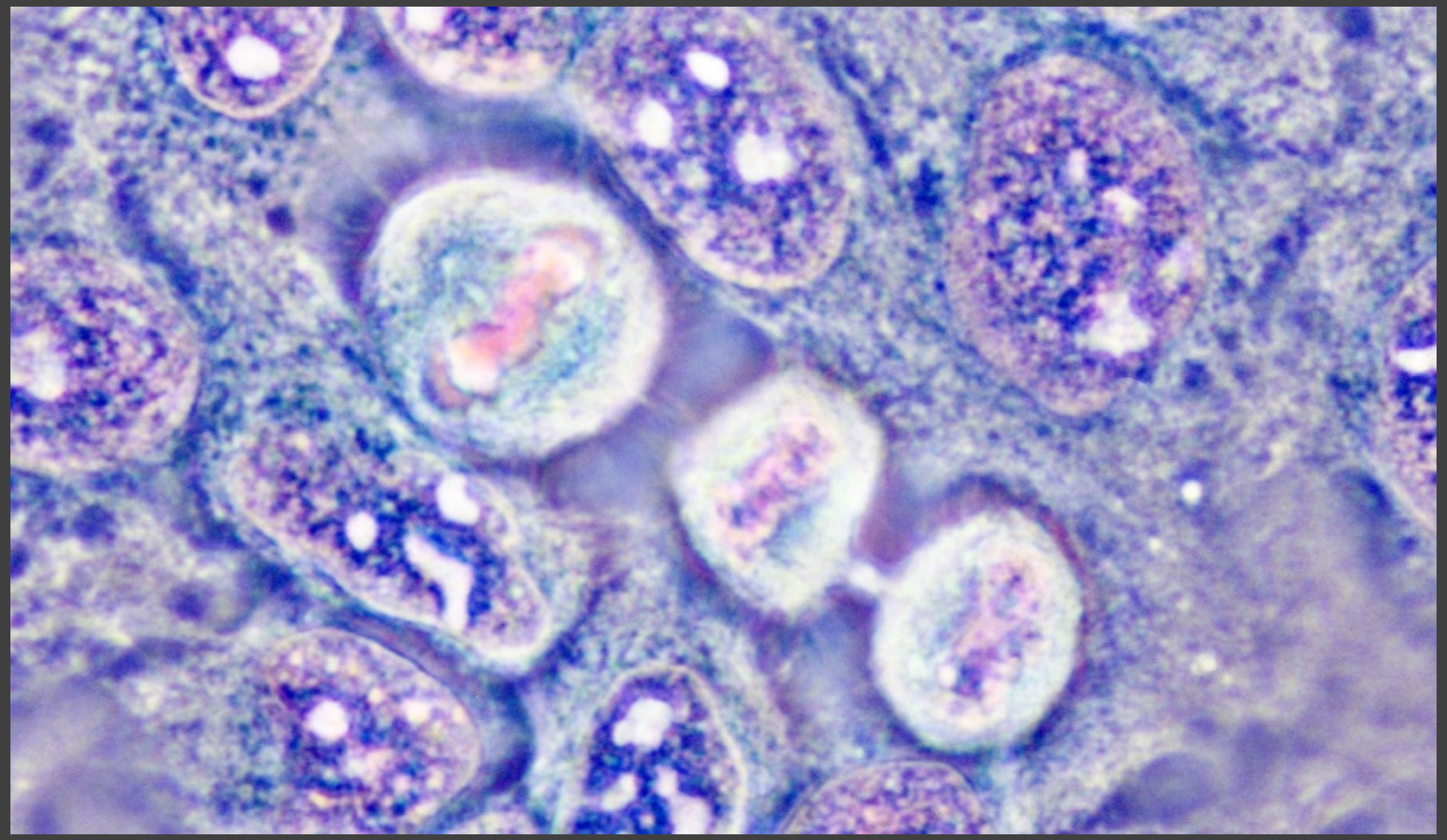
Andrea Rapuzzi

# DataScienceSeed Meetup #4

Digital Tree - Innovation Habitat, 14 Marzo 2019

# Parleremo di...

# Parleremo di…



# Parleremo di…

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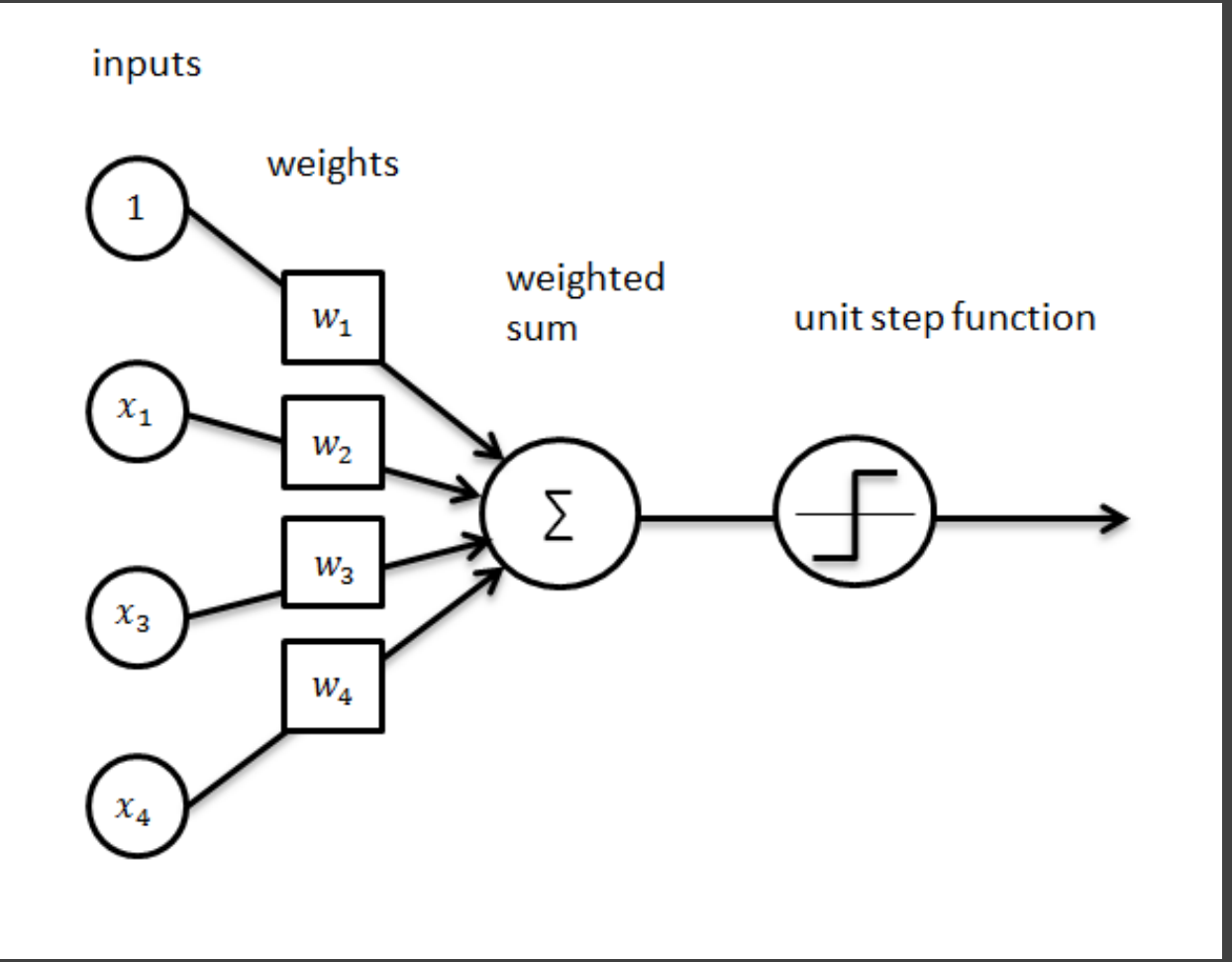

# Parleremo di…

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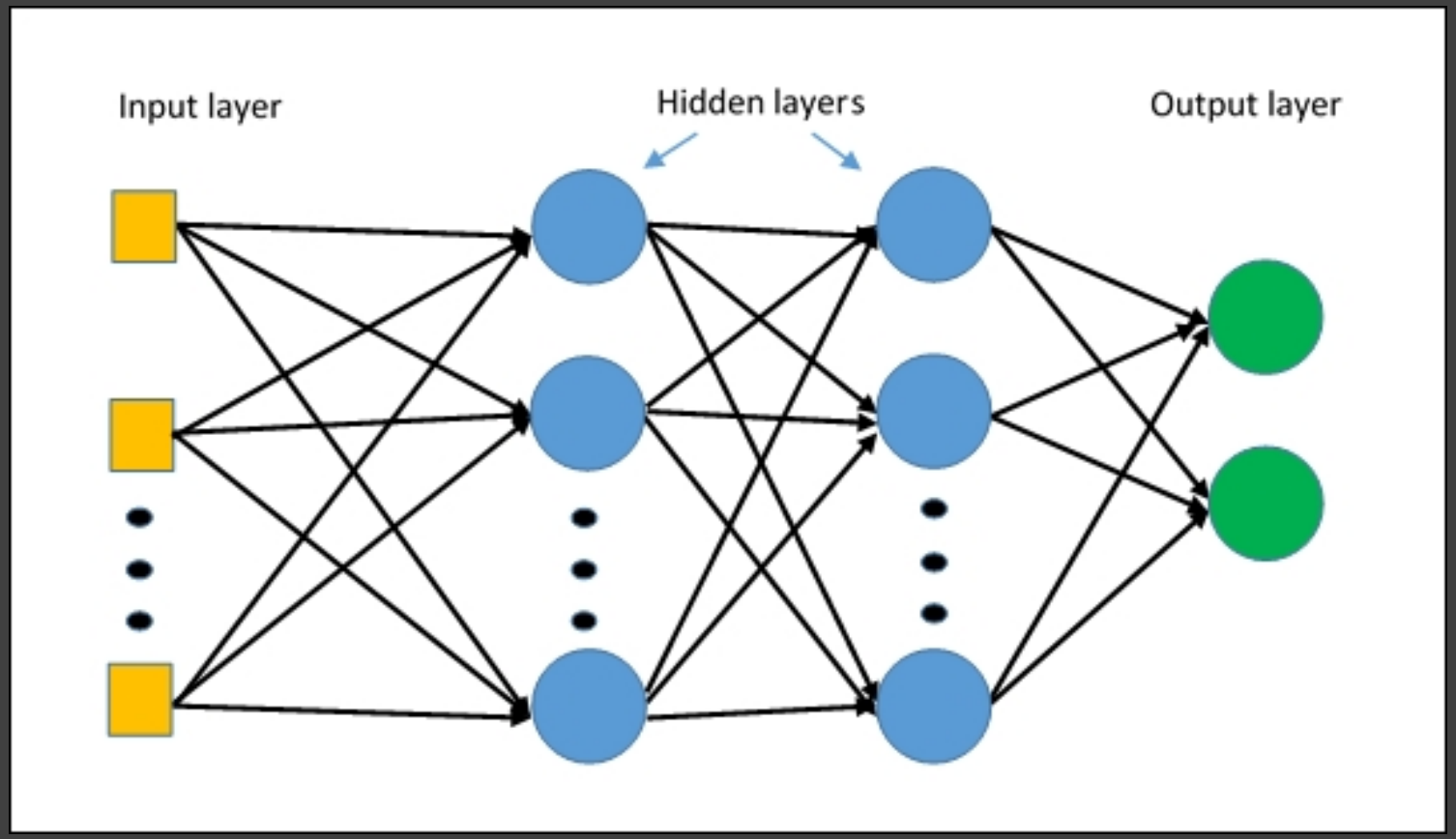

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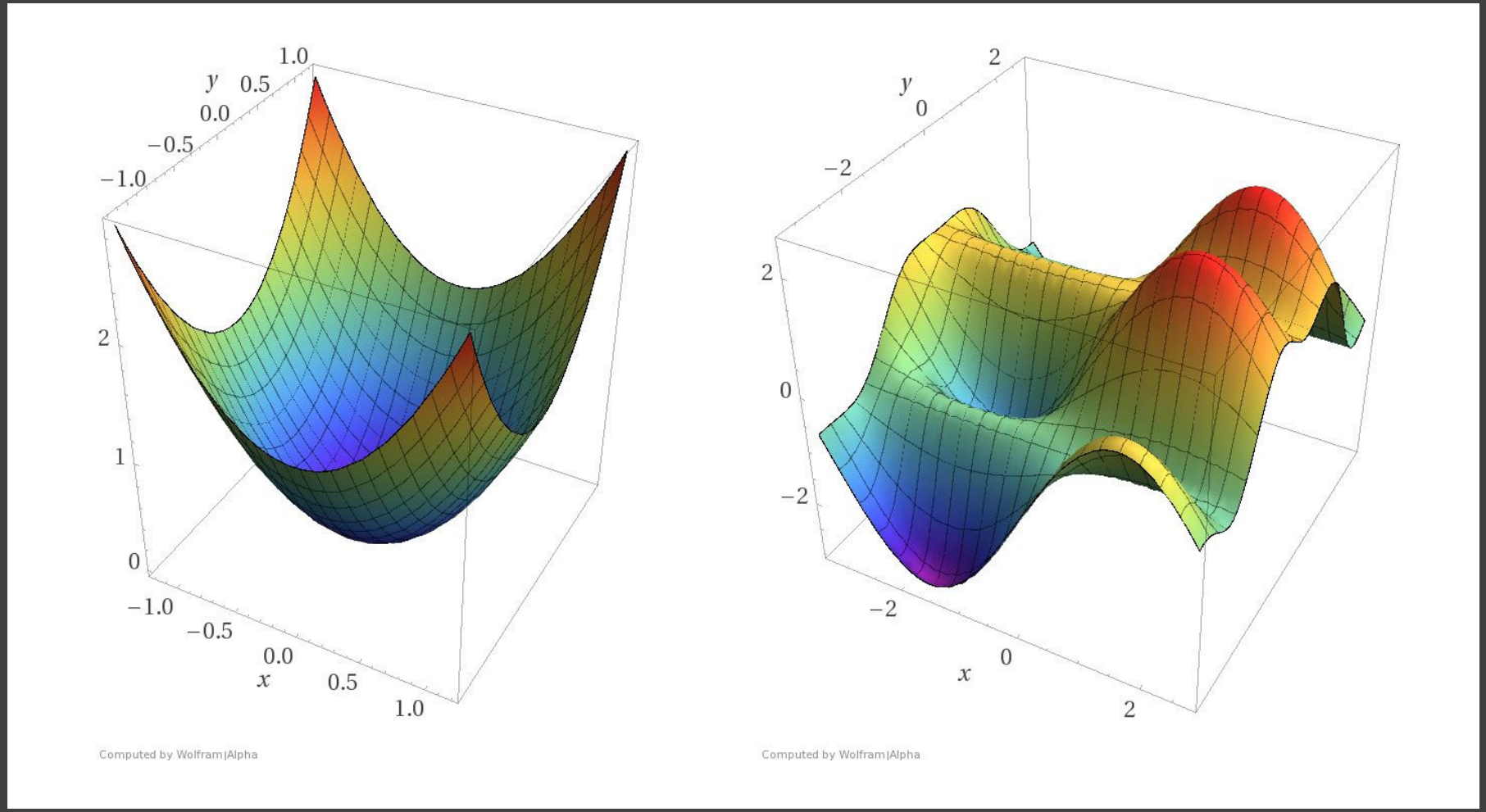

