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Intake-32

**Project Report**

**on**

# Wireless Electronic Notice Board Using Arduino UNO with Bluetooth

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# Dedicated to

*Our Parents*

*and*

*Our Honorable Teacher*

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# Table of Contents

# Chapter-01

# Abstract

We have made a project about the wireless electronic notice board using Arduino with Bluetooth. In this project we have made a notice board by Arduino-UNO and we have C-language. In this project, we have used 4682 LCD display as notice board and the notice board receives serial data from the wireless module receiver and displays it on the graphical liquid crystal display. This display is a KS0108 based 128x64 graphical LCD as a display element “BLUETOOTH based wireless noticeboard using Arduino”. In this paper built a Noticeboard using BLUETOOTH technology. Being a BLUETOOTH-based system, it offers flexibility to display flash news or announcements faster than the programmable system. This notice board is controlled by Bluetooth system and we can put any message by our handset mobile phone. We can send the message as an SMS in this device and this SMS system is realized through an embedded microcontroller.

# Chapter-02
# Introduction

## 2.1 Description

This 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. Nowadays information displaying is going digital with a high speed. 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. Using Bluetooth module display the message onto the display board. The main objective of this paper is to develop a wireless notice board that displays messages sent from the user. Notice Board is primary thing in any institution/ organization or public utility places like bus stations, railway stations and parks. In the last couple of decades, communication technology has developed by leaps and bounds. It has already established its importance in sharing the information right from house hold matters to worldwide phenomena. In this paper, we present the development of an SMS controlled E-notice board which can be updated automatically and remotely. The system was implemented using a BLUETOOTH Module IC controlled by a Microcontroller and an LCD display.

## 2.2 Objectives

- To know about the making of digital wireless notice board.
- To know about the internal connection of this project.
- To know about the Arduino and how does it work.
- To know about the working principle of LCD display and embedded microcontroller.

# Chapter-03

# Background

## 3.1 Description

A wireless notice board is a digital display system that allows information to be transmitted and displayed without the need for physical connections. It typically consists of three main components: a central control unit, a wireless communication module, and the display panel. Nowadays we can see the technological improvement in everywhere. Using wireless notice boards are so convenient than the analog ones. Because we can control it by our cellphone and it does not require any wire.

## 3.2 Motivation

### 3.2.1 Dynamic and Real-Time Updates:

Digital notice boards allow for instant and real-time updates of information. Unlike traditional notice boards where physical posters or notices need to be replaced manually, digital notice boards can be updated remotely with a few clicks. This enables organizations to share timely and relevant information without delay, ensuring that the displayed content is always up to date.

### 3.2.2 Cost and Environmental Efficiency:

Digital notice boards eliminate the need for printing and distributing physical posters or notices. This reduces costs associated with printing materials, such as paper and ink, and minimizes waste generated by outdated or obsolete notices. It is a more sustainable and environmentally friendly solution.

### 3.2.3 Increased Visibility and Attention:

Digital notice boards often employ bright and vibrant displays, attracting more attention compared to traditional paper-based notice boards. The use of animations, scrolling text, and multimedia content can further enhance visibility and engagement. This increased visibility ensures that important messages or announcements are more likely to be noticed by the intended audience.

### 3.2.4 Centralized Control and Management:

With digital notice boards, organizations can have centralized control over the displayed content. Administrators or designated personnel can manage and schedule content updates remotely from

a control unit. This allows for efficient coordination of information across multiple locations and ensures consistency in messaging.

### 3.2.5 Flexibility and Multimedia Capabilities:

Digital notice boards support a wide range of multimedia content, including text, images, videos, and even interactive elements. This flexibility allows organizations to convey information in various formats, making it more engaging and effective. Multimedia content can capture attention, convey complex information more easily, and create a visually appealing display.

### 3.2.6 Integration with Other Systems:

Digital notice boards can integrate with other systems or databases, enabling automated content updates. For example, they can display real-time data such as weather updates, news feeds, event schedules, or social media feeds. Integration with calendar systems or event management software can automatically display upcoming events or meetings.

Overall, digital notice boards offer a modern and efficient way to communicate information, providing organizations with cost savings, environmental benefits, improved visibility, and greater flexibility in conveying messages. These motivations make them an attractive choice for various settings, ranging from educational institutions and corporate offices to public spaces and transportation hubs.

