

Implementation of Arduino Based Voice Controlled Notice Board System by using Bluetooth Sensor with Android Application

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Abstract

The advanced mobile technology opens the scope to the widely usage of android app. This voice controlled notice board system was designed by using HC-05 Bluetooth module together with Adaptive Multi-Rate (AMR) voice application in android phone. In this research work, The AMR voice application sent the commands to Bluetooth by Arduino and performed the descriptive task and this voice message was displayed on LCD display. The program was compiled with the Arduino IDE compiler and upload to Arduino Uno board by using personal computer (PC). This project is work as automation system. The voice command is given by using mobile to the Bluetooth whose proposed design was used as to display information like exam schedule, notice, event notification, and exam result announcement. Thus the proposed technology can be used in many of public places such as the shopping malls or commercial buildings like hospitals to alert the security system and also increase the awareness of the regarding emergency situations to avoid any possible dangers.

Keywords: Arduino Uno, Bluetooth sensor, Notice Board, Smart Phone

Introduction

Voice controlled notice boards are commonly used in elementary schools, malls, public places and key attachments for sending messages publicly. Bluetooth wireless technology is a popular technique in the field communication and it is one of the fastest growing fields in the wireless technologies. The voice controlled notice board system can be used in the areas of railway stations and other such busy facilities where the station administrator need not have to type in every announcement message manually on the screen. The announcer may speak out the message through android phone; the message is then transferred wirelessly and displayed on the screen. To demonstrate this concept, LCD screen was used to display messages. Bluetooth was used to get the android transmitted messages, decode them and send them to the Arduino microcontroller for further processing. The microcontroller then displays the message on the LCD screen. 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 the voice based notice board project is very useful in various organizations. . Thus the proposed technology can be used in many of the public places such as shopping malls or commercial buildings like hospitals to alert the security system and also increase the awareness of regarding emergency situations and avoid any possible dangers. In this system, creating a small messaging application using HC-05 and Arduino can chat between Arduino and mobile with Bluetooth as the communication Channel.

Methodology

The design of Bluetooth voice controlled automatic notice board can replace the currently used programmable electronic display and conventional notice board. Figure 1 shows the complete circuit diagram of Arduino voice controlled notice board system using proteus software. Arduino is fairly easy to interface different sensors and actuators, which makes it

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quite attractive because it is a small computer on a single chip containing a processor, memory, and input/output. It is typically “embedded” inside some devices that they can control. Bluetooth technology handles the wireless part of the communication channel; it is used in this system to transmit and receive data wirelessly between devices. This system needs work with setting and working the help of Google voice speech.. The voice commands of user were given to this voice application with the help of Google voice service. The voice recognition of the scrolling messages was displayed on LCD display. The program was compiled with the Arduino IDE compiler and upload to Arduino Uno board by using personal computer (PC). Figure 2 and 3 shows the require components, HC-05 Bluetooth Module, Arduino Uno board, 16 x2 Liquid Crystal Display and, LED, Buzzer and some other electronic components were used in this system. Table 1 shows the connection system to construct the voice controlled notice board . The flow chap of voice controlled notice board system circuit using Bluetooth sensor is shown in Figure 4.

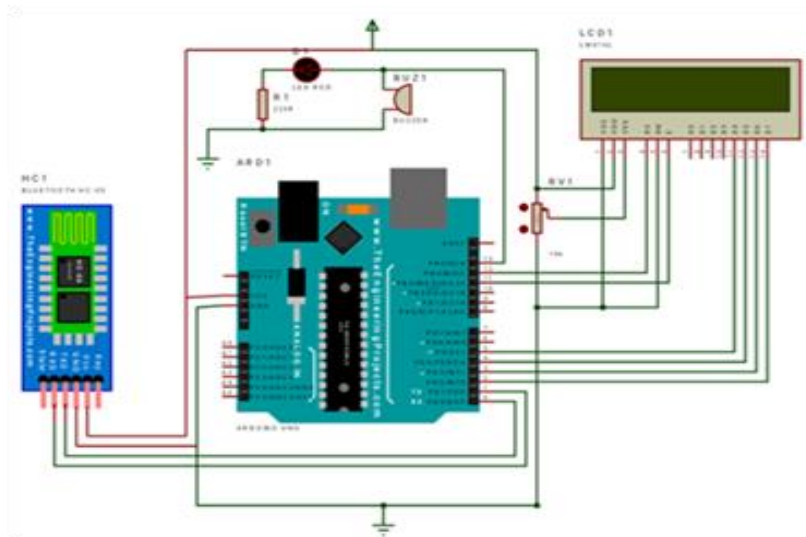


Figure 1 The circuit diagram of Arduino voice controlled notice board using proteus software



