

# MYOTUBES

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# SCHEDULE

- Project Introduction
- Key Concepts
- Data Understanding
- Methodology
  - Data Labeling
  - Model
- Results
- APP
  - AWS Architecture
  - Web Demo

# INTRODUCTION

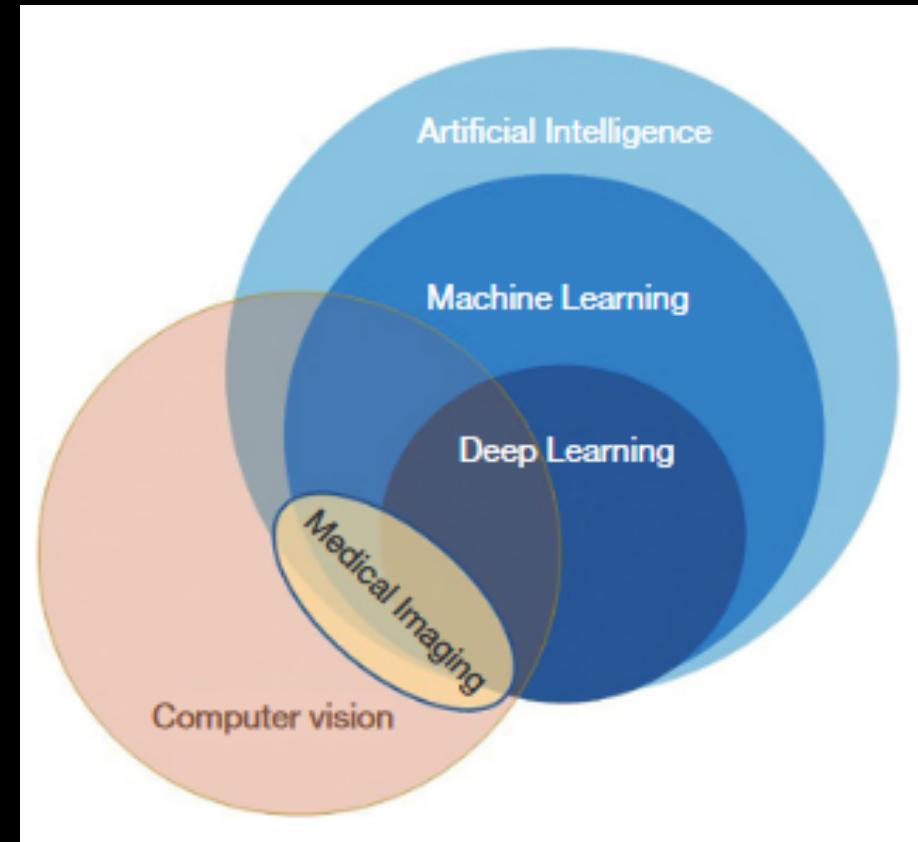
*“AI models for segmenting images of cellular structures called myotubes”*

Study of the effects of different alcohol concentrations on muscle tissues in in vitro samples

Myotubes are cellular structures formed during the process of muscle development and tissue repair

Automation of the recognition and classification of mature myotubes according to different alcohol doses

