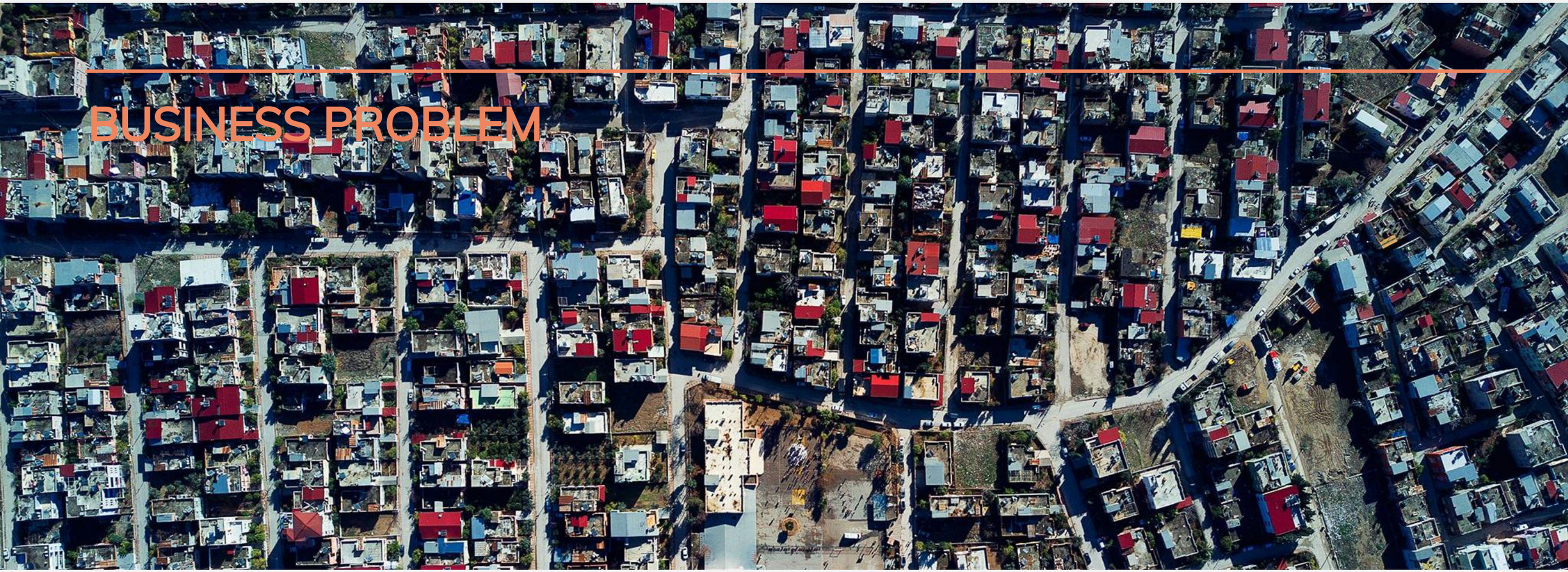
Building Detection in Satellite Images

PRESENTER: ALI HIJAZY



BUSINESS PROBLEM

OBJECTIVE

Detection of buildings within a satellite image

WHY?

This is a neccessary task in mapping activities

OPERATIONAL BENEFITS

This task is highly time consuming since it is done manually

WHY IT MATTERS?

1. In times of crisis, mapping the affected areas is a crucial step in humanitarian aid.

2. Time is limited, because people are displaces.

3. This is a crucial step to locate areas that require priority in humanitarian aid.

4. You might think that the whole world is mapped by now but the reality is that its not. The areas that are not mapped are the most subject to disasters because they lack resilient infrastructure.

Data

- The data comes from AIcrowd in the form of COCO Dataset, consisting of images and a json file contatining the instances.

