

# **Designing a Smart Voltage and Current Monitoring System For a Single-Phase Inverter Using an Android Smartphone Application**

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## **Abstract:**

This Project presents a new smart voltage and current monitoring system technique. It monitors a single-phase electrical system using an Arduino platform as a microcontroller to read the voltage and current from sensors and then wirelessly send the measured data to monitor the results using a new Android application. The mobile software application developed for the implementation of a smart voltage and current monitoring system for single-phase electrical systems. The system uses an Arduino platform as a microcontroller to gather voltage and current data from sensors, which is wirelessly transmitted to an Android smartphone application. The mobile application is created using the open-source MIT App Inventor 2 software and serves as a comprehensive monitoring tool for fundamental voltage power quality properties while providing control over power usage through the ability to switch home appliances on and off. The software was found to facilitate real-time monitoring of voltage and current levels within a single-phase electrical system. The Arduino microcontroller was found to collect data from the sensors and wirelessly transmit it to the Android smartphone application. This enables users to conveniently access and analyze crucial power quality information on their mobile devices. The Android application offers a user-friendly interface that displays essential voltage power quality parameters, such as voltage magnitude, current intensity, and power factor. Users can monitor these elementary fundamental properties in real-time, enabling them to identify irregularities or fluctuations in power supply. Additionally, the application provides the ability to switch home appliances on and off remotely, effectively controlling power usage and optimizing energy efficiency. The combination of the Arduino microcontroller and the Android application was found to allow for seamless integration of hardware and software, providing users with an efficient and accessible solution for monitoring and controlling single-phase electrical systems. The open-source nature of the software allows for customization and further development to meet specific user requirements. This mobile software application was found to offer a practical solution for individuals seeking to monitor voltage power quality properties and effectively manage power consumption in their homes. By leveraging the capabilities of the Arduino platform and the convenience of mobile devices, users can ensure the optimal performance of their electrical systems while promoting energy efficiency and reducing electricity costs.

**Key words:** Smart Voltage, Current Monitoring System, Single-Phase Inverter, Android Smartphone

