IJITCE

ISSN 2347- 3657

International Journal of Information Technology & Computer Engineering

Email : ijitce.editor@gmail.com or editor@ijitce.com

International Journal of Information Technology & Computer Engineering
ISSN 2347–3657
Volume 13, Issue 2, 2025

IMPLEMENTATION OF WIRELESS SENSOR NETWORK TO PREVENT DEFORESTATION USING IOT

[1]Mrs.A.Sandhya Deepthi,M.Tech, Assistant Professor
[2]B.Madhuri Mani, [3]M.Sireesha, [4] A.Muniza, [5]C.Naveen Kumar, [6]MLV.Surendranath
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY
VIDYA NAGAR, PALLAVOLU (V), PRODDATUR-516360, Y.S.R (Dt.), AP

ABSTRACT

Forests are the most important wealth we have. Forest fires are dangerous and lead to massive destruction of environment. Huge numbers of trees have been lost because of forest fires across the world. Deforestation is one of the emerging and death provoking issue. Human is to principally fault for deforestation. The forest fires and deforestation have caused many deaths and extinction of habitats and our resources. This project shows an IOT based framework structure for identification of temperature and fire for preventing forest fires and for discovery of sound and plot for forestalling the cutting of trees as right on time as possible. In our proposed framework Arduino UNO is interfaced with couple of sensors, buzzer and LCD. In the event that any disastrous occasions emerge, the framework consequently sends message to the receiver. The wireless sensor network is suitable network architecture for remotely monitoring or tracking applications in the environment.

Keywords: Arduino UNO, Flow Sensor, Rain fall Sensor, LCD, Buzzer etc

I. INTRODUCTION

1.1 INTRODUCTION

Microcontroller are widely used in Embedded Systems products. An Embedded product uses the microprocessor (or microcontroller) to do one task & one task only. A printer is an example of Embedded system since the processor inside it perform one task only namely getting the data and printing it. Although microcontroller is preferred choice for many Embedded systems, there are times that a microcontroller is inadequate for the task. For this reason, in recent years many manufactures of general-purpose microprocessors such as INTEL, Motorola, AMD & Cyrix have targeted their microprocessors for the high end of Embedded market. One of the most critical needs of the embedded system is to decrease power consumptions and space. This can be achieved by integrating more functions into the CPU chips. All the embedded processors have low power consumptions in additions to some forms of I/O, ROM all on a single chip. In higher performance Embedded system, the trend is to integrate more & more function on

ISSN 2347–3657
Volume 13, Issue 2, 2025

the CPU chip & let the designer decide which feature he/she wants to use.

1.2 EMBEDDED SYSTEM

Physically, embedded systems range from portable devices such as digital watches and MP3 players to large stationary installations like traffic lights, factory controllers, or the systems controlling nuclear power plants. Complexity varies from low, with a single microcontroller chip, to very high with multiple units, peripherals and networks mounted inside a large chassis or enclosure

In general, "embedded system" is not an exactly defined term, as many systems have some element of programmability. For example, Handheld computers share some elements with embedded systems such as the operating systems and microprocessors which power them but are not truly embedded systems, because they allow different applications to be loaded and peripherals to be connected. Embedded systems span all aspects of modern life and there are many examples of their use. Telecommunications systems employ numerous embedded systems from telephone switches for the network to mobile phones at the end-user. Computer networking uses dedicated routers and network bridges to route data.

EXAMPLES OF EMBEDDED SYSTEM:

Automated teller. machines (ATMS). Integrated system in aircraft and missile. Cellular telephones and telephonic switches. Computer network equipment, including routers timeservers and firewalls. Computer printers, Copiers. Disk drives (floppy disk drive and hard disk drive). Engine controllers and antilock brake controllers for automobiles. Home automation products like thermostat, air conditioners sprinkles and security monitoring system. House hold appliances including microwave ovens, washing machines, TV sets DVD layers/recorders. Medical equipment. Measurement equipment such as digital storage oscilloscopes, logic analysers and spectrum analysers. Multimedia appliances: internet radio receivers, TV set top boxes.Small hand-held computer with P1M5 and other applications. Programmable logic controllers (PLC's) for industrial automation and monitoring. Stationary video game controllers.

