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Wi-Fi Based E-Notice Board for Higher Educational Institutions

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Abstract : In higher educational institutions, effective communication is paramount for disseminating information to students and faculty members. Traditional notice boards have limitations in terms of accessibility and real-time updates. To address these challenges, this paper proposes the development of a Wi-Fi based E-Notice Board system utilizing SMPS power supply, NodeMCU, a local web server, and two P10 LED display modules connected in series. The proposed system leverages NodeMCU, a low-cost Wi-Fi enabled microcontroller, as the central processing unit. The system architecture includes a local web server hosted on the NodeMCU, facilitating seamless communication between the server and the LED display modules. The SMPS power supply ensures reliable power distribution to the components, enhancing system stability. Key functionalities of the E-Notice Board system include real-time message updates, remote access for administrators, and dynamic content display. Users can access the notice board through any Wi-Fi enabled device, enabling convenient dissemination of information irrespective of physical location. Administrators can remotely update notices through the web interface, ensuring timely communication of announcements, events, and important information. The integration of P10 LED display modules enhances visibility and readability, making the notice board suitable for large educational environments. Additionally, the use of multiple LED modules connected in series allows for scalability, enabling the system to accommodate varying display requirements. The proposed Wi-Fi based E-Notice Board system offers an efficient and cost-effective solution for improving communication within higher educational institutions. By harnessing the power of Wi-Fi connectivity and LED display technology, the system provides a versatile platform for sharing information, fostering engagement, and enhancing overall campus communication.

IndexTerms **- Node MCU, P10 Module, SMPS, Notice Board.**

I. INTRODUCTION

In the fast-paced world of higher education, effective communication is vital for ensuring smooth operations, disseminating important information, and fostering a sense of community among students and faculty members. Traditional notice boards, though ubiquitous, often fall short in delivering timely updates and engaging content. With the advancement of technology, there arises a need for innovative solutions to address these communication challenges.

In response to this need, we propose the development of a Wi-Fi based E-Notice Board system tailored specifically for higher educational institutions. This system aims to revolutionize campus communication by leveraging the power of Wi-Fi connectivity and digital display technology to create a dynamic and interactive platform for sharing information.

At the heart of this system lies the integration of modern components such as SMPS power supply, NodeMCU microcontroller, local web server, and P10 LED display modules. By harnessing these technologies, we can create a versatile and scalable solution capable of meeting the diverse communication needs of educational environments.

The Wi-Fi based E-Notice Board system offers several advantages over traditional notice boards. Firstly, it enables real-time updates, allowing administrators to instantly broadcast announcements, event schedules, and important notices to the entire campus community. This ensures that information reaches its intended audience promptly, reducing the risk of miscommunication or missed deadlines.

Secondly, the system provides remote accessibility, allowing administrators to manage and update the notice board content from anywhere with an internet connection. This flexibility eliminates the need for manual intervention, streamlining the process of content management and ensuring consistency across all displays.

Furthermore, the use of LED display modules enhances visibility and readability, making the notice board content easily accessible even from a distance. Whether it's displaying text messages, images, or multimedia content, the LED display modules offer vibrant and eye-catching visuals that capture the attention of passersby.

In summary, the Wi-Fi based E-Notice Board system represents a significant advancement in campus communication technology. By combining the convenience of Wi-Fi connectivity with the versatility of digital displays, this system empowers educational institutions to enhance communication, foster engagement, and create a more connected campus community. Throughout this paper, we will delve deeper into the technical details, implementation process, and potential benefits of this innovative solution.

The organization of this document is as follows. In Section 2 (Literature survey), shown, In Section 3 shown about the existing method and In Section 4 (Proposed method), presented. In Section 5 discussed Experimental Results and Discussed in Section 6(Conclusion).

II. LITERATURE SURVEY

"Message Displayed on LCD Screen using GSM and Bluetooth Technology" by Sravan Shah (2015): This paper likely focuses on the implementation of a message display system using both GSM and Bluetooth technologies. It could explore how these technologies are integrated to enable remote message display on an LCD screen, potentially allowing for versatile communication methods and accessibility.[1]

"Android Based Wireless Notice board and Printer" by Prof. Sudhir Kadam, Abhishek Saxena, Tushar Gaurav (2015): This study may discuss the development of an Android-based notice board system integrated with a printer. It likely explores how Android technology is utilized to create a wireless communication platform for displaying notices and potentially printing them, offering convenience and flexibility in information dissemination.[2]

