LED NOTICE BOARD BASED ON IOT

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Abstract - With the increasing in technology everything around us becoming smart. This leading to the development of new electronic devices for ease use. Keeping a view on this we are designing and developing an notice board which is handled digitally by using IoT technology with android mobile application. The primary objective of this project is to develop automatic, highly reliable and self enable led notice board. The DMD connected with the cloud will continuously waiting for the message from the user, if the user uploads the information in the MQTT mobile Application, it will automatically uploaded to the DMD. By using Node MCU ESP8266, the information can be upload to the DMD. The user can write the information from anywhere in the world to the DMD. Along with displaying important information on LED screen it can also provide voice assistance feature which makes it more attractive to use. This voice assistance is enabled by using Raspberry Pi. This will reduces the time to update the information and efficiently transfers the information to the end user. This is best suitable wireless notice board works with internet connection as the wireless world moving towards the fifth generation (5G) era.

Key Words: Node MCU ESP8266, Raspberry Pi, MQTT Mobile Application, Digital Matrix Display, Voice Assistance Speaker, IoT.

1.INTRODUCTION

In this modern world, we are Concentrating on accessing the information quickly and notice boards are the primary thing to display information. Paper notice boards have several drawbacks, including Extra labour charges, Consumes whole time and resources. Wired notice boards have several drawbacks, including Inflexible in placement, Complex installation, Limited scalability. GSM notice boards have several drawbacks, including Limited range, Dependence on GSM network, and Cost. It is very crucial to deliver the messages faster.

To overcome this problem, a wireless board using IoT technology is designed to display the information. In this project it displays the messages on the LED notice board that an user desires. We are using two panels of notice boards; each panel consists of 512 LED lights which are sequentially arranged in 16 rows and 32 columns (16*32). In addition to the display, the project consists of ESP8266 Wi-Fi module which

helps the system to connect to the Wi-Fi and cloud server. Switched mode Power supply is used for receiving the electrical power efficiently. Raspberry Pi and speaker are connected through the Bluetooth to provide voice assistance of the displayed information. A user-friendly android app is made with the help of MIT app inventor. Notice boards are essential at Public Spaces, Educational Institutions, Corporate Environments, Healthcare settings, Sports facilities, Entertainment, Manufacturing facilities, Transportation for displaying the important messages. This can prove to help the users save a lot of time against traditional pin and paper notice display.

1.1 OBJECTIVE

The major objectives for designing this led notice board are mentioned below:

To develop an e-Notice Board to share information by using user friendly Android App.

To Develop through WI-FI system which is the fastest usage of internet.

To provide user authentication for better security.

To save time without being manually handled.

To share the messages in an simplest way.

2. THE PROPOSED SYSTEM

In proposed system user friendly android app is used so that who entered correct login credentials can send the information. The authorized person can able to send the messages from any corner where internet facility is available. The message is transferred using wireless technology and this message will be displayed on the LED notice board. There is no need of any person for pasting the notices on the notice board so that man power is not required.

The proposed system consists of Raspberry pi, ESP8266 Wi-Fi module, Speaker, LED display, Cloud server. Speaker and Raspberry pi are connected through the Bluetooth connection. Android application is created with MIT app inventor. ESP8266 Wi-Fi module is connected to the hotspot of the host. When the user sends the message from the android app by

connecting the MQTT, ESP8266 Wi-Fi module collects the information from the MQTT and enables the LED notice board by communicating with cloud server. Raspberry pi receives the information which is stored in the cloud server and provides voice assistance of the message which is displayed on the notice board through speaker.

2.1 Block Diagram

Fig -1: Block Diagram

From the above block diagram,

Mobile application can communicate with the ESP8266 and the Raspberry Pi. By using MQTT app invertor an cross-platform app is created to run on both IOS and Android devices.

Communication protocols are built between mobile application and ESP8266, Raspberry Pi by connecting to a similar Wi-Fi network connection.

ESP8266 and Raspberry Pi receives commands from mobile application and controls the LED display and speaker respectively.

2.2 Schematic Diagram

Fig -2: Schematic Diagram
From the above schematic diagram,

A, and B pins represents the multiplex select pins, they take digital input to select any multiplex rows.

