

IoT Based Application Controlled Message Scrolling Digital Notice Board

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Abstract- Notice board are playing very important role in our day-to-day life. These notice boards can be used in many places like educational institutions, companies and etc. As, the technology was increasing day by day, the use of it was also increasing. By replacing conventional analog type notice board with digital notice board we can make information dissemination much easier in a paperless community. Here the admin can send notice through internet. In order to put up notices on the notice board lot of resources such as paper, printer ink are wasted and addition it consumes a lot of time to make notices. Here, information can be send anywhere in the world and can be displayed within a second. Android application is developed and the information is send through the app. For sending information, username and password type authentication with OTP is provided to the registered E-mail for security purpose. If the username and password are correct then the OTP is sent to E-mail. Information may be in the form of text or voice. In addition to this a voice recognition system is installed to access the information over voice.

Keywords- Android application, NODE MCU ESP8266-12E, Arduino UNO ATMEGA328, LED display.

I. INTRODUCTION

The notice boards are used to share the information in educational institutions, organizations and many other places. In earlier days people use paper as the medium to convey any messages and the printed paper is displayed in the notice board. A manual operation is required to update the information in the traditional notice board. But, sticking various notices day-to-day is a difficult process. A separate person is required to maintain the notice board. It is a time consuming method. The Internet of Things is the advance way we interact with the physical world, making it possible to connect devices, machines and objects in real-time. The system proposes an IoT based smart and secure digital notice board that can be used in public places like schools, hospitals and airports. In the current scenario, the notice boards can be digitally managed by advanced wireless technology and can be remotely controlled. These Notice Boards are a part of

communication in any institutions or organizations which are used to display any notification that reach quickly to intended persons. We choose internet as a medium for transferring information to the LED display. By using MIT app inverter, the android application is designed and it is programmed by PHP. For sending the information, we should login with correct username and password in android application. To ensure authentication, the OTP is send to the registered E-mail while logging in. In order to avoid misuse of the system. If the username and password are correct then we can send the information to the cloud. The IoT module can be used to receive data from any part of the world and display the data on the digital notice board. Admin can send information anywhere from the world within a second through the Android application. The information can be in the form of text or voice. The information send as a voice is converted as a text by speech to text converter and the sent information will be displayed on the digital notice board placed at required location. The sent information is stored at the SQL database. The process of posting the notice is efficient and easy process. It means admin doesn't need to go near to the notice board to change the message every time.

II. LITERATURE SURVEY

- 1) Digital notice board using IoT: The GSM module under consist of the SIM Card. The message is transmitted by user through its mobile phone to this number of the GSM module. The message is transferred to the display board.
- 2) Wireless digital notice board: The GSM module has a SIM card. It is mainly based on Wi-Fi module. So, there is a coverage problem. It consists of Arduino, Wi-Fi module, LED.
- 3) IoT Based smart notice board: In order to access digital notice board the sender must enter in correct mobile number. The user enter the correct mobile number then the information can be transmitted. If the mobile number is wrong then the message cannot be send. It consists on LED matrix, PIC micro controller, GSM modem.
- 4) Message display on notice board using GSM and Arduino: When a mobile user sends information from his

mobile It is received by a SIM, which is integrated into a GSM modem at the receiver end.

- 5) GSM based Wireless electronic notice board using PIC18F2550 Microcontroller: A GSM modem can be an external device. A external GSM modem is connected to a computer through a serial cable or USB cable.
- 6) Designing of GSM based digital notice board with scrolling LED Display: User sends the notices by SMS, which is received at GSM modem and display on dot matrix board.
- 7) GSM based digital notice board: The message is sent to the GSM modem through mobile phone and the GSM modem which is connected to the Max 232 receives the message.

III. OBJECTIVES

This smart notice board acts as a stage for the display of multi-type information. The user easily sends the message or information for displaying, from remote areas through android application. Every time any notice/information is being displayed, parallel the notice is sent to the respective E-mail id of the internet user. Here in the smart notice board which plays the text and number can be updated. The smart notice board can be accessed by the admin through Android application.

- The main objective of the system is to develop a wireless notice board that dispalys in the form of text, voice and it's interfaced with user mobile phones for displaying the information.
- A microphone will be placed in the smart notice board to access the voice.
- As general application, in an educational institutions the user data is collected and it's fed to the memory of the system, every time any notice/information is being displayed.
- It is very useful for sending the emergency information with in a second.

