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IOT based Digital Notice Board Using Pixel Led Display

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ABSTRACT: This project presents a digital notice board using WiFi module. The idea behind this project is to provide its users with a simple, fast and reliable way to put up important notices in an P10 Display where the user can send a message to be displayed in the P10 Display. The message can be sent through an android application designed in this project, through the WiFi module . So, notices can be put up in an P10 Display display from any location in the world. It uses a microcontroller for system control, WiFi based technology for communication and sends the message through the android application. The project consists of a Atmega328-8 bit AVR based microcontroller, WiFi module, an P10 Display, and an android application for user interface with the hardware. This device can be used anywhere irrespective of the place of deployment provided mobile network connectivity is available.

KEYWORDS: Android Application, Portable, Digital display board, P10 Display

I. INTRODUCTION

As technology improves, efficient, financially affordable and highly productive output becomes an absolute necessity, and this leads us to be more inclined towards using automated control systems. Human intervention, although it offers variety, adaptability and interactivity, could lead to errors, as it is a natural and inevitable result of this variability. Hence, automation of a system is an accepted means to minimize human error and its impact. Applying this to the situation under scrutiny now, the traditional methods of writing typing the notice on paper, and having a man/woman deliver the notice to the respective groups, or having him her paste the notice on the notice board, is prone to errors. The person delivering could deliver it to the wrong group, or tamper with the information being sent, etc. With the electronics industry moving at a fast pace, we are able to solve many such problems with digital replacements. Our project, Multi Electronic Notice Board, aims at eliminating the use of paper in offices, schools & colleges, and other institutions; also minimizing the risk of errors, by replacing project with P10 Display. In this project, a hardware capable of displaying notices electronically using an android application has been built. In order to display notices, a user can use the android application to type a notice and click on the send button to get it displayed. The functionality can be used only if WiFi module is connected to hot spot of the host. The hardware consists of an AVR based microcontroller Atmega328 that communicates to the application through a WiFi module to receive messages. Atmega328 itself retrieves message and sends signal to switchon/off a device or display a notice. The motivation behind such a project is mainly to reduce physical effort for operating appliances especially for aged people. Another reason for this project is overusage of paper in educational institutions for printing notices. Due to mushrooming paper usage day by day, lot of trees are being cut which is harmful for the environment. So, if notices are displayed everywhere electronically, it would reduce paper usage and make communication easier and faster. A GSM based system is exible, durable without any risk of getting hacked. Such a system has a low cost of installation and maintenance.

II. LITERATURE SURVEY

Literature survey is mainly carried out in order to analyze the background of the current project which helps to find out flaws in the existing system and guides on which unsolved problems we can work out. So, the following topics not only illustrate the background of the project but also uncover the problems and flaws which motivated to propose solutions and work on this project. GSM network is widely used today whether it is for calling or SMS. Also some of the places needs urgent notices like in college, railway stations share-market , and this notice

should be in real-time , so we need a real-time notice [1]. This project is our experiment to give a start to the era of real-time noticing. This project is about writing the message which is to be displayed in mobile and send it as SMS to other side. This received message is fetched into Microcontroller and after authentication it is displayed on LCD screen. Also by interfacing a voice data recording IC with Microcontroller we can also do announcements in real-time. This paper is designed using ARM-LPC2148 interfaced with Graphical Display. At present, when information has to be updated in a notice board, it has to bedone manually. Also in present electronic systems, no matter how many displays are present, only a single notice can be sent to all of the notice boards irrespective of their places. In order to overcome this disadvantage, multiple displays along with a decoder are used to select a particular display and the corresponding information is sent through an ARM controller by using GSM technology [2]. The entries can be documented and a record may be maintained for future use by using visual basic.

The controller has internal a real time clock used for synchronization of data. A resistive touch screen is used to access the previous notices and also progress details. The monitoring system consists of an image sensor which captures the images for the specified amount of time and the images can be transferred through an USB port to a PC for storage purposes. This paper is developed a GSM based notice board display using ARM7 controller along with LED array. The microcontrollers provide all the functionality of the display notices and wireless control. The Display is obtained on a 7X96 Light Emitting Diode (LED) dot matrix display. A desired text message from a mobile phone is sent via a Global System for Mobile Communication (GSM) to the GSM module located at the receiving end [3]. The GSM modem is connected, through MAX 232 Integrated Circuit (MAX 32IC), to the ARM7 microcontroller. The message that is stored in the Electrically Erasable Programmable Read Only Memory (EEPROM) is then displayed on the LED dot matrix display. This hardware uses regulated 5V, 500mA power supply. A three-terminal LM7805 is employed for regulation of the voltage. A bridge type full-wave rectifier is used to rectify the AC output of the secondary of 230/12V step down transformer. The system was tested to work according to specification.

