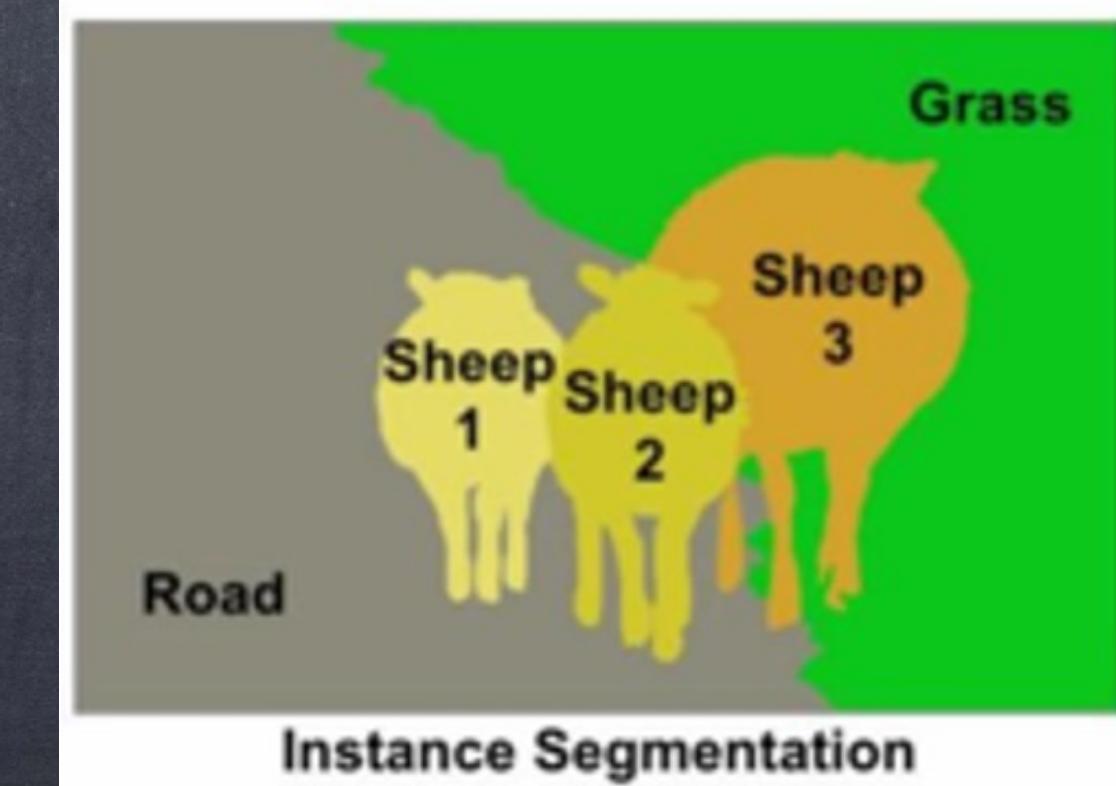
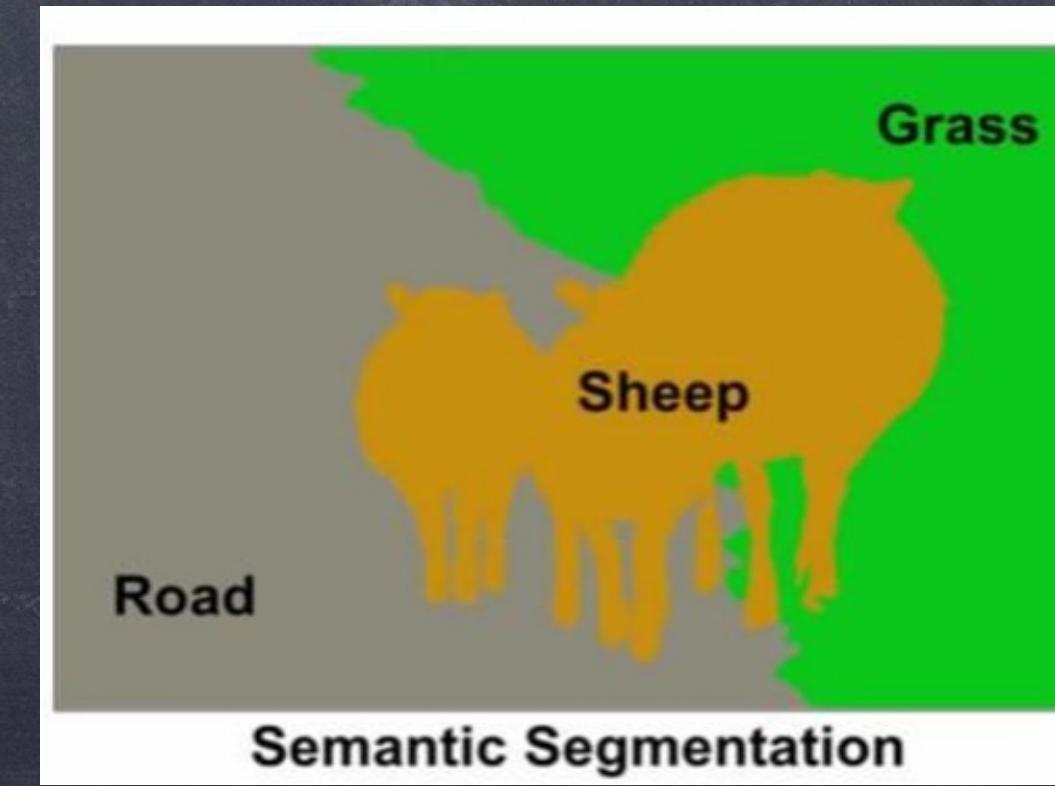