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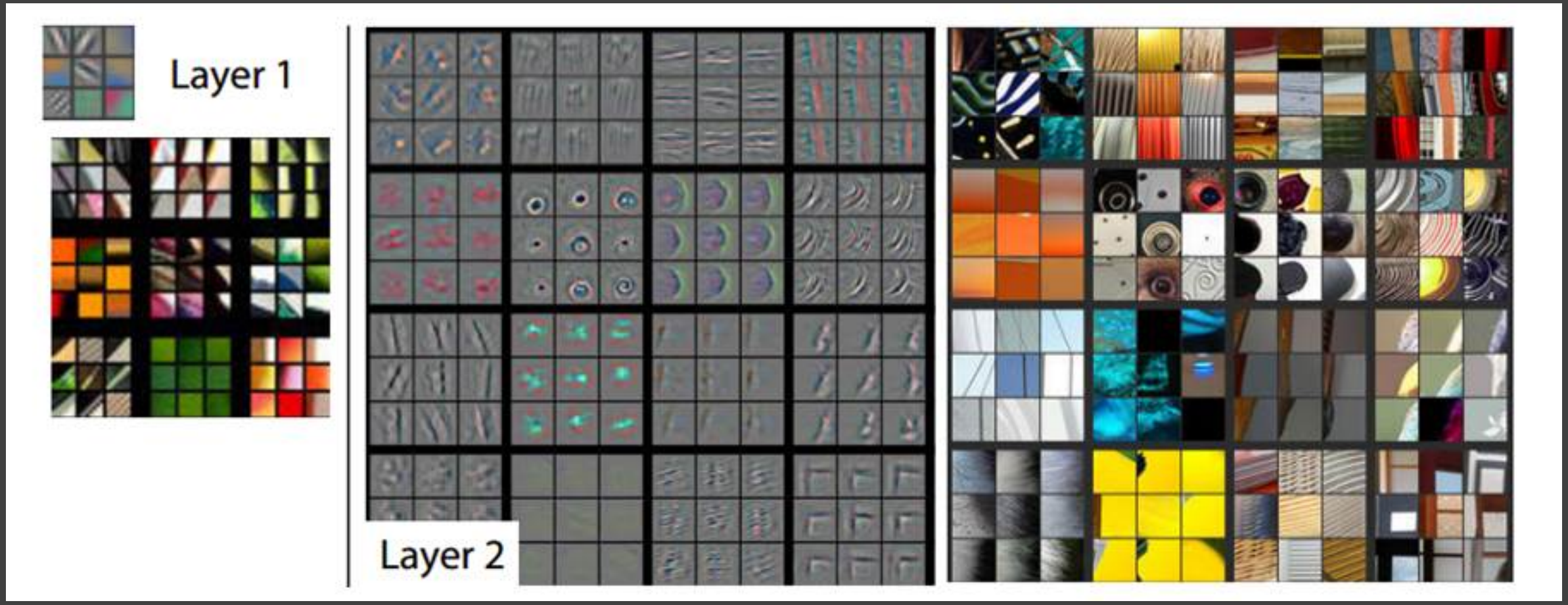

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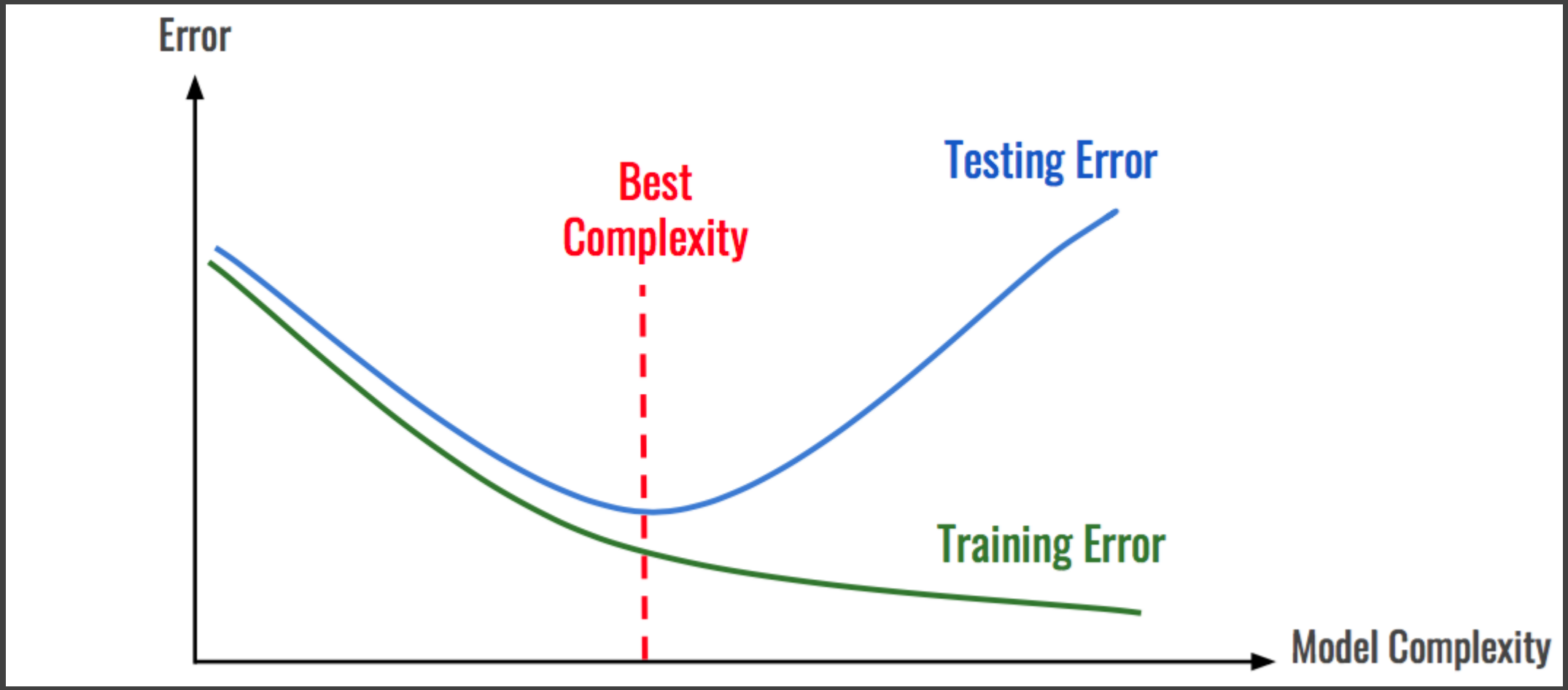


# Parleremo di...

$$IoU = \frac{\text{Area of Overlap}}{\text{Area of Union}}$$

# Parleremo di…

Featured Prediction Competition

# 2018 Data Science Bowl

## Find the nuclei in divergent images to advance medical discovery

Booz Allen Hamilton

DATA SCIENCE BOWL

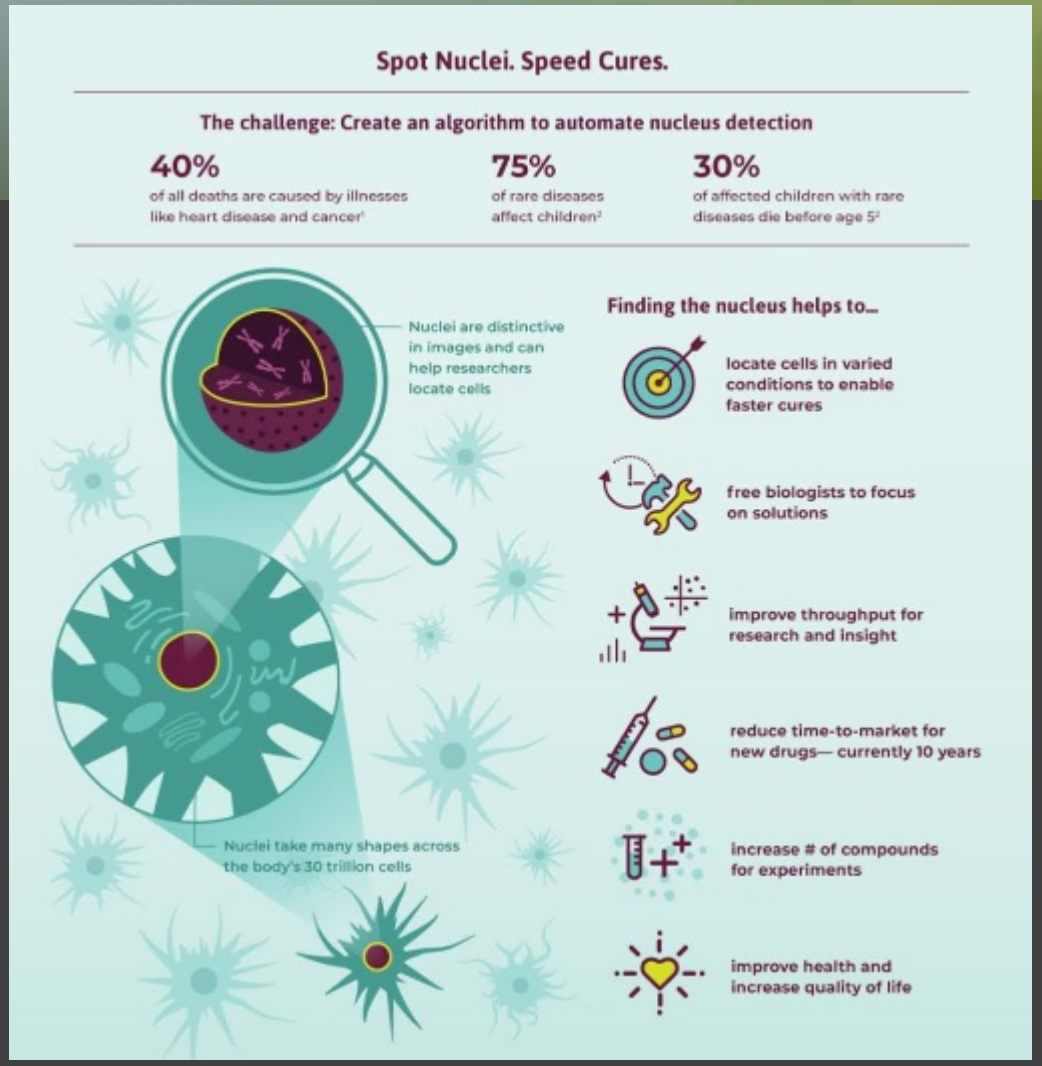
Passion. Curiosity. Purpose.

