

## SMS-BASED SMART NOTICE BOARD

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**Abstract:** - This project 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. Now-a-days 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 household matters to worldwide phenomena. In this project, 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. The BLUETOOTH module receives the message to be displayed as SMS, then transmits the message through the COM port to the microcontroller to validate the SMS and then displays the message on the LCD display. The results from the testing show that the E-notice board performs excellently on the various test conducted although there are some challenges that can be taken as further research. 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 pasting the message on notice board. This proposed technology can be used in 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 various AT commands is used to display the message onto the display board.

### 1. INTRODUCTION

Notice boards are of primary importance in any organization and in places such as bus and railway stations, when a need of for circulating notices arises it becomes tedious job. Thus an electronic notice board is an extremely efficient method of providing messages. It is difficult to update the messages at once. Thus, this project focuses on development of a wireless

board. This apparatus has the capability of displaying the latest messages using an Android application from a smart phone. This help susintransmitting any message with in a fraction of a second eliminating any delay by simply sending a command which is much efficient compared to any other traditional method of transmitting the message. Thus, the proposed technology can be of great utility in many public places such as malls or commercial buildings to enhance the security system and also increase the awareness regarding emergency situations and avoid any possible dangers.

In this project , Arduino UNO is used for controlling the whole process, Bluetooth module to receive the SMS/message sent from mobile phone and LCD 16\*2 display to display the message.

The idea to use mobile phones to receive message and then display it on smart notice board.

Bluetooth technology allows devices to communicate with each other without cables or wires. Bluetooth relies on short-range radio frequency, and any device that incorporates the technology can communicate as long as it is within the required distance.

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. Bluetooth wireless technology is a short range communications technology intended to replace the cables connecting portable unit and maintaining high levels of security. Bluetooth technology is based on Ad-hoc technology also known as Ad-hoc Pico nets, which is a local area network with a very limited coverage. Bluetooth employs Radio Frequency (RF) for communication. It makes use of frequency modulation to generate radio waves in the ISM band.

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#### 1.1 PROJECT OVERVIEW

The purpose of the project is to develop smart wireless e notice board that displays message send from the user to design a simple, easy to install, user friendly system , which can receive and display notice in a particular manner with respect to the date and time which will help the user to easily keep the track of notice board every day and each time he uses a system. Bluetooth and Wi fi are wireless technology used.

### 1.2 WORKFLOW DIAGRAM

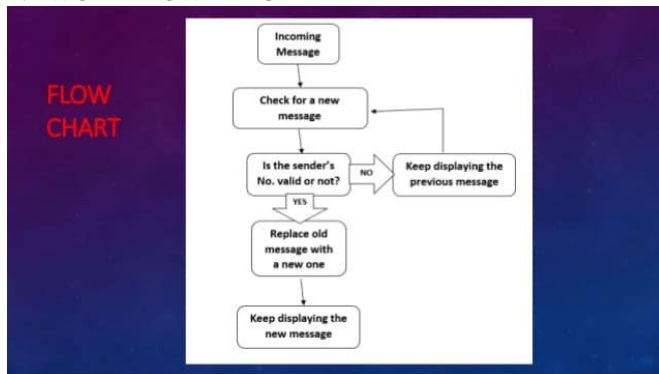


Figure 1.1:Workflow Diagram

Bluetooth Module is a Serial Interface. So when we want to communicate through a smartphone with the HC-05 Bluetooth module, connect this HC05 module to the PC through a serial to a USB converter. Before establishing communication between two Bluetooth devices, firstly we need to pair the HC05 module to smartphones for communication. The Bluetooth chip is an asynchronous communication channel. A Liquid crystal display 16x2 display will be used. In this 16-character, 2- line parallel liquid crystal display.

### 1.3 HARDWARE SPECIFICATIONS

#### (i) BLUETOOTH MODULE -HC-05

HC-05 Bluetooth Module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Its communication is via serial communication which makes an easy way to interface with controller or PC.

