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Article Title: **Smart Notice Board using Voice Chat**

Smart Notice Board using Voice Chat

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ABSTRACT

Effective communication within educational institutions is crucial for disseminating information to students and faculty members. Traditional notice boards are often limited in their reach and efficiency. To address this issue, a Wi-Fi-based Electronic Notice Board (E-Notice Board) system tailored for Higher Educational Institutions (HEIs) is proposed. This system integrates various components including power supply, Bluetooth module, Arduino microcontroller, a dedicated mobile application, and P10 LED display modules to create a comprehensive solution. The Wi-Fi connectivity ensures seamless transmission of notices and updates from the administrative staff to the E-Notice Board, eliminating the need for manual intervention. The Arduino microcontroller acts as the central processing unit, coordinating the functions of the system components. Bluetooth functionality enables local communication with mobile devices for configuration and management purposes via a dedicated mobile application. The mobile app provides administrators with an intuitive interface to update notices, schedule events, and manage the E-Notice Board remotely. The heart of the system lies in the P10 LED display modules, which offer high visibility and readability in both indoor and outdoor environments

Keywords: Arduino board, ATmega328P-PU with Arduino Boot loader, Bluetooth module, P10 LED Display Modules, power Supply

1 Introduction

In today's fast-paced digital era, the traditional notice board system in educational institutions faces challenges such as delays in updates, limited accessibility, and physical space constraints. To address these issues, there is a growing need for a more efficient, interactive, and dynamic solution. Introducing the Voice-Based E-Notice Board, a cutting-edge technology innovation tailored for higher educational institutions.

This project leverages the power of Arduino microcontrollers, Bluetooth communication modules, a mobile application, and P10 LED displays to create a seamless and user-friendly digital notice board system. By integrating voice recognition technology, users can easily

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interact with the notice board using natural language commands, enhancing accessibility and usability.

The Arduino microcontroller serves as the brain of the system, processing commands received from the mobile application via Bluetooth and controlling the display of information on the LED display. The Bluetooth module enables wireless communication between the mobile application and the Arduino, providing flexibility and convenience in updating and managing notices.

The mobile application acts as the primary interface for administrators and users to upload, edit, and view notices in real-time. Through the mobile app, administrators can dictate notices using voice commands, which are then converted to text and transmitted to the Arduino for display. Users can also access the notice board remotely, ensuring timely dissemination of information and fostering greater engagement within the academic community.

The P10 LED display offers high visibility and readability, making it suitable for displaying a wide range of notices, including announcements, event schedules, and important deadlines. With its vibrant colors and customizable display options, the LED display enhances the visual impact of notices, capturing the attention of students, faculty, and staff.

In summary, the Voice-Based E-Notice Board revolutionizes the traditional notice board system in higher educational institutions by introducing an innovative blend of technology and user-centric design. By harnessing the power of Arduino, Bluetooth, mobile applications, and LED displays, this solution empowers administrators to efficiently manage notices while providing users with convenient access to relevant information anytime, anywhere.

Traditional notice board systems in higher educational institutions often suffer from inefficiencies and limitations that hinder effective communication and information dissemination. These limitations include:

1. **Delayed Updates:** Notices posted on physical notice boards may not be updated promptly, leading to outdated information being displayed for extended periods.
2. **Limited Accessibility:** Students, faculty, and staff may face difficulties accessing physical notice boards, especially when located in busy areas or outside regular operating hours.
3. **Space Constraints:** Physical notice boards have limited space, making it challenging to display a large volume of notices or important information simultaneously.
4. **Communication Barriers:** Written notices may not effectively convey information to individuals with visual impairments or language barriers, limiting inclusivity and accessibility.