III. OBJECTIVE STATEMENTS

Presently almost all electronic notice boards are designed using wired system. One of the drawbacks of the design is the system is inflexible in term of placement. The common notice board cannot be placed anywhere because of the messy wire. The aim of this project is to develop a digital notice board that will be used at the faculty in order to display latest information through WiFi module. The message can be send through android application.
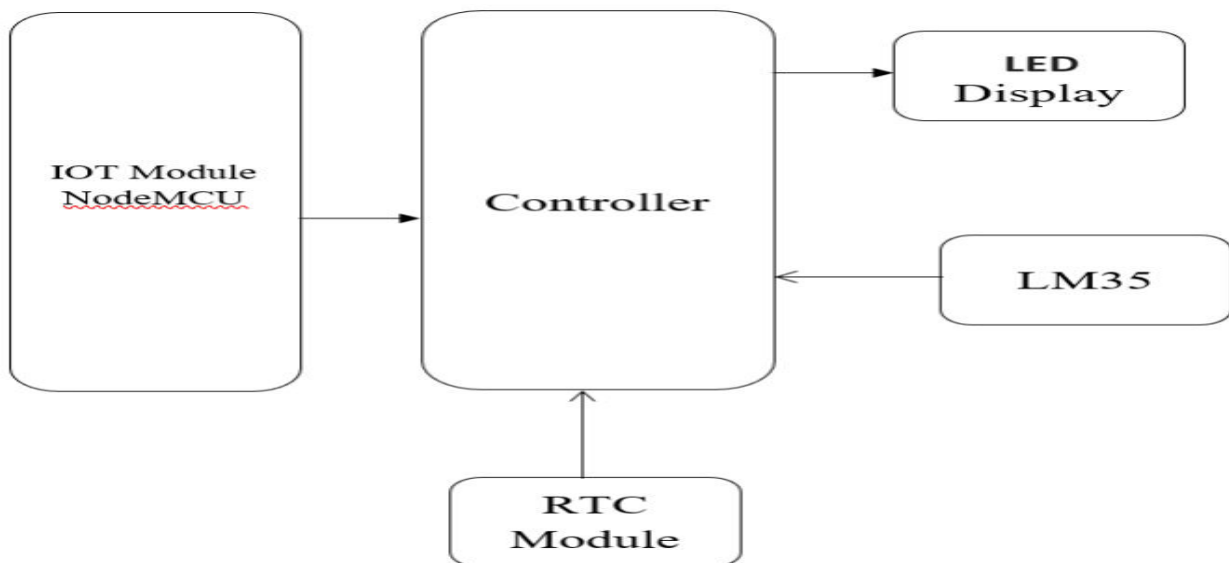
IV. SYSTEM DESIGN
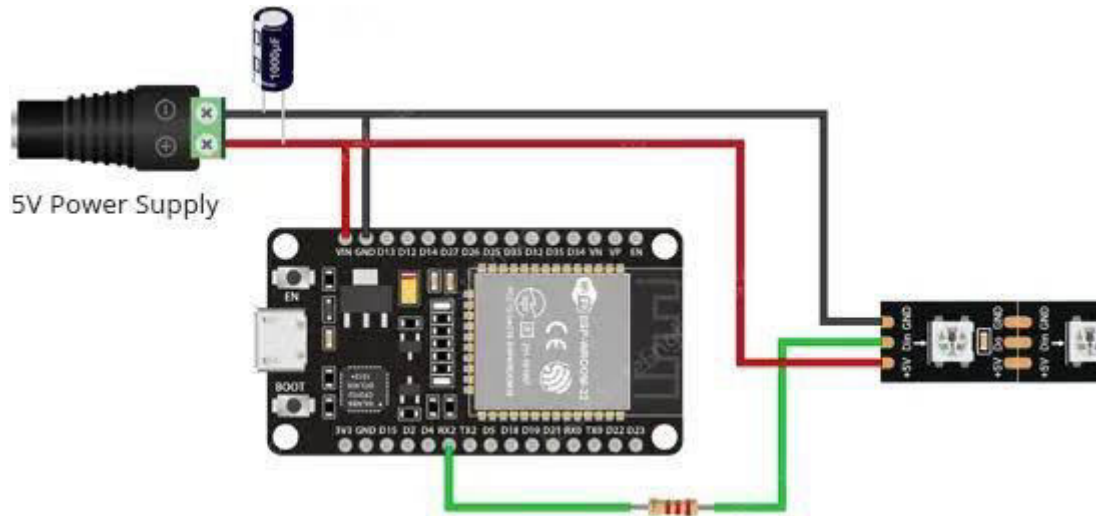

Figure 1. System Architecture

Figure 2: Circuit Diagram

V. RESULTS

1. Text Display:

Static and Scrolling Text: Successfully displayed both static and scrolling text messages. Users could select different fonts, sizes, and colors. Text was clear and legible from a distance. Multi-line Messages: The system supported multi-line messages, automatically adjusting the text to fit within the display area.