It has 6 pins,

1. 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.

HC-05 module has two modes,

1. Data mode: Exchange of data between devices.  
 2. Command mode: It uses AT commands which are used to change setting of HC-05. To send these commands to module serial (USART) port is used.

2. VCC: Connect 5 V or 3.3 V to this Pin.

3. GND: Ground Pin of module.

4. TXD: Transmit Serial data (wirelessly received data by Bluetooth module transmitted out serially on TXD pin)

5. RXD: Receive data serially (received data will be transmitted wirelessly by Bluetooth module).

6. State: It tells whether module is connected or not.

HC-05 has red LED which indicates connection status, whether the Bluetooth is connected or not. Before connecting to HC-05 module this red LED blinks continuously in a periodic manner. When it gets connected to any other Bluetooth device, its blinking slows down to two seconds. This module works on 3.3 V. We can connect 5V supply voltage as well since the module has on board 5 to 3.3 V regulator.

As HC-05 Bluetooth module has 3.3 V level for RX/TX and microcontroller can detect 3.3 V level, so, no need to shift transmit level of HC-05 module. But we need to shift the transmit voltage level from microcontroller to RX of HC-05 module.

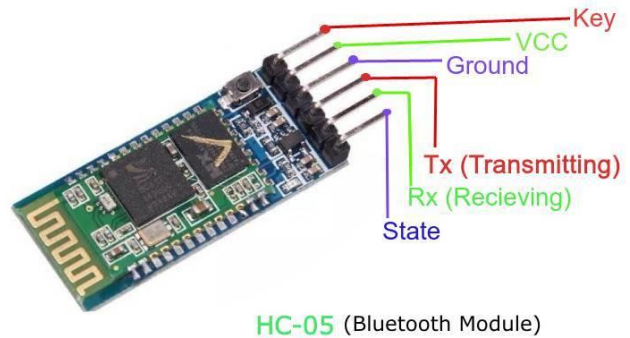


Figure 1.2: Bluetooth module

#### (ii) ARDUINO UNO

The Arduino uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable.[4] It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts. It is similar to the Arduino Nano and Leonardo. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available.

#### Technical specification

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

I2C: 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



Figure 1.3: Arduino uno

(iii) LCD 16\*2

In LCD 16x2, the term LCD stands for Liquid Crystal Display that uses a plane panel display technology, used in screens of computer monitors & TVs, smartphones, tablets, mobile devices, etc. An electronic device that is used to display data and the message is known as LCD 16x2. As the name suggests, it includes 16 Columns & 2 Rows so it can display 32 characters (16x2=32) in total & every character will be made with 5x8 (40) Pixel Dots. So the total pixels within this LCD can be calculated as 32 x 40 otherwise 1280 pixels. 16 X2 displays mostly depend on multi-segment LEDs. There are different types of displays available in the market with different combinations such as 8x2, 8x1, 16x1, and 10x2, however, the LCD 16x2 is broadly used in devices, DIY circuits, electronic projects due to less cost, programmable friendly & simple to access.

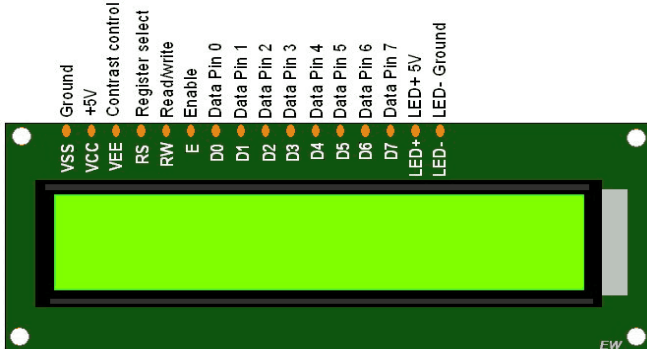


Figure 1.4: Lcd 16\*2

1.4 SOFTWARE USED

(i) ARDUINO IDE

Arduino IDE(Integrated Development Environment) is the software for Arduino.