# Chapter-04

# Equipment

- Arduino UNO
- Bluetooth Module HC-05
- 16*2 LCD Display
- Jumper wires
- Resistor-1k ohm
- Half breadboard
- Arduino Automation mobile app

# Chapter-05

# Literature Review

## 5.1 Description

The wireless notice board system can be controlled and updated remotely, allowing for easy dissemination of information in real-time. It finds applications in various settings such as schools, offices, public places, and transportation hubs, where information needs to be displayed and updated dynamically.

## 5.2 Arduino UNO

Arduino Uno can be used as a control unit in a wireless notice board system to control the display and communicate wirelessly with the display panel. Here's an overview of how Arduino Uno can work in a wireless notice board:

### 5.2.1 Arduino Uno as the Control Unit:

Arduino Uno is a microcontroller board that serves as the control unit of the wireless notice board system. It is equipped with a microcontroller (ATmega328P) and various input/output pins, making it capable of processing and controlling the information to be displayed.

### 5.2.2 Wireless Communication Module:

To enable wireless communication, you can connect a wireless module to the Arduino Uno. There are various wireless modules available that can be interfaced with Arduino Uno, such as Wi-Fi modules (e.g., ESP8266 or ESP32) or Bluetooth modules (e.g., HC-05 or HC-06).

### 5.2.3 Storing and Processing Information:

The Arduino Uno can receive and store the information that needs to be displayed. This information can be entered manually through input devices (such as buttons or a keypad) or received remotely via wireless communication from a computer or a network connection.

### 5.2.4 Wireless Transmission:

The Arduino Uno, with the wireless module attached, can establish a wireless connection with the display panel. It can transmit the stored information wirelessly to the display panel using the chosen wireless technology (e.g., Wi-Fi or Bluetooth).

### 5.2.5 Display Panel Control:

The Arduino Uno sends commands or data to the display panel to update the displayed information. The commands can include instructions on what content to display, the format, and the timing of the display.

### 5.2.6 Display Panel Update:

The display panel, which is typically connected to the Arduino Uno, receives the transmitted data and updates its display accordingly. The display panel can be an LCD screen, LED display, or any other compatible digital display.

### 5.2.7 Control and Interaction:

Arduino Uno can also provide control and interaction functionalities for the wireless notice board. For example, it can incorporate input devices to allow users to interact with the system, such as buttons for scrolling through different notices or selecting specific options.

By utilizing Arduino Uno as the control unit and integrating a wireless communication module, we can leverage its capabilities to control and wirelessly transmit information to the display panel. The specific implementation details will depend on the chosen wireless module, the display panel used, and the programming logic implemented on the Arduino Uno.

## 5.3 Bluetooth Module HC-05

A Bluetooth module can be used in a wireless notice board system to enable communication between the control unit (such as Arduino Uno) and the display panel. Here's a general overview of how a Bluetooth module works in a wireless notice board:

### 5.3.1 Bluetooth Module Configuration:

Initially, the Bluetooth module needs to be configured and paired with the control unit (e.g., Arduino Uno). This involves setting up the Bluetooth module with the appropriate settings, such as the communication protocol (e.g., Bluetooth Classic or Bluetooth Low Energy), device name, security settings, and pairing mode.

### 5.3.2 Establishing Connection:

Once the Bluetooth module is configured, it can establish a wireless connection with the control unit. The control unit (Arduino Uno) needs to have the necessary Bluetooth libraries or modules installed to communicate with the Bluetooth module effectively.

### 5.3.3 Data Transmission:

The control unit (Arduino Uno) sends data or commands to the Bluetooth module, which converts the information into a Bluetooth-compatible format. This data can include text, images, or other content that needs to be displayed on the notice board.

### 5.3.4 Bluetooth Signal Transmission:

The Bluetooth module transmits the converted data wirelessly using the Bluetooth technology and protocol. It sends the Bluetooth signals to the display panel, which is equipped with a compatible Bluetooth receiver.

### 5.3.5 Display Panel Update:

The display panel receives the Bluetooth signals from the Bluetooth module and decodes the transmitted data. It updates the displayed information based on the received data, following the instructions or commands sent by the control unit.

