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Implementation and Analysis of Photovoltaic Microgrid Monitoring by using WLAN and LoRaWAN

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Abstract: *This project implemented and analyzed a photovoltaic microgrid monitoring system utilizing LoraWAN and WLAN communication protocols. A Raspberry Pi Pico microcontroller was employed for data acquisition, successfully measuring key parameters including voltage, current, temperature, humidity, and light intensity of the photovoltaic microgrid. The implementation aligns with the increasing need for effective monitoring of solar PV systems, as highlighted in the sources for performance evaluation, fault detection, and optimization of energy generation. The use of LoraWAN was explored for its potential in long-range, low-power communication, while WLAN provided a means for potentially higher bandwidth data transmission and remote access to the monitoring data. By collecting and analyzing these parameters, the project contributes to a better understanding of photovoltaic microgrid operation, in line with the broader applications of IOT in renewable energy management.*

Keywords: LoRaWAN, WLAN, Raspberry Pi Pico, Data Acquisition, Sensors, Photovoltaic Microgrid

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