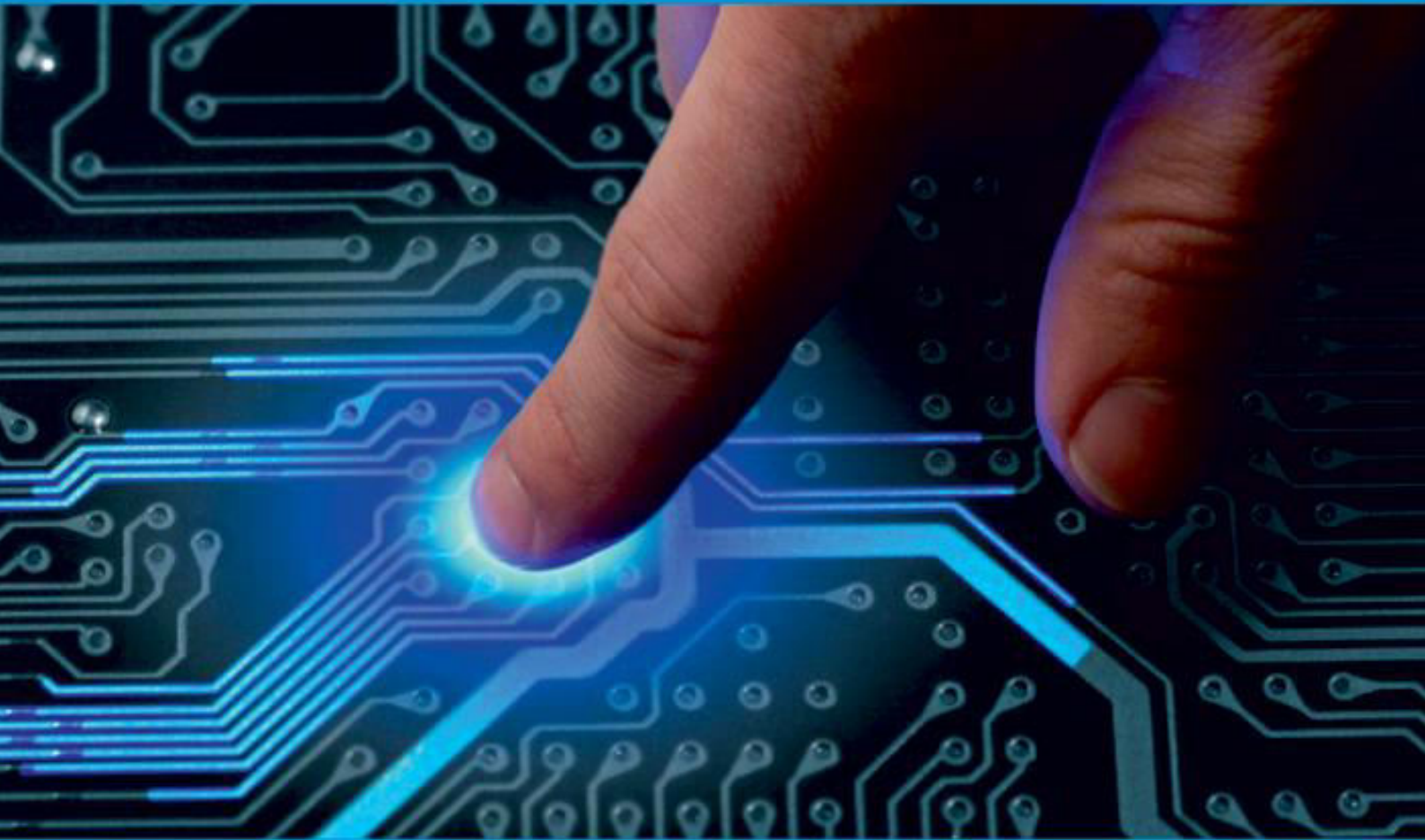




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WIRELESS NOTICE BOARD

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ABSTRACT: A notice board is an essential component of any institution, organisation, or public utility places such as bus stops, railway stations, or parks. However, it can be challenging to modify the messages in those places on a regular basis, and in our day-to-day lives, smartphones are becoming more and more important due to the convenience they offer. As a result, the fundamental idea of this project is the development of a wireless notice board that uses a smartphone to display information. The user's smartphone has an Android application installed allowing for communication and is simple to use. This system suggests a method of displaying notices by acquiring input from user requests and displaying it effortlessly, compared of manually changing the messages using papers.