- The instances contain the annotations that come in the form of dictionaries:

  - {annotation_id: [X1, Y1, X2, Y2, X3, Y3...]}

Data

- Training Set: 280,741 tiles, each being a 300x300 pixel RGB image of satellite imagery

- Validation Set : 60,317 tiles, also in the format of 300x300 pixel RGB satellite images

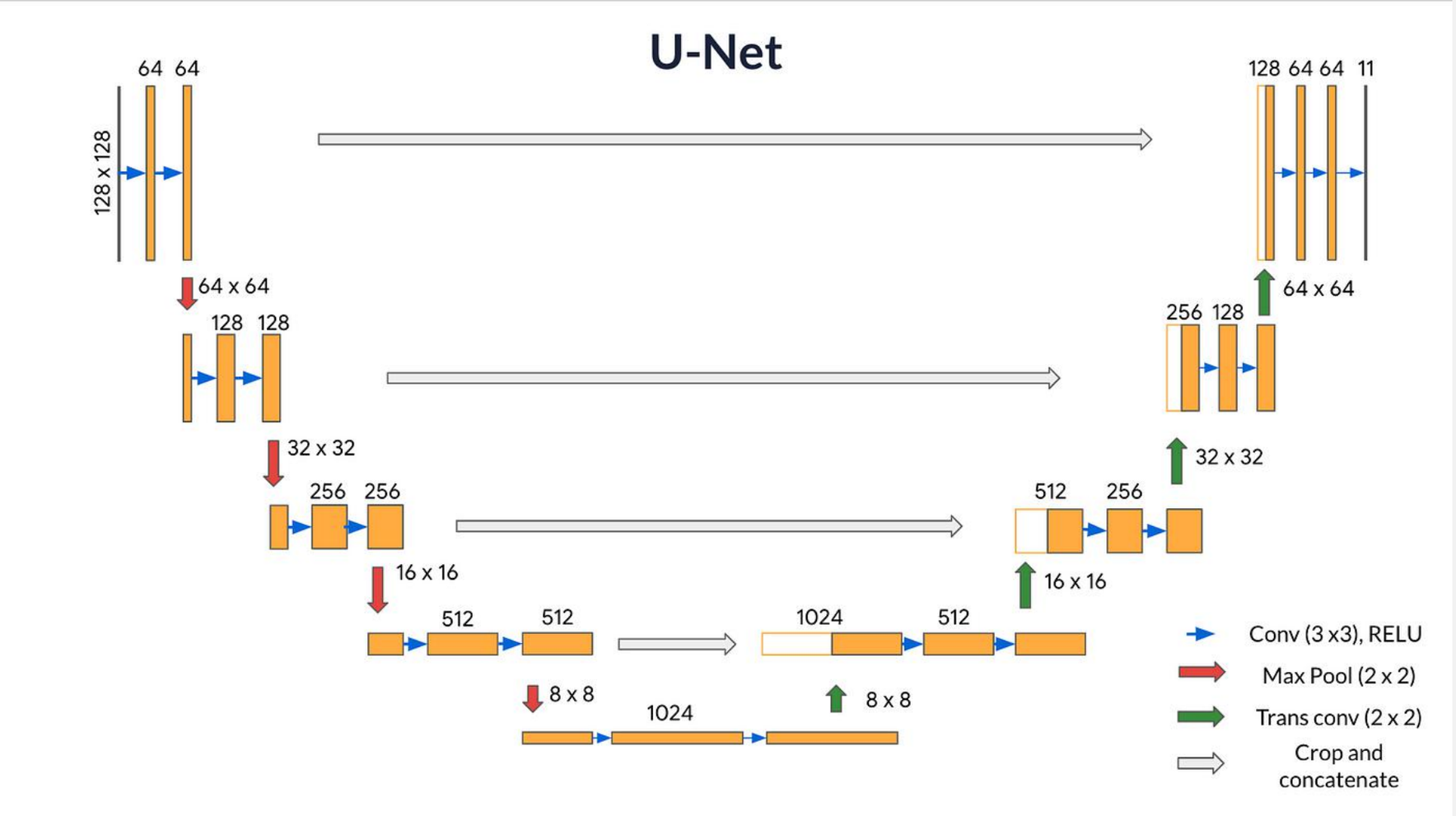
Baseline Model (UNET)