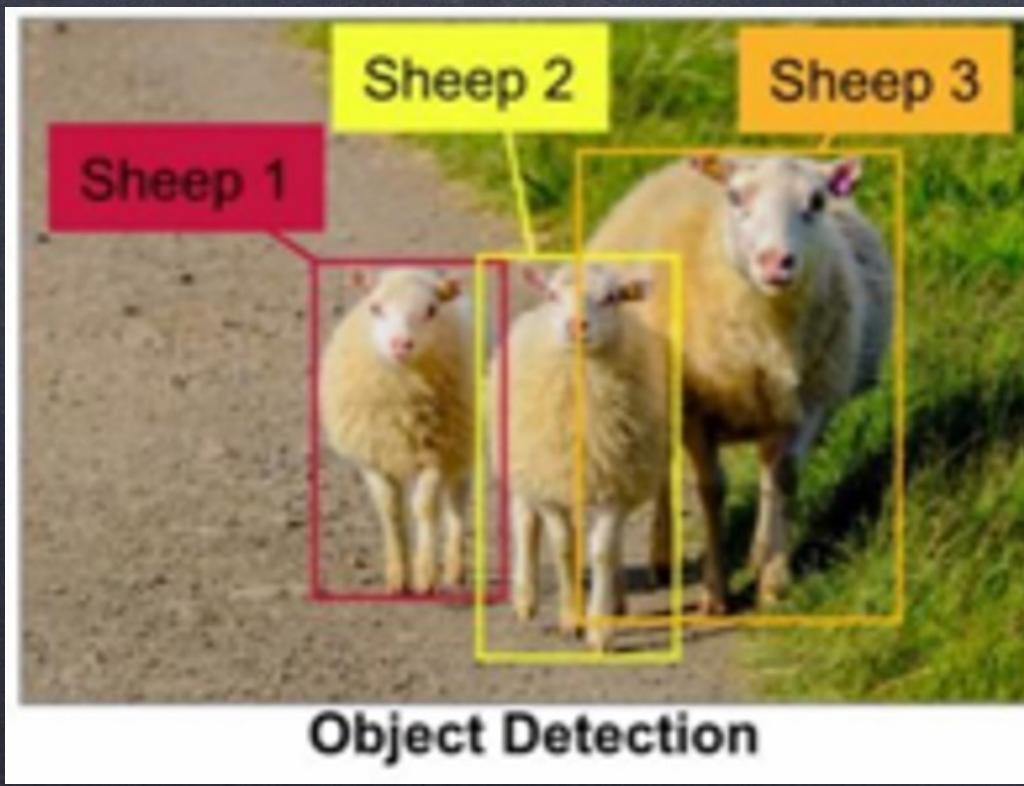


