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Wireless Notice Board Using Arduino and Bluetooth

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Abstract: The proposed method involves the use of an electronic notice board that can be controlled through an Android device, allowing messages to be displayed on it. In the past, notice boards required manual maintenance and daily sticking of notices, which was a tedious process. To address this issue, the project introduces an electronic display notice board that is connected to an Android device via Bluetooth. Messages are sent from the Android device to an Arduino board through Bluetooth. Notice boards are commonly used in places such as organizations, institutions, and public areas like parks, bus stations, and railway stations to convey important information. On the other hand, the process of stick various notices daily can be challenging. This project aims to solve this problem by developing an advanced wireless notice board system. The system utilizes an Android application installed on smartphones or tablets to instantly update and display the latest information.

I. INTRODUCTION

The proposed solution introduces an affordable and user-friendly wireless noticeboard system based on the Android platform. It leverages the capabilities of Bluetooth or Wi-Fi for wireless serial data communication, enabling the display of messages on a remote digital notice board. To transmit alphanumeric text messages, Android-based application programs are utilized on personal digital assistant (PDA) devices that support Bluetooth and Wi-Fi communication. At the receiver end, a transceiver module is connected to an Arduino Uno microcontroller board, which is known for its cost-effectiveness. The microcontroller board is programmed to receive alphanumeric text messages using the selected communication mode. This innovative system aims to streamline notice board management by reducing human effort, minimizing paper usage, optimizing printer ink consumption, and eliminating the costs associated with manual notice changes. The development of cellular networks began in the 1970s to address limited frequency availability in radiotelephone services. The first generation of cellular networks, known as AMPS (Advanced Mobile Phone System), employed Analog transmission. Subsequently, the second generation introduced digital transmission and was characterized by standards such as GSM and ERMES. This period also witnessed the introduction of cordless telephone standards. The third generation marked a significant advancement with the integration of various technologies. Currently, Bluetooth progress has gained popularity as an efficient and widespread medium for wireless data transfer."

II. LITERATURE REVIEW

1) *This paper presents an innovative approach to communication through the use of a wireless electronic display board synchronized with Bluetooth technology.*

The aim is to provide an efficient and reliable method of delivering messages in real-time, surpassing the limitations of traditional notice boards. This technology can be applied in various settings such as colleges, public places, malls, and large buildings to improve security measures, raise awareness about emergency environment, and prevent potential hazards.

2) *'Small and medium range wireless electronic noticeboard using Bluetooth and ZigBee' by Dharmendra Kumar Sharma and Vineet Tiwari presents a notice board that utilizes Bluetooth and ZigBee technology for communication.*

This research introduces an affordable and a portable wireless electronic notice board that utilizes the ATmega32 microcontroller from Atmel and incorporates wireless technologies like Bluetooth and ZigBee. The study focuses on analyzing the performance of these wireless technologies based on parameters such as bit error rate (BER) and range, received signal strength indicator (RSSI), signal attenuation, and power consumption. The graphical liquid crystal display of the notice board effectively presents data(serial) received from the wireless module receiver. A communication receiver hardware is designed to be compatible with both Bluetooth and ZigBee wireless modules. has been developed for the notice board. The display element utilized in the system is a KS0108-based 128x64 graphical LCD.

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3) *M. Abila Mary, B. Pavithra, R. Sangeetha, Prof.T.C. Subbu Lakshmi, "GSM based wireless noticeboard using Arduino" In this paper built a Noticeboard using GSM technology*.

"The objective of the GSM-based notice board is to provide colleges and universities with a convenient method of continuously or periodically displaying daily information during working hours. This system, based on GSM technology, enables the swift display of breaking news and announcements. The project's aim is to develop a user-friendly and easily installable GSM-based notice board that allows for updating its contents via SMS through an embedded system with a microcontroller. The design is straightforward, facilitating the receipt and display of notices in a specific manner. The notice board utilizes widely adopted GSM technology, enabling the communication of messages through users' mobile phones. The Arduino board is connected to a SIM 800 GSM modem with a SIM card, utilizing AT commands for communication.

