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IOT Based Performance Display System using ESP32: Design and Development

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Abstract

This paper is presenting the design and development of an IOT based performance display system using ESP32 (ESP) chip. The TFT LCD device can display several remote access parameters utilizes for various purposes like Instrumentation, Observations and Analysis. As usual it is a combination of Hardware and Software interface. Hardware comprises of ESP32 WROOM Chip microcontrollers with integrated Wi-Fi, ATMEGA 328 Chip, Remote Controller, TFT LCD Display along with necessary power supply. A firmware was developed in-house. A specific web page which is hosted by the ESP itself and the page is designed using a HTML form and CSS.ESP WROOM with SSID was configured using an available Wi-Fi. The webpage phrase the data to ESP using the GET Method. ESP process necessary data and saved it in the EEPROM. It restart, configure itself accordingly in station mode and started looking for the SSID saved in the EEPROM. The local network connected to ESP and configure the port accordingly. In absence of the required data ESP configure itself in Access Point mode and start hosting the web page again for the correct configuration. Now ESP fetch the require data as desired from the require server. NTP server was utilized as a test case. ESP fetch the Date, Time, and Week Days accordingly from NTP server, stored in the local variables according to the internet region and display it. System automatically generate a clock offline mode up to 1500 hours without any turnoff. The entire display system used for laboratory purposes indicating the occupancy of a particular facility (Like: Radiation Generating Facility etc.) controlling by Mobile Application or Remote Control. Receiving data from Remote Control, ATMEGA328 fetch the data to ESP and simultaneously it save the data in server and display the status in the LCD panel. Otherwise ESP directly receive the data from Mobile Application and display it accordingly as configured. The performance displaying system is successfully demonstrating the desired fetched parameters for industries and laboratories. It can be used in different industrial areas for remote accessing of vital parameters equipped with various sensing components. Such devices can also have a huge applications in Medical, Instrumentation, SOS alarming and Research field.