

Design and Development of Wireless Electronic Notice Board

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Abstract—This project looks at a cool & innovative way to show messages on an electronic display board using wireless tech. Notice boards are a must-have in any organization or public places like hospitals, airports, bus stations, railway stations, shopping malls, & parks. Writing down different notices by hand can take a lot of time and is quite boring. To fix this problem, we come up with the idea of a wireless digital display board here.

The main goal of this project is to create a notice board that can get & show messages from a trusted user from anywhere around the globe using IOT and also GSM technology. The development of IoT-based projects facilitates rapid data transformation and remote accessibility, enabling users to access information from anywhere globally. A cloud-connected display continuously monitors for user messages, automatically updating the TFT display upon receiving data uploads through the server. Utilizing the System Wi-Fi, users can upload messages to the TFT display by accessing a server-connected website from anywhere in the world. This setup reduces update timeframes and efficiently transfers data to end-users, enhancing overall information dissemination.

In scenarios where internet connectivity is unavailable, GSM technology provides an alternative solution for data transmission. By integrating a SIM card into the GSM module connected to the wireless display board, authorized users with mobile phones can send messages that are received and displayed on the notice board. This setup enables seamless communication and efficient information dissemination. With GSM technology, trusted users can send messages from anywhere globally to be displayed on the notice board, ensuring timely and reliable communication.

Keywords—*Arduino Uno, Global system for mobile communication (GSM), TFT display, IOT*

I. INTRODUCTION

The primary objective of designing an electronic notice board system is to establish a wireless connection between users mobile phone and notice board. This allows users to remotely send information, which is then received by a Wi-Fi module connected to an Arduino board. The Arduino board processes the information and display it on a screen in real time. this can be done using IOT. This system is designed with ATmega328P Microcontroller, which is interfaced with Arduino Uno and level shifter through serial cable. TFT display is also used this system for displaying the information or data. GSM, or Global System for Mobile Communications, is an open technology used for digital cellular networks. The Wi-Fi module is wireless component that will maintain connection with server.

We are using server and it has number that can be used by the authorized person and that person can write or re-write the information which want to display. This system is designed with ATmega328P microcontroller, which is interfaced with Wi-Fi module and level shifter through serial cable. TFT display is also used in this system for displaying the information or data. The heart of this system is microcontroller, this will receive data from Wi-fi modem using UART (universal transmitter and receiver), update this message on LED board through same UART only. In this we are using Atmel ATmega328P microcontroller, it is 8bit controller which has inbuilt 8k 8 bytes flash memory, 256 bytes RAM and 32 I/O pins and UART. The advantages of this controller are low cost, availability of tools and resources are more.

Wi-Fi technology is a long-range wireless communications technology. It has been developed rapidly in recent years. In this we are using Wi-Fi module and its operating voltage is 12v and 1 amp, data format is UART with 9600 baud rate. The advantages of Wi-Fi are more secured and can send messages from anywhere These days, digital ads are everywhere. Shopping malls, airports, & supermarkets are all using digital display boards. From tiny shops to large organizations, messages now appear on these boards. Over the

past twenty years, cell phone usage has shot up dramatically. In today's world, mobile phones & their technologies play a crucial role in our everyday lives. This surge in mobile phone use sparked the neat idea of sending and receiving messages that can be shown on digital boards. Thanks to the SMS feature (Short Message Service), we can communicate worldwide through our mobile devices with international roaming features.

The main goal of this project is to swap out old-fashioned notice boards with wireless digital displays powered by GSM tech. An approved user can send an SMS (the notice) using their mobile phone to the SIM card installed in a GSM module attached to the wireless notice board. The GSM module receives this message and sends it to an Arduino Nano microcontroller for storage. After that, it shows the SMS on the wireless digital board. You can use this device anywhere there's mobile network coverage.

Today, advertisements are going digital fast! Big stores & shopping centers are using digital displays now. Also, trains & buses show important information like platform numbers or ticket details on digital boards. People have quickly gotten used to accessing everything at their fingertips. Mobile phone usage has risen significantly over the years. Communication and control matter everywhere nowadays. Notice boards are common, used from primary schools all the way up to major companies to share messages broadly.