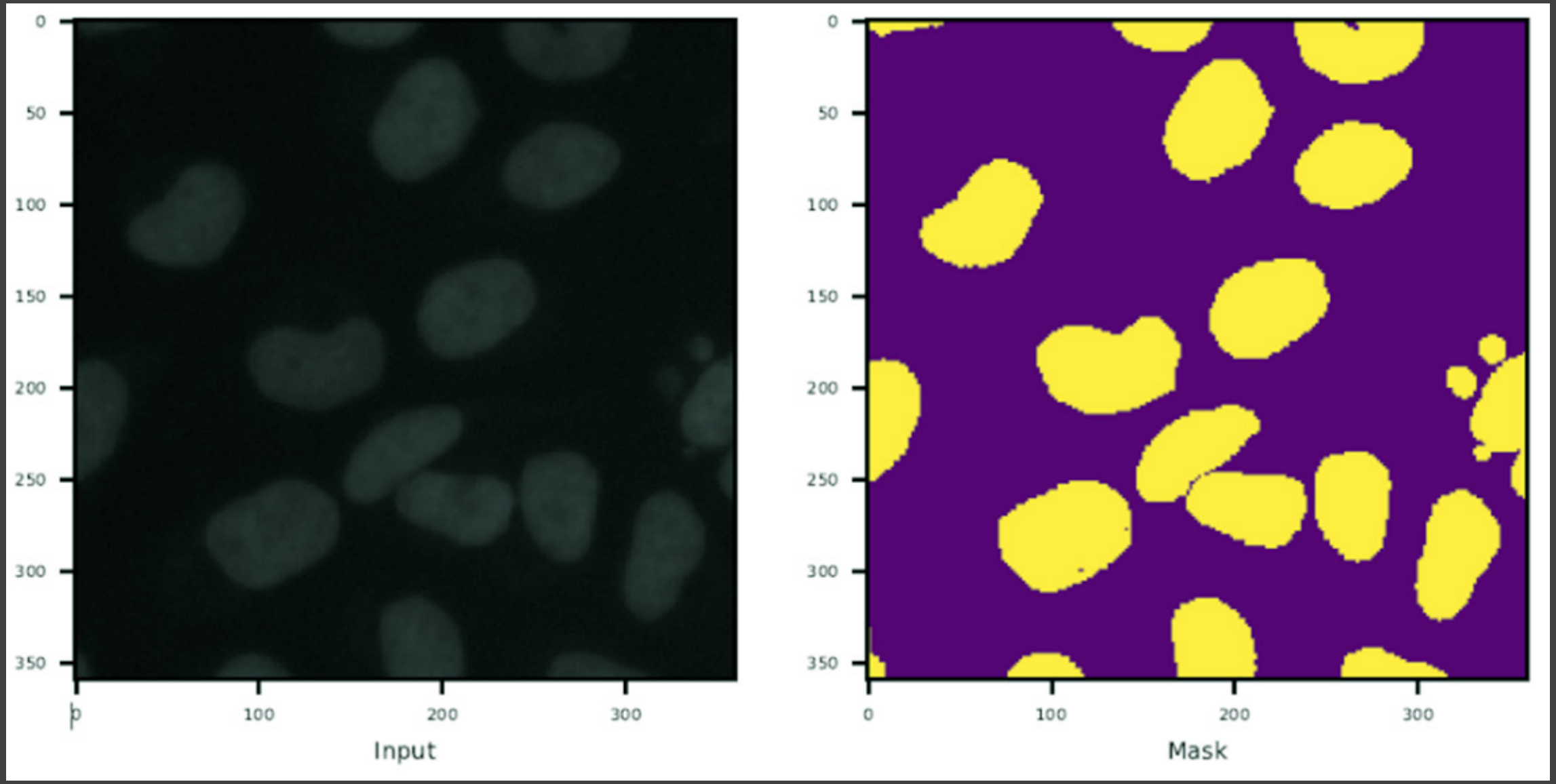
$100,000

Prize Money

*Presented by*

Booz | Allen | Hamilton & kaggle

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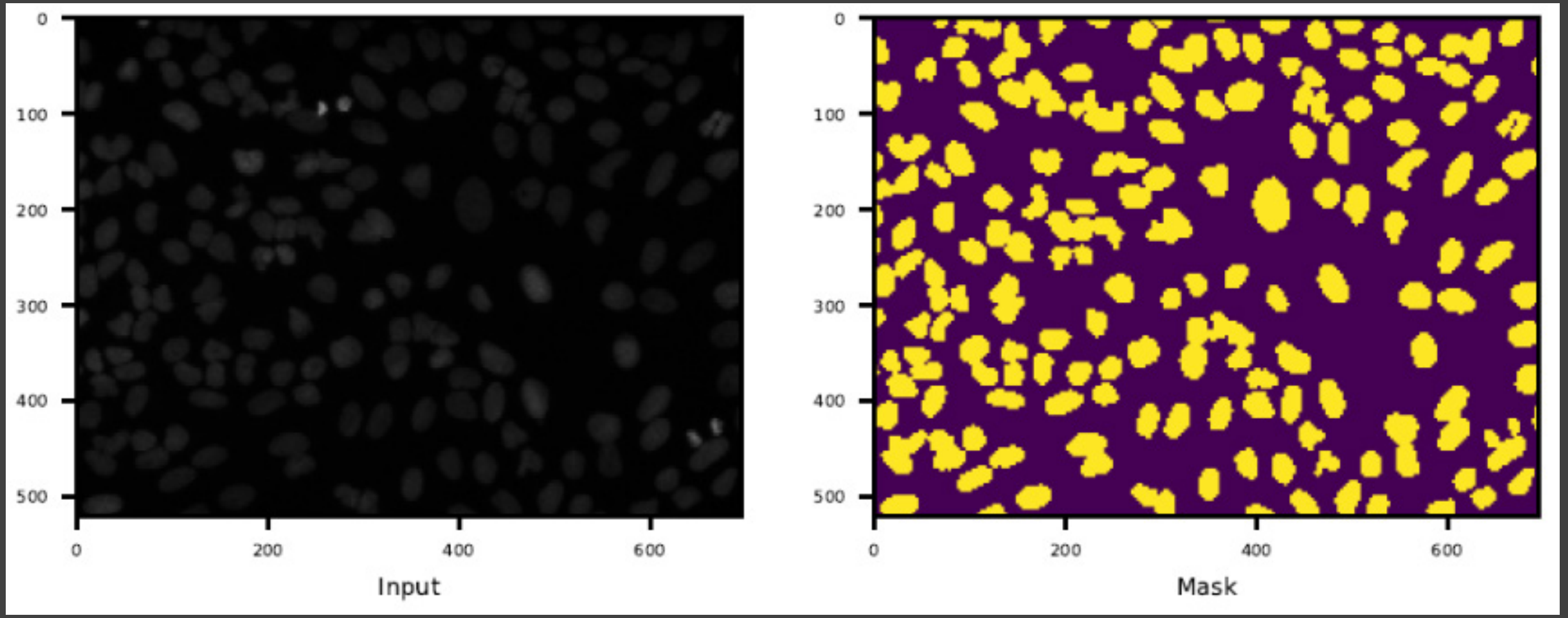
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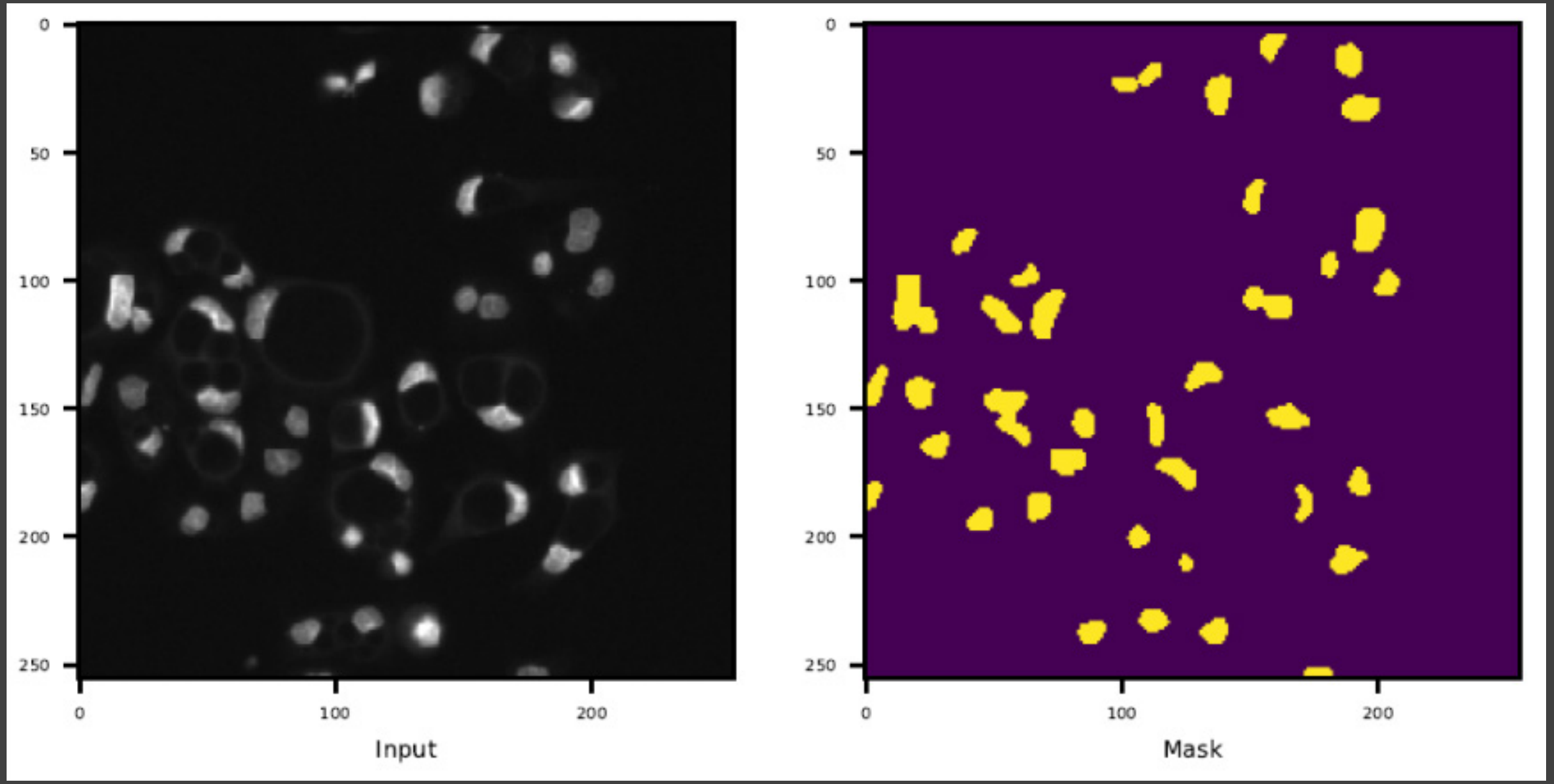
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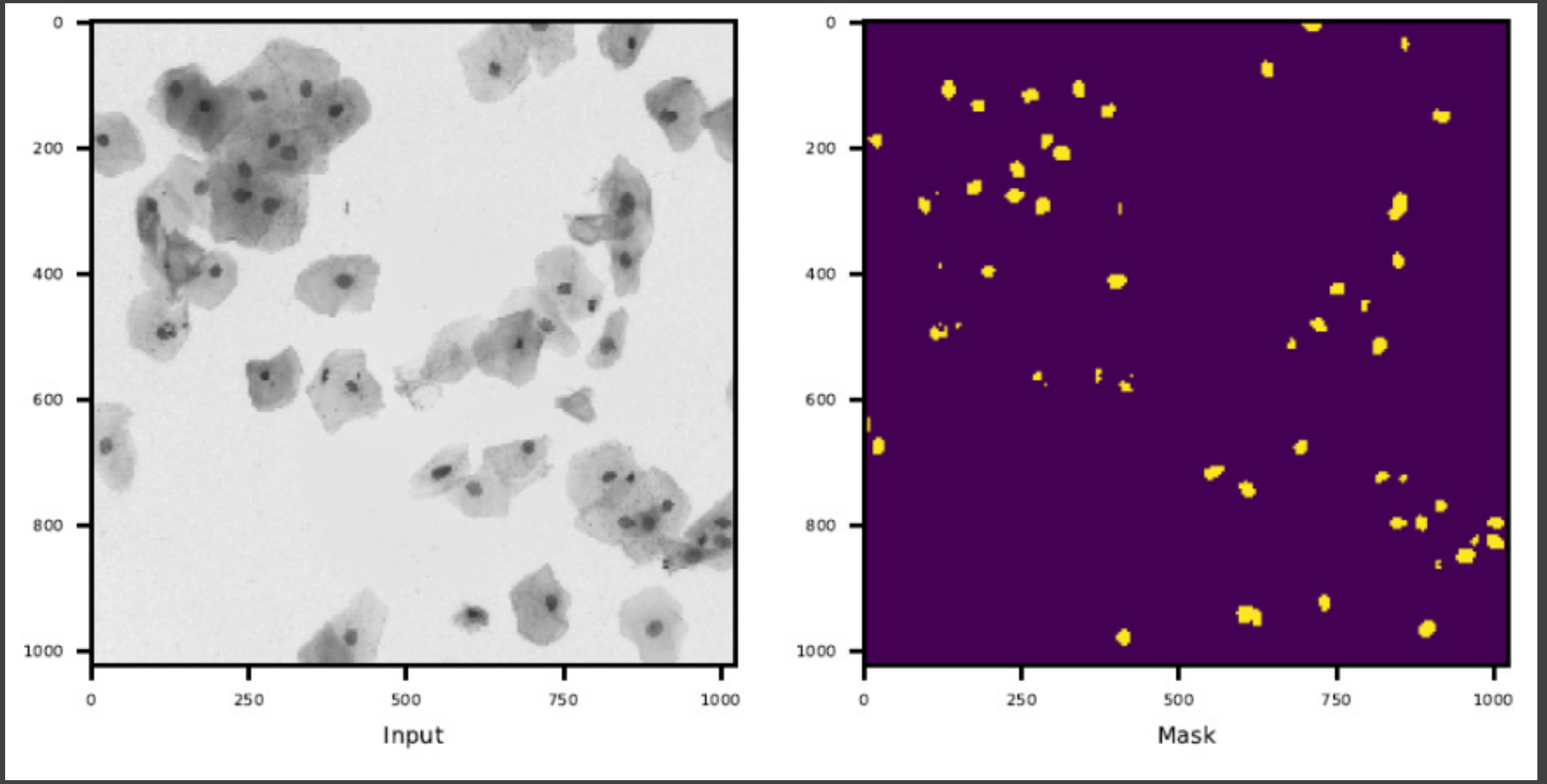
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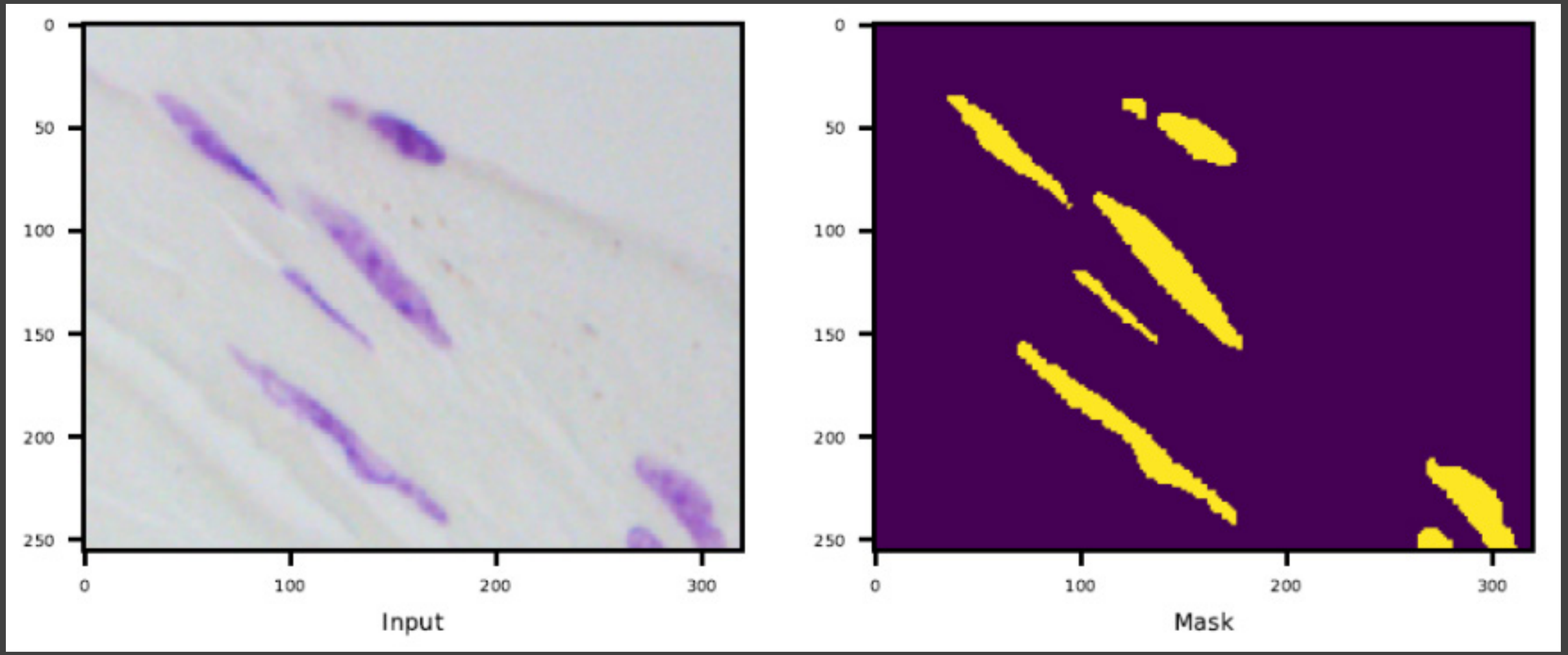