# KEY CONCEPTS

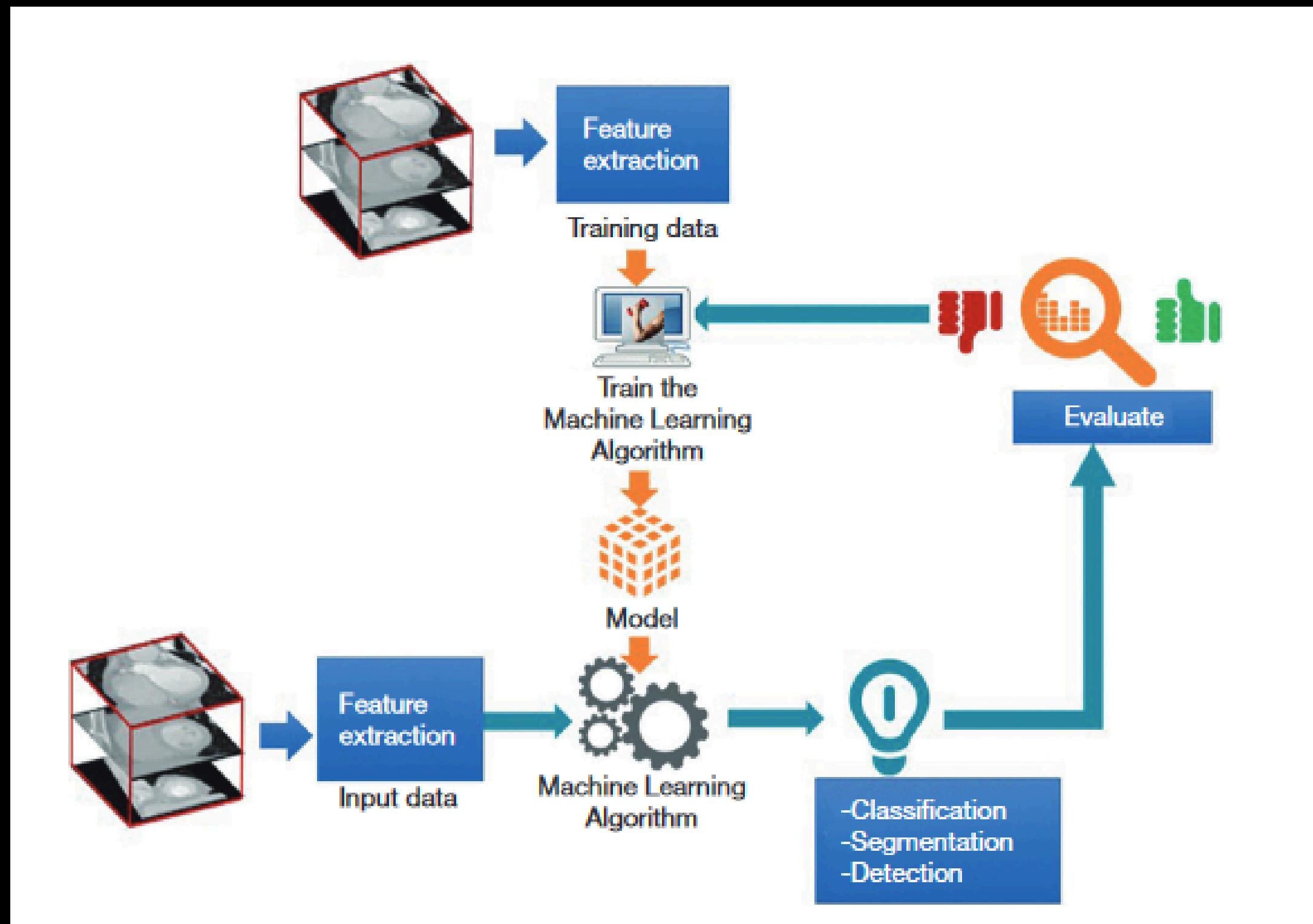


Deep Learning

Computer Vision

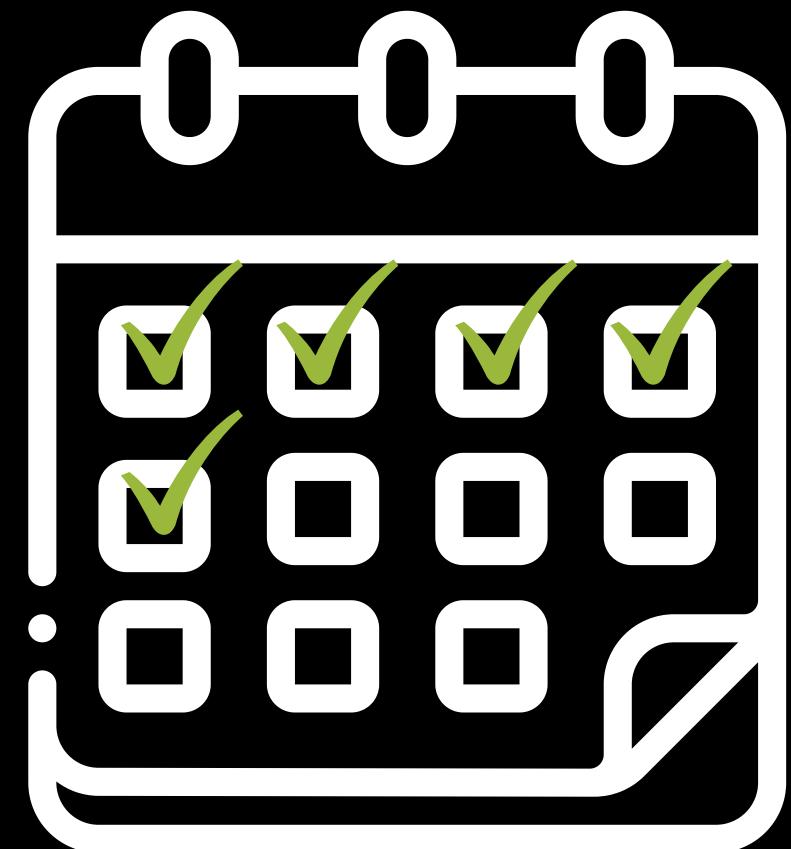
Transfer Learning

# METHODOLOGY



# DATA UNDERSTANDING

Images of samples exposed to different alcohol levels, collected over a period of 5 days at 3-hour intervals.



# DATA UNDERSTANDING



Alcohol concentrations  
of 0  $\mu\text{M}$  or 10  $\mu\text{M}$ .



Alcohol concentrations of  
25  $\mu\text{M}$  or 100  $\mu\text{M}$ .

Each set of images is classified into six groups according to the alcohol level.

# DATA PREP

**# 1**

Only images from  
Plate 1 were  
selected.

**# 2**

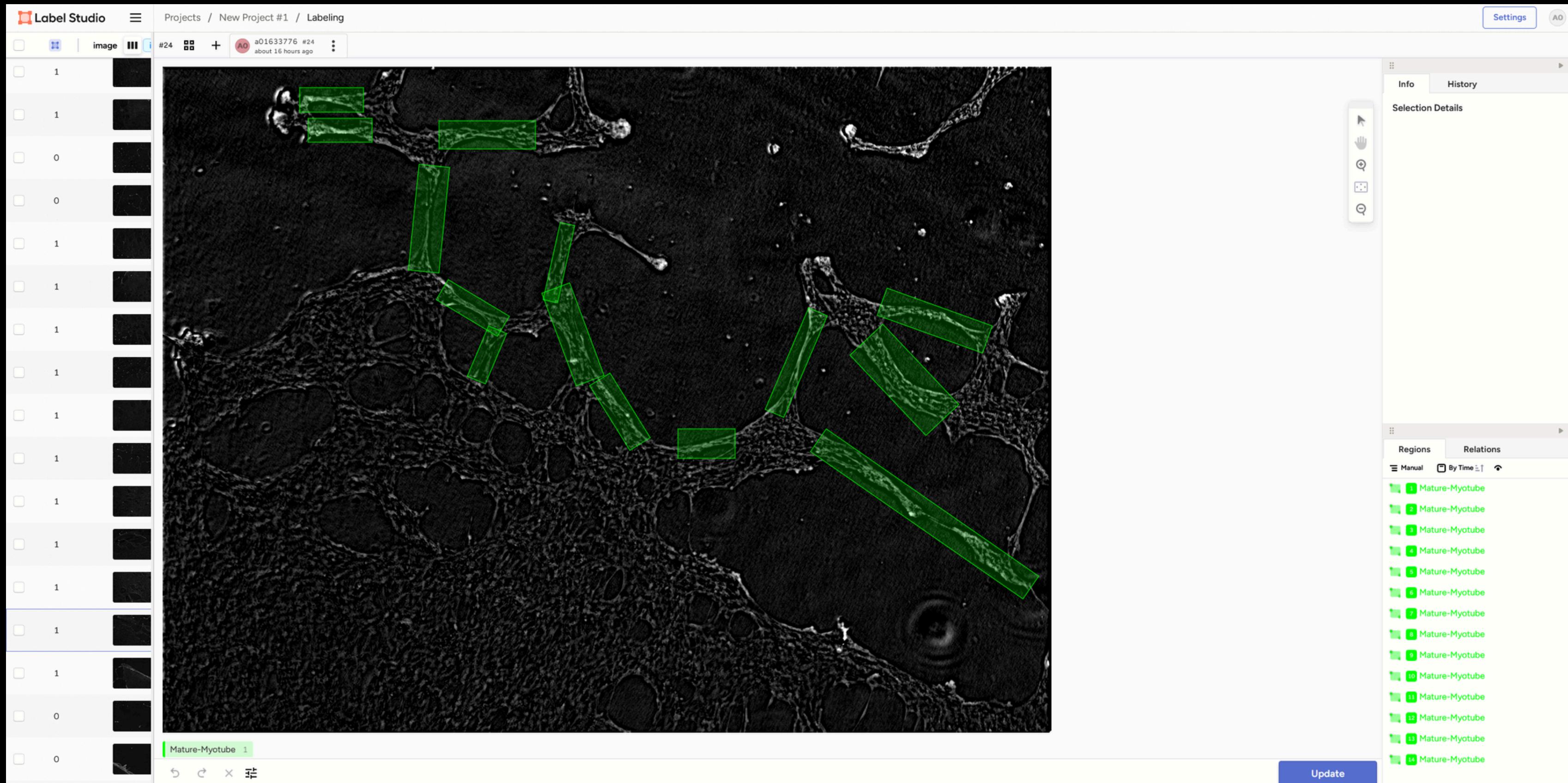
Images from the  
third and fourth  
days of the  
experiment are  
used.

**# 3**

The images  
labeled as  
BestImages are  
used.

**# 4**

Label those  
images with  
Label Studio.