IV. EXISTING METHOD

In this, the wireless notice board is developed with the help of GSM technology. The message is sent to the GSM modem through mobile phone and the SIM card is loaded at the GSM modem. The GSM modem is protected with a password. For sending the message to the GSM modem, the password of the GSM modem should be entered. If the password is correct then GSM modem receives the message, if the password is incorrect then GSM modem does not receive the message. DHT11 sensor is interfaced, it measures the

temperature and humidity from the surrounding atmosphere and it display default.

DRAWBACKS:

- Security issue
- Subscription cost
- Works with in the country

V. PROPOSED SYSTEM

To develop a Digital notice board the message sent from the user through internet and to design a simple, user friendly system, which can receive and display notice in a particular manner which will help the user to easily keep the track of notice board every day and each time he/she uses the system. System consist of two section called as sender and receiver. Sender is responsible for sending valuable information's through the wireless network. The information is send through the android application. The android application is designed by MIT app inverter and it is programmed by using PHP. For preventing unauthorized access, we provide security authentications like username and password. The 4 digit OTP is send to the registered E-mail. After entering the correct OTP we can update the information. The admin send the information through android application to the cloud. Then, the information is received by the NODE MCU ESP 8266-12E and the information is then passed to ARDUINO UNO ATMEGA 328 through the internet and then the Arduino passes the information LED display. Here, the information is transferred by the user from anywhere in the world within a second. The information is transferred with safe and securely. Then, the information is displayed with in a second.

VI. BLOCK DIAGRAM

The figure 1 shows the block diagram of IoT based application controlled message scrolling notice board. The digital notice board is based on the IoT module and Arduino board. The block diagram consist of Android application, NODE MCU ESP8266-12E, Arduino UNO ATmega328, LED driver cricut, LED display. The user send the information through the Android application. Then the information is sent to the cloud. The NODE MCU receives the message from the cloud, if the NODE MCU receives the data the light will blink at the NODE MCU board. Then the information is sent from the NODE MCU to the Arduino UNO board through the internet. The information is sent to the LED display. Here the LED driver circuit limits the power supply. The power supply for all unit is 12v. Then the message is displayed in the LED display.

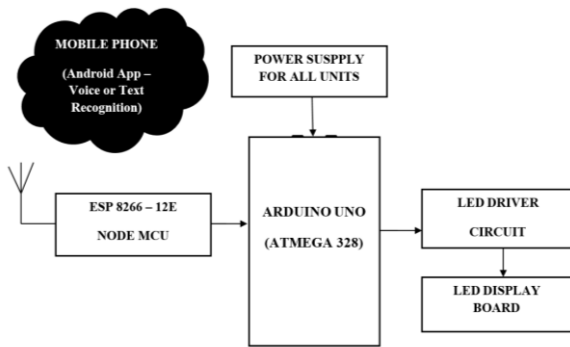


Figure 1:Block diagram.

FLOW CHART:

The figure 2 shows the flow chart of IoT based application controlled message scrolling notice board, While the android application sends the information to cloud. The information/data may be in the form of text command or voice. The voice is converted into text by speech to text converter. Then we need to initialize the NODE MCU and ARDUINO UNO. Here the NODE MCU is a IoT board. For receiving the information we need to connect to the internet. If the internet connection is not available we need to check the internet connection. If the internet connection is available then the NODE MCU receives the data from the server. If the data is available, it is collected at the NODE MCU, Then it sends the data/information to the ARDUINO UNO Microcontroller board, If the data is not available then the NODE MCU wait for the data/information from the server. The ARDUINO UNO Microcontroller collect the data from the server. The ARDUINO UNO Microcontroller send the data to the LED scrolling display. The data/information is displayed in the LED scrolling display.

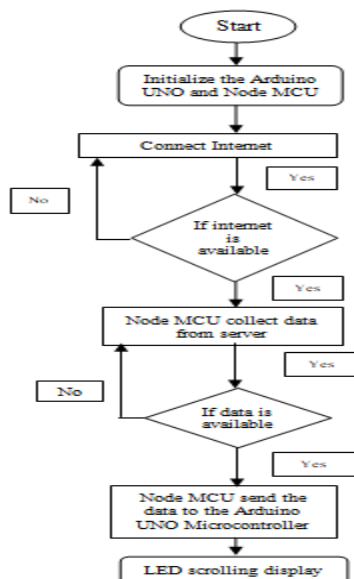


Figure 2:Flow chart.

