

SOLAR PANEL HOTSPOT DETECTION WITH OPENCV

Tech Mahindra's computer vision (CV) based solution helps to detect hotspots on thermal images of solar panels automatically.

Companies that offer diversified services within the renewable energy and clean tech space have been looking for a solution to detect hotspots automatically using an artificial intelligence (AI) framework in order to improve accuracy and efficiency.

- Hotspots are bright spots visible on thermal images of solar panels, which create inconsistent temperature output
- Hotspots in thermal panels result in decreased throughput and thus reduce efficiency
- Solution developed aims to minimize the manual effort of identifying the huge volume of defective thermal panels

OUR SOLUTION

Tech Mahindra's solar panel hotspot detection solution has been developed to process thermal camera images and thus enhance accuracy and efficiency. Deep knowledge of machine learning and image processing is required to build a stable and scalable hotspot detection system in solar panels.

Features of the Solution

This solution encapsulates the existing processes of hotspot identification along with the solar panel metadata repository.

- Implementation of end-to-end process automation
- OpenCV and thresholding techniques are used to find out a variation in pixel intensity
- Distinguishes the difference between hotspots within solar panels as well as spots outside the panels
- Hough-lines are used to detect solar panels accurately from the cluster of solar panels and other background images

Solution Technology

- OpenCV
- Python

KEY CHALLENGES

- Inability of existing methods to differentiate the hotspot threshold to detect correctly when the temperature of the panel and its surrounding temperature are equal, especially during humid conditions
- Lack of accurate image processing leads to errors in hotspot identification
- Understanding and processing images to be in line with the algorithms to be used is a challenging task

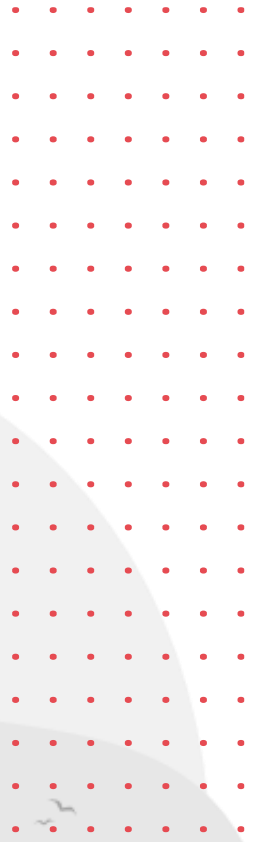
BENEFITS

The manual validation process is replaced by an AI-powered system, which reduces the chances of errors due to human involvement.

- High volume and variety of images could be explored with less effort and time
- Decision making is made faster by CV solution resulting in enhanced accuracy and efficiency
- Reduction of search time for hotspot detection
- Lower maintenance cost

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