SMART WIFI NOTICE BOARD

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Abstract*—The notice board is a crucial element in institutions, organizations, and public facilities. Traditionally, sharing information has been a manual process, limiting its reach. Posting various notices can be challenging, requiring a designated person to oversee the task. This project aims to introduce a digital notice board that utilizes a Wi-Fi module. The objective is to offer users a straightforward, speedy, and dependable means of displaying significant notices on a P5 LED screen. Users can send their messages to be circulated through the display. In this project, a web application has been developed to send messages via the Wi-Fi module. The system control is managed by an Arduino and the communication is performed using Wi-Fi technology. The message is then sent through the aforementioned web application. The hardware used in this project includes a Node MCU-ESP8266 Wi-Fi module, an LED display, and a user-friendly web application that utilizes Firebase. This device can be used anywhere as long as there is mobile network connectivity available.*

Keywords—P5 LED display, Arduino, NODE MCU- ESP8266, Wi-Fi Module, Firebase Web ,

1. INTRODUCTION

A smart notice board is a revolutionary device that combines the power of Wi-Fi technology and Arduino UNO to have an interactive information display system. This innovative solution has transformed traditional notice boards into digital and connected platforms, enhancing communication which engaged in various environments such as schools, offices, and public spaces. By utilizing Wi- Fi connectivity, the smart notice board can seamlessly receive and display real-time information, including announcements, updates, and schedules. Any changes or new announcements can be instantly updated on the notice board ensuring that users are kept informed up-to-date. The Arduino acts as the brain of the system, controlling the display, processing user inputs, and managing the wireless communication. With its user-friendly interface and customizable features, the smart notice board provides aconvenient and efficient way to share information. The Firebase platform is highly effective and extensively utilized, and it has the potential to significantly improve the features and abilities of a smart notice board. With Firebase authentication, administrators can control who has the ability to create or edit content on the notice board, ensuringthat only authorized individuals can make changes. These features enhance the functionality, security, and user experience of the smart notice board, making it a powerful and efficient communication tool. This smart notice board has the potential to revolutionize communication and transform static information displays into dynamic and interactive hubs of information.

ESP8266 WIFI MODULE

Popular Wi-Fi modules like the ESP8266 are frequently utilized in IoT (Internet of Things) applications, such as smart Wi-Fi notice boards. It is based on the ESP8266 chip, a module that combines a microcontroller and a Wi-Fi radio.The breakdown of how it works is as

follows:

The ESP8266 module's features include:

- Wi-Fi Connectivity: By enabling devices to connect to Wi-Fi networks, the ESP8266 module enables communication and data exchange betweenthem over the internet.
- Microcontroller: The module has a robust 32-bit microcontroller that can execute user-defined code and manage several elements of the Wi-Fi-enabled smart notice board.
- The ESP8266 module's GPIO pins serve as a means to connect external devices, such as sensors and LEDs, through general purpose input/output.
- Storage: The notice board contains an integrated flash memory that may be used to hold any necessary programe code, web pages, or otherdata.
- Programming: Developers can access the module easily as it can be programmed using multiple programming languages and frameworks such as the Arduino IDE, Micro Python, and Lua. It also offers flexibility.

2. LITERATURE SURVEY

This research paper presents a cost-effective, portable, wireless electronic notice board that facilitates information exchange over a network The study primarily concentrates on guaranteeing data authenticity and security. The device employs Bluetooth and ZigBee are two wireless technologies integrated within Atmel's ATmega32 microprocessor. It is noteworthy that the notice board's display component is a 128x64 graphical LCD based on the KS0108. [1]

A digital notice board that complies to Internet of Things (IoT) principles is created using the Raspberry Pi. This technique makes it easier to post notices online and show information on a digital notice board. Registered userscan also get notifications on their Android phones, and it allows remote updating of notices via the website. This research aims to investigate the basic idea of a digital display that uses a Raspberry Pi the Internet of Things context. The notice board can be updated by an administrator using a dedicated website accessible on the internet. This enables the rapid transmission of data to any location, with display updates occurring within seconds. The data transmitted typically consists of text and images. A personal computer is used for information storage and transmission, while the Raspberry Pi connects to the PC via Wi-Fi at the receiving end. [2]