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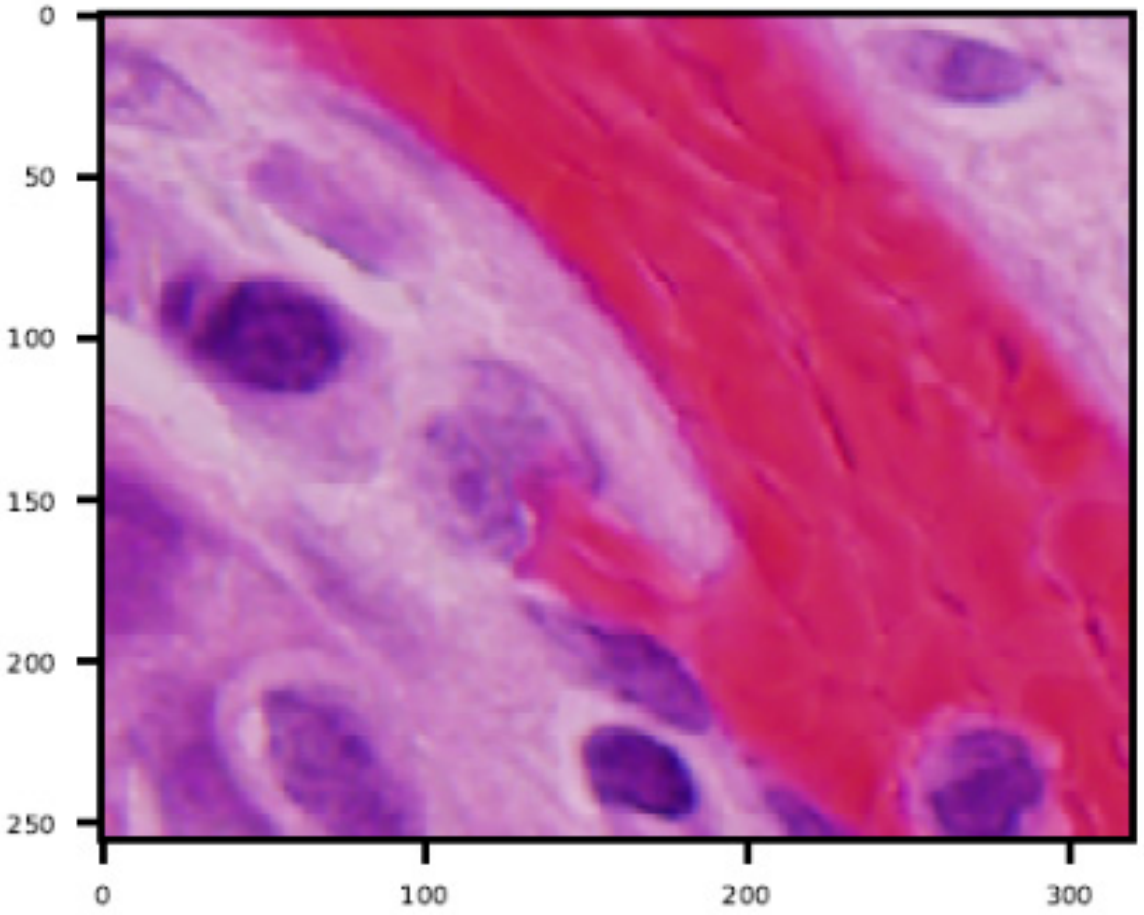
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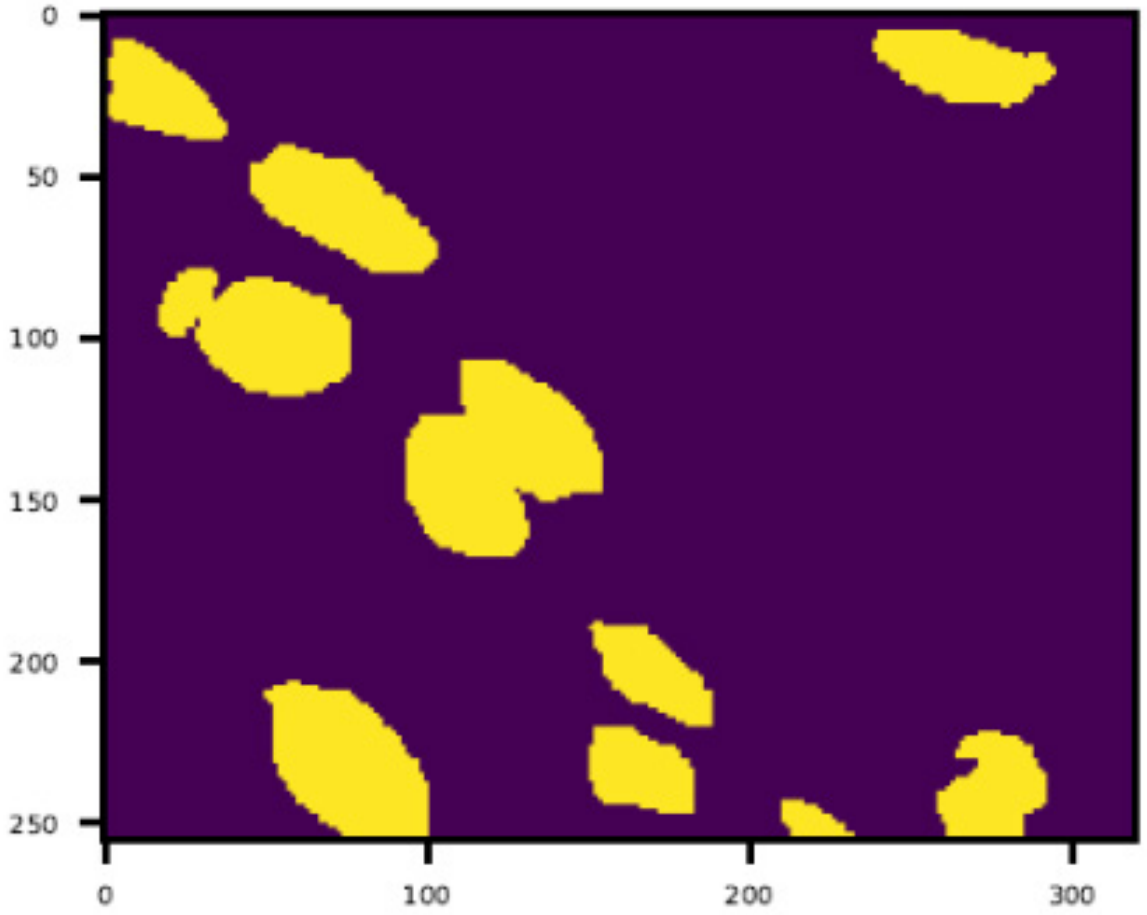
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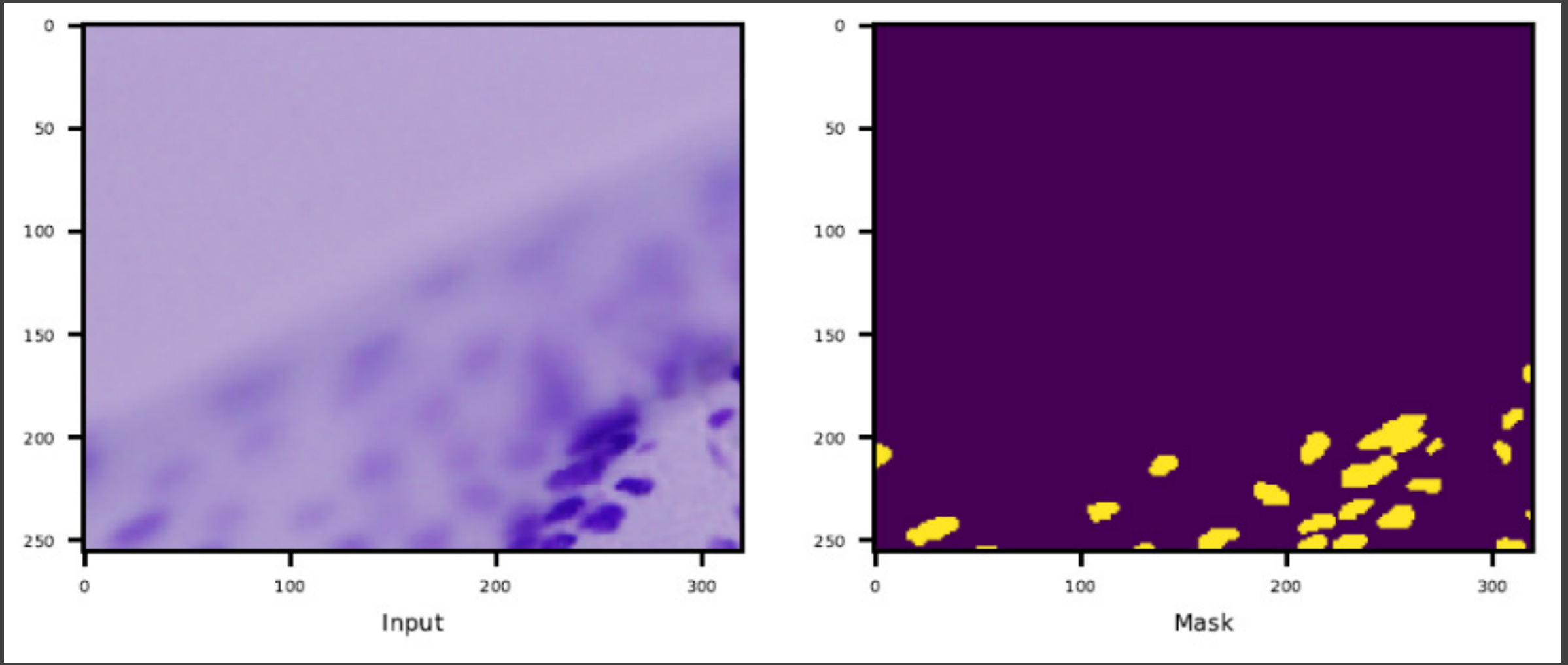
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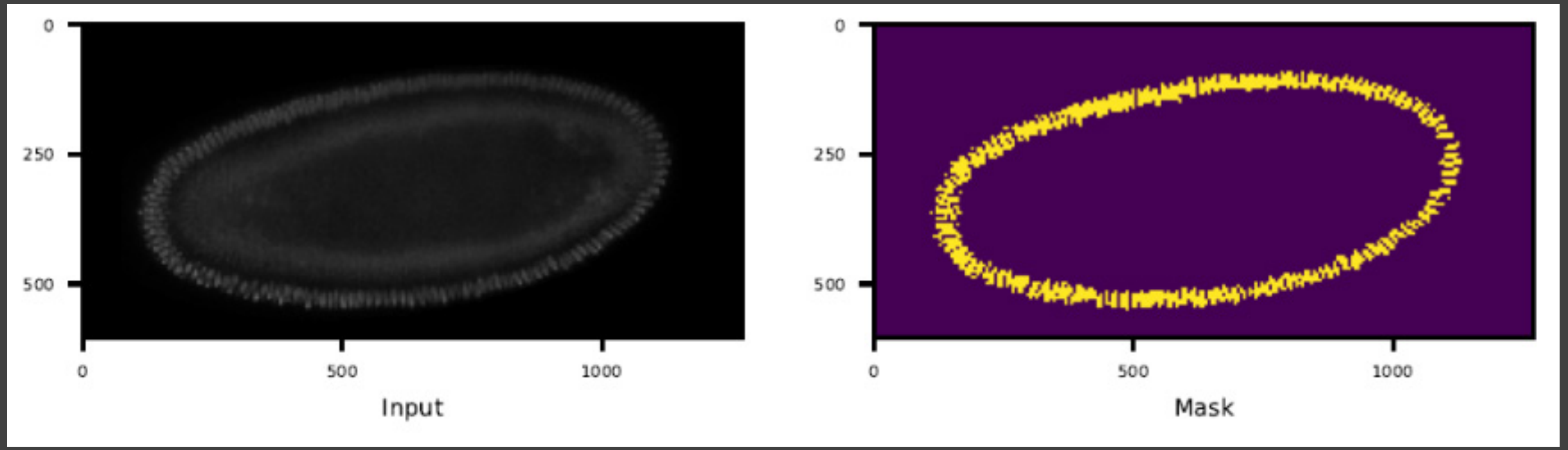
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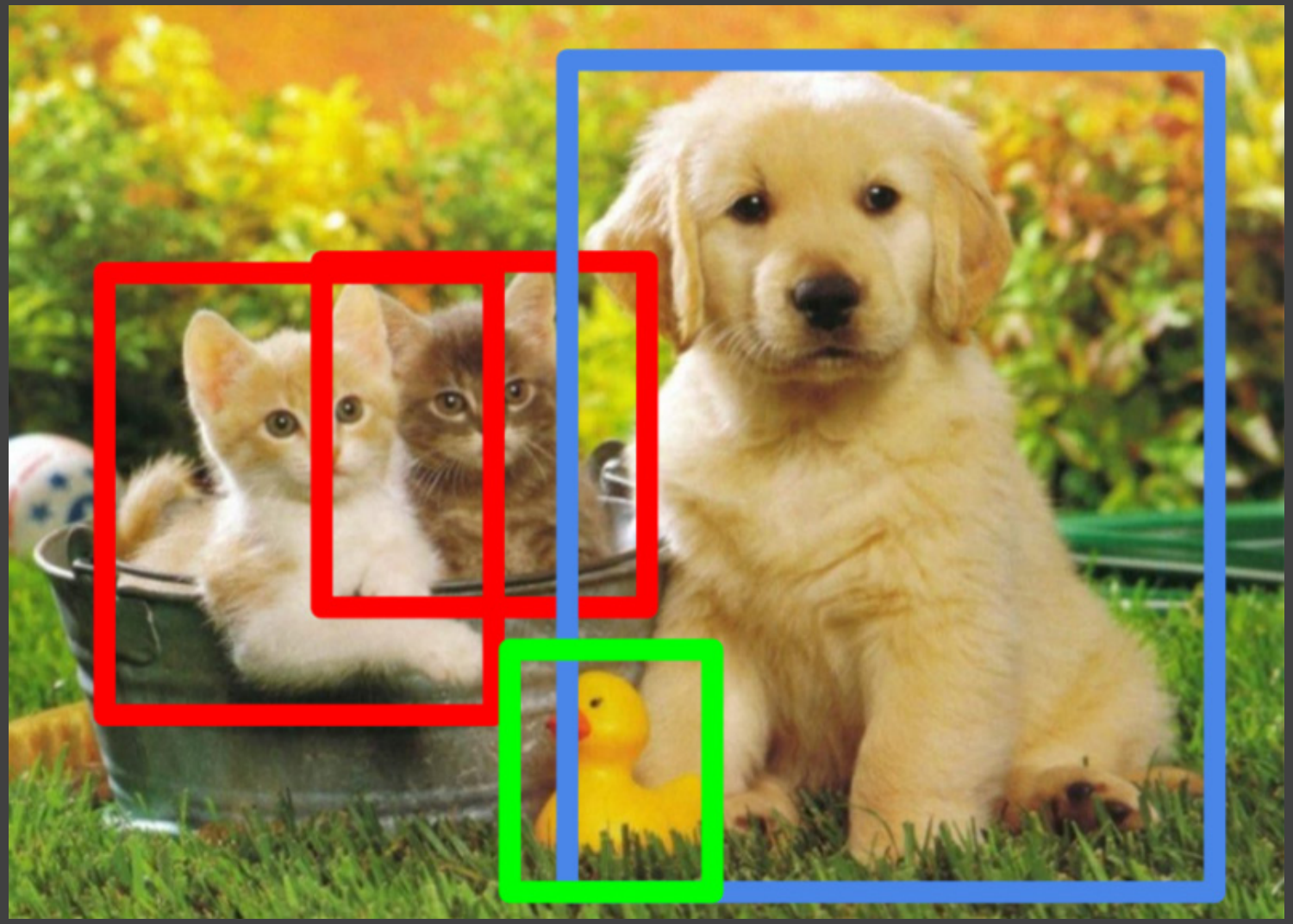
Mask

