

A MINI-PROJECT REPORT

For

MINI PROJECT REPORT - I (21CEE38A)

ON

**“WIRELESS BLUETOOTH NOTICE BOARD”**

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### *In partial fulfillment of the award of the degree of*

**BACHELOR OF ENGINEERING IN**

**COMPUTER ENGINEERING**

**BY**

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CERTIFICATE

*This is to certify that the mini-project work titled*

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# ABSTRACT

Using wireless electronic billboards synchronized with Bluetooth technology is an innovative and fun way to reach people. This helps us to deliver any message almost instantly and without delay by just sending SMS, which is better and more reliable than the traditional way of delivering messages to bulletin boards. This proposed technology can be used in universities, many public places, shopping malls or large buildings to improve security systems, warn of emergencies and avoid many dangers by displaying messages on bulletin boards using Bluetooth modules.

The main goal of this paper is to develop a wireless message board that displays messages sent by users. Notice boards are very important in any institution, organization or public place such as bus stops, train stations and parks. Communication technology has advanced by leaps and bounds over the past few decades. It has already proven its importance in sharing information on everything from family matters to global phenomena. In this article, we present the development of an SMS-driven electronic bulletin board that can be automatically and remotely updated. The system is implemented with a Bluetooth module IC controlled by a microcontroller and LCD.

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**LIST OF ACRONYMS**

|  |  |
| --- | --- |
| **Acronyms** | **Expanded form** |
| I2C | Inter-Integrated Circuit |

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***Chapter 1***

**INTRODUCTION**

**1.1 OVERVIEW**

Mobile phones and associated technologies are becoming more and more common in today's world. There are many people in the crowd who work in the vibrant area of telecommunications and embedded systems. The use of mobile phones has grown significantly over the past fifteen years, and the development of network technology has encouraged the growth and development of genuinely dense networks. Advertising on bulletin boards is used by big associations as well as beginner workshops. This uses a lot of paper, which the association totally wastes. Deforestation results from this, which fuels global warming. Small, creative uses of technology for everyday tasks can exacerbate the environmental issues we are already facing.

**1.2 BASIC CONCEPTS**

Sender and receiver are a way of describing the entire procedure. The microcontroller pulls the communication from the Bluetooth module and shows it on the matrix display panel after the communication has been received by the Bluetooth module from the authorized mobile phone. The entire procedure uses cycle-like communication from the Bluetooth module to the single-chip microcomputer, and from the single-chip microcomputer to the matrix display panel. And offer the TV as proof.

**1.3 MOTIVATION**

Our main objective is to replace public notice boards with this form of notice board system in order to reduce the amount of time and paper used. The "Desired Notice" or any other Department Announcement should be displayed. An Android or phone is connected to the message board. Mobile phones are used to send data to the microcontroller.

**1.4 PROBLEM DESCRIPTION**

For sending alpha-numeric messages in text format, Android-based software applications for Bluetooth and Wi-Fi connection for personal information assistant (PDA) products are utilized. The receiving end's microcontroller board has been linked with the matching transceiver module via serial data transmission via Bluetooth or Wi-Fi. To transmit alphanumeric text messages to an inexpensive microcontroller board, any of the mentioned earlier transfer methods can be used. (Arduino Uno). By optimizing certain tasks, the suggested approach conserves time, paper, printer ink, as well as money that would have to be spent to change notices manually.

**1.5 OBJECTIVES**

* The project's primary objective is to create a wireless message board that shows messages sent by the web server. When a user transmits a message, a WIFI module receives it via a nearby web server.
* With the help of a WIFI network, this project seeks to create a wireless bulletin board that can display messages sent via a local website.
* This electronic bulletin board system was primarily created with the intention of connecting to users' mobile devices and displaying the most recent information.

**1.6 SCOPE OF THE WORK**

Future uses for the system suggested in this paper include crime prevention, traffic management, railroads, advertising, and many other fields, including those in educational institutions and organizations. The simplicity of use, extensive coverage, and quick information sharing are significant advantages of this application. With the help of the suggested approach, we can strengthen the security system, increase public knowledge of emergencies, and reduce numerous risks.

