IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 8, June 2025
Impact Factor: 7.67

ESP8266-Based Smart Room Decoration System Using Addressable LEDs

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Abstract: *With the rise of smart homes, ambient lighting has become a vital element in enhancing the atmosphere and user interaction experience. This paper introduces a firmware-based IoT solution for smart room decoration using addressable RGB LEDs controlled by an ESP8266 microcontroller. The system offers features such as customizable color themes, support for multiple LED types (WS2812, SK6812, etc.), a Wi-Fi-based web application for interactive control, and robust API support for automation. The user-friendly interface hosted on a local web server allows seamless switching between access point (hotspot) mode and home Wi-Fi. The primary aim of this project is to create an affordable, customizable, and extensible LED control system that integrates modern IoT practices with aesthetic lighting.*

Keywords: ESP8266 microcontroller

DOI: 10.48175/IJARSCT-28190