Encoder Block

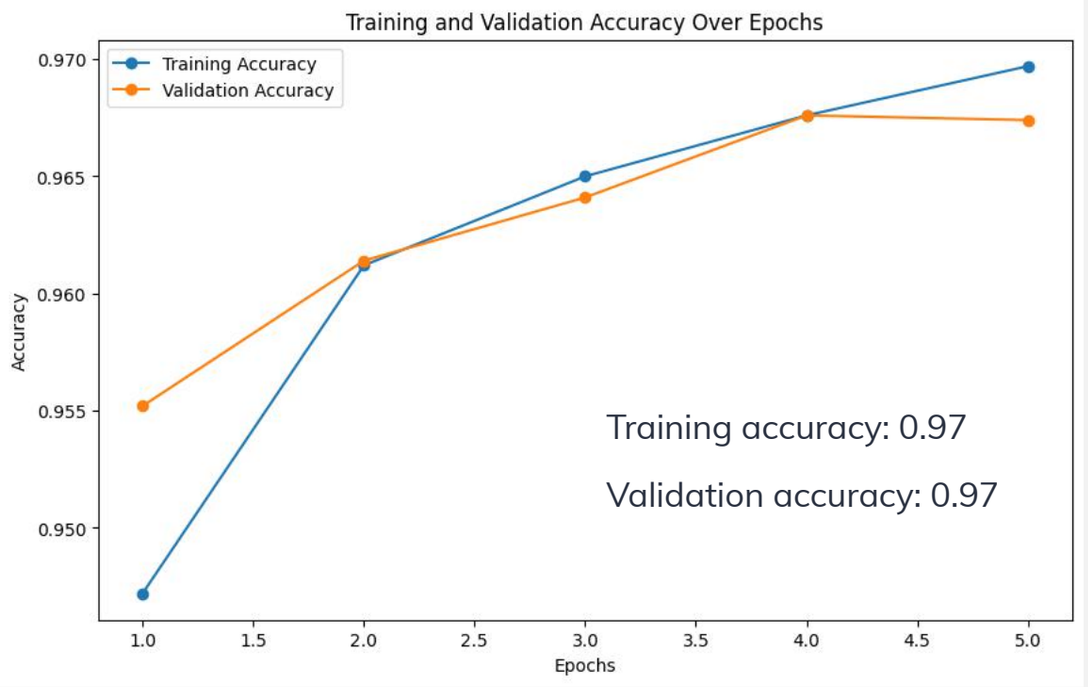
Bottle neck

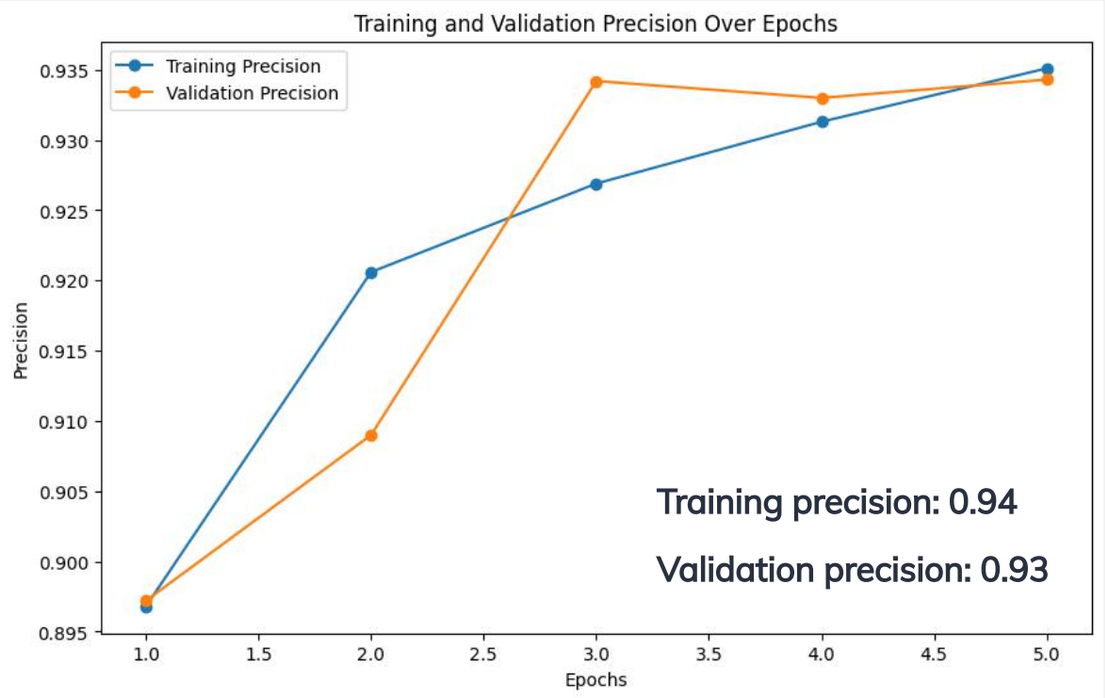
