

Intelligent Platform for Photovoltaic Park Operation and Maintenance

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Abstract : A main challenge in the quest for ensuring quality of operation, especially for photovoltaic (PV) systems, is to safeguard the reliability and optimal performance by detecting and diagnosing potential failures and performance losses at early stages or before the occurrence through real-time monitoring, supervision, fault detection, and predictive maintenance. The purpose of this work is to present the functionalities and results related to the development and validation of a software platform for PV assets diagnosis and maintenance. The platform brings together proprietary hardware sensors and software algorithms to enable the early detection and prediction of the most common and critical faults in PV systems. It was validated using field measurements from operating PV systems. The results showed the effectiveness of the platform for detecting faults and losses (e.g., inverter failures, string disconnections, and potential induced degradation) at early stages, forecasting PV power production while also providing recommendations for maintenance actions. Increased PV energy yield production and revenue can be thus achieved while also minimizing operation and maintenance (O&M) costs.

Keywords : failure detection and prediction, operation and maintenance, performance monitoring, photovoltaic, platform, recommendations, predictive maintenance

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