II. LITERATURE SURVEY

Remarkable contributions have been made by scientists in establishing a method for wireless electronic notice board. [1] The developed notice board system aims to achieve two primary objectives. firstly Wireless information sharing which enables the seamless and wireless dissemination of information to intended users. And secondly cost and time efficiency which reduces the time and cost associated with traditional paper based notice boards, including savings on paper, printing hardware and labor. By achieving these objectives, the system provides an efficient, cost effective, and environmentally friendly solution for sharing information with intended users.

[2] This paper presents the design and implementation of an advanced, high-tech wireless notice board system. The system utilizes an Android application on smartphones or tablets connected to a Bluetooth module (HC-05) to display real-time information. A cost-effective, programmed microcontroller (Arduino Uno) receives and displays messages on an LCD screen. Authorized users can send voice messages through the Android app, Verbalized voice is sent via Bluetooth and displayed on the LCD screen, Speech recognition technique: Hidden Markov Model (HMM), Online speech-to-text conversion via Google's server, Microphone input for voice messages (English only).

[3] This paper presents the implementation of a simple and IoT-based wireless notice board system. The proposed system leverages Wi-Fi connectivity to communicate with a

cloud database, enabling seamless message transmission. Message transmission: An Android mobile app pushes messages to the cloud database, Reception: An Arduino Uno with a valid internet connection receives the messages, Alert and display: Upon receiving a new message, the system alerts an LCD display connected to the Arduino Uno, which then displays the message.

[4] In this paper, the system has been designed using GSM and Bluetooth, LCD, regulator, and rectifier. This project focuses on developing a wireless electronic notice board that leverages an Android application to display real-time messages from a smartphone. This innovative system enables rapid message transmission, eliminating delays and increasing efficiency compared to traditional methods. By simply sending a command, users can instantly share critical information, making it an ideal solution for public places such as malls, commercial buildings, and emergency services.

[5] This paper presents the design and development of a smart wireless electronic notice board, leveraging a combination of cutting-edge technologies. The system architecture comprises, GSM module for remote communication. Bluetooth module for proximity-based communication. Arduino microcontroller for system control and integration. LCD display for visual notifications. Buzzer and LED for auditory and visual alerts. Based on the distance, the user of the proposed system can select one of the two approaches, are GSM modem-based and Bluetooth module-based approaches.

[6] This project showcases the development of an IoT-based smart notice board, leveraging cutting-edge technology to enable fast and global access to data. The primary objective is to create an automatic, self-sustaining, and highly reliable electronic notice board. Cloud-connected display awaiting user message. Automatic upload of user data to the LED display via server. Wi-Fi module ESP8266 enables global access and updates through a website connected to the server. Users can upload messages from anywhere in the world, reducing update time and increasing data transfer efficiency.

The proposed system is inspired from the above mentioned works and an attempt is made to improve the designs and further bring out the best of these works put together.

III. PROPOSED METHODOLOGY

To overcome the restrictions of the existing systems that are employed for Wireless Electronic Notice Board, the proposed system can be used. An arduino UNO board is utilized in this proposed system. Arduino is a programmable circuit board. It is an open-source electronic prototyping platform which simplifies the coding and allows the users to create interactive electronic devices. It detects the sensor output and transmits the data through the cloud.

The proposed methodology for Wireless Electronic Notice Board system using IOT is achieved by using arduino

microcontroller which is been used sysstem wifi to send the data to the cloud and display the data on the TFT lcd display. And using GSM technology enable users to send messages to the notice board from anywhere via text messages (SMS).

The wireless bulletin board project combines an Arduino Uno microcontroller, a GSM module, system Wi-Fi, and a TFT LCD display to create a remotely updateable bulletin board.