To address these challenges, there is a pressing need for a modern, efficient, and user-friendly notice board system tailored for higher educational institutions. This system should leverage advanced technologies to enable real-time updates, remote accessibility, and enhanced user

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interaction, thereby improving communication and engagement within the academic community

2 Recent Work

1. Ramya R, Bavithra N, Priyanka M, "Wireless E-notice board using Bluetooth technology" This paper explains E-notice board with the help of Bluetooth technology.
This document deals with an innovative rather an interesting manner of intimating the message to the people using a wireless electronic display board which is synchronized using the Bluetooth technology. This will help us in passing any message almost immediately without any delay just by sending a SMS which is better and more reliable than the old traditional way of passing the message on notice board. This proposed technology can be used in colleges many public places, malls or big buildings to enhance the security system and also make awareness of the emergency situations and avoid many dangers.
2. Dharmendra Kumar Sharma, Vineet Tiwari, "Small and medium range wireless electronic noticeboard using Bluetooth and ZigBee" this paper introduces Notice Board using Bluetooth and ZigBee technology.
When information exchange occurs between people via a network, then authentication and security of data have more priority. This paper introduces a low cost, handheld, wireless electronic notice board by using Atmel's ATmega32 microcontroller and different wireless technologies (Bluetooth and ZigBee) and their performance analysis based on the parameter such as range, BER (bit error rate), RSSI (Received signal strength indicator), signal attenuation and power consumption. The notice board receives serial data from wireless module receiver and displays it on the graphical liquid crystal display. We have realized a common communication receiver hardware for notice board having compatibility with both wireless modules i.e., Bluetooth and ZigBee. We used KS0108 based 128x64 graphical LCD as display element.
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 GSM based notice board is aimed at the colleges and universities for displaying day-to-day information continuously or at regular intervals during the working hours. Being GSM-based system, it offers flexibility to display flash news or announcements faster than the programmable system.
To develop a GSM based notice board whose contents can be updated through an SMS which realized through an embedded system with microcontroller.
To design a project simple, easy to install, user friendly system, which may receive and display notice in a very specific manner.
SMS based notice board incorporating the widely used GSM to facilitate the communication of displaying message on notice board via user's mobile phone.

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SIM 800 GSM modem with a SIM card is interfaced to the ports of the Arduino with the help of AT commands.

4. Pallavi M. Banait, Nikita P. Bakale, Mayuri S. Dhakulkar, Bhushan S. Rakhonde, "Cost effective Android based wireless notice board" IJETER International Journal of Emerging Technologies in Engineering Research.

In the day-to-day life, smart phone is gaining a wide range of importance in its usage and is portable. Thus, an android smart phone can be for the purpose. An android application is installed in the user's smart phone which permits the transmission. At receiver end, a low-cost microcontroller board (Arduino Uno) is programmed to receive and display messages in any of the above communication mode. Using the developed system, two different applications for displaying messages on a remote digital notice board and wireless person calling has been implemented. The developed system will therefore aim in wirelessly sharing the information with intended users and also helps in saving the time and the cost for paper and printing hardware.

3 Existing System

We come across situations where we need to urgently need to display notices on a screen. For areas like railway stations and other such busy facilities the station master/announcer need not have to type in every announcement message manually on the screen. So here we propose an innovative android based notice display system that allows the user to display notices without typing them in manually. Here the announcer/administrator may speak out the message through his/her android phone; the message is then transferred wirelessly and displayed on the screen. To demonstrate this concept we here use an LCD screen to display messages. The LCD is interfaced with an 8051 family microcontroller. We also use a Bluetooth receiver to get the android transmitted messages, decode them and send them to the microcontroller for further processing. The microcontroller then displays the message on the LCD screen. The entire circuit is powered by a 12 V supply through a transformer. This innovative system can be used in a variety of places including railway stations, schools, colleges, offices for displaying emergency announcements on the screen instantly by just speaking out the message instead of typing it in each time. So this is how voice based notice board project is very useful in various organizations

