CHAPTER 1

1.1ABSTRACT:

In this era of digital communication, the demand for dynamic and interactive notice boards is rapidly increasing. To address this need, we propose a Bluetooth-controlled notice board system leveraging Arduino and Internet of Things (IoT) technology. This project aims to create a customizable and remotely manageable notice board that can display text messages, images, and updates in real-time.

The system consists of an Arduino microcontroller, a Bluetooth module for wireless communication, and an LED display panel. Users can send messages or updates to the notice board through a mobile application installed on their smartphones. The Arduino board receives these messages via Bluetooth and processes them to display the content on the LED panel.

The mobile application provides a user-friendly interface for composing messages, selecting display options, and sending them to the notice board. Additionally, the application allows users to schedule messages for future display, ensuring timely communication.

The proposed Bluetooth-controlled notice board offers versatility, scalability, and convenience, making it suitable for various applications such as schools, offices, public spaces, and homes. By harnessing the power of IoT and Arduino technology, this project aims to enhance communication efficiency and interactivity in modern environments.

Through this innovative integration of hardware and software, the Bluetooth Controlled Notice Board serves as a practical solution for effective communication in modern environment.

1.2INTRODUCTION:

In the world Mobile Phones and the related technologies are becoming more and more prevalent. Various technical arenas in the field of Telecommunication and Embedded system are becoming omnipresent in the people. The use of cellphones has rapidly increased over the last decade and a half upgradation in networking technologies has encouraged the development and growth of very dense network.

Notice board are one of the widely used ones ranging from primary schools to major organizations to convey message at large. Small innovative steps in making use of technology for regular purpose would have an adverse effect on environment issues which are presently concerned about. The main aim of this project is to design a SMS driven automatic display board which can replace the currently used programmable electronic display and conventional notice board. It is proposed to

design to receive message in toolkit which can be used from an authorized mobile phones. The whole process can be described from the transmitter and receiver section.

The Bluetooth module receives a message from authorized mobile phone and message is extracted by the microcontroller from the Bluetooth module and is displayed on the LCD display board.

1.3PROBLEM DEFINITION:

To address this limitation, there is a need for a versatile and interactive notice board system that allows for remote management and real-time content updates. Such a system should enable users to easily compose, schedule, and display messages or announcements without the need for physical intervention.

Furthermore, the solution should be cost-effective, user-friendly, and adaptable to different environments and display requirements.

1.4KEY CHALLENGES:

- **Remote Management**
- **Real time updates**
- **Bluetooth communication**
- **User interface**
- **Compatibility and scalability**

By achieving these objectives, the Bluetooth-controlled notice board IoT project aims to enhance communication efficiency, flexibility, and interactivity in various settings, including schools, offices, public spaces, and homes.

CHAPTER 2

COMPONENTS:

2.1 Arduino UNO:

Arduino is an open-source electronics platform based on easy-to-use hardware and software. It consists of a microcontroller board (the hardware) and a development environment (the software) used for writing, compiling, and uploading code to the board. Arduino boards are widely used by hobbyists, students, and professionals for prototyping, experimenting, and creating interactive electronic projects

2.2 16*2 LCD display:

Integrating a 16x2 LCD display into a Bluetooth-controlled notice board adds a visual element to the communication system, allowing for more versatile message presentation.

2.3 HC05 Bluetooth Module:

It's commonly used in applications where a device needs to communicate with another device over Bluetooth. For a Bluetooth-controlled notice board, the HC-05 module can be used to enable communication between a smartphone or a computer and the notice board.

2.4 I2C Module:

I2C is a synchronous serial communication protocol that allows multiple devices to communicate with each other using just two wires: a clock line (SCL) and a data line (SDA)

2.5 Jumper Wires and BreadBoard:

Jumper Wires:

Jumper wires are electrical wires used in electronics and electrical circuits to create electrical connections between different components or points on a breadboard, printed circuit board (PCB), or other circuitry. They are commonly used in prototyping, testing, and experimenting with electronic circuits.

BreadBoard:

A breadboard is a fundamental prototyping tool used in electronics and electrical engineering to build and test electronic circuits quickly and without the need for soldering. It consists of a plastic board with numerous holes or sockets into which electronic components, such as resistors, capacitors, integrated circuits, and wires, can be inserted to create temporary electrical connections. Breadboards are essential for prototyping and experimenting with circuit designs.

CHAPTER 3:

SYSTEM ANALYSIS:

3.1 EXISTING SYSTEM:

Existing systems for Bluetooth-controlled notice boards vary in complexity and features, but they generally consist of the following components and functionalities:

1.Hardware Components:

Microcontroller: Typically Arduino or Raspberry Pi, which serves as the brain of the system.
Bluetooth Module: HC-05 or HC-06 for wireless communication with mobile devices.
Display: LED matrix display, LCD display, e-paper display, or similar, to show the messages.
Power Supply: Usually a USB connection or batteries to power the system.