4) *'Cost-effective Android-based wireless notice board' authored by Pallavi M. Banait, Nikita P. Bakale, Mayuri S. Dhakulkar, and Bhushan S. Rakhonde published in the IJETER International Journal of Emerging Technologies in Engineering Research*

"The significance of smartphones in our daily lives is increasing steadily, thanks to their portability and versatility. One way to utilize an Android smartphone is by installing a dedicated Android application that enables transmission capabilities. On the receiving end, a cost-effective microcontroller board, such as Arduino Uno, and it is programmed to receive and display messages using various communication modes mentioned earlier. This system has been successfully employed in two different applications: a wireless person calling and a remote digital notice board. Its primary goal is to wirelessly disseminate information to targeted individuals, saving time and reducing paper and printing costs."

III. PROPOSED METHODOLOGY

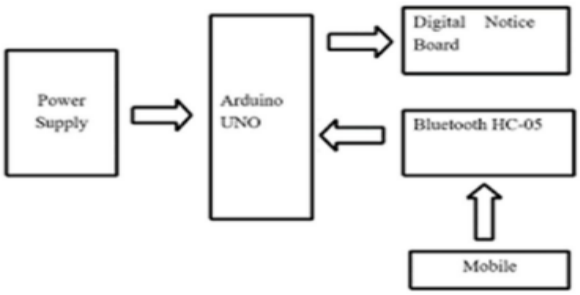

Fig (i) : Block diagram

The system being proposed comprises an Arduino UNO, power supply, LED module, Bluetooth HC-05, and a mobile application. Once the program is uploaded to the Arduino UNO and providing it with an external power supply, all functions of the equipment are activated. Notices or SMS messages can then be sent using a mobile device. These messages are received by the Bluetooth module and displayed on the digital notice board using Arduino. This system holds great potential for various applications, such as educational institutions, organizations, crime prevention, traffic management, railways, and advertising. Its user-friendly nature, extensive coverage, and efficient information transmission make it a highly valuable tool. Employing this methodology can enhance security systems and enable effective communication during emergency situations to prevent potential dangers.

IV. HARDWARE IMPLEMENTATION

A. Arduino uno

Fig 2 : Arduino uno

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The Arduino board is the core element of our system. It is a microcontroller board that uses the ATmega328p chip. It has 14 digital input/output pins, 6 Analog inputs, a 16 MHz crystal oscillator, a power jack a USB connection, an ICSP header, and a reset button. These features make it a versatile and powerful tool for a variety of projects. In our system, the Arduino board is used to control various components, like motors, sensors, and LEDs. It also communicates with other devices, such as computers and smartphones. The Arduino board is essential for the overall functionality of our system.

B. Bluetooth HC-05

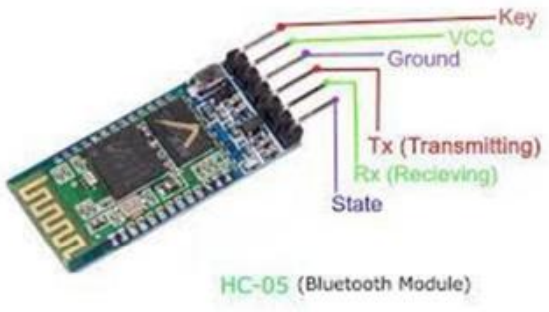

Fig 3 : Bluetooth HC05

It is developed to facilitate communication between Android devices and Bluetooth devices using a terminal interface. This application enables Android devices to exchange messages with connected Bluetooth devices, supporting both hexadecimal and string formats. Within our system, we utilize the HC-05 module as the designated receiver. This module is connected to a programmed microcontroller responsible for storing and displaying received messages on an LCD screen. The HC-05 module offers versatile two-way wireless functionality, empowering the transmitter to wirelessly transmit data to the receiver. It is equipped with four pins, namely TX for data transmission, RX for data reception, VCC for power supply, and GND for ground connection.

C. LCD

Fig 4 : 2x16 LCD Display

In our project, we use an LCD screen to display the output of the application. LCDs work by using liquid crystals to control the light that passes through them. The liquid crystals are sandwiched between two pieces of glass, and each crystal is aligned in a specific direction. When an electric current is applied to the crystals, they rotate and block the light from passing through. This allows us to create images on the screen by turning on and off specific crystals.