2. Image and Animation Display:

Image Rendering: The LED matrix could render simple images with reasonable clarity given the resolution. Images were processed to match the pixel grid. Animations: Basic animations, such as blinking and moving patterns, were implemented. These animations ran smoothly without noticeable lag.

3. Remote Updates:

Wi-Fi Connectivity: The ESP32 maintained a stable Wi-Fi connection and could receive updates from any device on the same network. Real-time Updates: Content changes were reflected on the display almost instantly after submission from the web interface. This enabled dynamic and flexible information dissemination.

4. User Interaction:

Ease of Use: The web interface was user-friendly and required no technical knowledge. Users could easily update content, making the system accessible to a wide audience. Customization: Users could customize messages and images with various formatting options, enhancing the utility and appeal of the notice board.
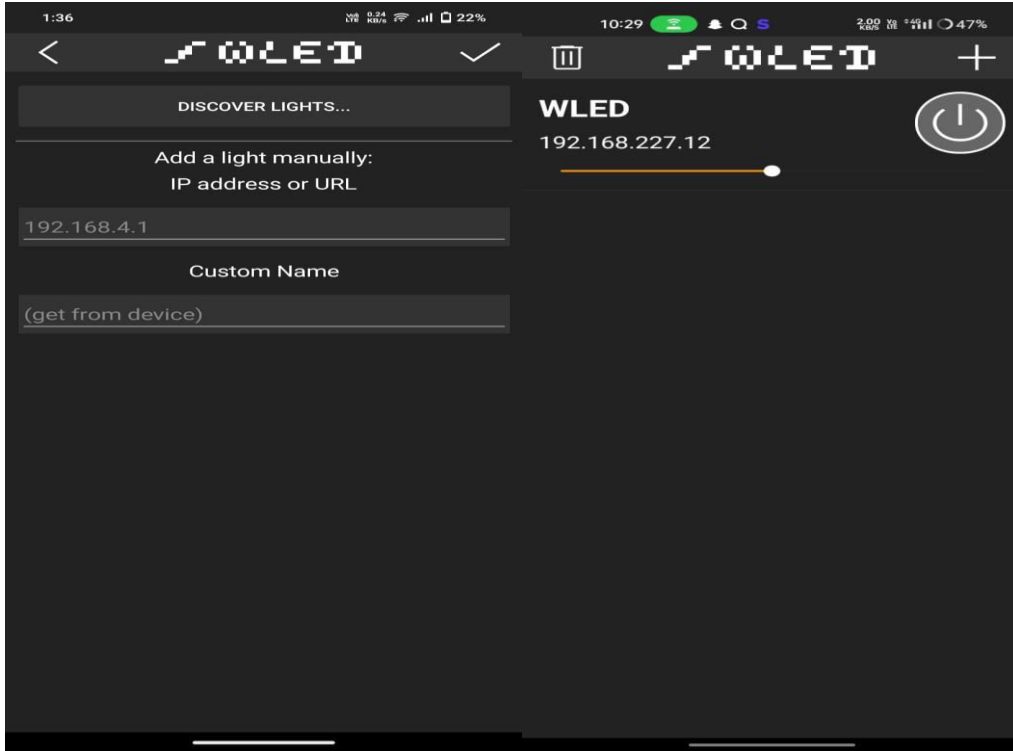
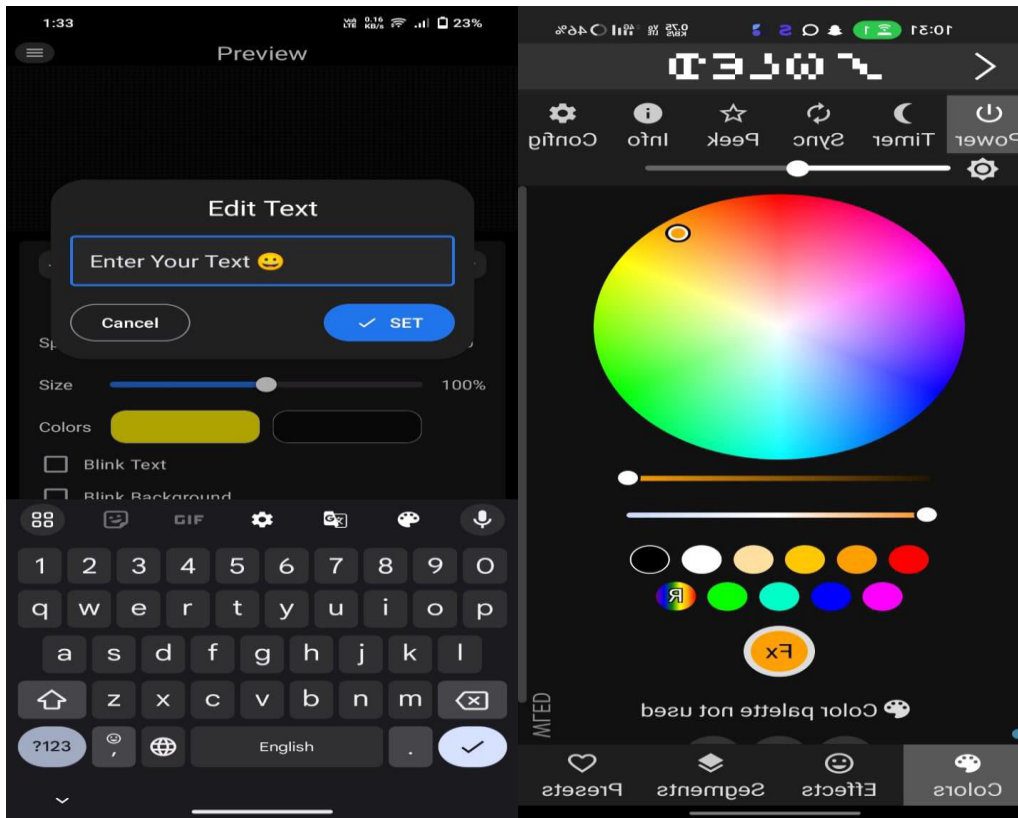Figure 3. App WIFI IP Connection   Figure 4. WIFI Reconnect Screen