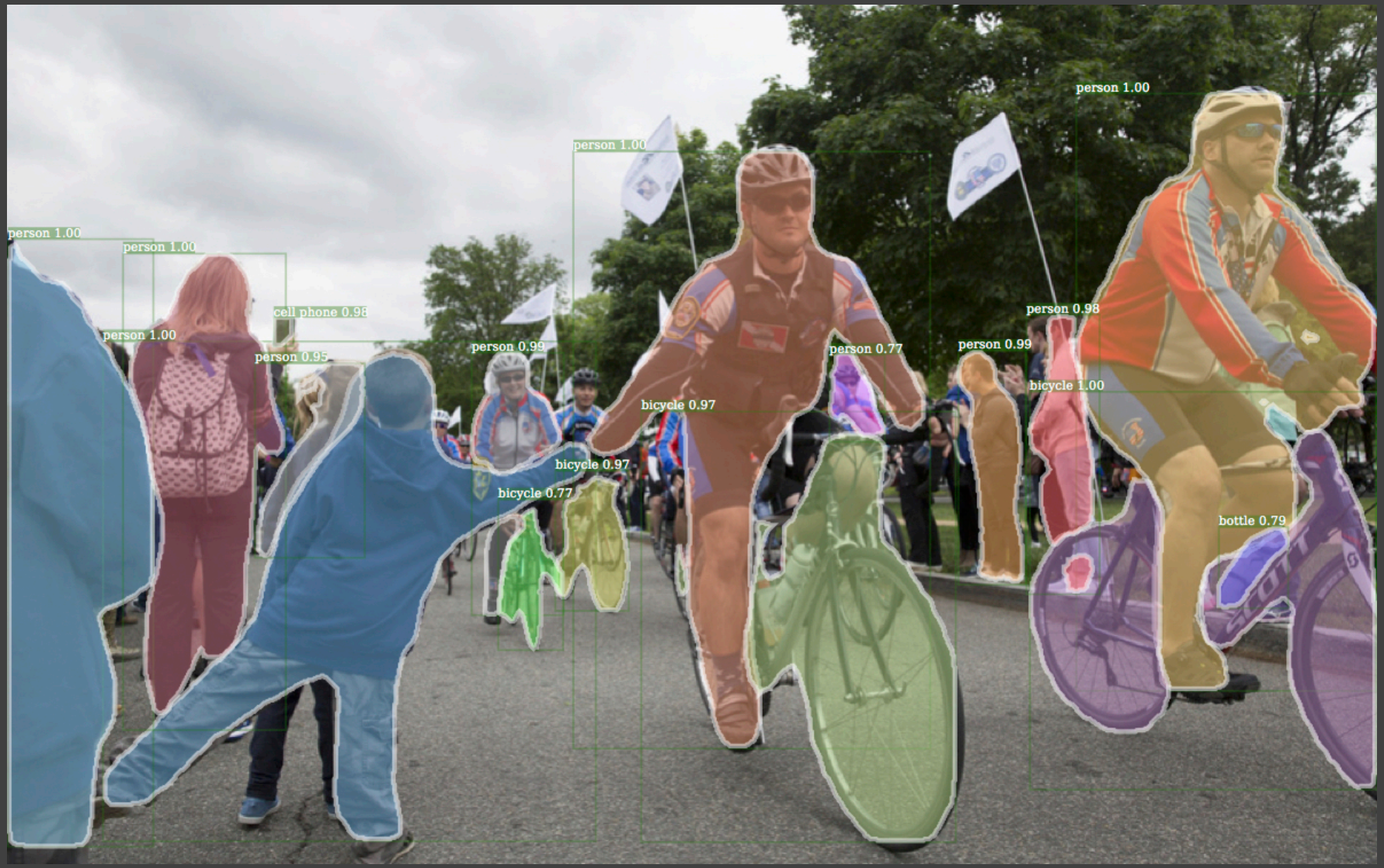
# Image Classification

# Object Detection

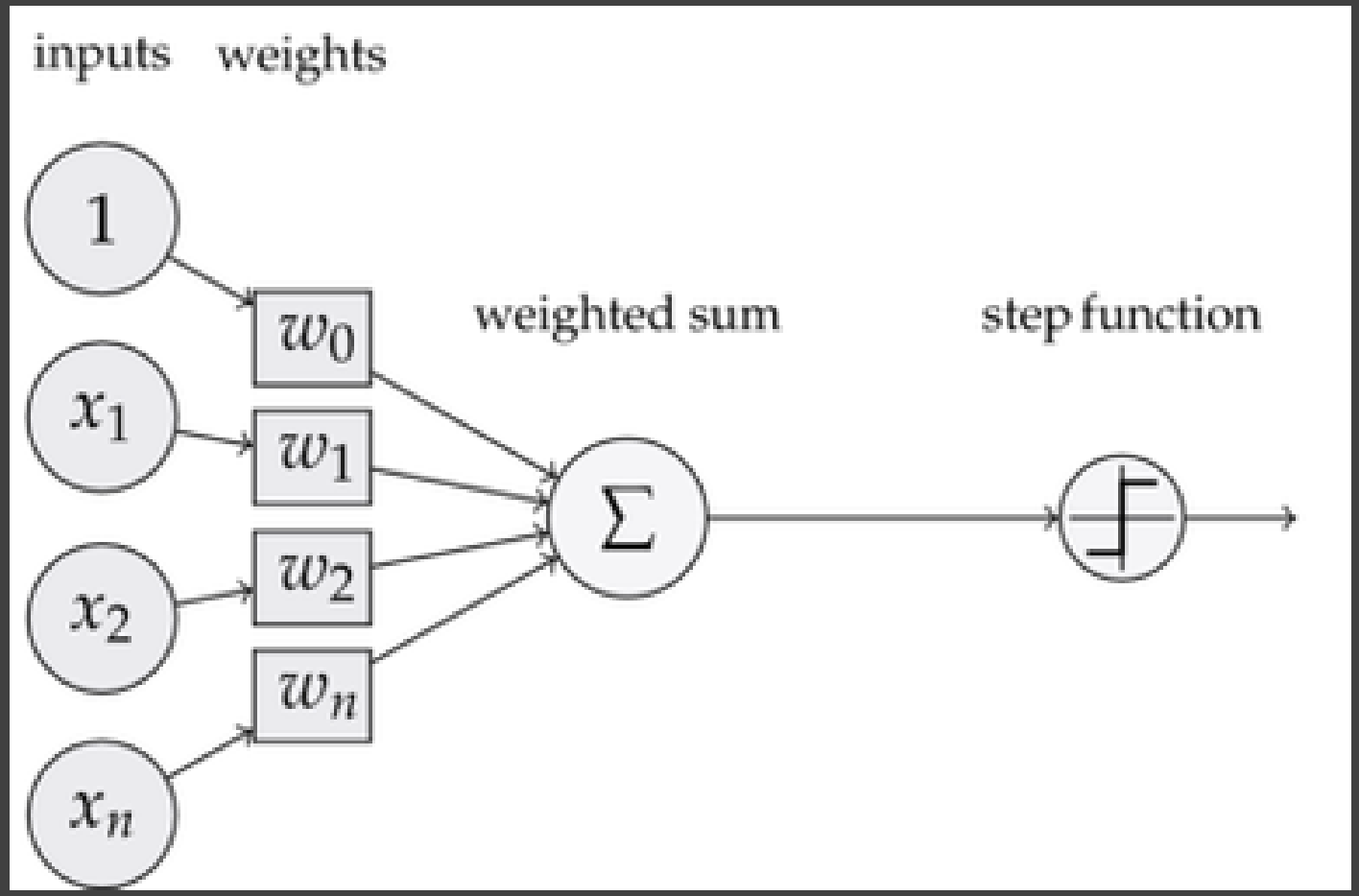


# Semantic Segmentation

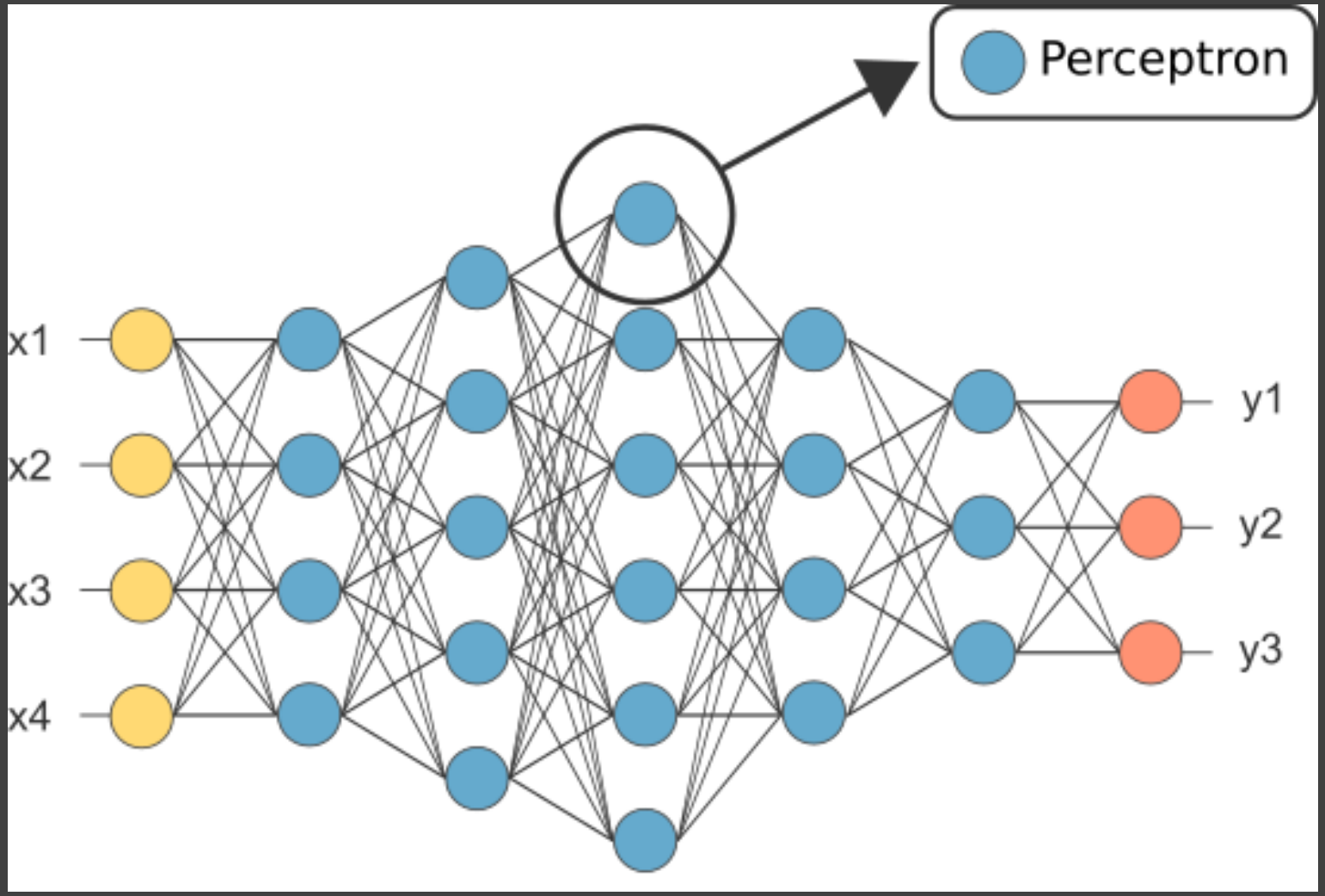
# Instance Segmentation



# Perceptron - (Frank Rosenblatt)




# Rete neurale



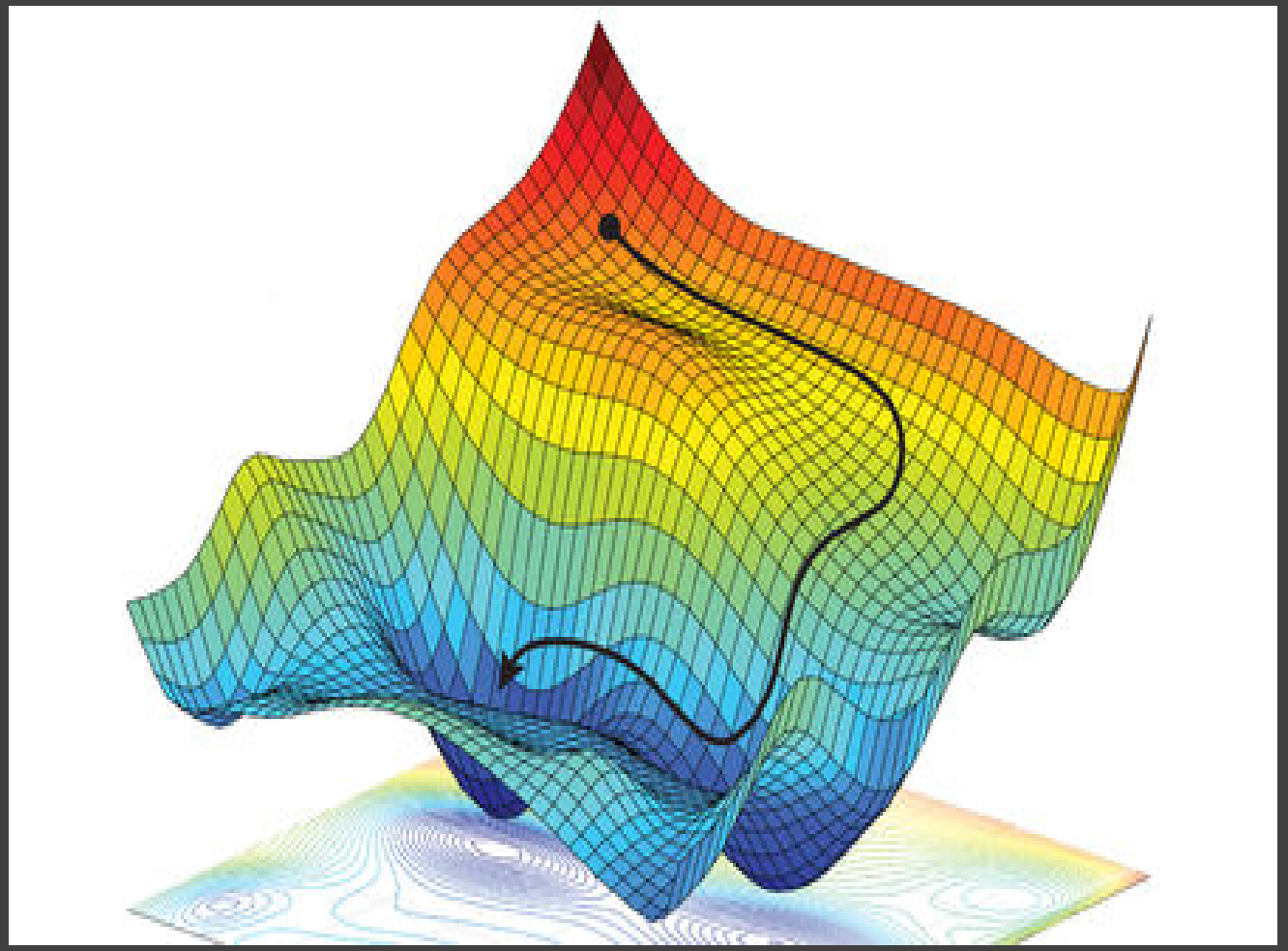
