https://www.cellpose.org/

WHY CELLPOSE?

Generalist algorithm : Trained on >600 images, involving different kinds of microscopy

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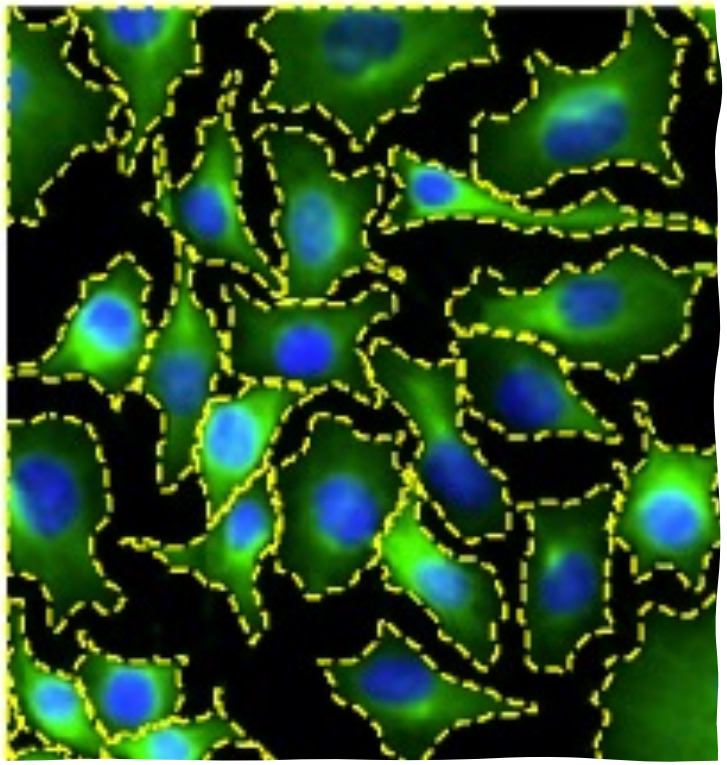
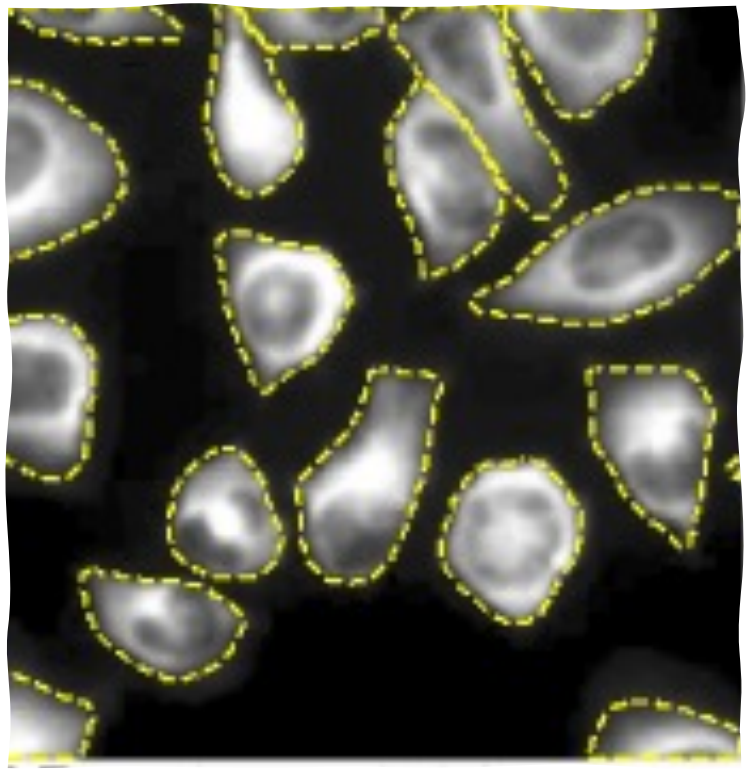
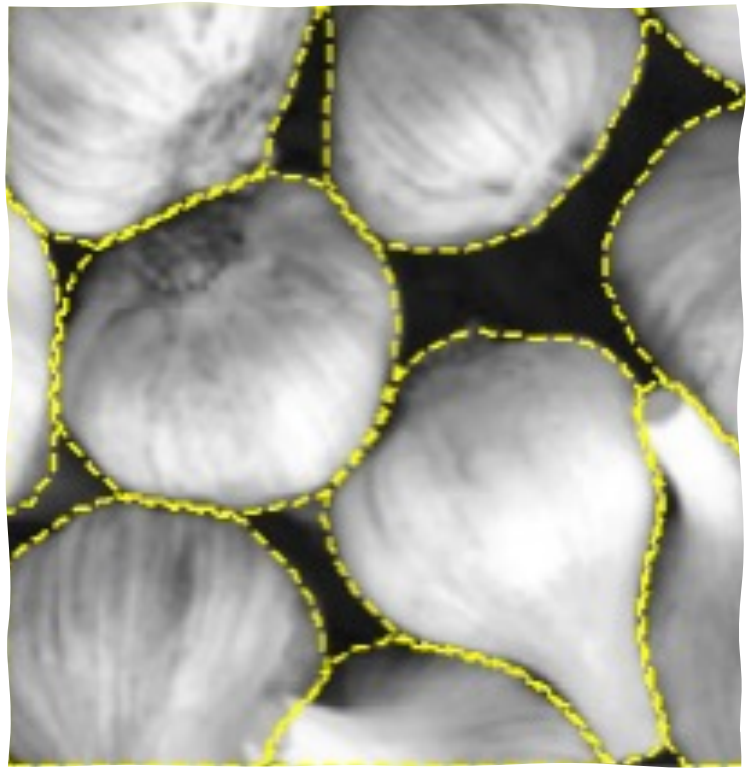
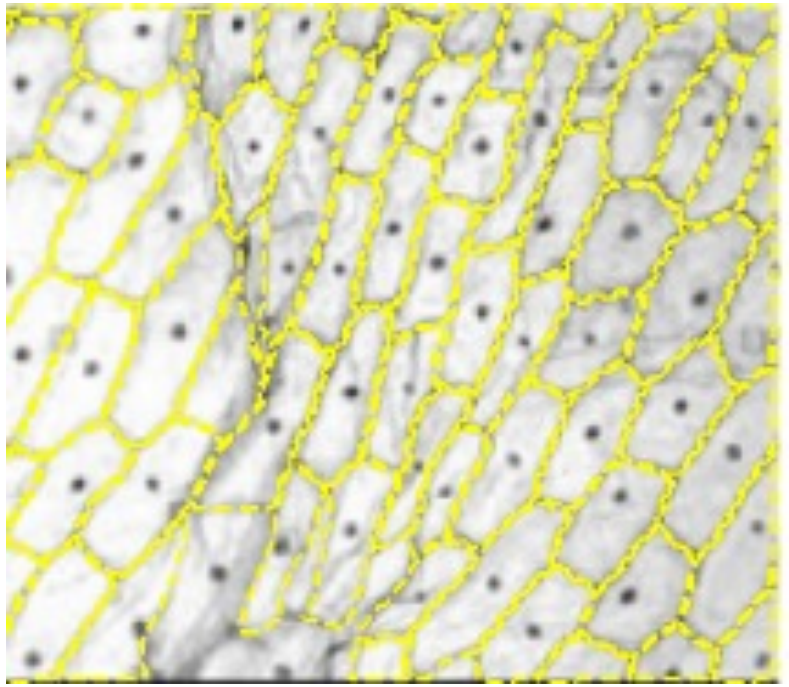






