# Detection and Classification of Photovoltaic Panel Defects from a Drone Thermal Camera


## Fault detection

### U-Net

- Semantic segmentation
- One class for each defect type
- Output pixel mask for each class
- Convolutional neural network model architecture
- Dataset with 770 images was created

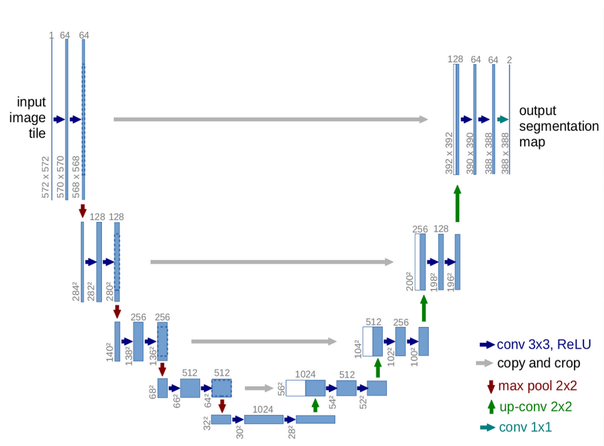



Figure 1: U-Net architecture

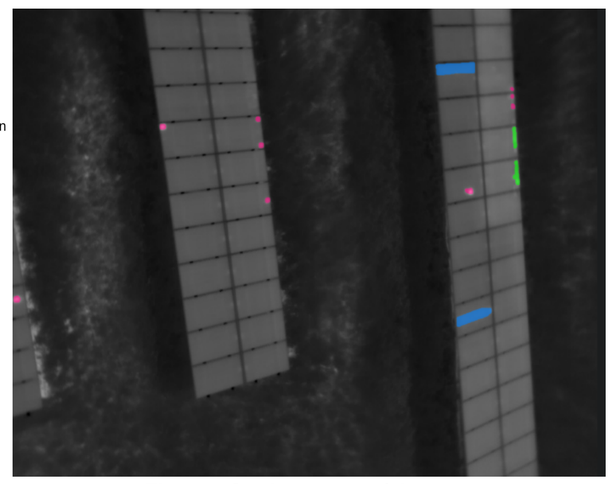


Figure 2: Annotated image

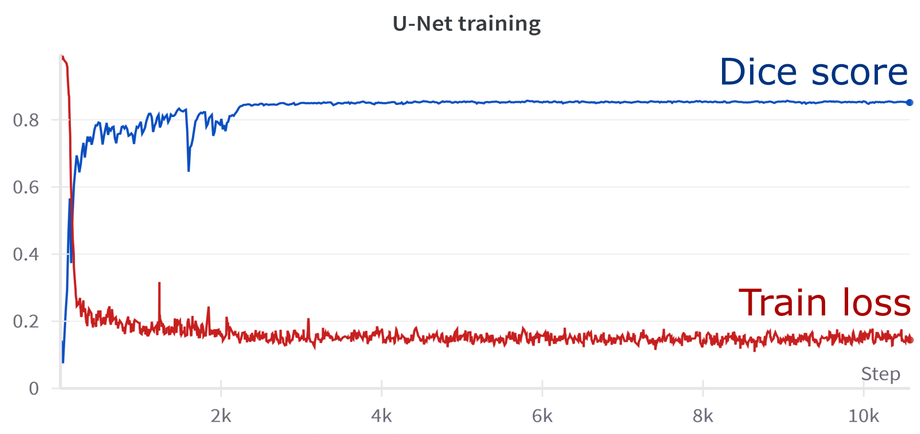


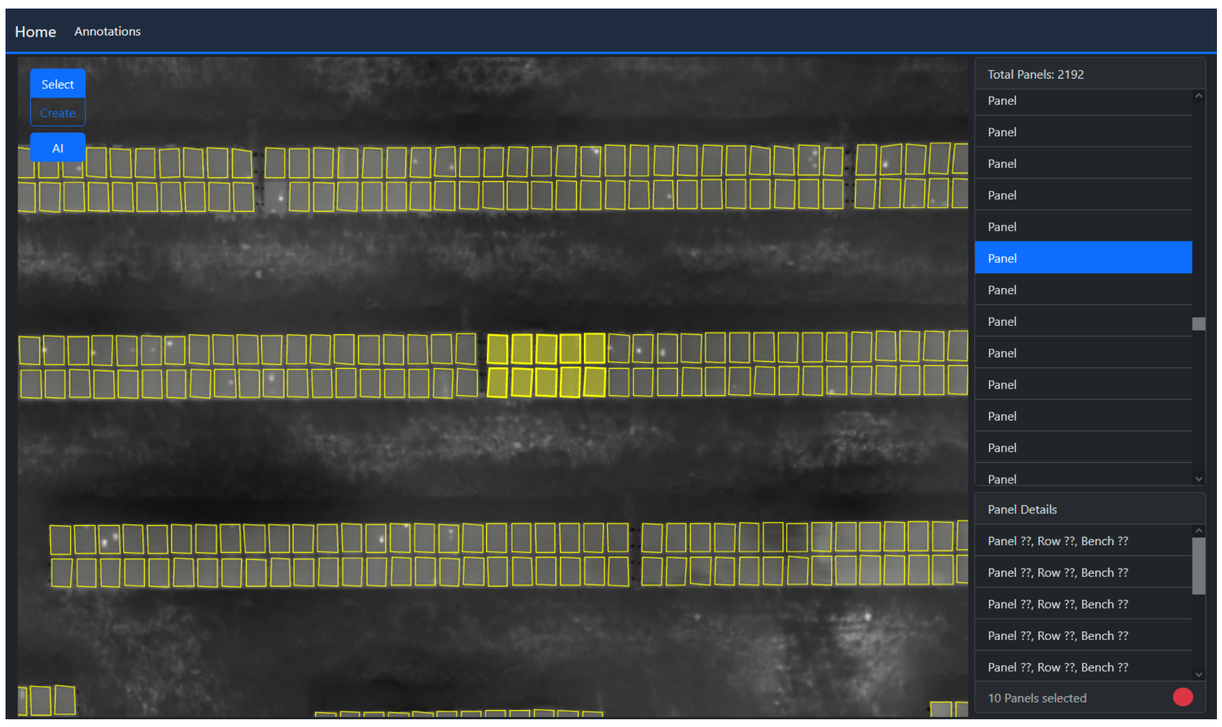

Figure 3: U-Net training graph

- Final **Dice** coefficient = **0.85**

## Panel detection

### Mask R-CNN

- Detectron2 implementation was used for instance segmentation
- Dataset with 150 images was created
- Allows for annotation of panels