"GSM based Wireless Notice Board" by Prof. Ravindra Joshi, Abhishek Gupta, Rani Borkar, Samita Gawas, Sarang Joshi (2016): This research could delve into the implementation of a notice board system utilizing GSM technology for wireless communication. It may explore how GSM modules are used to transmit messages to the notice board, enabling remote updates and real-time information dissemination.[3]

"Android Controlled Digital Notice Board" by Prof. Madhavi Repe, Akshay Hadoltikar, Pranav Deshmukh, Sumit Ingle (2016): This paper might focus on the development of a digital notice board system controlled via an Android application. It likely discusses the use of Android devices to remotely manage and update the content displayed on the notice board, offering convenience and flexibility to administrators.[4]

"Remotely Controlled Android Based Electronic Notice Board" by Prof. P.yakaiah, Bijjam Swathi, M. Jhansi, B. Nikhala, K.Shiva Prasad (2017): This study may explore the implementation of an electronic notice board system controlled remotely through an Android interface. It could discuss the integration of Android technology to enable administrators to update and manage notice board content from anywhere with internet access.[5]

"Review on Electronic Notice Board" by Darshika Morey, Mamta Taikar, Rageeni Waghmare, Vivek Ghumde (2018): This review likely provides an overview of existing electronic notice board systems, discussing their features, advantages, and limitations. It may offer insights into the various technologies and approaches used in electronic notice board development.[6]

"Digital Notice Board" by Modi Tejal Prakash, Kureshi Noshin Ayaz, Oswal Pratiksha Sumtilal (2017): This paper may present a digital notice board system, potentially discussing its design, implementation, and functionality. It could explore how digital technologies are utilized to create an efficient and user-friendly notice board platform.[7]

"GSM Based Wireless Electronic Notice Board" by Swapnil S. Kambale, Nilesh B. Swami, Punam S. Kadam, Prof. Vijay J. Madane (2018): This study may focus on the development of a wireless electronic notice board system using GSM technology for communication. It could discuss the integration of GSM modules to enable remote updates and real-time information dissemination on the notice board. [8]

"Wireless Digital Notice Board uses GSM Technology" by Ramachandra K. Gaurav, Rohit Jagtap (2015): This research may discuss the implementation of a digital notice board system utilizing GSM technology for wireless communication. It could explore how GSM modules are used to transmit messages to the notice board, enabling remote management and updates. [9]

"Display message on Notice Board using GSM" by Foram Kamdar, Anubbhav Malhotra, Pritish Mahadik (2013): This paper likely focuses on the implementation of a notice board system where messages are displayed using GSM technology. It could discuss the design and functionality of the system, highlighting the role of GSM modules in message transmission.[10]

These references provide a comprehensive overview of the research and development efforts in the field of electronic notice board systems, showcasing various technologies and methodologies used to enhance communication in educational institutions and other settings.

III. PROBLEM ANALYSIS

Early days to display any information, circulars, daily events are to be display in LCD with help of GSM and Zig-Bee. It is usefull to display in early days but nowadays this is too difficult process because GSM has been used large distance area but if anywhere the tower problem is occurred it total damage the output display. It has to cover the smaller area and it manufactures small market hesitant to release in the world. The Zig-Bee has been used to send the information it only passing through the small coverage area to be transmit and receive the output. Zig-Bee is used mainly in the concentrators, data collectors, repeaters, and meters installed in the urban distribution.so using Wi-Fi to display the information passing very fast and large coverage distance to be accessed so to saving our time due to it act a transmit and receive the information at a time.

IV. PROPOSED METHOD

The proposed Wi-Fi Based E-Notice Board system aims to revolutionize campus communication by integrating modern technologies to create a dynamic and interactive platform for sharing information within higher educational institutions. At its core, the system utilizes SMPS power supply for reliable power distribution to the components, ensuring uninterrupted

operation. The NodeMCU microcontroller serves as the central processing unit, facilitating communication between the local web server and the P10 LED display modules. Leveraging the capabilities of Wi-Fi connectivity, the system establishes a networked environment where administrators can remotely access the local web server to manage and update notice board content in real-time. This remote accessibility eliminates the need for manual intervention, streamlining the process of content management and ensuring consistency across all display modules. The integration of P10 LED display modules enhances visibility and readability, providing vibrant and eye-catching visuals for conveying announcements, event schedules, and important notices. By combining these technologies, the proposed system offers an efficient and scalable solution for enhancing communication within higher educational institutions, fostering engagement, and creating a more connected campus community.

