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LED Advertising Board based on IoT for E-Circular Notification for Students through Wi-Fi

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Abstract: Notice boards are playing a very important role in our day-to-day life. By replacing conventional analog type notice board with digital notice-board we can make information dissemination much easier in a paperless community. Notice board could be a primary factor in any establishment or public places like bus stations, railway stations, colleges, malls etc. Sticking out numerous notices day to day could be a tough method. A separate person is needed to take care of this notice display. The objective of our project is to design a dot-matrix moving message display using microcontroller and IOT where the characters shift from left to write continuously. Educational institutions also have a similar situation wherein students can be present in any part of the campus and might miss important updates such as rescheduling of classes etc. Furthermore, students and employees might not to know important information in-time for it to be useful to them as they might not be able to pass through those notice boards regularly. Project based notice boards are especially cumbersome to maintain due to many people posting information with no mechanism for removing them. In every institute or industry there is always an information desk that provides information about the staff, institute, and its departments and about everything related to that institute. The problem is that it requires some staff that is dedicated to that purpose and that must have up to date information about the institute and the recent happenings in the institute. The second issue is that a person needs to go in the institute at the information desk in order to get information from them.

Keywords: Node MCU, LED Matrix, Transformers, Rectifiers Arduino IDE, Blynk Server.

I. INTRODUCTION

Now-a-days LED Message Scrolling Displays are becoming very popular for advertisements. These displays are used in shopping malls, theatres, public transportation, traffic signs, highways signs, etc., The big problem with these displays is to carry a computer or special keyboard for generating and sending messages to LED moving display boards dynamically. Carrying a host computer or special keyboard every time to generate message for LED display boards is big headache and also increase cost if it go for wireless based message sending.

Notice boards are playing very important role in our day-to-day life. 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 control notice board through internet. So, information can be send anywhere in the world and can be displayed within seconds. Information may be in the form of text, image, pdf etc

Educational institutions also have a similar situation wherein students can be present in any part of the campus and might miss important updates such as rescheduling of classes etc. Furthermore, students and employees might not to know important information in-time for it to be useful to them as they might not be able to pass through those notice boards regularly. Project based notice boards are especially cumbersome to maintain due to many people posting information with no mechanism for removing them. In every institute or industry there is always an information desk that provides information about the staff, institute, and its departments and about everything related to that institute. The problem is that it requires some staff that is dedicated to that purpose and that must have up to date information about the institute and the recent happenings in the institute. The second issue is that a person needs to go in the institute at the information desk in order to get information from them.

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message and turn it into an output - activating amotor, turning on an LED, publishing something online. You can tell your boardwhat to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language and the Arduino Software(IDE) based on Processing. A world-wide community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike.

Node MCU is an open-source LUA based firmware developed for ESP8266 wi-fi chip. By exploring functionality with ESP8266 chip, NodeMCU firmware comes with ESP8266 Development board/kit i.e.NodeMCU Development board. Since NodeMCU is open-source platform, their hardware design is open for edit/modify/build. NodeMCU Dev Kit/board consist of ESP8266 wifi enabled chip.

The ESP8266is a low-cost Wi-Fi chip developed by Espressif Systems with TCP/IP protocol. For more information about ESP8266, you can refer ESP8266 WiFi Module. There is Version2 (V2) available for NodeMCU Dev Kit i.e.NodeMCU Development Board v1.0 (Version2), which usually comes in black colored PCB. NodeMCU Dev Kit has Arduino like Analog (i.e. A0) and Digital (D0-D8) pins on its board.

The Internet of things (IoT) is the inter-networking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. In 2013 the Global Standards.

Initiative on Internet of Things (IoT-GSI) defined the IoT as "the infrastructure of the information society. The IoT allows objects to be sensed or controlled remotely across existing network infrastructure creating opportunities for more direct integration of the physical world into computer-based systems, and results in improved efficiencyaccuracy and economic benefit in addition to reduced human intervention. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. Experts estimate that the IoT will consist of almost 50 billion objects by 2020.