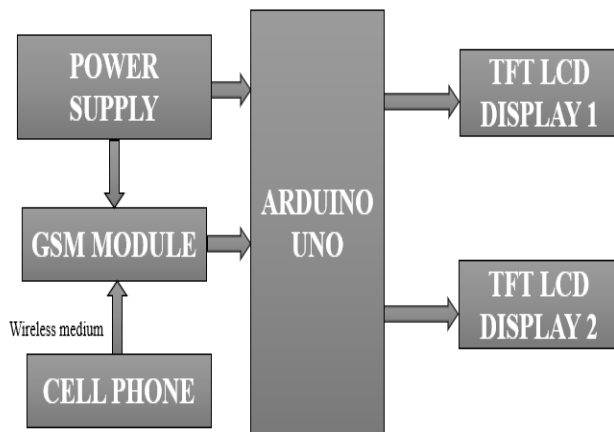


Fig. 1. Block Diagram of Proposed System

In the Fig. 1. The board can be powered up by connecting it to the laptop or PC using a USB cable or plugging an AC-DC power adapter and the microcontroller is connected. The Arduino Uno is the central controller that controls the communication between the modules and processes incoming messages. To receive messages, the SIM900 GSM module is connected to the Arduino via UART communication. the Flask library is used, which allows the Arduino to receive messages from the web server. TFT LCD screen is used to display the information.

SIM900 GSM module is connected to the Arduino via UART communication. The RX pin of the GSM module is connected to the TX pin (pin 1) of the Arduino. The Arduino TX pin of the GSM module is connected to the RX pin of the Arduino (pin 0). Power the GSM module from the 5V and GND pins of the Arduino. To connect to the Internet, the Flask library is used, which allows the Arduino to receive messages from the web server. This configuration allows Arduino to connect to the selected Wi-Fi network and communicate with the server to receive data.

Messages from are displayed on the TFT LCD screen, providing clear and understandable results. TFT LCD is connected to Arduino via SPI communication. Specifically, CS pin of TFT is connected to pin 10 of Arduino, RST pin to pin 9, DC pin to pin 8, MOSI pin to pin 11, and SCK pin. is connected to pin 13 and the LED pin is connected to the 5V pin of the Arduino through a current limiter (220Ω). This configuration provides efficient data transfer and display control.

In terms of software, the Arduino IDE is used to write and load the control system. The core libraries include SoftwareSerial.h for GSM communication, and

Adafruit_GFX.h and Adafruit_TFTLCD.h for TFT messages. The configuration works to initialize the GSM module and prepare the TFT LCD to display messages. In the main loop, the Arduino constantly checks for new SMS messages or updates from the web server. When a new message is received, it is analyzed by clearing the screen and printing the new message, and displayed on the TFT LCD. power management is essential to ensure reliable and efficient operation. All devices can be powered by a 5V adapter or a 9V battery connected to the Arduino power input. The Arduino's built-in voltage regulator ensures that all components receive the appropriate voltage. For battery operation, it is recommended to use a battery with sufficient capacity to maintain the system for a long time. Additionally, using power saving features such as putting the ESP8266 module into sleep mode when not in use can help extend battery life.

Overall, this project has completed the resources of Arduino Uno, GSM module and TFT LCD display to create dynamic and versatile wireless notifications. Detailed pin interfaces, comprehensive software and power management concepts enable powerful and efficient users to instantly receive and display data from multiple sources. This makes wireless media an ideal solution for applications in schools, offices and public information systems where timely updates are important..

Hardware requirements:

- Arduino Uno
- TFT LCD display
- GSM module

IV. WORKING

The system shown here is the Design and Development of Wireless Electronic Notice Board. Here we are used the Internet of Things (IoT) and GSM technologies to send messages to the notice board.

Notice boards are a crucial element in any institution or public utility, such as transportation hubs like bus and railway stations. However, relying on traditional sticky notes in today's technology-driven world seems outdated. Typically, an individual is employed to manage the notice display, but this scenario is being replaced by the concept of an advanced wireless notice board. This project leverages an Ethernet module as its core functional component. Through the Internet of Things (IoT) and the Ethernet module, we can instantly update, remove, or modify the text on the notice board as needed, making it a highly efficient and convenient solution.

The board will be powered up by connecting it to the laptop or PC using a USB cable and the microcontroller is connected. TFT LCD display come up with "Welcome all to Notice Board" and Wi-Fi module gets connected to the internet.

Initially microcontroller will be powered up by connecting our PC to the microcontroller (Arduino Uno) and

then the SIM900 GSM module is connected to the Arduino via UART communication and then the TFT LCD is used to display any information.

