Computer Vision

Intermediate Project Results

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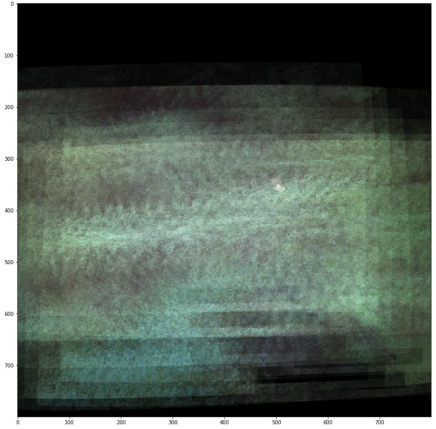
Image Integration

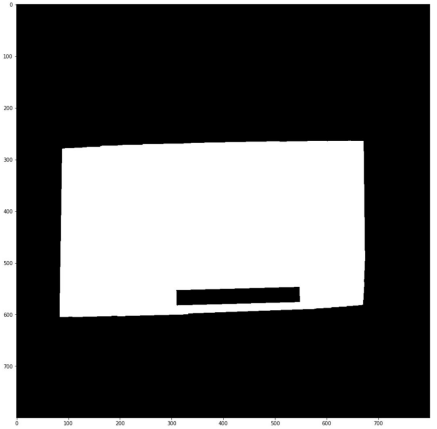
We tried different approaches:

e.g: "Pixel Labeling Via Energy Minimization", simple Median

The simple “naive” approach seems to work best:

- Apply homographies
- Compute the average of all images
- Compute the mask where all images overlap



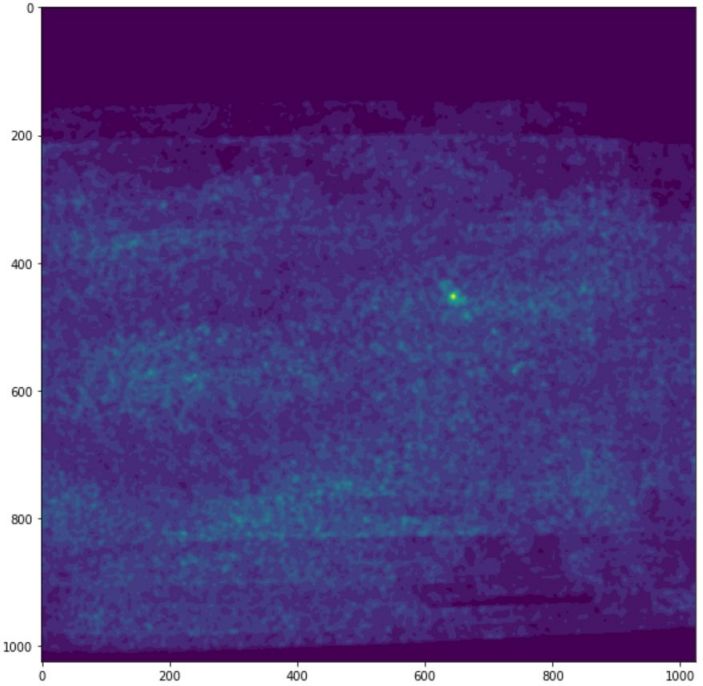


Anomaly Detection

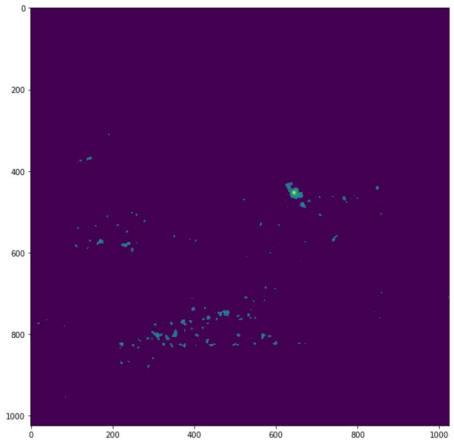
Inspired by: *"Reducing Anomaly Detection in Images to Detection in Noise"*

- Divide image into patches
- Train KNN on these patches
- Compare each patch to its knn-neighbors

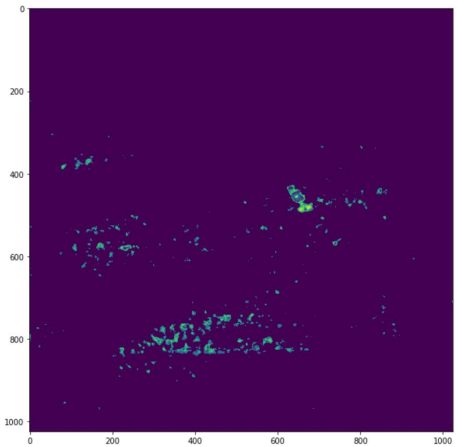
Computationally expensive (>1 min per image)