It is a text editor like a notepad with different features.

It is used for writing code, compiling the code to check if any errors are there and uploading the code to the Arduino.

It is cross-platform software which is available for every Operating System like Windows, Linux, macOS.

It supports C/C++ language.

It is open-source software, where the user can use the software as they want it to. They can also make their own modules/functions and add them to the software.

It supports every available Arduino board including Arduino mega, Arduino Leonardo, Arduino Ethernet and more.

Word file is called a Document similarly, Arduino file is called a Sketch where the user writes code.

The format of Arduino is saved as .ino

HOW ARDUINO IDE WORKS?

When a user writes code and compiles, the IDE will generate a Hex file for the code. (Hex file are Hexa Decimal files which are understood by Arduino) and then sent to the board using a USB cable. Every Arduino board is integrated with a microcontroller; the microcontroller will receive the hex file and runs as per the code written.

FUNCTIONS OF ARDUINO IDE:

Arduino IDE consists of different sections:

1. WindowBar
2. MenuBar
3. ShortcutButtons
4. Text Editor
5. Output Panel

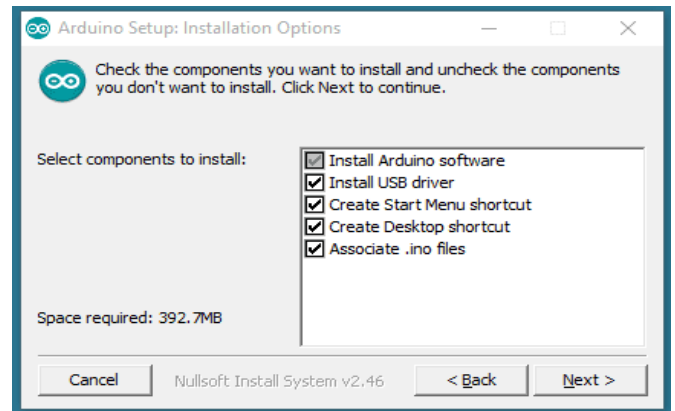


Figure 1.5: Installation of Arduino Ide

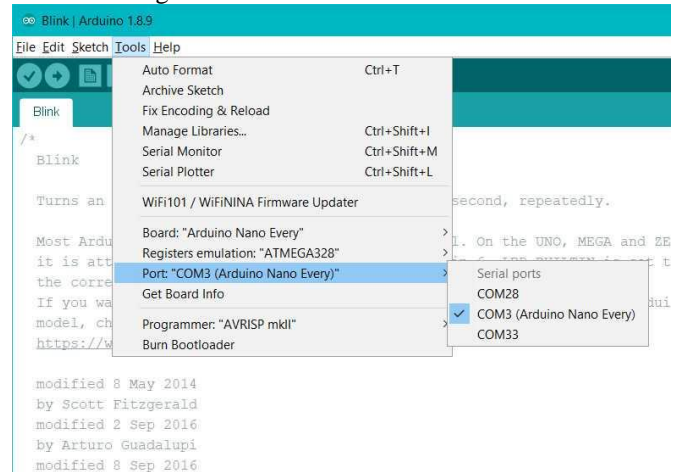


Figure 1.6: Getting started with Arduino ide

2. LITERATURE SURVEY

1. SMS controlled e-notice board Volume 2, (2013, IJERT) Nanaware R. A., Bharat Sanchar Nigam Limited, Satara. Sonawane T. B., Modern College Shivajinagar, Pune.

