ISSN (Print): 2957-9325, ISSN (Online): 2957-9333

INTERNATIONAL JOURNAL OF APPLIED ENGINEERING RESEARCH TRANSACTION

(Open Access-Referred-Peer-Reviewed Journal)

Journal homepage:https://ijaer-transaction.com/

Research Article

REVIEW PAPER ON WIRELESS IOT NOTICE BOARD USING LED DISPLAY

Ankita Uprikar[1], Leena Sunil Kawle[2], Snehal Ghansham Wasekar[3], Om Subhash Raut[4], Prasanna Titarmare[5], Dr. Yogesh S. Bais[6], Ashish Polke[6]

[1-6] Dept. of Electrical Engineering, Suryodaya College of Engineering &Technology, Nagpur, India

Article History:	Received: 20.01.2025	Accepted: 24.02.2025	Published: 03.03.2025

Abstract

A notice board plays a crucial role in organizations and public spaces such as railway stations, bus stations, shopping malls, and educational institutions. Traditionally, notices are displayed by manually printing and posting them, which is a time-consuming task. To overcome this challenge, a Digital Notice Board using IoT Technology has been introduced, significantly reducing paper usage and saving time. The Internet of Things (IoT) is a network of connected physical objects embedded with technology, enabling them to interact with their internal states or external environments. Automation is a key concept in modern electronics, driving numerous technological advancements. A bulletin board is essential in various institutions and public areas. However, manually updating notices daily is cumbersome and requires dedicated personnel. This project focuses on an advanced wireless bulletin board utilizing IoT. In this system, the internet is used to wirelessly transmit messages from a web browser to the display unit. A local web server is created, which can function as a global server over the internet. The system employs a PIC microcontroller, which receives messages via a GSM module and displays them on an LED matrix. Additionally, a Flask application is used for network communication, ensuring seamless message delivery. The Internet of Things (IoT) is a highly distributed network composed of intelligent, interconnected devices capable of communication and interaction. As IoT advances, the use of compact, affordable, and programmable hardware components becomes increasingly essential.One such component is the PIC microcontroller, a small, programmable computing board. Despite some limitations, its cost-effectiveness and versatility make it a valuable tool for various IoT-based applications. Comparative studies indicate that, despite competition from other IoT platforms, the PIC microcontroller remains a practical choice for research and real-world implementations.

Keywords: Smart, solar, cooling, internet of things,challenges, applications, energy efficiency, temperature control, renewable energy..

INTRODUCTION

Over the past few years, numerous communication technologies have emerged, revolutionizing the way information is shared. The primary goal of any communication system is efficient information dissemination. Nowadays, people prefer wireless connectivity due to its ability to facilitate seamless interaction while minimizing time and effort.

The Internet of Things (IoT) is a groundbreaking technology that enables the development of various smart applications. IoT is a network where physical objects are connected to the internet through network devices or routers, allowing seamless data exchange. This technology enables remote control of devices over an existing network infrastructure, reducing human effort while providing efficient access to physical devices.IoT employs intelligently connected devices that gather information through embedded sensors and actuators. It is expected to grow rapidly in the coming years, enhancing the quality of life for consumers and productivity for businesses. This innovation, often referred to as the "connected lifestyle", is shaping the future of communication.In this system, an IoT-based communication interface is integrated with a Raspberry Pi and a LAN module at the transmission end. To display messages, users can send an email with the desired content to a designated email address. A Python script processes the received email and updates the message on an LCD display connected to the Raspberry Pi.The primary aim of this digital notice board is to provide real-time updates about important events such as conferences, workshops, and institutional activities. The system is designed to be compact, space-efficient, and highly reliable. As technology continues to evolve, staying informed about global and local events has become essential. Wireless communication plays a significant role in modern information exchange, allowing devices to interact without the need for physical connections. This project focuses on developing an automated, self-sustaining, and highly reliable digital notice board system.

By leveraging IoT technology, this project offers a modernized alternative to traditional notice boards, ensuring efficient and timely communication in public spaces.

PROPOSED SOLUTION

The development of the smart notice board system follows a structured approach, covering system requirements, hardware and software design, integration and testing, and deployment and maintenance.

1. System Requirement Analysis

The first step involves analyzing the **functional and technical requirements** of the system. This includes:

- Identifying the **types of messages** to be displayed.
- Determining the **size and placement** of the display.
- Defining the **essential system features** for effective communication.

This analysis forms the foundation for designing both the **hardware** and **software** components of the system.

2. Hardware and Software Development

Based on the system requirements, we will develop the necessary hardware components, including:

- **P10 LED display** for message visualization.
- **Atmega32p microcontroller** to process commands.
- **Wi-Fi module** for wireless connectivity.