KEYWORDS: Smartphones, Wireless notice board, Android application.

I. INTRODUCTION

A notice board, commonly referred to as a bulletin board, is a visual display board that can be either traditional or digital and is used to post and convey information to a particular audience or individuals. Notice boards are frequently used in an array of contexts, including places of work, social centres, hospitals, and outdoor areas. A notice board's primary purpose is to convey important information, announcements, and reminders to people in general in a prominent and accessible place.

Depending on their surroundings and function, notice boards can be produced from a variety of materials, including cork, foam, fabric, or metal. Physical notice boards are usually constructed of cork or foam, and people can affix notices to them with pushpins, staples, or thumbtacks. Digital notice boards, on the other hand, are electronic displays that may be used to deliver information, announcements, and messages, and are commonly found in public places such as airports, train stations, and malls.

Notice boards are one of the most widely used ones, ranging from primary schools to major organisations, to convey messages at large. A lot of paper is used, which is later wasted by the organisations. This in turn leads to a lot of deforestation, thus leading to global warming. Small innovative steps in making use of technology for regular purposes would have an adverse effect on environmental issues, which we are presently concerned about. In addition to conventional notice boards, digital notice boards are becoming more common. These are actually digital panels that display information on screens or monitors. Digital notice boards come with a number of benefits, such as the capacity to show dynamic and interactive content, real-time updates, multimedia components like photographs and videos, and the adaptability to manage and schedule content remotely. Some digital notice boards additionally have further capabilities like touchscreens for user interaction, connectivity with other digital systems or databases for automated updates, and the capacity to show audience-specific or targeted content.

II. BACKGROUND

A wireless notice board, also known as an electronic notice board or digital signage system, is a display system that allows users to remotely update and display information on a digital screen or board. It eliminates the need for manual notice boards or printed posters and offers a more efficient and flexible way to communicate messages in various settings. Here's a brief background on wireless notice boards:

1. Purpose: The primary purpose of a wireless notice board is to provide real-time information and communication in public spaces, institutions, organizations, and businesses. It allows users to display announcements, notifications, advertisements, schedules, and other relevant information to a targeted audience.
2. Technology: Wireless notice boards utilize a combination of hardware and software components. The hardware typically consists of a digital display panel, a wireless communication module (such as Wi-Fi or Bluetooth), and a

control unit. The control unit can be a computer, a dedicated media player, or a cloud-based platform. The software component enables users to remotely manage and update the content displayed on the notice board.

3. Real-time Updates: Changes made to the content are instantly reflected on the notice board, allowing for immediate information dissemination.
4. Interactive Elements: Some systems may support touchscreens or interactive elements, enabling users to engage with the displayed content.
5. Integration: Wireless notice boards can integrate with other systems or software, such as calendar applications or social media platforms, to display relevant and up-to-date information.
6. Scalability: The system can be expanded to accommodate multiple display screens in different locations, all managed from a centralized platform.
7. Customization: Users can customize the design, layout, and visual appearance of the displayed content to align with their branding or specific requirements.

III. STUDIES ON RELATED WORK

The Summary of Related works is presented in Table 1 below.