**1.7 SUMMARY**

Any organization that wants to routinely disseminate messages and cut down on physical overhead should consider the "Bluetooth-based Wireless Notice Board using Arduino" system because it is affordable, quick, dependable, and secure. Our main objective is to replace public notice boards with this form of notice board system in order to reduce the amount of time and paper used. An Android or phone is connected to the message board. Alpha-numeric text messages are transmitted using Android-based application programs for Bluetooth and Wi-Fi contact with personal digital assistant (PDA) devices. This electronic bulletin board system was primarily created with the intention of connecting to users' mobile devices and displaying the most recent information.

***Chapter 2***

**LITERATURE SURVEY**

**2.1 INTRODUCTION**

The electronic communication system is now a crucial component of many different wireless communication devices, enabling contact even from remote, uncontrolled nations. Mobile phones are among the gadgets that use wireless connections. The Zigbee technology for wireless communications, GPS technology, Wi-Fi, satellite TV, cordless phones, and wireless machine parts Modern cordless headphones support 3G and 4G internet, Bluetooth, and Wi-Fi. One type of wireless technology used by individuals that is widely dispersed throughout the world and enables users to connect almost anywhere in the world is satellite communication. When this form of communication—light from modulated microwaves—is transmitted close to the earth. As a result, the apparatus boosts this communication and transmits it returned to the wireless receiver, which is positioned on the earth's surface. Two crucial components make up satellite communication: the surface segment and the space part. While the location portion primarily comprises of the satellite itself, the surface section also includes stationary or mobile broadcasting, communication, and auxiliary equipment.

The main application of this Bluetooth technology is the wireless connection of various electronic devices to the system for data transmission. Portable headphones, mice, and wireless computers can all be used with cell phones. This info is transmitted from one device to another by using Bluetooth instrumentation. The technology serves a variety of functions and is frequently used in the wireless transmission sector. This concludes the discussion of the wireless communication scenario; these networks are one of the key technologies in the telecom sector: Bluetooth, WiMAX, and LAN.

**2.2 RELATED WORKS**

*1. "Bluetooth-enabled wireless notice board," Priyanka M, Ramya R, and Bavithra N*

This essay covers Bluetooth-enabled notice boards. This essay examines a unique and intriguing method of sending messages to individuals using Bluetooth-enabled wireless electronic message boards. By simply sending an SMS, we will be able to convey any communication almost incontinently and without delay, which is more dependable and better than the outdated method of posting dispatches on a communication board. This suggested technique can be used in large structures, public areas, supermarkets, and sodalities to enhance security, raise citizen knowledge of crises, and prevent a number of issues.

*2. "Bluetooth and ZigBee training Bluetooth and Wi-Fi electronic noticeboard," Vineet Tiwari and Dharmendra Kumar Sharma*

This piece introduces an announcement board that assesses understanding of Bluetooth and ZigBee. While content is transmitted among people over a network, there is an extra setup prior to proof and information freedom. This paper presents an inexpensive, portable Wi-Fi photoelectric banner to promoting that uses Atmel's ATmega32 microcontroller and vibrant Wi-Fi technologies(ZigBee and Bluetooth), and their trial developed the factors for a level span, BER( button error rate), RSSI (programmed signal strength index), signal debilitation, and strength use. The advertising sign display on the illustrated liquid-transparent display the philanthropist's periodic data from the Wi-Fi module. We have created well-liked designs for wireless, Bluetooth, and ZigBee announcement board installations for charity organizations.

*3. "GSM inspired wireless noticeboard using Arduino," by Prof. T. C. Subbu Lakshmi, M. Abila Mary, B. Pavithra, R. Sangeetha.*

In this article, a noticeboard that uses GSM technology is described. At colleges and institutions, theism-located billboards are suggested for broadcasting regular news continuously or constantly during active hours. It can show flash information or advertisements more quickly than the programmable plan because it is GSM-grounded. A bedded configuration with a microcontroller is used to increase the size of a GSM-located notice board whose contents can be streamlined via SMS. To create a user-friendly, stonerfriendly system that enables authorization to admit and prominently show notices. SMSbased notice boards advance the concept of posting thoughts on notice boards using a customer's mobile phone by combining the widely used GSM.

