]Departmentt of ECE, Sengunthar Engineering College, Tiruchengode, (INDIA)
[5]Departmentt of ECE, Sengunthar Engineering College, Tiruchengode, (INDIA)

ABSTRACT

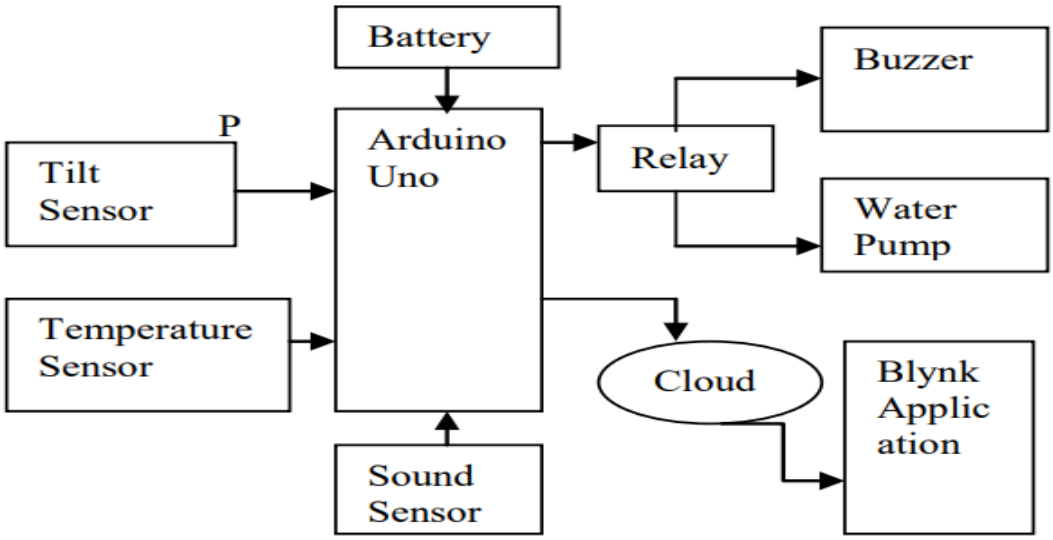
Nowadays there are many incidents about smuggling of trees like Sandal, Sagwan etc. These trees are very costly and meagre. They are used in the medical sciences, cosmetics. To restrict their smuggling and to save forests around the globe some preventive measures needs to be deployed.Routing protocols in wireless senor networks are responsible for forwarding the information within the network ensuring reliable communication.We have developed a system which can be used to restrict smuggling.The design system uses three sensors tilt sensor(to detect the inclination of tree when its being cut),temperature sensor(to detect forest fires),sound sensor(for effective detection of illegal logging i.e. even the sounds generated while axing the tree are also sensed).Data generated from these sensors is continuously monitored with the aid of Blynk App. With respect to the sensors, their output devices are activated through relay switch. For tilt sensor and sound sensor a buzzer is activated and for temperature sensor a water pump is activated. Generated data is stored in Blynk Server over the Wi-Fi module. Forest officials are notified when any event occurs so that appropriate action can be taken.

Key Words: WSN, Sensor, Blynk App.

INTRODUCTION:

Wireless Sensor Networks (WSN) is the most evolving technology and is used in various applications. WSN consists of nodes integrated with sensors, communication module, powering unit interfaced with and controlled by a low power microprocessor. The unique characteristics of wireless sensor networks such as low power consumption, compactness, and low cost makes it a feasible technology for variety of applications such as monitoring, maintenance, security, and controlling

EXSISTING SYSTEM:



Wireless sensor network technology can help develop an energy efficient system for monitoring the poaching of tree. This paper proposes an effective routing technique for signaling the nearby base station about the poaching activity based on the vibration measurement using the designed sensor node. The protocol is designed based on the field layout, system design, and application requirement of low power consumption and energy efficiency. The Area based routing protocol will measure the RSSI of the sensor node and forward the signal if the RSSI is within the required range.WSN is used in varied fields to serve the purpose of the application in the real world. In this project a low powered wireless sensor network is designed to monitor the poaching of economically valuable trees.

DISADVANTAGES:

- In existing system , this application is done based on Embedded with the help of GSM.
- Identifying is little bit difficult in this system.
- Efficiency level is low.