Figure 2 The mainly required components of a voice controlled notice board

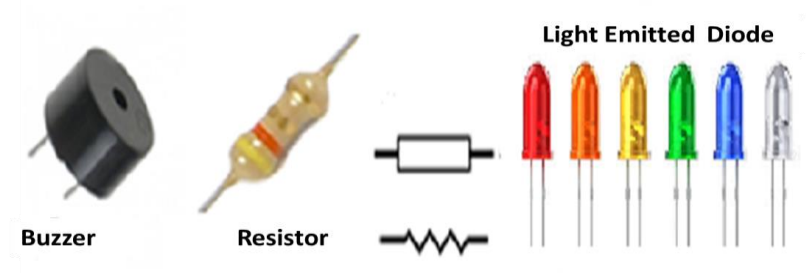


Figure 3 The other required components of a voice controlled notice board

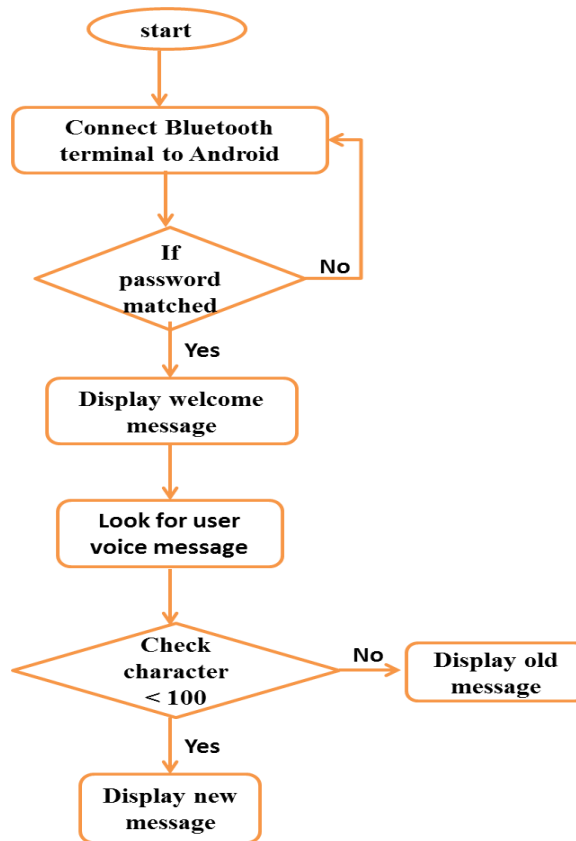


Figure 4 The flow chart of a voice controlled notice board system

Table 1 Connection system of Arduino based voice controlled notice board

Arduino	Hc -05	Arduino	LCD
5V pin	Vcc pin	D4	12
GND pin	GND pin	D5	11
2	RXD	D6	5
4	TXD	D7	4
		GND	3
		VCC	2

Software Development

The software code is written in C++ programming language and compiled using arduino IDE compiler. Programs are created in the Arduino development environment and then uploaded to the Arduino board. The software performs in an infinite loop. When the program starts, it initializes variables. SoftwareSerial class library is used for creating virtual Serial interface.

Hardware Description

The circuit of Arduino voice controlled notice board system using Bluetooth controller mainly consists of Hc-05 bluetooth module, Arduino Uno microcontroller, 2x 16 liquid crystal display(LCD), AMR voice application in smart phone, LEDs and buzzer. The ATmega328P Microcontroller is connected by H-05 Bluetooth module with wireless technique. The Blue

tooth controller Android application and the input/output ports of the embedded system board are connected to wireless notice board system.

Software Description

```
#include <liquid Crystal.h>
// initialize the library with the numbers of the interface pins
Liquid Crystal lcd (12,11,5,4,3,2);
String voice;
Int buz = 13;
// ..... Call A Function .....//
void allon(){
digital Write (buz,HIGH);
}
voidalloff (){
digital Write (buz,LOW);
}
void setup ( ) {
pin Mode (buz,LOW);
delay (100); // set up the LCD's number of columns and rows:
lcd.begin (16,2);
lcd.clear ( );
lcd.setCursor(0,0);
lcd.print ("It's only 5 minutes before the train leaves");
lcd.setCursor(0,1);
lcd.print("Physics department");
delay (6000);
lcd.setCursor(0,0);
lcd.print("Voice controlled");
lcd.setCursor(0,1);
lcd.print("Notice Board");
Serial.begin(9600);
}
void loop ( ){
While (Serial avaiable ( )
{ // Check if there is an ava
delay(50);
```

```

// Delay added to make thing stable
char c = Serial.read ( ) ;
// Conduct a serial read
if (c == '#'){
break;}
// Exit the loop when the # is det
voice +=c;
// Shorthand for voice =voice+c
}
}
if(voice.length ( ) > 0)
{
Serial.print(voice);
lcd.clear( );
lcd.setCursor(0,0);
for (int i = 0; i< voice.length ( ) && i<= 16; i++){
If(voice[i]=='*') {
lcd.setCursor(0,0);
} else
{
lcd.print(voice[i]);
}
delay(50); }
lcd.setCursor(0,1);
for (int j= 17; j< voice.length( ); j ++){
lcd.print(voice[j]);
delay(50);
}
}