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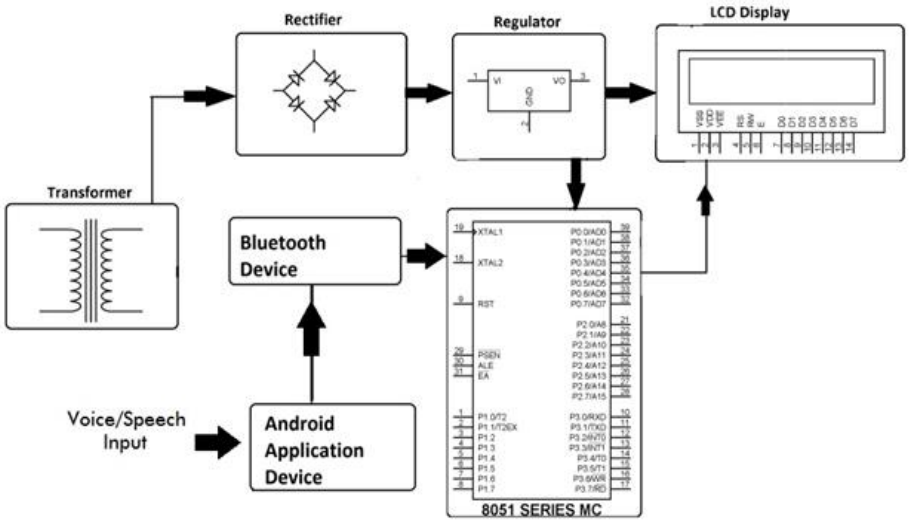

Figure 1: *existing block diagram*

3.1 Overview of Embedded System Architecture

Every embedded system consists of custom-built hardware built around a Central Processing Unit (CPU). This hardware also contains memory chips onto which the software is loaded. The software residing on the memory chip is also called the 'firmware'. The embedded system architecture can be represented as a layered architecture as shown in Figure.

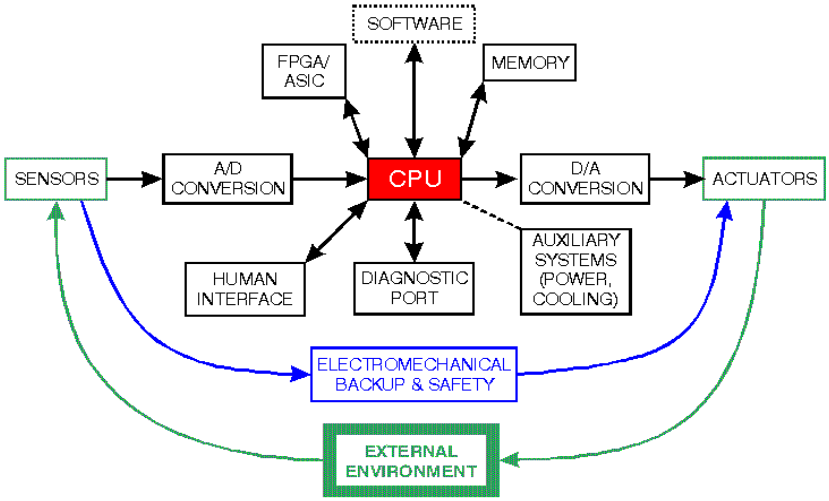

Figure 2: *Overview diagram of Embedded system*

The working system keeps running over the equipment, and the application programming keeps running over the working framework. A similar design is material to any PC including a

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desktop PC. Be that as it may, there are huge contrasts. It is not necessary to have a working framework in each installed framework. For little machines, for example, remote control units, aeration and cooling systems, toys and so forth. There is no requirement for a working framework and you can compose just the product particular to that application. For applications including complex handling, it is fitting to have a working framework. In such a case, you have to incorporate the application programming with the working System and after that exchange the whole programming on to the memory chip. This may be seen as an adjustment in the lifestyles of people.

