Wireless Notice Board with Voice Commands

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Abstract: The Wireless Notice Board with Voice Commands via Bluetooth Technology presents a cutting-edge solution to the limitations of traditional notice boards by harnessing the power of wireless connectivity and voice recognition. This system enables seamless communication and information dissemination in public spaces, educational institutions, and workplaces. Leveraging Bluetooth technology, users can interact with the notice board using their smartphones or other Bluetooth-enabled devices, eliminating the constraints of physical proximity and manual updates. By integrating voice commands, the system enhances usability and accessibility, allowing users to effortlessly update, retrieve, and manage information using natural language interactions. This abstract provides a concise overview of the innovative features and benefits of the Wireless Notice Board with Voice Commands, highlighting its potential to revolutionize communication in various settings. The target of this paper is to design a wireless notice board using voice commands. This system enables seamless communication and information dissemination in public spaces, educational institutions, and workplaces.

Keywords: Microcontroller, Bluetooth Module, LED Board, and Android mobile.

1. Introduction

A contemporary and effective method of communicating critical information within an educational institution is through a college notice board that is Bluetooth-based and has text messaging capabilities. This cutting-edge system makes use of Bluetooth technology to provide smooth communication between students, teachers, and staff and the college administration. The way the notice board works is that authorised staff members can use Bluetooth-enabled devices to transmit text messages or notifications straight to the notice board's system. Announcements about future events, class schedules, emergency alerts, deadline reminders, and other important information pertinent to the campus community can all be included in these messages. Administrators may create and send messages with ease thanks to the system's user-friendly interface, which guarantees prompt and widespread distribution throughout the campus. These can be received by instructors and students who are within the notice board's Bluetooth range, providing them with real-time information. This technology guarantees that important information reaches its target audience on time, drastically improves communication efficiency, and uses less paper. Furthermore, by offering a centralized venue for significant changes and announcements, it promotes a more educated and connected campus community.

1.1 Literature Survey

Hansal Shah, Zarna Parekh, Akshay Sawant, Shivani Bhattacharjee proposed a wireless free notice board. This system uses an XBee explorer which receives and retrieve data from the PC and sends it to ATMEGA16 who displays it on the Graphic LCD. The range of around 300-400m can be obtained [1].

Prasad P.Kulkarni, Shubham V.Patil,Balaso R.Shingate,Vikas N.Mali,Sumit S.Thoke,Sagar N.Pawar proposed a Wi-Fi based notice board. In this system information given through Wi-Fi and Arduino receives data from Wi-Fi and displays on LED notice board [2].

Diksha Ghodeswar, Ankita Katare, Boby Sudame, Tanushri Khojre introduced Wireless electronic notice boards using GSM. This system utilizes 48*8 LED for displaying notices sent as text messages from a mobile phone and the notice is sent as a Short Message Service (SMS), which is received by a Global System for Mobile Communications (GSM) modem [3].

Ashutosh Pandya, Chinmay Raut, Mihir Patel, Siddharth Das, Amol Deshpande proposed an electronic notice board. This system has functionality to convert voice facts to text and sends the text over to the micro-controller through Bluetooth [4].

Dr. S. M. Gulhane, Ashwini Gite, Archana Lahamage, Kailash Waghmare introduced a voice control notice board using LCD. Here voice commands are converted into text message via android mobile. This system utilizes Wi-Fi for wireless data communication [5].

Gulshan Kumar Jha, Aryan Singh, Anjali Guptha, Anmol Nigam, Vipin Sharma proposed an affordable and efficient wireless notice board. The system utilizes Bluetooth and Wi-Fi or data transmission, using the Wi-Fi module and HC-05 Bluetooth module [6].

Explored the HC-05 Bluetooth module featured on Electronic Wings, a reliable resource for sensor and module information and studied detailed specifications, usage instructions, and example projects, aiding enthusiasts and professionals in integrating Bluetooth functionality into their electronics projects with ease [7].

Embedded C theory has been studied, highlighting its prominence as the predominant programming language in the software industry for crafting electronic devices. Embedded software is intricately linked with each processor utilized in electronic systems. [8].

Studied about Atmega328p microcontroller and it is widely utilized in embedded systems for its balance of processing power and energy efficiency. Featuring a rich set of built-in peripherals and Arduino compatibility, it offers versatility for diverse electronic projects. Understanding its pin configuration and operational principles is crucial for effective utilization in embedded applications [9].

Studied the P10 LED board, a versatile display module available on IndiaMart, offering vibrant visual output suitable for various applications such as advertising, signage, and information display. The module, featured on the specifications, pricing, and potential use cases, provides valuable insights for those interested in incorporating LED technology into their projects or businesses [10].

