
Image Segmentation - Update 2

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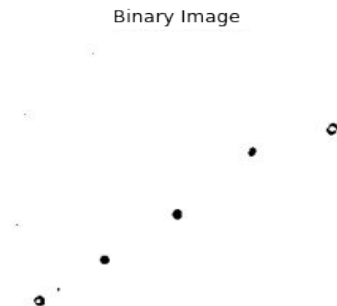
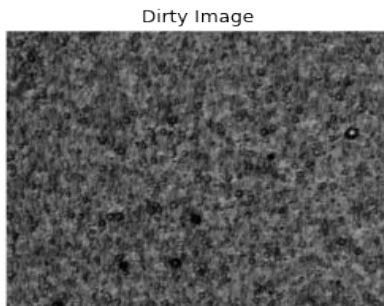
Project Guides:

J. Hays and L. Milward

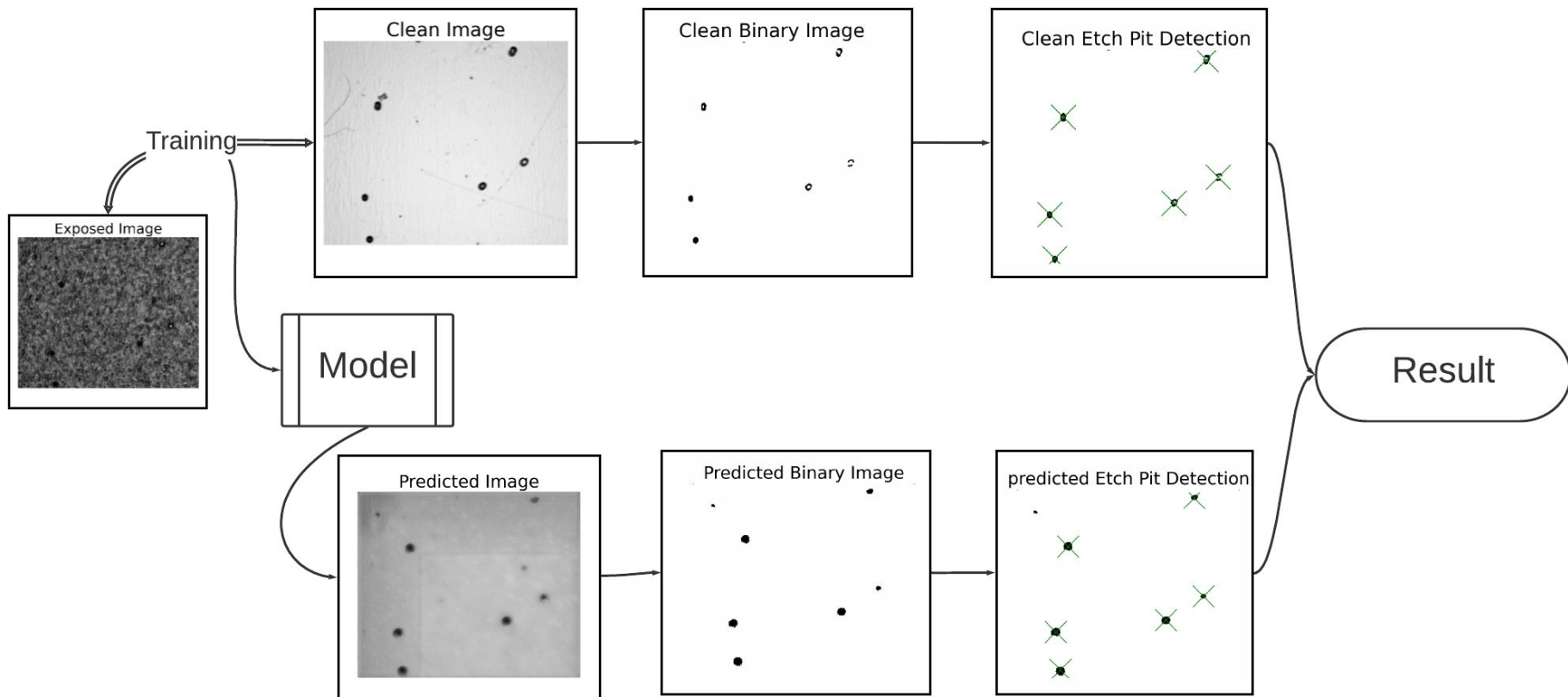
16th October, 2020

Recap of last presentation

- **Fully Convolutional Networks** (FCNs) are named due to their architecture, which is built only from connected layers, such as **convolution**, pooling and upsampling.
- **Image segmentation** is the process of partitioning a digital image into multiple segments (sets of pixels, also known as image objects).
- **Outlook**
 - Try to measure and increase the accuracy of the segmented image.
 - Work on non binary clear image.
 - Incorporate other channels in the dataset.