Decoder Block

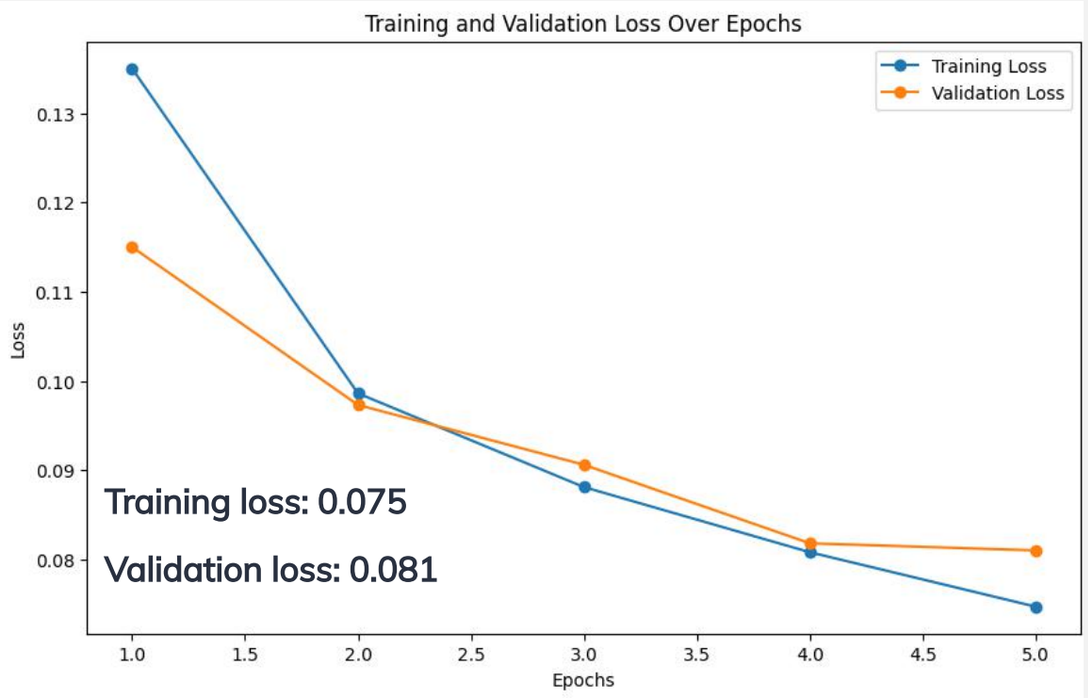
7.7 million parameters



Baseline Model (UNET)