2.Mobile Application:

An Android or iOS application that communicates with the notice board via Bluetooth.
The application allows users to input text, select display options.

3.Bluetooth Communication:

The microcontroller listens for incoming messages from the mobile application via the Bluetooth module.Upon receiving a message, the microcontroller processes it and controls the display to show the message accordingly.

4.Message Display:

The notice board displays messages sent from the mobile application.Messages can be static or dynamic, depending on the system's capabilities. For example, some systems support scrolling text, displaying images, or showing animations.

5.Integration with External Systems:

In some cases, Bluetooth-controlled notice boards may be integrated with other systems or services, such as calendar applications, social media platforms, or IoT devices, to automatically display relevant information or updates.

3.2 PROPOSED SYSTEM:

The advanced Bluetooth-controlled notice board system integrates state-of-the-art technology to provide a seamless and interactive communication platform. This system offers enhanced features:

1.AI-Driven Message Processing:

The microctroller utilizes machine learning algorithms to analyze incoming messages, extract relevant information, and optimize display formatting.Natural language processing (NLP) algorithms enable sentiment analysis and content categorization for personalized message delivery.

2.Augmented Reality Integration:

Messages displayed on the LED matrix can be augmented with interactive AR content, providing additional context and engagement opportunities.Users can interact with AR elements using their smartphones, triggering animations, videos, or 3D models related to displayed messages.

3.Integration with IoT Ecosystem:

The notice board system seamlessly integrates with IoT devices and sensors deployed in the surrounding environment, enabling real-time data visualization and contextual message delivery. Environmental sensors monitor air quality, temperature, and humidity, providing valuable insights for personalized messaging and situational awareness.

4.Intelligent Content Scheduling:

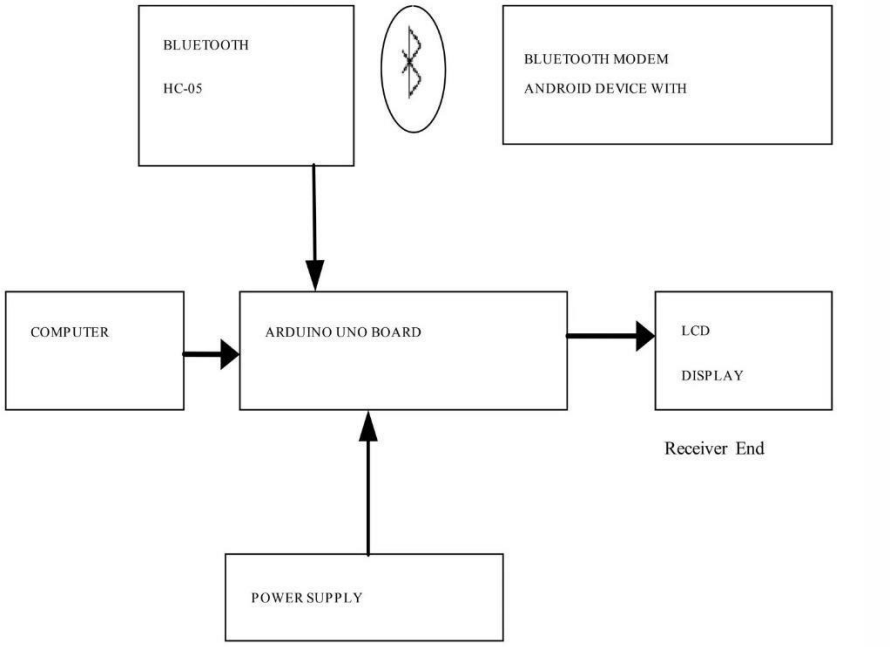
An intelligent content scheduling system optimizes message delivery based on contextual factors such as time of day, location, and audience demographics.Predictive algorithms anticipate peak engagement times and adjust content scheduling accordingly to maximize impact.

- Bluetooth-controlled notice board system becomes a versatile and indispensable tool for communication, collaboration, and engagement in modern environments. By combining cutting-edge technology with user-centric design principles, this system empowers users to connect, communicate, and collaborate in innovative ways, driving productivity, creativity, and community engagement.