NOE represents the Enable pin. This pin is mainly used for controlling the brightness levels of the LED panel by giving a PWM pulse to it.

CLK (shift clock), SCLK (Store Clock) and R (Data pin) are the normal shift register control pins. The main use of CLK pin is to clock each pixel into the Dot Matrix Display shift registers and the SCLK is to latch the current content of the Dot Matrix Display shift registers.

GND pins of DMD is connected to the GND pins of ESP8266 Wi-Fi-Module.

2.3 Algorithm

Following step by step procedure of the actual working of the system,

1. Start.

2. Login into application to access notice board.

3. Provide user authentication details. If the user details is valid then go to next step otherwise go to step previous step.

4. Switch on Bluetooth to connect MQQT. After connecting it will display as MQTT connected.

5. Provide Information in the text box and click on submit to upload.

6. It display messages in the First in first out order (FIFO)

7. The displayed message is stored in cloud and raspberry pi will announce the information through speaker.

8. Check for new message. If it occurs go to step 5. else previous message will be displayed.

9. The above steps are displayed until power supply is maintained.

10. Stop.

2.4 Working Mechanism

Below steps shows the overall working mechanism of this led notice board with the practical implemented pictures.

The below displayed android app is created by using MQTT app invertor.

STEP 1:

For sharing information a sender should open our project app and must enter username and password in the login page. The below figure 3 shows our login page.
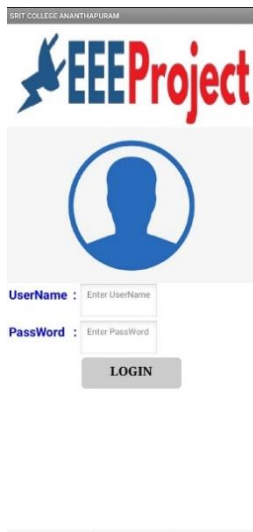

Fig. 3: Login page

STEP 2:

The login credentials are predetermined, if the user gives wrong details then an error will be displayed as incorrect username/password. It is shown in below figure 4.

Fig. 4: error for incorrect details in login page

STEP 3:

After providing correct credentials, next slide will be display in the app as shown in figure 5.

Fig. 5: Main Page of App

STEP 4:

Now Bluetooth connection should be paired with ESP8266, after successfully connected with Bluetooth it will display as Connected on notice board as shown in Figure 6.

Now we can share information by entering into text box and click on send text to get display. For providing voice assistance for the displayed information we can enable/disable the speaker button.
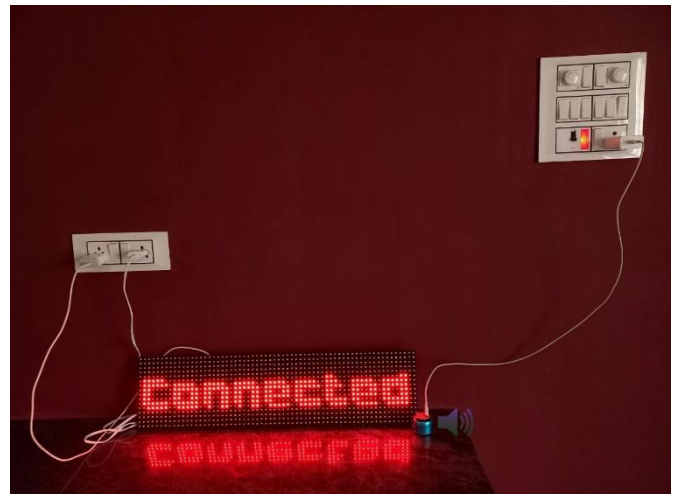

Fig. 6: Notice board display after Bluetooth connection.

The above figure 6 shows the overall final setup of led notice board.

The below figure 7 shows the final output of this project setup.

Fig. 6: Output

3. CONCLUSION

With IoT based led notice boards, now it is possible to spread information in real time to a large audience regardless of their location. These boards are designed to be easily accessible by using user friendly android application which makes it more easy for anyone to add or remove information. The voice assistance feature of this notice board makes more attractive for anyone to spread information quickly. In addition to this, they are cost-effective, easy to install and maintain, and can remotely controlled.

As the technology continues to evolve, this notice board have made communication more efficient, effective, and convenient.

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