*4. IJETER International Journal of Emerging Technologies in Engineering Research, “Costeffective Android-based Wireless Bulletin Board,” Pallavi M. Banait, Nikita P. Bakale, Mayuri S. Dhakulkar and Bhushan S Rakhonde.*

The portability of the smartphone is making it more and more significant in daily living. Consequently, a smartphone running Android can be employed for this. The user's smartphone has Android installed, allowing for the communication. The receiving end uses an inexpensive board with a microcontroller (Arduino Uno) that has been programmed to accept and display information in any of the following communication formats. The system developed has two distinct uses: a wireless individual calling and the display of messages on a remote digital notice board. In order to save both money and time on printing as well as paper supplies, the most advanced system will attempt to wirelessly share information with its target audience.

**2.3 COMPARISON OF RELATED WORK**

When comparing related works to the work presented previously, it is quite obvious that they are quite comparable. To the best of our ability, we combined the Arduino device with Bluetooth technology, also known as GSM. We created a straightforward 16-character notice board (LCD Display) using an Arduino software and a block diagram and schematic provided under chapters 3 and 4. This notice board accepts inputs via Bluetooth from mobile applications.

**2.4 SUMMARY**

Many different wireless communication devices, which enable remote human interaction, must have a wireless communication system. Examples of these gadgets include cordless phones, Zigbee wireless technology, GPS, Wi-Fi, satellite TV, and wireless machine parts. Almost anywhere on the planet can be linked thanks to satellite communication, a form of human-incorporated wireless communication technology that is widely used. In the wireless communication industry, Bluetooth technology is frequently used to wirelessly link a variety of electronic devices to the system for data transmission. LAN, WiMAX, and Bluetooth are a few examples of wireless communication networks that are among the most significant telco technologies.

***Chapter 3***

**DESIGN & METHODOLOGY**

**3.1 INTRODUCTION**

The Arduino board can operate on a power force ranging from 6 to 20 volts. Indeed if the accompanying price is lower than 7 volts, attach 5 entitlement authorization force is lower than 5 volts, and the board entitlement authorization is doubtful. However, the generated power director subventions authorization for the board to overheat and damage. If a fresh 12 volts are supplied. The reason for choosing the 9-volt ordnance is that the recommended range is 7 to 12 volts.

**3.2 BLOCK-DIAGRAM AND WORKING**

|  |
| --- |
| MOBILE  PHONE  POWER SUPPLY UNIT  LCD  DISPLAY  UNIT  BLUETOOTH  MODULE  ARDUINO  MICRO-CONTROLLER  *Fig 1: Block diagram of the messaging display system* |

Several parts of our project are powered by a power supply, including an Arduino UNO, an LCD, a Bluetooth HC-05, and a mobile application. The Arduino UNO will be powered by an external power supply after the program has been uploaded. Thus, all equipment functions are activated. A mobile notice will be sent at that time. Once the notification is sent, it will be received via Bluetooth. In addition, a digital notice board will display this SMS notice using Arduino.

Our system utilizes Bluetooth wireless technology over a PAN (personal area network) operating at 2.45 GHz with a range of 10-15 meters. A serial interface has been used to control external devices using the Bluetooth module HC-05. MAC addresses are used, and only Bluetooth terminals with the Android application program can communicate with the identified smartphone. Once communication between an Android-based smartphone (PDA) and a Bluetooth device with the HC-05 Bluetooth module is established, the Bluetooth terminal can transmit and receive text data in the form of hex and string. This enables the user to immediately pass text data. Using Bluetooth technology on campus, it is possible to transmit new notices and replace old ones at any time to alter the messages displayed on the LCD.

**3.3 METHODOLOGY**

In our design, strong power, the Arduino UNO, an LED component, the Bluetooth Module HC05, as well as a mobile operation are all included. We will provide them with a unique power supply shortly after we transmit the code to the Arduino UNO. As a consequence, the ensemble as a whole is utilized. The SMS that we are interested in sending at that precise time will be transmitted using a mobile device. This SMS or message will additionally be delivered via Bluetooth. Thanks to Arduino, this SMS or message will also be displayed on an electronic notice board. The Arduino device is suitable with powers within 6 and 20 volts. Since the suggested range for voltage ranges from 7 and 12 volts, 9-volt ammunition was selected.