1.3 CHARACTERISTICS:

Embedded systems are designed to do some specific tasks, rather than be a general-purpose computer for multiple tasks. Some also have real-time performance constraints that must be met, for reasons such as safety and usability; others may have low or no performance requirements, allowing the system hardware to be simplified to reduce costs. Embedded systems are not always standalone devices. Many embedded systems consist of small, computerized parts within a larger device that serves a more general purpose. For example, the Gibson Robot Guitar features an embedded

International Journal of Information Technology & Computer Engineering
ISSN 2347–3657
Volume 13, Issue 2, 2025

system for tuning the strings, but the overall purpose of the Robot Guitar is, of course, to play music. Similarly, an embedded system in an automobile provides a specific function as a subsystem of the car itself.

The software written for embedded systems is often called firmware, and is usually stored in read- only memory or Flash memory chips rather than a disk drive. It often runs with limited computer hardware resources: small or no keyboard, screen, and little memory.

1.4 MICROPROCESSOR (MP):

A microprocessor is a general-purpose digital computer central processing unit (CPU). Although popularly known as a "computer on a chip" is in no sense a complete digital computer. The block diagram of a microprocessor CPU is shown, which contains an arithmetic and logical unit (ALU), a program counter (PC), a stack pointer (SP), some working registers, a clock timing circuit, and interrupt circuits.

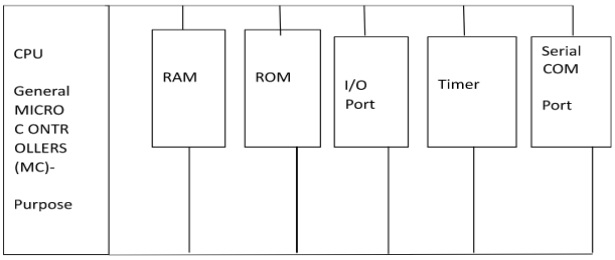


Fig 1.1 Block diagram of microprocessor

1.5 MICROCONTROLLER (MC):

Figure shows the block diagram of a typical microcontroller. The design incorporates all of the features found in micro-processor CPU: ALU, PC, SP, and registers. It also added the other features needed to make a complete computer: ROM, RAM, parallel I/O, serial I/O, counters, and clock circuit.

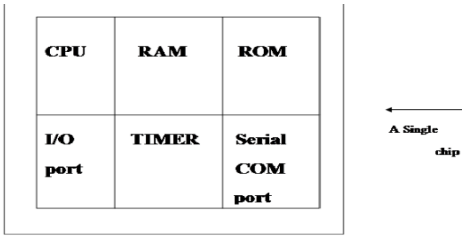


Fig 1.2 Microcontroller

1.6 COMPARISION BETWEEN MICROPROCESSOR AND MICROCONTROLLER

The microprocessor must have many additional parts to be operational as a computer whereas microcontroller requires no additional external digital parts. The prime use of microprocessor is to read data, perform extensive calculations on that data and store them in the mass storage device or display it. The prime functions of microcontroller is to read data, perform limited calculations on it, control its environment based on these data. Thus the microprocessor is said to be general-purpose digital computers whereas the microcontroller are intend to be special purpose digital controller. Microprocessor need many opcodes for moving data from the external memory to the CPU, microcontroller may require just one or two, also microprocessor may have one or two types of bit handling

ISSN 2347–3657
Volume 13, Issue 2, 2025

instructions whereas microcontrollers have many.

II. LITERATURE SURVEY

2.1 INTRODUCTION

Deforestation means removal or destruction of trees. It is the cause of natural disasters caused by nature and the most important cause for deforestation is human appetite for money, acquiring land, business, industries and many. Illegal activities such as cutting of large trees for wood, like sandalwood for money happens even nowadays. For example, the cost of one Teak tree which is very much grown costly above ten thousand which is used for furniture. The trees are cut and sold illegal way.

We are emerging such a system which can be used to limit wood trafficking and also to stop forest fires. The impartial of the scheme is to shape safe and protected forests to prevent smuggling and anti-social activities against unlawful cutting of the tress for Environment safety and pollution switch. Therefore, a system is developed. In this we use Arduino UNO Wireless network to monitor trees using appropriate sensors which forms basically IOT. IOT stands for internet of things which means connecting physical things wirelessly over internet. IOT devices are used in our daily life to monitor and control the electrical and electronic systems used in buildings and homes.

III. PROBLEM STATEMENT

Manual Surveillance: Forest areas are monitored manually by forest guards and officials.

CCTV Cameras: Fixed cameras are used in some areas to monitor activities.

Satellite Monitoring: Satellite images are used to track changes in forest cover.

3.1 LIMTATION OF SYSTEM

Limited Coverage: Manual surveillance and fixed cameras cover only specific areas.