CHAPTER 4:

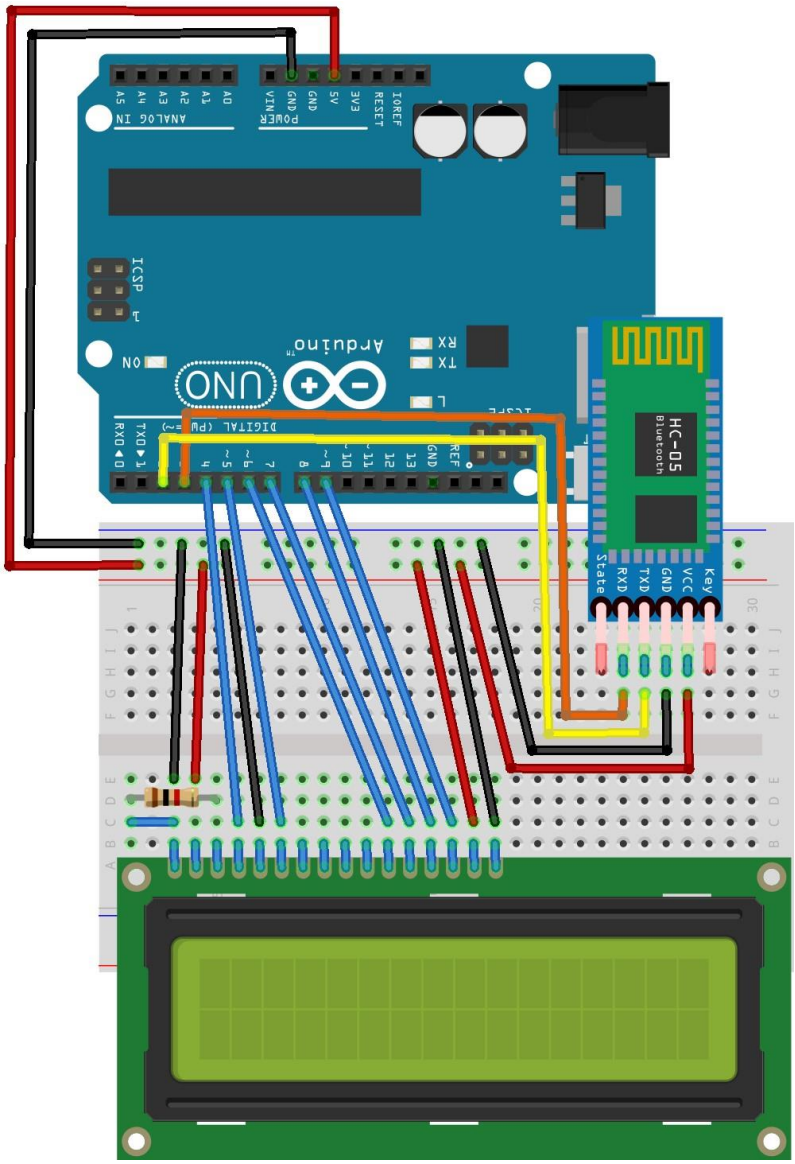
SYSTEM IMPLEMENTATION:

4.1 BLOCK DIAGRAM:



The above block diagram shows the overview how our component will be connected to each other to make the system work efficiently.

4.2 CIRCUIT DIAGRAM:



In the circuit diagram ,following components are used with required specification**.**

1.Microcontroller (Arduino Uno)

Microcontroller: ATmega328P

Clock Speed: 16 MHz

Operating Voltage: 5V

Digital Pins: 14 (of which 6 provide PWM output)

Analog Pins: 6

EEPROM: 1 KB

SRAM: 2 KB

Flash Memory: 32 KB

2.Bluetooth Module (HC-05)

Bluetooth Version: Bluetooth 2.0 + EDR

Operating Voltage: 3.3V

Communication Range: Up to 10 meters

Default Baud Rate: 9600 bps

Support: Serial communication (UART)

3. LED Matrix Display:

Type: 32x64 RGB LED matrix display

Resolution: 32 columns x 64 rows

Interface: SPI (Serial Peripheral Interface)

Operating Voltage: 5V

Power Consumption: Varies based on brightness and usage

4. Power Supply

Input Voltage: 5V DC

Power Source: USB power adapter or batteries

Solar Panels: Monocrystalline or Polycrystalline, rated for charging 5V batteries

Energy Storage: Lithium-ion battery or supercapacitor bank

4.3 HOOKUP:

Connection of HC-05 :

- Hook the GND pin (Negative Pin) of HC-05 to PinGND of Arduino.
- Connect Red VCC Pin (Positive Pin) of HC-05to VCC of Arduino.
- Connect TX pin (Data Transfer Pin) of HC-05to RX pin of Arduino.
- Connect RX Pin of HC-05 to TX Pin of Arduino.

Connection Of LCD :

- Connect the First pin from the left of LCD (GNDpin) with GND pin of Arduino.
- Connect the Second pin from the left of LCD (VCC pin) with VCC pin of Arduino.
- Connect the Third pin from the left of LCD (V0 pin) with GND pin of Arduino.
- Connect the Fourth pin from the left of LCD (RS pin) with 11 pin of Arduino.
- Connect the Fifth pin from the left of LCD (R/W pin) with GND pin of Arduino.
- Connect the Sixth pin from the left of LCD (E pin) with 10 pin of Arduino.
- Connect the Eleventh pin from the left of LCD (D4 pin) with 5 pin of Arduino.
- Connect the Twelveth pin from the left of LCD (D5 pin) with 4 pin of Arduino.
- Connect the Thirteen pin from the left of LCD (D6 pin) with 3 pin of Arduino.
- Connect the Fourteenth pin from the left of LCD (D7 pin) with 2 pin of Arduino.
- Connect the Fifteenth pin from the left of LCD (5V pin) with 1 K Resistor with 2 pin of Arduino.
- Connect the Last pin from the left of LCD (GND pin) with GND pin of Arduino.