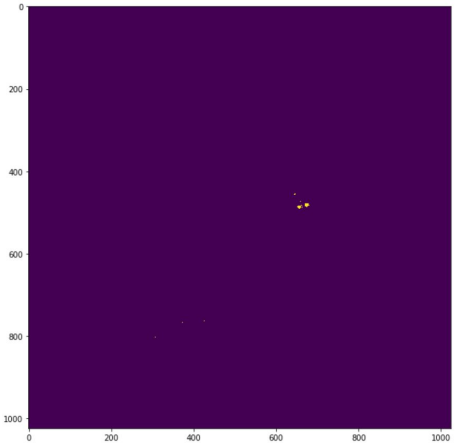
Anomaly Processing



Cutoff small values



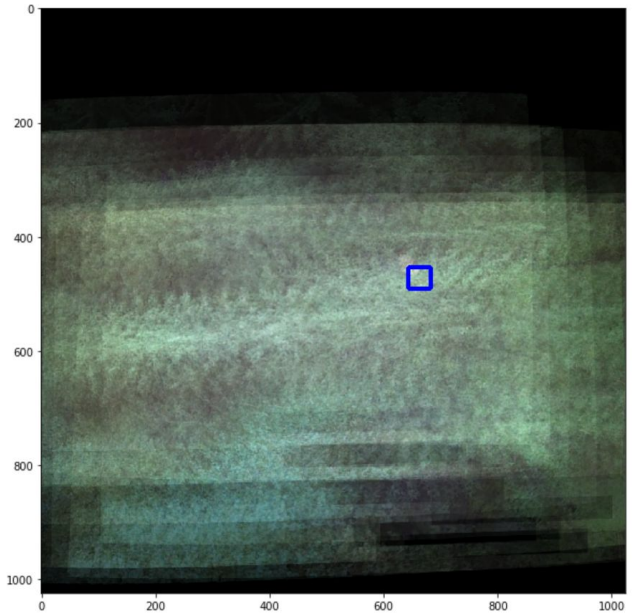
Pairwise difference between all timesteps



Keep the highest values

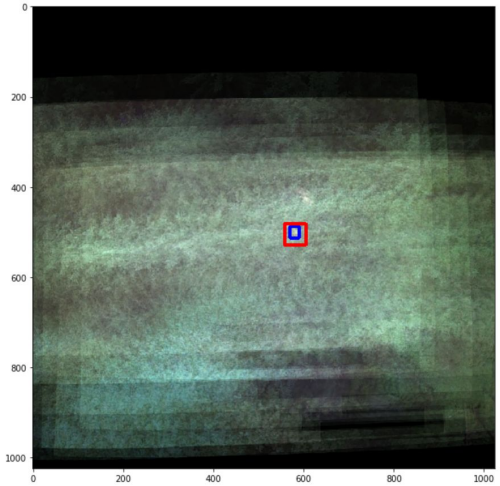
Bounding Boxes

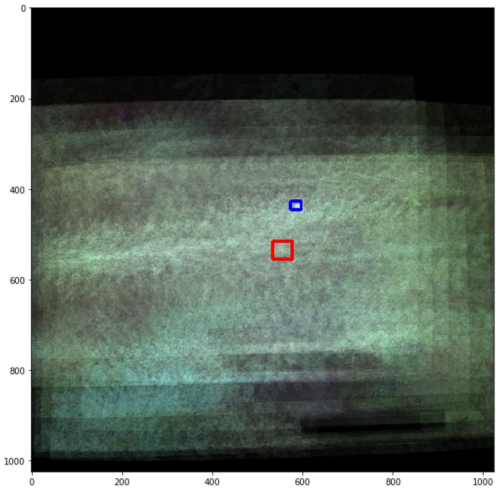
- Draw contours around “islands” of pixels
- Combine close islands together
- Check that the anomaly is not just a few pixels / random noise
- Create a rectangle around the island

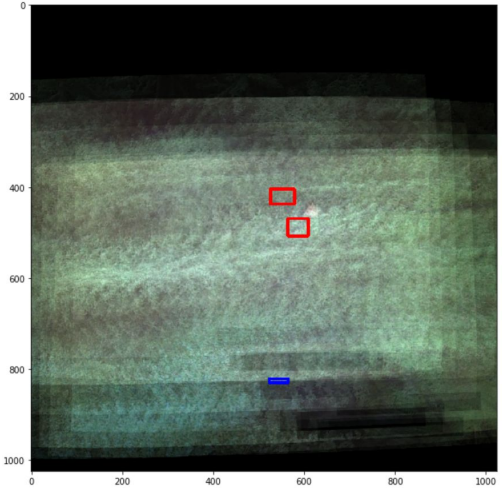


Results

Final average precision: 0.212

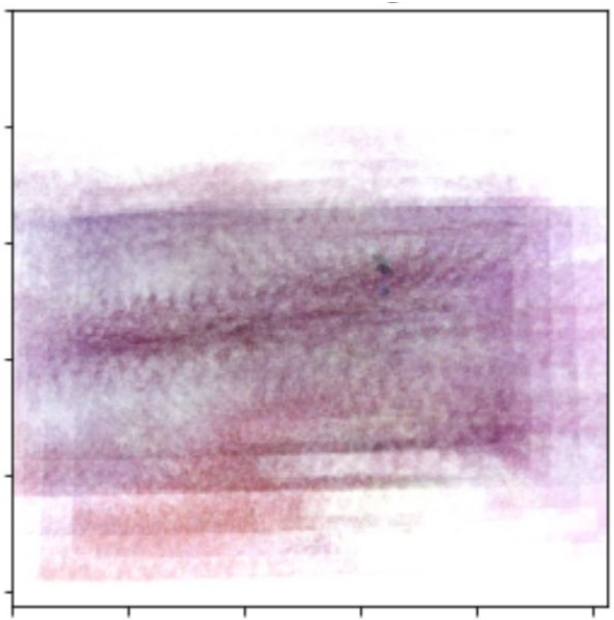






Future Improvements

- Better anomaly detection
  - Mask/filter out the white object
  - Make it less sensitive to noise
  - Preprocessing (adjust color, contrast)
- Better bounding boxes
  - Correct detections don't have good IoU
  - Better algorithm for determining size and position of bounding boxes



Thank you for your attention!

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