CSCI 8360 Project 3 Lightning Talk

TEAM BATH

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Methodology - NMF

- Non-negative Matrix Facorization
  - Thunder project (https://github.com/thunder-project/thunder)
  - Chunks images into n x m segments and adds zero-padding to each segment
  - Training data useful for parameter tuning!
- Globally-tuned NMF: average score of 2.800

Methodology – NMF Tuning

- Neurofinder website: datasets come from five different labs (00, 01, 02, 03, 04)
- What if each lab has a different set of good hyperparameters?
- Lab-specific parameters: Combined score of 3.0259

	Lab 00	Lab 01	Lab 02	Lab 03	Lab 04
Chunk-size	32x32	32 x 32	128 x 128	32 x 32	64 x 64
Padding	20x20	25 x 25	25 x 25	10 x 10	20 x 20
Kernel	5	5	5	5	5

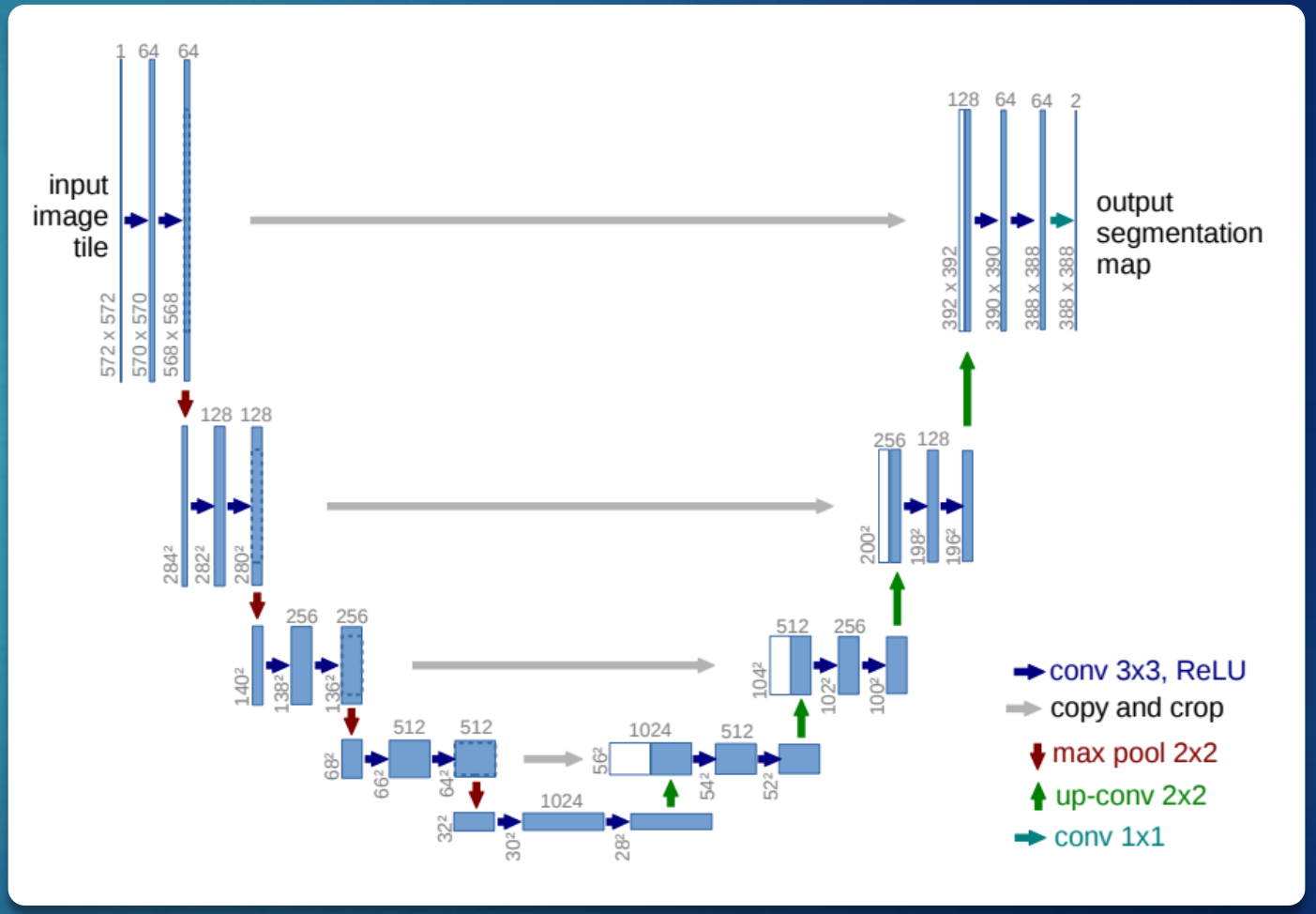
Methodology – Gaussian Smoothing

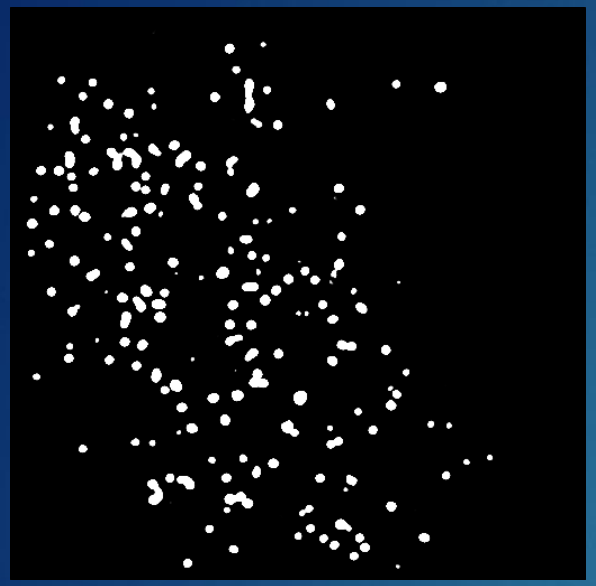
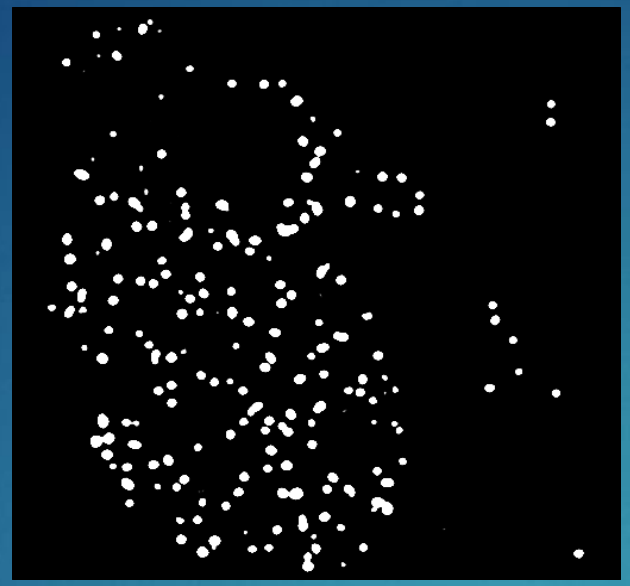
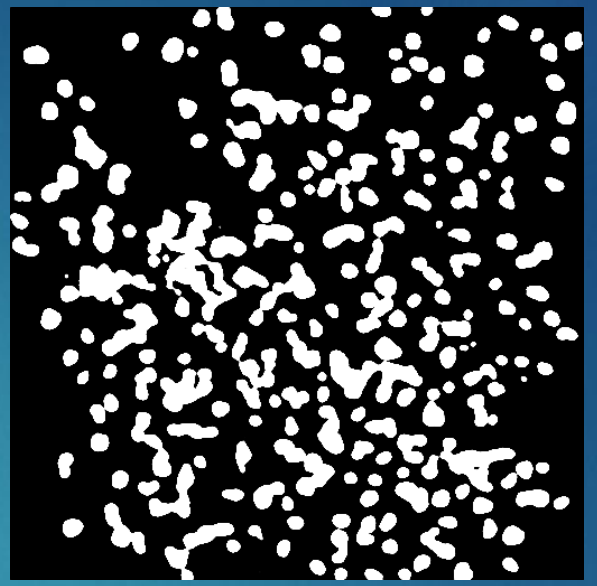
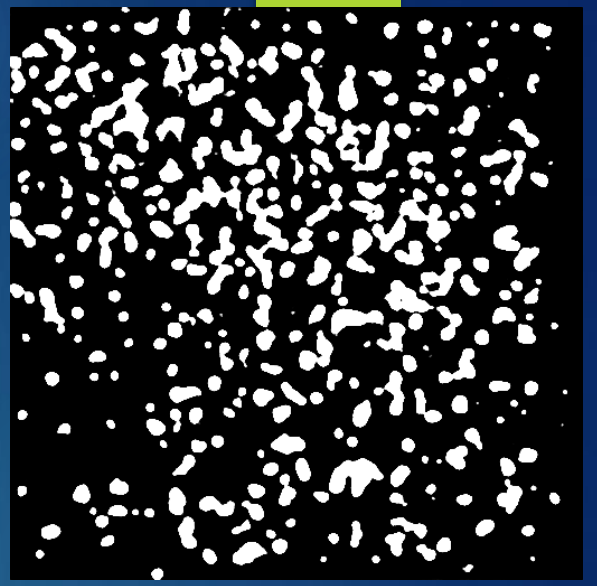
- Final improvement: smooth input images using Gaussian blur
- Memory issues when smoothing entire video
- Summarize each video with 30 summary snapshots
- Fed blurred snapshots to NMF
- Final combined score: 3.08446

Methodology – U-Net

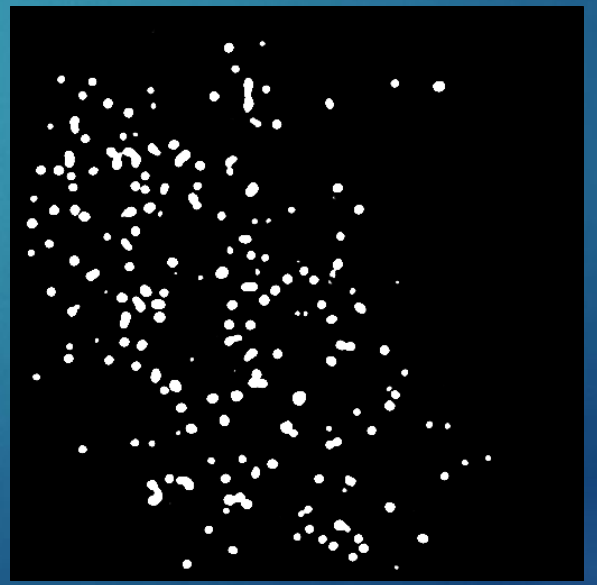
We used the U-Net in https://arxiv.org/pdf/1505.04597.pdf with a slight modification:

We started the first layer with 32 feature maps and increased the feature maps in a similar fashion as the image on the right.



Predictions of U-Net for 0, 1, 2 and 6

NMF(left) vs Unet

Thanks!