WHY CELLPOSE?

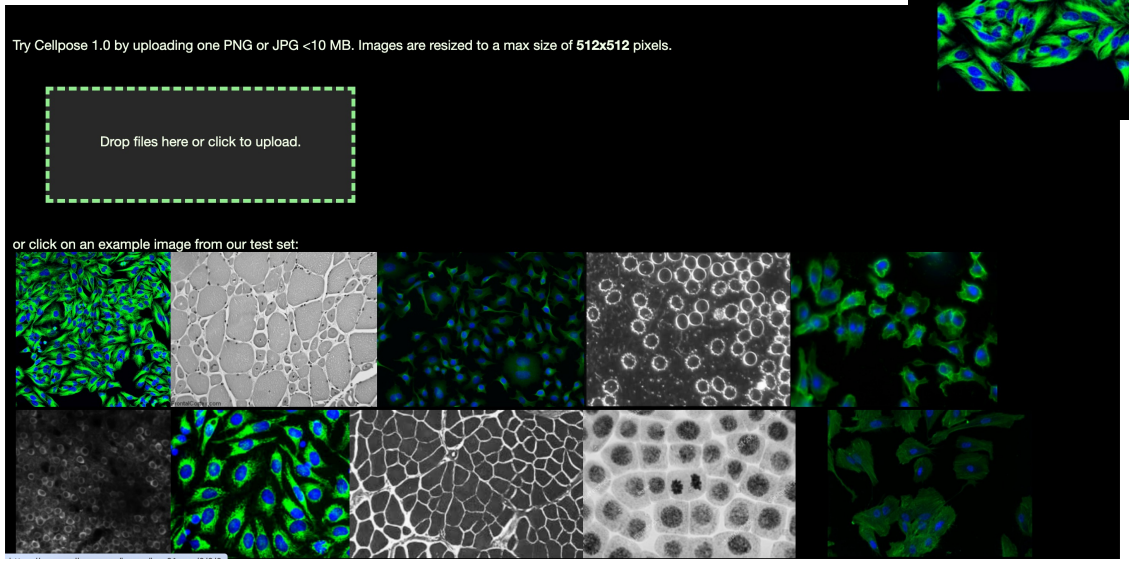
Can identify close objects: Uses process of simulated diffusion and tracing gradients

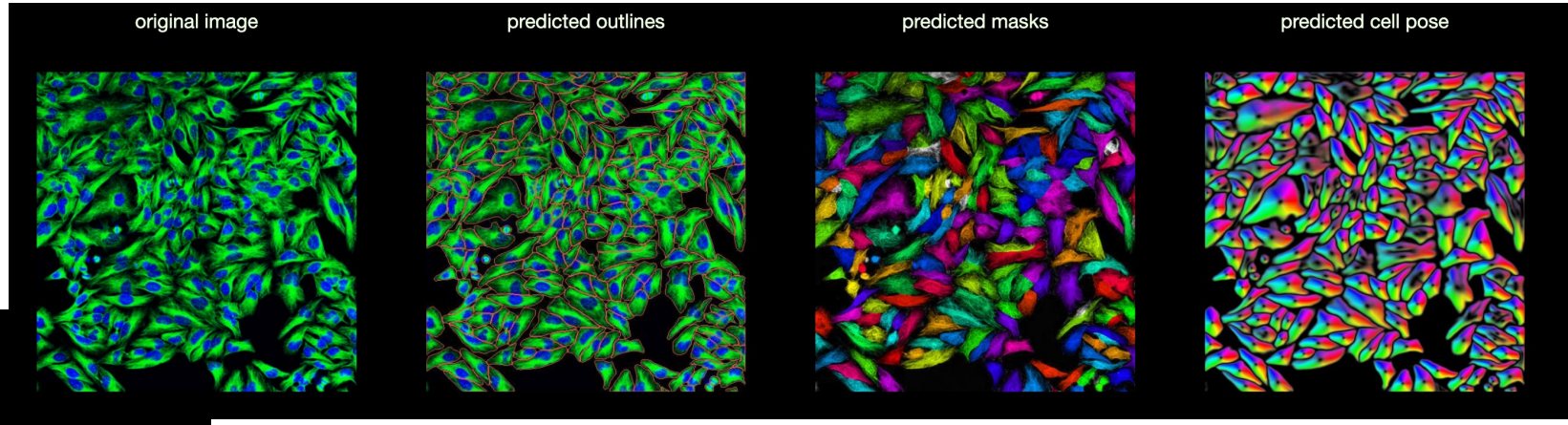


WHY CELLPOSE?

Straightforward GUI, also available web interface to test:

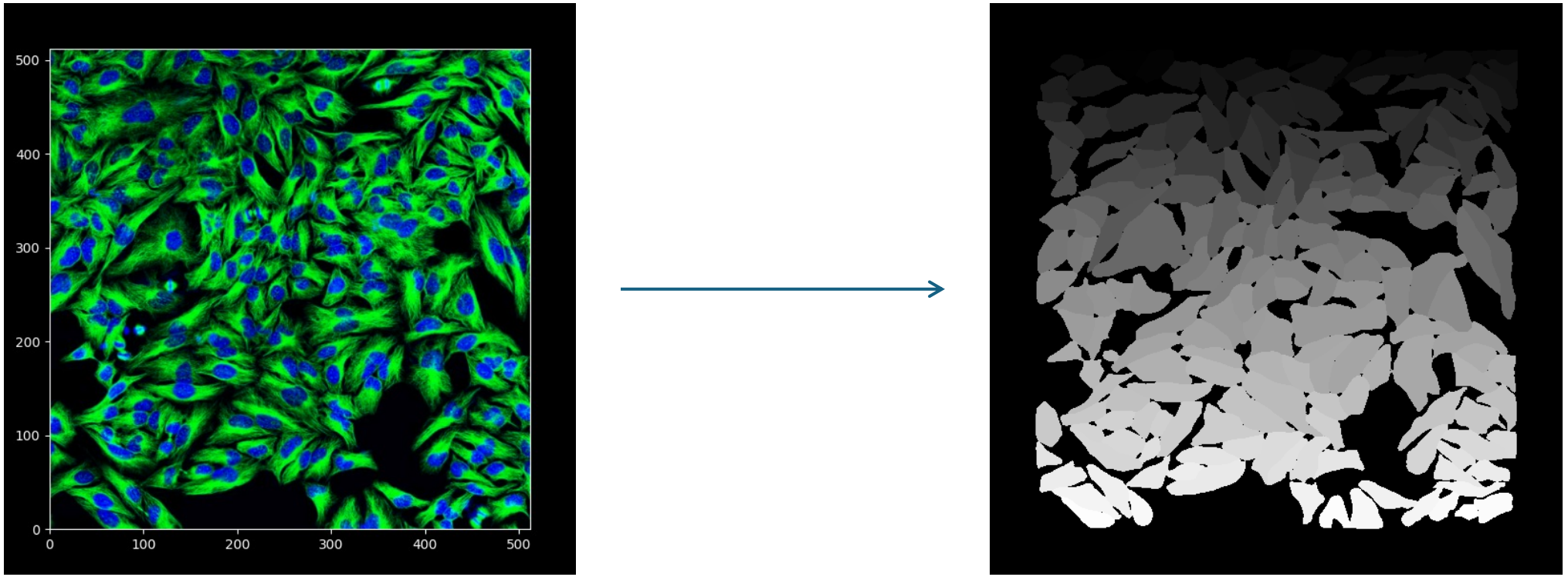
https://www.cellpose.org/





WHY CELLPOSE?

Written in Python, but masks outlines can fed into ImageJ



RESOURCES

Installation (Needs Python):

https://pypi.org/project/cellpose/
https://cellpose.readthedocs.io/en/latest/

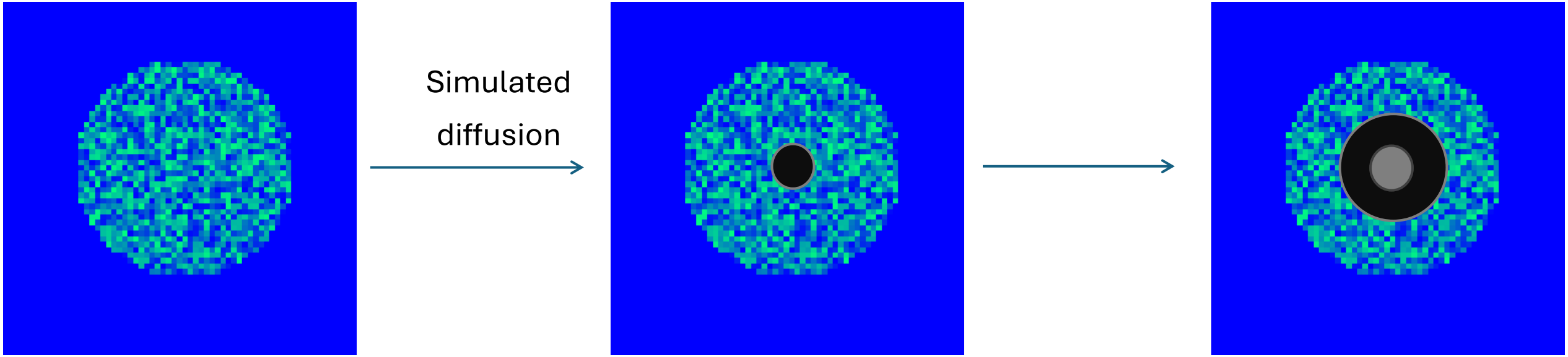
With pip:

```
pip install 'cellpose[gui]'/ pip install cellpose[gui]
```