### 5.3.6 User Interaction (Optional):

Bluetooth can also enable user interaction with the wireless notice board system. For instance, users can pair their mobile devices with the notice board and send instructions or content wirelessly. This allows for more dynamic and interactive notice board experiences.

### 5.3.7 Control and Synchronization:

The control unit (Arduino Uno) can continue to send data to the Bluetooth module, ensuring that the displayed information remains up to date and synchronized with any changes made on the control unit.

It's important to note that the specific implementation details and programming logic will depend on the Bluetooth module and the control unit being used. The Bluetooth module may require specific libraries, commands, or configuration steps to establish and maintain the Bluetooth connection successfully.

## 5.4 16*2 LCD Display

A 16x2 LCD (Liquid Crystal Display) is commonly used as a display panel in a wireless notice board system. Here's how it works in a wireless notice board:

### 5.4.1 Display Initialization:

The 16x2 LCD display needs to be properly initialized before it can be used. This typically involves sending specific commands to the display to configure its settings, such as the number of display lines, cursor visibility, and display mode. The initialization process is usually done during the system startup or whenever the display is powered on.

### 5.4.2 Data and Command Communication:

To control the display and update its content, the control unit (such as Arduino Uno) sends data and commands to the 16x2 LCD display. The communication with the display usually involves a parallel interface, where each bit or data line corresponds to a specific function or character to be displayed. The control unit sends commands to configure the display settings, such as cursor position, shift display, or clear display. It also sends data to display specific characters, symbols, or messages.

### 5.4.3 Display Content:

The control unit determines the content to be displayed on the wireless notice board. It may receive this information from user input, sensors, or other data sources. The control unit processes the data and formats it accordingly for the 16x2 LCD display. It sends the formatted data and commands to the display to update its content.

### 5.4.4 Display Update:

The 16x2 LCD display receives the data and commands from the control unit and updates its display accordingly. The display uses its built-in character set to represent alphanumeric characters, symbols, and special characters. The control unit can send a sequence of characters or commands to display messages, announcements, or any relevant information on the wireless notice board.

### 5.4.5 Interaction and User Input (Optional):

Some 16x2 LCD displays may also support user interaction through buttons or a keypad. The control unit can read the input from these buttons or keypad and perform corresponding actions based on the user's selection. This enables users to interact with the wireless notice board system by navigating through menus, selecting options, or inputting data.

The control unit, such as Arduino Uno, plays a crucial role in processing and transmitting the necessary commands and data to the 16x2 LCD display. It instructs the display on what to show, how to format the content, and when to update the displayed information. This allows the wireless notice board system to present the desired messages or announcements effectively.

# Chapter-06

# Methodology

We have made a project of wireless notice board which is controlled by Arduino using C-language. At first, we have connected the Arduino Uno with Bluetooth and display.

Step:1 Connection: We have connected the VCC and GND pins of the Bluetooth module to the 5V and GND pins on the Arduino Uno, respectively. We have connected the TX and RX pin of the Bluetooth with the Arduino.

## Step 2: Installing Required Libraries:

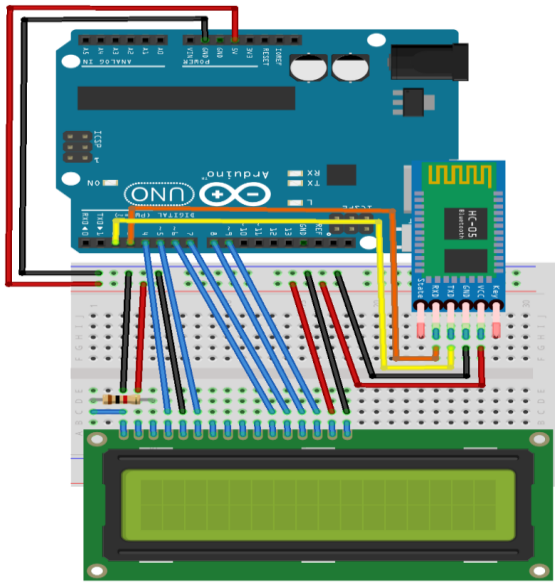
We have to install the required library which are liquid crystal library and software serial library