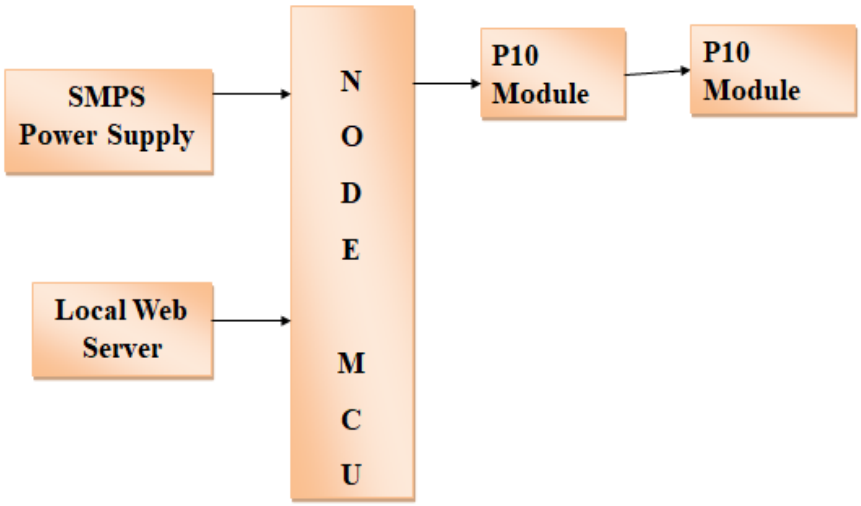


Figure 1: Proposed Flow Diagram

A. Hardware Description

1. Node MCU

Node Microcontroller ESP8266: ESP8266EX provides notable integrated Wi-Fi SoC solution to meet wireless customer's continuous needs for WiFi efficient electricity usage, compact design, and dependable overall performance inside the internet of things industry. While ESP8266EX hosts the application, it promptly boots up from the flash. They included excessive speed cache that allows us to grow the system performance and optimize gadget memory. Also, ESP8266EX will be applicable to any microcontroller design as a WiFi adaptor via SPI/SDIO or UART interfaces ESP8266EX desegregate strength amplifier and antenna, switches, low noise acquire amplifier, filters, and energy management modules except the Wi-Fi functionalities, ESP8266EX additionally integrates a far better version of Tensilica's L106 Diamond collection 32-bit processor and on-chip SRAM.

Figure 2: Node MCU Controller

2. P10 LED

P10 LED: P10 32x16 (total 512 LEDs) LED show module is the perfect manner to prepare any size of outdoor or Indoor LED show signal board. Dotmatrix display or more generally called running text is often observed in stores as a means of advertising and marketing their products, it's practical and flexible in its use that inspires commercial enterprise actors to use it as advertising advice. There's no damage in the usage of bigger energy deliver rated for greater Amps (e.g. a 10A supply), but by no means use one with a higher Voltage (use 5V, period). This panel is having total of 512 excessive brightness pink led's mounted on a high pleasant plastic housing designed for nice show results.

Figure 3: P10 LED Module

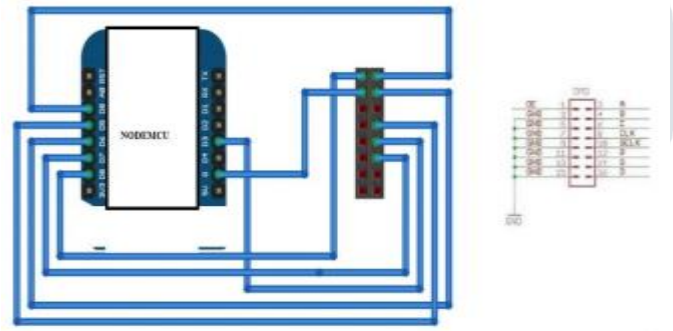
3. SMPS

A switched-mode power supply (SMPS), also called switching-mode power supply, switch-mode power supply, switched power supply, or simply switcher

Figure 4: SMPS

B. Methodology

The Nodemcu ESP8266 family controller is used to attach the Wi-Fi community p10 LED display is used for the output. The web page is created inside the Nodemcu the use of programming. The IP address is allotted to the Nodemcu from the hotspot and we will access the internet page to ship the message to display on P10 LED. The display message is dispatched via the net browser to an ESP8266 module this is configured as an internet-server. No Arduino or every other microcontroller is used.