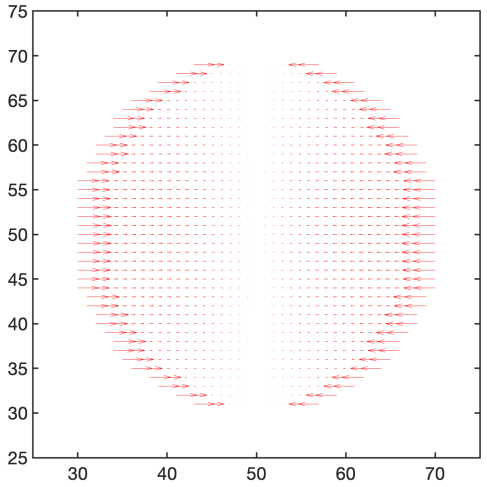
With conda:

```
conda create --name cellpose python=3.8
```

ALGORITHM

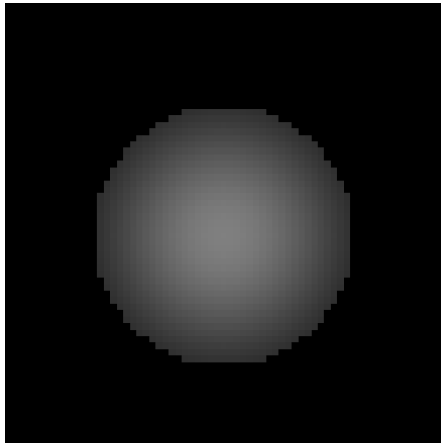


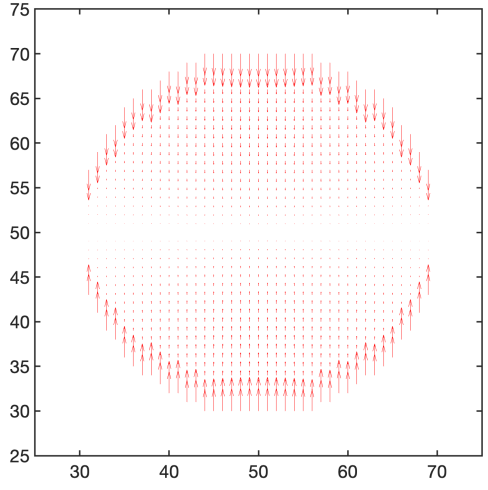
ALGORITHM

