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2. Voice Based Notice Board using Android

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ABSTRACT

This paper presents a Voice Based Notice Board using an Android application, designed to simplify real-time notice management. The system leverages speech-to-text technology to convert voice commands into text, which is then displayed on a digital notice board. The Android app acts as a user-friendly interface, enabling seamless notice updates through wireless communication. This innovative solution is cost-effective, scalable, and accessible, making it suitable for educational institutions, offices, and public spaces. The implementation and testing demonstrate its efficiency, significantly reducing manual effort and improving communication

KEYWORDS:

Speech Recognition Notice Board, Android Application, Wireless Communication, Real-Time Updates, Digital Display, Speech-to-Text Conversion.

I. Introduction:

Communication plays a crucial role in managing and sharing information efficiently across various domains. Traditional notice boards are commonly used for this purpose but involve time-consuming manual updates that are often prone to errors. This highlights the need for a modern, automated system to streamline the process.

This paper presents a Voice-Based Notice Board that uses an android application and speech recognition technology to revolutionize the way notices are managed. Users can simply speak their messages, which are converted to text and displayed on a digital screen via wireless connectivity. The system eliminates manual intervention, reducing time and effort while improving accuracy and accessibility. The solution is adaptable to different environments, including schools, offices, and public spaces, offering a scalable and cost-effective alternative to conventional systems. This paper details the design, implementation, and evaluation of the system, showcasing its potential to enhance communication through automation.

II. Technology used:

Bluetooth: Bluetooth technology plays a crucial role in enabling wireless communication for the Voice-Based Notice Board. By leveraging Bluetooth, the system ensures reliable and low-energy connectivity between the Android application and the digital display unit. This eliminates the need for complex network configurations and provides a cost-effective solution for short-range communication.

The Android application transmits the text data, generated via speech-to-text conversion, to the display board using Bluetooth modules. The integration ensures seamless data transfer with minimal latency, making it suitable for environments where internet connectivity is unavailable or limited.

Additionally, Bluetooth's secure pairing mechanism prevents unauthorized access, ensuring that only authenticated devices can update the notice board. Its ease of implementation, energy efficiency, and robust performance make it an ideal choice for a compact and efficient voice-based notice system.

Microcontroller: The Voice-Based Notice Board project, the Arduino Uno serves as the central microcontroller that processes voice commands from the Android app and controls the display system. The ATmega328P microcontroller on the Arduino Uno receives the text data, which is transmitted wirelessly via a Bluetooth module (HC-05) or a Wi-Fi module (ESP8266), depending on the communication method used. Once the Arduino receives the text from the Android app, it processes and formats the data before sending it to the connected display unit, such as an LCD screen or an LED matrix. This allows the notice board to be updated in real-time with the latest message captured from the voice command.

The Arduino Uno handles the entire communication flow, ensuring that the voice input is translated into readable text and displayed accordingly, enabling hands-free operation of the notice board. It also takes care of power management by using a 9V battery or USB power, ensuring reliable operation throughout the system's use. With its simple and user-friendly interface, the Arduino Uno makes it easy to prototype and implement this system, making it an ideal solution for environments like schools, offices, or public spaces where information dissemination needs to be efficient and dynamic. The low cost of the Arduino Uno further adds to its appeal, allowing for an affordable and scalable solution for modern communication systems.

III. Literature Survey:

Prof. Nawale Shubhangi et.al [1]: In this paper they conveyed a notion to style an SMS based automatic display panel which may restore the contemporary programmable electronic display. it's been proposed to style a display panel that has been programmed via a licensed mobile. This will be utilized in every place where message is conveyed in less time.A. Meenachi et.al [2]: This paper directing on Wireless E-Notice Board Using Wi-Fi and Bluetooth Technology. This paper put forth a new idea of communicating the message to the people working on wireless electronic board which was integrated with the assistance of the Wi-Fi technology. this is often getting utilized in conveying any message almost instantaneously with none delay just by sending an SMS that's better and reliable than the

old regular method of communicating the message on bulletin board This advanced modern method is often utilized in huge institutions, several busy places, malls or in construction areas to extend the reliability of the safety system and also alert the general public just in case of any emergency breaks out and avoid any devastating accidents. R.G.Gupta et al. [3]: In this paper it's primarily being focused on designing an electronic bulletin board for various sectors like schools. The notice is often sent wirelessly within a second. These creative techniques are often wont to display the newest information. The contents of notice are often changed anytime. the thought was to style an SMS based automatic display panel which may reconstruct the present used programmable electronic display. it's been proposed to style a display panel that has been programmed via a licensed mobile. The message to be displayed was transferred through an SMS from a transmitter. The microcontroller collects the SMS and certifies the sent Mobile Identification. Prof. Leena H. Patil et.al [4]: In this paper it's mainly focused on displaying any message soon with no hold up just by sending voice through SMS display on the LCD. The short messages are displaying on the bulletin board. The developed system will therefore aim's in wirelessly sending the short information with intended users and also helps in saving the time and thus the value for paper work. It is user friendly system, which may display notice about information during a particular way .so that the user can help keep track of the knowledge easily a day and each time. Android may be a set of software for mobile devices including Operation System.

