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 9, May 2025
Impact Factor: 7.67

An ESP32-Based IoT Architecture for Smart Home Automation with Manual and Voice Control

Aher Ganesh Bhausaheb[1], Malik Yogesh Navnath[2], Ghegade Omkar Shamrao[3], Ghule Rutik Balasaheb[4], Prof. Waghule M. N.[5]

[1,2,3,4,5]Department of Electronics & Telecommunication Engineering
Adsul Technical Campus, Chas, Ahilyanagar, MH

Abstract: *This paper presents the design and implementation of an integrated smart home automation system leveraging the ESP32 microcontroller in conjunction with the ESP Rainmaker platform and voice assistant technologies. The proposed system enables seamless control of home appliances through multiple interfaces, including Amazon Alexa, Google Assistant, and a manual switch mode, ensuring both convenience and accessibility. By utilizing the ESP32's built-in Wi-Fi capabilities, the system offers real-time remote monitoring and control via cloud connectivity without the need for an external server. The integration with voice assistants allows users to operate devices through natural language commands, enhancing user interaction and comfort. Additionally, a manual override option ensures continued usability during network failures, promoting system reliability. The architecture is scalable, cost-effective, and energy-efficient, making it suitable for deployment in modern smart homes. Experimental results demonstrate low latency, high responsiveness, and stable performance, affirming the system's potential as a practical solution for multi-modal home automation.*

Keywords: IoT, Fuel Theft Detection, Vehicle Tracking, Real-Time Monitoring, ESP32

DOI: 10.48175/568