```

Results and Conclusion

Experimental Results

Arduino voice controlled notice board system using Bluetooth sensor system is based on IOT (internet of thing) project. It can be seen in Figure 5 to 7. To construct this system, firstly, Arduino IDE program was written and compiled. And then, the generated hex file was found successfully with done compiling program. After all, the circuit was constructed on a universal double side prototype circuit board. In the constructed system, TXD and RXD pin of Bluetooth module HC-05 is connected to RXD pin 4 and TXD pin 2 of Arduino microcontroller. Pin GND and VCC of the Bluetooth module are connected to GND and 5V of

Arduino microcontroller. 2 x16 liquid crystal display (LCD) was used for notice board system. EN, RS and (D4 to D7) pins of LCD are connected to digital pins 11,12,5,4,3,2, of the Arduino microcontroller. And then, Bluetooth terminal AMR voice application was downloaded and installed in Android phone pair with Bluetooth module HC-05 sensor. This application sends the command to Bluetooth which is then received by Arduino and performs the described task. In Figure 5, The operating system (i) represents the design of arduino based voice controlled notice board, the operating system (ii) states the condition before the operation shown in Figure 6 and the operating system (iii) was displayed on notice board by the commands of user as shown in Figure 7. This automation system was used by voice command of “Physics Department”.

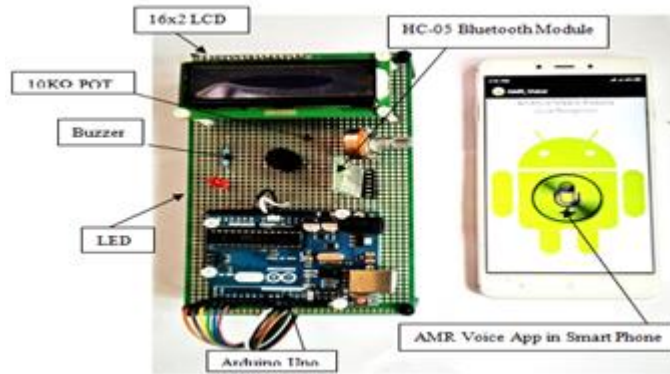


Figure 5 Photograph of voice controlled notice board system (i)

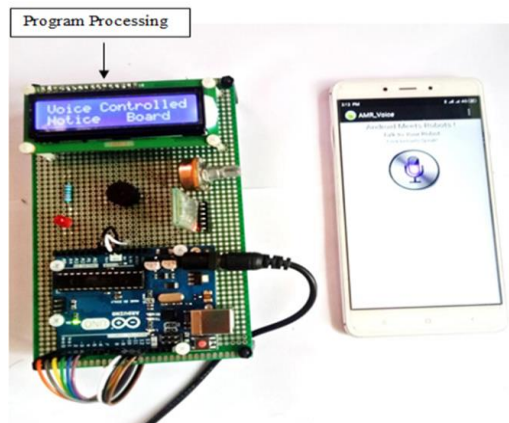


Figure 6 Photograph of voice controlled notice board system (ii)

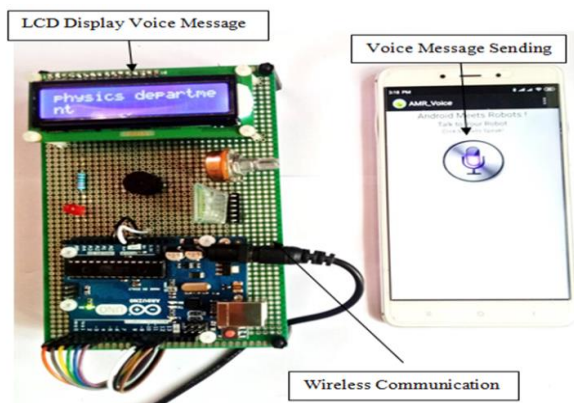


Figure 7 Photograph of voice controlled notice board operating system (iii)

Conclusion

This research, Arduino based voice controlled notice board system, is an implementation of the idea of wireless communication between a mobile phone and an ATmega328 controller through Bluetooth module. This system consists of an Arduino Uno board, a Bluetooth module, an Android phone, 2 x16 LCD and AMR android voice application. Bluetooth (HC-05) based voice controlled notice board system was presented in this research work. It is easy to use and reduces man power and also it can be applied to display information in the area of exam schedule, notice, event notification, and exam results announcement of all colleges and schools. Beside, the advanced wireless voice controlled notice board is useful for public transportation areas like bus stations, railway stations and even at airports, shops and offices. It can be concluded that Arduino based voice controlled notice board system using Bluetooth sensor has been successfully designed and prototyped.

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