Delayed Response: Manual monitoring and satellite images do not provide real-time alerts.

High Costs: Installing and maintaining CCTV cameras and satellite monitoring systems can be expensive.

Human Error: Manual processes are prone to errors and may not be effective in detecting all illegal activities.

IV. PROPOSED SYSTEM

Wireless Sensor Network: Deploy a network of sensors to monitor forest areas continuously.

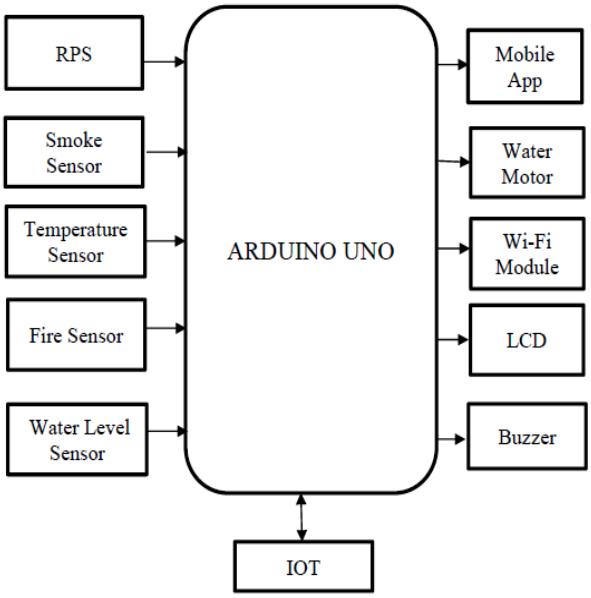
Real-Time Monitoring: Sensors detect tree cutting, fire outbreaks, and other environmental changes in real-time.

Data Transmission: Sensor data is transmitted to a central server for analysis and monitoring.

Alerts and Notifications: The system provides real-time alerts to forest authorities through mobile apps and web interfaces.

4.1 BLOCK DIAGRAM OF PROPOSED SYSTEM

International Journal of Information Technology & Computer Engineering
ISSN 2347–3657
Volume 13, Issue 2, 2025



V. BLOCK DIAGRAM OF PROPOSED SYSTEM

HARDWARE COMPONENTS

The following hardware tools used in the proposed system

Power Supply, Arduino UNO, Smoke SensoR,Temperature Sensor,Fire Sensor, Water Level Sensor, Water Motor, Wi-Fi Module, LCD, BuzzeR

SOFTWARE COMPONENTS

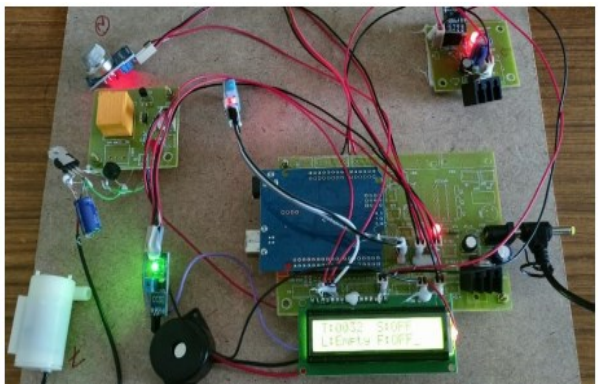
The following software tools used in the proposed system : Arduino IDE, Proteus Design Tool

