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IOT Based College Notice Board LED Display

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***Abstract:** This project aims to develop a smart notice board system using P10 LED display and IoT technology. The system is designed to display important messages in schools, colleges, banks, and other public places. The system is controlled by an Atmega32p microcontroller, which interfaces with the Wi-Fi module and P10 LED display. Text-based commands are transmitted through Wi-Fi and received by the esp8266 Wi-Fi module. The microcontroller processes the information and scrolls the message on the P10 LED display. The system replaces the older message with a new one. The Atmega32p is loaded with an intelligent program written in embedded 'C' language to perform the task. The system provides an efficient and effective way of displaying important information to the public. The project is a cost-effective solution that can be implemented in various settings to improve communication and information dissemination. The system can be remotely managed through an Android SSH client such as JuiceSSH. Overall, the project provides an effective solution for displaying important information to the public in various settings.*

I. INTRODUCTION

The communication of important information in public spaces is crucial for the effective functioning of these institutions. The traditional notice board systems used to display such information are often inefficient, time-consuming, and labor-intensive. In this project, we aim to develop a smart notice board system that utilizes P10 LED display and IoT technology to provide an efficient and cost-effective solution for displaying important information. The system is designed to be controlled by an Atmega32p microcontroller, which interfaces with the Wi-Fi module and P10 LED display. The system can be remotely managed through an Android SSH client such as JuiceSSH, allowing for easy and efficient management of the displayed information, even from a remote location. The project's objective is to provide an efficient and effective way of displaying important information to the public in various settings, including schools, colleges, banks, and other public places. The system is cost-effective, easy to use, and scalable, making it suitable for implementation in different institutions. In this project, we will present the design, implementation, and testing of the smart notice board system. We will also discuss the challenges faced during the development of the system and the solutions that were implemented. Finally, we will highlight the benefits of the system and provide future directions for research in this area.

II. PROPOSED METHODOLOGY

The proposed method for the development of the smart notice board system involves a comprehensive approach that addresses the system requirements, hardware and software design and development, integration and testing, and deployment and maintenance.

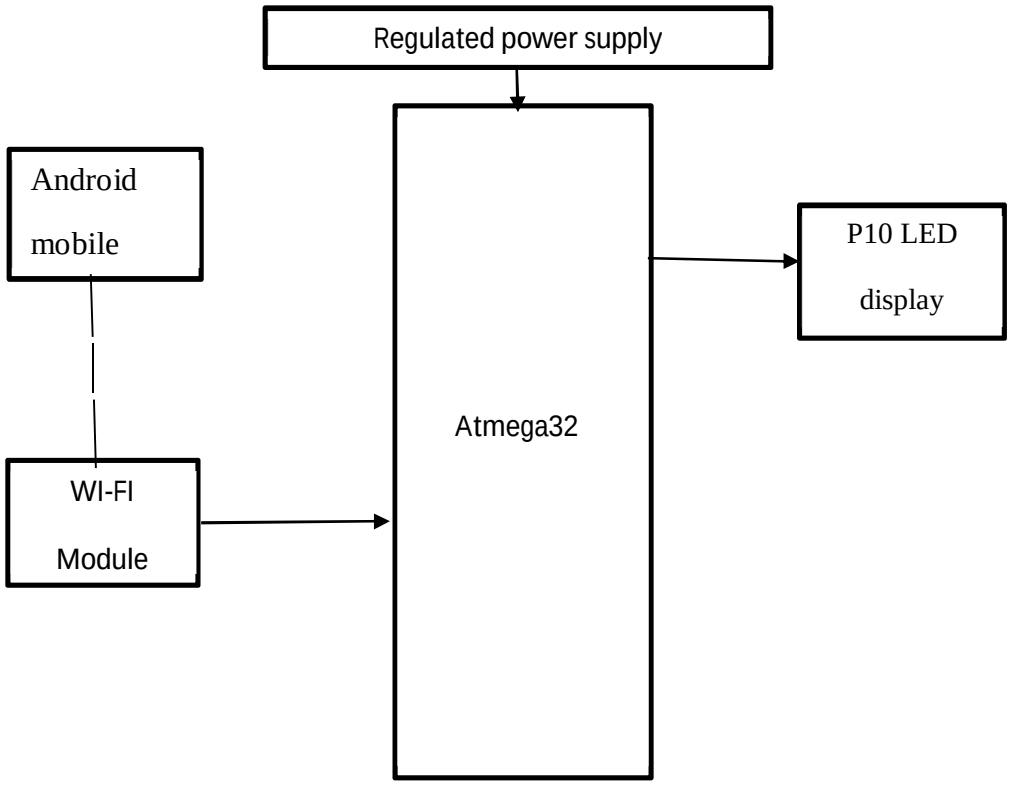
To begin with, we will analyze the system requirements to determine the specific needs and functionality of the system. This will include assessing the type of messages to be displayed, the size and location of the display, and the required features of the system. This analysis will serve as a basis for designing and developing the hardware components of the system, including the P10 LED display, Atmega32p microcontroller, and Wi-Fi module. We will also design and develop the software components of the system, which includes the development of an intelligent program written in embedded 'C' language that controls the system's operations. An Android SSH client such as JuiceSSH will be developed to enable the remote management of the system.

Once the hardware and software components are developed, we will integrate them and test the system's functionality. This includes testing the system's ability to receive and display text-based commands transmitted through 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 and support to ensure its optimal performance. This will include creating user 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-use solution for displaying important information in public spaces. The comprehensive approach ensures that the system meets the needs of its users and provides an effective means of communication and information dissemination.

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The smart notice board system comprises several hardware and software components that work together to display important messages in public spaces. 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.
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 JuiceSSH 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.

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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 found that the use of digital signage systems improved students' satisfaction with communication and information dissemination.