IV. Methodology:

The methodology involves developing an Android application for voice-based notice input, utilizing a Speech-to-Text API to convert voice commands into text. The app communicates with a backend server via REST APIs to transmit the text notices. The server processes the notices, stores them in a central database, and sends updates to the display unit. The display unit, controlled by an Arduino Uno, retrieves the notices and updates the digital screen in real-time. This approach ensures efficient notice management and dynamic updates with minimal manual intervention.

A. Design:

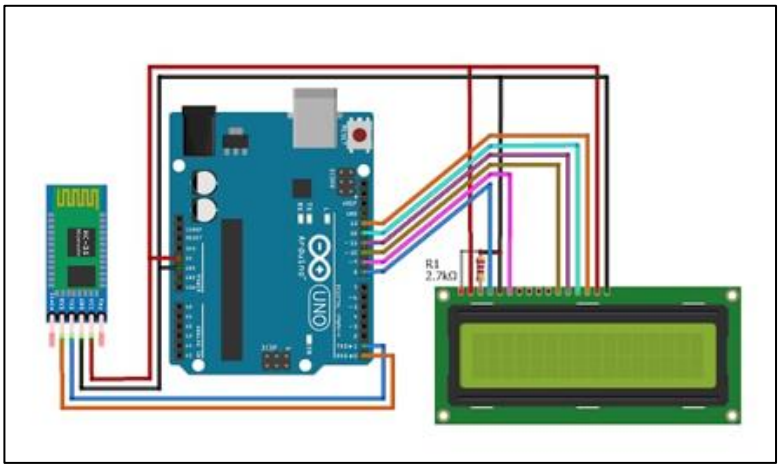

Figure 1: Design

B. Hardware Implementation:

Arduino Board: Arduino is an open-source platform with a microcontroller that serves as the brain of our project. It facilitates easy interfacing of different components and can be programmed using a user-friendly Integrated Development Environment (IDE).

16x2 LCD Display: The 16x2 LCD (Liquid Crystal Display) is a versatile and widely used display module with two rows of 16 characters each. It provides a simple and compact way to display information.

HC-05 Bluetooth Module: The Bluetooth module enables wireless communication between the Arduino and a smartphone or any Bluetooth-enabled device.

Jumper Wires: These are essential for connecting the components together on the breadboard. Power Source: It can power the Arduino using a USB cable or an external power supply.

C. Flowchart Working:

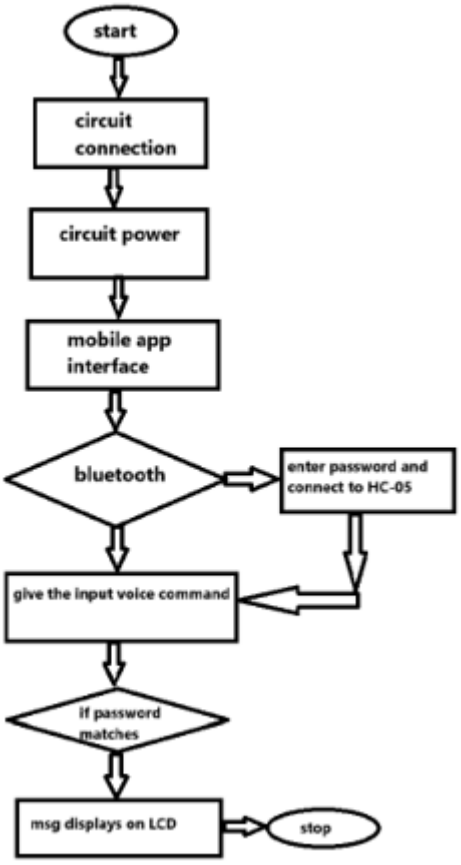

Figure 2: flow chart

STEP 1: Circuit connections should be made.
STEP 2: Power supply is connected to the circuit.
STEP 3: Mobile and notice board are paired through the android application.
STEP 4: Check the Bluetooth connection.
STEP 5: If Bluetooth is connected then the device ready to accept the voice commands.
STEP 6: Then the message displays the information according to the commands.

D. Software Implementation:

This is are the steps for uploading the code to Arduino Uno

1. Write the code in Arduino IDE to control the Arduino Uno and interface with the display.
2. Connect the Arduino Uno to the PC. via USB to upload the code.
3. Select the correct board and port in the Arduino IDE.
4. Click "Upload" in Arduino IDE to transfer the code to the Arduino Uno.
5. Test the Arduino Uno with the display to ensure proper functioning