LITRETURE REVIEW:

RELATED WORKS: **FORWARD-AWARE FACTOR (FAF) ENERGYMECHANISM FOR WIRELESS SENSOR NETWORKS**:

Wireless sensor networks (WSNs) is an self-organization system consists ofnumbers of energy-limited micro sensors in the banner of industrial application (IA). Because of limited energy and communication ability present in the WSN, it is important to design routing protocol for WSNs, by this the sensing data can transmit Forward-Aware Factor (FAF) based on energy balancing mechanism for WSN is proposed in this paper. FAF is based on three factors, Forward Transmission to the receiver efficiently. An improved area, link quality, and energy density. In addition, Received Signal Strength (RSS) value is also calculated with FAF.

INDUSTRIAL AUTOMATION USING WIRELESS SENSOR NETWORKS:

The advent of Wireless Sensor Networks (WSNs) has revolutionized the field of automation in many ways. This paper presents the implementation of one such WSN useful for industrial applications. Methods/StatisticalAnalysis: The establishment of the WSN cluster using low cost MSP430 processor and RF transceivers is explained. This network could be easily modified to suit the needs of a particular process in an industry. Findings**:** A basic hardware system comprising of a cluster having five nodes is tested with real time control signals. Such a network was found to be reliable, low cost and low power consuming. This cluster can be duplicated and such clusters can be integrated with the use of gateways to form a large network to monitor and control the various processes in an industry simultaneously. In the consumer end, these networks will be more users friendly and available at low cost. Applications/Improvements**:** The WSN clusters can be used for automation of various industries with the possibility of easy modification or expansion in the future.

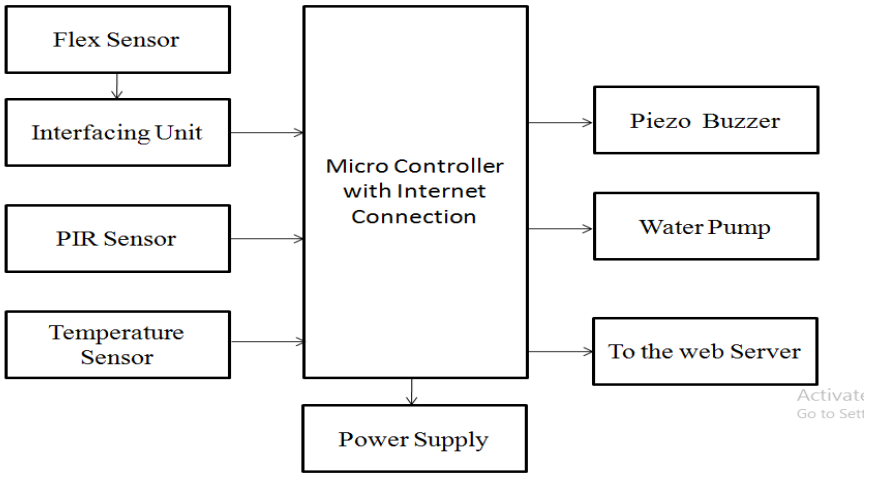
ENERGY-EFFICIENT HIERARCHICAL ROUTING PROTOCOLS FOR WSN:

A WSN is a specialized wireless network made up of a large number of sensors and at least one base station. The foremost difference between the WSN and the traditional wireless networks is that sensors are extremely sensitive to energy consumption. Energy saving is the crucial issue in designing the wireless sensor networks. Since the radio transmission and reception consumes a lot of energy, one of the important issues in wireless sensor network is the inherent limited battery power within network sensor nodes. In order to maximize the lifetime of sensor nodes, it is preferable to distribute the energy dissipated throughout the wireless sensor network. So it is essential to design effective and energy aware protocols in order to enhance the network lifetime. A WSN can have network structure based or protocol operation based routing protocol .In this paper, a review on network structure based routing protocol in WSNs is carried out. Energy consumption and network life time has been considered as the major issues .