The primary focus of this paper is to address the challenges associated with sending and monitoring numerous notices on a daily basis. Currently, this process requires a dedicated individual to handle the notices. To overcome these limitations, the paper proposes an advanced notice board system. The system features a scrolling display that is specifically designed for schools and colleges to continuously display everyday information. The system provides a more efficient display of flash news compared to traditional programmable systems by using Wireless Fidelity (Wi-Fi) technology. Furthermore, a keyboard-based display scheme can be utilized in various public areas like hospitals, railway stations, colleges, hotels, and malls.The display board that scrolls is made up of two parts: a receiver and a toolkit for programming shows. Messages arereceived by the receiver via a serial port and are then displayed after being converted into code. [3]

The purpose of this study is to report the results of a project that aimed to develop a wireless electronic notice board that could control how data is displayed. across multiple displaysin a particular space. The notice board is designed to receiveinformation from a central control unitvia a serial communication protocol and then display that information accordingly. The paper provides an overview of the project'sresults and outcomes. [4]

Institutions, organisations, and public utilities regularly post information on notice boards

in places like parks, train stations, and bus stops. However, the task of managing and updating these boards on a daily basis can be difficult and may necessitate the employment of dedicated personnel. Although traditional bulletin boards can provide comprehensive information to the public, keeping them up- to-date can be a challenge. The objective of this undertaking is to tackle these obstacles by creating a sophisticated announcement board with cutting-edge functionalities. The setup will employ a Node MCU, allowing users to updatethe bulletin board from a distance via Google voice assistant. This will grant users the liberty to append, delete, or revise the text exhibited on the board in accordance with their particular prerequisites. [5]

Advancements in technology have significantly improved human life, as seen in the transition from landline phones to smartphones. Nowadays, individuals are surrounded by smart devices that have reduced the need for human intervention in performing manual tasks. One area where physical effort remains high is in advertising or displaying notices through traditional paper-based methods. To address this issue, microcontroller-based digital LEDboards have been introduced. Messages can be programmed into the microcontroller through the boards, which are then displayed on the LED board. However, modifying the message necessitates reprogramming the microcontroller each time. This paper concentrates on creating an IoT-based LED display board in real-time using ESP32 and Arduino to overcome this challenge. The system integrates novel wireless IoT technology, obviating the need for manual reprogramming and allowing for real-time updates ofmessages on the LED board. [6]

The current paper showcases the creation of an intelligent display system that utilizes the Internet of Things (IoT) concept. The system's primary purpose is to present class schedules at the entrance of classrooms within educational institutions. The display comprises of a series of LEDs arranged in four lines of text, each line containing 8x32 LEDs . The primary interface of the program permits the user to enter data for every time slot of the day, which includes the name or number of the room, the discipline being taught, and the academic year linked to the discipline. The information is saved in a file and sent to the display controller from a remote location. Whenever alterations are necessary, the file can be retrieved without having to re-edit all fields. This display system is useful for managing the schedules of many rooms at other facilities, where a responsible person is in charge. [7]

This article presents a wireless digital notice board system that provides a fresh and intelligent method for sharing information. The notice board utilizes wireless technology and includes an LCD display, as well as a password-protected, SMS-based system. To enhance the system's versatility, a multiuser notice management and display system has been implemented, allowing multiplenotices to be displayed simultaneously. Furthermore, users have the capability to print specific notices that are of particular interest to them. A simple logic and a robust algorithm were used in the system's design. It uses an LCD, GSM module, midrange PIC microcontroller, as well as other readily available electronic parts. This guarantees that the system is efficient, dependable, and cost-effective.. [8]

An LED display system for colleges and universities is discussed in this study. It broadcasts daily news or announcements during business hours. The system makes use of GSM technology, which shows flash announcements or news more quickly than conventional programmable systems. A receiver and a display board make up the LED display system. An Arduino can be used to reprogram these parts. The technology serves as an electronic notice board that instantly displays critical information without any latency problems. Regardless of location or requirement, the LED display system is alsohighly versatile and can readily scale up to add more displays. [9]

Construction of a wirelessly remote-controllable notice board is the primary goal of this project. utilizing an Arduino board and an Android OS smartphone. With the progress of technology, information is evolving into a more

dynamic and interactive state, and is shifting away from regular notice boards to centralized control systems that incorporate Wi-Fi. The current approach of having notice boards placed in different locations poses challenges forusers who need to physically access each board to operate it. In this system, the main controller is an Arduino board, acting as the master, while four other Arduino boards serve as slaves. The data is transmitted from one location to the next using shift registers, creating a gradual scrolling effect. Each slave line in the system displays different data that is received from the master and scrolls accordingly. [10]