A diode is an electronic component with two electrodes (connectors). It allows electricity

to go through it only in one direction. Diodes can be used to convert alternating current to direct current (Diode bridge).Today, the most common diodes are made from semiconductor materials such as silicon or sometimes germanium.

A light-emitting diode (LED) is a two-lead semiconductor light source. It is a p–n junction diode, which emits light when activated When a suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the color of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor. An LED is often small in area (less than 1 mm^2) and integrated optical components may be used to shape its radiation

LITERATURE REVIEW

*[1]*Yash Tekkamaki described "Large Screen Wireless Notice Display System" with an aim to increase the usability of electronic notice board, deals with wireless reception and display of message using Raspberry Pi. Practically, all output resolution is supported. This paper presents a way to incorporate messages in HTML script. It offersan edge over other notice boards because of features such as customizable font size, color and background color. The size of the screen, a major limitation of other methods, is overcome by this system.

*[2]*Dharmendra Kumar Sharma ,This paper describes the "Small and Medium Range Wireless Electronic Notice Board using Bluetooth and Zig Bee" introduces a low cost, handheld, wireless electronic notice board by using Atmel's ATmega32microcontroller and different wireless technologies (Bluetooth and ZigBee) and their performance analysis based on the parameter such as range, BER (bit error rate), RSSI (Received signal strength indicator), signal attenuation and power consumption. In this project a low cost, office/ industry usable, portable wireless notice board has been successfully developed. The graphical LCD displays transmitted character and its functionality satisfies all definitions of notice board.

*[3]*KruthikaSimha proposed "Electronic Notice Board with Multiple output display" aims at iterating the results of a project focused on developing a wireless electronic notice board, which offers the flexibility to control information display within a given range on multiple displays. The notice board will display information being transmitted to it from a central controlling unit, using a serial communication protocol.

*[4]*KruthikaSimha Shreya Chethan Kumar, Parinitha C and Shashidhar Tantry has developed a Display Message on Notice Board using GSM. This paper deals with an SMS based notice board incorporating the widely used GSM to facilitate the communication of displaying message on notice board via user's mobile phone. Its operation is based on microcontroller ATMEGA32 programmed in assembly language. ASIM300 GSM modem with a SIM card is interfaced to the ports of the microcontroller with the help of AT commands. When the user sends a SMS via a registered number from his mobile phone, it is received by Display Prof. KruthikaSimha Shreya SIM300 GSM modem at the receiver send. Electronic Notice Board with Multiple Output. In this paper simha, it can be easily integrated with general purpose display board to provide its mobility. The system accepts the message from of SMS and display on the notice board. Development of Simple and low-Cost Android Based Wireless Notice Board.

*[5]*Ravindra Joshi, Abhishek Gupta, Rani Borkar, SamitaGawas and Sarang Joshi. This paper describes the design and construction of Enotice board using GSM technology. The system consists of four basic units: GSM modem, Raspberry pi board, LCD monitor and Mobile device. The operation of the system is centred on Raspberrypi Board. The operation of

system is such that the notice which is to be displayed is send by the mobile device to the GSM modem and displayed on the LCD monitor using Raspberry Pi board. The system is based on real time process and saves lot of resources i.e., human effort. The main objective of this paper is to develop a wireless e-notice board that displays message sent from the user and to design a simple, easy to install, user friendly system, user friendly system. Wi-Fi provides higher data rates for multimedia access as compared to Bluetooth which provides lower data transfer rates. Bluetooth are intended for communication (about 10m), while Wi-Fi is designed for WLAN about 100m.But when using GSM, we cannot display message without Network connectivity.