SINO	Authors	Technology	Advantages	Limitations
1	Ramya R, Bavithra N, Priyanka M [5]	Bluetooth module HC-05	Passing any message almost immediately without any delay	It has low bandwidth as compared to Wi-Fi.
2	Gaurav Bhardwaj, Gunjan Sahu, Rajan Kumar Mishra [6]	PIC16F microcontroller, GSM modem and level shifter	Information is easily accessible, even if we are far away from our actual location	It is very difficult to plan, build, manage, and enable a broad technology to IoT framework.
3	Ashutosh Pandya, Chinmay Raut, Mihir Patel, Siddharth Das, Amol Deshpande [7]	GSM and Bluetooth, LCD, regulator, and rectifier.	Passing any message almost immediately without any delay	It allows only short rangecommunication between devices.
4	Mulugeta Tegegn Gameda, Ayane Lebeta Goshu [8]	GSM module, Bluetooth module, arduino microcontroller	Notices is avoided and the information can be updated by the authorized persons.	To transfer a massive amount of data, it is highly advised to use another source of communication and technology.
5	Kruthika Simha ,Chethan Kumar, Parinitha C [4]	NodeMCU	Backup data can be stored in cloud. Real time communication is possible.	Processing power is weaker than the microcontroller.

Table 1: Comparison of related work.

IV. PROPOSED SYSTEM

The primary goal of the work is to create a remote notification system that displays any note sent by the client's Android application gadget. The suggested system communicates between an Android phone and an LED display board using Bluetooth technology. This method has been improved to show the most recent information via an Android app on smartphones or tablets.

1. Digital Display Panel: A high-quality digital screen or LED panel capable of presenting colourful and clear content.
2. Wireless Communication module: Digital Display Panel: A high-quality digital screen or LED panel capable of presenting colourful and clear content.

Centralized Control Software: A user-friendly software interface that is simple to use and available from a computer, tablet, or smartphone. It allows users to remotely manage and update the content shown on the notice board.

3. Content Management System: The control unit should include a content management system (CMS) that enables users to create, edit, schedule, and organize various types of content.

4. Real-time Updates: Changes made to the content in the control unit should be instantly reflected on the wireless notice board.

5. Multi-zone Display: The screen can be divided into different zones, allowing users to display multiple sorts of content at the same time.

6. Interactive Elements: Incorporate interactive elements such as touchscreens or motion sensors to enable user interaction with the displayed content.

V. STUDIES ON RELATED WORK

Wireless notice boards, also known as electronic bulletin boards or digital signage systems, have gained popularity in recent years due to their convenience and versatility in displaying information. Some notable studies and research in this area include below:

1. Wireless Communication Technologies: Several studies have focused on the wireless communication technologies used in notice board systems. These technologies include Wi-Fi, Bluetooth, Zigbee, and GSM/GPRS.

2. Hardware Design and Implementation: Studies have investigated the design and implementation of hardware components for wireless notice boards. This includes the selection of display screens, microcontrollers, wireless modules, power supply units, and sensors.

3. Software Development: Wireless notice board software has also been actively researched. Users can remotely manage and update the content that is displayed on the boards thanks to the platforms and applications that researchers have created.

4. User Interaction and Experience: Several studies have focused on enhancing user interaction and experience with wireless notice boards. This involves designing intuitive user interfaces, incorporating touchscreens or gesture recognition, and exploring user preferences and behaviors. The goal is to create user-friendly systems that encourage engagement and effective communication of information.

5. Energy Efficiency and Sustainability: Given the wireless nature of these notice boards, energy efficiency has been a topic of interest. Studies have explored energy harvesting techniques, power management strategies, and optimization algorithms to minimize power consumption and extend battery life. Additionally, researchers have investigated

6. Security and Privacy: As wireless notice boards handle sensitive information, studies have addressed security and privacy concerns. Research has focused on secure data transmission, encryption methods, authentication mechanisms, and access control. The aim is to protect the integrity and confidentiality of the displayed content and prevent unauthorized access or tampering.

VI. THE PROBLEMS

Existing notice boards frequently have a number of restrictions and difficulties, particularly those that rely on conventional techniques like printed material or human updating. Here are some typical issues with conventional notice boards:

1. Manual Updates: Traditional notice boards need to be physically updated to change the information presented. When there are numerous notice boards in various places or there are frequent modifications, this process can be time-consuming and difficult. If revisions are not made right away, it could potentially lead to outdated or erroneous information.

2. Limited Space: Physical notice boards have limited space to display information. As a result, there is a constant struggle to prioritize and fit all the relevant content. This limitation can lead to important messages being overlooked or crowded displays that make it difficult to read and comprehend the information.

