# Facade Segmentation

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- Segment main facade building


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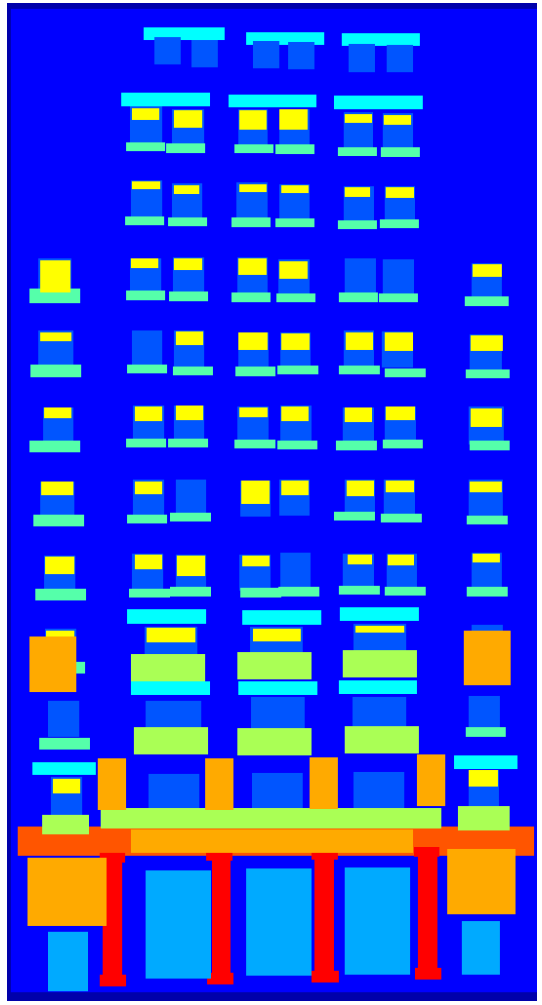
We can view on this task in several ways, like:

1. Instance Segmentation
2. Semantic Segmentation with objects counting

# Using Dataset

CMP Facades Dataset with 11 classes, but we need only three:

- Facade
- Window
- Pillar



# My solutions — Instance Segmentation

Segment and classify every instance separately.

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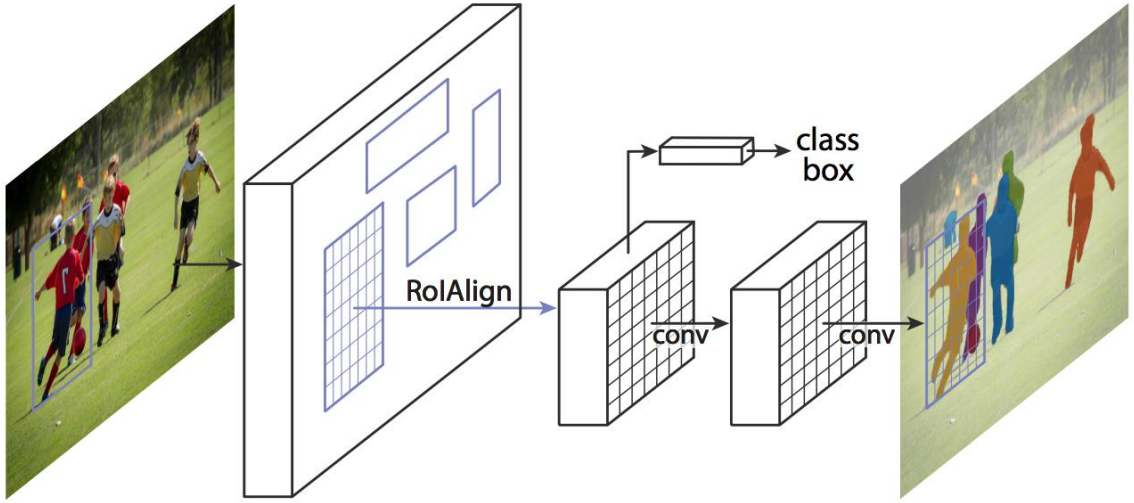
Advantages:

1. end2end approach
2. More natural for this task

# My solutions — Approach

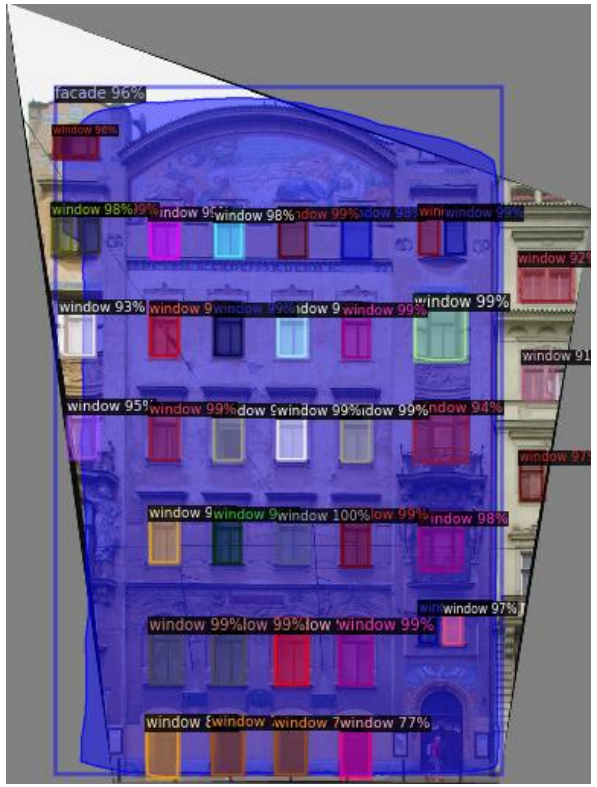
- Architecture: Mask-RCNN with Resnet50 backbone and FPN
- Metric: mAP
- Augmentations: HorizontalFlip, RandomBrightness, Rotate
- Paper: https://arxiv.org/abs/1703.06870v3