# Learning: Gradient Descent + Backpropagation

TL;DR

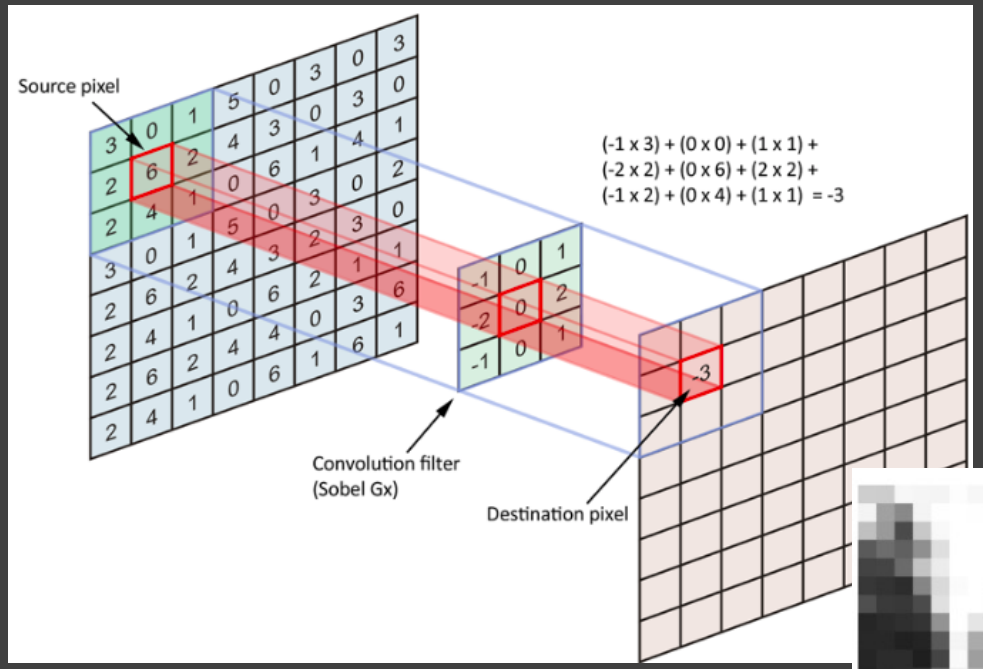
Modificare iterativamente parametri

↓

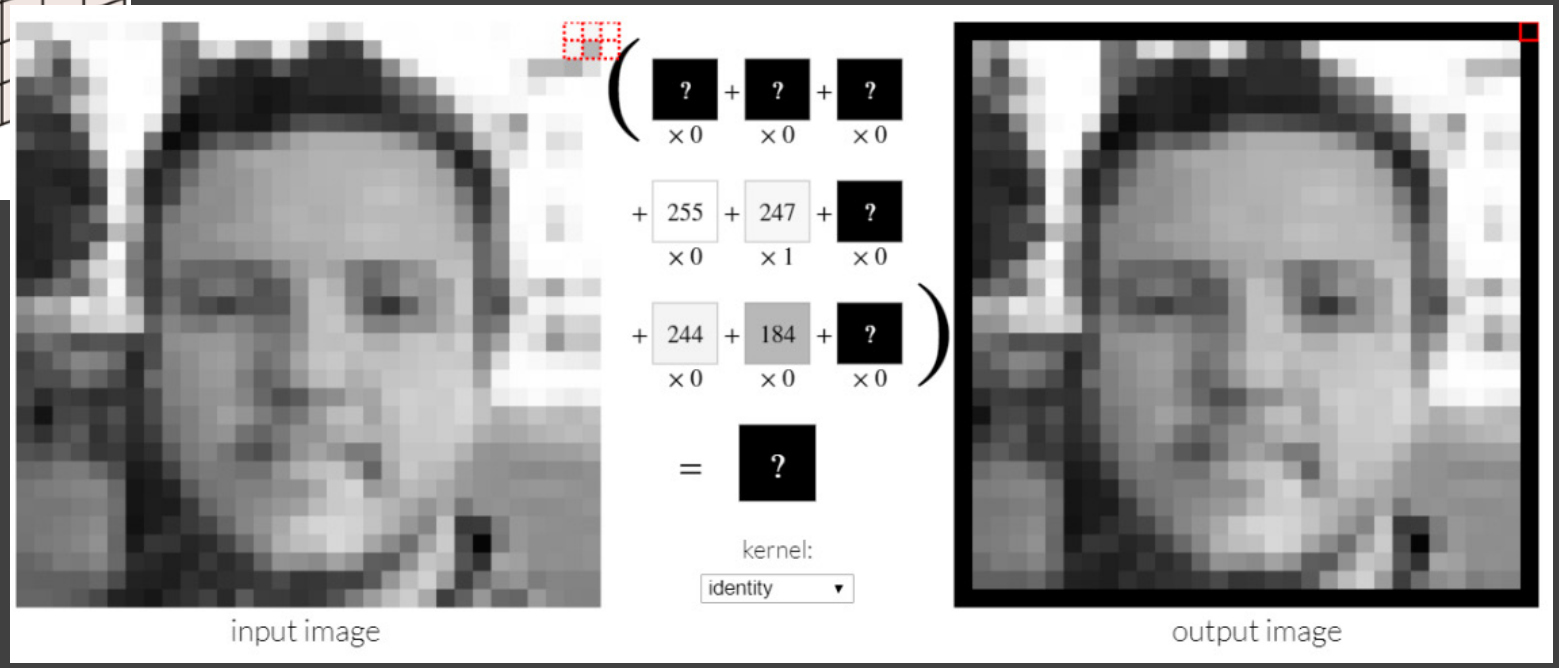
Migliorare risultati algoritmo



# Convolutional Filter

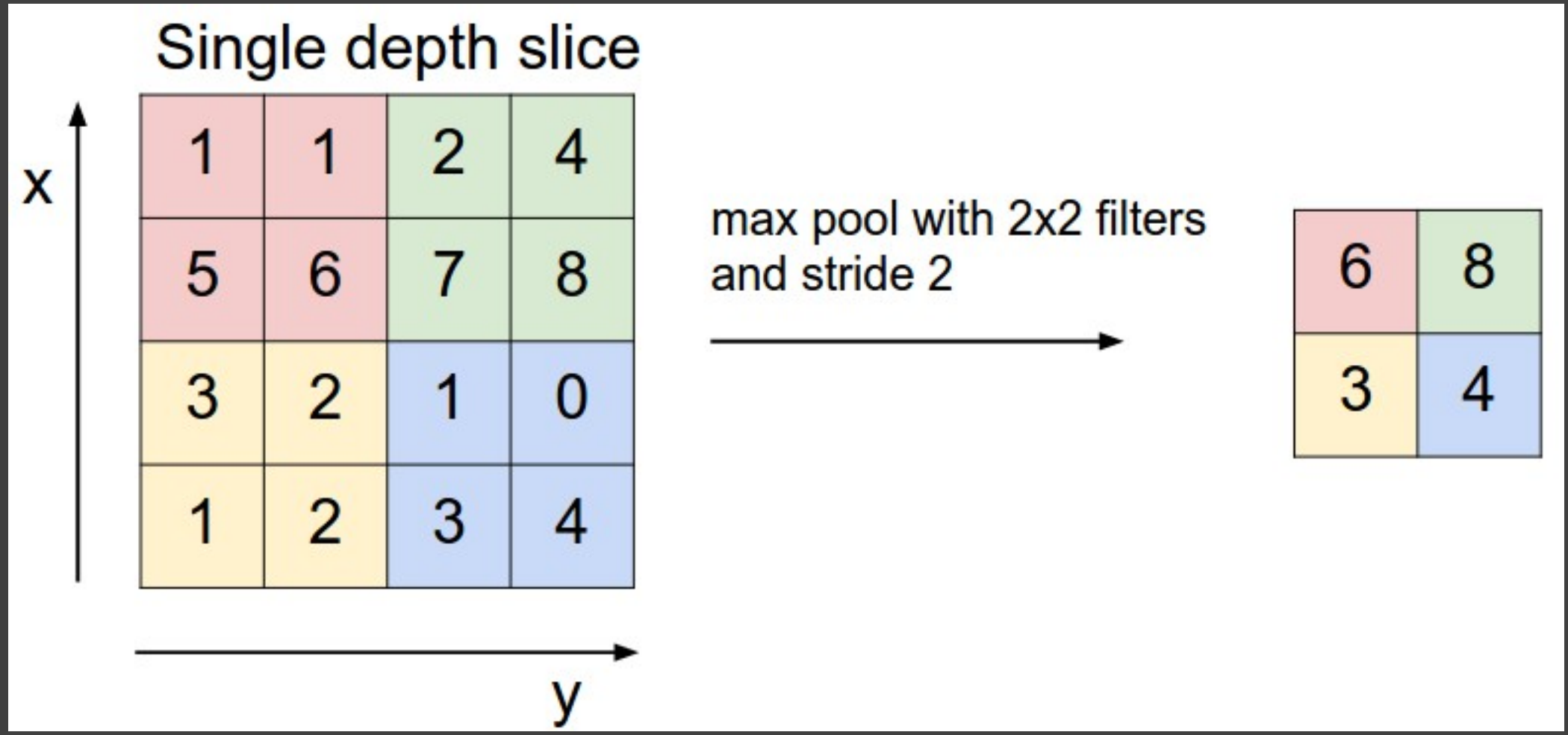



Explained Visually (http://setosa.io/ev/image-kernels/)