**3.4 SUMMARY**

A power source with a voltage range of 6 to 20 volts can run an Arduino board. Because the permitted voltage range is between 7 and 12 volts, the 9-volt ordnance was selected as a result. We use an Arduino UNO, an LED module, a Bluetooth HC-05, a smartphone software, and a power source in our creation. We'll give the Arduino UNO a separate power source after the program is uploaded. Due to Arduino, this SMS or message will also be displayed on a digital notice board.

*Chapter 4*

**IMPLEMENTATION & RESULTS**

**4.1 INTRODUCTION**

The system compromises the hardware equipment such as the Arduino UNO, for the notice board we have used an LCD of size 16X2, a breadboard, and as a connection to be established between the sender and receiver, we have HC-05 Bluetooth Module.

**4.2 HARDWARE AND SOFTWARE REQUIREMENTS**

|  |  |
| --- | --- |
| HARDWARE REQUIREMENTS | SOFTWARE REQUIREMENTS |
| 1. Arduino UNO 2. HC-05 Bluetooth Module 3. 16x2 LCD Display 4. I2C 5. Breadboard & Jumper Wires 6. Power bank | 1. Arduino IDE(Integrated Development Environment) 2. ARDUINO Automation 3. For code, language used: Extended C |

**4.3 BUDGET ESTIMATION**

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Product Name** | **Price** |
| 1 | Arduino UNO | 900 |
| 2 | HC-05 Bluetooth Module | 350 |
| 3 | 16x2 LCD Display | 350 |
| 4 | I2C | 300 |
| 5 | Breadboard With Jumper Wires | 300 |
| 6 | Power Bank | 250 |
| Total Amount | | 2450 |

**4.4 SPECIFICATION OF HARDWARE AND SOFTWARE**

**1. ARDUINO UNO**

|  |
| --- |
| *Fig 2. ARDUINO UNO* |

Arduino Uno is an open-source microcontroller board based on the ATmega328P microcontroller. It is designed for beginners and professionals who want to create interactive projects. The board has 14 digital input/output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header, and a reset button. The ATmega328P microcontroller on the board can be programmed using the Arduino software, which is a simple and easy-to-use platform for programming microcontrollers. Arduino Uno can be used to control various electronic devices, such as motors, sensors, lights, and displays, and it can be connected to the internet using vanous add-on modules.

**2. HC-05 BLUETOOTH MODULE**

|  |
| --- |
| *Fig 3. HC-05 Bluetooth Module* |

The HC-05 is a popular Bluetooth module that allows you to add wireless communication capabilities to your projects. It is commonly used in hobbyist and DIY projects, such as remote controls cars, robots, and home automation systems. The HC- 05 module supports Bluetooth 2.0 and can operate in either master or slave mode. In master mode, the module can connect to other Bluetooth devices such as smartphones, tablets, and computers. In slave mode, the module can be connected to a microcontroller, allowing you to control it wirelessly.

**3. LCD DISPLAY**

|  |
| --- |
| *Fig 4. 16X2 LCD Display* |

LCD stands for Liquid Crystal Display, which is a type of flat-panel display commonly used in electronic devices such as televisions, computer monitors, and smartphones LCDs work by using liquid crystals, which are materials that can change their alignment and orientation in response to an electric current. This property allows LCDs to manipulate light passing through them to produce images. In an LCD display, a backlight illuminates the screen from behind, and the liquid crystals in the display control the amount of light that passes through to create an image. Each pixel in an LCD display is made up of three subpixels, one red, one green, and one blue, which combine to produce the full range of colors.

**4. INTER-INTEGRATED CIRCUIT (I2C)**

|  |
| --- |
| *Fig 5. I2C* |

I2C stands for inter-Integrated Circuit, which is a type of communication protocol used to transmit data between microcontrollers, sensors, and other electronic devices 120 was developed by Philips Semiconductors (now NXP Semiconductors) in the early 1980s and is commonly used in embedded systems, mobile devices, and other applications where multiple devices need to communicate with each other. In an I2C communication, there are two lines, the Serial Data (SDA) line and the Serial Clock (SCL) line, which are used to transmit data and synchronize communication between devices. Multiple devices can be connected to the same bus, and each device is identified by a unique address.