Semiconductors have taken over in recent times, resulting in LED light sources rising in popularity due to affordability. The project's authors centered on using LEDs in graphic displays with the main goal of creating a flexible system that could be altered to suit multiple applications. This was done by creating similar segments that could be easily merged when needed. The device might be used to produce a straightforward one-segment clock or a more complex display for advertising. The 8-bit shift registersoperate the LED matrices. These shift registers are controlled by AVR microcontrollers. The RS232 interface facilitates communication between the microcontroller and apersonal computer. This allows for the display to be driven using the TCP/IP protocol. [11]

Information is often spread through the use of digital notice boards in institutions, organizations, and public utility locations. However, managing and sending multiple notices on a daily basis can be a burdensome task, requiring dedicated personnel. This paper presents an advanced noticeboard system that addresses these challenges. Our proposed system utilizes GSM technology and smartphones to wirelessly transmit notices to the notice board. Additionally, users receive automatic notifications on their smartphones through the parse cloud service.The ATMEGA 328 microcontroller, programmed in the C language, runs the system. When a registered smartphone user delivers a message, the parse cloud uses real-time parsing to display it on the notice board. Additionally, other users receive automatic notifications on their smartphones. Furthermore, the system can be compatible with multiple wireless technologies, and IoT connectivity allows for automatic status updates of the notice boards on cellular devices. [12]

This paper focuses on addressing the challenges associated with updating information on notice boards by introducing an SMS controlled E-notice board that enables automatic and remote updates. The study concludes that GSM technology can be effectively utilized in various systems and contexts. The system utilizes a GSM module toreceive the required message to be displayed, which is transmitted as a message. The received SMS is then sent to the microcontroller via the COM port for validation, and finally, the message is displayed on the LCD display. [13]

3. PROPOSED SYSTEM

The proposed system for a digital display module is connected to a microcontroller in the suggested Wi-Fi-basedsystem for a Smart Notice Board, and the microcontroller is managed by a web or app interface. This system is designed to provide an efficient and flexible way to display information in a dynamic and interactive manner. The Smart Notice Board using Wi-Fi technology offers numerous advantages over traditional physical notice boards, including easy updating and management of digital content, real-time display of information, remote access and control, and the ability to display dynamic and interactive content.

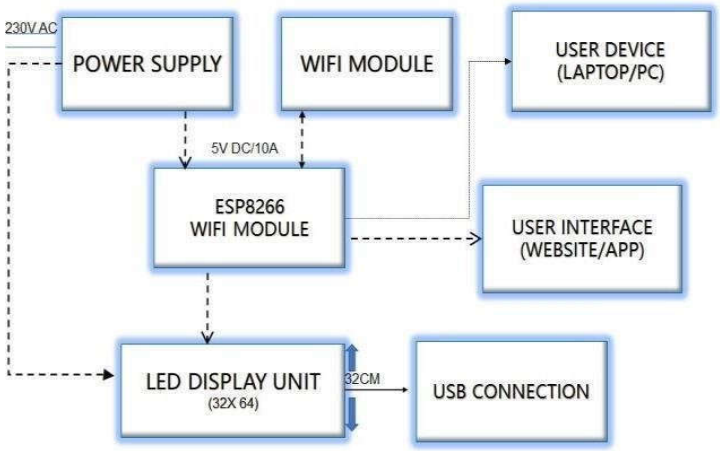

Figure 1. Proposed system

In Fig 1.1 the Wi-Fi router is used to establish a wireless connection between the Smart Notice Board and the user's device. The ESP8266 Wi-Fi module is connected to the Arduino board and allows for Wi-Fi connectivity. Thedisplay module, which could be an LED screen or any other type of display, is connected to the Arduino board. The user interface, such as a web or app interface, allows the user to send messages or updates to the Smart Notice Board, which are then sent through the Wi-Fi network and received by the Wi-Fimodule.