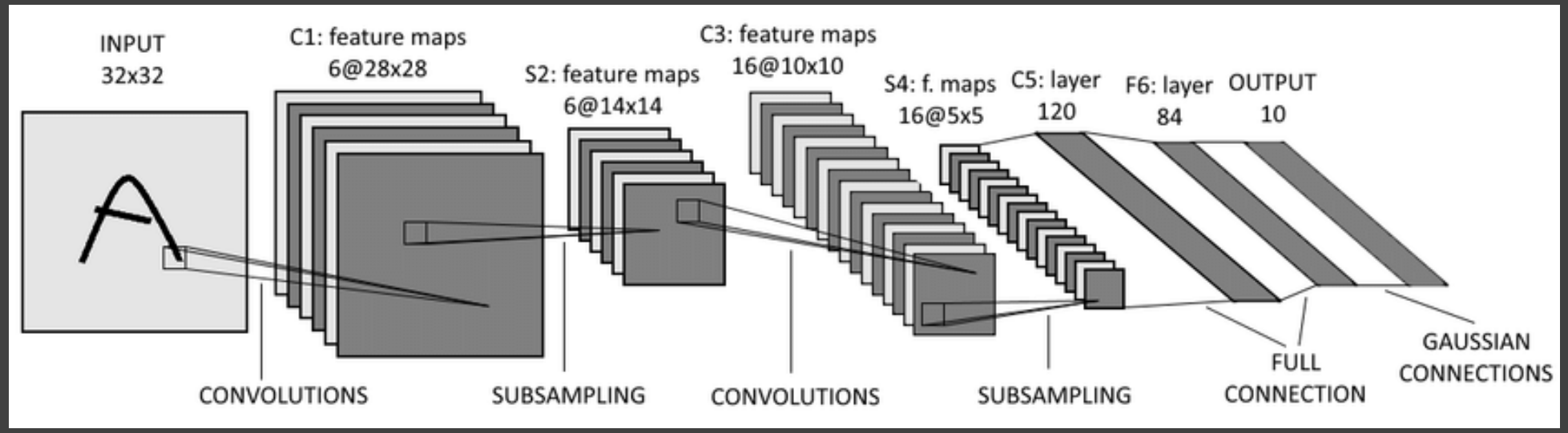


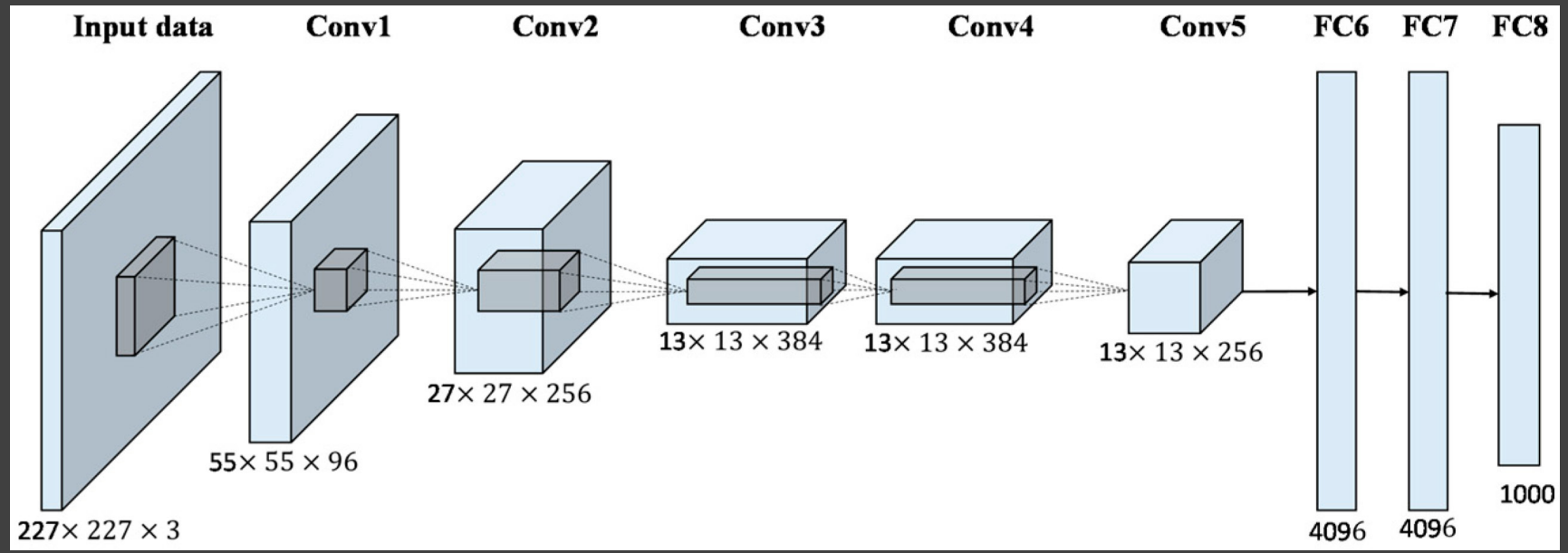
# Esempio filtri

# Pooling

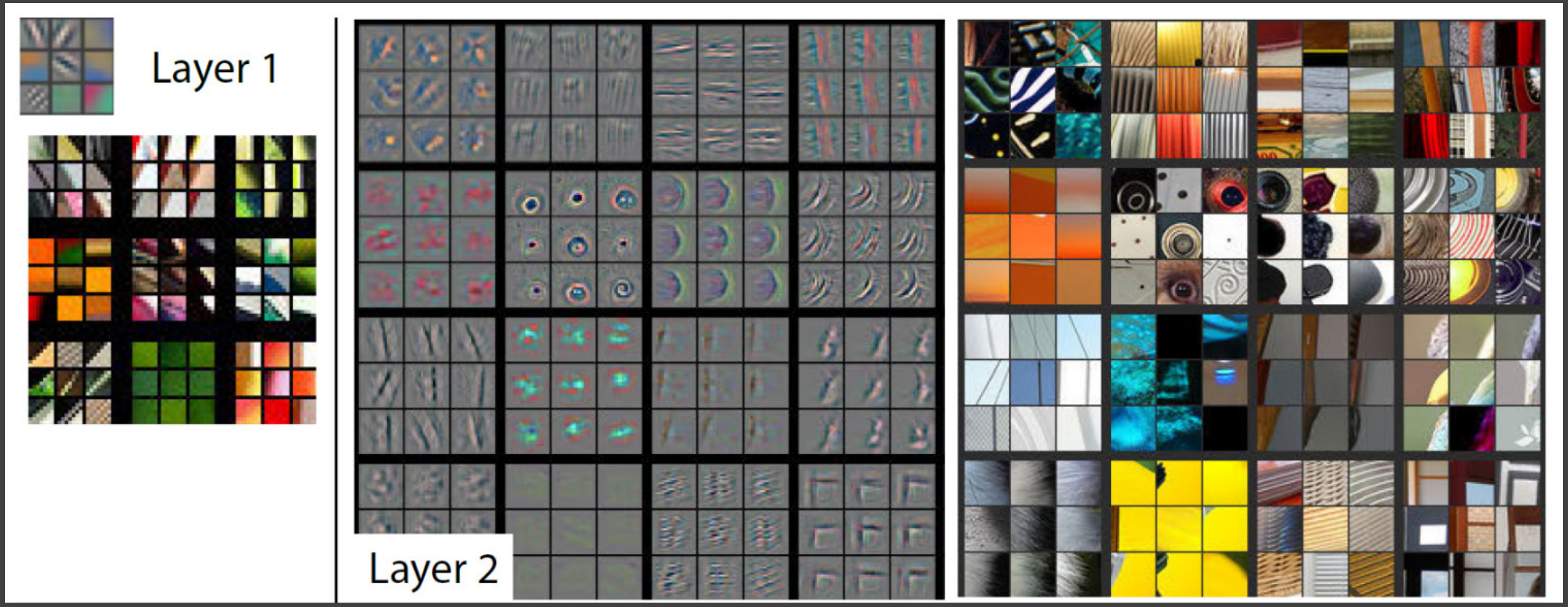

Single depth slice
x
y
1 1 2 4
5 6 7 8
3 2 1 0
1 2 3 4
max pool with 2x2 filters
and stride 2
6 8
3 4

# LeNet-5 (Yann LeCun) - AlexNet (Alex Krizhevsky)




# Visualizing and Understanding Convolutional Networks (https://arxiv.org/abs/1311.2901)

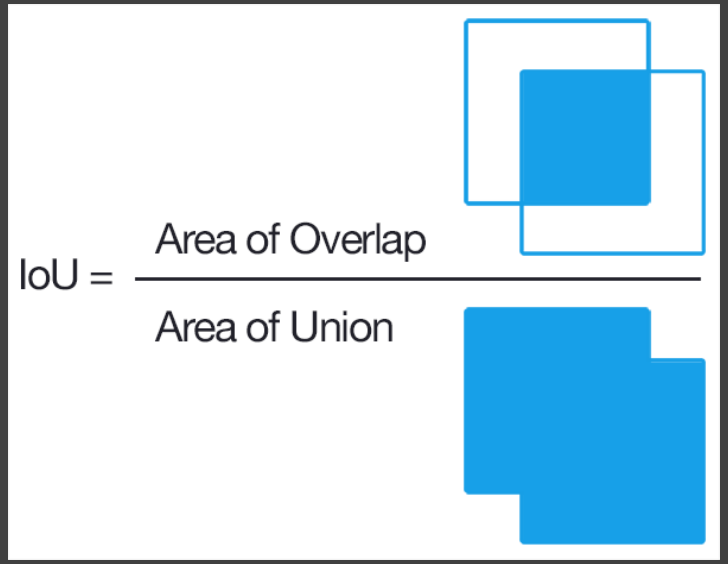


si parte!!

# Comprensione del problema

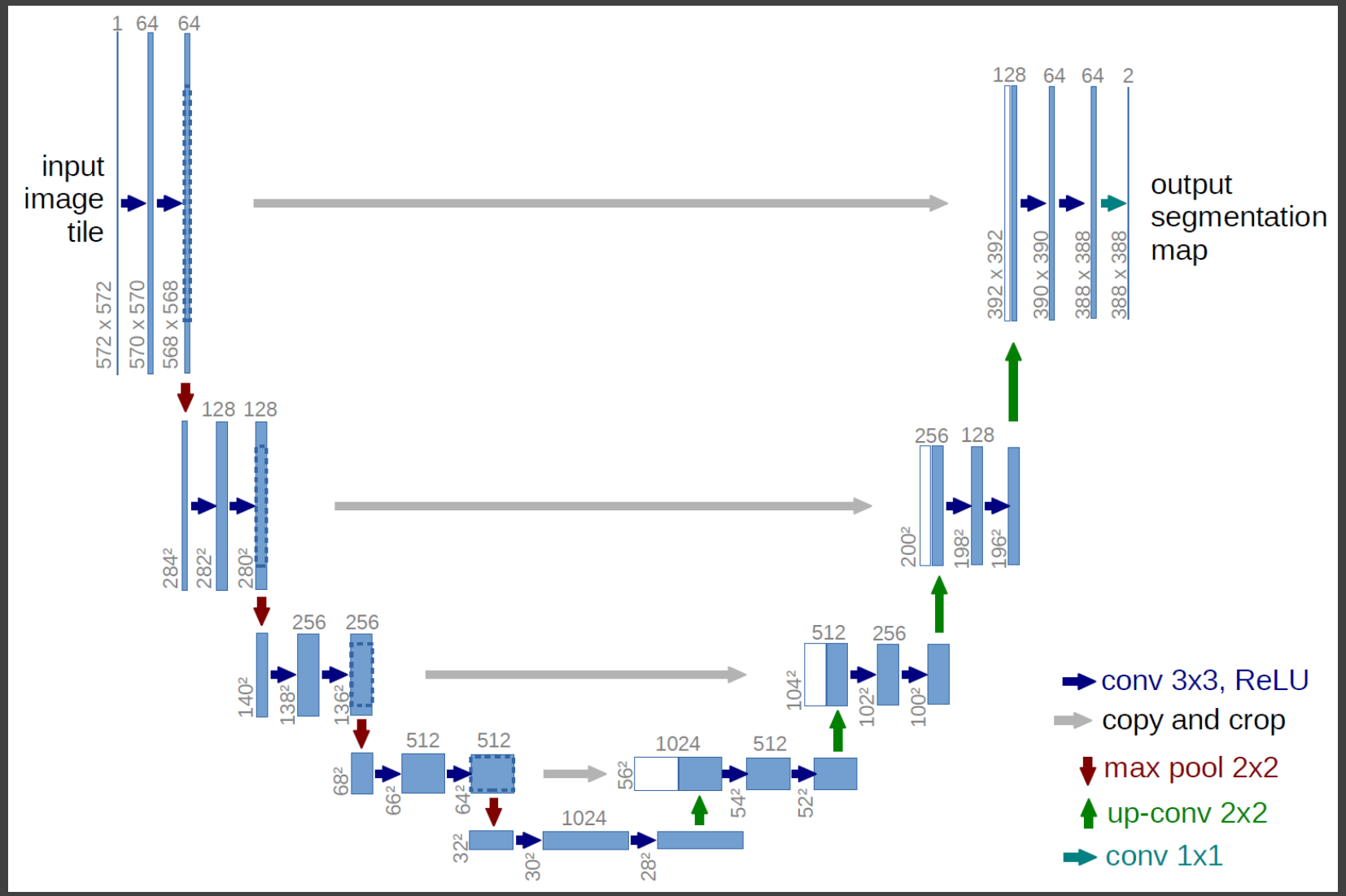
- Criterio di valutazione:
  - Intersection over Union (IoU)
  - Soglie (0.5 - 0.95)