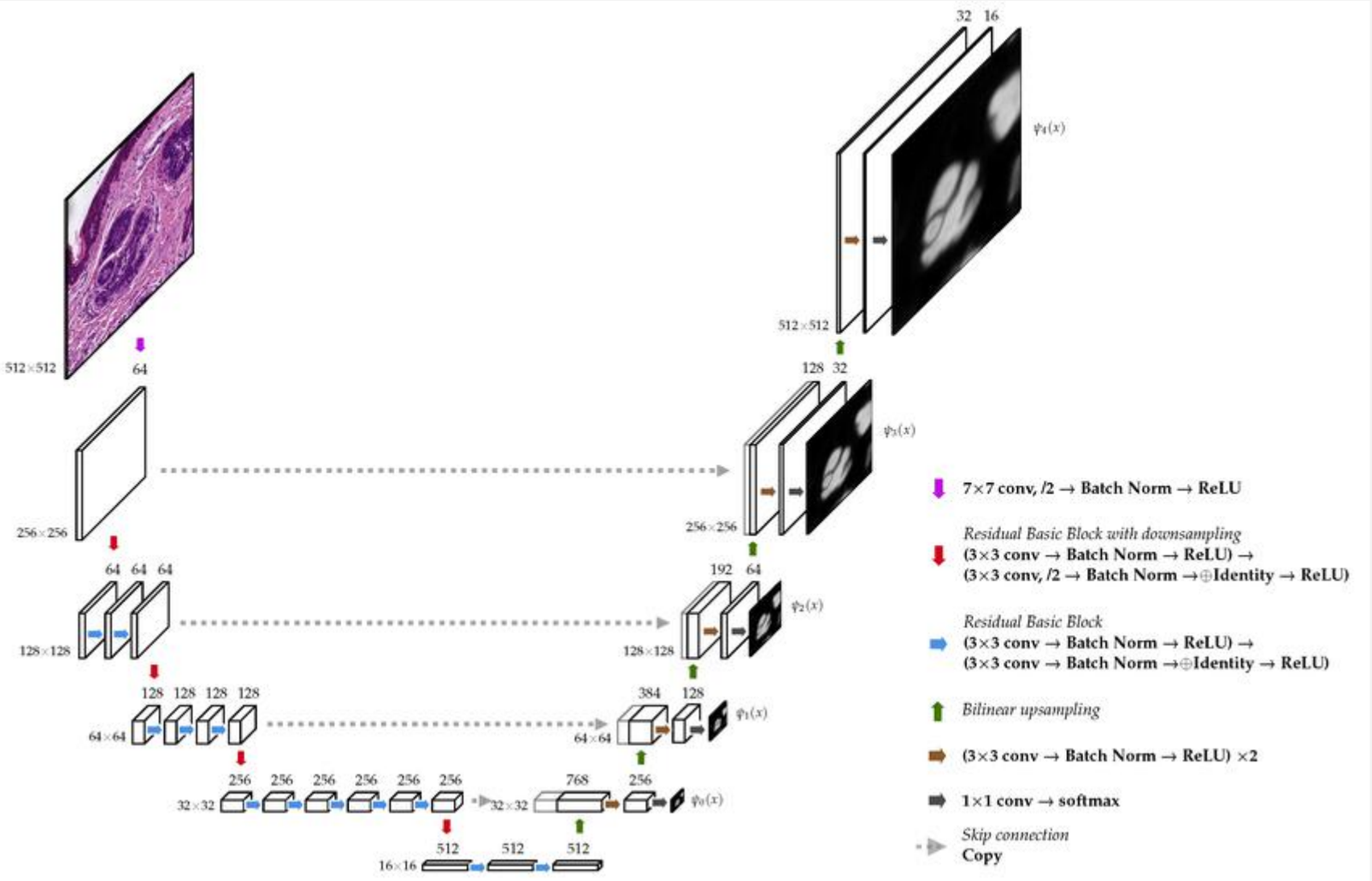


2nd Model (pretrained ResNet-34)

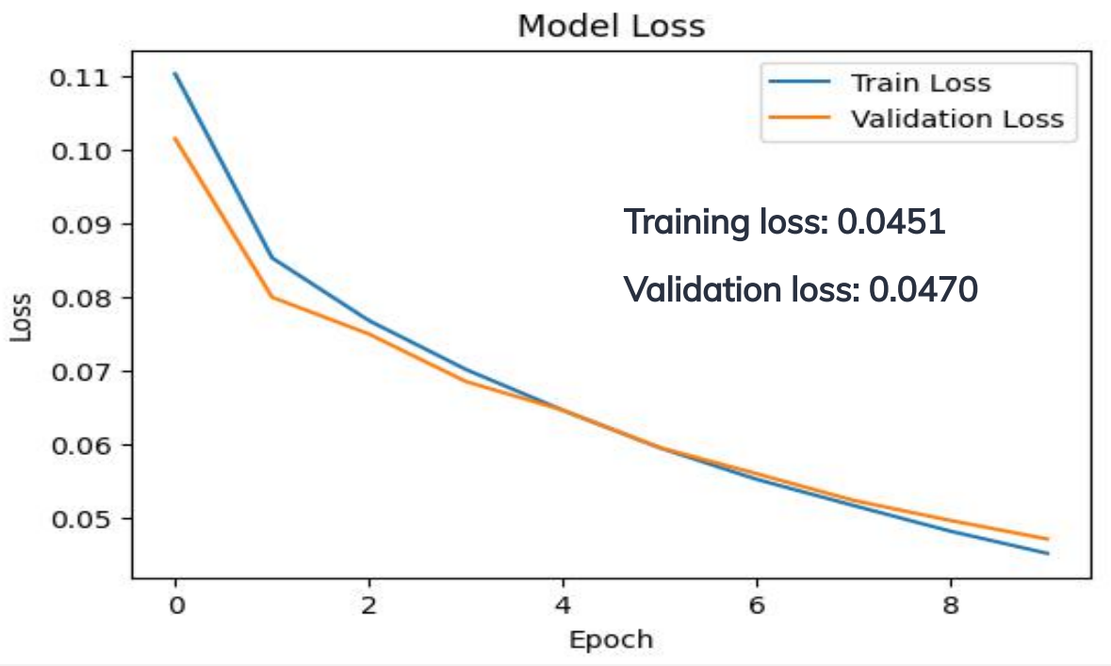
Total params: 24456154 (93.29 MB)

