UAV detection of photovoltaic panels

Compared to the more common UAV-based surveys, inspections by aircraft may present an attractive alternative for monitoring large PV plants or numerous plants located ...

Previous reviews have paid more attention to the technical issues within the solar PV system development: Livera et al. [3] have reviewed methods applied to fault detection and diagnosis in PV systems based on machine learning and statistical analysis; Gassar and Cha [4] have reviewed and discussed the studies of rooftop solar PV potential estimation; Melius et al. ...

Photovoltaic panels exposed to harsh environments such as mountains and deserts (e.g., the Gobi desert) for a long time are prone to hot-spot failures, which can affect power generation efficiency and even cause fires. The existing hot-spot fault detection methods of photovoltaic panels cannot adequately complete the real-time detection task; hence, a detection model ...

This dataset contains unmanned aerial vehicle (UAV) imagery (a.k.a. drone imagery) and annotations of solar panel locations captured from controlled flights at various ...

The unmanned aerial vehicle (UAV) equipped with infrared thermal imager inspects the solar panel group overhead, getting infrared images of the photovoltaic plate area. The limitation of the infrared thermal imager, the flight height of UAV and other factors will result in the low-resolution photos which are hard for the human view.

Accurate classification and detection of hot spots of photovoltaic (PV) panels can help guide operation and maintenance decisions, improve the power generation efficiency of the PV system, and ...

In light of the continuous and rapid increase in reliance on solar energy as a suitable alternative to the conventional energy produced by fuel, maintenance becomes an inevitable matter for both ...

The preliminary results show that Unmanned Aerial Vehicle (UAV) cooperation in Photovoltaic (PV) systems monitoring was effective to detect degradation and defects on Photovoltaic (PV) modules and ...

6 · The landscape of defect detection in PV systems has evolved significantly with the advent of advanced machine learning (ML) and image processing techniques. ... X., et al.: ...

model is more suitable to be deployed on the UAV platform for real-time photovoltaic panel hot-spot fault detection. Keywords: photovoltaic panels; hot spot; failure detection; neural network 1. Introduction In July 2021, SolarPower Europe issued The ...

photovoltaic (PV) systems. Towards this goal, this paper presents a UAV-enabled, AI-powered framework to automate solar energy asset monitor ing and fault detection . First, a n experimental testbed has been set up at the Energy Lab at Rutgers University - New Brunswick, wherein a UAV is flown over an operational PV system to collect real-

This paper aims to design and fabricate a prototype of a solar-powered, fixed-wing, Unmanned Aerial Vehicle (UAV) with energy harvesting capabilities that can inspect and ...

SOLAR PANEL DEFECTS DETECTION. PV defects are described as components of the photovoltaic system that aren"t perfect or up-to-par. A PV defect is different from a PV failure since it doesn"t result in safety hazards or ...

In order to cooperate with the current UAV platform for photovoltaic panel anomaly detection, this paper proposes a photovoltaic infrared target anomaly detection system. In this paper, the Sobel operator is used to extract the photovoltaic slab area of the image, and the canny operator is used to obtain the photovoltaic small plate area to realize the ...

DL-based detection of an unmanned aerial vehicle (UA V) has been studied, where Y ou only look once (YOLOv3) has. ... Two approaches to the solar panel detection model were adopted: Approach 1 and ...

Solar energy has received great interest in recent years, for electric power generation. Furthermore, photovoltaic (PV) systems have been widely spread over the world because of the technological advances in this field. However, these PV systems need accurate monitoring and periodic follow-up in order to achieve and optimize their performance. The PV ...

First, photovoltaic module images are collected by UAV equipped with infrared thermal imaging cameras. Next, the collected PV module defects are labeled. Finally, the improved Faster R ...

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The dataset of 2,542 annotated solar panels may be used independently to develop detection models uniquely applicable to satellite imagery or in conjunction with existing solar panel aerial ...

Solar energy is the fastest-growing clean and sustainable energy source, outperforming other forms of energy generation. Usually, solar panels are low maintenance and do not require permanent service. However, plenty of problems can result in a production loss of up to ~20% since a failed panel will impact the generation of a whole array. High-quality and ...

Partial infrared photovoltaic image dataset. (a) The UAV took photos along the horizontal direction of the photovoltaic panel. (b) The UAV took photos along the tilt angle of the photovoltaic panel.

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PDF | In recent years, solar energy has been regarded as one of the most important sustainable energy sources. ... primarily based on the fault detection methods employed to analyze the UAV ...

Energy generation employing solar energy has a key role in the expansion and utilization of renewable energies. Photovoltaic (PV) solar industry is a fast-growing market, expected to reach 130 GW of average annual solar PV capacity, and concentrating 60% of the new renewable energy development [1].This growth is because of the increment of PV cell ...

An overview of the proposed computer vision algorithm for the automatic solar panel detection in high-resolution UAV images. The initial step has its basis in the Canny edge ...

Solar photovoltaic (PV) energy has gained significant attention and has undergone rapid global development in the past decade. The deployment of PV technology has expanded quickly, including both ...

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