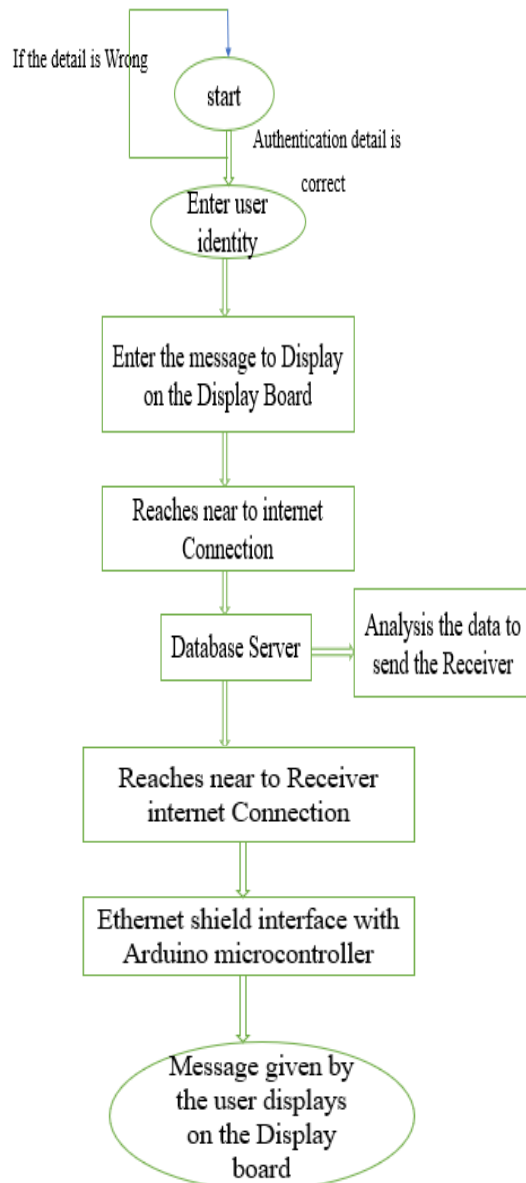


Fig. 2. Flowchart of Working

In the Fig. 2. A specialized gadget enables authorized users to send notices, which are then received by a designated device connected to a Wi-Fi network. The receiving device features an Ethernet module interfaced with an Arduino microcontroller. When an authorized user sends a notice, it is transmitted to the designated recipient's device, ensuring secure and targeted communication.

The initialization process, executed within the setup function, comprises the configuration of the GSM module, establishment of a Wi-Fi connection via the system wifi, and initialization of the TFT LCD for message display purposes. Upon entering the main loop, the Arduino microcontroller perpetually monitors for incoming SMS messages or updates

from the web server. Upon reception of a new message, the system parses the content and updates the TFT LCD display by clearing the screen and rendering the newly received message.

The Android application serves as a user authentication and SIM card security mechanism for the system. Upon initial setup, the application stores authorized user passcodes in the system's database. When an authorized user attempts to send an SMS text message, the application performs a verification check by retrieving the user's code from the system's database. If the user's code is successfully validated, the application grants permission to send the SMS text message. Conversely, if the user's code is not registered in the database, the application alerts the authorized user with a notification indicating an unauthorized access attempt.

V. RESULTS

The results of hardware and software will be discussed, primarily the Development of wireless electronic notice board system has been successfully deployed with GSM and IOT technologies.