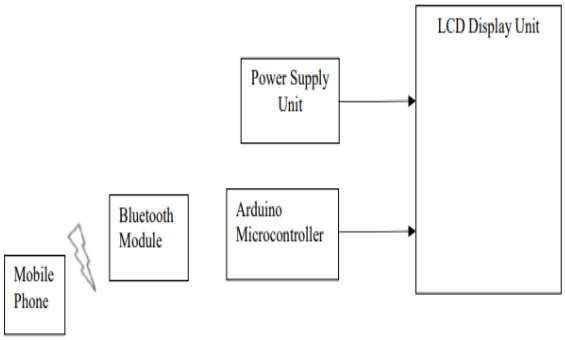
## Step 3: Uploading the Code:

We have to open the Arduino IDE and write the code for our wireless notice board.

# Chapter-07

# Circuit Diagram





# Chapter-08

# Code

```
#include <LiquidCrystal.h>
#include <SoftwareSerial.h>
LiquidCrystal lcd (4, 5, 6, 7, 8, 9);
SoftwareSerial mySerial (2, 3);   //(RX, TX);
String val = "No Data";
String oldval;
String newval = "No Data";
int i = 0;

void setup()
{
  // put your setup code here, to run once:
  lcd.begin(16,2);
  mySerial.begin(9600);
  Serial.begin(9600);
  lcd.setCursor(0, 0);
  lcd.print("Wireless Notice");
  lcd.setCursor(0, 1);
  lcd.print("     Board     ");
  delay(3000);
  lcd.clear();
  lcd.print("Welcome!");
}
void loop()
{
  val = mySerial.readString();
  val.trim();
  Serial.println(val);
  if(val != oldval)
  {
    newval = val;
  }
  lcd.clear();
  lcd.setCursor(i, 0);
  lcd.print(newval);
  i++;
  if(i >= 15)
  {
    i = 0;
  }
  val = oldval;
}
```

# Chapter-09

# Code Explanation

```
#include <LiquidCrystal.h>
#include <SoftwareSerial.h>
```

At first, we have added two libraries which are liquid crystal library and another one is software serial library. Liquid crystal library is used to control the LCD display and software serial library is used for serial communication.

```
LiquidCrystal lcd (4, 5, 6, 7, 8, 9);
SoftwareSerial mySerial (2, 3);   //(RX, TX);
```

The 4 to 9 pins are connected with LCD display that's why we have mention these pins with Liquid Crystal Display variable and the 2 and 3 pins are used for serial communication that's why we have mentioned them with serial communication variable. That's why we have connected these 2 and 3 pins with RX and DX of Bluetooth. They are used to maintain the serial communication between Bluetooth and Arduino.

```
String val = "No Data";
String oldval;
String newval = "No Data";
int i = 0;
```

Here we have selected the string variable to store the initial data which will show first and then it will store as old value then it will show the new value. And we have mentioned that it will start from 0.

```
void setup()
    {
     }
```

Here setup means the starting of Arduino which will one time and it will not repeat till we will keep the device active.

```
lcd.begin(16,2);
```

Here the begin() function is the part of serial object. It tells the serial object to perform initialization steps to send and receive data. And we have mentioned that the display will show the data serially by 16 columns and 2 rows with initialization.

```
mySerial.begin(9600);
Serial.begin(9600);
```

Here we have mentioned the speed of exchanging the message by this. This begin() function passes the value “9600” to the speed parameter and it tells the Arduino to get ready to exchange messages with the serial monitor at a data rate of 9600 bits per seconds. This is also called the baud rate.

lcd.setCursor(0, 0);
Here we have mentioned that the column number and the row number from where the data will start showing.

```
lcd.print("Wireless Notice");
  lcd.setCursor(0, 1);
  lcd.print("     Board     ");
```

Here the display will show the project name which is “Wireless Notice Board”. It will show Wireless notice from 0 column and 0 row then it will come to 0 column and 1 row and it will show “Board” from 0 column and 0 row.

```
delay(3000);
  lcd.clear();
  lcd.print("Welcome!");
```

Here we have mentioned the delay which is 3000 mS. This means when we start the device it will show “wireless Botice Board” then the display will be cleared and it will show “Welcome” and this delay will be 3000 mS.

```
void loop()
{
}
```

This is a loop.

val = mySerial.readString();
When the data will come from Arduino Bluetooth apps, then will read the data.

val.trim();

If we put extra space in our data then it will trim that extra space.