3. Poor Visibility: Printed posters or notices on traditional notice boards can suffer from poor visibility, especially in low-light conditions or from a distance. Factors like font size, color contrast, and lighting can significantly impact the readability of the displayed content, making it challenging for viewers to gather the information effectively.

4. Lack of Interactivity: Traditional notice boards typically lack interactivity and engagement. Viewers cannot interact with the displayed content or seek additional information. This limits the effectiveness of the notice board in capturing attention, encouraging participation, and facilitating two-way communication.

5. Lack of Real-Time Updates: Traditional notice boards struggle to provide real-time updates. In dynamic environments where information needs to be communicated promptly, such as emergency situations or rapidly changing schedules, relying on manual updates may lead to delays and potential confusion.

VII. SYSTEM DESIGN

For our project, we'll be utilising a power supply, an Arduino UNO, an LED display, a Bluetooth HC-05, and a mobile app. The Arduino UNO will receive an external power supply after the programme has been uploaded. Following the turn-on of all components, the user must use a mobile phone to send the note or SMS that they wish to post to the notice board. The Bluetooth module will then receive this notice or SMS, and using Arduino, it will display it on a digital notice board. Below is the block diagram

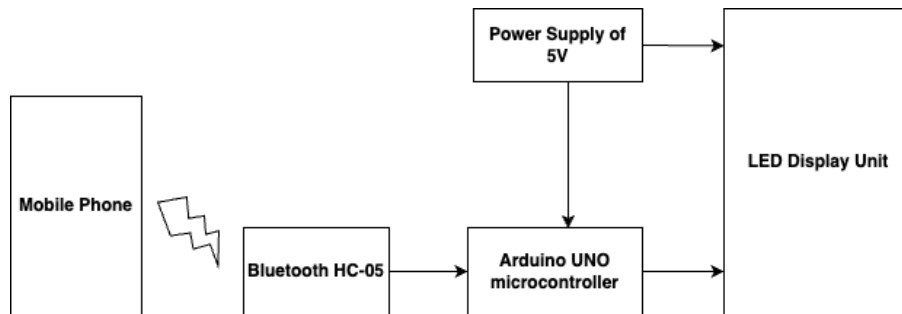


Fig. Block Diagram

Here are the steps to design a wireless notice board using Bluetooth HC-05:

Step 1: Selecting the hardware components

- The following hardware components will be required
- Arduino UNO board
- P10 LED Display
- Bluetooth HC-05 Module
- Jumper wires
- 5V power supply

Step 2: Setting up the Hardware

Connect the HC-05 module to the Arduino UNO board using the following connections

- VCC -> 5V
- GND -> GND
- RXD -> TXD
- TXD -> RXD

Connect the LED matrix display to the Arduino UNO board using the following connections