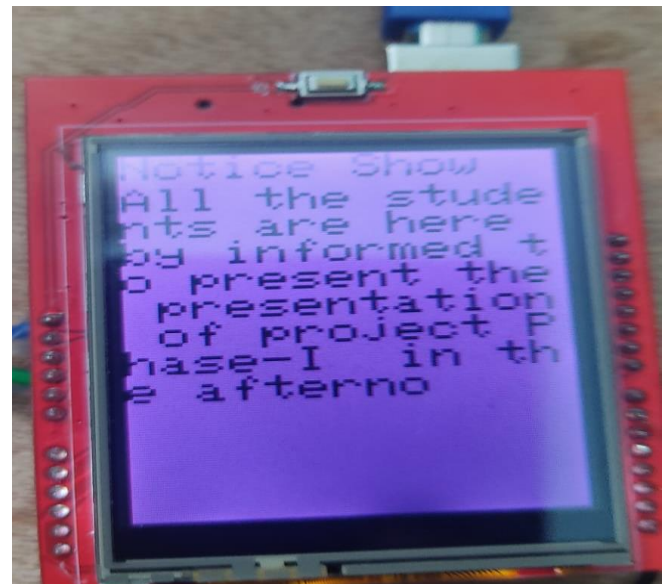


Fig. 3. Any information can be displayed



Fig. 4. Displayed the information send by the aauthoriser person

As shown in the Fig. 3. And Fig. 4. Notice board will display any information sent by the authorised user.

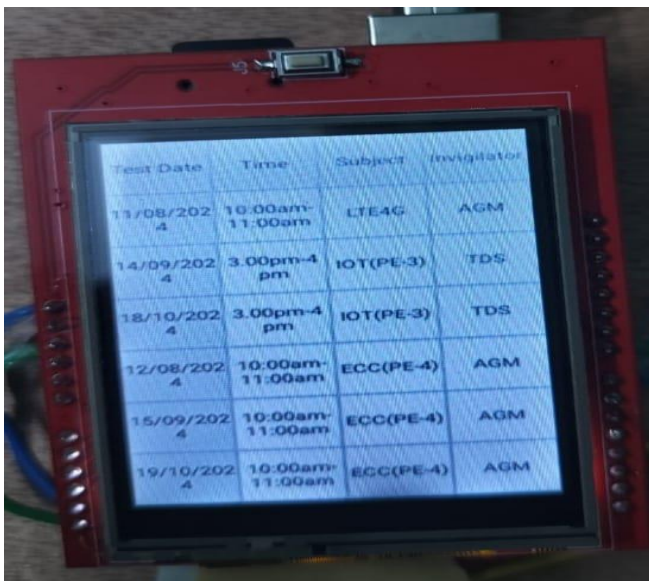


Fig. 5. Timetable can be displayed

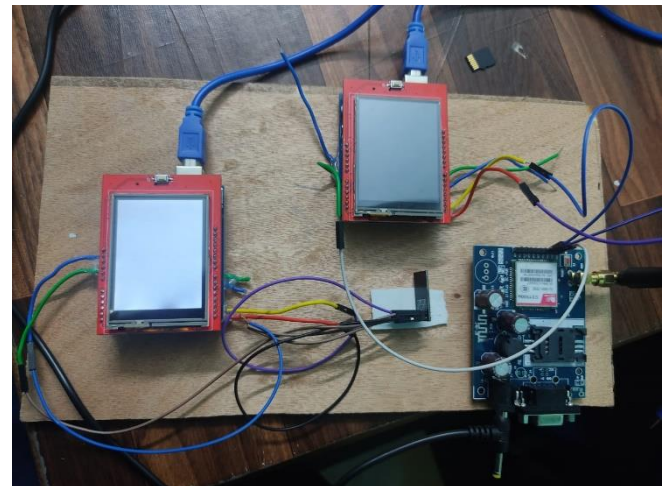


Fig.4. Hardware implementation

VI. CONCLUSION

We've successfully designed a prototype for the electronic notice board! It easily connects with regular display boards, showing how flexible it is. You send messages by SMS as the system checks their validity & displays them if the sender is authorized. It handles one message at a time but we can upgrade it with better microcontrollers and more RAM for improved performance! This setup is super useful for sharing messages instantly around campus.

This project has successfully demonstrated the design and hardware implementation of a wireless electronic notice board. The hardware implementation has revealed that the proposed system is a cost-effective and user-friendly solution, eliminating the need for printing and photocopying, thereby reducing associated costs. The system facilitates rapid information dissemination, is easy to install and maintain, and avoids the latency inherent in traditional paper-based notice boards. Furthermore, authorized individuals can update the information in real-time. The proposed system has vast potential applications, including educational institutions, organizations, public transportation hubs (railways, bus stations, airports), roadside traffic control, and advertising purposes.

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