The e-notice boards has several applications which are used in various sectors such as shopping malls, educational institutes, traffic control, banks and public addressing system (PAS) etc. The old wired e-notice board is controlled by

microcontroller. The microcontroller contains the program code to show the message on display. To change message on display, it needs to change microcontroller program code again. All these processes are generally hardwired and complex. By adding GSM wireless communication interface to these system, we can make smart e-notice board to overcome these limitations. So we have interfaced GSM Modem with microcontroller and implemented a SMS transmission and reception technique. The message on display is easily changed by sending SMS to it. This paper explains development of SMS controlled smart e-notice board.

2. IOT based smart notice board Volume 9, Issue 06 (June 2020, IJERT) Gaurav Bhardwaj, Gunjan Sahu, Rajan Kumar Mishra UG Student, Department of ECE MIT School of Engineering Pune, Maharashtra, India. This project is regarding advanced wireless notice board. In IOT based Web Controlled Notice Board, Internet is employed to wirelessly send the message from Browser to the display. A local web server is created; this could be a global server over net. At the PIC microcontroller, LED matrix is used to display message and flask for receiving the message over network. Whenever microcontroller receives any wireless message from GSM module, it displays on the LED matrix. The Internet of Things (IOT) belief system can be looked as an exceptionally unique and radically distributed networked system composed of a very large number of identifiable smart objects. These objects can convey and to interface among themselves, with end- users or different elements in the system. Entering the era of Internet of Things, the use of small, shoddy and flexible computer hardware that allow end- user programming become present. One of them, considered in this, is the PIC microcontroller, fully customizable and programmable small computer board.

3. Development of a voice and sms controlled dot matrix display based smart noticing system with RF transceiver and GSM modem Md. Eftekhair Alam, M. A. Kader, Shamima Akter Proma, Sanchita Shar (2018 21st International Conference of Computer and Information Technology (ICCIT)) Publisher: IEEE The noticeboard is a primary thing in any institution or organization to disperse information among the stakeholders. In the busy and fast moving world today, conventional sticking paper notice system is time-consuming and not suitable for quick sharing of information. This paper represents a smart electronic remote noticing system where an authorized accountable person can share information in the notice board anytime from his office room or any places in the world having the cellular network. In the proposed system, notice can be sent in two ways. The user can update notice from his office room either by voice or text message via a smartphone using Bluetooth and RF communication within 1- kilometer distance. In this way, the user sent notice using his own local wireless network and should not pay money to any operator. Another way to update notice by sending SMS using mobile network when the user stays outside of his office room. In this way, the user has to pay SMS charge to the mobile operator. The notices

sent by the user are scrolled in a 32X8 LED matrix display. The system can show current notice with two previous notices. It also gives a notification by a buzzer when a new notice is received.

4. Real Time Digital Notice Board on Cloud Platform, 2016, IMPERIAL JOURNAL OF INTERDISCIPLINARY RESEARCH Avhad Jyoti S., Bhavar Vedika S., Chavhan Sneha K., Dhole Tushar R. & Prof. Kapadnis Jagdish Y. Department of Computer Engineering, Pune Vidyarthi Griha's College of Engineering, Nashik-422004

Notice board is used in institution or organization or public utility places like College campus, railway stations, But sending various notices day to day is a heavy process. This paper deals with advanced notice board. Our proposed system will enable people to wireless transmit notices on a notice board using Bluetooth with smart phone and users get auto notification using parse cloud. Its operation is based on micro controller ATMEGA 328P Programmed in C language. When the user sends notice via registered smart phone simultaneously that message will get display on the notice board and also through the parse cloud other users get auto notification on their smart phone. We can also make the system compatible with more than one wireless technology.

#### 2.1 PROJECT FORMULATION

In this project , Arduino UNO is used for controlling the whole process, bluetooth module (HC-05) to receive the SMS/message sent from mobile phone and Lcd 16\*2 display to display the message. The idea to use mobile phones to receive message and then display it on smart notice board. The Bluetooth technology is used. Bluetooth is a wireless communication technology that can be used for close-range data transmission from one digital device to another.