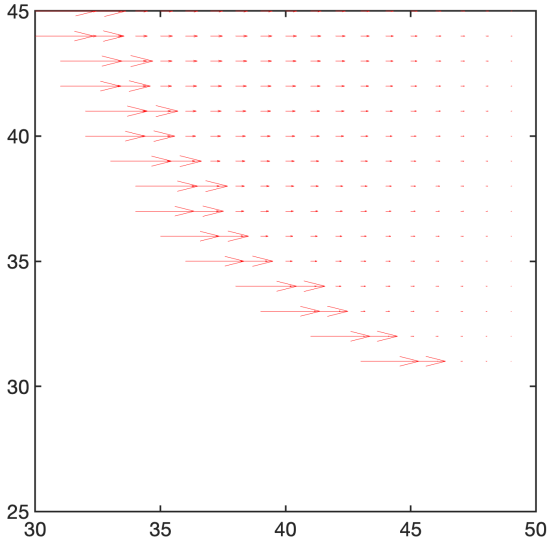


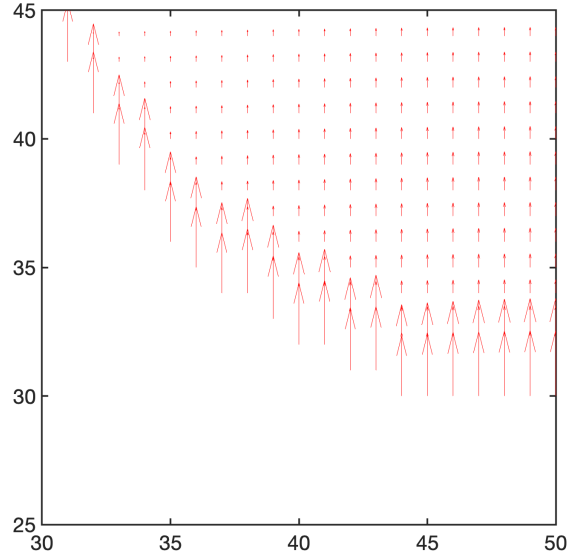
Horizontal

Gradients

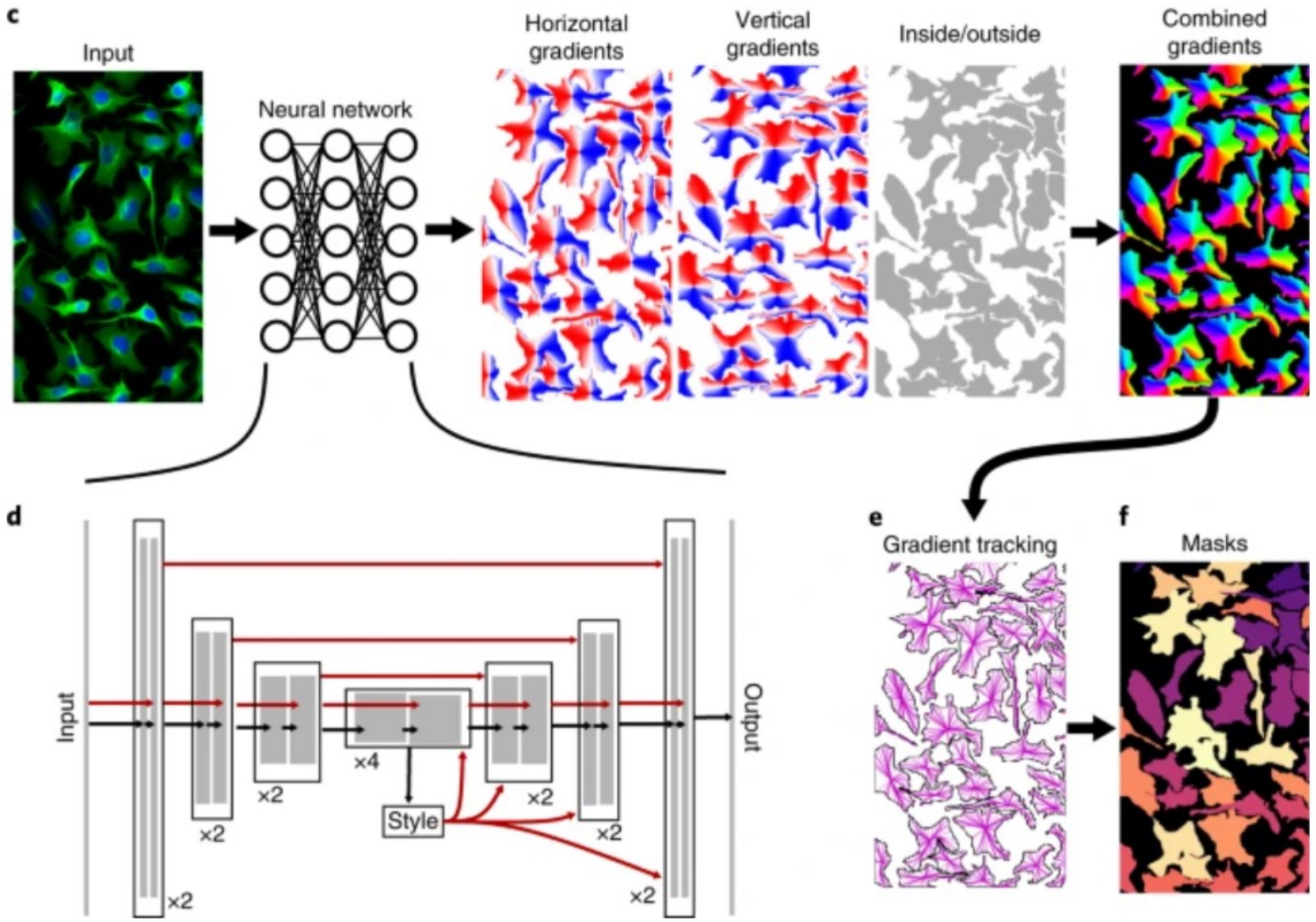




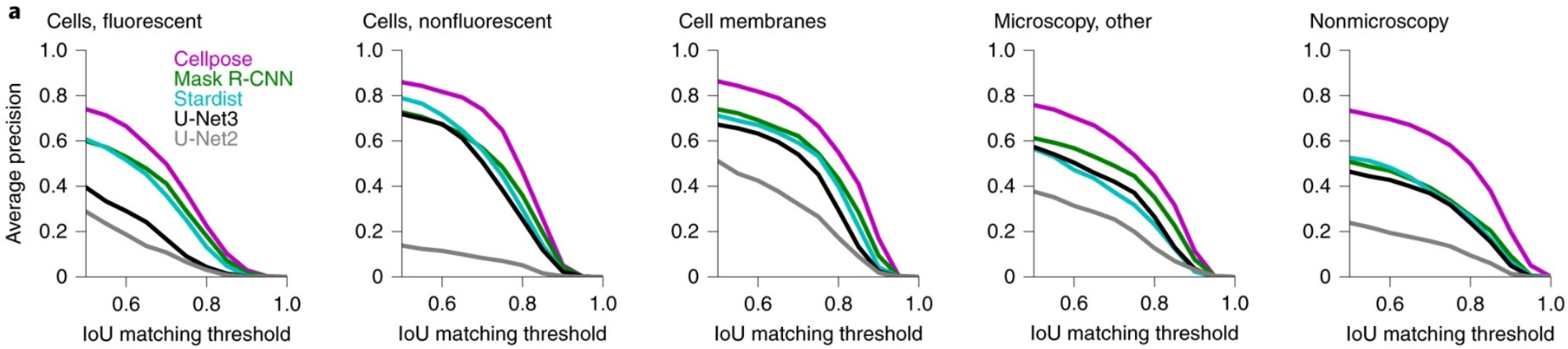




ALGORITHM

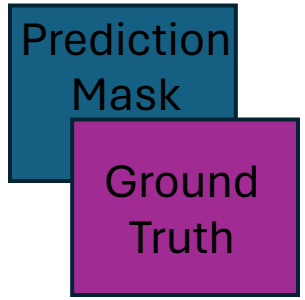

c
Input
Neural network
Horizontal gradients
Vertical gradients
Inside/outside
Combined gradients
d
Input
Output
×2
×2
×2
×4
Style
×2
×2
×2
e
Gradient tracking
f
Masks