Semantic Segmentation

Sadeep Jayasumana

Computer Vision Tasks and Datasets

- Image classification: ImageNet, CIFAR-10/100
- Object detection - Pascal VOC, COCO, KITTI
- Semantic segmentation - Pascal VOC, Cityscapes
- Instance segmentation/panoptic segmentation - COCO



Semantic Segmentation

- Given an image, divide it into regions while identifying what's there in each region



Original image (hover to highlight segmented parts)



Semantic segmentation

Semantic Segmentation

- We're going to discuss the fully-supervised setting.
- But weakly-supervised approaches are getting popular due to the annotation cost.

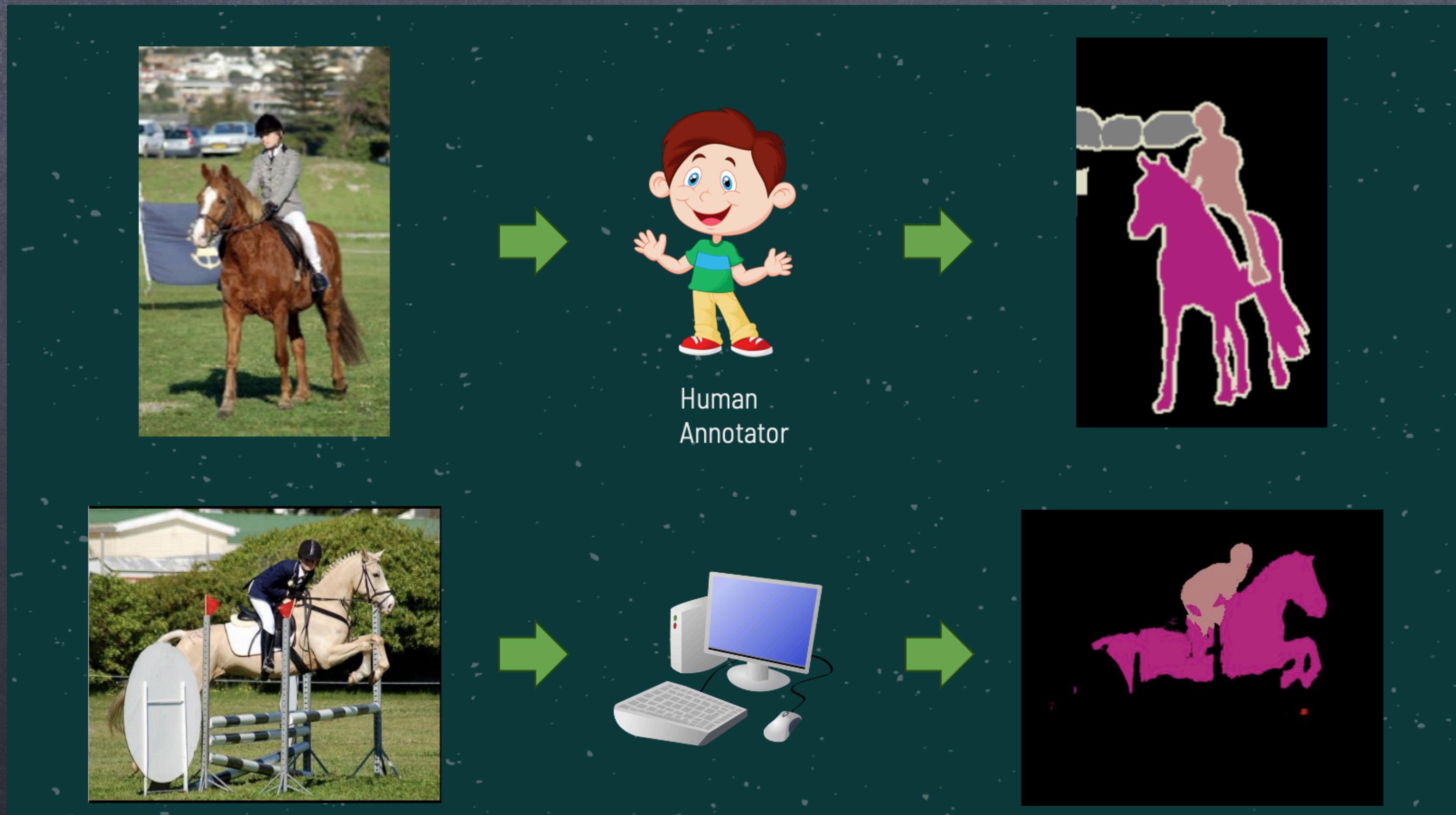


Image Classification Networks