# METHOD #1

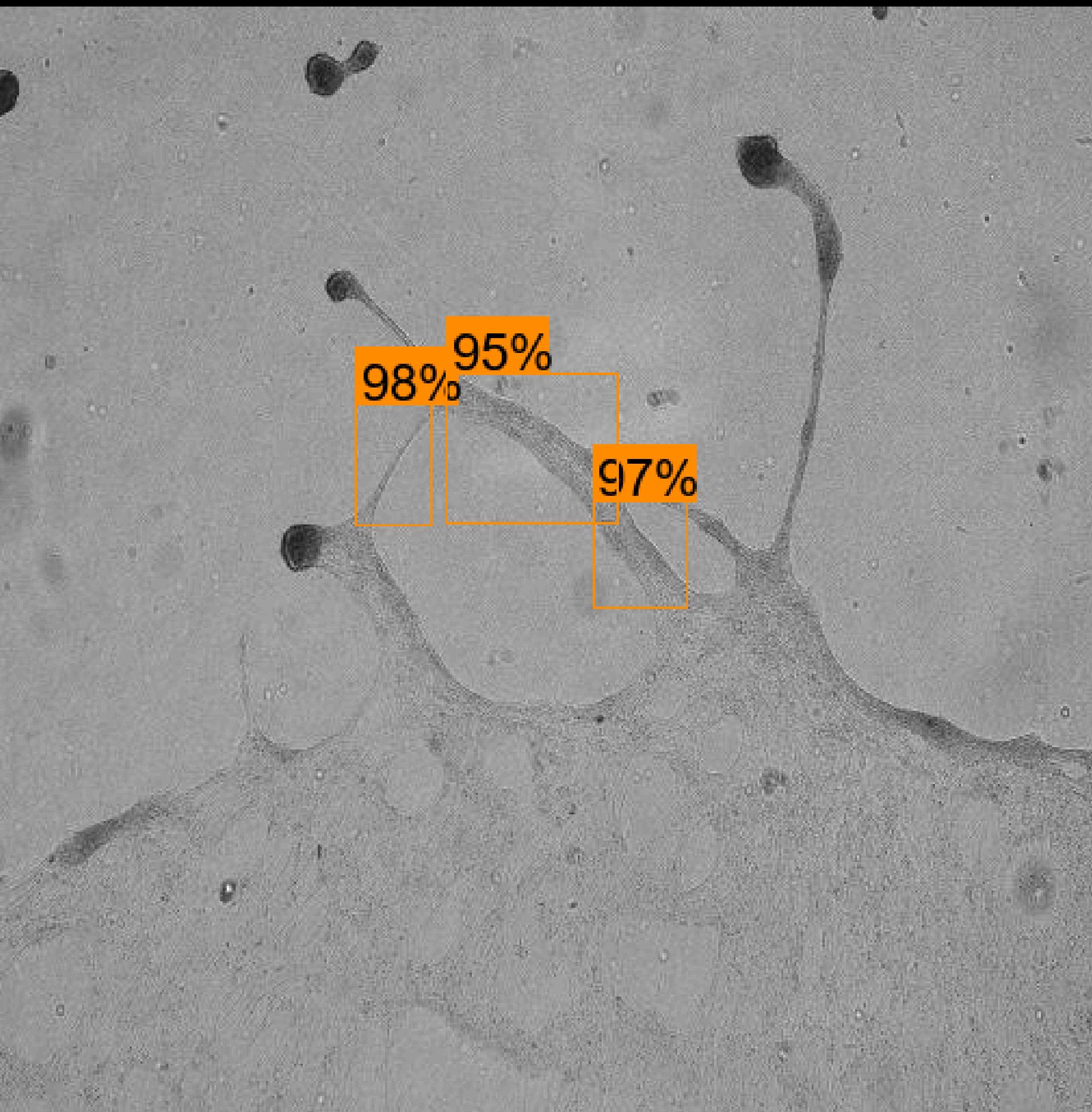
SSD (Single Shot Detection)