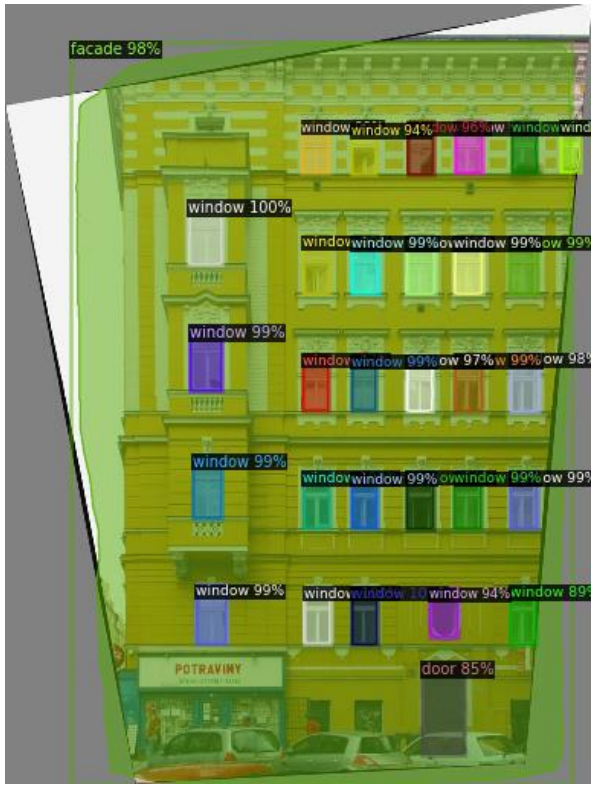
# My solutions — Results

The model was trained for 30 epochs on a learning rate of 0.00025, with 0.7 as the train split.

mAP[0.50:0.95] = 0.421 on validation dataset







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- Poor performance on the pillars
- Poor performance on the far objects
- Poor quality for building with a large number of windows

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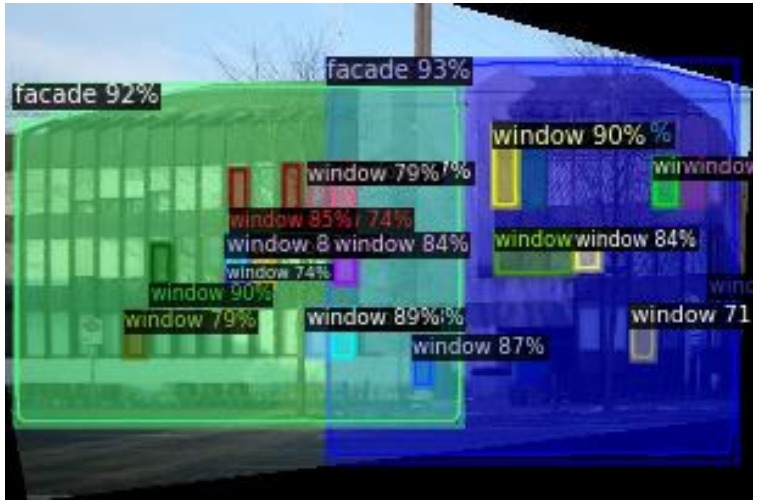
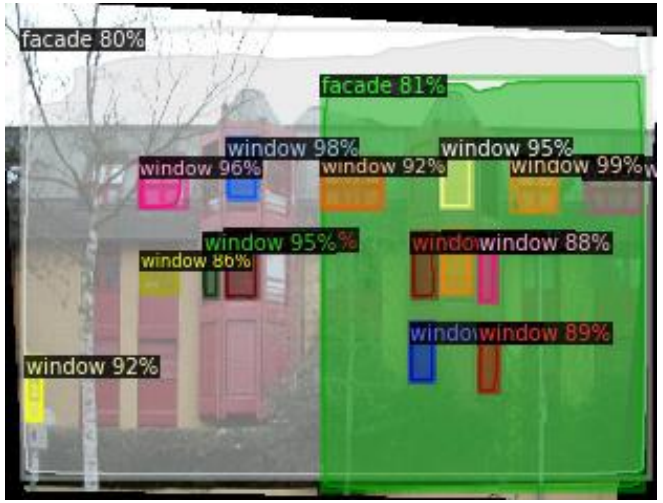


