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REAL TIME LED DISPLAY FOR DATE AND TIME STASTICS

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Abstract: - The Evolution of Technology made Human life easier where we can compare the timeline of using landline and smart phone, right now every human being is surrounded by smart gadgets where human interference has reduced to perform mechanical works. The physical work effort is high for advertising or passing a notice throw a paper, this kind of problem is outplayed by using micro controller based digital LED boards, in this system the message is programmed into the microcontroller which is wired to LED board the microcontroller will pass the message to LED board where led board will display the message. This LED displays are becoming primary need in heavy crowded places such as malls, railway stations, educational institutions to display information regarding offers, platforms or important notices. To change the message in microcontroller we have to reprogram it every time we can outplay this scenario by integrating it by new wireless IoT technology. This paper will paper the development made in IoT based real time LED display board by using esp32 and Arduino.

Keywords: Arduino UNO, ESP32, Led Display, Led Board, integrating.

I. INTRODUCTION

This project is based on the idea of designing a led display system for wireless communication between mobile and led display. In this, wireless communication is done by Wi-Fi or Bluetooth. Now a day every mobile consists of Wi-Fi and Bluetooth features. The users having mobile hand set can send message to the display to flash or to display message content in scrolling pattern. Bluetooth module is used to receive the message in circuit. The message content sent by the user is stored in Bluetooth module in case, the user can send message by using wifi then led controller was received the message and stored in it.

The led dot matrix display consist 8*8 matrix with a distance between the rows or pins is 10mm. a preprogrammed microcontroller is used to supply with the standard format of character set containing character and

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alphabets with the possibility of generating and displaying punctuation marks, numbers, special characters, simple graphics. Each character is display in the pattern based on hexadecimal values that are stored in the microcontroller that is termed as look up or match table. The microcontroller looks or matches from pattern and sent out the data bits serially and clock signal. Shift registers are used to shift dada between the pins connected to each led. Persistence of vision is the base of the fast scanning of data that is set on rows and column, which allows the pattern to be display because of persistence of vision. Decode counter is used to control the rows on the bases of pulses that is connected to the clock input of the microcontroller the design involves both hardware and software.

The wireless system of communication requires the following hardware components

- LED dot matrix Display
- HC-05 Bluetooth module
- Arduino Uno
- Power Supply (5V)
- WIFI Led controller

Propeller is a term associated with circular rotating objects. Conventional methods of displaying images are mainly using LCD display and dot-matrix where a huge number of LED's and power processors are used to create the display. The main idea of this project is to use minimum number of LED's and components to create a virtual display with minimum power consumption. For the purpose of displaying a set of LEDs have been used, hence the name Propeller LED display. The main advantage of propeller displays as compared to the LED matrix board is its lower power consumption. The first propeller clock was created by Bob Blick, where a single array of LED’s was used to produce the display. Propeller clock uses extremely small LED's for displaying the typescript and symbols on its assembly in an appropriate way. The main mechanism behind virtual display is the phenomenon of Persistence of vision (POV). The phenomenon is related to vision capability of human eye by which an after image is thought to persist for approximately 1/25th of a second. So, if someone is observing the images at a rate of 25 images per second, then they appear to be continuous. Existing systems do employ POV principle, but for displaying each pixel, individual LED is used [1]. This results in a huge number of LEDs even for small sized displays. By using a propeller type display, LED count can be kept minimum. The LEDs are attached to a rotating board. They turn ON and OFF at very definite and precise time intervals. All we can see are the

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lighted dots from the LED's making a readable display that seems to float [2]. In the project an array of LED's, microcontroller and infrared receiver are placed on the board and are rotated by a motor at a very high rpm. The prototyping board itself is used as the propeller to minimize the weight and parts used for the propeller LED display. Applications can find their way into cost effective solutions for large public displays, information systems. It can directly replace Railway station information displays, bus stands and many more places.

