

APPLICATION NOTE

Solar Panel Inspection



CHALLENGES IN AUTOMATED INSPECTION OF ELECTROLUMINESCENCE (EL) IMAGES

- Large variations in luminescence between cells or modules are to be expected and tolerated.
- Some defects like micro-cracks or contact-forming errors can be very subtle and difficult to discern from a strong and highly irregular background texture.
- There is a multitude of very different defect types which makes it impossible to develop a simple yet robust algorithm to detect all of them.

ViDi SUITE

Deep learning based industrial image analysis software for automated inspection and classification

Human-like: Outperforms the best quality inspectors

Self-Learning: No software development required

Powerful: Tackles the impossible to program inspection challenges

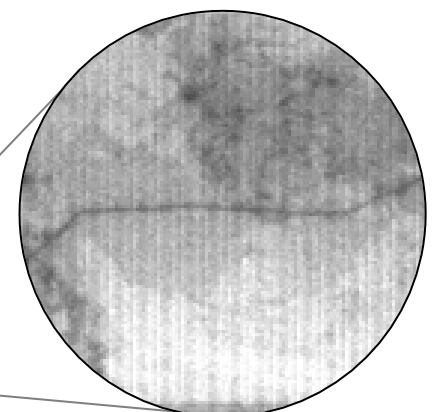
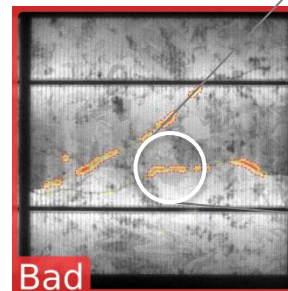
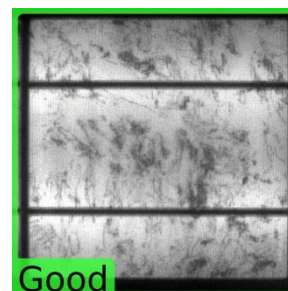
HOW DOES IT WORK?

It is as simple as 1-2-3:

- 1- Collect images of the different defects types as well as defect free samples
- 2- Let ViDi Suite train on those samples to create its reference model
- 3- Proceed with testing

With ViDi Suite and the ViDi red tool in supervised mode, the automated analysis of EL images of photovoltaic modules is now extremely simple.

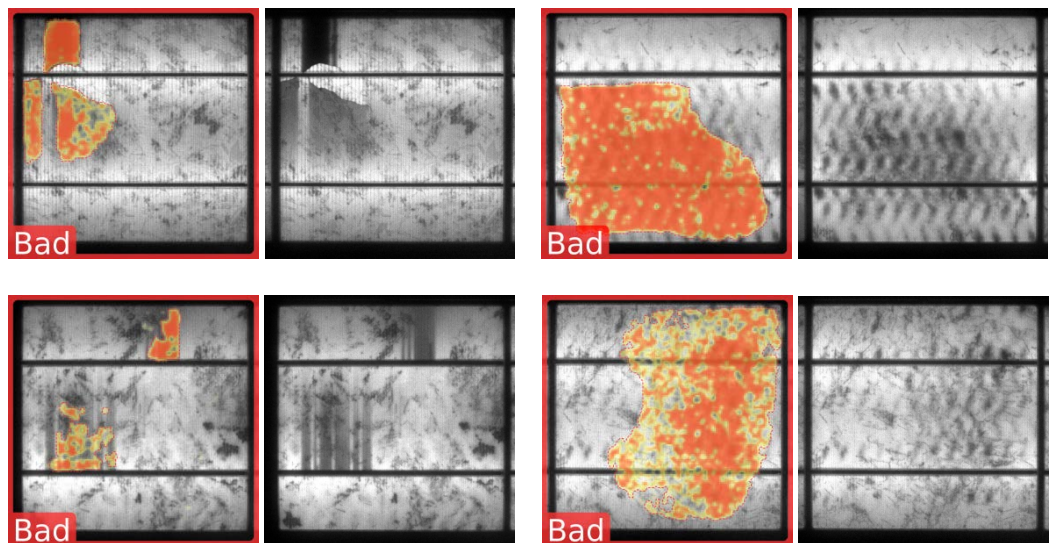
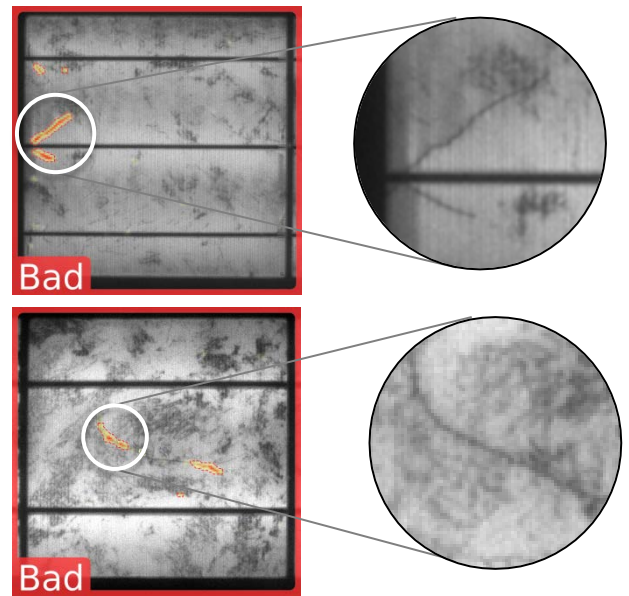
The software algorithm trains itself on a representative set of annotated images of the different defect types as well as known good samples. The learning system automatically incorporates contextual information in order to form a reliable model of the defects.



Once this training phase is completed, the inspection is ready to proceed. Defective areas of the cells can quickly be identified and reported.

MICRO-CRACKS

The most challenging types of defects are the micro-cracks, mostly due to the strongly structured background which typically shares many features with them. Provided with a representative set of sample cracks, the learning system forms a reliable model of that defect. At the same time, it learns to distinguish the cracks from the similar appearance of the background pattern. The resulting detection is therefore highly specific and selective at the same time.



INTEGRATION

Due to its self-learning abilities, ViDi Suite can be deployed quickly and easily on new applications without the need for any specific development

RESULTS & PERFORMANCE

Powerful Detection: Most types of defects in photovoltaic modules revealed by EL imaging can automatically be detected and identified (cracks, breaks, short circuits, grid finger interruptions, contact-forming errors)

Self-Learning: The inspection of the EL images was conducted without the need for a multitude of carefully tuned and optimized detection algorithms, but instead relied on a human-like approach - learn and apply - topped with an improved testing consistency and repeatability.

Quick & Easy: Learning from the representative set of samples can be achieved in less than 30 minutes.

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