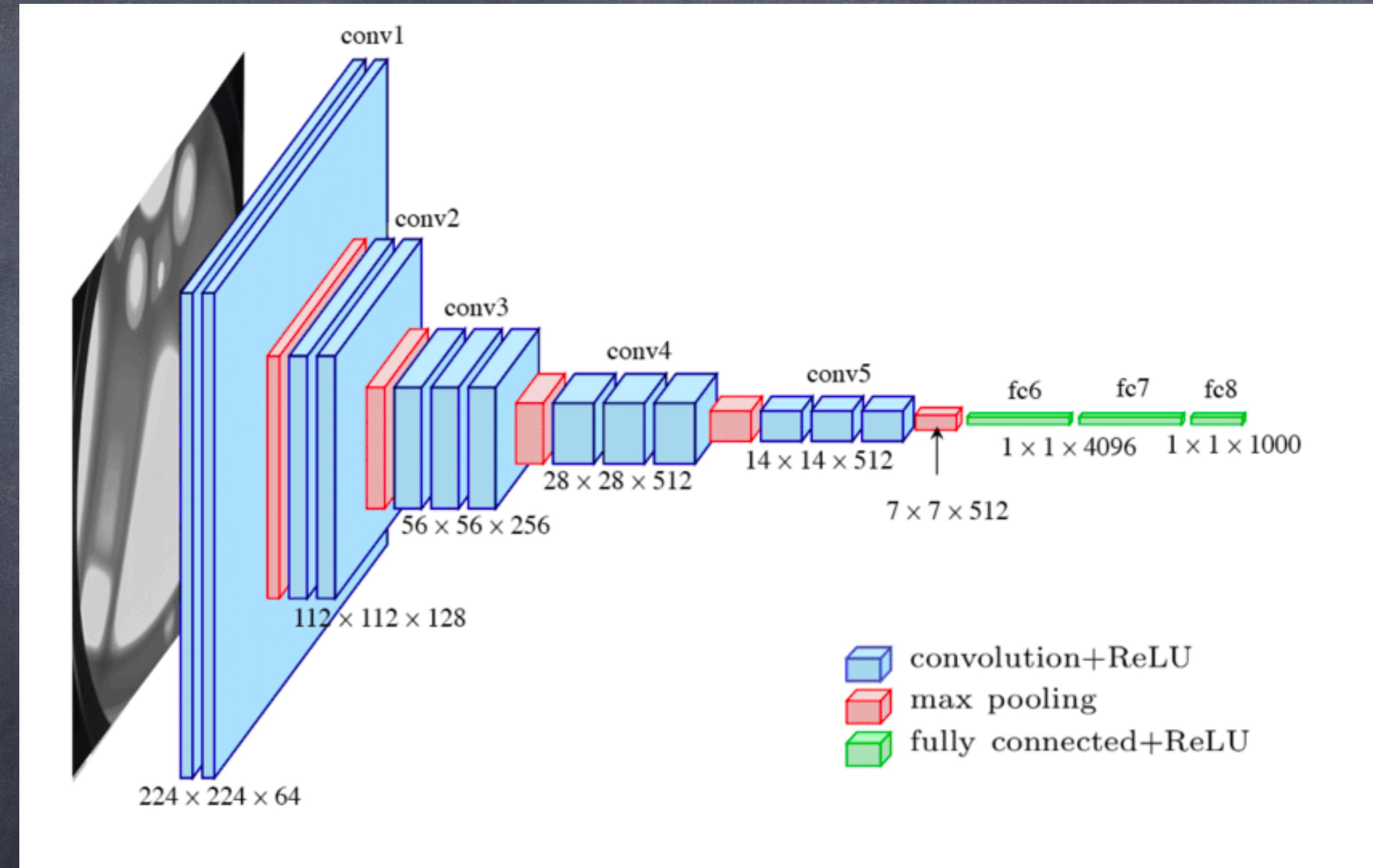
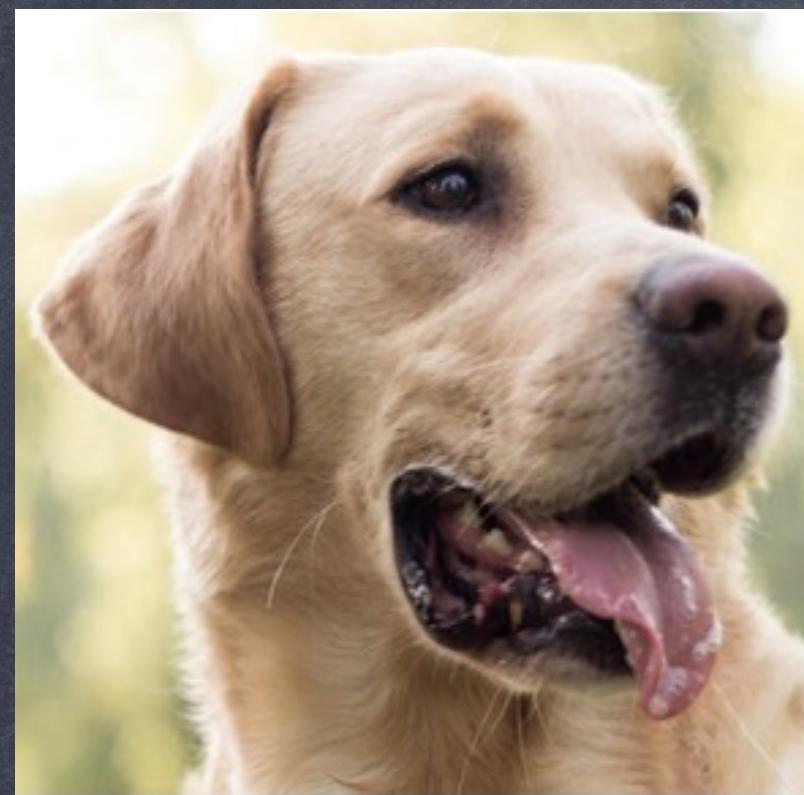
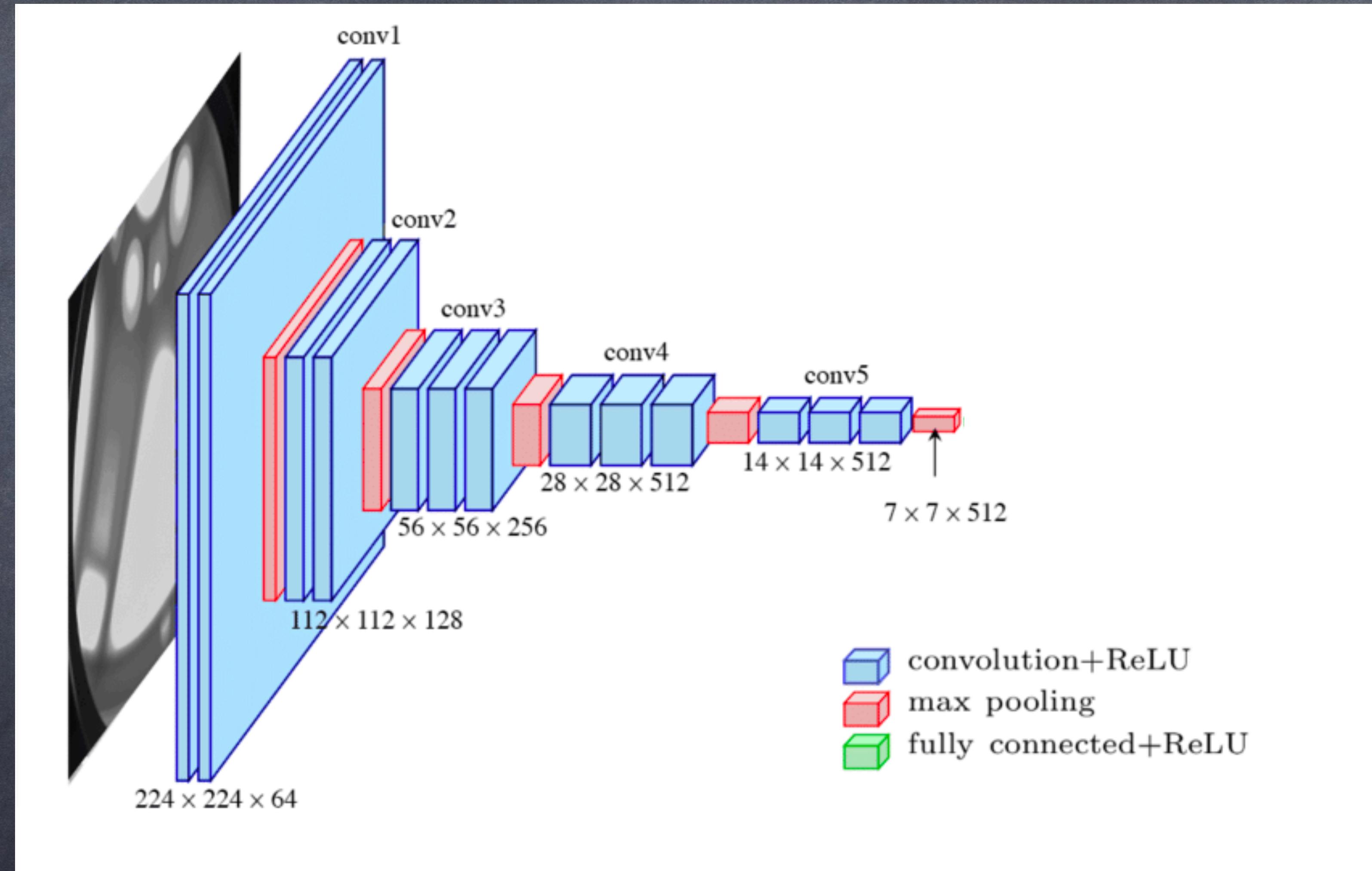
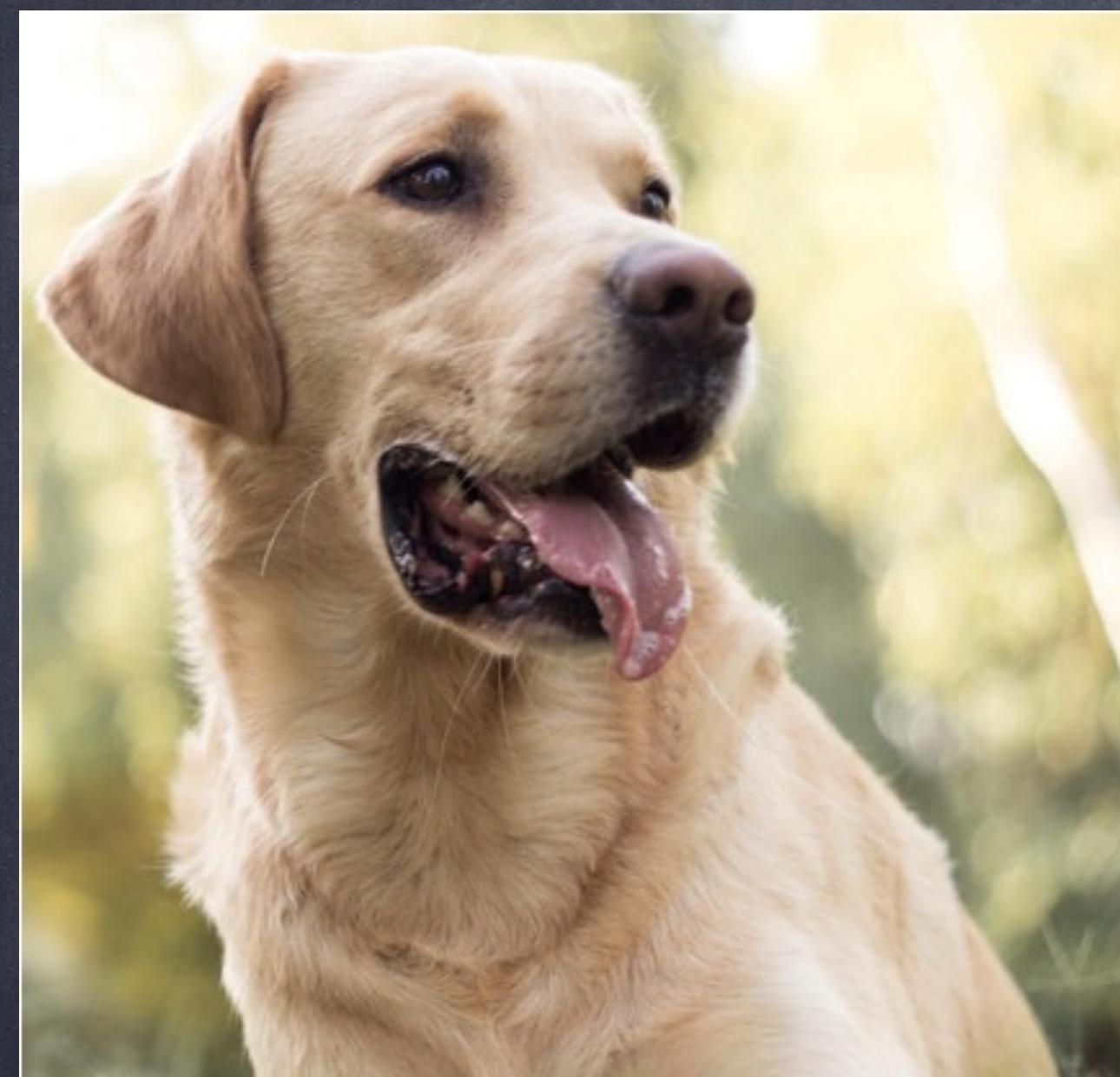