FLOW CHART FOR ANDROID APPLICATION :

The figure 3 shows the flow chart for Android application in IoT based application controlled message scrolling notice board, for sending information through the android application first we need to install the app. The user should open the Android application and connect to the internet. After connecting to the internet we need to login with the correct username and password that are provided while registering the E-Mail ID. If the Username and password the OTP will be send to the registered E-Mail ID.

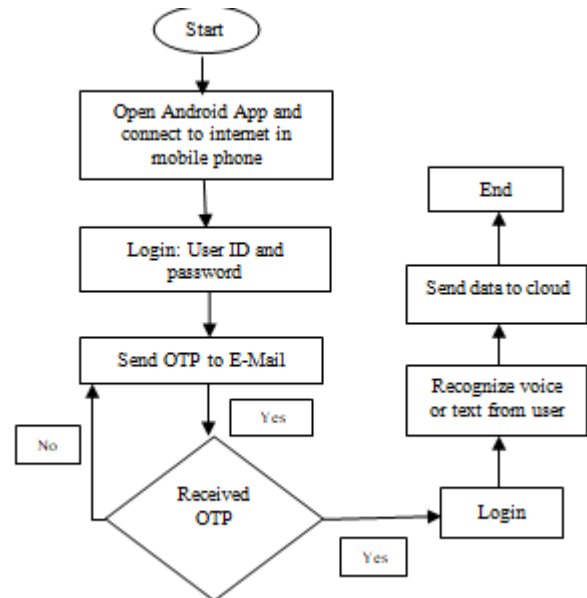


Figure 3:Flow chart for Android application.

We need to enter the OTP, then we should click login button. If the OTP entered is correct we can able to send the information. If the OTP entered are not correct then we can't able to send the information. The text or voice information is entered and then it is updated. The text or voice is send to the cloud.

HARDWARE REQUIREMENTS:

A.IoT:

The Internet of Things (IoT) describes the network of physical objects “things” that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. Over the past few years, IoT has become one of the most important technologies of the 21st century. Now that we can connect everyday objects such as, kitchen appliances, cars and etc, to the internet via embedded devices, seamless communication is possible between people, processes, and things. By means of low-cost computing, the cloud, big data,

analytics, and mobile technologies, physical things can share and collect data with minimal human intervention. Devices are connected to the cloud through many different methods depending on the device connectivity capabilities. These methods include cellular, satellite, Wi-Fi, Low Power Wide Area Networks (LPWAN) and direct connection to the Internet via Ethernet.

B.NODE MCU ESP8266-12E:

Node Microcontroller Unit is a microcontroller. It can be used for all IoT systems. It is an open source IoT platform. It has Wi-Fi module in it. It is a low cost microcontroller. Node MCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Expressif system and hardware is based on ESP-12 module.

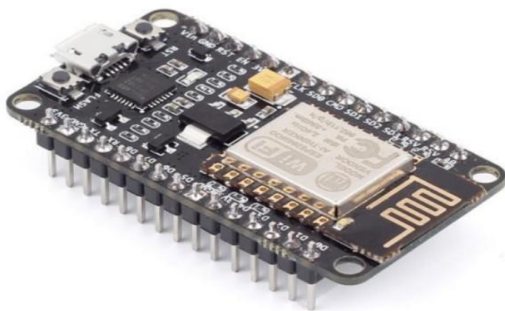


Figure 4: Node MCU.

It can be programmed in Arduino IDE software using embedded C. The Node MCU has 128 KB RAM and 4MB of Flash memory to store data and programs. It has high processing power with in-built Wi-Fi. The Node MCU ESP8266-12E has 16 digital I/O pins and 1 analog input pins. The input voltage of Node MCU is 7v-12v. The operating voltage of Node MCU is 3.3v. ESP8266-12E is a member of the “ESP-XX” series. It is a miniature Wi-Fi module used to establish a wireless network connection for a microcontroller.