**retinanet\_resnetfpn\_coco**

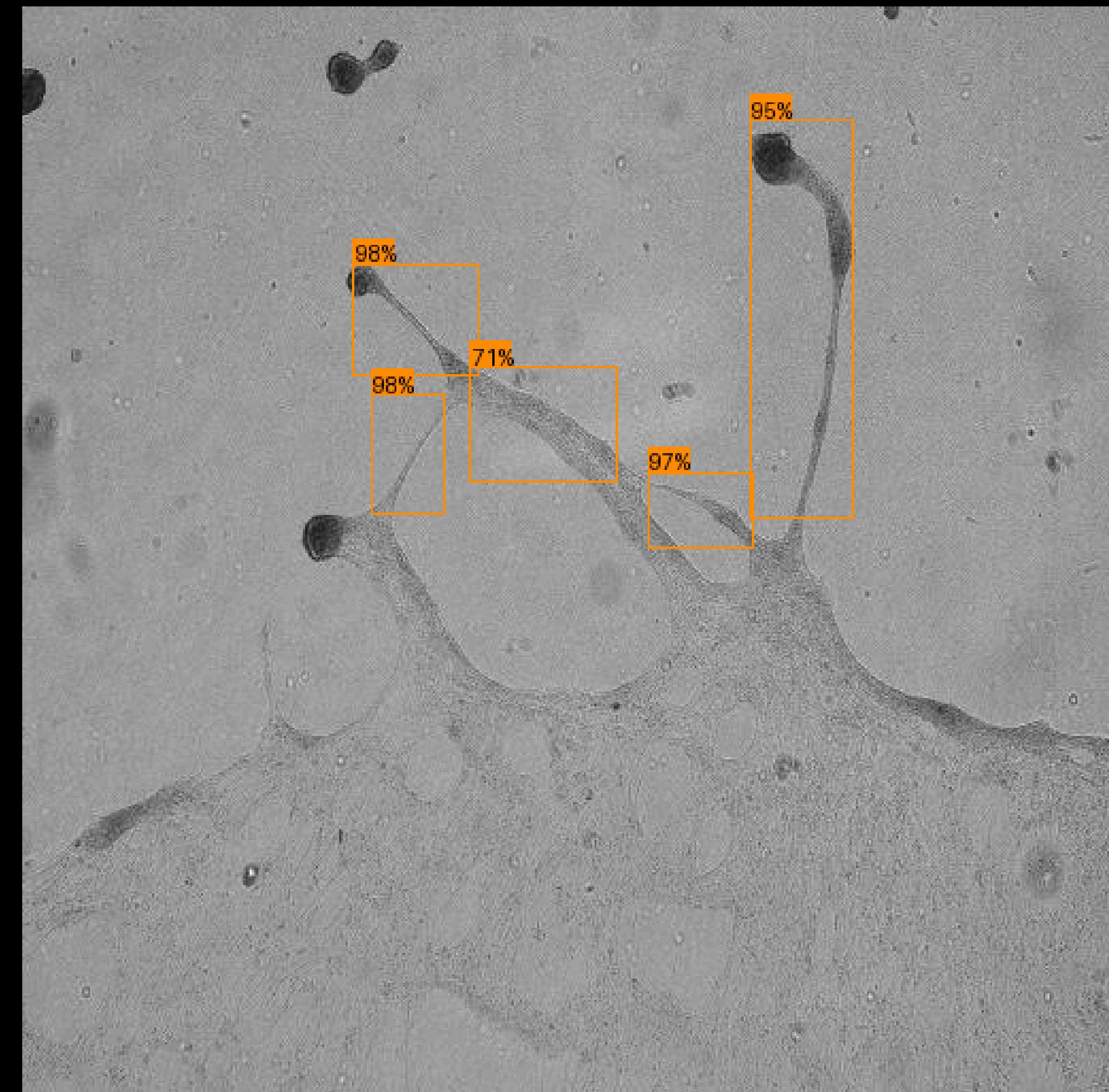


Residual Feature Common  
Network Pyramid Objects in  
Network Context

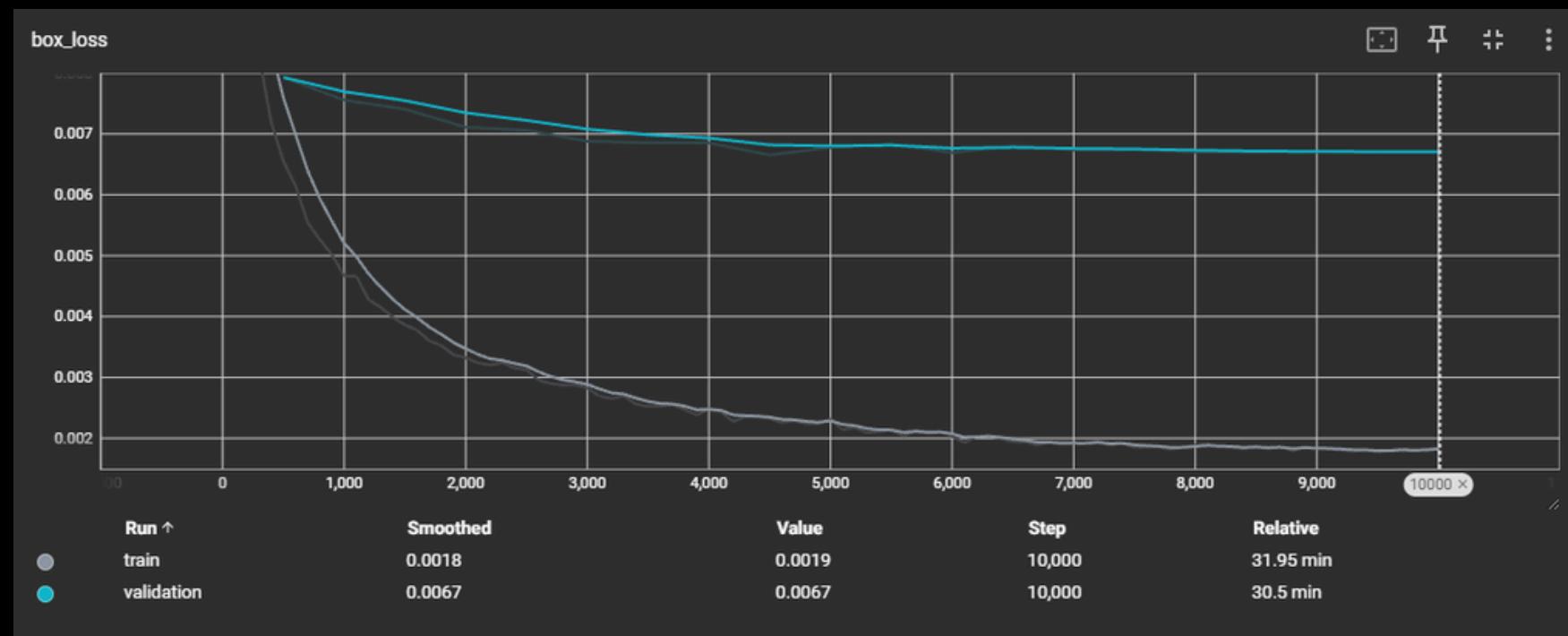
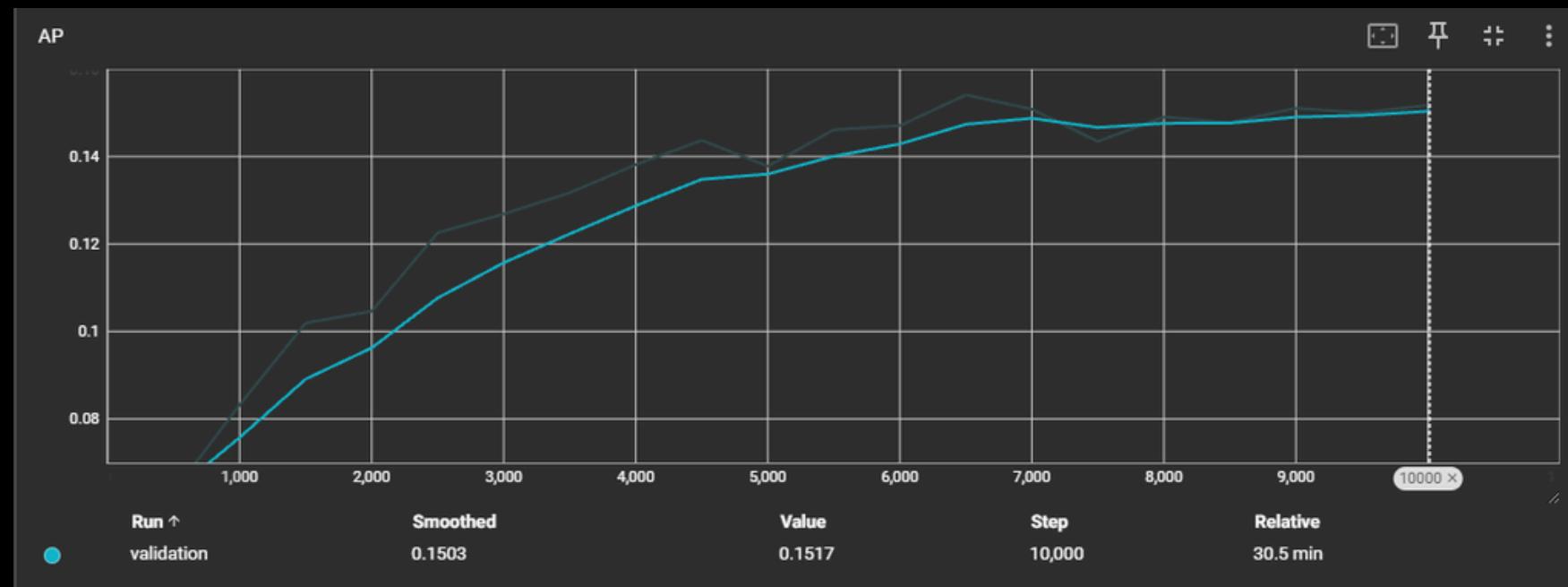
**BEFORE**