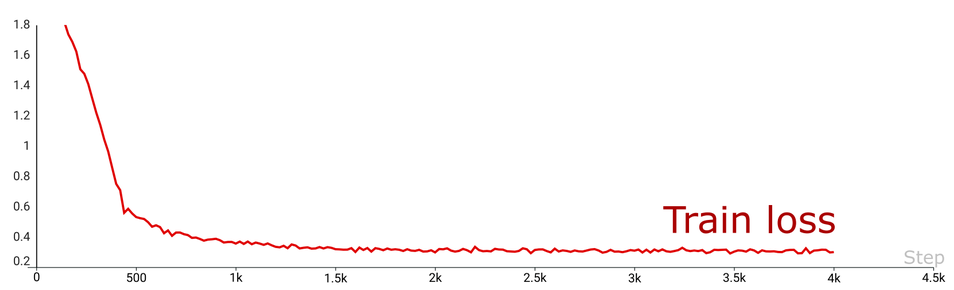
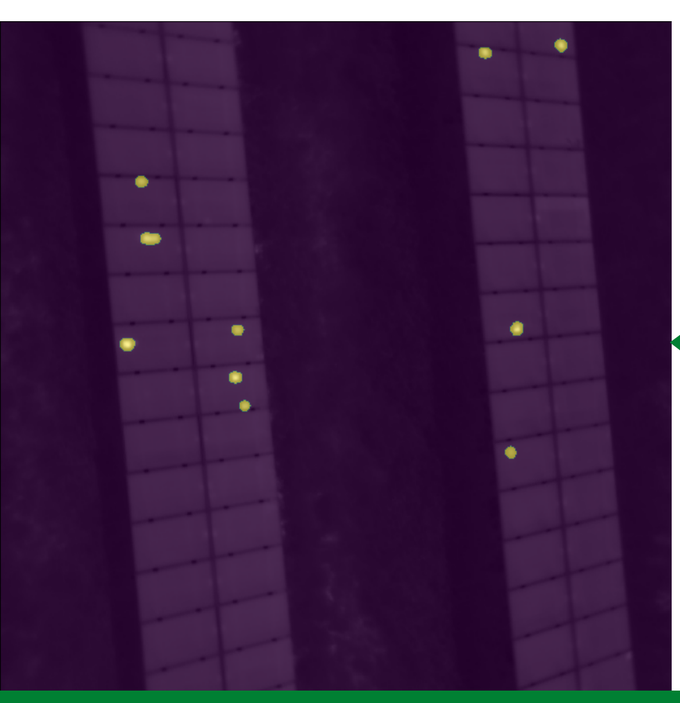
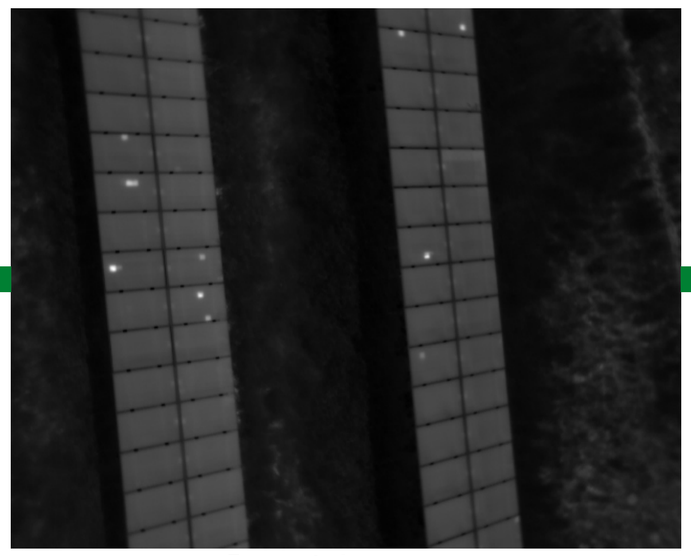




Figure 4: Mask R-CNN training graph

- Final **mAP** = **0.83**

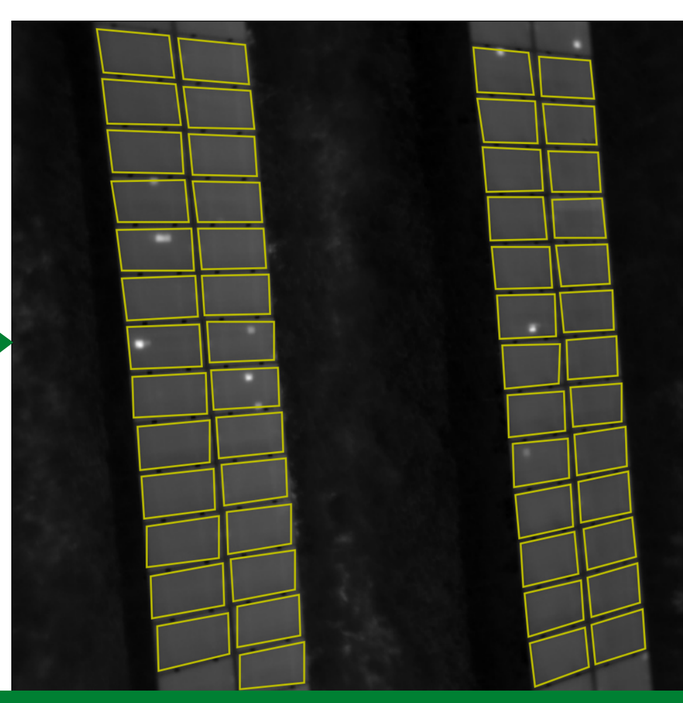


**U-Net**



Input image

**Mask R-CNN**



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