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

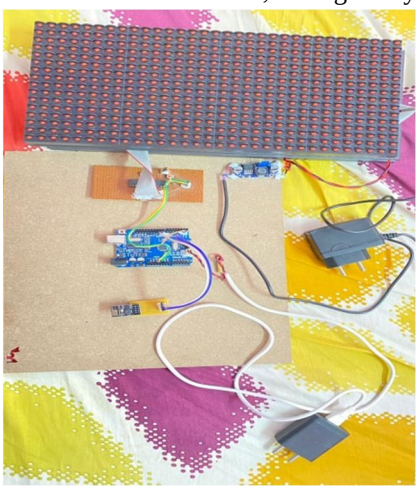
The use of IoT technology in digital signage systems has also been explored in the literature. A study by Jia et al. (2019) proposed a smart city digital signage system that uses IoT technology to collect and analyze data from various sources, including weather forecasts and traffic patterns, to provide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

Overall, the literature suggests that digital signage systems, including those that incorporate IoT technology, are effective in improving communication 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 displaying 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 JuiceSSH 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.
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, configuring the Wi-Fi module and Android SSH client, testing the system, and deploying it in the desired location.



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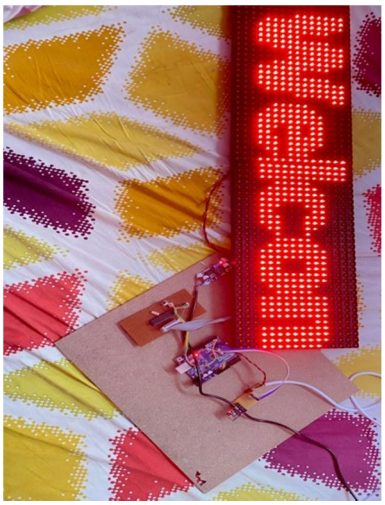


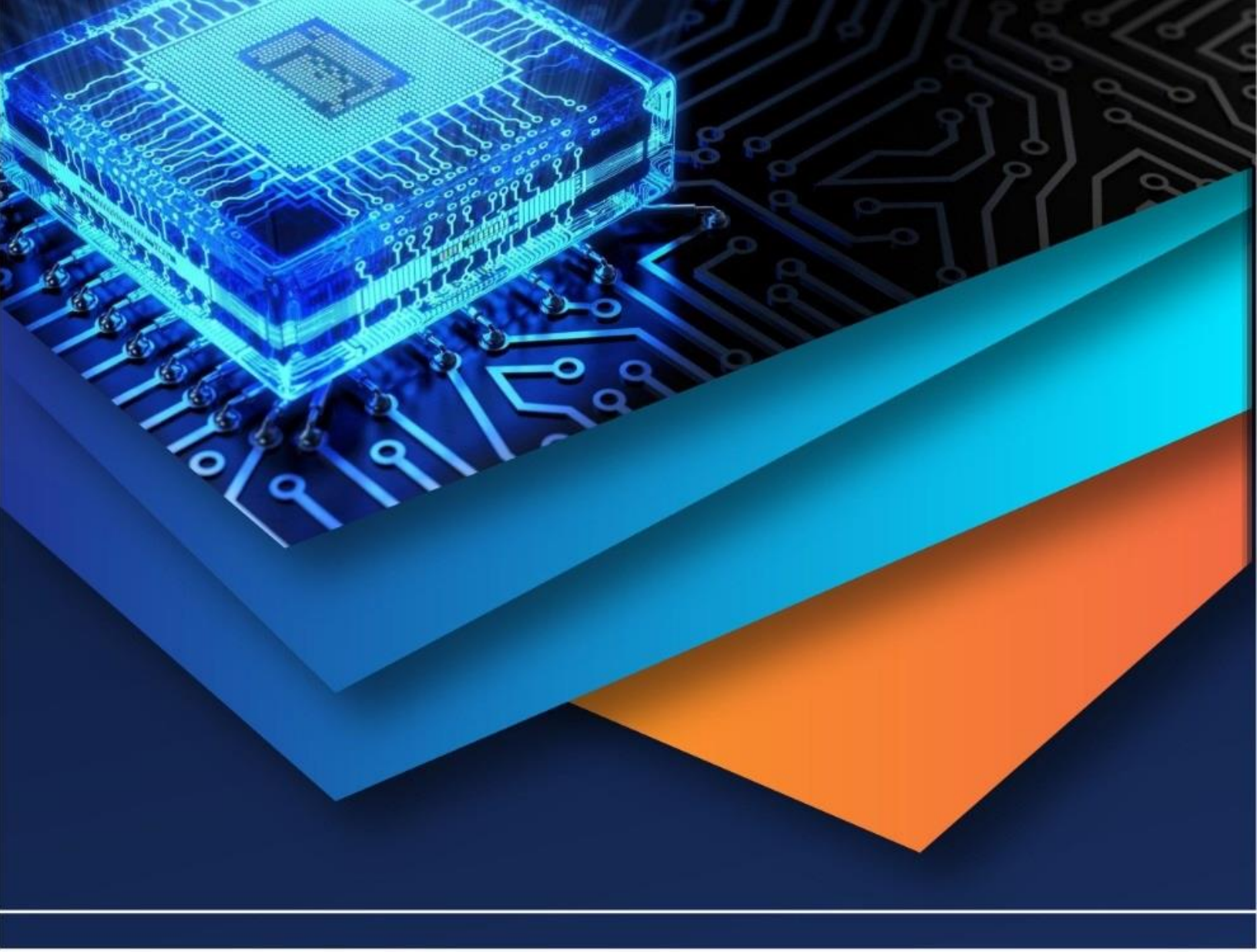
Fig: Circuit and connections

V. CONCLUSIONS

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 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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