Abstract This project implements a WiFi-based smart home system using an ESP32 microcontroller. The system integrates motion, temperature, humidity, and light sensors to automate a relay and servo mechanism and sends alerts via Pushover app when motion is detected in Away mode. A web interface allows toggling between Home and Away modes. The system prioritizes real-time motion detection using FreeRTOS task scheduling.

1. Introduction Smart home systems improve security and energy efficiency by automating device control and providing remote notifications. This work focuses on a compact implementation using ESP32 and commonly availab sensors, emphasizing responsiveness and minimal false alerts.

2. System Architecture and Hardware 2.1 System Architecture