CHAPTER 5:

5.1 WORKING MODEL:

Hardware Setup:

- Connect the Bluetooth module to the microcontroller according to its datasheet.
- Connect the display to the microcontroller. The specific connections will depend on the type of display you're using.
- Power up the system.

Microcontroller Code:

- Write code to initialize the Bluetooth module and set up communication.
- Implement logic to receive messages from the mobile app via Bluetooth.
- Write code to update the display with the received messages.

Mobile App:

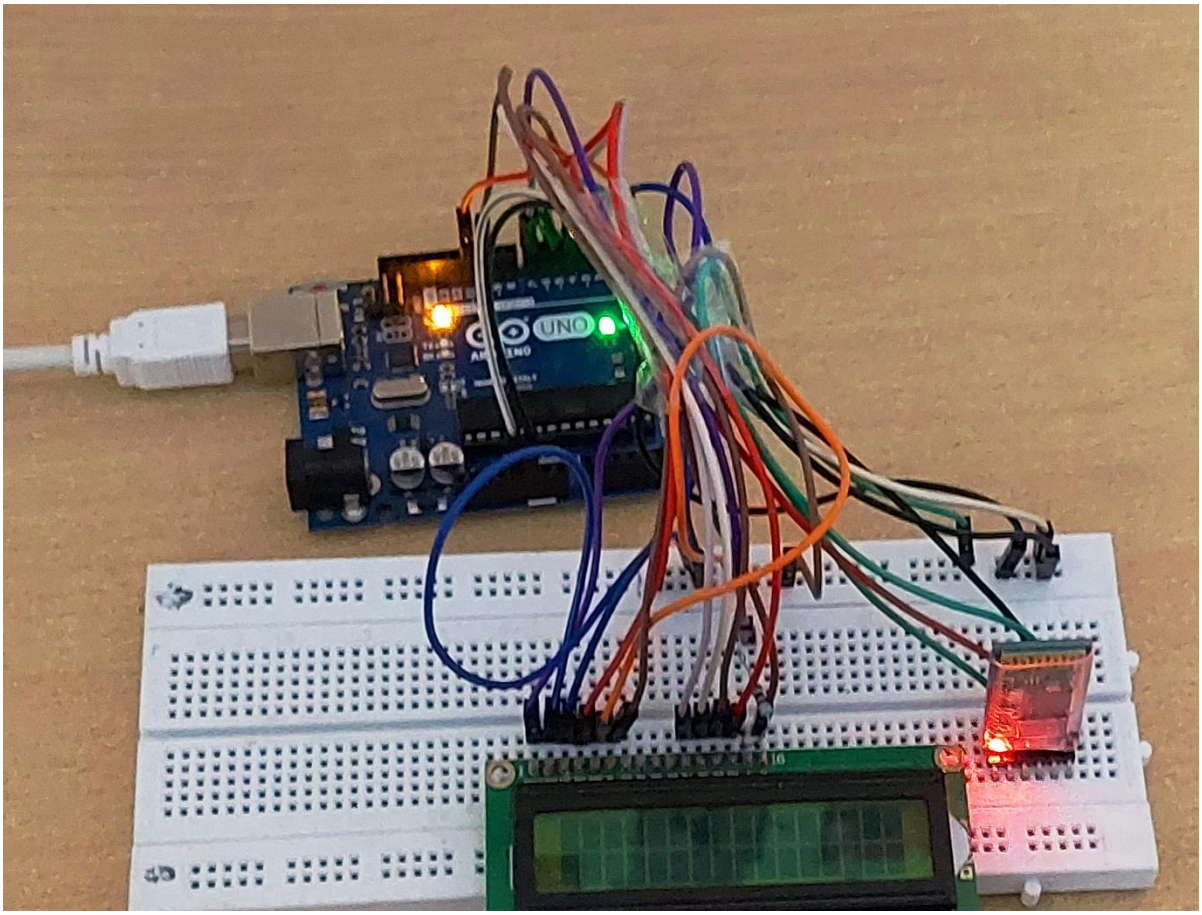
- Develop a mobile app using a programming language such as Java or Swift.
- Implement Bluetooth connectivity in the app to establish a connection with the notice board's Bluetooth module.
- Design a user interface for users to input messages.
- Send messages to the notice board in a compatible format over Bluetooth.