PROPOSED SYSTEM:

The design system uses three sensors tilt sensor(to detect the inclination of tree when its being cut),temperature sensor(to detect forest fires),sound sensor(for effective detection of illegal logging i.e. even the sounds generated while axing the tree are also sensed).Data generated from these sensors is continuously monitored with the aid of Blynk App. With respect to the sensors, their output devices are activated through relay switch.For tilt sensor and sound sensor a buzzer is activated and for temperature sensor a water pump is activated. Generated data is stored in Blynk Server over the Wi-Fi module. Forest officials are notified when any event occurs so that appropriate action can be taken.

Block Diagram:



HARDWARE DESCRIPTION:

MICROCONTROLLER:

Introduction of Atmega328p

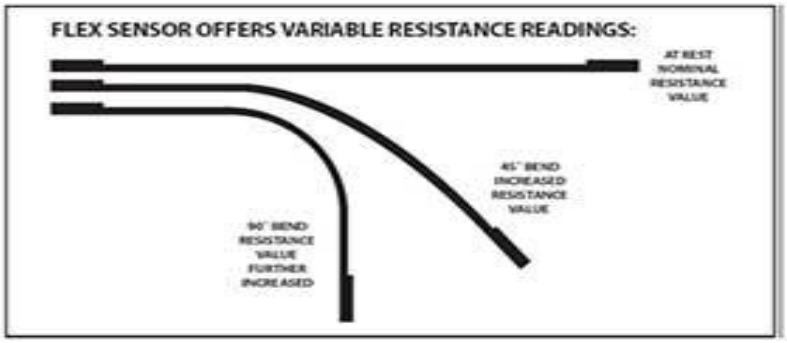
The Atmel® Pico Power® ATmega328/P is a low-power CMOS 8-bit microcontroller based on the AVR® enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega328/P achieves throughputs close to 1MIPS per MHzthis empowers system designer to optimize the device for power consumption versus processing speed.

Features:

- High Performance, Low Power Atmel®AVR® 8-Bit Microcontroller
- Advanced RISC Architecture
- High Endurance Non-volatile Memory Segment

FLEX SENSOR:

The Flex Sensor patented technology is based on resistive carbon elements. As a variable printed resistor, the Flex Sensor achieves great form-factor on a thin flexible substrate. When the substrate is bent, the sensor produces a resistance output correlated to the bend radius—the smaller the radius, the higher the resistance value



Features:

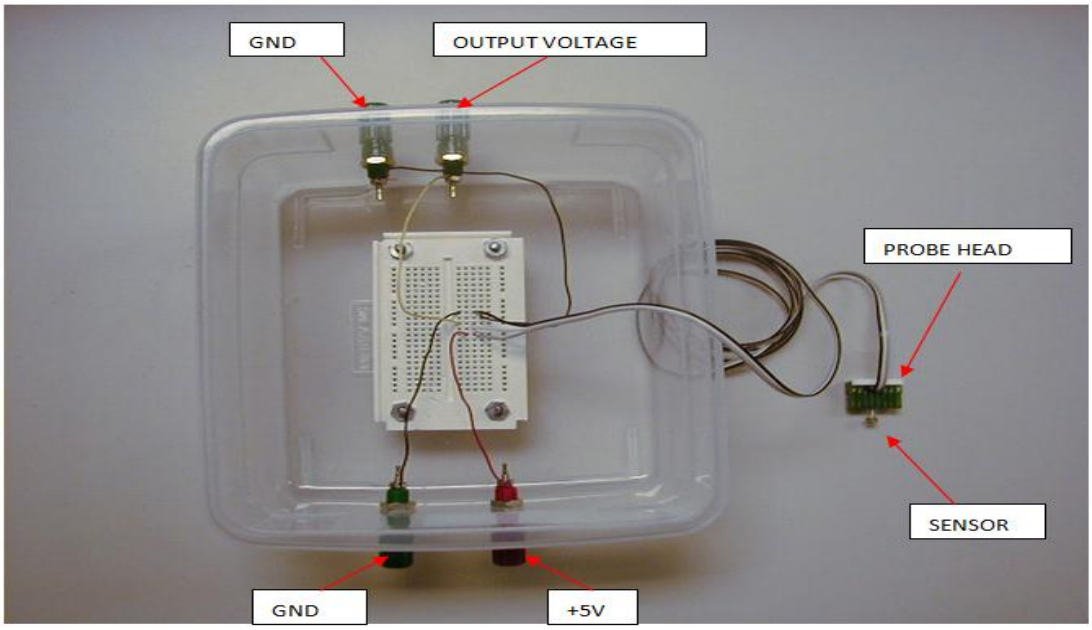
- Size: approx 0.28" wide and 1"/3"/5" long
- Resistance Range: 1.5-40K ohms depending on sensor. Flex point claims a 0-250 resistance range.
- Lifetime: Greater than 1 million life cycles
- Temperature Range: -35 to +80 degrees Celsius
- Flex Bending Nominal degree, 45 degree, 90 degree.