*[6]*Savan Shah In this paper a project model for electronic notice board is described which uses two different technologies, GSM and Bluetooth for displaying on LCD screen. Here the main part is Microcontroller 8051. The microcontroller is interfaced with GSM Modem via MAX232 level convertor. It is used to convert RS232 voltage levels to TTL voltage level and vice versa. The hardware also has a 64K EEPROM. This EEPROM is used to store the timings and messages to be displayed. While using Bluetooth technology, Bluetooth modem fetch the message and sends it forward to the display board. When using GSM technology GSM Module is used.

*[7]*Neeraj Kheraproposed "Development of Simple and Low-Cost Android Based Wireless Notice Board". The proposed system uses either Bluetooth or Wi-Fi based wireless serial data communication in displaying messages on a remote digital notice board. In this the technological advancement of the notice board is proposed that will help in saving time and resources and making the information available instantly to the intended Person. The system is simple, low cost and easy to use that interacts with the intended users instantly. This system can be used in various applications like banking, schools, restaurants offices, hospitals, score boards for sports etc. The voice calling feature can be added with the proposed system as a further enhancement for using the system in railways, airport or bus stations.

II. METHODOLOGY:

To make the LED scrolling display more portable, a IoT based NODE MCU Wi- Fi Module is used instead of carrying keyboard or a host computer for generating or sending messages to LED display board. A text message is typed in the Android mobile phone and sent it by using Wi-Fi Internet service of the mobile phone to LED moving display boards. A Wi-Fi Module is connected to the LED display hardware is used to receive the Data (Message) andsend it to the controller circuit of the LED display. Then the controller circuit of the LED display filters the message content is used to display text in LED display dynamically. By using this IoT service it is possible to change the text in the LED display board from anywhere in the country. The idea implemented in this project reduces the total cost that is required in the traditional LED display boards not only it makes easier to send message to the LED display boards. A IoT Web Server such as Blynk or MQTT Server or Local Wi-Fi Server is used to send message from Android Mobile. Buzzer Module is connected with this System to generate a Audio Alert on new incoming message

The project uses a Wi-Fi module to Receive message from user using Internet service. Arduino UNO board is used process the data and drives the LED display board. Along with these a power supply unit and supporting hardware for microcontroller is used.Transformer or SMPS is used as a Primary source of this Notice Board. Bridge Rectifier is used to convert 12V AC to 12V Dc. Voltage Regulators & Filter Capacitors are used to produce regulated and constant DC Voltage.

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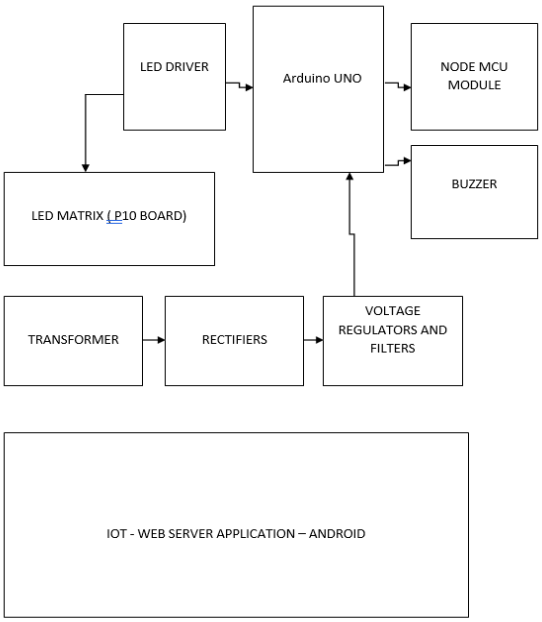
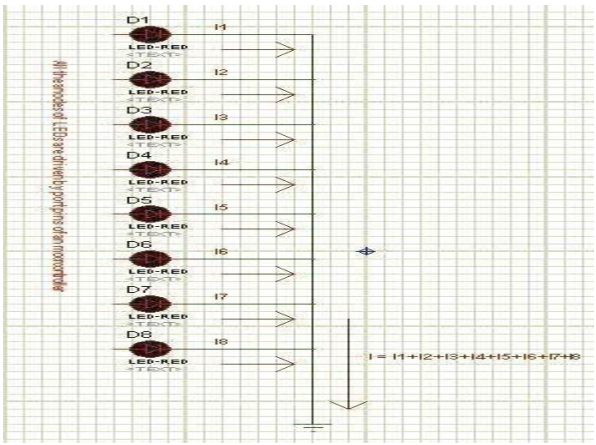