Our project is SMS Based Smart notice board which displays the messages received from android app. People can send flash information from mobiles. It uses Arduino Uno, Bluetooth Module(HC-05) and LCD 16\*2 display. Based on the principle of serial communication in collaboration with embedded systems. This project is an implementation of the ideas of the wireless communication between a mobile phone and a microcontroller (Arduino uno). HC-05 Bluetooth Module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Its communication is via serial communication which makes an easy way to interface with controller or PC. Bluetooth devices usually communicate with other Bluetooth devices in relatively close proximity. Like Wi-Fi, Bluetooth can offer wireless access to LANs, including Internet access.

#### 2.2 OBJECTIVE

The main purposes to design this sms based smart notice board system is to interface it with users mobile phones for displaying the latest information. Bluetooth based wireless notice board using Arduino 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, to enhance the security system and also make awareness of the emergency situations and avoid many dangers. For this purpose, Android based application programs for Bluetooth and Wi-Fi communication between Android based personal digital assistant devices and remote wireless display board are used Using the developed system, two different applications for displaying messages on a remote digital notice board and wireless person calling has been implemented. It also helps in saving the time and the cost for paper and printing hardware.

### 3. RESEARCH METHODOLOGY

In this project we use mobile phone to text the message to be display on the Lcd 16\*2 display.

In our project we use power supply, Arduino UNO, Lcd Display, Bluetooth HC-05 and mobile application. After uploading the program in Arduino UNO, we will give them external power supply. Due to that all functions of equipment's are on. At that time, we will pass the notice/SMS which we want using mobile. Then this notice/SMS will receive by Bluetooth. And by using Arduino this notice/SMS will display on digital notice board

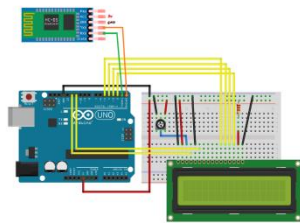


Figure 3.1: Circuit Diagram

### 4. CODING & LIBRARIES

Libraries Installation:

We have to install the required libraries in the Arduino IDE. To do so, follow the steps given below. Click on Tools -> Manage library -> Search "Liquidcrystal" and click install.

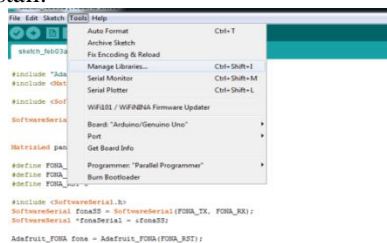


Figure 4.1 manage libraries

This library allows an Arduino board to control LiquidCrystal displays (LCDs) based on the Hitachi HD44780 (or a compatible) chipset, which is found on most text-based LCDs. The library works with in either 4- or 8-bit mode (i.e. using 4 or 8 data lines in addition to the rs, enable, and, optionally, the rw control lines).

To use this library  
`#include <LiquidCrystal.h>`

Examples

Autoscroll: Shift text right and left.

Blink: Control of the block-style cursor.

Cursor: Control of the underscore-style cursor.

Display: Quickly blank the display without losing what's on it.

Hello World: Displays "hello world!" and the seconds since reset.

Scroll: Scroll text left and right.

Serial Display: Accepts serial input, displays it.

Set Cursor: Set the cursor position.

Text Direction: Control which way text flows from the cursor.

After the successful installation of libraries, we can start coding.

CODING:

So, data sent to the bluetooth module using mobile or any bluetooth enabled devices through bluetooth terminal apps are fetched to the Arduino and in return displayed on the LCD.

Arduino IDE has the LCD sketch just the modification is adding the bluetooth serial input with some if- if else statements and while loop.

So the code is written in such a manner that you can notice just by going through the code once.