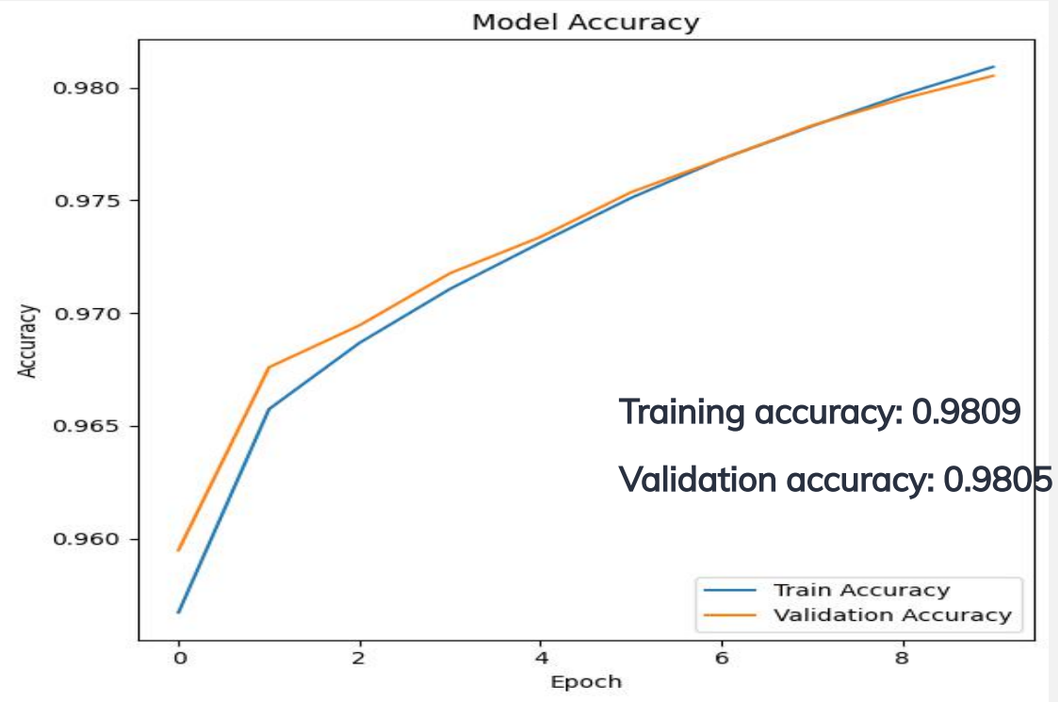
Trainable params: 24438804 (93.23 MB)

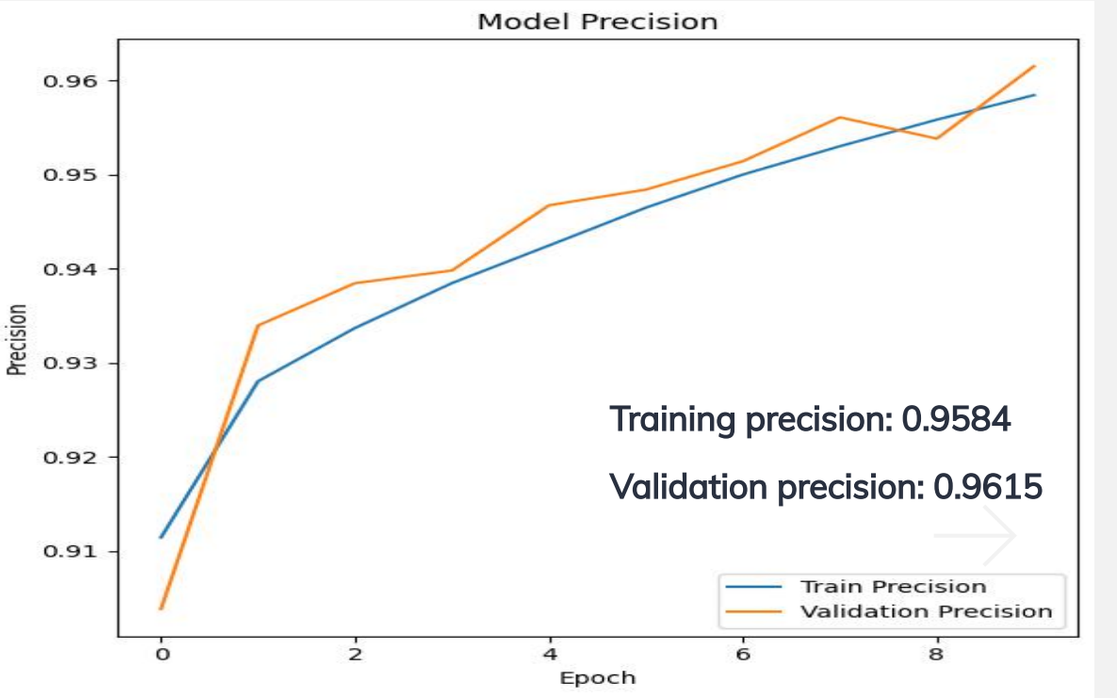
Non-trainable params: 17350 (67.77 KB)