Figure 5. Enter Message Screen   Figure 6. Color Picker Screen
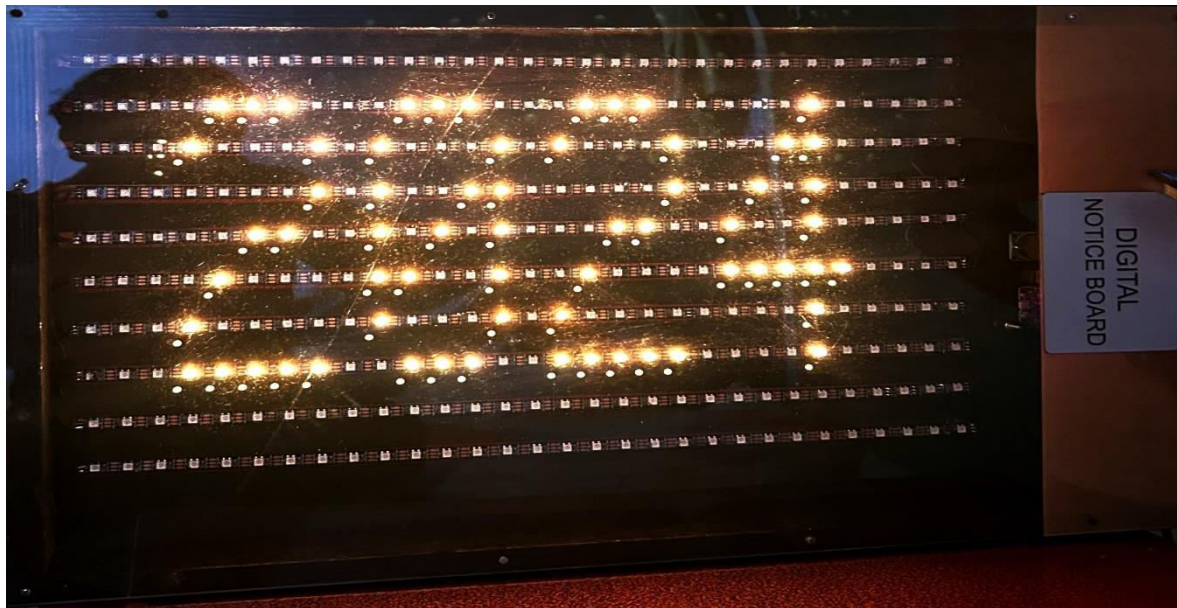
Figure 7. Pixel LED Screen

V. CONCLUSION

The prototype of the proposed WI-FI based electronic notice board was successfully designed. It can be easily integrated with all general-purpose display board thus proving its mobility. The message is transferred using wireless technology and is eventually obtained on the LED matrix. Thus we are using modern technology to replace conventional display boards the android app interface can make this system even more user friendly and popular. The system accepts the message from app to be displayed in the form of Short Message Service (SMS) stores it, checks for its validation and then displays it on the display unit if it meant for that particular display unit, it decided based on IP address. This system supports only one message at a time. The proposed system can be efficiently used for transfer of message instantly on campus. The WI-FI based smart electronic notice board is efficiently designed. the smart electronic notice board system accepts new SMS, store it and display it on LED panel. It reduces the overall development cost and also minimizes the complexity. Therefore, electronic notice board system becomes smarter, efficient, robust and portable.

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