



Status Report: Project 3, Neuron Finding Team : Canady

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Overview

- Preprocessing
- Algorithms
 - NMF
 - Unet
 - Tf-unet
 - <https://arxiv.org/pdf/1707.06314.pdf>

Biggest issue

Extracting neuron coordinates from predicted mask



Preprocessing

- Removed overlapping neuron coordinates
- Merged all time series image to a single image



Non-negative Matrix Factorization

- Used Thunder Extraction Python package
- Basic implementation as per example documentation:

<https://github.com/thunder-project/thunder-extraction>

- Tweaked parameters.



Parameter Tuning for Best Results

DataSet	chunk_size	k	max_iteration	percentile	Accuracy
neurofinder00.00	50*50	10	20	95	3.0
neurofinder00.01	50*50	5	30	95	3.1
neurofinder01.00	50*50	5	30	95	3.4
neurofinder01.01	50*50	3	50	95	3.1
neurofinder20.00	100*100	5	50	99	3.5
neurofinder20.01	100*100	5	50	99	3.3
neurofinder30.00	50*50	10	30	95	3.0
neurofinder40.00	100*100	5	50	97	3.3
neurofinder00.01	60*60	3	50	95	3.20



Best Results - 3.20635

- Total score: 3.20635
- Average Precision: 0.9043
- Average Recall: 0.9335
- Average Inclusion: 0.63567
- Average Exclusion: 0.73288



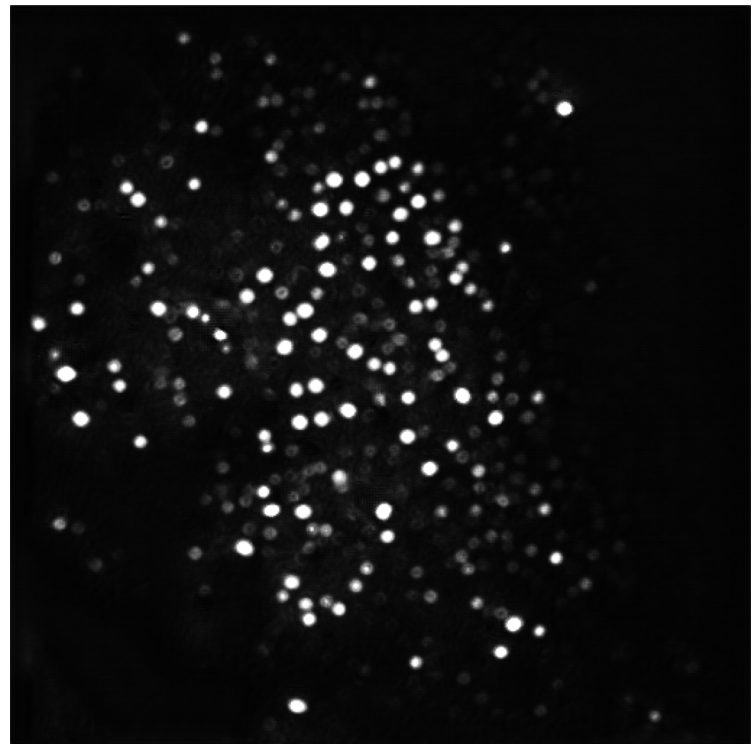
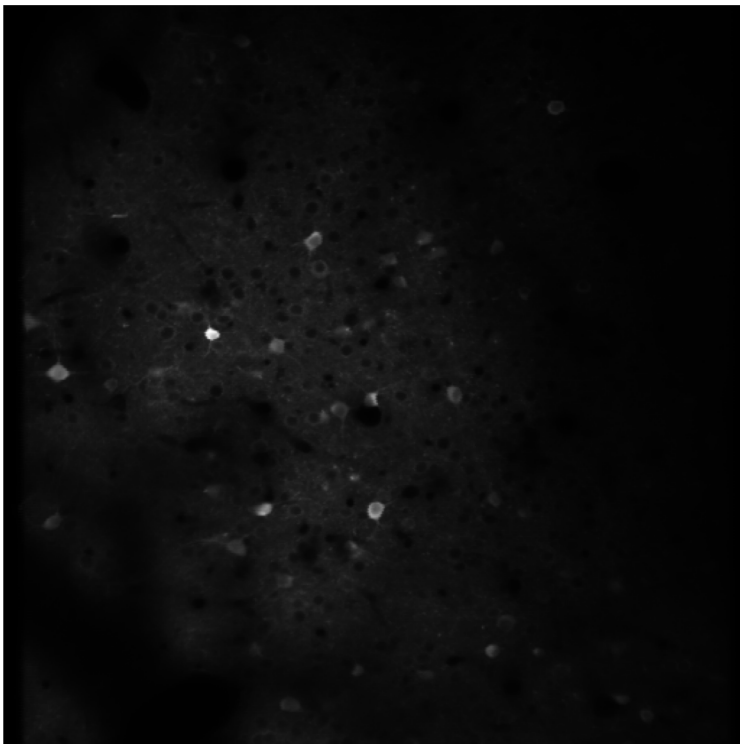
Unet

- Minor modification to basic Unet as per the paper:

<https://arxiv.org/pdf/1707.06314.pdf>

- Added batch normalization after every convolution layer
- Added dropout after every Unet block
- Could not extract coordinates from predicted mask on time.

Sample Output



Sample Output