The progression of a transportation structure has been the generative power for individuals to have the most essential human headway above creatures in the earth. Auto has a great noteworthiness in our step-by-step life. In the current circumstance, owning distinctive vehicles is seen as a financial prosperity in the overall population and accordingly the number of vehicles in the city has extended greatly in the earlier decade. On one hand, this may be seen as an adjustment in the lifestyles of people, along these lines, it can't be denied that there is a stark augmentation of road disasters, air defilement caused by the vehicles and wrongdoings related to the vehicles like theft et cetera.

We utilize it to go to our work place, remain in contact with our friends and family, and pass on our stock. Regardless, it can moreover pass on disaster to us and even can kill us through accidents. Speed is a champion among the most key and basic peril factors in driving. It impacts the reality of a crash, and also fabricates peril of being required in a crash. Regardless of various attempts taken by different authoritative and non-managerial affiliations all around the world by various ventures to careful against impulsive driving, yet disasters are happening every once in a while. In any case, many lives could have been saved if the emergency organization could get the crash information in time. Everything considered, capable customized incident acknowledgment with a modified cautioning to the emergency advantage with the setback zone is a prime need to save the profitable human life. It can moreover pass on disaster to us and even can kill us through accidents.

4 Proposal System

4.1 Voice-Based Notice Board

A Voice-Based E-Notice Board system designed for higher educational institutions, represents a forward-thinking approach to communication and information dissemination. By leveraging a combination of cutting-edge technologies including Arduino microcontrollers, Bluetooth modules, mobile applications, and P10 LED displays, this system offers a comprehensive solution to the challenges faced by traditional notice board systems. Through the integration of voice recognition technology, users can interact with the notice board effortlessly using natural language commands, enhancing accessibility and usability.

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Administrators are empowered to manage notices efficiently through a mobile application interface, enabling real-time updates and scheduling of notices for display. The Arduino microcontroller serves as the central control unit, facilitating communication between the mobile application and the LED display units. The use of Bluetooth modules enables wireless connectivity, eliminating the need for cumbersome wiring and enhancing flexibility in deployment. The P10 LED display provides a visually appealing platform for displaying notices, supporting text, images, and animations to capture the attention of the academic community. With provisions for scalability, customization, and ongoing maintenance and support, the proposed method offers a holistic solution tailored to the unique needs of higher educational institutions. Overall, this innovative approach promises to modernize communication processes, promote inclusivity, and enhance user engagement within academic communities.

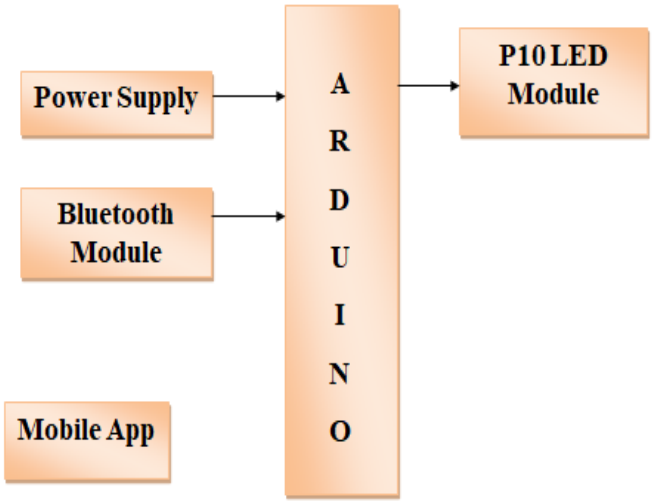

Figure 3: *Proposed Architecture*

Figure 3.1 shows the block diagram of the proposed system.

4.2 Wireless Notice Board

In our project we use power supply, Arduino UNO, LED module, Bluetooth HC-05 and mobile application. After uploading the program in Arduino UNO, we will give them external power supply. Due to that all functions of equipment's are on. At that time, we will pass the notice/SMS which we want using mobile. Then this notice/SMS will receive by Bluetooth. And by using Arduino this notice/SMS will display on digital notice board.