P10 led panel input pins	ESP8266 pins
A	D0
B	D6
CLK	D5
SCK	D3
R	D7
NOE	D8
GND	GND

Figure 5: Node MCU connected circuit diagram

B. Implementation

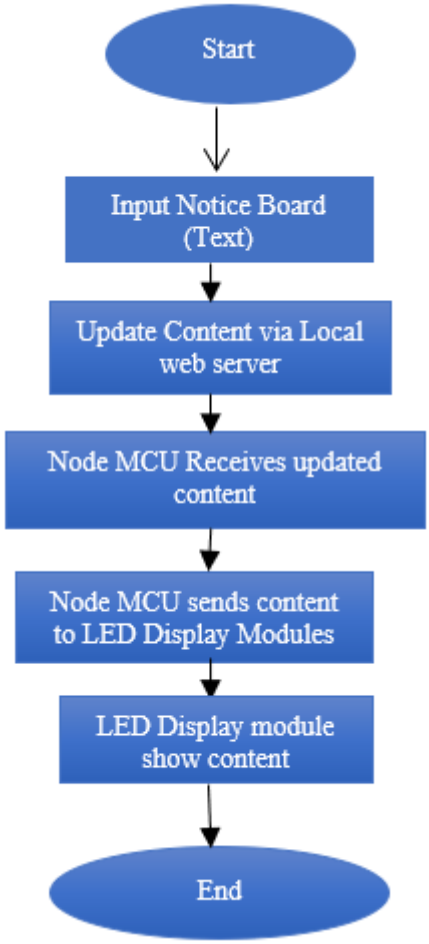


Figure 6: Flow Diagram

This flowchart illustrates the basic flow of the system:

1. **Input Notice Board Content**: Content such as text, images, or announcements is inputted into the system. This could be done through a web interface hosted on the local web server.
2. **Update Content via Local Web Server**: Administrators access the local web server to update and manage the content displayed on the notice board.
3. **NodeMCU Receives Updated Content**: The NodeMCU microcontroller receives the updated content from the local web server.
4. **NodeMCU Sends Content to LED Display Modules**: The NodeMCU then sends the updated content to the connected LED display modules.
5. **LED Display Modules Show Content**: The LED display modules receive the content from the NodeMCU and display it on the notice board for students and faculty to see.
6. **End**: The process end

V.EXPERIMENNTAL RESULTS

At the beginning of the experiment, the notice board system is powered on, and the initial message "ECE Department to Siddhartha" is displayed on the LED display modules. This message serves as a placeholder or default content until it is updated with new information. The administrator accesses the local web server interface, which allows them to input and update content on the notice board. Upon accessing the web server, the administrator enters the desired message or announcement to be displayed on the notice board. The entered message is then submitted through the web interface, initiating the update process. The NodeMCU microcontroller, acting as the central processing unit, receives the updated message data from the local web server. Upon receiving the new message, the NodeMCU processes the data and prepares it for transmission to the LED display modules. The NodeMCU sends the updated message data to the connected LED display modules. The LED display modules

receive the updated message and replace the initial "ECE Department to Siddhartha" message with the newly inputted content. The updated message is then displayed on the notice board for viewers to see.

Figure 7: Flow Diagram

VI. CONCLUSION

This the Wi-Fi based E-Notice Board system presents a promising solution for enhancing communication within higher educational institutions. Through the integration of modern technologies such as SMPS power supply, NodeMCU microcontroller, local web server, and P10 LED display modules, the system enables efficient dissemination of information in real-time.

The experimental results demonstrate the system's ability to display initial messages and seamlessly update content via the local web server. The transition from the initial "ECE Department to Siddhartha" message to the updated message exemplifies the system's practicality and effectiveness in conveying timely information to students and faculty members.

The system's remote accessibility and dynamic content display capabilities offer flexibility and convenience to administrators, streamlining the process of content management and ensuring consistency across all display modules. Additionally, the integration of LED display modules enhances visibility and readability, creating vibrant and eye-catching visuals for communicating announcements, event schedules, and important notices.

Overall, the Wi-Fi based E-Notice Board system represents a significant advancement in campus communication technology, fostering engagement and creating a more connected campus community. The proposed method can be extended with Develop mobile applications that enable students and faculty members to receive notifications and interact with the notice board system directly from their smartphones.

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