2nd Model (pretrained ResNet-34)

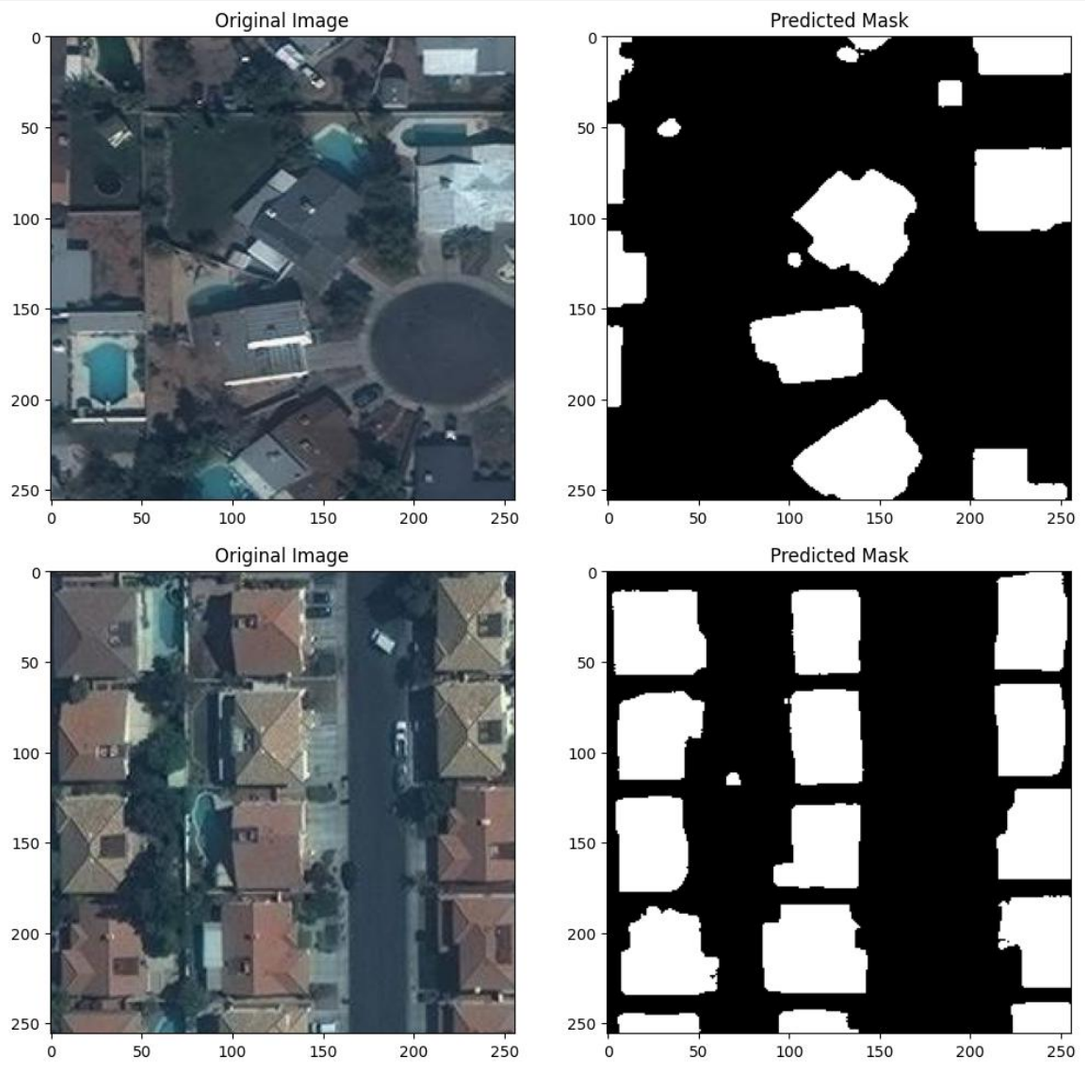




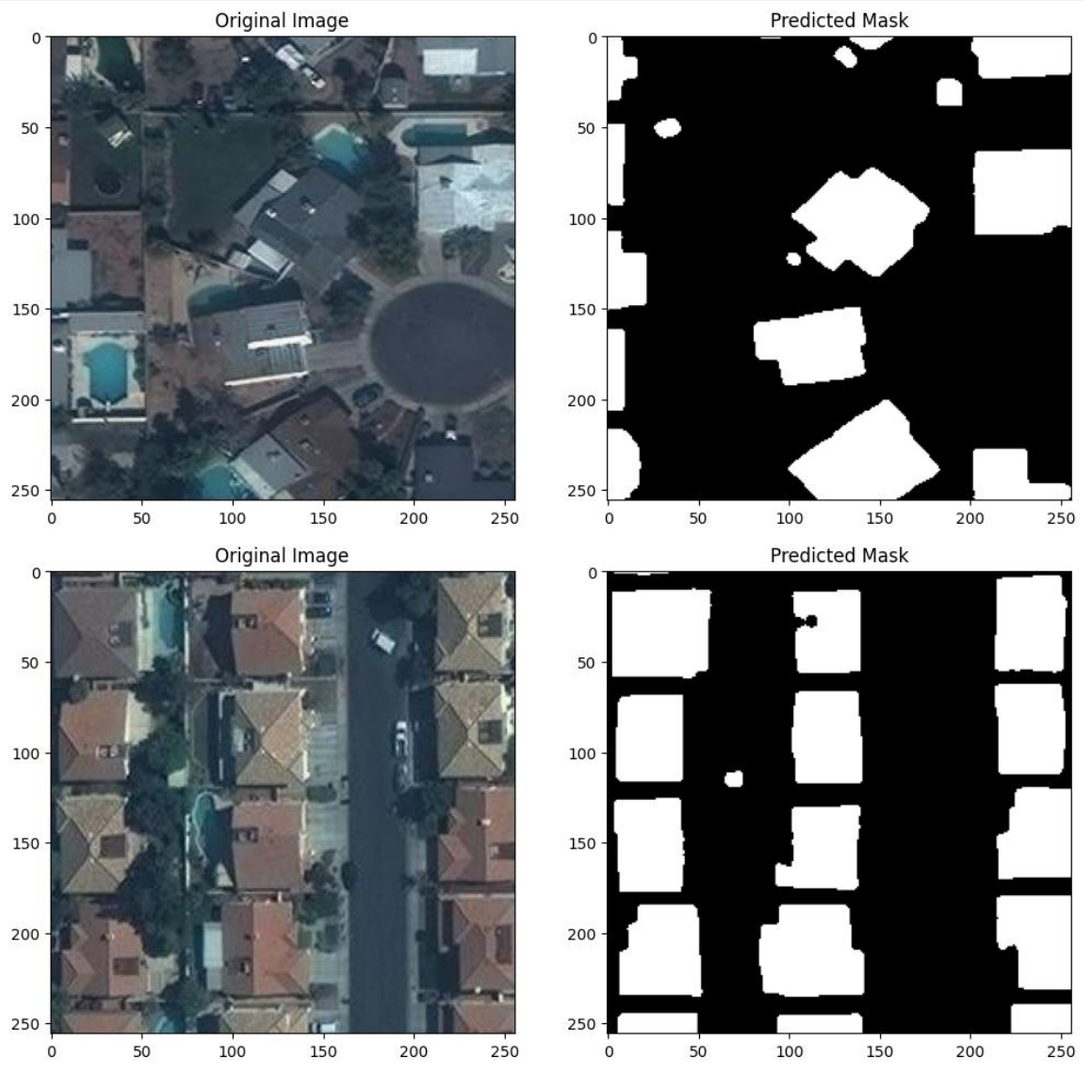


Predictions

UNET model



ResNet-34 model



Thank You

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