Testing:

- Pair the mobile device with the Bluetooth module on the notice board.
- Open the mobile app, input a message, and send it to the notice board.
- Verify that the message appears correctly on the notice board's display.

By following these steps, you can create a functional Bluetooth-controlled notice board that provides a convenient way to display messages or notifications wirelessly.

5.2 Reference Working Model:



CHAPTER 6

6.1 Software code:

```
#include<Wire.h>
#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd (0x27,16,2);

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

Code Explanation:

The provided Arduino code is designed to create a simple system for displaying wireless data on an LCD screen using the I2C communication protocol. Let's delve into the code in detail to understand how it accomplishes this task.

The first section of the code includes the necessary libraries for I2C communication and controlling an LCD display using the I2C protocol. Specifically, it imports the "Wire.h" library for I2C communication and the "LiquidCrystal_I2C.h" library for controlling the LCD screen. Additionally, it initializes a LiquidCrystal_I2C object named 'lcd' with the address '0x27', indicating the address of the LCD module, and specifies that the display is 16 characters wide and 2 lines tall. This section prepares the environment for interfacing with the LCD screen via I2C.

Next, the code declares and initializes several variables. Three String variables ('val', 'oldval', and 'newval') are declared to store data received from the Serial port. 'val' is initialized to "No Data" as a default value. 'i' is an integer variable initialized to 0 and used as a cursor position on the LCD screen.

The 'setup()' function is where the initialization of the system occurs. Within this function, the LCD display is initialized using 'lcd.begin()', and Serial communication is initiated with a baud rate of 9600 using 'Serial.begin(9600)'. Initial messages, "Wireless Notice" and "Board", are displayed on the LCD screen for 3 seconds before being cleared. After the delay, the screen is cleared again, and the message "Welcome!" is displayed. This function ensures that the system is properly set up and ready to receive and display data.

The 'loop()' function is where the main operation of the system takes place. In this function, the program continuously reads data from the Serial port using 'Serial.readString()' and removes any leading and trailing whitespace characters using 'val.trim()'. It then checks if the received data ('val') is different from the previously received data ('oldval'). If it's different, it updates 'newval' with the new data.

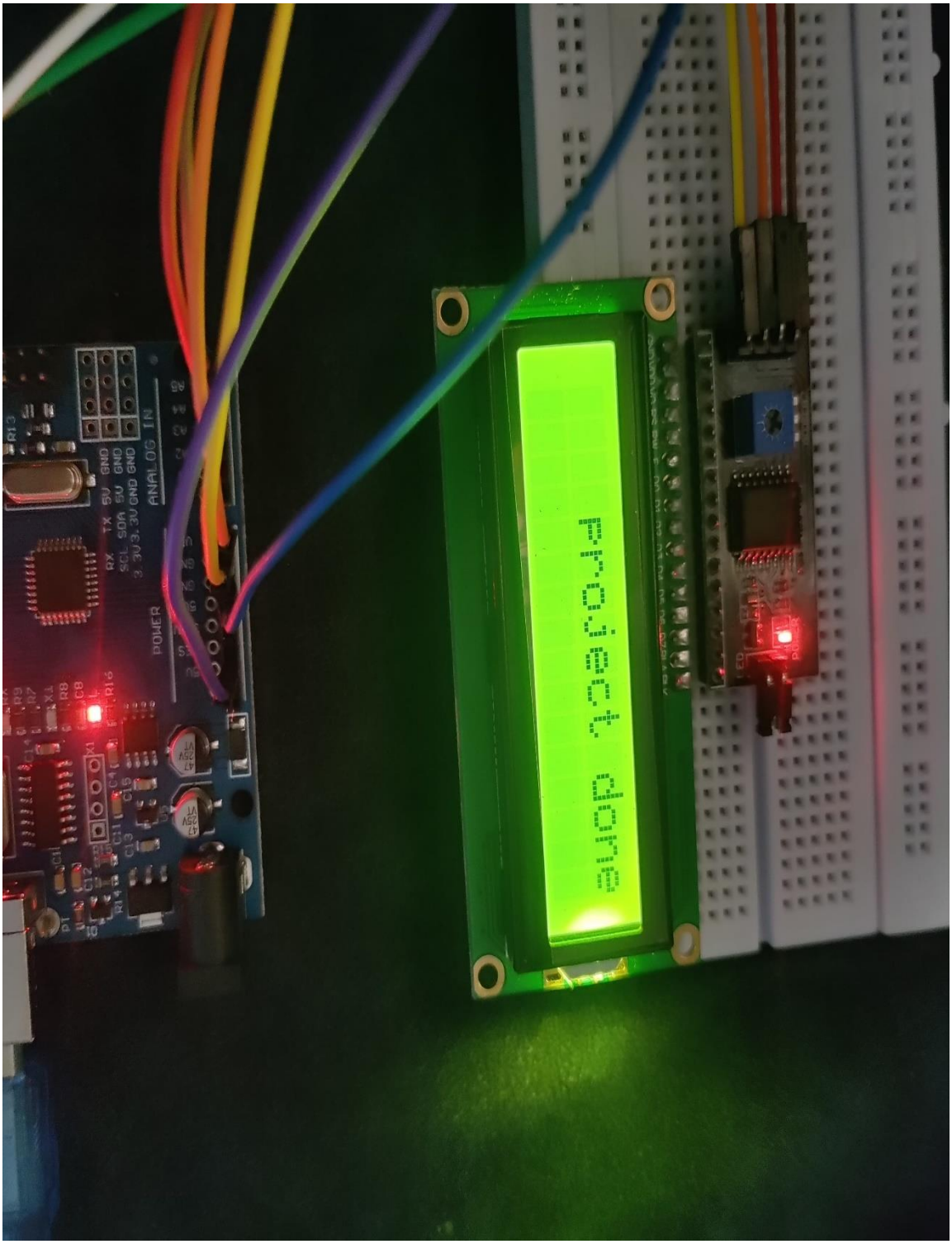
After updating 'newval', the LCD screen is cleared, and the cursor position is set to 'i' on the first line. The 'newval' is then printed on the LCD screen. 'i' is then incremented to shift the text on the LCD display. If 'i' reaches or exceeds 15 (the display width), it is reset to 0, ensuring that the text scrolls horizontally on the LCD screen.

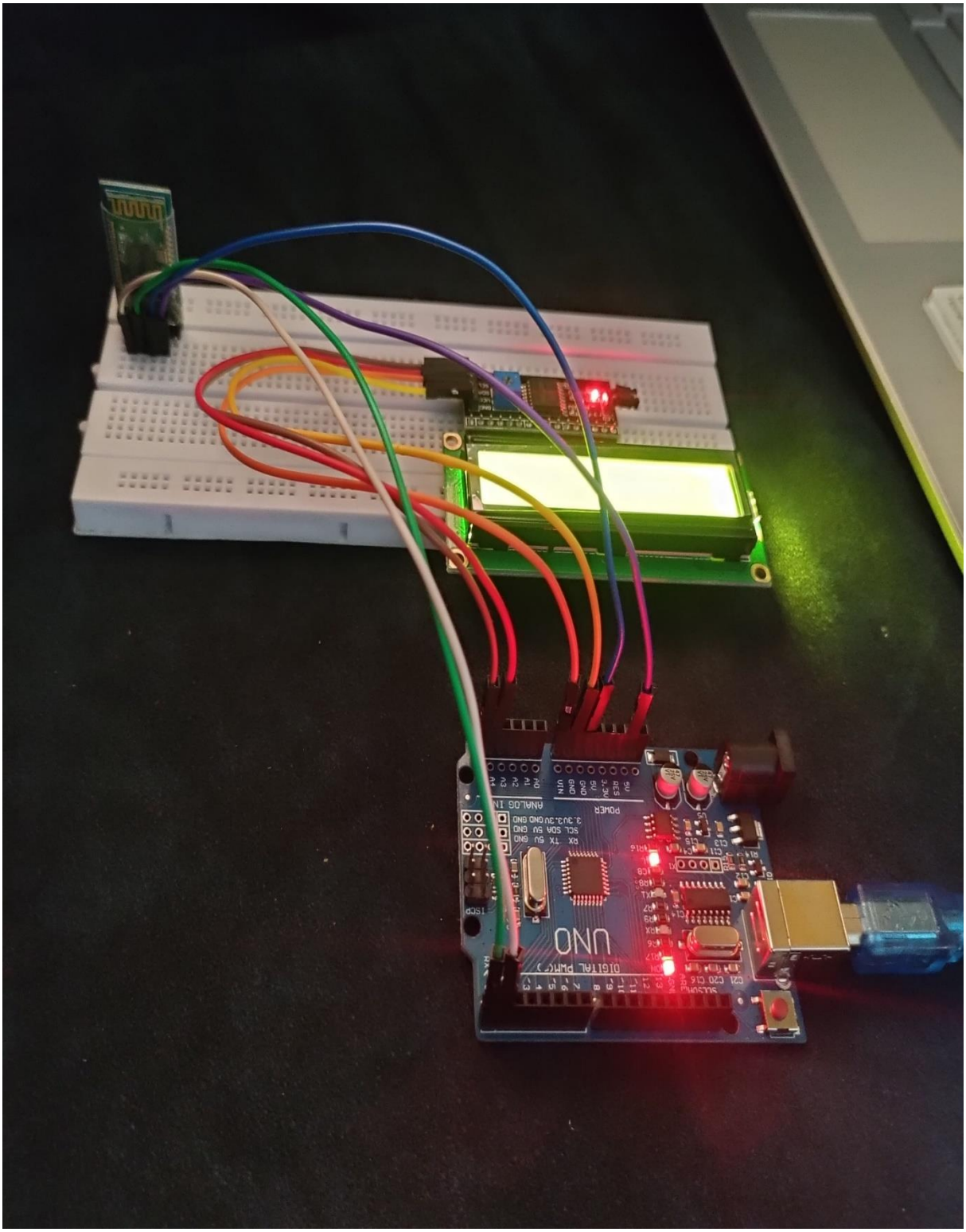
Finally, 'oldval' is updated with the current value of 'val' to prepare for the next iteration. This loop continues indefinitely, continuously updating the LCD screen with the latest wireless data received via the Serial port.

In summary, this Arduino code creates a system that interfaces with an LCD screen via I2C communication and continuously displays wireless data received from the Serial port in a scrolling fashion. It provides a simple and effective way to visualize real-time data in an embedded system application.