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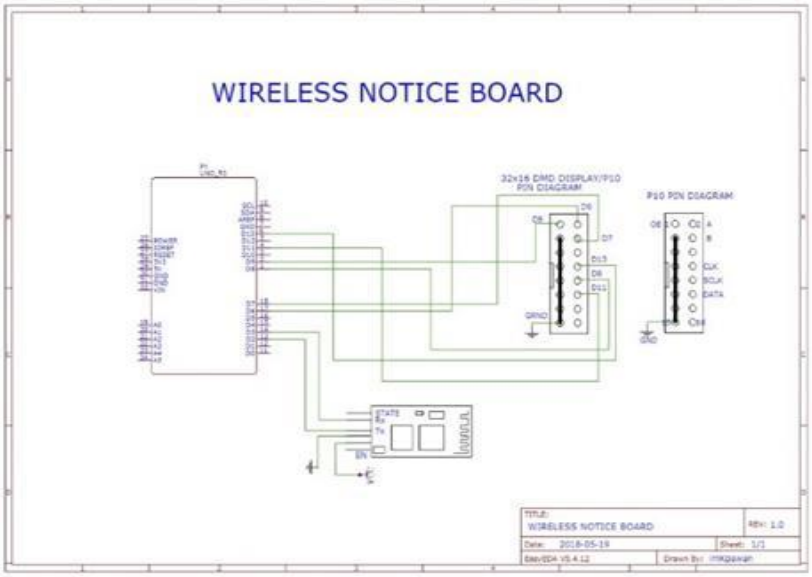

Figure 4: *Circuit Digram*

As per the circuit diagram we built the circuit connection. After that we upload the program in Arduino then all functions start to run with program. After uploading the program, we will give the external power supply to the Arduino. then we send notice/SMS from mobile then this notice/SMS will receive Bluetooth and display on LED module. This proposed system used for many upcoming applications in educational institutions and organizations, crime prevention, traffic management, railways, advertisements etc.

4.3 System Description

Proposed system consists of

a. Arduino board:

Arduino is a model stage (open-source) in light of an easy to-use hardware and programming. It incorporates a circuit board, which can be modified (suggested as a microcontroller) and a possible programming called Arduino IDE (Integrated Development Environment), which is worn to casing and exchange the PC code to the physical board. The key sections are: Arduino sheets can read fundamental or pushed data signals from different sensors and change it into a yield, for instance, starting a motor, turning LED on/off, join to the dull and diverse obvious exercises.

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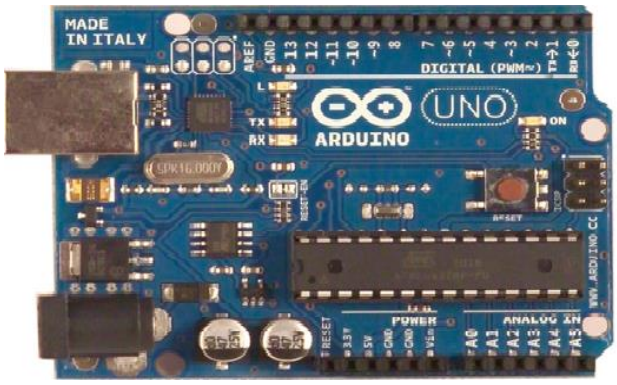

Figure 5: *Arduino Board*

You can deal with your board obliges as far as expert vocation a procedure of rules to the microcontroller on the board by methods for Arduino IDE (recommended as exchanging programming). Not at all like most before programmable circuit sheets, Arduino does not require an extra piece of hardware (called a thing diagram) with a particular veritable objective to stack another code onto the board. You can basically use a USB relate. Also, the Arduino IDE uses a streamlined difference in C++, making it less requesting to appreciate how to program. Finally, Arduino gives a traditional bundling factor that breaks the parts of the cut back scale controller into a more open package.

b. ATmega328P-PU with Arduino Boot loader

The name says everything on this one. An Atmega328 in DIP bundle, pre-stacked with the Arduino (16MHz) Boot loader. This will engage you to utilize Arduino code in your especially presented connects without using a genuine Arduino board.