Benchmarks

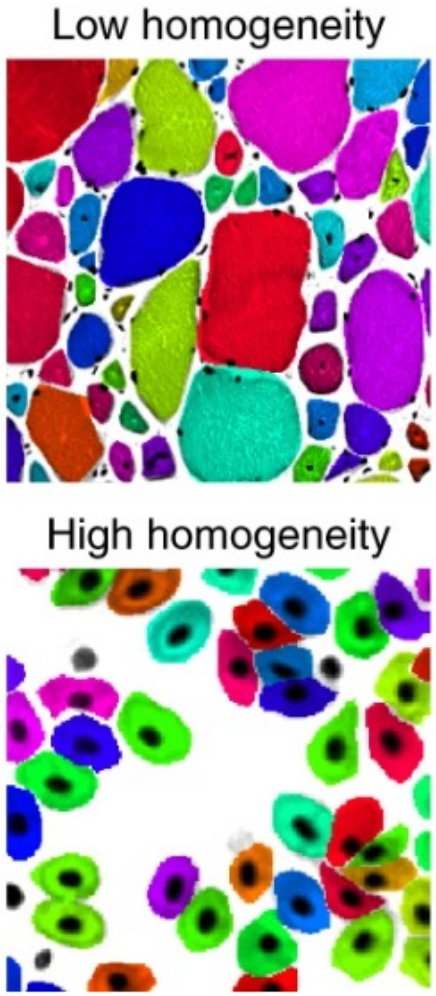


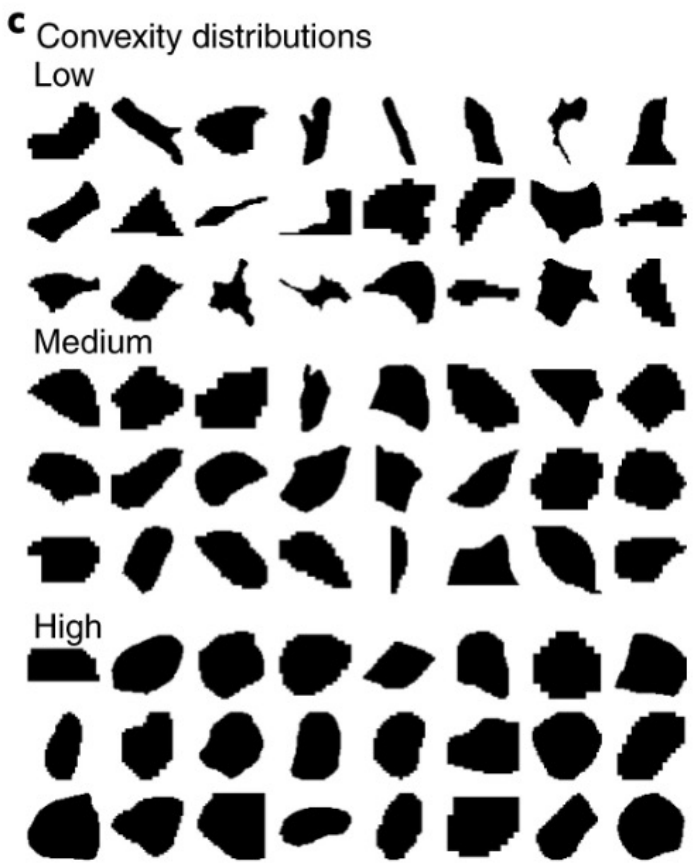
Precision Metric: True Positives Normalized by Positives, False Negatives, False Positives

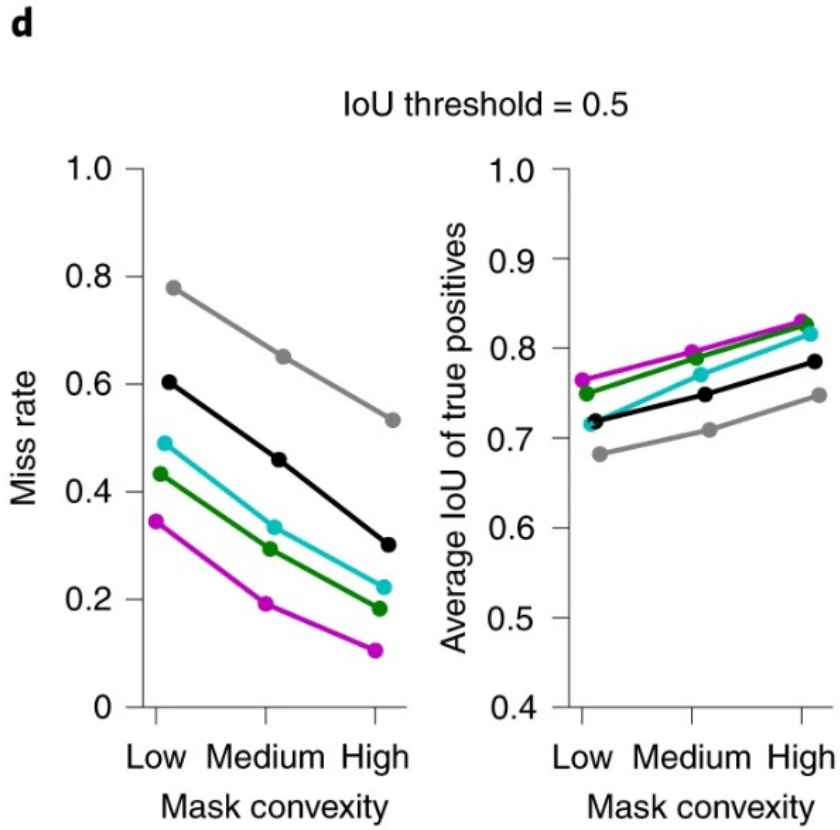
Intersection over union Probability



Benchmarks


Low homogeneity
High homogeneity


c
Convexity distributions
Low
Medium
High


d
IoU threshold = 0.5
Miss rate
1.0
0.8
0.6
0.4
0.2
0
Low Medium High
Mask convexity
Average IoU of true positives
1.0
0.9
0.8
0.7
0.6
0.5
0.4
Low Medium High
Mask convexity

Plan Ahead

- Introduction to the GUI
- Using Jupyter Notebook/ Insights into Batch Processing