CHAPTER 7

OUTPUT:




UNO

CHAPTER 8

7.1 APPLICATIONS:

A Bluetooth-controlled notice board has various practical applications across different domains due to its ability to wirelessly display messages or notifications. Here are detailed applications for such a system:

1.Educational Institutions:

Classroom Notices: Teachers can use the notice board to display important announcements, upcoming events, exam schedules, or class cancellations**.**

Campus-wide Alerts: Administrators can send campus-wide alerts in case of emergencies, such as natural disasters, security threats, or urgent announcements.

Student Projects: Students can showcase their projects or research findings on the notice board, allowing for easy sharing and feedback from peers and faculty.

2.Corporate Environments:

Office Notices: HR departments can use the notice board to communicate company policies, meeting schedules, HR announcements, or employee recognition messages.

Meeting Room Management: Display meeting schedules, room reservations, or availability status for conference rooms, improving meeting organization and resource utilization.

Employee Recognition: Recognize outstanding performance, birthdays, work anniversaries, or achievements of employees, fostering a positive work culture.

3.Public Places:

Transportation Hubs: Display real-time transit information, departure schedules, delays, or safety messages at airports, train stations, or bus terminals, helping travelers stay informed.

Retail Stores: Use the notice board for advertising promotions, discounts, new arrivals, or store events, enhancing customer engagement and driving sales.

Healthcare Facilities: Display health-related information, appointment reminders, vaccination schedules, or general wellness tips in hospitals, clinics, or waiting areas.

4.Smart Homes:

Family Notices: Display household chores, grocery lists, appointment reminders, or personalized messages for family members, improving household communication and organization.

Home Automation: Integrate the notice board with smart home devices to display real-time weather updates, calendar events, smart device status, or energy consumption data.

Guest Welcome Messages: Greet guests with personalized messages, Wi-Fi passwords, or directions to key areas in the home, providing a warm and inviting atmosphere.

5.Events and Entertainments:

Conferences/Exhibitions: Use the notice board to display event schedules, session agendas, speaker profiles, or sponsor advertisements, enhancing attendee experience and engagement.

Concerts/Venues: Display artist lineup, performance schedules, ticket information, or venue directions at music festivals, theaters, or sports arenas, improving audience communication**.**

Interactive Installations: Create interactive installations or digital art projects using the notice board to display dynamic content, animations, or user-generated messages.

CHAPTER 9

8.1 FUTURE ENHANCEMENT:

To enhance the functionality and usability of a Bluetooth-controlled notice board, consider incorporating the following future enhancements:

1.Mobile App Improvements:

Rich Text Formatting: Allow users to format messages with different fonts, colors, sizes, and styles within the mobile app before sending them to the notice board.

Media Support: Enable users to attach images, videos, or audio clips to messages, expanding the types of content that can be displayed on the notice board.

Scheduled Messages: Implement scheduling functionality in the mobile app to send messages at specific times or dates, enabling automated communication and timely reminders.