To get this chip working with Arduino IDE, you will require an outside 16MHz significant stone or resonator, a 5V supply, and a serial association. On the off chance that you are not content with doing this, we propose acquiring the Arduino Duemilanove board that has these merged with the board.

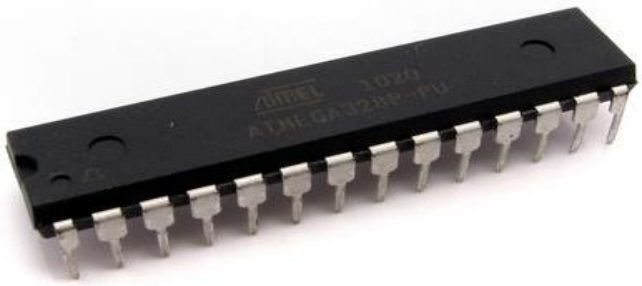

Figure 6: *ATmega328P-PU*

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c. Get an Arduino board and USB cable

You additionally require a standard USB link (An attachment to B plug): the kind you would associate with a USB printer, for instance. (For the Arduino Nano, you'll require an A to Mini-B link.)

The Arduino Uno, Mega, Duemilanove and Arduino Nano consequently draw control from either the USB association with the PC or an outer power supply. In case you're utilizing an Arduino Diecimila, you'll have to ensure that the board is configured to draw control from the USB association. The power source is chosen with a jumper, a little bit of plastic that fits onto two of the three sticks between the USB and power jacks. Watch that it's on the two sticks nearest to the USB port. Associate the Arduino board to your PC utilizing the USB link. The green power LED (named PWR) ought to go on.

d. Transformer

When in doubt, DC voltages are obliged to work diverse electronic apparatus and these voltages are 5/9/12 Volts. In any case these voltages can't be gotten arrange.

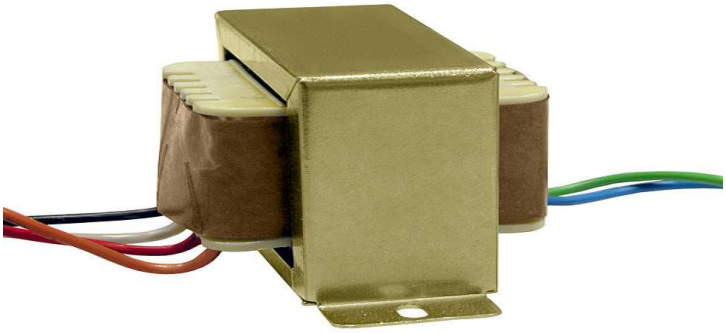

Figure 7: *Step-down Transformer*

In this way the AC information open at the mains supply i.e., 230Volts is to be cut down to the obliged voltage level. This is done by a transformer. Along these lines, a wander down transformer is used to diminish the voltage to an obliged level.

e. P10 MODULE

P10 LED display screen is made up of the modules whose pixel pitch is 10mm. The P10 full colour LED display screen is widely applicable for advertisement, gymnasium, factory and mining enterprises, transportation, station, wharf, airport, building, educational system and other public occasions. The function of P10 full colour LED display screen. It can display various of fonts, font sizes and different languages. It can connect scanner from exterior, to input various of images and patterns. It can input video signal (Television, Camera, Laser Disc), real-time to display dynamic video picture, and it can display other graphic and animation at

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the same time. It can input computer signal, real time to display the content which is supervised by computer monitor, such as various of charts, curve, image which is processed by computer, at the same time, it also can display weather forecast, various of news, current affairs, etc. The display mode and retention time can be controlled. There are many ways for animation display, such as up and down, left to right, etc.