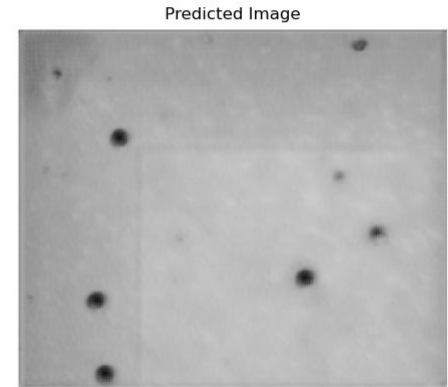
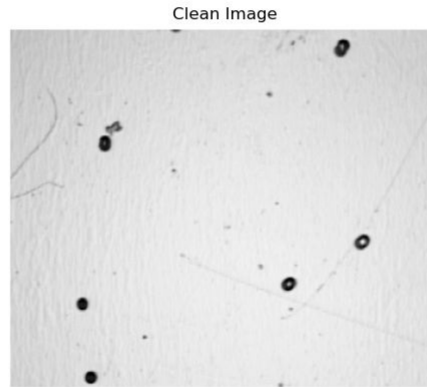
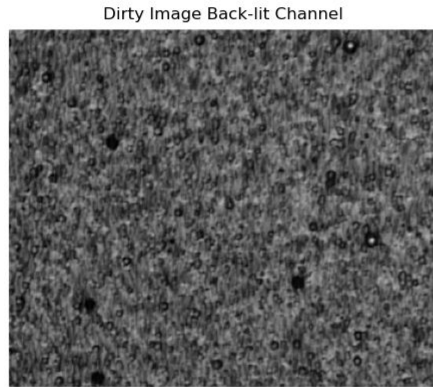


Flowchart



Models

- Three models were trained:
 - Using backlit + blank channel → clean images from 1st and 2nd stack
 - Using backlit channel X 2 → clean images from 1st and 2nd stack and,
 - Using all 10 channels → clean images from 1st and 2nd stack X5.
- The results from models 1 and 2 were able to detect etch pits, but the 3rd model didn't yield any results.



Results

	Backlit+Blank	Backlit X2
True positives	91	87
False positives	23	21
False negatives	12	15
Total positives	114	108
Total true etch pits	103	102
Signal efficiency	88.34%	84.46%

Summary

- Algorithm was improved to include multi-channel training.
- The significance we got from backlit + black is greater than the backlit X2 model.
- We have trained using non-binary images.

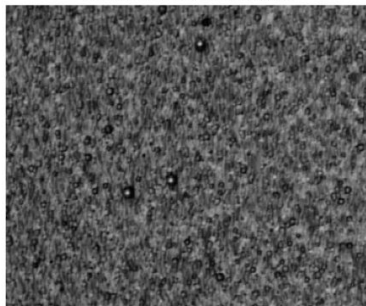
Outlook

- Try Halo channel training.
- The etch finding algorithm can be optimized.
 - Tuning sigma of the Gaussian mask.
- Try to incorporate other channels
 - Tuning skip connection for 10 channel training.
 - Try reducing the output layer to 1.

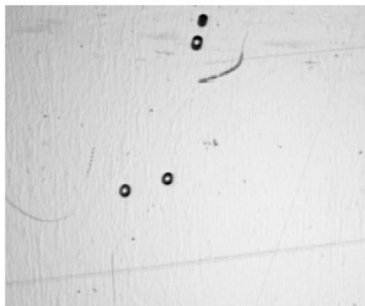
Backup

Result from Model 2 & 3

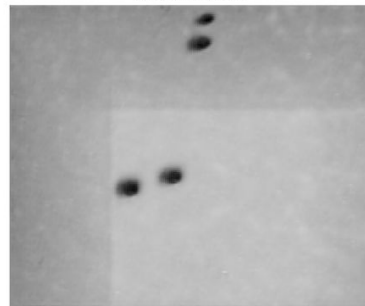
Dirty Image Back-lit Channel



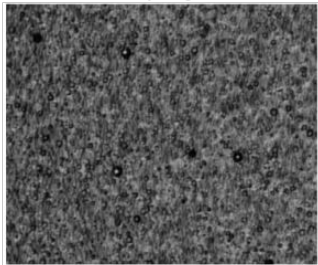
Clean Image



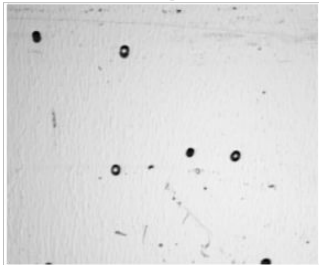
Predicted Image



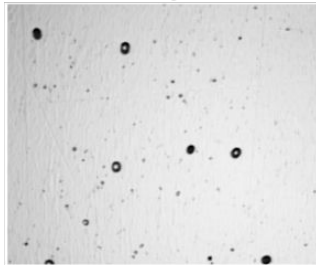
Dirty Image



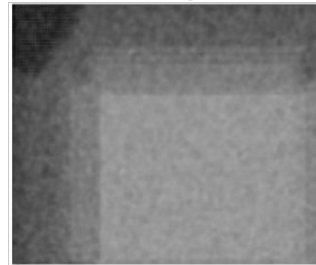
Clean Image Front



Clean Image Back



Predicted Image Front



Predicted Image Back