2.Display Features:

Touchscreen Interface: Integrate a touchscreen display with interactive capabilities, allowing users to interact directly with the notice board to view messages, navigate menus, or provide feedback.

Modular Design: Design the notice board with a modular structure, allowing users to easily expand or customize the display size, resolution, or orientation based on their requirements.

Gesture Control: Implement gesture recognition technology to enable hands-free interaction with the notice board, allowing users to navigate through messages or perform actions using gestures.

3.Connectivity Options:

Wi-Fi Connectivity: Add Wi-Fi connectivity alongside Bluetooth to provide alternative communication options, enabling remote management and updates for the notice board over the internet.

Cloud Integration: Integrate with cloud services to store and synchronize message data across multiple notice boards, enabling centralized management and seamless collaboration.

API Integration: Provide APIs (Application Programming Interfaces) to allow third-party developers to integrate the notice board with other systems or services, such as social media platforms or IoT devices.

4.Advanced Functionality:

Multi-Language Support: Implement multi-language support in both the mobile app and the notice board interface to accommodate users from diverse linguistic backgrounds.

Voice Control: Integrate voice recognition technology to enable voice commands for controlling the notice board, such as dictating messages, adjusting settings, or navigating menus**.**

Machine Learning Integration: Use machine learning algorithms to analyze user interactions and preferences, providing personalized recommendations or suggestions for content displayed on the notice board.

5.Security and Privacy:

User Authentication: Implement user authentication mechanisms in the mobile app and notice board to ensure that only authorized users can send or modify messages.

Data Encryption: Encrypt communication between the mobile app and the notice board to protect sensitive information from unauthorized access or interception.

Privacy Controls: Provide privacy settings that allow users to control who can view or interact with messages on the notice board, ensuring compliance with privacy regulations.

By incorporating these future enhancements, a Bluetooth-controlled notice board can evolve into a more versatile, interactive, and secure communication platform, catering to the diverse needs of users across different domains.

CHAPTER 10

9.1 ADVANTAGES:

Here are some key benefits of implementing Bluetooth Controlled Notice Boards:

1.Wireless Communication:

Convenience: Bluetooth technology enables wireless communication between the notice board and mobile devices, eliminating the need for physical connections or cables.

Flexibility: Users can interact with the notice board from a distance, allowing for placement in various locations without constraints imposed by wired connections.

2.Easy installation and setup:

Plug-and-Play: Setting up a Bluetooth-controlled notice board is straightforward, requiring minimal hardware configuration and no complex wiring.

User-Friendly: The installation process can be easily understood by users with basic technical knowledge, reducing the need for specialized expertise.

3.Real time updates:

Instantaneous Communication: Users can send messages or notifications to the notice board in real-time, ensuring that information is promptly displayed and accessible to viewers.