Microcontroller Theory and Applications, authored by Mohammed Rafiquzzaman, John Wiley and sons presents another the fundamental concepts of language programming with typical microcontroller Theory and Applications with the PIC18F is a comprehensive and self-contained book that emphasizes characteristics and principles common to typical microcontrollers. The PIC18F is excellent as a text for undergraduate level students of electrical/computer engineering and computer science [11].

2. Block Diagram

The block diagram for Wireless noticeboard with voice commands is shown in the Fig. 1.

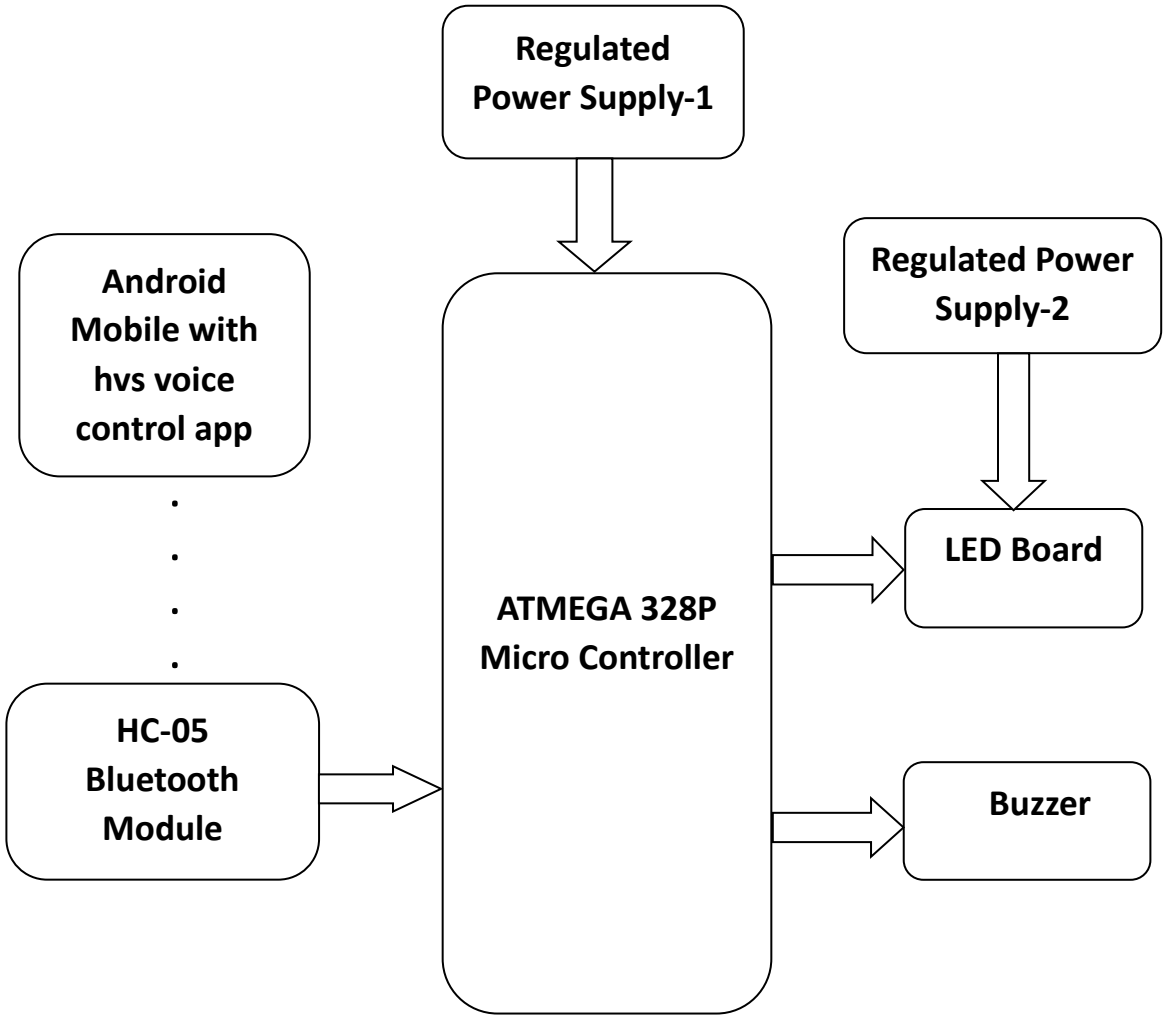

Figure 1. Block Diagram

The ATMEGA328P Microcontroller [9] receives 5V from a Regulated Power Supply-1 (RPS). Voice commands from a mobile application can be transferred to the microcontroller more easily by connecting an HC-05 Bluetooth Module [7] as an input. An HVS Voice Control app is used to send voice commands from an Android mobile device that is linked to the Bluetooth module. The microcontroller is connected to two P10LED [10] boards in series and used as an output. To improve the LED boards' display's brightness, the Regulated Power Suppl-2 is needed. A transformer receives a single-phase, 230V, 50Hz AC supply for this reason. This input is transformed into a 12V AC supply by the transformer. After that, a rectifier receives the transformer's output and converts the 12V AC supply to a 12V DC one. A regulator then distributes this steady supply to the LED boards, guaranteeing steady operation. When a text message is received and shown on the LED board, a buzzer will sound twice to alert.

3. Hardware Module

The top view of hardware module is shown in the Fig. 2.

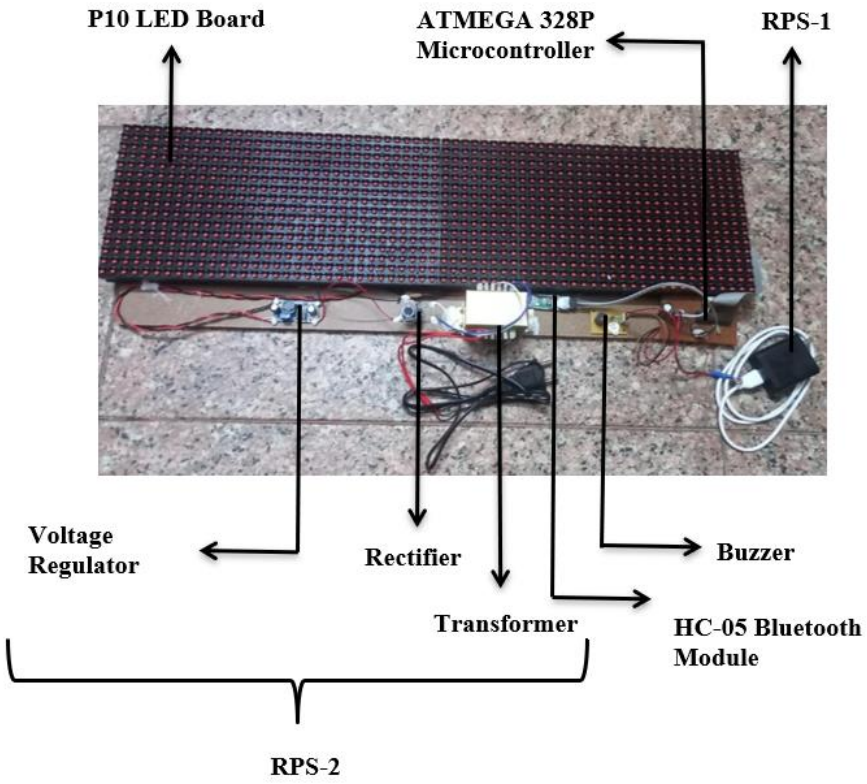

Figure 2. Hardware Module