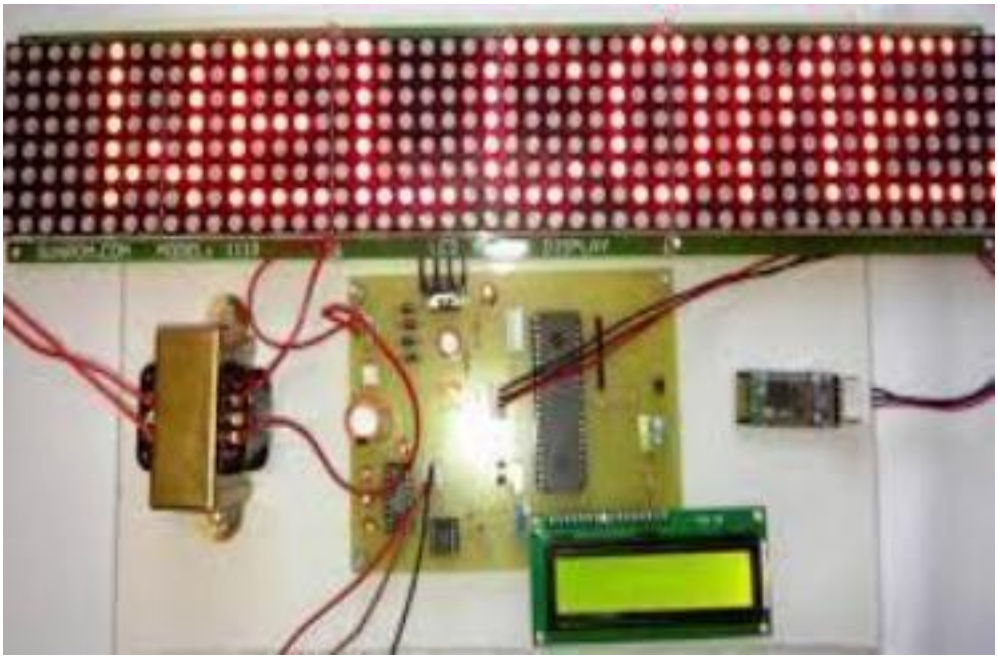

Fig 1 LED Display

II. PROPOSED METHODOLOGY

The proposed method for the development of the smart notice board s ystem involves a comprehensive approach that addresses the system require ments, hardware and software design and development, integration and testi ng, and deployment and maintenance.

To begin with, we will analyse the system requirements to determine t he specific needs and functionality of the system. This will include assessing the type of messages to be displayed, the size and location of the display, an d the required features of the system. This analysis will serve as a basis for designing and developing the hardware components of the system, including the P10 LED display, Atmega32p microcontroller, and Wi-Fi module. We wil l also design and develop the software components of the system, which incl udes the development of an intelligent program written in embedded 'C' lang uage that controls the system's operations. An Android SSH client such will be developed to enable the remote management of the system.

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Once the hardware and software components are developed, we will in tegrate them and test the system's functionality. This includes testing the sy stem's ability to receive and display text-based commands transmitted throu gh Wi-Fi. We will also validate the system's effectiveness in various settings, such as schools, colleges, and banks.

Finally, we will deploy the system and provide ongoing maintenance a nd support to ensure its optimal performance. This will include creating use r manuals and technical documentation, as well as training users on how to operate the system.

Overall, the proposed method for the development of the smart notice board system is designed to provide an efficient, cost-effective, and easy-to-u se solution for displaying important information in public spaces. The compr ehensive approach ensures that the system meets the needs of its users and provides an effective means of communication and information disseminatio n.

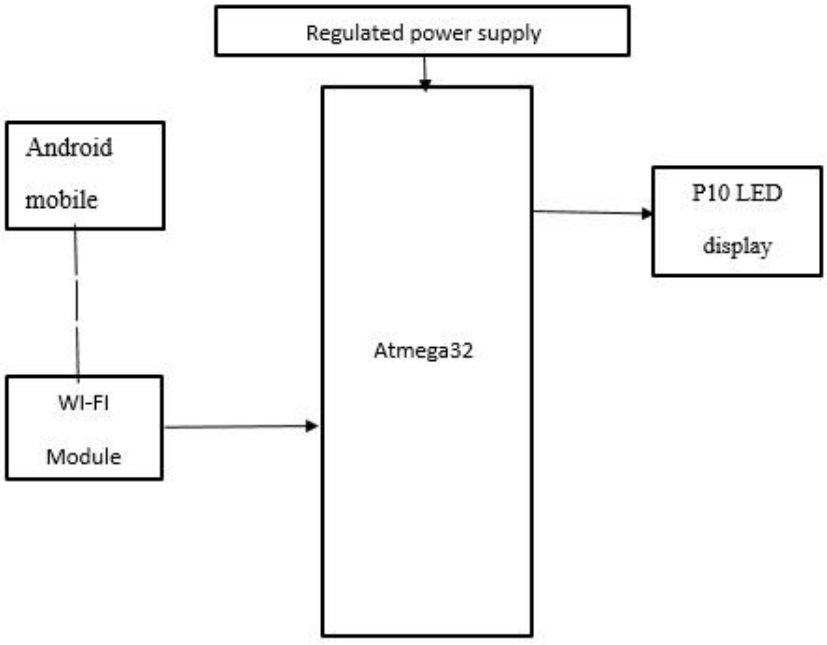

Fig 2 Complete output Block Diagram

The smart notice board system comprises several hardware and software co mponents that work together to display important messages in public space s. The main components of the system include:

1. *P10 LED Display:* The P10 LED display is a high-resolution display that is used to display the messages. It is a modular display made up of small LED panels that can be assembled into any size and shape required.

