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# Solar Module Monitoring and Data Logging System Storing Data Locally and Remotely Over LoRa

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**Abstract:** *The Solar Module Monitoring and Data Logging System is designed to enhance the efficiency, reliability, and maintainability of solar power installations by providing real-time monitoring and data management capabilities. The system continuously measures key parameters such as voltage, current, power output, temperature, and irradiance from solar panels using appropriate sensors. The collected data is processed by a microcontroller and stored locally on an SD card for backup and offline analysis. Simultaneously, data is transmitted remotely over a LoRa (Long Range) communication network, enabling low-power, long-distance wireless communication between remote solar modules and a central monitoring station. This dual-storage approach ensures data redundancy and accessibility even in the absence of internet connectivity. The remotely received data is visualized on a monitoring dashboard or cloud platform for performance evaluation, fault detection, and predictive maintenance. This system offers a cost-effective, scalable, and energy-efficient solution for smart solar farms and distributed photovoltaic systems, contributing to sustainable and data-driven energy management.*

**Keywords**: Renewable Energy, Solar Array, PV, Monitoring System, Lora, Battery, Operating Conditions and Modes etc


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