C.ARDUINO UNO ATMEGA328:

The Arduino UNO is an open-source microcontroller board based on the Microchip ATmega328p microcontroller and developed by arduino. Arduino platform became quite popular with people just starting with electronics. The board is equipped with sets of digital and analog input and output pins that may be interfaced to various expansion boards and other circuits. The board has 14 digital I/O pins, 6 analog I/O pins and programmed in Arduino IDE software in embedded C. ATmega328p is an 8-bit microcontroller based on the AVR RISC architecture. It is most popular of all AVR controllers as it is used in Arduino boards. AT mega is commonly used in

many projects and autonomous systems where a simple, low-powered, low-cost microcontroller is needed.



Figure 5: Arduino board.

D.POWER SUPPLY:

A power supply is an electrical device that offers electric power to an electrical load such as laptop, computers and other electronic devices. In our project we are going to use 12v power supply. We use AC supply of 230V 50HZ, but this power has to be changed. We are using step down transformer to step down 230V AC supply to 12V AC. The power supply for all the units are same i.e, 12V.

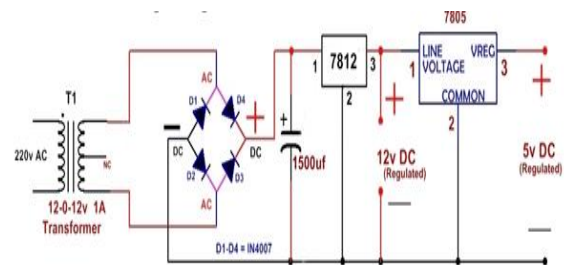


Figure 6: Power supply circuit

E.LED DRIVER:

In electronics, an LED circuit or LED driver is an electrical circuit used to power a light emitting diode. The circuit must provide sufficient current to light the LED at the required brightness, but must limit the current to prevent the damaging of LED. LEDs are designed to run on low voltage (12-24v).

F.LED SCROLLING DISPLAY:

A LED display is a flat panel display that uses an array of light-emitting diodes as pixels for a video display. Their brightness allows them to be used outdoors where they are visible in the sun for store signs and billboards. LED

Display (light-emitting diode display) is a screen display technology that uses a panel of LEDs as the light source. It has Better Picture Quality. No motion delay and lags. It has Longer lifespan and less environmental impact. Light emitting diode (LED) is basically a P-N junction semiconductor diode particularly designed to emit visible light. There are infrared emitting LEDs which emit invisible light. The LEDs are now available in many colour red, green and yellow. A normal LED emits at 2.4V and consumes MA of current. The wavelength relates to the color. The high-efficiency red parts are 635 nm, which is orangey-red. There are yellow ones (585 nm) and green (565 nm) in this series as well. The spectral width refers to the purity of color and is not really of much interest for displays. The dominant wavelength is a human factor: the peak intensity is at 635 nm, but our eyes are more sensitive to lower wavelengths in this region, so we will perceive the display to be the color corresponding to 623 (more orange). The power supply to the LED scrolling display is 12v. The LED display size is 16*32.

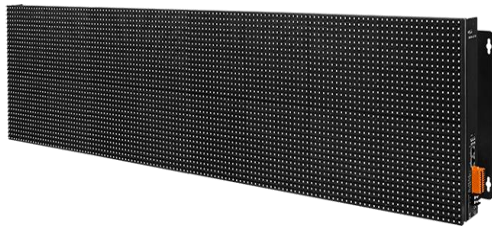


Figure 7: LED display.

SOFTWARE REQUIREMENTS:

A. MIT APP INVERTER:

MIT App Inventor is an intuitive, visual programming environment that allows everyone even children to build fully functional apps for smartphones and tablets. MIT App inverter is a website used to design Android applications. MIT App Inventor is a web application integrated development environment originally provided by Google, and now maintained by the Massachusetts Institute of Technology (MIT). MIT App Inventor is the best because it is an opensource project. MIT App inverter is used to create layout in app. A formatting element in which to place components that should be displayed one below another.

B. PHP:

PHP is an acronym for Hypertext Preprocessor PHP is a widely-used, opensource scripting language. PHP scripts are executed on the server. PHP is free to download and use.

PHP (Hypertext Preprocessor) is known as a general-purpose scripting language that can be used to develop dynamic and interactive websites. It was among the first server-side languages that could be embedded into HTML, making it easier to add functionality to web pages without needing to call external files for data.

C.SQL DATABASE:

SQL stands for Structured Query Language. SQL lets you access, manage and process the data in the system.

SQL database is a database management system. SQL database or relational database is a collection of highly structured tables, wherein each row reflects a data entity, and every column defines a specific information field. Relational databases are built using the structured query language (SQL) to create, store, update, and retrieve data.