Dynamic Content: The notice board can display dynamic content, such as live updates, news feeds, or social media posts, keeping viewers informed and engaged.

4.Remote Management:

Convenient Control: Users can remotely manage the notice board using a mobile app, allowing for easy content creation, editing, and scheduling from anywhere with an internet connection.

Efficient Maintenance: Remote management capabilities enable troubleshooting, software updates, and maintenance tasks to be performed without physical access to the notice board.

5.Customization and Personalization:

Tailored Messages: Users can customize messages with various formatting options, media attachments, and scheduling preferences, ensuring that content meets specific communication needs.

Personalized Experience: The notice board can display personalized messages for different audiences or individuals, enhancing engagement and relevance.

6.Cost Effectiveness:

Affordable Solution: Bluetooth-controlled notice boards offer a cost-effective communication solution compared to traditional displays or signage systems, reducing hardware and installation expenses**.**

Scalability: Organizations can deploy multiple notice boards at different locations without significant infrastructure investments, facilitating scalability as communication needs grow.

7.Interactivity and Engagement:

Interactive Features: Advanced notice boards may incorporate touchscreen interfaces, gesture controls, or voice commands, allowing users to interact with content in immersive ways.

Enhanced Engagement: Interactive elements encourage viewer participation and engagement, leading to improved retention of information and increased user satisfaction.

8.Environment Friendliness:

Energy Efficiency: Bluetooth-controlled notice boards consume less power compared to traditional displays, contributing to energy conservation and lower operating costs.

Reduced Paper Waste: By replacing printed notices or posters with digital displays, notice boards help reduce paper consumption and minimize environmental impact.

CHAPTER 11:

CONCLUSION:

In the realm of modern communication and technology, the Bluetooth-controlled notice board emerges not just as a tool for relaying information but as a symbol of connectivity and innovation. As our world becomes increasingly interconnected, the versatility of such a notice board transcends mere functionality, embodying the spirit of adaptability and efficiency.

With its ability to seamlessly integrate with various devices, the Bluetooth-controlled notice board symbolizes the convergence of traditional communication methods with cutting-edge technology. It embodies the ethos of progress, bridging the gap between analog and digital worlds, and empowering users to disseminate information with unprecedented ease and speed.

Moreover, this notice board serves as a testament to human ingenuity and creativity. Its creation represents the culmination of inventive minds leveraging the power of technology to address practical needs in inventive ways. It stands as a beacon of inspiration, encouraging further exploration and innovation in the ever-evolving landscape of communication technology.

In essence, the Bluetooth-controlled notice board is not just a means of communication but a catalyst for change, a testament to our capacity to reimagine and redefine the world around us. As we continue to push the boundaries of what is possible, let it serve as a reminder of the transformative potential inherent in the fusion of imagination and technology.

References:

CHATGPT:
1. https://chat.openai.com/

YOUTUBE:

1.https://youtu.be/s7dx4suezAQ?si=ftJZn0PSJG3Y666D