A single-phase 230V, 50Hz regulated power supply-1 powers the ATMEGA328P microcontroller [9]; an adapter converts the output to 5V. The buzzer, P10 LED board [10], HC-05 Bluetooth module [7], and microcontroller all receive this 5V supply. The LED board is the only target of the Regulated power supply-2, which increases display brightness. The buzzer sounds when the system is turned on, signalling that it has been activated. Install a serial communication app on an Android smartphone to start a conversation. Turn on Bluetooth by entering the default password, "1234", and use the app to connect to the HC-05 device. The device will show "connected" once connected. Enter a message in the keypad and press the send button after you're connected. This message is received by the Bluetooth module, which then passes it to the microcontroller, which then sends it to the LED board. The buzzer sounds before the message is displayed. an announcement. An assortment of tiny LED modules arranged in an array power the P10 LED display board. a pitch configuration of 10 mm. These modules have clusters of LEDs that form pixels. The information flow starts with data being sent to the display controller via the microprocessor. This data is interpreted by the controller, which then generates signals that correspond to the individual LEDs' on and off states within the display modules. Next, the LEDs are turned on. or turned off in accordance with the data received, producing the required texts, patterns, or images. By adjusting the brightness and colour of individual LEDs throughout modules, the display generates the desired visual result.

4. Testing and Results

The hardware was tested to display various messages of different lengths controlled through mobile.