Block Diagram

In this project, miniature type of LED of Round Dome with 5mmsize is used to construct the LED display. LED interface circuit is important because the direct connection of an LED to a battery supply may destroy it. LEDs must have a limiting resistor in series to limit the current for safely operation as shown in figure.



Array of LEDs connected in common cathode

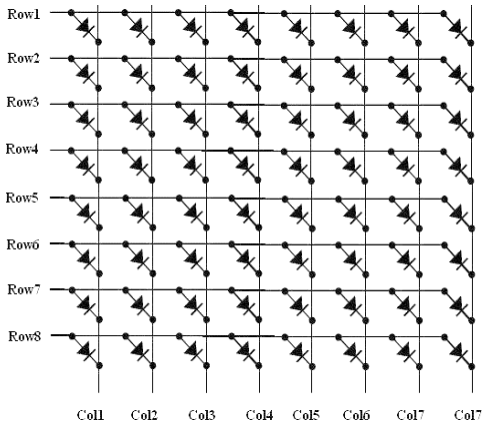
The LED dot matrix can be formed by connecting all the anodes of LEDs in a single row are joined together and all the cathodes of LEDs in a single column are joined together. Likewise, by connecting the remaining rows and columns, it is possible to form an LED dot matrix as shown in figure 4.6. In this project, a 24x16 matrix display is constructed to produce output.

For Eight LEDs,

Total Current (total) = 8 * 20mA = 160 mA.

But a shift register is capable to sink current of 20mA only. Any additional current flow through the shift register pins may burn out the IC. Hence we need a high current sinker which is capable to sink current greater than 160mA. The IC ULN2803 provides this feature which can sink current up to 500mA.

Driving circuit for an LED dot matrix is shown in the figure 4.6. In thisall the anodes of matrix are connected to a port of a microcontroller and the columnsare connected to a shift register (74LS164) via a large current sinker (ULN2803). The data and clock pins of the shift register are driven by microcontroller. In matrix display, a column contains eight LEDs which are connected in common cathode



Representation of 8x8 dot matrix

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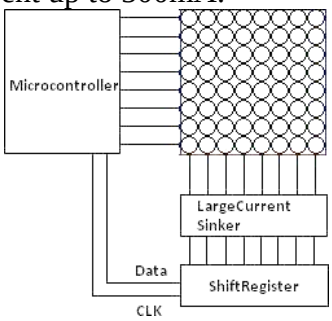
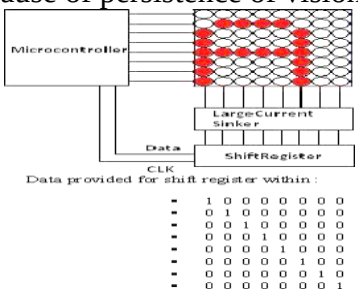


LED Matrix driving using microcontroller

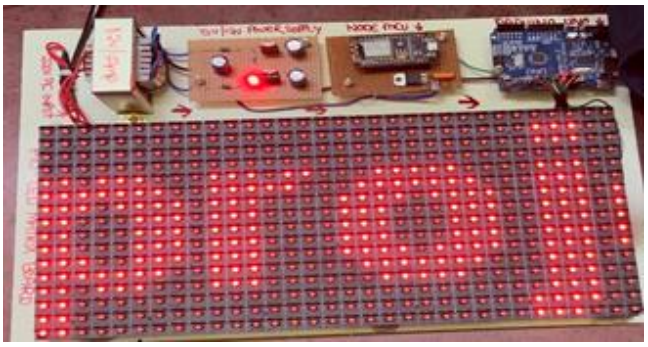
If the data sequence (01000000) is provided to shift register, then the next column LEDs will glow according to port data provided. Likewise next columns will drive one by one with corresponding sequence given to shift register.If we send the data sequence to the shift register with greater than 40Hz-50Hz (refresh rate), then human-eye will not find the flicker in the display, because of persistence of vision.



