

Real Time Led Scrolling Display with Wifi Connectivity

Mr. H. Raghunatha Rao¹, C. Gayathri Devi², M. Divya Sree³, G. Lakshmi Narayana⁴, M. Jabeen⁵
Assistant Professor¹, UG Student^{2, 3, 4, 5}, Department of Electronics & Communication Engineering,

Sai Rajeswari Institute of Technology, Proddatur, Andra Pradesh, 516360.

raghunathhanchate@gmail.com¹, chowdamgayathri27@gmail.com²,

diireddy9490@gmail.com³, lakshminarayanaguddeti0@gmail.com⁴, gurudavavarma@gmail.com⁵.

ABSTRACT

In this project, a web-based P10 Display system is developed using the ESP8266 micro controller to facilitate real-time text display and brightness control. The system enables users to send text input from a PC via web-based Python software or from a mobile device using MQTT based applications. The Node MCU, equipped with Wi-Fi capability, acts as the core micro controller, interfacing with the P10 display module to process data into a visual representation. The input is transmitted to an MQTT cloud server, from where the ESP8266 retrieves the data and updates the P10 Display accordingly. This approach provides a flexible and efficient method for remote content management and control of P10 Displays. The proposed system finds applications in digital signage, educational institutions, public areas, offices, smart advertisements, and interactive display solutions.

KEYWORDS-

ESP8266 Node MCU Controller, Arduino IDE, Buzzer, Python Flask MQTT Protocol, P10 Display.

I. INTRODUCTION

In recent years, the demand for remote and dynamic content management in P10 Display systems has significantly increased, particularly in applications such as digital signage, public information boards, and interactive display systems.

Traditional P10 Display systems require manual intervention for content updates, limiting their flexibility and real-time adaptability. To address this challenge, this paper presents a Web-Based P10 Display System utilizing the ESP8266 micro controller and MQTT (Message Queuing Telemetry Transport) protocol for seamless communication and control.

The proposed system enables users to send text inputs remotely using a web-based Python application on a PC or an MQTT based mobile application.

The data is first transmitted to the MQTT cloud server, from where it is retrieved by the ESP8266 micro controller and displayed on the LCD screen. Additionally, a gesture sensor is integrated to allow users to adjust the brightness of the P10 Display through hand gestures, enhancing the system's interactivity and usability.

II. PROBLEM STATEMENT

Traditional LED scrolling displays rely on manual content updates and limited control mechanisms, making them inefficient for applications requiring real-time information updates. These systems often use wired connections or pre-programmed content, restricting flexibility and requiring frequent manual intervention.

Additionally, the lack of remote access and leading to inefficiencies in advertising, public information systems, and event Display. To address these limitations, a Real time LED scrolling display with WIFI Connectivity is proposed, allowing users to remotely update content via a web interface using Wi-Fi connectivity, ensuring greater flexibility, efficiency, and ease of use.

III. METHODOLOGY

1. Requirement Analysis & Problem Identification: Identified limitations of traditional LED displays, such as manual updates and lack of remote access.
2. Hardware & Software Development: Used Node MCU as the micro controller and P10 LED Display for dynamic content display. Designed the web-based interface using HTML, CSS, and JavaScript.
3. System Integration & Testing: Connected and tested all components for real-time data transmission.

4. Deployment & Evaluation: Installed the system in a real-world setting and monitored usability, speed, and effectiveness. Collected feedback for future improvements, such as multi-display support and cloud integration.

IV. BLOCK DIAGRAM

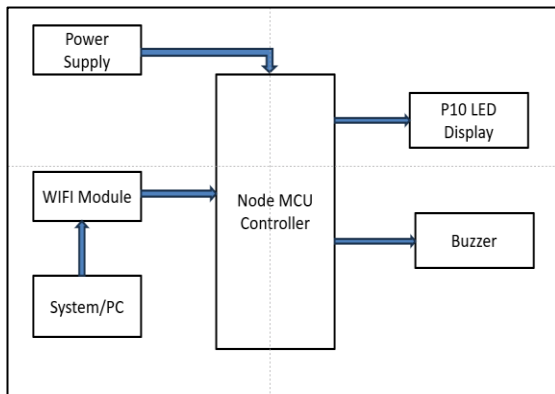


Fig: BLOCK DIAGRAM

V. COMPONENTS USED

1. NODE MCU CONTROLLER

The ESP8266 Node MCU is a low-cost, Wi-Fi-enabled micro controller widely used for IoT applications. It features an integrated Wi-Fi module, allowing seamless connectivity for remote data transmission and control. With built-in GPIO, ADC, and PWM pins, it supports various peripheral devices such as LED displays, sensors, and actuators.