Source Code:

```
#include <LiquidCrystal.h>
char str[34],L=2;
int temp=0,i=0;
int Pass=0,p=0;
 int c,x,d;
 int LED1=6;
 int LED2=5;
 int Li       = 17;
int Lii       = 1;
int Ri        = -1;
int Rii       = -1;
// initialize the library by associating any needed LCD interface pin
// with the arduino pin number it is connected to
LiquidCrystal lcd(8,9,10,11,12,13);

void setup () {
 // set up the LCD's number of columns and rows:
 lcd.begin(16, 2);
 // Print a message to the LCD.
 lcd.print("BLUETOOTH CONTROLLED");
 lcd.setCursor(0,1);
 lcd.print ("Speech Recognition");
 Serial.begin(9600);
 pinMode(LED1, OUTPUT);
 pinMode(LED2, OUTPUT);
}
```

```
void loop()
{
 if(temp==1)
{
//check();
temp=0;
 i=0;
   delay(1000);
  }
for (int i = 0; i <= 15; i++) {
   lcd.setCursor(0, 0);
   lcd.print(Scroll_LCD_Left("  BLUETOOTH CONTROLLED"));
   lcd.setCursor(0, 1);
   lcd.print(Scroll_LCD_Left("SPEECH RECOGNITION SYSTEM"));
delay(400);
}
}

void serialEvent() {
while (Serial.available())
     {
     char inChar=Serial.read();
     str[i++]=inChar;
     delay(10);
     }
      for (p=i+1;p<34;p++)
     {
       str[i++]=32;
     }
   temp=1;
  Serial.write(str);
Clear_Scroll_LCD_Left();    // Use if the text in the string is changed / different from before
  Clear_Scroll_LCD_Right();
  lcd.setCursor(0, 0);
 lcd.print(str);
  if(i>16)
  {
    d=16;
    for (x=0;x<=17;x++)
    {
    lcd.setCursor(x,2);
    lcd.print(str[d]);
    d++;
    }
  }
  delay(2000);
```

```
 if (str=="turn on LED")
  {
    digitalWrite(LED1,HIGH);
   }
if (str=="turn off LED")
  {
    digitalWrite(LED1,LOW);
   }
  }

//----------------------------------

String Scroll_LCD_Left(String StrDisplay){
  String result;
  String StrProcess = "                " + StrDisplay + "                ";
  result = StrProcess.substring(Li,Lii);
  Li++;
  Lii++;
  if (Li>StrProcess.length()){
    Li=16;
    Lii=0;
  }
return result;
}

void Clear_Scroll_LCD_Left(){
  Li=16;
  Lii=0;
}

//----------------------------------

String Scroll_LCD_Right(String StrDisplay){
  String result;
  String StrProcess = "                " + StrDisplay + "                ";
  if (Rii<1){
    Ri  = StrProcess.length();
    Rii = Ri-16;
  }
  result = StrProcess.substring(Rii,Ri);
  Ri--;
  Rii--;
  return result;
}
void Clear_Scroll_LCD_Right(){
  Ri=-1;
  Rii=-1;}
```

V. Experimental Results:

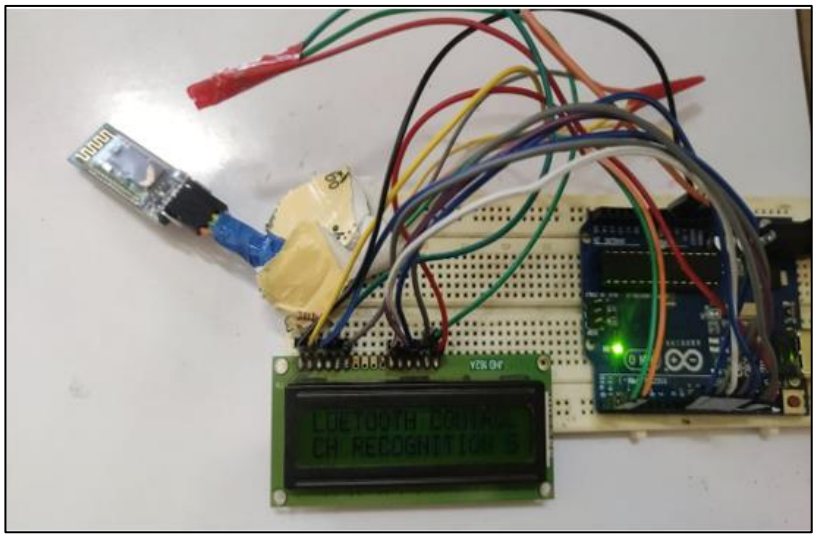

Figure 3: Result

VI. Future Scope:

The future scope of this project includes expanding its functionality to support multiple synchronized notice boards. Enhanced voice recognition and natural language processing could improve the accuracy and ease of user interaction. The system could be adapted for use in larger environments such as schools, offices, and public spaces, with additional features like personalized notices. Incorporating sensors for automatic updates based on environmental factors like time or location could further enhance its usability. Additionally, integrating mobile apps for remote control and notice management could provide more flexibility.

VII. Conclusion:

In conclusion, the voice-based notice board system using Android provides a modern, efficient solution for managing and displaying notices. By utilizing voice commands through an Android app, the system allows for easy and hands-free updates, reducing manual effort. The integration of Arduino Uno with a digital display ensures real-time updates and dynamic content management. This project enhances accessibility, especially in public or educational spaces, where quick dissemination of information is essential. It eliminates paper-based notices, promoting sustainability. Overall, the system simplifies notice management while offering scalability and potential for further enhancements.

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