

IOT-Based Solar Panel Cleaning and Monitoring System

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Abstract: This paper presents an “IoT-based system for cleaning and monitoring solar panels” to maintain their optimal performance. Dust and debris accumulation reduces the efficiency of solar panels. The proposed system uses sensors to detect soiling and environmental conditions such as sunlight intensity, temperature, and humidity. When soiling exceeds a threshold, a water pump is activated automatically to clean the panel. The system is based on a microcontroller integrated with ESP8266 Wi-Fi for real-time data monitoring. The collected data is sent to a cloud platform for performance tracking. This system minimizes human intervention, reduces maintenance cost, and improves solar energy output..

Keywords: Solar Panel, IoT, Cleaning Mechanism, Microcontroller, Sensors, Efficiency, ESP8266, Automation