In the project, the ESP8266 Node MCU acts as the central controller, handling communication between the web interface and the P10 LED display. It processes user inputs from the web page, updates the scrolling text or images in real time, and ensures Wi-Fi-based remote access.



Fig: ESP8266 NODE MCU

2. P10 DISPLAY

P10 LED display modules are widely used in digital signage and electronic message boards due to their high brightness, energy efficiency, and modular design. These displays are based on dot matrix LED technology and offer a cost-effective solution for real-time information display applications.

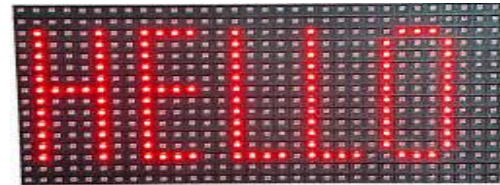


Fig: P10 DISPLAY

3. WIFI MODULE

Although integrated within the ESP32, the Wi-Fi functionality is crucial for establishing communication between the landslide monitoring system and a centralized web server. Through Wi-Fi, the system transmits real-time data and alert notifications via HTTP requests, facilitating remote monitoring and timely intervention.

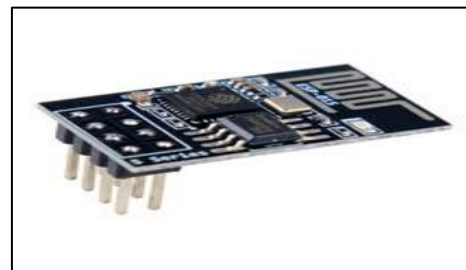


Fig: WIFI MODULE

4. ARDUINO IDE SOFTWARE

Arduino is a model stage (open-source) in perspective of an easy to-use gear and programming.

It includes a circuit board, which can be tweaked (suggested as a microcontroller) and a moment programming called Arduino IDE (Integrated Development Environment), which is used to make and exchange the PC code to the physical board.

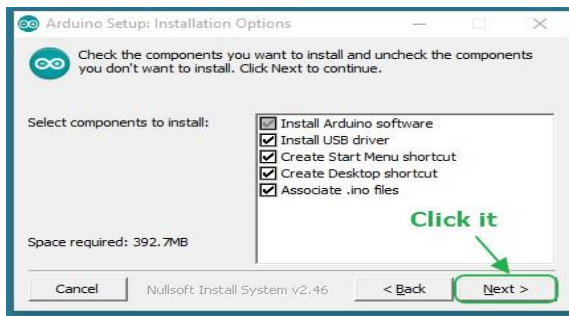


Fig: ARDUINO INSTALLATION SETUP

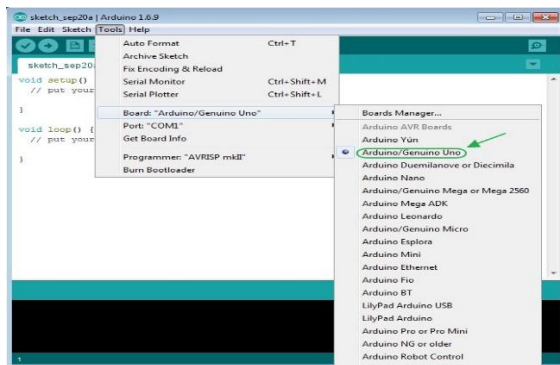


Fig: PATH TO SELECT BOARD



Fig: TOOLS IN ARDUINO INTERFACE SOFTWARE

RESULT :-



Fig: WEB BASED DISPLAY WITH WIFI CONNECTIVITY

CONCLUSION :-

The Web Controlled LED scrolling display system offers a unique and innovative approach for dynamic communication. While there are some limitations, such as dependency on WIFI and display resolution. Future enhancements could include improving gesture control, optimizing power management and integrating additional sensors for further interaction.

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