LCD screens are a popular choice for displays because they are lightweight, energy-efficient, and relatively inexpensive. They are also available in a wide range of sizes and resolutions, making them suitable for a wide range of applications. When an electric current is applied to the electrodes, the liquid crystal molecules align themselves in such a way that blocks or allows light to pass through. This is how the LCD screen is able to display images. LCD screens are used in a vast variety of devices, like computers, televisions, and mobile phones. They are popular because they are relatively inexpensive, easy to manufacture, and consume less power than other types of displays, such as cathode ray tubes (CRTs).

D. Bread Board

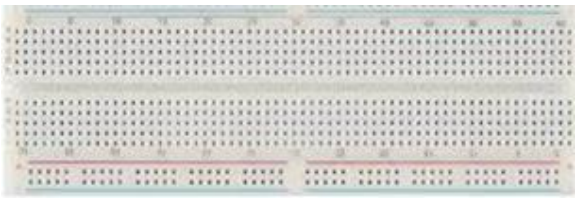

Fig 5 : Bread board

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Also known as a plugboard, is a tool commonly used for making circuits. Its purpose is to provide designers with a convenient platform for easily adding, removing, and replacing components. This flexibility is valuable for demonstrating circuit functionality and reusing components in various circuit designs.

E. Jumper Wire

Fig 6 : Jumper wires

A jumper wire is a short piece of insulated wire with connectors at each end. It is used to connect two points in a circuit without soldering. Jump wires are commonly used with breadboards to make temporary or permanent connections between components. Stranded 22AWG jump wires are the most common type of jump wire. They have a solid tip that fits into the holes of a breadboard. Jump wires are available in a variety of colors, which can be used to identify different circuits or components.

V. SOFTWARE REQUIREMENTS

A. ARDUINO IDE

Fig 7 : Arduino IDE

The Arduino IDE makes it easy to write code for Arduino boards. The text editor has syntax highlighting and auto-completion, and the compiler can be used to compile code into a binary file that can be uploaded to the Arduino board. The monitor in serial can be used to send and receive data(info) from the Arduino board, and the debugger can be used to step through code and debug errors.

B. Arduino Automation

Fig 8 : Arduino automation

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BT Terminal is a terminal application that utilizes the UART serial communication protocol to establish wireless data transmission and reception via Bluetooth connections. It provides a means to control devices through Bluetooth or WIFI using Arduino boards or similar microcontroller boards. The application proves useful in various areas, including configuring Bluetooth modules using AT commands, robotics communication, and home automation.

VI. RESULTS

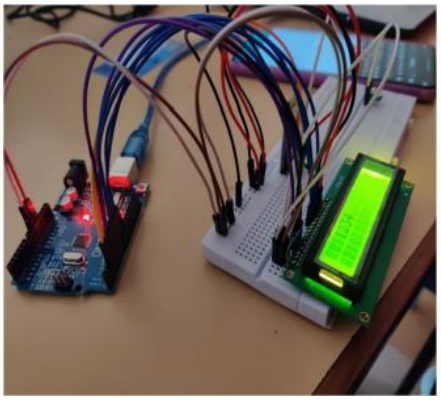

Fig 9 : Connections

This proposed method yields a straightforward outcome, which involves displaying a message on an LCD screen. This output serves as a means to assess the success of the intended result. The message will be displayed on the screen is transmitted via the HC-05 Bluetooth terminal, and a sample message is visible on the interface.

VII. CONCLUSION

In conclusion, the wireless notice board using Arduino and Bluetooth has emerged as a dependable and effective solution for wireless information display. Its ease of use, customizable features, low power consumption, and versatility have made it a preferred option for various applications in public places and organizations. However, it is essential to address the challenges associated with its implementation. The system's adaptability makes it well-suited for deployment in public places and organizations. In educational institutions, it facilitates the timely dissemination of announcements, event schedules, and emergency alerts to students and staff. Similarly, in corporate environments, it serves as a convenient tool for sharing company updates, meeting schedules, and project progress, streamlining internal communication.

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