

Information Flash Board using IoT

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Abstract

Display boards have played a significant part in mass communication over the years. This work intends to propose an Internet of Things (IoT)-based online notice board. The proposed solution includes an online information flash board using IoT to decrease paperwork, time, and labour. Things are linked to the internet by IoT. As a result, the internet can be used to access the information flash board from anywhere in the world. The board has an interface for a Wi-Fi module to provide internet connectivity. The message is received from the specified user and shown on the flash board using the Wi-Fi module that is installed at the digital notice board. According to this suggested model, an authorised admin can post a message from any location, and the message will appear on the LED. The suggested concept includes several applications, such as support desks in transportation hubs including train, bus, and airport terminals that provide travellers with current/updated information. It works better, especially in congested areas like supermarkets, and decreases costs. Any remote region of the world can be represented on the screen with the most recent news, which is made possible only by IoT.

Keywords: Internet of Things (IoT), Microcontroller, Wi-Fi Module, Flash board

1. Introduction

Notice boards are an informational component in any institution or public space, such as a bus stop or a train station. Dependence on daily routine sticky notes in this age of improvised technology seems strange. The situation is replaced with the idea involving an advanced wireless notice board, and which is maintained by an admin. The Wi-Fi module, a functional component of the system, is the foundation around which the project is based. Using

IoT and a Wi-Fi module, the text may be added, removed, or changed at any time according to the needs.

The system is built using electronic circuits that include a variety of parts, including a Esp8266 module, an LED matrix, a power source, a phone or a computer, etc. With the help of this method, a person can make an announcement by staying in one location i.e., without physical meeting. This system, which carries out numerous tasks like displaying the class schedule and giving the students notes in an institution, is utilised to cut down on the time needed to provide information. When a person sends data to the cloud and when the cloud recognises that the data has been received, the system is active. The cloud is then set to execute forward action, directing the information to the Esp8266 module, and making it accessible to the faculty via a power supply. The Wi-Fi esp8266 main module is used in this research for data handling and manipulation.

2. Related Works

“Development of Simple and Low-Cost Android Based Wireless Notice Board” [1] displayed information on a distant LED board using serial data communication that is based on Bluetooth or Wi-Fi. It is suggested that the notice board be upgraded technologically in order to save power and time and swiftly give the desired person the information. This device communicates with the intended consumers immediately and is straightforward, inexpensive, and easy to use. Applications for this system include banking, schools, restaurants, workplaces, hospitals, scoreboards for sporting events, etc. The system can be enhanced further by the addition of the voice calling feature to allow for use in airports, train stations, and bus terminals.

“Smart Electronics Notice Board Using Wi-Fi” [2] demonstrated a system that wirelessly posts notices to a notice board using Wi-Fi. Notice boards are frequently employed in a wide range of establishments seen daily. The current generation manually manages the advertisement notice boards. It's difficult to participate in this notice-posting procedure. Many resources, such as paper, labour work, money and time, are wasted in this process. In the suggested system, Wi-Fi can transmit data over around 100 metres. The data rate for Wi-Fi is 1 or 2 Mbps. It connects to a variety of point and support network interfaces.

“Small and Medium Range Wireless Electronic Notice Board using Bluetooth and Zig Bee” [3] used the ATmega32 microcontroller from Atmel, along with the wireless medium, to introduce a user friendly, portable, wireless electronic notice board and analyse the performance of each wireless technology based on parameters like range, bit error rate, signal

attenuation, Received Signal Strength Indicator, and power consumption. This device has an portable wireless notice board that is affordable, useable in offices and industries, and has been produced successfully. The transmitted character and functionality of the graphical LCD met all specifications of a notice board.

“Digital Signage Using Wireless Network” [4] provided basic Wi-Fi instructions for a digital signage system. This provided a basic introduction to using a wireless digital display. Modern digital signage systems require changing their material through a pen drive or the internet, although this is just an introduction. Based on the user’s preferences, the notice board is updated every time it is submitted.

