

Wireless Digital Notice Board using Wi-Fi

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Abstract – A Notice Board is one of the key functionalities at any public places such as schools, colleges, Railway stations, bus stops, airports, etc. This notice boards are very helpful for easily conveying our messages to the public. Conventional notice boards make use of paper and pin to convey notices. This notices are very inconspicuous. People often avoid going near the notice board to read notices. Hence, we have created a digital notice board which will make use of wireless technology and big LED displays to show notices which are easily readable. The notice to be displayed will be sent from user's smartphone.

Key Words: Digital Notice Board, LED Dot Matrix Display, NodeMCU, ESP8266 Wi-Fi, Mobile App.

1. INTRODUCTION

Notice boards have been widely used in public places. We know the significance of using these boards, they are known to be a great tool and effective way of communicating important messages with public. The drawback with conventional notice boards is that they aren't very attractive, also people often avoid reaching to the notice board for reading notices. Our notice board uses LED dot matrix display to display notices which are attractive and easily readable from longer distance. Another disadvantage of conventional notice board is that it requires human interaction to maintain the board, printing notices on paper and pin them on board. With our notice board, a single authenticated user will be able to send notices through his smartphone. This saves time and efforts of printing and pinning. It also eliminates the use paper.

1.1 Overview

Our digital notice board is a circuit designed for displaying notices or messages on P10 LED Dot Matrix Display. It uses an Atmega32A microcontroller along with ESP8266 Wi-Fi module to wirelessly communicate with mobile devices. User will connect to the respective Wi-Fi network and send the notice from a mobile application. This message will be received by ESP8266. It will transmit the data to microcontroller. And microcontroller will display it on LED board.

1.2 Literature survey

The Literature survey is mainly carried out in order to analyze the background of the current project which helps to find out flaws in the existing system and guides on which unsolved problems we can work out.

1.2.1 WIRELESS NOTICE BOARD Our Real-Time Solution [1]

In early wireless communication, GSM was widely used for calling and messaging. Such SMS based digital notice boards uses SIM300 GSM modem to enable wireless communication with microcontroller. Modem is interfaced to the microcontroller with AT commands.

Limitations:-

- Requires a GSM modem with a registered SIM card
- Speed with GSM modem is slower as compared to other wireless technologies
- GSM modem are expensive as compared to other wireless technology such as Wi-Fi

1.2.2 Design and implementation of digital notice board using power line communication [2]

This system uses existing power lines to send the data to a special node or to broadcast to various power line nodes. The address is assigned to each receiver and it response based on their appropriate commands.

Limitations:-

- It is vulnerable to physical interferences
- Expensive to implement

1.2.3 Scrolling LED display using wireless transmission [3]

This system uses 8x8 LED matrix to display character information. The Characters to be displayed on the matrix are first decoded in a particular format according to the

dimensions of per character spacing on the matrix. The character codes to be accessed by the microcontroller are written in C language and converted to equivalent hex format with the help of KEIL uVision software.

Limitations:-

- a. Provides a very little number of characters. In order to increase character set you have to manually write C language code for each character.
- b. This system is also GSM based.

2. Block Diagram

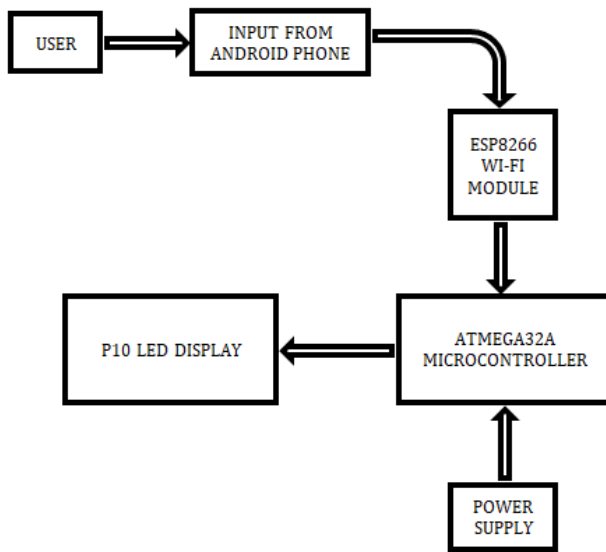


Fig -1: Block Diagram of proposed system

2.1 USER

User is any person who is authorized to send messages to the notice board.

2.2 Input from Android Phone

User can send messages to the digital notice board through his/her smartphone using our android app. This app has simple GUI and is easy to use. First it will ask the username and password which is only given to authorized user. After successful login into the app, it will ask for message to be sent.

2.3 ESP8266

ESP8266 is Wi-Fi module used to enable wireless communication between smartphone and microcontroller. It is very powerful and compact module at very low cost. It can be easily interfaces with microcontroller using any communication

protocols such as UART and SPI. It can be programmed using Arduino IDE, AT commands and Lua script. [4]

2.4 Atmega32A Microcontroller

In our proposed system, we have created a digital notice board using Atmega32A microcontroller. It is CMOS 8-bit controller with AVR enhanced RISC architecture. With powerful single-clock executable instructions, this controller can achieve throughput up to 1 million instructions per second per Mhz. With 16Mhz crystal oscillator, it can give up to 16MIPS throughput. This controller also provides you 1KB EEPROM, 2KB SRAM and 32KB Flash. [5]

2.5 Power Supply

In our proposed system we have used SMPS to power the controller, Wi-Fi module and P10 LED Display.

2.6 P10 LED Display

It is a high brightness LED matrix display. One panel of P10 has total 512 (16x32) high brightness LEDs mounted on a high quality plastic. [6] Any number of such panels can be easily combined in any fashion using FRC cable to increase overall display size. We have used 4 such panels in series to create 128x16 pixel display for our notice board.

3. Working

Once you initialize the system by providing a power supply. ESP8266 Wi-Fi module will look for the specified Wi-Fi network. It is programmed using Arduino IDE. You can establish a Wi-Fi connection using few lines of code. Once the connection is established, it will send the IP address of web server to the notice board.

User have to connect to the Wi-Fi network through the smartphone and enter the IP address in android application. Once the connection between web server and user is established, app will ask the user to enter username and password.

After successful login into the application, it will ask the user to enter message to be displayed on the notice board. Once user clicks on the submit button, message will be sent to the server. Sent message will be received by ESP8266 module and then passed to the P10 display board by the controller.

4. Results

4.1 IP input Window:

It is the input window to enter IP address.

Enter IP address

Fig -2: IP input window

4.2 Login Window

This input window asks user to enter username and password to authenticate the user.

Sign In

Fig -3: Login Window

4.3 Notice input window

This input window asks the user to enter message to be displayed on the notice board.

Enter Notice

Fig -4: Notice Window

4.4 Digital notice board



Fig -4: Proposed Notice Board

5. CONCLUSIONS

We have successfully created the Digital notice board using atmega32A microcontroller in combination with ESP8266 ESP01 Wi-Fi module. The proposed system uses authentication system to authorize the user to send notices. This system has various applications. It can be used to display notices at educational institutes, railway info at railway stations, advertisements, etc.

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