For the software development, we will create an **embedded C program** to control system operations. Additionally, an **Android SSH client**, such as **JuiceSSH**, will be implemented to facilitate remote management of the display.

3. Integration and Testing

ISSN (Print): 2957-9325, ISSN (Online): 2957-9333

INTERNATIONAL JOURNAL OF APPLIED ENGINEERING RESEARCH TRANSACTION

(Open Access-Referred-Peer-Reviewed Journal)

Journal homepage:https://ijaer-transaction.com/

Once the hardware and software components are developed, they will be **integrated and tested** to ensure proper functionality. The testing phase will evaluate:

- The system's ability to **receive and display messages** sent via Wi-Fi.
- Performance in different environments, such as **schools, colleges, and banks**.

4. Deployment and Maintenance

After successful testing, the system will be deployed, and ongoing **maintenance and support** will be provided. This includes:

- Creating **user manuals** and **technical documentation**.
- Training users on **system operation and troubleshooting**.

2. BLOCK DIAGRAM

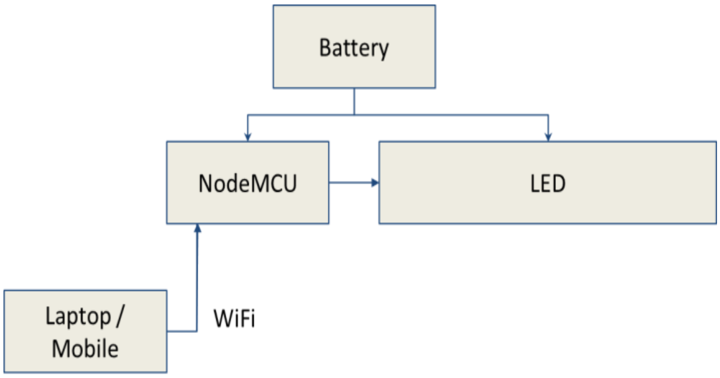

Fig. 1 :- Block Diagram

3. HARDWARE USE

•Node MCU
•LED Display
•Battery
•Mobile/Laptop

A. <u>Node MCU</u>

NodeMCU is primarily used as a versatile development board, especially for prototyping and building Internet of Things (IoT) applications, leveraging the ESP8266 Wi-Fi chip for wireless connectivity, and can be programmed using the Arduino IDE or other languages.

ISSN (Print): 2957-9325, ISSN (Online): 2957-9333

INTERNATIONAL JOURNAL OF APPLIED ENGINEERING RESEARCH TRANSACTION

(Open Access-Referred-Peer-Reviewed Journal)

Journal homepage:https://ijaer-transaction.com/

For applications requiring a greater number of GPIO pins, more computing power, or a greater variety of compatible shields and modules, Arduino is recommended. For IoT projects that need low power consumption and integrated Wi-Fi, NodeMCU is the recommended solution.

B. <u>LED Display</u>

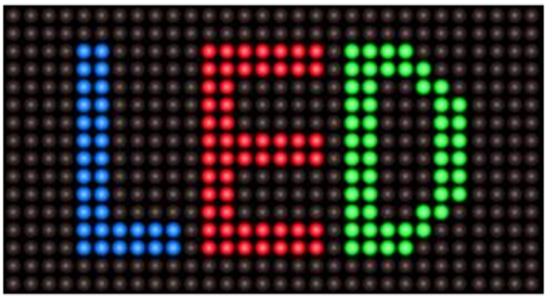

Fig. 3:- LED Display

A LED display is a flat panel display that uses an array of light-emitting diodes (LEDs) as pixels for a video display. Their brightness allows them to be used outdoors where they are visible in the sun for store signs and billboards.

LEDs (Light Emitting Diodes) operate on the principle of electroluminescence, where a semiconductor material emits light when an electric current passes through it, specifically when electrons and holes recombine at the p-n junction

C. <u>Battery</u>

Fig.4 :- LCD

ISSN (Print): 2957-9325, ISSN (Online): 2957-9333

INTERNATIONAL JOURNAL OF APPLIED ENGINEERING RESEARCH TRANSACTION

(Open Access-Referred-Peer-Reviewed Journal)

Journal homepage:https://ijaer-transaction.com/

12V batteries are common types of batteries that are used in powering boats, cars, RVs and other forms of automobiles. Some 12V batteries are also used alongside generators to generate electricity and power up buildings.

In simplest terms, a 12-volt system is an electrical power setup designed to operate using a 12-volt battery as its main power source. The 12V system is often the go-to for campers, fishermen, and adventurers because it's both effective and efficient for powering various devices.

D. Atmega32p Microcontroller

Fig. 5:-Atmega32p Microcontroller

The ATmega328 is **a single-chip microcontroller created by Atmel in the megaAVR family** (later Microchip Technology acquired Atmel in 2016). It has a modified Harvard architecture 8-bit RISC processor core.

