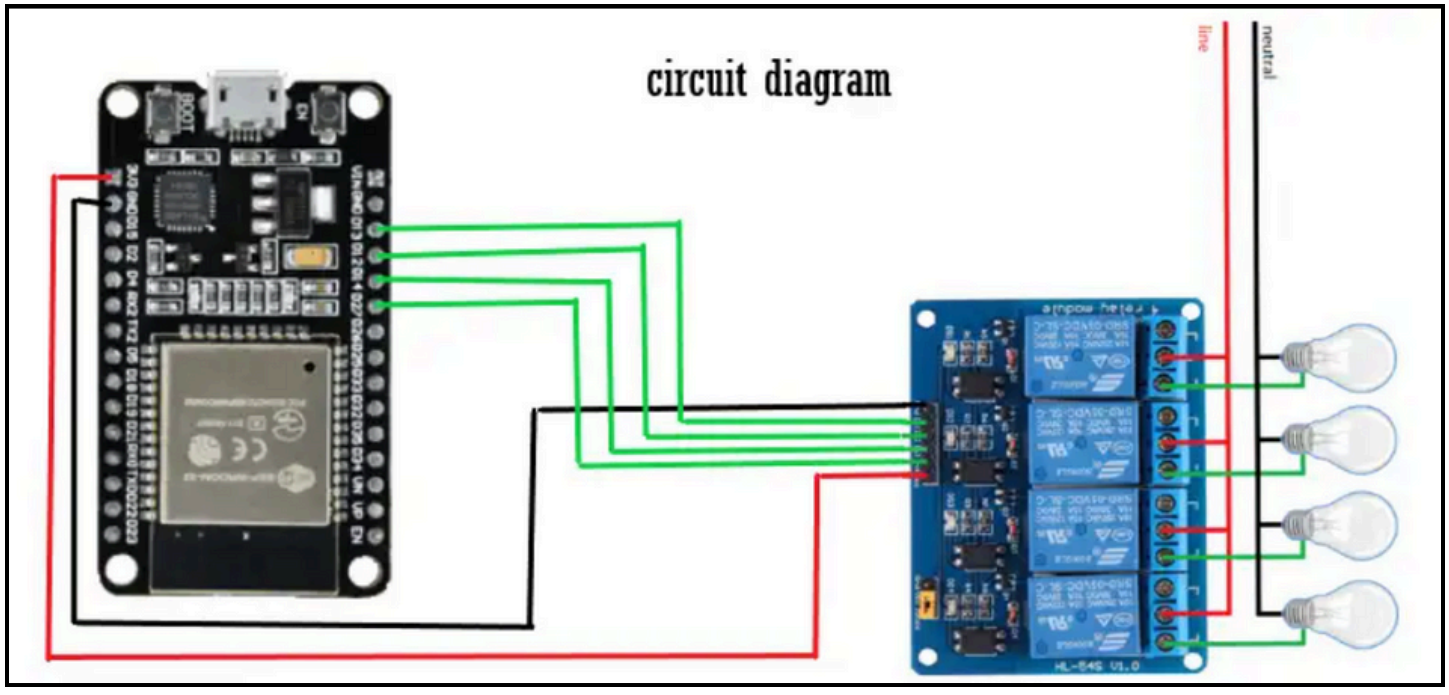
IoT-Based Remote Home Automation System using ESP32

Abstract:

This project presents the development of an IoT-based home automation system that enables remote control of electrical appliances using cloud technology. Leveraging the Arduino IoT Cloud platform, this system allows users to manage appliances via a mobile app or web interface, providing real-time control and feedback. The core functionality includes controlling relays, which act as switches for various household devices, making it possible to monitor and toggle their states remotely. This system enhances convenience and energy management in modern homes by offering accessible, reliable, and secure automation solutions.

Circuit Diagram:



Circuit Description:

The circuit for this home automation system centers around an ESP32 microcontroller, which connects to the Arduino IoT Cloud. Relays are used to control appliances, wired through the ESP32's GPIO pins, and are managed by digital signals based on the user's input from the cloud platform. The ESP32 communicates wirelessly with the cloud, receiving commands and updating appliance states accordingly. Each relay is connected to a load device, enabling or disabling power to that device upon activation. This setup provides a straightforward yet powerful mechanism for controlling multiple devices remotely with minimal energy consumption.

Result:

The IoT-based home automation system successfully enables remote control of household appliances via the Arduino IoT Cloud, with real-time status updates and reliable relay operation.