WATER PUMP:

DC pumps come in many different design types, each with its own method of operation, advantages, and preferred applications. For more information on these different types of pumps, visit the Pump Types information page on Engineering360

TEMPERATURE SENSOR:

The temperature sensor functional module consists of two parts: the function module box and the probe head. The LM34 temperature sensor is mounted on the probe head. Be careful to make sure that the sensor is properly mounted on the probe head.



Labeled picture of the temperature sensor circuit functional module.

By replacing the LM34 with another precision integrated-circuit temperature sensor LM35, we can easily get an output voltage proportional to the centigrade temperature. The LM35 sensor has a linear +10.0 mV/°C scale factor and a temperature range from -55°C to +150°C.In fact LM34 and LM35 are among the same series of temperature sensors so that they can be easily exchanged in different applications. The wiring for LM 35 is the same as that of LM34. Please refer to the datasheetsof LM34 and LM35 for more detailed packaging and features information.

PIR (Passive Infrared):

A **passive infrared sensor** (**PIR sensor**) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. The sensor converts the resulting change in the incoming infrared radiation into a change in the output voltage, and this triggers the detection. Objects of similar temperature but different surface characteristics may also have a different infrared emission pattern, and thus moving them with respect to the background may trigger the detector as well.

Buzzer:

A buzzer is a mechanical, electromechanical, magnetic, electromagnetic, electro-acoustic or piezoelectric audio signalling device.

Buzzers from Future Electronics

Future Electronics has a complete selection of buzzers from several manufacturers that can be used as an electromagnetic buzzer, piezo buzzer, electro-acoustic transducer, piezo electric transducers or magnetic buzzer for any electric circuit applications. You can easily refine your buzzer product search results by clicking your preferred buzzer brand below from our list of manufacturers.

Applications for Buzzers:

Typical uses of buzzers include:

- Alarm devices
- Confirmation of user input (ex: mouse click or keystroke)
- An ordinary Piezo buzzer works between **3 – 12 volts** DC.

SOFTWARE REQUIREMENT

EMBEDDED C:

Embedded C is a set of language extensions for the C programming language by the C standards committee to address commonality issues that exist between C extensions for different embedded systems. Historically embedded C programming requires non-standard extensions to the C language in order to support exotic features such as fixed-point arithmetic, multiple distinct memory banks and basic I/O operations.

Advantages of Embedded C:

- C compilers are available for almost all embedded devices in use today and there is a large pool of experienced C programmers.
- It is fairly efficient.
- It supports access to I/O and provides ease of management of large embedded projects.

PROTEUS:

The proposed system that is going to be described in this phase is done using the Proteus model. In order to get the desired output, the simulation circuit has been designed in Proteus software by using the respective components that is present in the Proteus. This simulation circuit will be described in detail below.

Blynk application:

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, vizualize it and do many other cool things.

There are three major components in the platform:

- **Blynk App** - allows to you create amazing interfaces for your projects using various widgets we provide.
- **Blynk Server** - responsible for all the communications between the smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server locally. It's open-source, could easily handle thousands of devices and can even be launched on a Raspberry Pi.
- **Blynk Libraries** - for all the popular hardware platforms - enable communication with the server and process all the incoming and outcoming commands.

Now imagine: every time you press a Button in the Blynk app, the message travels to space the Blynk Cloud, where it magically finds its way to your hardware. It works the same in the opposite direction and everything happens in a blynk of an eye.

CONCLUSION:

In this way we are developing the system which able to restrict the smuggling of trees in forest,where the human being not able to provide security. Such as system we are developing in the forest where the trees are costly and their production is important fact. In this area we provide such kind of system .we also monitor the animals in the forest which tends to affect the trees that are provided with valuable features such as medicinal plants, herbal plants etc.and an alert was send .

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