**5. BRAEDBOARD & JUMPER WIRES**

|  |
| --- |
| *Fig 6. Breadboard with Jumper Wires* |

Breadboards are used to create and test electronic circuits without having to solder components together. The components can be placed into the holes and connected using wires, which are inserted into the same holes. Breadboards allow for easy and quick experimentation with different circuit designs and configurations. Breadboards are commonly used in the development and testing of electronic projects, and they are also used in education to teach students about electronics and circuit design. They come in various sizes and configurations, with some including power supply rails and other features to simplify prototyping.

**6.ARDUINO IDE(Integrated Development Environment)**

Breadboards are used to create and test electronic circuits without having to solder components together. The components can be placed into the holes and connected using wires, which are inserted into the same holes. Breadboards allow for easy and quick experimentation with different circuit designs and configurations. Breadboards are commonly used in the development and testing of electronic projects, and they are also used in education to teach students about electronics and circuit design. They come in various sizes and configurations, with some including power supply rails and other features to simplify prototyping.

**7. ARDUINO AUTOMATION**

With the help of the interfaces provided by the Arduino Automation app, you can control devices with your Arduino Board (and other similar boards) via Bluetooth or Wi-Fi and come up with incredible projects that are completely unique.

**8. CODE**

#include <SoftwareSerial.h>

#include <LiquidCrystal\_I2C.h>

LiquidCrystal\_I2C lcd(0x3F,20,3);

SoftwareSerial mySerial (0,1);

//(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.init();

// initialize the lcd

lcd.init();

// Print a message to the LCD.

lcd.backlight();

// put your setup

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;

}

**4.5 IMPLEMENTATION DETAILS**

|  |
| --- |
| *Fig 7. Schematic Diagram of Circuit* |

According to the schematic, we built the circuit link. All of the features start to work in accordance with the program once we upload the program to the Arduino. After uploading the operation, we will provide the Arduino with an external power supply. Additionally, we can send an SMS or announcement from a mobile device, which is input via Bluetooth and displayed on the LED module. Numerous upcoming applications for this system include those in associations and educational institutions, felony prevention, company operations, roads, announcements, etc.

**4.6 RESULTS AND ISSUES**

|  |
| --- |
| *Fig 8. Real Time Implementation Result* |

The transmitter and philanthropist corridor could serve as an analogy for the entire procedure. The Bluetooth component receives communication from the authorized mobile phone, and the microcontroller extrapolates information from the Bluetooth component before displaying it on the matrix display board. The entwined process from the Bluetooth component to the microcontroller and from the microcontroller to the matrix display uses periodic to parallel transfer.

**4.7 COMPONENTS FOR REAL-TIME IMPLEMENTATION**

|  |
| --- |
| *Fig 9. Real Component-ARDUINO UNO* |

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| --- |
| *Fig 9. Real Component-HC-05 Bluetooth Module* |

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|  |
| *Fig 10. Real Component-16X2 LCD Display* |

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|  |
| *Fig 11. I2C* |

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|  |
| *Fig 12. Real Component-Breadboard and Jumper Wires* |

|  |
| --- |
| *Fig 13. Real Component-Power Bank* |

**4.8 SUMMARY**

We have used an Inter-Integrated Circuit (I2C), which is a little off the schematic, to organize the cables in use. We combined the components in real-time execution and created the Wireless Bluetooth Notice Board with success.

***Chapter 5***

**CONCLUSION & FUTURE SCOPE**

**5.1 CONCLUSION**

Modern display board layouts shift from manual to automated displays as information increases. Along with wireless viewing devices. This is a lab model wireless notice board that shows the information requested by stoners via SMS in ultimately populated or crowded areas. It has Arduino and Bluetooth attached to it. This planned scheme will operate in a variety of unanticipated fields, including academic associations, crime prevention, business administration, railways, announcements, and so forth. An easily accessible, long-distance, quick data transmission style is very advantageous for this activity. By following the suggested process, we can fortify our defenses, create a feeling of urgency, and steer clear of some dangers.