**AFTER**



# retinanet\_resnetfpn\_coco



# METHOD #2

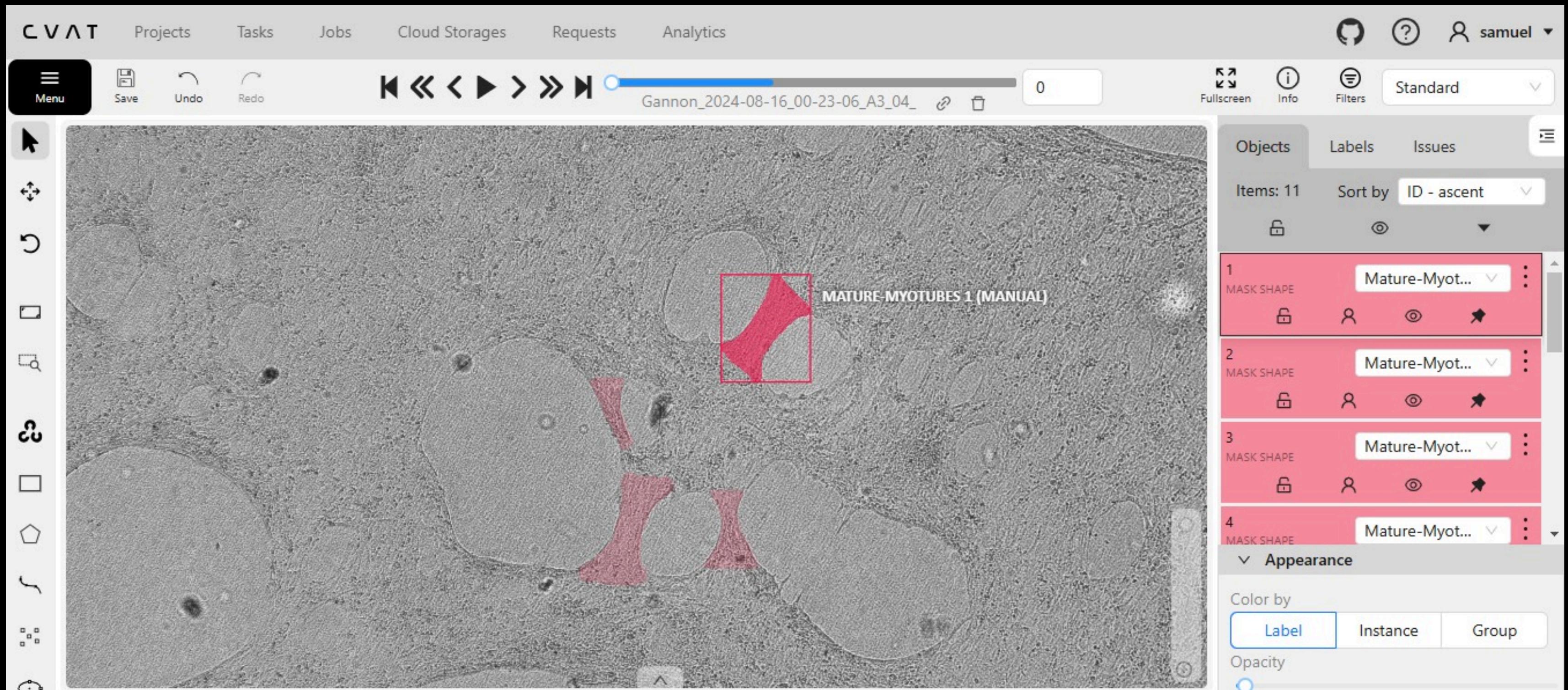
Instance Segmentation