The Atmega32p microcontroller is the brain of the system that controls the display and receives commands from the Wi-Fi module. It is a low-power, high-performance microcontroller that is capable of handling complex tasks.

E. Wi-Fi Module

Fig.6:- Wi-Fi Module

Wifi modules or wifi microcontrollers are used to send and recieve data over Wi-Fi. They can also accept commands over the Wi-Fi. Wi-Fi modules are used for communications bewtween devices. They are most commonly used in the field of Internet of Thnigs.

The Wi-Fi module is used to connect the system to the internet and receive text-based commands transmitted through Wi-Fi. The module used in this system is the esp8266 Wi-Fi module.

4. IMPLIMENTATION

The implementation of the **smart notice board system** follows a structured process, from circuit design to system deployment. Below are the key steps involved:

1. Circuit Design

The first step is to design the **circuit** that controls the **P10 LED display** and processes commands from the **Wi-Fi module**. This involves:

- Selecting essential components such as the **Atmega32p microcontroller**, **Wi-Fi module**, and **power supply**.
- Wiring the components together to ensure proper functionality.

2. Writing the Embedded 'C' Program

Once the circuit is designed, an **embedded 'C' program** is developed and uploaded to the **Atmega32p microcontroller**. The program should:

- Receive and interpret commands from the **Wi-Fi module**.
- Display the transmitted messages on the **P10 LED display**.

3. Configuring the Wi-Fi Module

The **Wi-Fi module** must be set up to connect to the **internet** and receive **commands** from users. This involves:

- Entering the appropriate **network credentials**.
- Configuring the module to **listen for incoming commands** and transmit data to the microcontroller.

4. Installing and Configuring the Android SSH Client

To enable **remote control**, an **Android SSH client** (such as **JuiceSSH**) is installed on a **smartphone or tablet**. This step includes:

- Establishing an **SSH connection** to the system.
- Configuring the client to **send messages** to the notice board system.

5. System Testing

After assembling the circuit, programming the microcontroller, and configuring the Wi-Fi module and SSH client, the system is **tested** to ensure proper functionality. The testing phase includes:

- Sending **commands and messages** remotely.
- Verifying that messages are correctly displayed on the **P10 LED display**.

6. Deployment of the System

Once testing is successful, the system is **deployed** at the designated location. This step involves:

- **Mounting** the **P10 LED display**.
- Connecting it to the **circuit and power source**.

ISSN (Print): 2957-9325, ISSN (Online): 2957-9333

INTERNATIONAL JOURNAL OF APPLIED ENGINEERING RESEARCH TRANSACTION

(Open Access-Referred-Peer-Reviewed Journal)

Journal homepage:https://ijaer-transaction.com/

- Ensuring the **Wi-Fi module** is connected to the local network.
- Verifying the system's **operation and reliability**.

CONCLUSION

The proposed smart notice board system offers an innovative and efficient solution for displaying important messages in public spaces such as schools, colleges, and banks. By integrating IoT technology with a P10 LED display, the system enhances communication and information dissemination effectively. Utilizing an Atmega32p microcontroller, Wi-Fi module, and an embedded 'C' program, the system can receive commands from an Android SSH client and update messages on the P10 LED display in real time. This cost-effective and scalable solution has the potential to significantly enhance communication in various environments, making it a valuable addition to modern public spaces.

AUTHOR(S) CONTRIBUTION

The writers affirm that they have no connections to, or engagement with, any group or body that provides financial or non-financial assistance for the topics or resources covered in this manuscript.

CONFLICTS OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

PLAGIARISM POLICY

All authors declare that any kind of violation of plagiarism, copyright and ethical matters will taken care by all authors. Journal and editors are not liable for aforesaid matters.

SOURCES OF FUNDING

The authors received no financial aid to support for the research.

REFERENCES

1. Dharmendra Kumar Sharma and Vineet Tiwari, Small and me- dium range wireless electronic notice board using Bluetooth and ZigBee IEEE 2015.
2. Neeraj Khera and Divya Shukla Development of simple and low cost Android based wireless notice board IEEE 2016.
3. Aniket Pramanik, Rishikesh and Vikash Nagar GSM based Smart home and digital notice board IEEE 2016.
4. Kruthika Simha, Shreya and Chethan Kumar Electronic notice board with multiple output display IEEE 2017
5. S. Rubin Bose and J. Jasper Prem Design and Implementation of Digital Notice Board Using IoT IJRIER 2017.
6. M. Arun, P. Monika and G. Lavanya Raspberry Pi Controlled Smart e-Notice Board using Arduino IJCAT 2017