**5.2 FUTURE SCOPE**

The main thing of our design is to find and display colorful notices that we've created using Bluetooth electronics, but because Bluetooth has a limited range, the request is limited to a specific terrestrial extent, which is the main disadvantage of our structure, so if the Bluetooth Based Electronic Notice Board Grounded placard for advertising is dissociated from a Wireless fidelity, the network's range may be increased. Adding effective limits to a degree date and event can be approved, and inventories can be designed to display multiple notices together on the notice board. A playlist of specific dereliction notices can be anticipated to display finished everyday support to the extent the notice is welcome or the colorful good ideas that may be fresh. The design could be made further stoner-friendly by perfecting consumer commerce. There could be a force for each pupil to connect his/ her mobile to the Bluetooth modem so that the notice can be seen on their phones. We can have specific information about who transferred the communication and what the meaning was and state a correction suggestion for each receiver. Another advancement that could be made to the current model is the addition of a temptress and a surpassed to warn the philanthropist that new information or a notice that has appeared won't be ignored.

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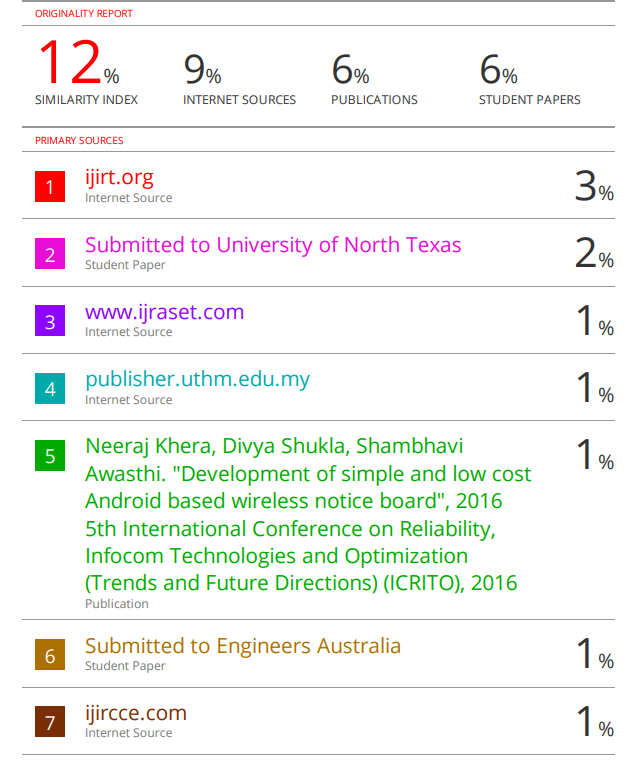
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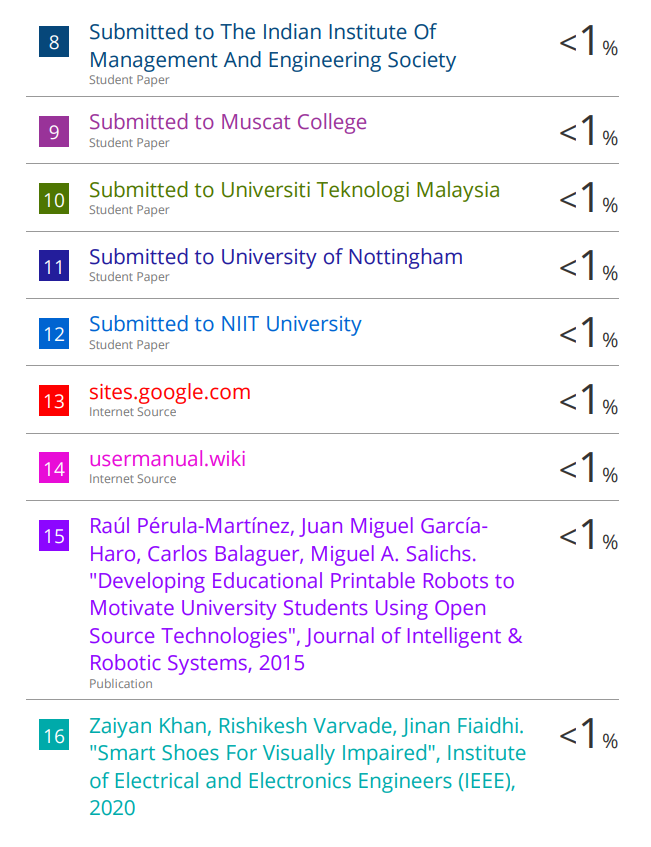
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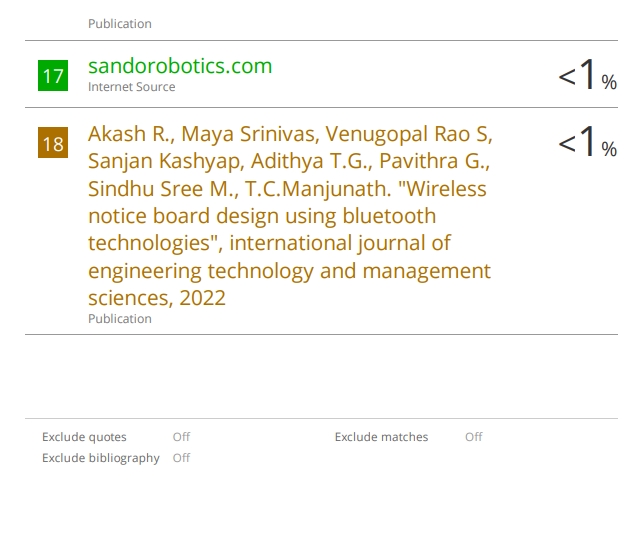
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**APPENDIX A: PLAGIARISM REPORT**