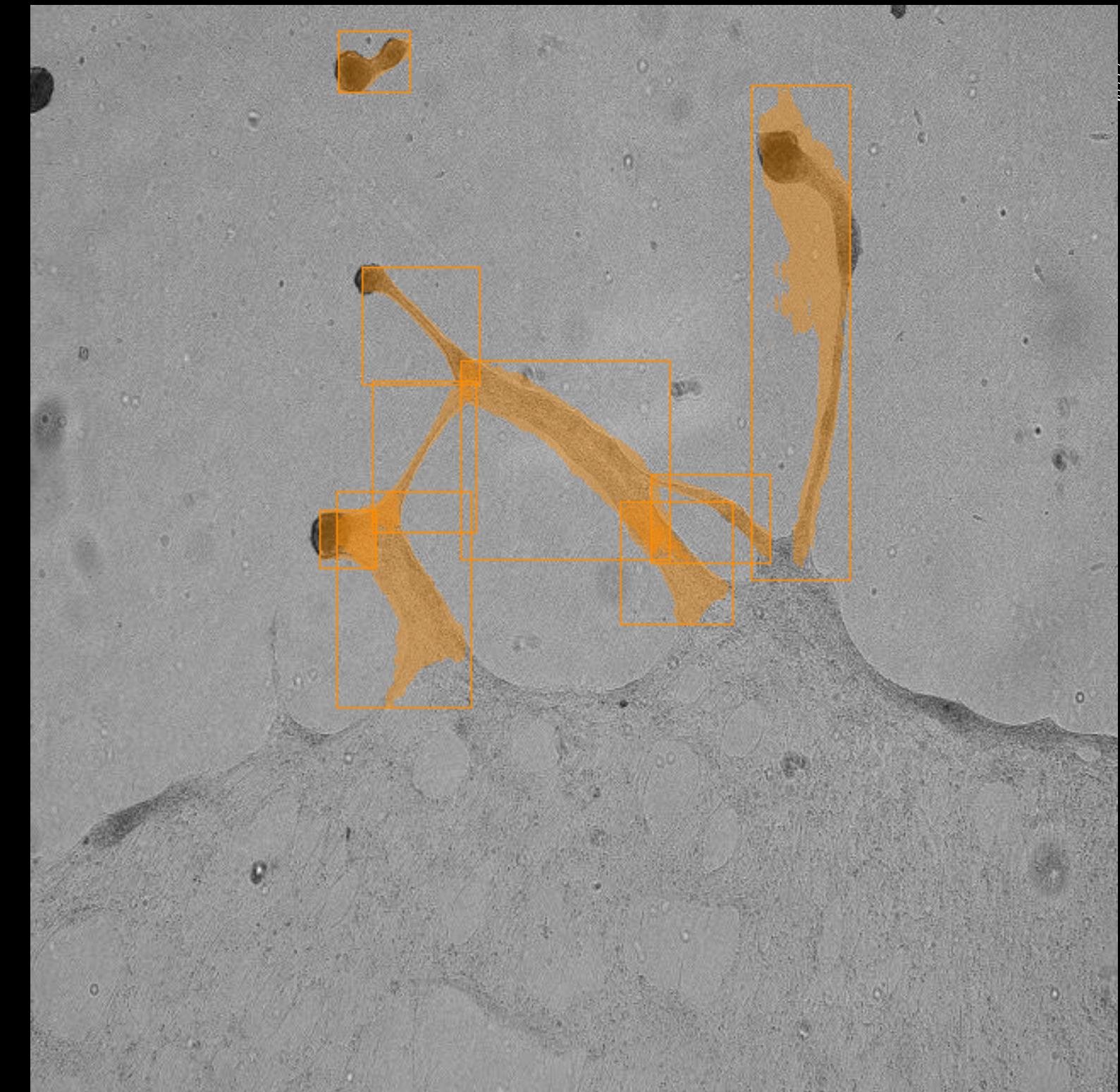
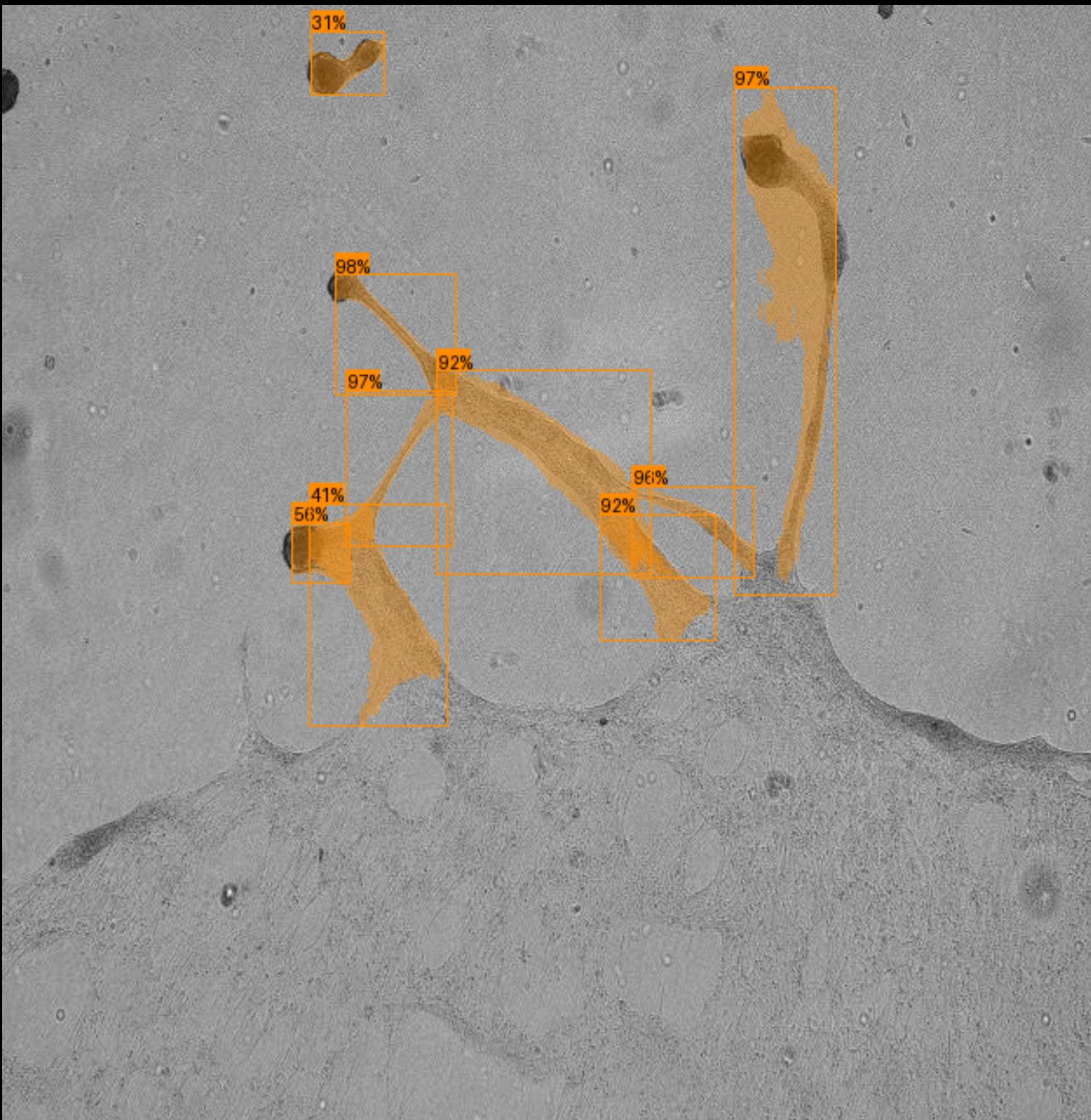
**Mask R-CNN-ResNet50-FPN**