Illuminating LED Matrix using MCU and shift registers data

III. RESULTS

IoT-enabled LED advertising boards for e-circular notifications through Wi-Fi offer an innovative and effective way for businesses to communicate with their target audience in real-time. With benefits such as real-time updates, flexibility, cost-effectiveness, increased visibility, and remote management, these boards can be a valuable addition to a business's advertising strategy. However, careful planning and implementation are necessary to ensure optimal performance and security.



Working Model Results

IV. DISCUSSION / LIMITATIONS

The concept of a led advertising board involves using an Internet of Things (IoT) platform like Blynk to remotely control and display messages on a digital notice board.

LED advertising boards based on IoT (Internet of Things) for e-circular notifications through Wi-Fi are an exciting and innovative application of technology in the advertising industry. Let's discuss some key points related to this topic:

IoT-enabled LED Advertising Boards: These are advertising boards that are connected to the internet and can receive and display notifications or messages in real-time. They are typically equipped with LED (Light Emitting Diode) displays, which offer high visibility and flexibility in terms of displaying dynamic content.

Compatibility: Different IoT devices may use different communication protocols or standards, and they may not always be compatible with each other. This can limit the interoperability of smart notice boards, making it challenging to integrate them with existing systems or devices.

Connectivity: IoT devices require a reliable internet connection to function effectively. If there is an issue with internet connectivity, it may disrupt the functioning of the smart notice board, resulting in delays or inaccuracies in displaying information.

Considerations for Implementation: When implementing IoT-enabled LED advertising boards for e-circular notifications through Wi-Fi, businesses should consider factors such as the location of the boards, the quality and durability of the LED displays, the security of the Wi-Fi connection, and the content management system used for remote updates.

V. CONCLUSION

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 LEDdisplay. The main objective of the project is to develop a wireless notice board that displaysmessages sent from the user's mobile application. Thus, this project gives the easiest approach of sending and displaying information in important places like schools andcolleges.

When this system comes in real life, the message displaying scheme would be simpler than before. No need to have a centralized system for the architecture. A single person will be able to handle the entire system. Making this "LED scrolling boards using internet" should be able to portable for media messages makes this system more helpful.

Our system should able to be portable for media messages by extracting the text from them. Making this "LED scrolling boards using internet" should be able to portable for media messages makes this system more helpful.Our system should be able to be portable for media messages by extracting the text from them.Whatever output should always display text format.

We can upgrade this system to accept not only text, but also media messages. Receiving media in form of text, PDF format, a PNG image as input, extracting the text from the media and showing the relevant text in the display.

VI. REFERENCES

[1]. Neeraj Khera and Divya Shukla Development of simple and low-cost Android based wireless notice board IEEE 2016.

[2]. Aniket Pramanik, Rishikesh and Vikash Nagar GSM based Smart home And digital notice board IEEE 2016.

[3]. KruthikaSimha, Shreya and Chethan Kumar Electronic notice board with multiple output display IEEE 2017.

[4]. Dharmendra Kumar Sharma and Vineet Tiwari, Small and medium range wireless electronic notice board using Bluetooth and ZigBee IEEE

[5]. D Dalwadi, N Trivedi and A Kasundra (2011), Article in Nation conference on recent trends in engineering and technology, INDIA

[6]. XBee Series 2 OEM RF Modules Product Manual", Digi International, Inc., June 2007

[7]. E. Ferro and F.Potorti," Bluetooth and Wi-Fi wireless protocols a survey and a comparison", Wireless Communications, IEEE, vol. 12, no. 1, pp.12-26, February 2005.