The display time of each frame picture can be controlled, and being able to switch automatically. The programming can be changed at any time, including its content, playing direction, playing time, etc. The amendment programming can be displayed timely. It can take computer control as network station, to read data from designated server, to display on screen. In a word, P10 LED display screen is widely applicable for most of outdoor occasions, it can connect with exterior video devices, such as television, VCD, camera, and computer, etc, which has wide compatibility to digital devices.

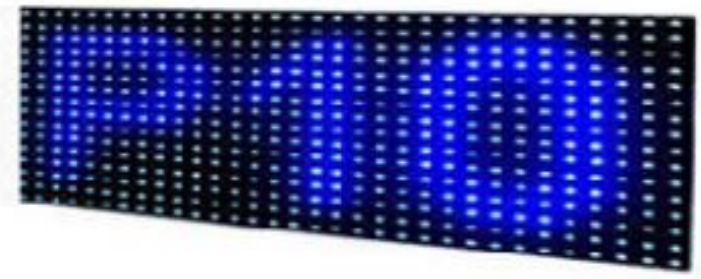

Figure 8. *P10 LED Display Module*

f. Flat Ribbon Cable

FRC is also known as multi wire planar cable because they are the type of cables formed by joining insulated wires in a flat plane forming the Ribbon shape. In other words, Ribbon cable have many conducting wires running parallel to each other on the same flat plane. These wires are commonly used for internal peripherals in computers, such as hard drives, CD drives, wired robots, etc. The ribbon cable was invented in 1956 by Cicoil Corporation, California. This ribbon cable then allowed major companies to replace bulky, stiff round cables with sleek, flexible ribbon cables. This cable consists of 4,6,8,9,10,14,16,18,20,24, etc. upto 80 conducting wires stuck together in parallel.FRC is an ideal way to connect two device digitally. The resultant impedance for any two adjacent wires within the cable is 120 Ohms. FRC also fold and bend readily, conforming to the mounting area, and they fasten easily with clamps, adhesive, or double-faced tape. Since the conductors are visible and in a fixed position within the dielectric coding, inspection and circuit tracing are simplified.

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Figure 9: *FRC Cable*

g. Power Supply

The power supply will supply the regulated power supply to the unit which is first converted into 12V AC. 12V AC is converted into DC using rectifier circuit. Finally the 7805 voltage regulator provides constant 5V DC supply which will be given to circuit.

Figure 10: *Power supply*

5 Results and Discussion

In this paper, in our project we use power supply, Arduino UNO, LED module, Bluetooth HC-05 and mobile application. After uploading the program in Arduino UNO, we will give them external power supply. Due to that all functions of equipment's are on. At that time, we will pass the notice/SMS which we want using mobile. Then this notice/SMS will receive by Bluetooth. And by using Arduino this notice/SMS will display on digital notice board

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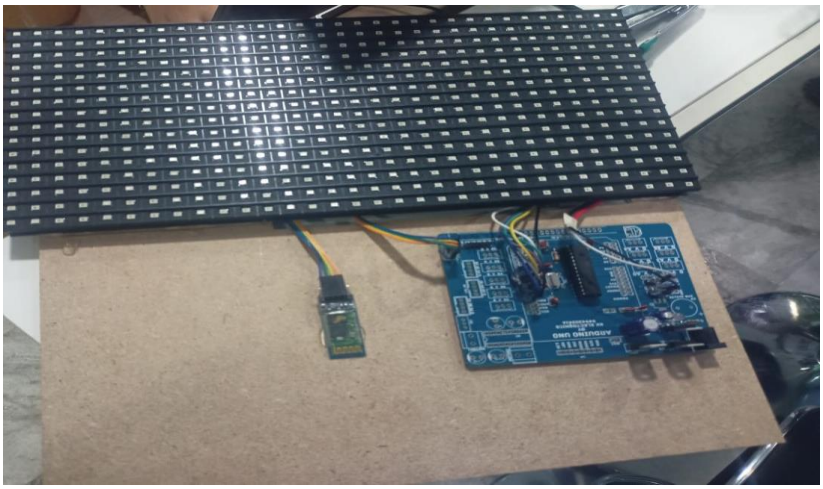