Convolutional  
Neural  
Network

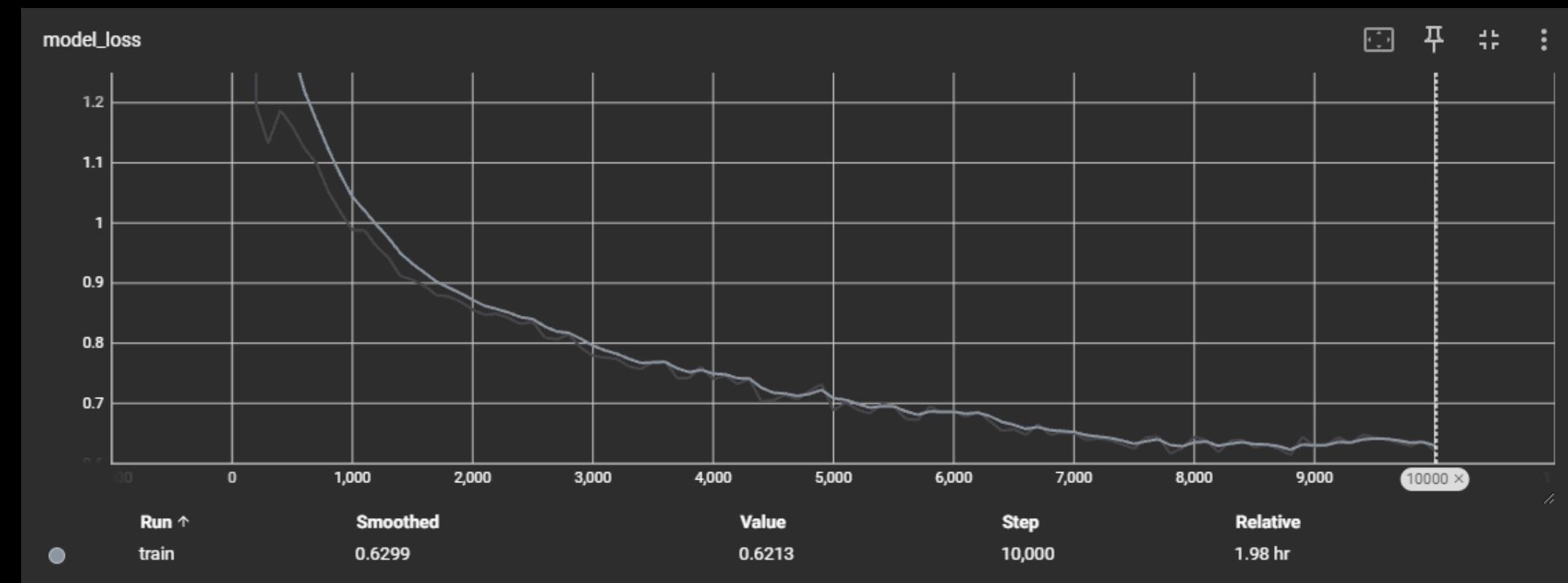
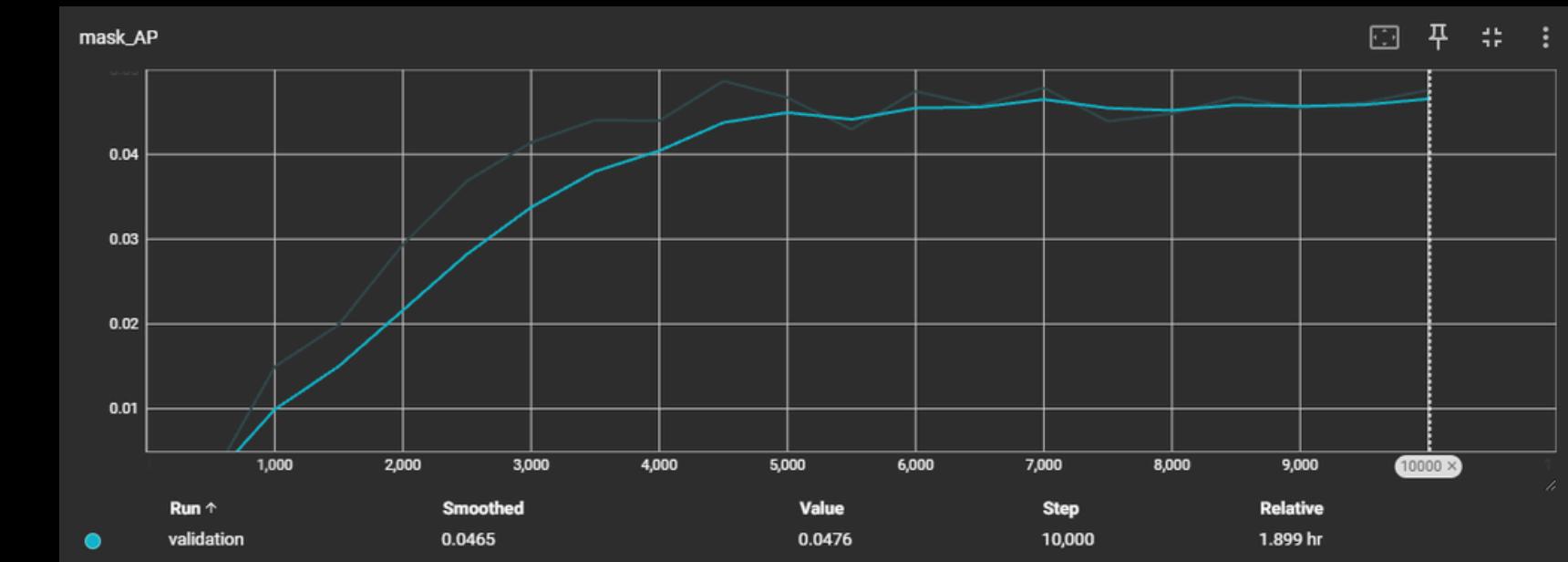
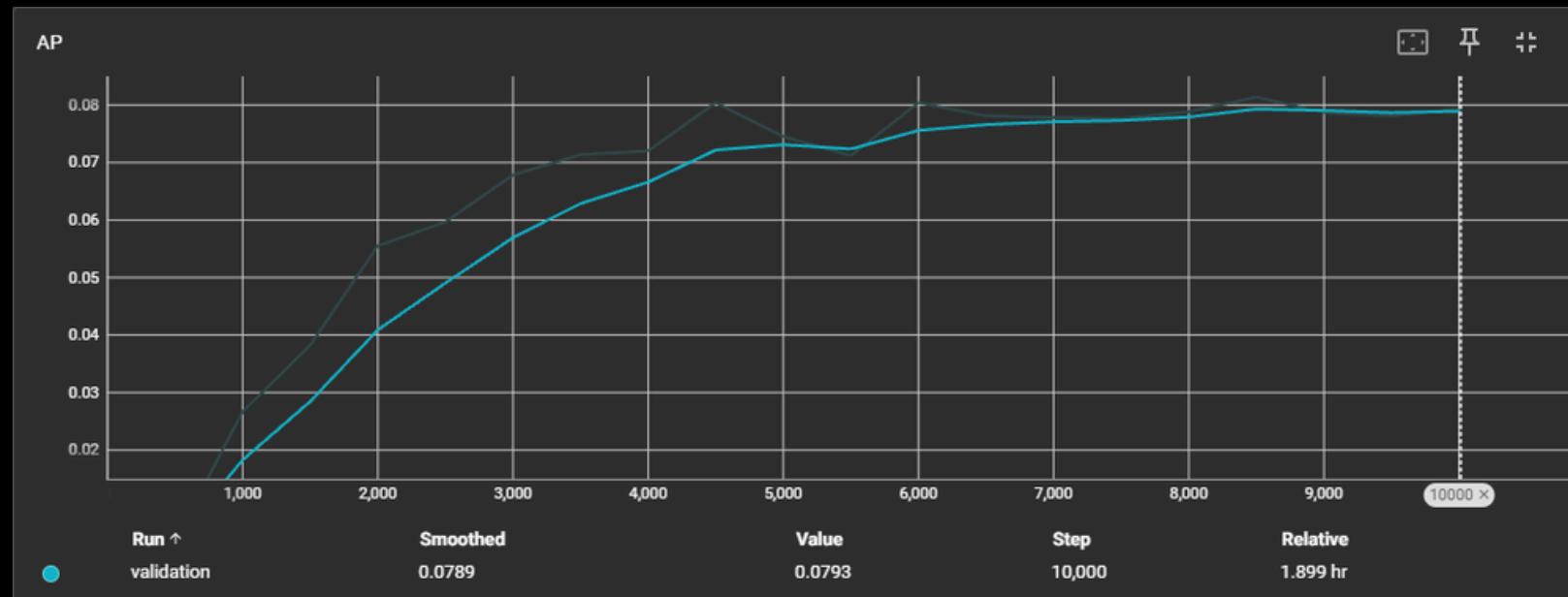
Residual  
Network