3. General Methodology

Designing an autonomous, self-enabled, extremely dependable electronic notice board is the major goal. A display that is connected to a system of servers must continuously watch for incoming user messages, process them, then display the results on an LED screen. Every time the user transmits fresh information, the displayed message ought to be modified. The data that will be shown on the monitor should only be updated by the registered users.

The main goal of the proposed system is to build a message board that displays information supplied by users via websites utilising Android smartphones. Additionally, it intends to develop an easy-to-use system that can receive and display messages and information in a certain manner in relation to time and date, making it simpler for users to keep track of the flash board each day and every time they use the system. Sender and receiver are the two sections that make up a system. Sender oversees communicating important information on the websites in android mobiles. Receiver oversees getting the messages and then it will be displayed in the information flash board.

4. Block Diagram

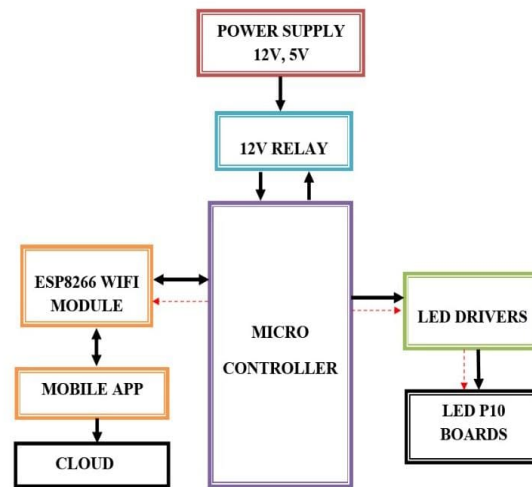


Figure1. Block diagram of the proposed system

4.1 Description

Fig.1. shows the block diagram of information flash board. Mobile app is used for delivering the messages in this system. The data is entered on the user's phone, and once the phone is online, the data is uploaded to the cloud. It may be labelled as an EDGE server if the user connection is reasonably close, meaning high connectivity is needed to complete the activity. When the cloud receives data from the PC or phone, it first asks the user for permission to transmit the data to a Esp8266 module. If the user grants permission, the data is then transferred to the esp8266 and saved on the module. The entire setup depends on a power source, and when that source is turned on, the Esp8266 generates PWM pulses in line with the relevant data as instructed by the user. Only authorised users will be able to send messages to the notice board due to password protection, and any messages or notices sent by users will be displayed on the LED matrix display board. The messages can be transferred as fast as the internet connectivity.

4.2 Details of Components

A. Micro Controller

This system is built around the microchip PIC16F877A microcontroller. This microcontroller is an 8-bit microcontroller with 256 bytes of EEPROM, self-programming, and a top speed of 40 MHz. Moreover, it features two PWM functions, an 8-channel Analogue to Digital converter (A/D), and a synchronous serial connection for serial communication. The synchronous serial port can also be set up for addressable universal asynchronous transmitter

and receiver, 2 wire inter integrated circuit bus, or 3 wire Serial Peripheral Interface (SPI). The PIC16F877A uses FLASH memory technology, allowing for a thousand write-erase cycles. This RISC microcontroller outperforms conventional microcontrollers thanks to its code reduction and 8-bit operation, especially at a speed of 40 MHz .

B. ESP8266 WIFI Module

Using ESP8266 Wi-Fi module, this strategy is put into practise. It has been put into place so that information can be sent and received simultaneously. The information can thus be transmitted very quickly across a wide area. In order to send and receive information across long distances, Wi-Fi has been used. The region has access to up to 100 metres of Wi-Fi coverage distance.

C. Mobile App

Blynk IoT app is used for mobile application. Using a smartphone and Blynk, microcontrollers that are connected to a PC are operated with internet access from anywhere in the globe (for example, control LEDs, servos, receive data, etc.). For Android users, Blynk is available for download from the Google Play store & app store (for apple), giving access to the dashboard and connectivity to the microcontroller. Pushing and dragging widgets from the tools bar and assigning them pins on the microcontroller are all that is required to programme Blynk. Fig.2. shows sending messages from Blynk app.

