

Method And System For Monitoring Health Of Solar Photovoltaic Modules

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ABSTRACT

A method (800) and system (200) for monitoring health of solar photovoltaic (PV) modules (110) is disclosed. A processor (204) receives an electroluminescence (EL) image of each of a plurality of solar PV modules (110) using an EL imaging device (106) coupled to an aerial vehicle (102). A visual image of each of the plurality of solar PV modules (110) is received using a visual imaging device (108) coupled to the aerial vehicle. The EL image and the visual image of each of the plurality of solar PV modules (110) are processed to identify a range of defects using a machine learning model. A severity and a location of each of the range of identified defects are determined based on correlating the internal defects and the external defects of each of the solar PV modules. A report is generated based on the determination of the severity and the location of each of the range of identified defects.

KEY APPLICATION AREAS

1. Solar Power Plants & Solar Farms.
2. Solar PV Asset Management.
3. Renewable Energy Operations & Maintenance (O&M).
4. Drone-Based Infrastructure Inspection.
5. AI-Powered Predictive Maintenance.
6. Utility-Scale and Rooftop Solar Monitoring.

POTENTIAL USE

1. Automated inspection of solar PV modules using drones.
2. Detection of internal defects such as micro-cracks, cell fractures, PID, LID, and interconnect failures.
3. Detection of external defects such as soiling, shading, discoloration, delamination, and glass breakage.
4. Health assessment and performance monitoring of large solar installations.
5. Generation of maintenance reports with defect location and severity analysis.
6. Predictive maintenance to reduce downtime and improve energy output.