

IoT Based Wall Socket Outlet with Power Monitoring and Safety Features

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This project introduces an *IoT*-Based Wall Socket Outlet with Power Monitoring and Safety Features, designed to enhance energy efficiency and safety in electrical systems. The system employs a smart wall socket outlet integrated with a *ESP32 microcontroller*, enabling real-time power consumption monitoring and demand-supply analysis. The accompanying mobile application, developed using Visual Studio with JavaScript through Expo React Native, offers users a streamlined interface for remote control and monitoring. Key features include home management, switch selection, real-time data updates, and graphical representation. Leveraging Firebase, the application ensures secure and seamless communication with the *ESP32*, facilitating immediate response and control. The project's methodology encompasses systematic design and implementation, with progress documented in regular reports. Challenges are addressed, and solutions are applied to achieve a robust integration of the *IoT*-based power monitoring system. The project not only addresses traditional power management challenges but also introduces demand cutoff for enhanced safety and energy conservation. In conclusion, this project signifies a pioneering approach to power management, with future work focused on application optimization, additional safety features, and integration with broader smart home systems.

Keywords: *IoT; Demand management; Smart wall socket; Power monitoring*