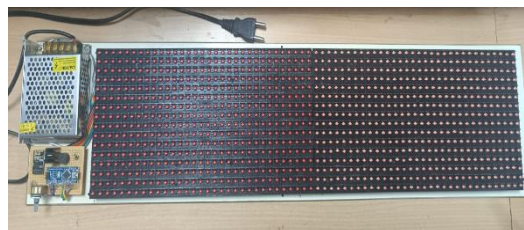


Figure 2. Sending messages from Blynk app

5. Advantages

- User friendly & easy installation.
- Access from anywhere.
- Ensures high security.
- Less power & time consumption.

- Convenient for elderly and physically impaired people.

6. Applications

- Used in hotels to display information about room availabilities and rent, etc.
- Colleges utilize it to display circular, results and daily events.
- The railways use it to display the train stations' schedules and platforms.
- To present nursing facilities based on staff availability, doctor availability, list of specialist doctors, number of patients, etc.

7. Result And Discussion

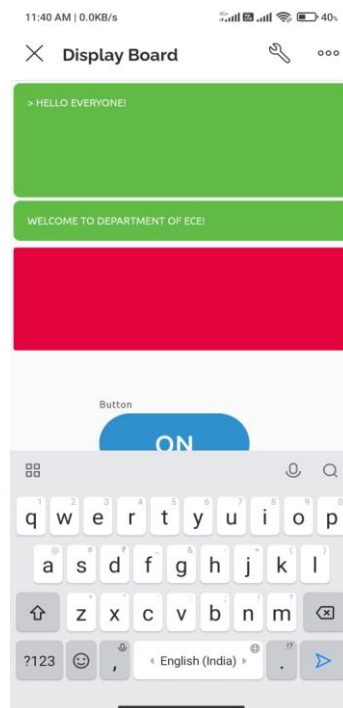


Figure 3. Implementation of information flash board

Fig.3 shows that the projected information flash board's prototype was successfully created. Its mobility is demonstrated easily with which it may be incorporated with any general-purpose display board. The information was transmitted and ultimately flashed on the LED matrix. Hence, the traditional display boards can be replaced with ones that utilize modern technologies. The user-friendly mobile app interface has the potential to improve this system.

The system accepts the message from the app to be shown in the form of a Short Messaging Service (SMS), stores it, verifies that it was intended for that specific display unit, and after confirmation, displays it on the display unit, as determined by IP address. Only one information can be sent and displayed through this mechanism. The suggested technique works well for instant message transfer on campuses.



Figure 4. Output of the flash board

Fig.4. shows the clever information flash board with Wi-Fi. New SMS are accepted by the intelligent electronic notice board system, which then verifies, stores, and displays them on an 8x8 LED screen. It reduces complexity while reducing total development costs. The smart electronic notice board system becomes more intelligent, effective, durable, and portable as a result.

8. Future Enhancement

In future, business version might be able to display numerous pieces of data concurrently. Wi-Fi network is used in the proposed system to send and receive messages while also displaying them on an LCD. To control electrical equipment at a distance, the same technique can be used. Longer characters can be displayed using higher-end microcontrollers and additional memory like RAM, enabling the system to transmit longer messages. A standard red LED may be used as a power indication. It is because, with the LED ON and OFF sign, issues with not actually knowing whether the system is properly plugged into a power outlet or whether the system is not starting up, will be understood.

9. Conclusion

Information flash board using IoT has been proposed in this research. Making use of this technology's notion in wireless communication allows to communicate more quickly and effectively. Messages can be displayed more accurately and efficiently with fewer errors. This flash boards can be used in industries, public places, railway stations, bus stands and in colleges

where staff and students can be notified of information at the same time. It can be placed at public transportation hubs like train stations, bus terminals, and airports, as well as on the sides of the road for traffic control and in case of emergencies at places like malls, hospitals, etc. This device is a user friendly and easy to handle system for everyone. It completely avoids the use of paper for notice displays, allowing for real-time information updates.

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