D. ARDUINO IDE:

The Arduino IDE is an open-source software, which is used to write and upload code to the Arduino boards. Here, IDE stands for Integrated Development Environment. It is Integrated Development Environment software for programming of Arduino. The IDE application is suitable for different operating systems such as Windows, Mac OS X, and Linux. It supports the programming languages C and C++.

E. Embedded C:

Embedded C is a set of language extensions for the C programming language by the C Standards Committee to address commonality issues that exist between C extensions for different embedded systems. Embedded C is most popular programming language in software field for developing electronic gadgets. Each processor used in electronic system is associated with embedded software. Embedded C programming plays a key role in performing specific function by the processor. A general term for such subsets is “Embedded C” because they apply to programming embedded controllers. The language in which Arduino is programmed is a subset of C and it includes only those features of standard C that are supported by the Arduino IDE.

ADVANTAGE:

- Reduction of man power.
- Easy to use.
- Secure.
- Cost-effective.
- Scalable.

APPLICATION:

- Public places.
- Educational institutions.
- Corporate offices.
- Hospitals.

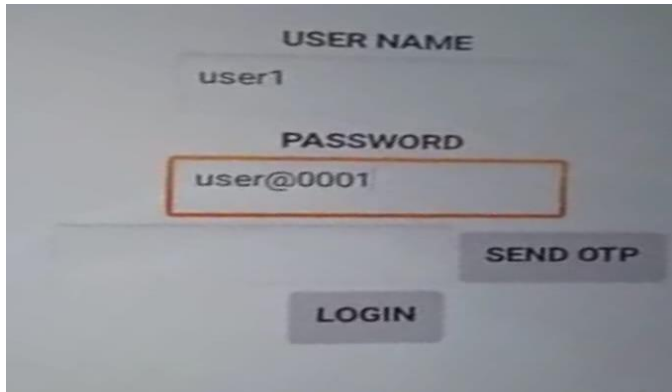
VII. RESULT

Figure 8: security check

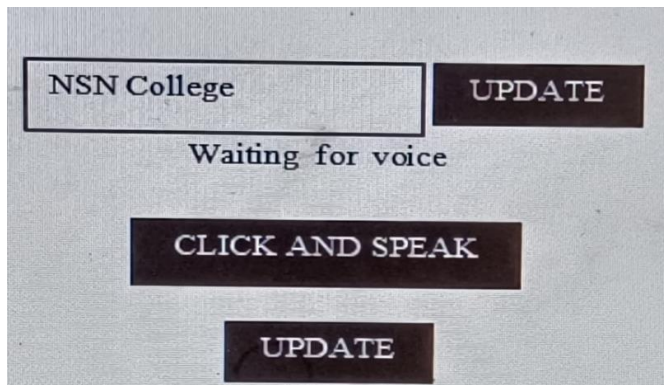


Figure 9: updating text or voice message



Figure 10 :LED display

A smart notice board using cloud communication can be a very effective way to improve communication and information dissemination in various settings such as schools, offices, and public places. By using cloud communication, the

notice board can be connected to the internet and managed remotely from any location, allowing for real-time updates and access to information from anywhere. The use of cloud-based software also means that updates and changes to the notice board can be made easily and quickly. In terms of results, a smart notice board using cloud communication can improve the efficiency and effectiveness of communication by providing a central platform for sharing information. This can lead to better collaboration, improved productivity, and better decision-making.

VIII. CONCLUSION

Now the world is moving towards digitalization, so to make changes the previous techniques it should be upgraded from time to time. Wireless technology provides fast transmission over long range data transmission. It saves time, cost of cables and size of the system. Data can be sent from anywhere in the world. Username and password with OTP type authentication system is provided for adding securities. Previously the notice board GSM module was used. In that, the cost of recharging SIM card is increasing it is required for the whole month but in our system the internet is used when it required for the particular time. Here, we use internet as a medium to send the information. So, there is no problem with coverage area. Text messages can be seen fast as possible with better quality.

IX. FUTURE SCOPE

In future they may add advanced technology like finger print recognition method in the handheld terminal, we can implement the attendance monitoring in the same system. Can provide memory element for showing the different file formats. The proposed system can be efficiently used for the organizations where teacher can teach far distance class from the remote place by adding video calling to the proposed system.

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