# My solutions — Semantic Segmentation

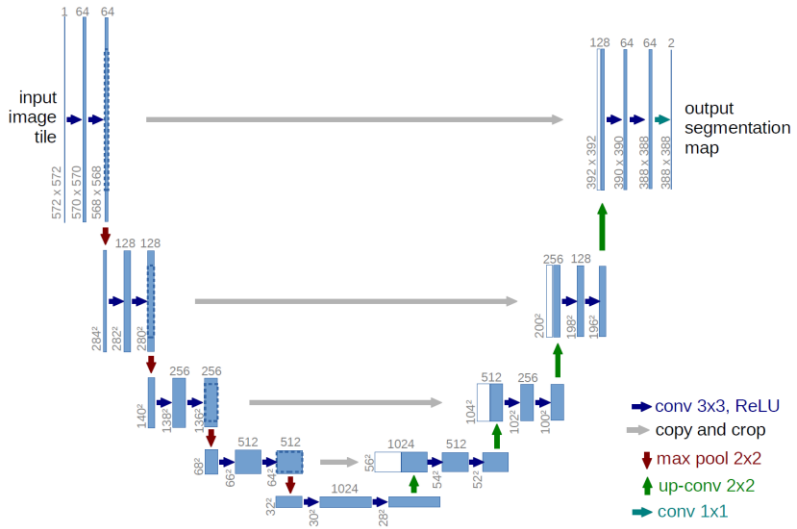
Semantic segmentation is task that involves dividing an image into several segments and assigning each segment a label corresponding to the class.

Advantages:

- Easier than Instance segmentation
- More datasets

# My solutions — Approach

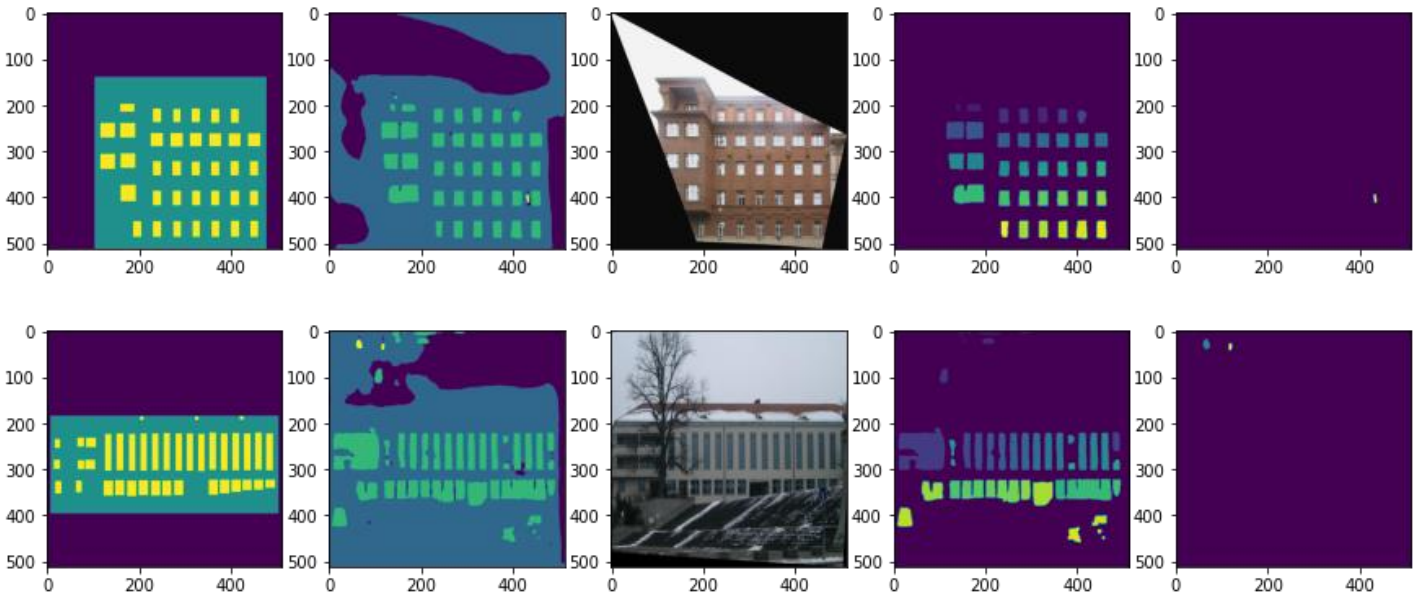
- Architecture: Unet with Renet34 backbone
- Metric: IoU
- Augmentations: HorizontalFlip, ColorJitter, SafeRotate
- Loss: Focal Tversky loss for coping with imbalanced classes of objects.



# My solutions — Results

The model was trained for 100 epochs on a learning rate of 0.00025, with 0.8 as the train split.

IoU = 0.79 on validation dataset



# Experiments with Stable Diffusion

Approach is Deliberate + Lora Building-Facades + ControlNet depth mask

Input

Outputs

# SD interesting examples

Interesting results

# My contacts

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