$$\frac{1}{|thresholds|}\sum_{t}\frac{TP(t)}{TP(t)+FP(t)+FN(t)}$$

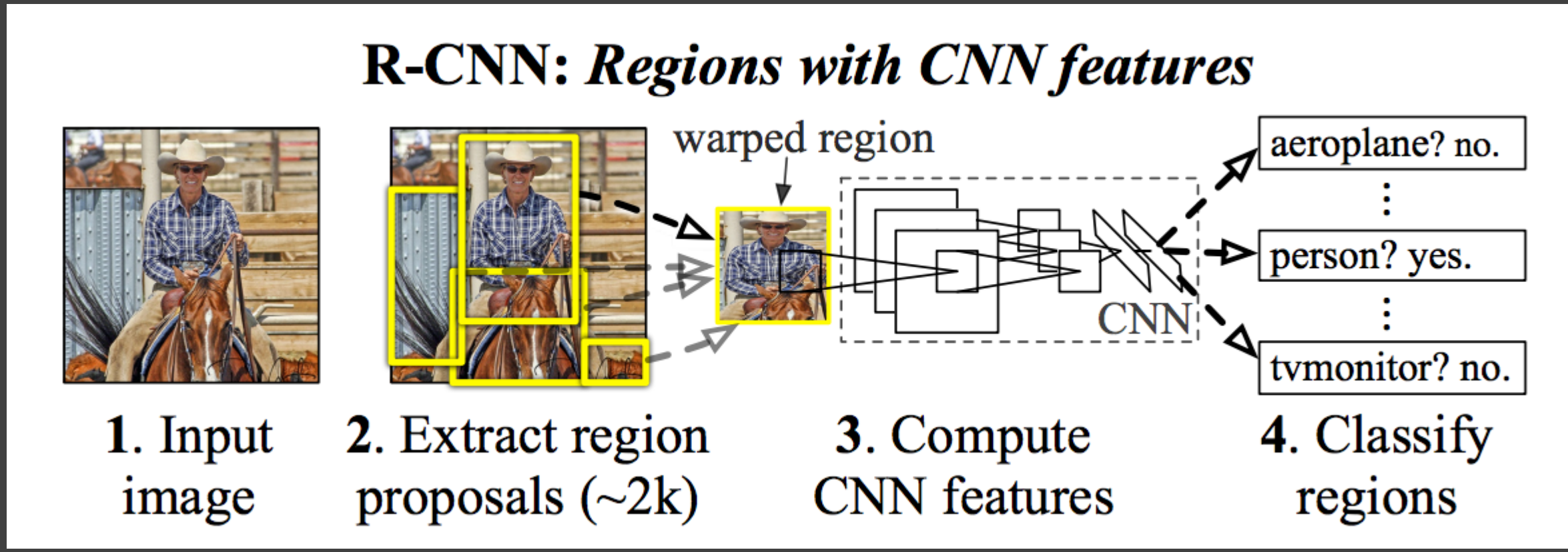



- Strategia di validazione

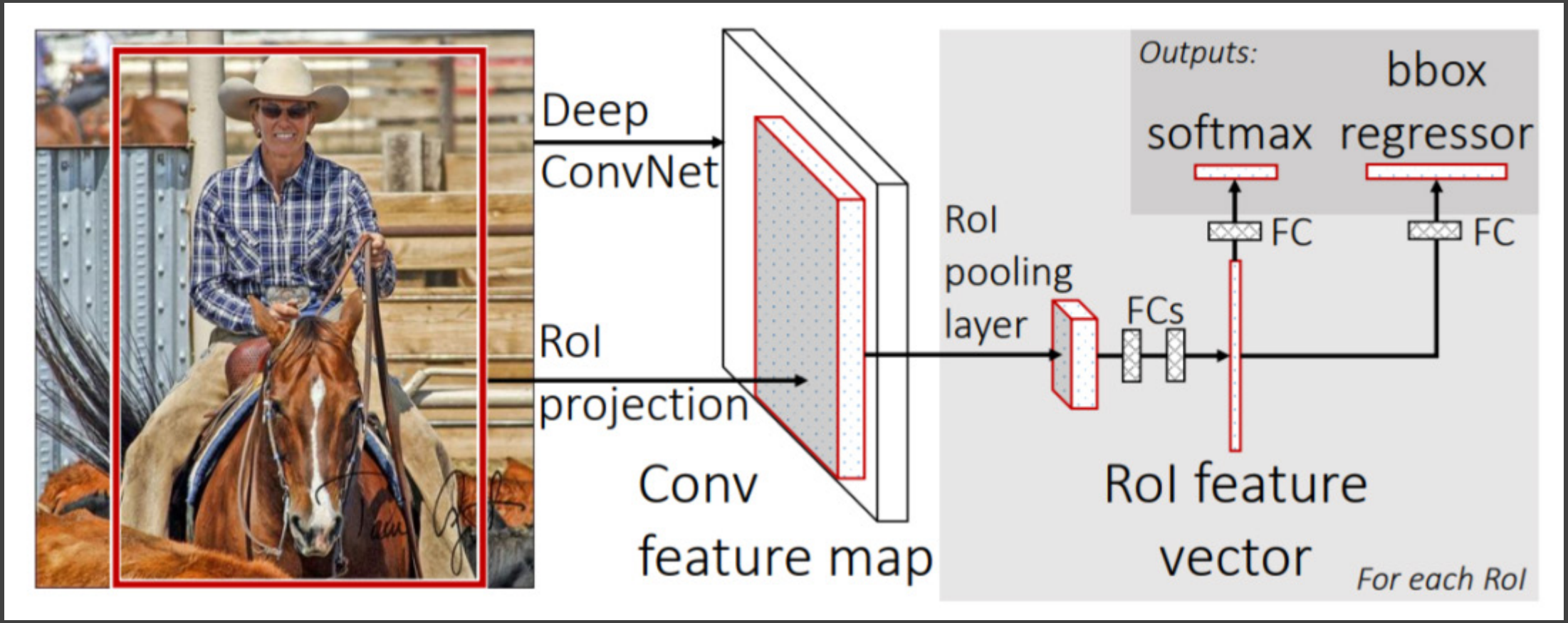
# U-Net (2015) (https://arxiv.org/abs/1505.04597)



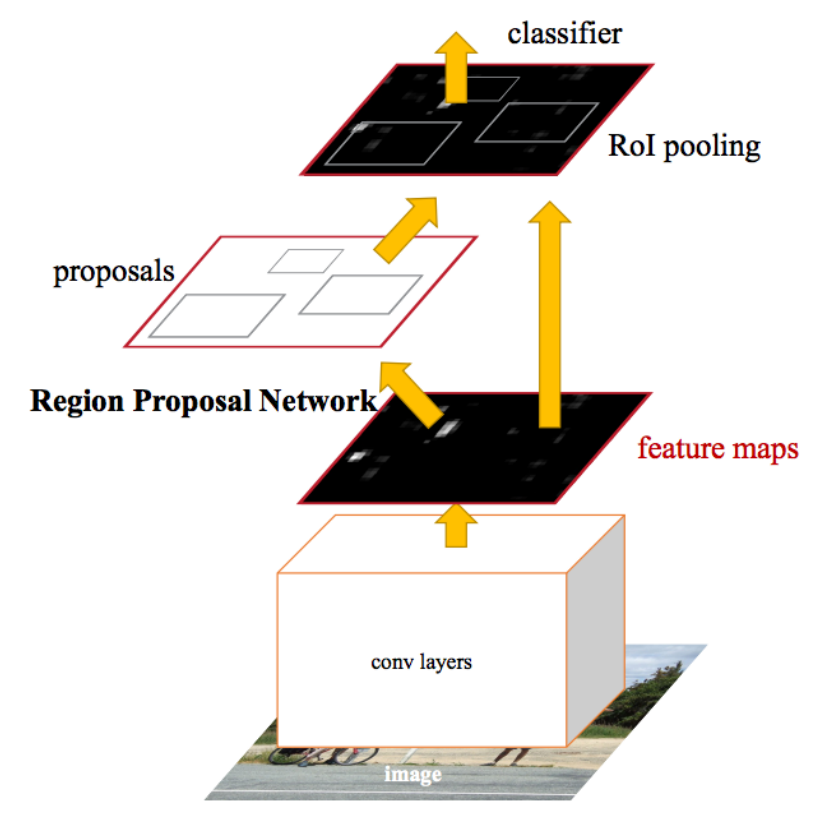
# R-CNN (2014) (https://arxiv.org/abs/1311.2524)

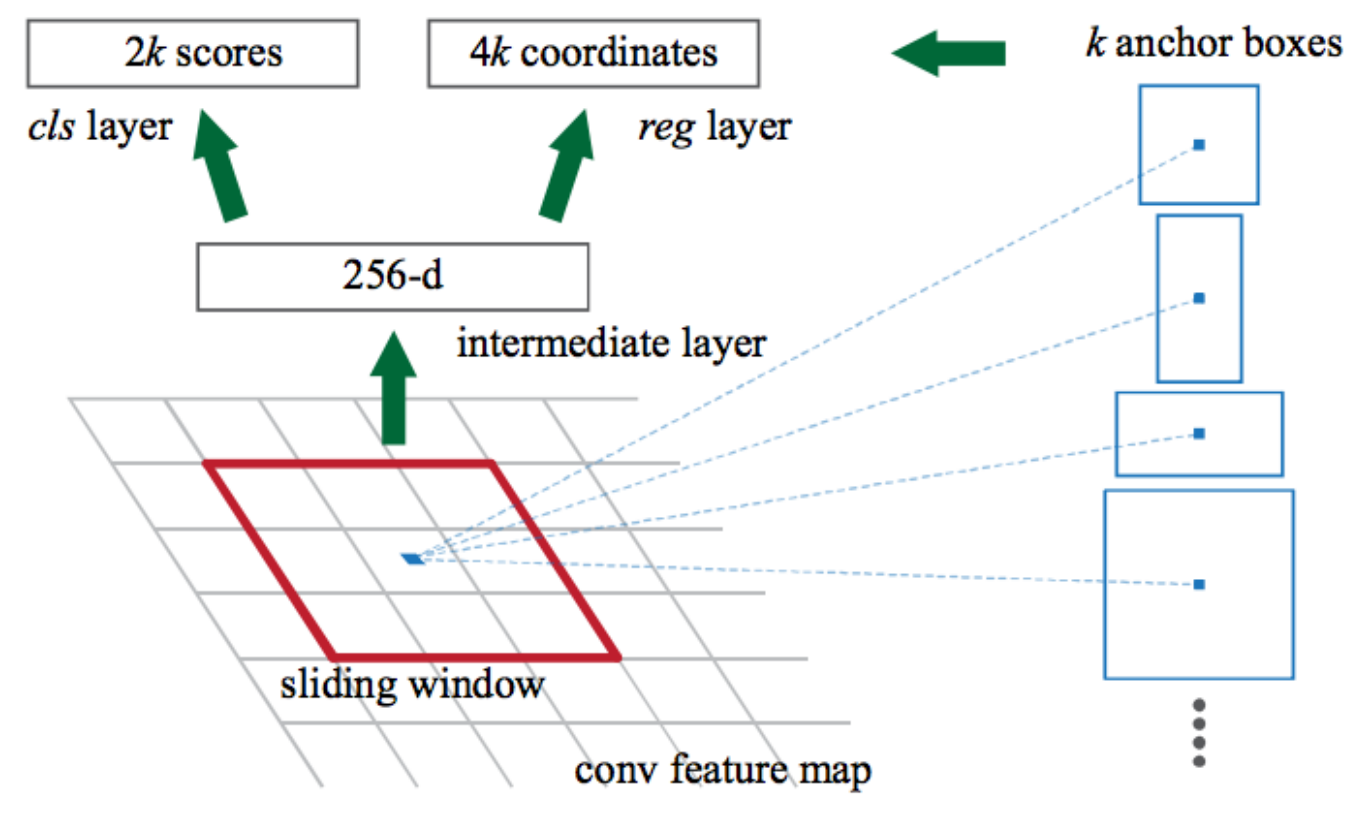


# Fast R-CNN (2015) (https://arxiv.org/abs/1504.08083)

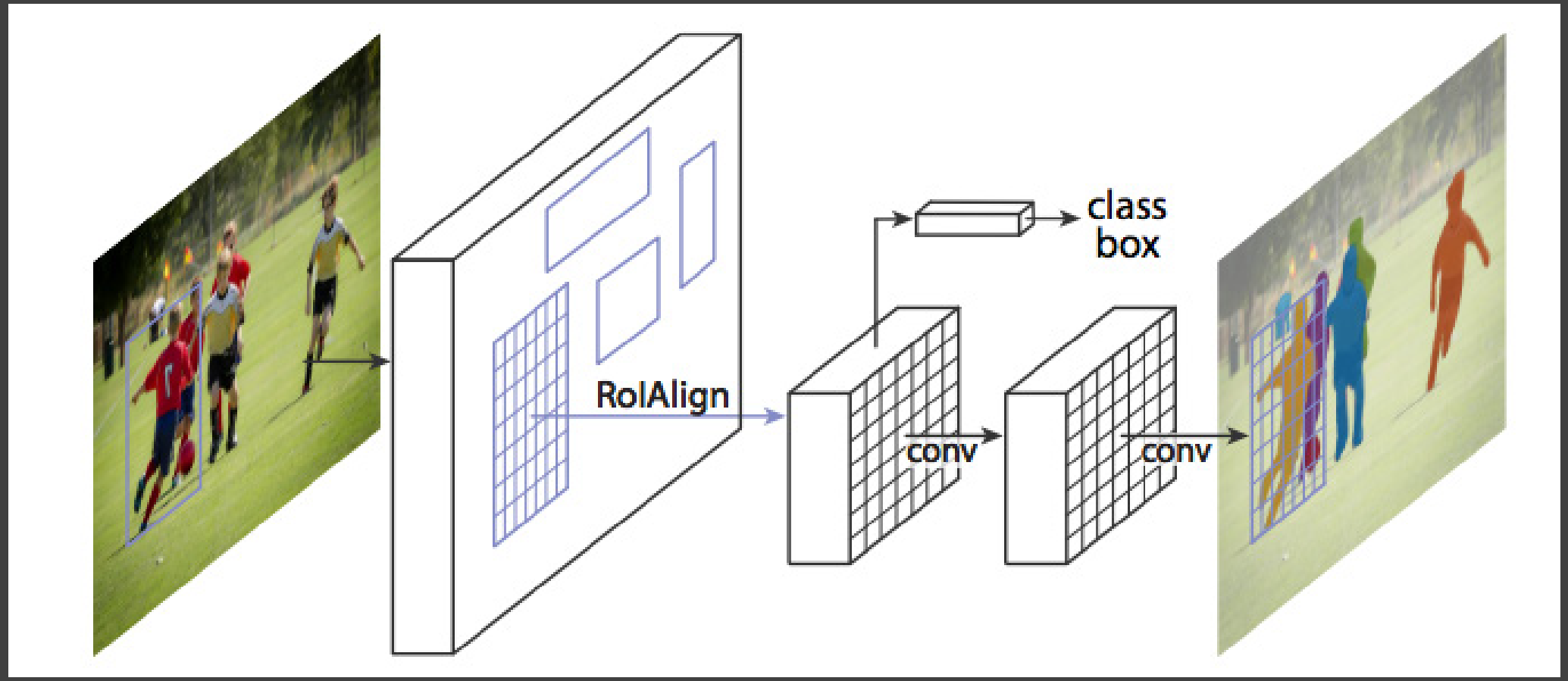


# Faster R-CNN (2015) (https://arxiv.org/abs/1506.01497)



# Mask R-CNN (2017) (https://arxiv.org/abs/1703.06870)



# Induzione


FINE


FINE


FINE


FINE


FINE