TECHNOLOGY USED

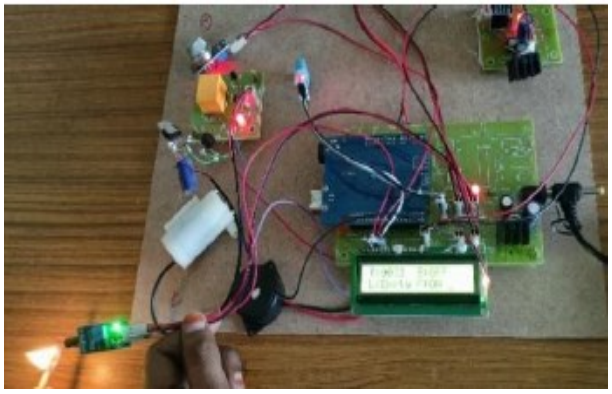
IOT

VI. RESULT AND DISCUSSION

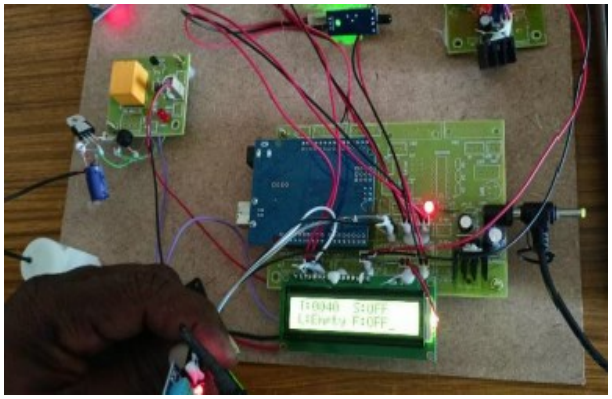
PROTOTYPE



EXPERIMENTAL RESULTS



Fire Detection



Temperature detection

Real-time monitoring

VII. CONCLUSION

In this Project, it has been demonstrated that framework safeguards the private cultivating spot, for example, teak cultivating, sandalwood cultivating and it diminishes the

human gatekeeper, continuously watching the region for long time. The framework includes straightforward sensors like, Flame sensor and Tilt sensor. These sensor information are shipped off fundamental microcontroller from each and every hub. The idea of IOT is executed to make the checking productive. The customary updates can be given to the clients through Wi-Fi module. Then, at that point, the cautions can be shipped off the clients remotely to the beneficiary when dubious action is advised. The fundamental adage of this task is to give cost effective and dependable checking of trees with assistance of Arduino UNO which gives own Wi-Fi administration in view of remote innovation

however there is no organization association in the backwoods'.

VIII. FUTURE SCOPE

when any fire works are detected by sensors with the help of wi-fi module it can easily gives alerts to the forest officials.if forest fire occurs the MQ gas sensor monitors the gas from fire and sends digital value to microcontroller. If the monitored value reaches a threshold value it sends message to receiver that fire is detected and immediately MCU turn on the water pump or sprayer to stop fire. Results for both cases are shown below. Incorporating more advanced sensors and communication technologies into the proposed system holds the potential to enhance its accuracy and reliability. Furthermore, the implementation of machine learning algorithms can process the sensor data, providing realtime insights into the forest environment and enabling more efficient monitoring and response to potential threats. To expand the coverage area, the system can be extended by increasing the number of nodes and expanding the wireless communication range. Additionally, integrating unmanned aerial vehicles (UAVs) with the system can offer a comprehensive view of the forest environment and enable remote monitoring. The adaptability of the proposed system extends to other applications, such as wildlife tracking and habitat monitoring. Exploring the utilization of renewable energy sources like wind and hydro power can further improve the sustainability of the system.

REFERENCE

1. Naveenraj M, Arunprasath, Jeevabarathi C.T, Srinivasan, "IoT Based Anti

Poaching Alarm System for Trees in Forest", International Journal of

Innovative Technology and Exploring Engineering IJITEE, April 2020.ISSN:

2278-3075, Volume-8 Issue6S.

2. X. Bajrami, I. Murturi, "An efficient approach to monitoring environmental

ISSN 2347–3657
Volume 13, Issue 2, 2025

conditions using a wireless sensor network and NodeMCU", published by Elektrotechnik & Informationstechnik 2021 135/3: 294– 301, https://doi.org/10.1007/s00502-018- 0612- 9.

3. Lamir Shkurti, Besim Limani, Xhevahir Bajrami, Samedin Krrabaj, Astrit Hu-laj, "Development of Ambient Environmental Monitoring System Through Wireless Sensor Network WSN Using NodeMCU and WSN Monitoring", on 2021 6th Mediterranean conference on embedded computing (MECO), june 50 Sivasankari N et al.

4. Jin Zhao, Xiaoqin Lian, Yelan Wu, Xiaoli Zhang, and Song Wang, "Design of Wireless Temperature and Humidity Data Collection System Based on MSP430 and CC2530", published on 2021 3rd International Conference on System Science, Engineering Design and Manufacturing Informatization.

5. Prof.P.G.Salunkhe, PoonamU.Chaudhari, "Design WSN Node For Protection Of Forest Trees Against Poaching Based MSP430", 2021 International Conference On Advances in Communication and Computing Technology (ICACCT) Amrutvahini College of Engineering, Sangamner, Ahmednagar, India. 2018 .Feb 8-9.

6. V.D.Ambeth Kumar (2021), "Efficient routing for Low Rate Wireless Network a Novel Approach", International Journal of Image Mining, 2017, Vol. 2, Nos.3/4.