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(57) Abstract :

ANOMALY IDENTIFICATION AND PREDICTIVE FAULT ANALYSIS FOR SOLAR ENERGY SYSTEMS USING IOT AND DEEP LEARNING The present invention provides a development of an advanced framework for anomaly detection and predictive fault analysis in solar energy systems employing Internet of Things (IoT) and deep learning methodologies. The integration of IoT devices enables real-time surveillance of solar panels and related components, gathering essential data such as voltage, current, temperature, and irradiance. By utilizing deep learning models, the framework identifies anomalies with high accuracy, differentiating normal operational variations from potential failures. Predictive fault analysis further anticipates equipment malfunctions prior to occurrence, enabling proactive maintenance and minimizing downtime. Experimental results illustrate the framework's effectiveness in augmenting the reliability and efficiency of solar energy systems. This approach not only supports sustainable energy generation but also reduces operational costs through timely interventions. The study underscores the transformative potential of integrating IoT and deep learning in renewable energy management, fostering smarter and more resilient solar power infrastructures. FIG.1
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