The Wi-Fi module and Arduino board connect witheach other via serial communication, with the Arduino board serving as the Smart Notice Board's primary controller. The Smart Notice Board can detect changes in its environment thanks to the sensors, which include a PIR sensor, which are also connected to the Arduino board. An Arduino-based smart Wi-Fi notice board is a project that combines the capabilities of an Arduino microcontroller and Wi-Fi connectivity to create a electronic notice that board can display notifications, and other information. It can be a useful tool for displaying dynamic content in homes, offices, schools, or other environments where information needs to be shared. Overall, this block diagram represents the basic architecture of a Smart Notice Board using Wi-Fi

4. EXPERIMENT

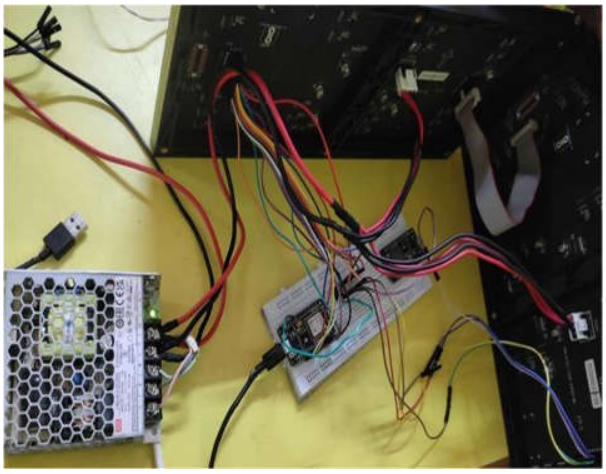

Figure 2. Connection of P5 Matrix Display Unit

In Fig 1.2, the connections with the hardware components for P5 display unit is shown. This set-up shows the connection for p5 matrix display. Here we use Switch mode power supply for the power supply which is connected with the help of jumping wires. Also, we use Breadboard and Arduino Uno for interfacing with the ESP8266 module. We use Wi-Fi network for transmission of Messages.HUB75 is interfaced from P5 panel to Breadboard through jumping wires for the Pin configuration.

Web application

Here, we have used Firebase to create a website that serves as the user interface and the web URL is mapped with website to Arduino, which serves as a platform to connect with ESP8266. The ESP8266 writes the data to the P5 display, which displays the information to the user. Firebase plays a critical role in this process by providing a reliable and scalable platform for hosting your website and storing and synchronizing data.

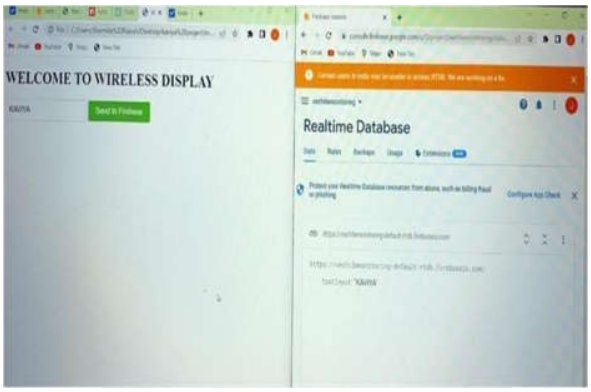

Figure 3. Web application

In Fig 3. shows the Web Dashboard for display and we have used Firebase hosting to host the website and make it accessible to users on the internet.

In Fig 4. shows the interfacing of WebApp for display to use Firebase authentication to restrict access to certain parts of website and ensure that only authorized users can view and interact with application.

Figure 4. Interface of WebApp for Wireless Display

A smart notice board using Wi-Fi and Arduino can display a variety of information, such as messages, news headlines, weather updates, are shown. Here are the steps how the output could be displayed:

STEP 1: When the device is powered on, it will display a welcome message or logo on the

screen.

STEP 2: If the notice board is connected to Wi-Fi, it will connect to the internet and start receiving data from a remote server or API.

STEP 3: The data received from the server can be in various formats such as text, images, or videos. The Arduino board can decode the data and display it on the screen.

STEP 4: If there are any new messages or updates, they will be displayed on the screen in real-time.

STEP 5: The board can also be programmed to display alerts or notifications in case of any emergency situations or important events.

STEP 6: The board can be controlled remotely through a smartphone app or a web interface. This allows users to update the information on the board from anywhere and at any time.

STEP 7: The board can be customized to display information that is relevant to the users, such as reminders, schedules, and to-do lists.

5. OUTPUT

Figure 5. Display of Wireless Notice Boa

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6. CONCLUSION

The combination of Wi-Fi, Arduino, and Firebase in a smart notice board system offers a dynamic and interactive way to share information. It simplifies the process of updating and displaying messages, enhances user engagement, and provides a flexible platform that can be customized to meet specific requirements. Whether in educational institutions, offices, or public spaces, a smart notice board using Wi-Fi and Arduino technology is a valuable tool for effective communication.

7. REFERENCES

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