- OE -> D9
- GND -> GND
- A -> D6
- B -> D7
- CLK -> D13
- SCLK -> D8
- Data -> D11

Below is the circuit diagram of the implemented project

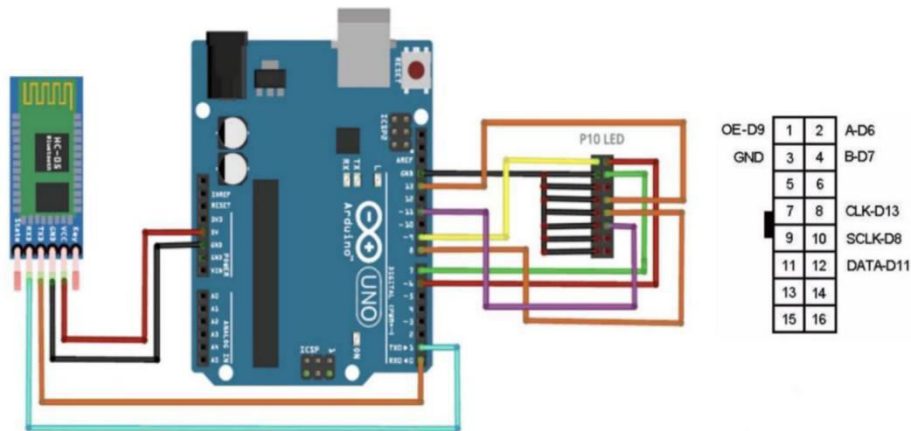


Fig. Circuit Diagram

- Use an Arduino microcontroller as the main controller for the wireless notice board. The Arduino will be responsible for controlling the LED matrix and communicating with the Bluetooth module.
- Use a Bluetooth HC-05 module to connect the notice board to a mobile device or a computer. The HC-05 module will be connected to the Arduino using the UART pins.
- Use an P10 LED matrix as the display module for the notice board. The LED matrix will be connected to the Arduino using the digital pins.
- Use a 5V power supply to power the Arduino and the LED matrix.
- Install and configure the Arduino IDE on your computer.
- Write the code to control the LED matrix and Bluetooth module on the Arduino. The code should include functions for receiving data from the Bluetooth module and displaying it on the LED matrix.
- Write a mobile app to input the notice board content and send it to the Arduino via Bluetooth. The app can be designed using any programming language that supports Bluetooth communication.
- Connect the Bluetooth HC-05 module to the Arduino using the UART pins. Connect the LED matrix to the Arduino using the digital pins. The LED matrix should be powered using a 5V power supply.
- Upload the code to the Arduino using the Arduino IDE. Pair the Bluetooth HC-05 module with the mobile device or computer. The pairing process can be done using the Bluetooth settings on the mobile device or computer.

Test the system by sending notice board messages from the mobile app to the Arduino and displaying them on the LED matrix. The messages should be displayed on the LED matrix in real-time.

VIII. RESULTS

The below results are obtained from testing the system using P10 LED matrix display with Bluetooth HC-05 module and Arduino Uno.



Fig. Message displayed on P10 LED matrix display

The message is sent through the mobile application via Bluetooth and the corresponding message is being displayed on the screen and it is shown below in the figure.

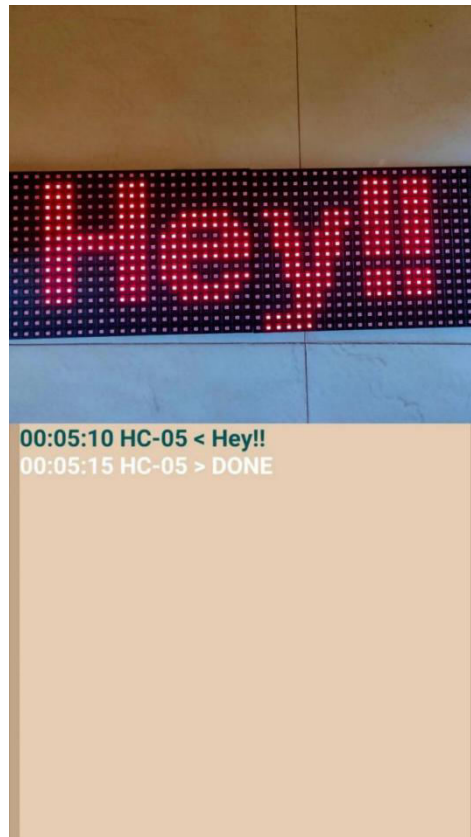


Fig. Displaying the message via Bluetooth and App

Once the message is sent through the mobile application an acknowledgement “DONE” is received from the system meaning that the message is received successfully.

IX. CONCLUSION

As the technology is advancing every day the display board systems are moving from Normal handwriting display to digital display. Further to Wireless display units. This project develops a wireless notice board system with Bluetooth connected to it, which displays the desired message of the user through an SMS in a most populated or crowded places. We can make our communication more efficient and faster, with greater efficiency. Further development includes a security feature where in the authorized user has to share a secret message or a key before sending the actual information so that the wireless notice board cannot be accessed by the unauthorized user. With continuous technological advancements, wireless notice boards are likely to become even more versatile, efficient, and user-friendly in the coming years.

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