Serial.println(val);

Then this will show our input message.

```
if(val != oldval)
  {
    newval = val;
```

```
  }
```

This condition means if we put the new data which is similar to the old data then the display will show the old data but if we put the new data which is not similar to old data then the display will show the new data.

```
lcd.clear();
  lcd.setCursor(i, 0);
  lcd.print(newval);
  i++;
  if(i >= 15)
  {
    i = 0;
  }
  val = oldval;
```

Then the display will be cleared and here took a variable “i” which is used for the increment of the cursor. Then the new value will be printed and the increment will be serially as like 0,1,2,3,….. and this will go to 15. When it will reach to 15 then it will come to initial point again. Then the value will be known as old value.

# Chapter-10

# Social Economy Impact

## 10.1 Description

The implementation of wireless displays, such as wireless notice boards, can have several positive impacts on the social economy. Here are some potential social and economic benefits:

### 10.1.1 Improved Communication and Information Sharing:

Wireless displays enable more efficient and effective communication and information sharing. They allow organizations, institutions, and communities to disseminate important messages, announcements, and updates quickly and in real-time. This can enhance public awareness of events, initiatives, and opportunities, fostering a sense of connectedness and engagement among community members.

### 10.1.2 Cost Savings and Resource Efficiency:

Wireless displays can lead to cost savings and resource efficiency. By transitioning from traditional paper-based notice boards to digital displays, organizations can reduce printing and distribution costs associated with physical materials. Additionally, the ability to update content remotely eliminates the need for physical maintenance, reducing both time and resource requirements.

### 10.1.3 Environmental Sustainability:

The shift to wireless displays aligns with environmental sustainability goals. By minimizing or eliminating the use of paper and reducing waste generation from outdated or irrelevant notices, wireless displays contribute to reducing deforestation, energy consumption, and carbon emissions associated with the paper production and disposal processes. This promotes a greener and more sustainable approach to information dissemination.

### 10.1.4 Increased Accessibility and Inclusivity:

Wireless displays can improve accessibility and inclusivity by providing information in various formats, accommodating different needs and preferences. For example, the use of multimedia content, such as images and videos, can enhance the understanding and engagement of individuals with visual impairments or those who prefer visual cues. Wireless displays can also support multilingual content, making information more accessible to diverse language communities.

### 10.1.5 Support for Local Businesses and Community Initiatives:

Wireless displays can be used to promote local businesses, events, and community initiatives. They provide an opportunity for small businesses, startups, and local organizations to showcase their products, services, and events to a wider audience. This can stimulate economic growth, foster community engagement, and encourage collaboration among local stakeholders.

### 10.1.6 Flexibility and Adaptability:

Wireless displays offer flexibility and adaptability in content management and updates. Messages can be modified or tailored to specific audiences or events easily, allowing for more targeted and personalized communication. This flexibility enables organizations and community groups to respond quickly to changing needs, emerging opportunities, and evolving circumstances.

Overall, wireless displays have the potential to enhance communication, reduce costs, promote sustainability, and support local economies and initiatives. By leveraging wireless technology, these displays contribute to a more connected, informed, and inclusive social economy.

## 10.2 Future Plan

The main aim of our project is to display various notices which we have achieved using the Bluetooth technology but as Bluetooth has a limited range, the application is limited to a particular geographical area which is the main drawback of our system, so if the distance between the device and cellphone becomes out of its range, then device will be disconnected to a Wireless fidelity. That's why the range of the network can be increased. The inclusion of other effective parameters such as date and time can be done as well as provisions can be made to display several notices simultaneously can be achieved in the notice board. A playlist of certain default notices can also be created to be displayed and the daily basis such as the notice if 'welcome' or the various good thoughts can be added. The design can be made more user friendly by enhanced interaction for the user. There can also be a provision for each student to connect his/her mobile to the Bluetooth modem so that the notice can also be seen in their mobiles. We can have detailed information about who has send the message, whether the message has been read or not by the receiver. Another advancement that can be made to the current model is that a buzzer and a led can be added in order to make aware the receiver a new message or notice will not go unread.

# Chapter-11

# 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.

# Chapter-12

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