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**APPENDIX B: DATA SHEET**

**1. ARDUINO SPECIFIACTIONS**

* Microcontroller: Microchip ATMega328P
* Operating Voltage: 5 Volts
* Input Voltage: 7 to 20 Volts
* Digital I/O Pins: 14 (of which 6 can provide PWM output)
* PWM Pins: 6 (Pin # 3, 5, 6, 9, 10 and 11)
* UART: 1
* 12C: 1
* SPI: 1
* Analog Input Pins: 6
* DC Current per I/O Pin: 20 mA
* DC Current for 3.3V Pin: 50 mA
* Flash Memory: 32 KB of which 0.5 KB used by bootloader
* SRAM: 2 KB
* EEPROM: 1 KB
* Clock Speed: 16 MHz
* Length: 68.6 mm
* Width: 53.4 mm
* Weight: 25 g
* ICSP Header: Yes
* Power Sources: DC Power Jack & USB Port.

**2. HC-05 BLUETOOTH MODULE: PIN DESCRIPTION**

* Key/EN: It is used to bring Bluetooth module in AT commands mode. If Key/EN pin is set to high, then this module will work in command mode. Otherwise by default it is in data mode. The default baud rate of HC-05 in command mode is 38400bps and 9600 in data mode.
* VCC: Connect 5 V or 3.3 V to this Pin.
* GND: Ground Pin of module.
* TXD: Transmit Serial data (wirelessly received data by Bluetooth module transmitted out serially on TXD pin)
* RXD: Receive data serially (received data will be transmitted wirelessly by Bluetooth module).
* State: It tells whether module is connected or not.

**3. LCD DISPLAY: PIN DESCRIPTION**

|  |  |  |
| --- | --- | --- |
| Pin No. | Function | Name |
| 1. | Ground(0V) | Ground |
| 2. | Supply Voltage; 5V (4.7V-5.3V) | VCC |
| 3. | Contrast Adjustment; through a variable resistor | VO/VEE |
| 4. | Selects command register when low, and data register when high | RS (Register Select) |
| 5. | Low to write to the register, High to rad from the register | Read/Write |
| 6. | Sends data to data pins when a high to low pulse is given | Enable |
| 7. | 8-bit data pins | DB0 |
| 8. | DB1 |
| 9. | DB2 |
| 10 | DB3 |
| 11. | DB4 |
| 12. | DB5 |
| 13. | DB6 |
| 14. | DB7 |
| 15. | Backlight VCC(5V) | Led+ |
| 16. | Backlight Ground (0V) | Led- |