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2. *Atmega32p Microcontroller:* 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.
3. *Wi-Fi Module:* 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. *Embedded 'C' Program:* The embedded 'C' program is the software component of the system that controls the operations of the microcontroller. It is a low-level programming language that is used to write efficient and fast code for embedded systems.
5. *Android SSH Client:* An Android SSH client such as Juice SSH is used to remotely manage the system. This allows the user to send commands and messages to the system from a remote location using a smartphone or tablet.
6. *Power Supply:* The system requires a power supply to operate. In this project, a 5V DC power supply is used to power the microcontroller and other hardware components.

Together, these components work to provide an efficient and effective means of displaying important information in public spaces such as schools, colleges, and banks. The system is designed to be cost-effective and can be easily deployed and maintained.

III. LITERATURE REVIEW

The use of digital signage systems for displaying information has gained significant popularity in recent years due to their ability to provide real-time, targeted, and dynamic content. There is a growing body of literature that discusses the effectiveness of digital signage systems in various settings, including educational institutions, healthcare facilities, and public spaces.

In a study by Wiewiora et al. (2016), digital signage systems were found to be an effective means of communicating with patients in healthcare settings. The study showed that patients who were exposed to digital signage messages were more likely to remember the information and act on it compared to those who received the same information through traditional means.

In the education sector, digital signage systems have been used to improve communication between students and faculty. A study by Bolkan et al. (2017) showed that digital signage systems were effective in delivering messages related to academic events, activities, and deadlines. The study also foun

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d that the use of digital signage systems improved students' satisfaction wit h communication and information dissemination.

In public spaces such as airports and transportation hubs, digital sign age systems have been used to provide real-time information on arrivals, de partures, and delays. A study by Zhang et al. (2017) showed that digital sign age systems were effective in reducing passengers' perceived waiting time an d increasing their satisfaction levels.

The use of IoT technology in digital signage systems has also been exp lored in the literature. A study by Jia et al. (2019) proposed a smart city digi tal signage system that uses IoT technology to collect and analyze data from various sources, including weather forecasts and traffic patterns, to provide targeted and personalized content to users.

Overall, the literature suggests that digital signage systems, including those that incorporate IoT technology, are effective in improving communicat ion and information dissemination in various settings. The proposed smart notice board system, which combines P10 LED display and IoT technology, has the potential to provide an efficient and cost-effective means of displayin g important information in public spaces.

IV. IMPLEMENTATION

1. *Design the Circuit:* The first step is to design the circuit that will be used to control the P10 LED display and receive commands from the Wi-Fi module. This involves selecting the appropriate components, including the Atmega32p microcontroller, Wi-Fi module, and Power supply, and wiring them together.
2. *Write the embedded 'C' Program:* Once the circuit design is complete, the next step is to write the embedded 'C' program that will be loaded onto the Atmega32p microcontroller. The program should be designed to receive commands from the Wi-Fi module and display the messages on the P10 LED display.
3. *Configure the Wi-Fi Module:* The next step is to configure the Wi-Fi module to connect to the internet and receive commands from the user. This involves setting up the Wi-Fi module with the appropriate network credentials and configuring it to listen for incoming commands.
4. *Install and Configure the Android SSH Client:* To remotely manage the system, an Android SSH client such as Juice SSH needs to be installed and configured on a smartphone or tablet. This involves setting up the SSH connection to the system and configuring the client to send commands to the system.

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5. *Test the System:* Once the circuit is wired, the program is written, and the Wi-Fi module and Android SSH client are configured, the system can be tested to ensure that it is working correctly. This involves sending commands and messages to the system and verifying that they are displayed on the P10 LED display.
6. *Deploy the System:* Once the system has been tested, it can be deployed in the desired location. This involves mounting the P10 LED display and connecting it to the circuit, configuring the Wi-Fi module to connect to the local network, and verifying that the system is functioning correctly.

Overall, the implementation of the smart notice board system involves designing and building the circuit, programming the microcontroller, configu ring the Wi-Fi module and Android SSH client, testing the system, and deplo ying it in the desired location.

Fig 3 Hardware Kit

V. CONCLUSION

In conclusion, the proposed smart notice board system is an innovative solution for displaying important messages in public places such as schools, colleges, and banks. The system leverages IoT technology and P10 LED display to provide an efficient and effective way of communicating important information to the public. By utilizing an Atmega32p microcontroller, Wi-Fi module, and embedded \'C\' program, the system can receive commands from an Android SSH client and display messages on the

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P10 LED display in real-time. The implementation of the system involves designing and building the circuit, programming the microcontroller, configuring the Wi-Fi module and Android SSH client, testing the system, and deploying it in the desired location. This cost-effective solution has the potential to improve communication and information dissemination in various settings, making it a valuable addition to any public space.

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