Figure 11: *Proposed system*

The circuit operation for this project is simple. When the 12V supply is provided to the circuit, it will start operating. The Arduino board receives a string (message) from the HC-05 module and will pass it on to the Matrix LED board. The scrolling message will then be displayed on this board

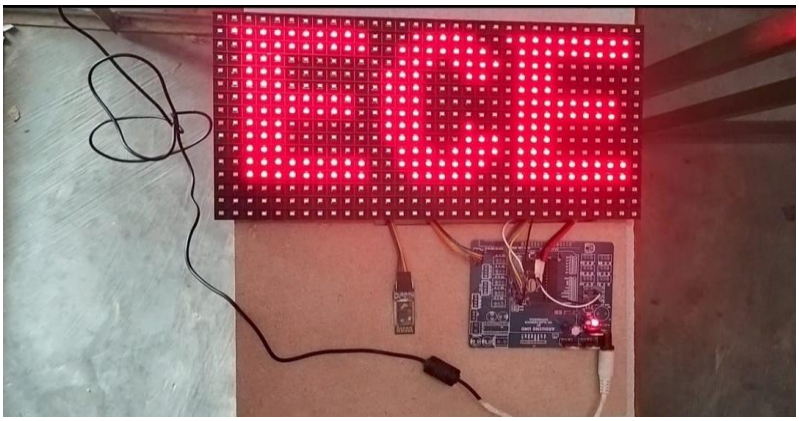

Figure 11(a): *Sample result for notice board using voice chat*

After that we upload the program in Arduino then all functions start to run with program. After uploading the program, we will give the external power supply to the Arduino. then we send notice/SMS from mobile then this notice/SMS will receive Bluetooth and display on LED module. This proposed system used for many upcoming applications in educational institutions and organizations, crime prevention, traffic management, railways, advertisements etc.

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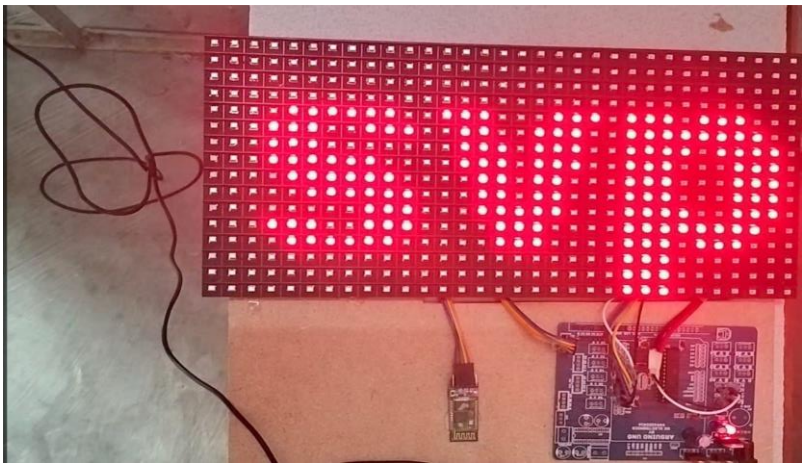

Figure 11(b): *sample result for notice Board using voice chat*

This proposed system has many upcoming applications in educational institutions and organizations, crime prevention, traffic management, railways, advertisements etc. By Using this proposed methodology, we can enhance the security system and also make awareness of the emergency situations and avoid. Latency involved in using of papers in displaying of notices is avoided and the information can be updated by the authorized persons

6 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. Here by introducing the concept of wireless technology in the Field of the communication. We can make our communication more efficient and faster, with greater efficiency. We can display the messages and with less errors and maintenance.

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