4.1 Case (1): Message with ≤ 6 Characters

The Notice board was tested to display a message of less than or equal to 6 characters. As seen in Figure 3, the HVS voice control software was used to send the voice message "hello." The notice board displaying the sent message is seen in Figure 4. See one thing at a time on the display. The start and end of the message are symbolically represented by the characters "*" and "#". The send message was totally visualized at a time on the notice board repeatedly as shown in Figure 4.

Figure 3. Message (≤ 6 Characters) Sent Notice Through Mobile App

Figure 4. Message (≤ 6 Characters) Displayed on Board

4.2 Case (2): Message with >6 Characters

The Notice board was tested to display greater than 6 characters. The HVS voice control software was used to send the speech message "Bhoj Reddy Engineering College for Women," as seen in Figure 5. The notice board displaying the sent message is depicted in Figure 6. Imagine a message scrolling on the screen.

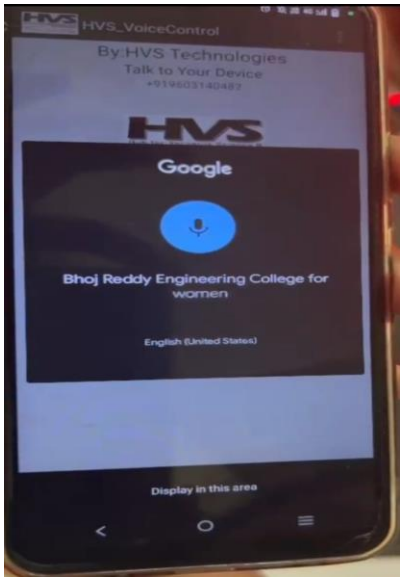

Figure 5. Message (>6 Characters) Sent Notice Through Mobile App

Figure 6. Message (> 6 Characters) Displayed on Board

4.3 Case (3): Message with Maximum Number of Characters

The Notice board was tested to display the maximum number of characters. The message in voice The HVS voice control software was used to send the 164-character message, "The main objective of this project is to design a wireless notice board to facilitate smooth communication and information dissemination using text and voice commands," as seen in Figure 7. The notice board displaying the message sent up to 61 characters is depicted in Figure 8. seems like a message that is scrolling across the screen.

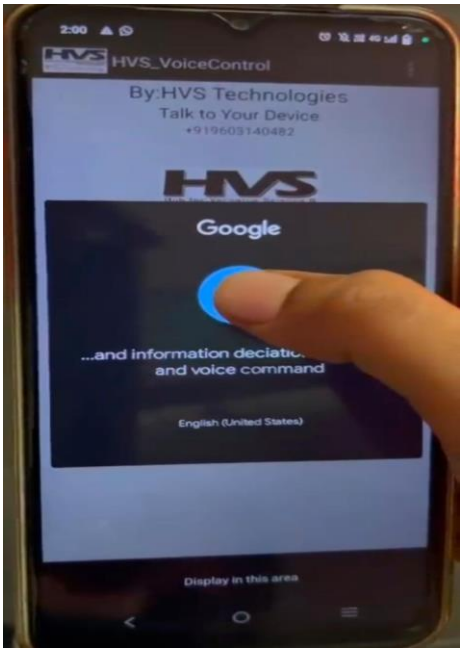

Figure 7. Message (164 Character) Sent Notice Through Mobile App

Figure 8. Message (61 Characters) Displayed on Board

4.4 Results

The outcomes of testing the LED board with various character counts are listed in the table below.

Table 4.1 Message Displayed on Notice Board

Cases	Message Sent	Sent Characters Count	Message Displayed	Displayed Characters Count
1	Hello	5	Hello	5
2	Bhoj Reddy Engineering College for Women	35	Bhoj Reddy Engineering College for Women	35
3	The main objective of this project is to design a wireless notice board to facilitate smooth communication and information dissemination using text and voice commands	164	The main objective of this project is to design a wireless not	61

The sent message that was posted on the notice board is shown in the table. Cases 1 (less than or equal to 6 Characters) and 2 (greater than or equal to Characters) showed the whole transmitted message. However, in scenario 3, the Notice board could only display a maximum of 61 characters due to Bluetooth's restricted capacity.

5. Conclusion

The wireless notice board built utilizing simple hardware and controlled via voice commands is a groundbreaking innovation that redefines how we manage and disseminate information in various settings. By merging advanced speech recognition technology with seamless wireless connectivity, this system offers unparalleled ease of use, efficiency, and accessibility. It significantly reduces the need for manual updates and paper usage, promoting eco-friendly practices. While challenges such as accuracy in noisy environments and security concerns remain, ongoing advancements in technology promise to address these issues effectively. As this technology evolves, it is set to become an indispensable tool across educational institutions, corporate offices, and public spaces, making communication more dynamic and inclusive.

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