# - clear LCD display

\* - set the cursor to second row i.e. (0,1)

% - scroll left display

! - stops the scrolling

Now putting innovation into this one can easily make the display scroll right, may be make the text bounce within the screen to go left and right with while looping and delay function

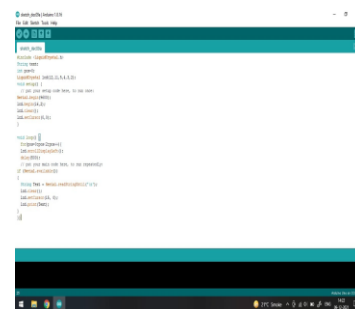


Figure 4.2 Final code

BLUETOOTH SERIAL TERMINAL APP

pair our HC05 bluetooth with the pin 1234 to my mobile:

- 1) scan device
- 2) select the bluetooth device
- 3) give no if message come
- 4) select TERMINAL from the home screen
- 5) Type the message in the format #MESSAGE\*
- 6) touch the send button..

Now you can see your message in the LCD

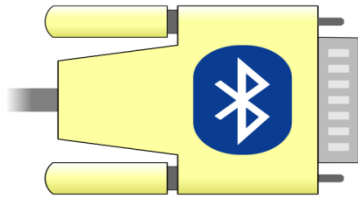


Figure 4.3 Serial Bluetooth terminal

'Serial Bluetooth Terminal' is a line-oriented terminal / console app for microcontrollers, arduinos and other devices with a serial / UART interface connected with a bluetooth to serial converter to your android device.

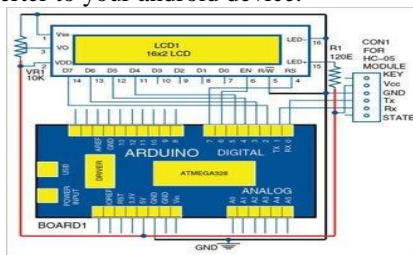


Figure 4.4 circuit diagram for connection

### 5. APPLICATIONS

Also used in hotels to display welcome message and costs of all items etc. In Banks these are used to display special offers, new plans and various services of them. In Airports these are used to display the arrival and departure timings of planes and special messages. In Railway stations these are used to show platform numbers, arrival and departure timings of trains and special attention messages. The applications of wireless digital notice board mainly involve public places like bus stands, railway stations, airports, shopping malls, and parks to display the message wirelessly. This project is used in school, colleges and universities to display student's results, events and important notices.

### 6. RESULT AND CONCLUSION

#### RESULT

The result of the system is nothing but a very simple display of the message on the LCD screen. The output helps us to analyze that the result which was intended to achieve is so successfully. The output Displayed on the screen is the messagesendingHC05terminal. The sample message that will be displayed on the screen.

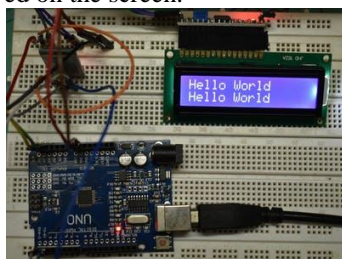


Figure 6.1: Connection of material

### 7. CONCLUSION

The prototype of the Bluetooth based electronic notice board is designed successfully. It can be easily integrated with all general purpose display board and thus proving its mobility. The system accepts the message to be displayed in the form of Short Message Service (SMS), stores it , checks for its validation and displays it on the display unit if it from an authorized user. This system supports only one message at a time and short distance. This limitation can be tackled by the use of higher end microcontroller and extended RAM .The proposed system can be efficiently used for transfer of message instantly in the campus

### 8. FUTURE SCOPE

Temperature display during periods wherein no message buffers are empty is one such theoretical improvement that is well possible. Another very interesting and significant improvement would be to accommodate multiple receiver MODEMS at different positions in the geographical area carrying duplicate SIM cards. Multilingual display can be another added variation in the project we can able to store messages for long time by using SD memory card. Along with the notice messages, date and time; breaking news can be flashed timely. Currently only one message can be displayed at a time this can be overcome by using many LCDs to display different messages. This system can also be made password protected.

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