Feature  
Pyramid  
Network





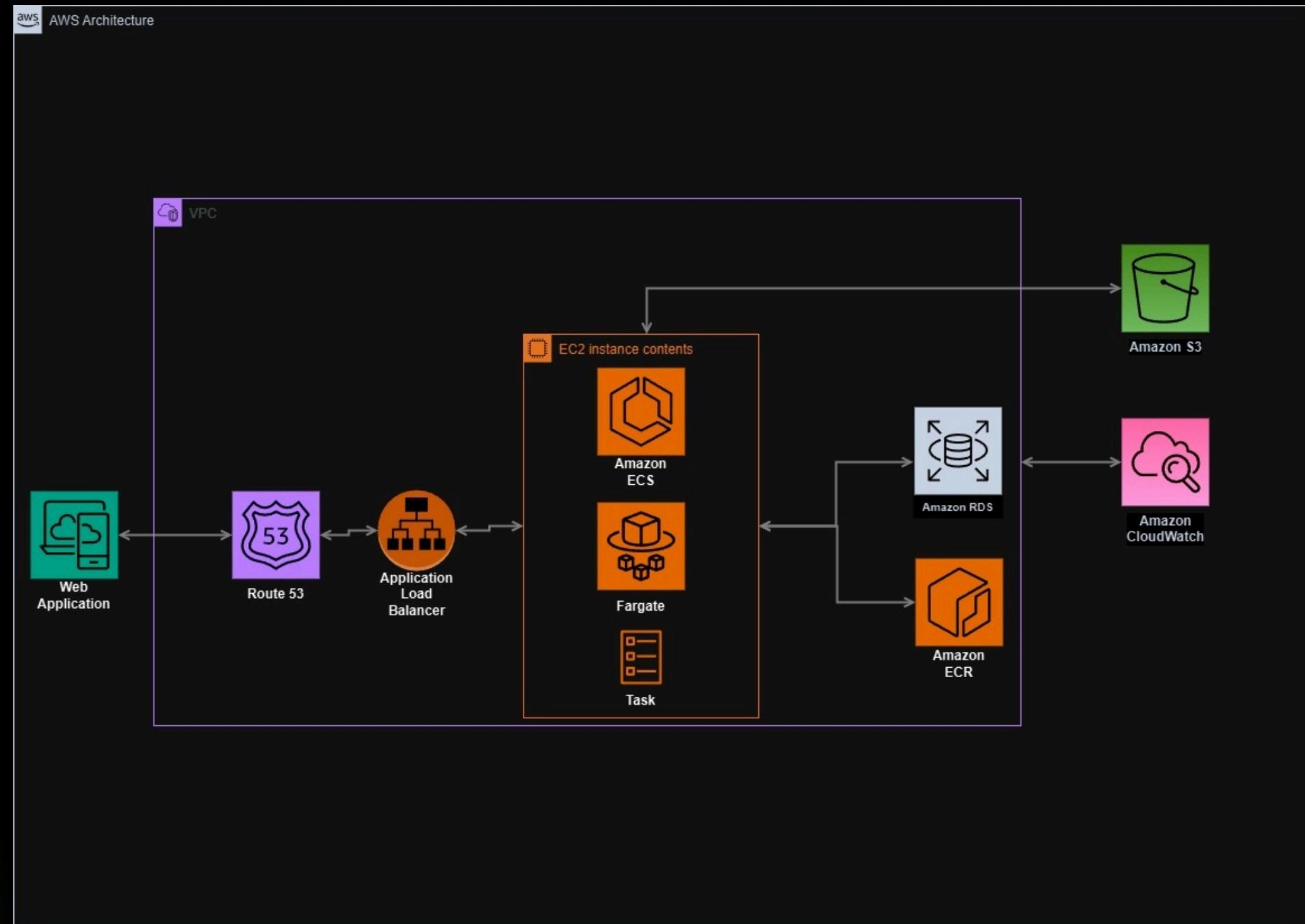
# Mask R-CNN-ResNet50-FPN





**APP**

# AWS ARCHITECTURE





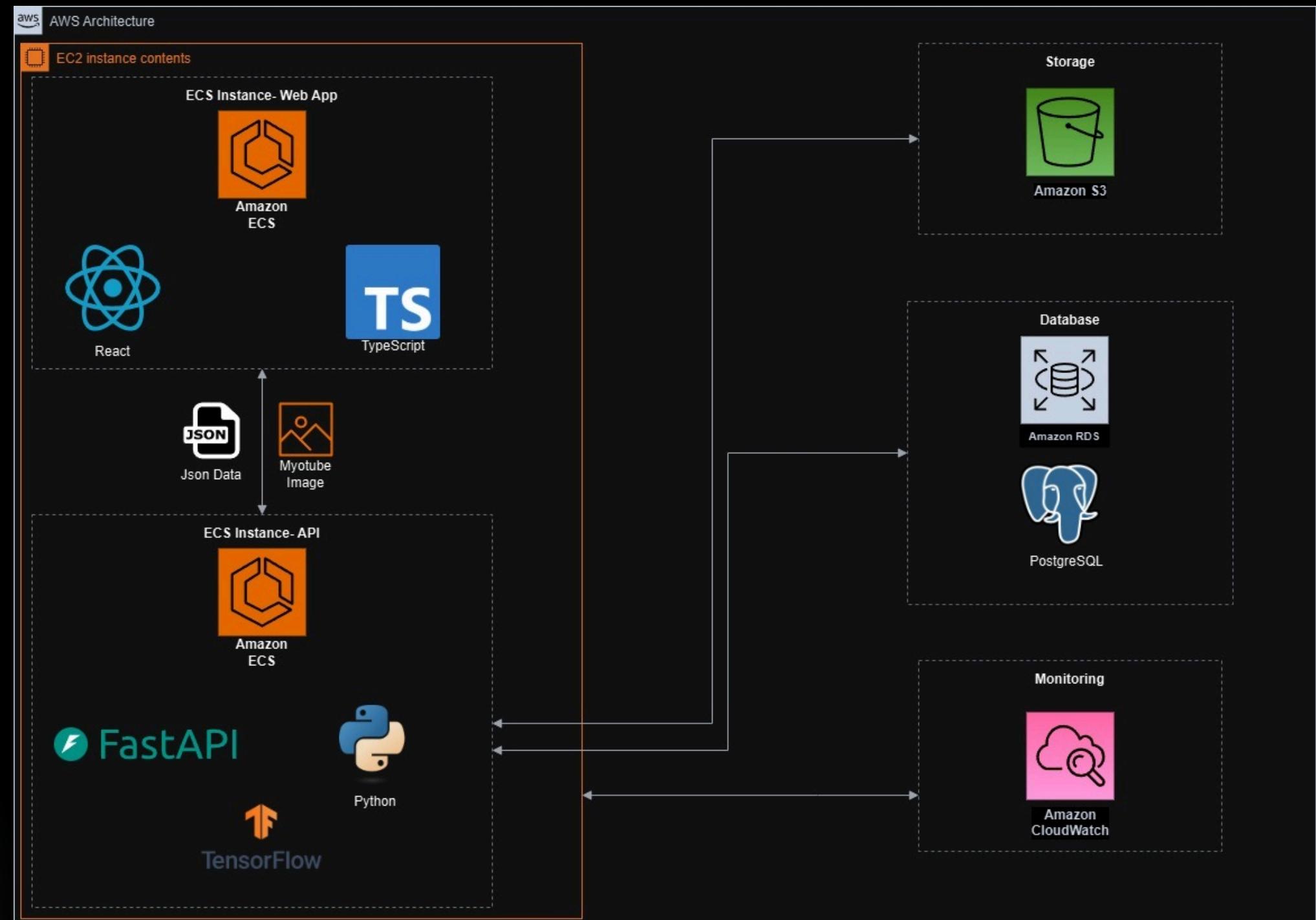
**Encryption**

**Access Control**

**Data Durability and Redundancy**

**Audit Logging**

# APP ARCHITECTURE





**THANK  
YOU**