Image Classification Networks

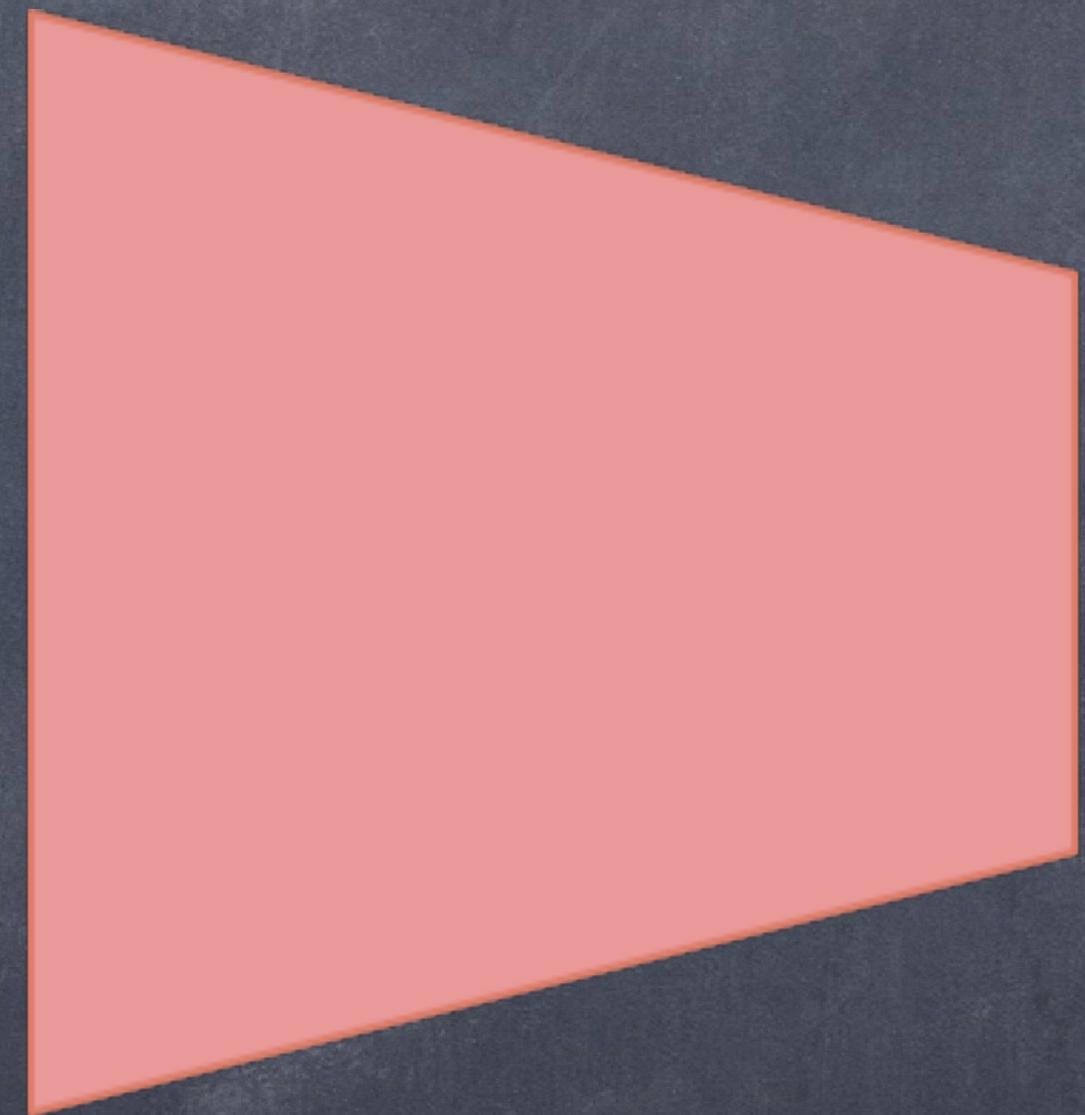
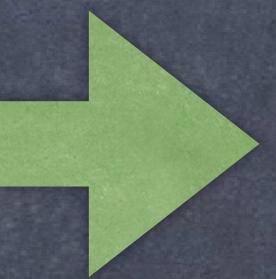


Fully Convolutional Networks

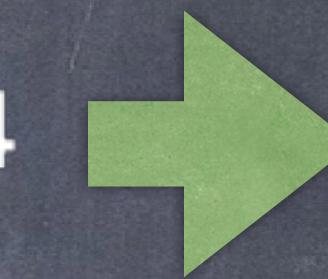


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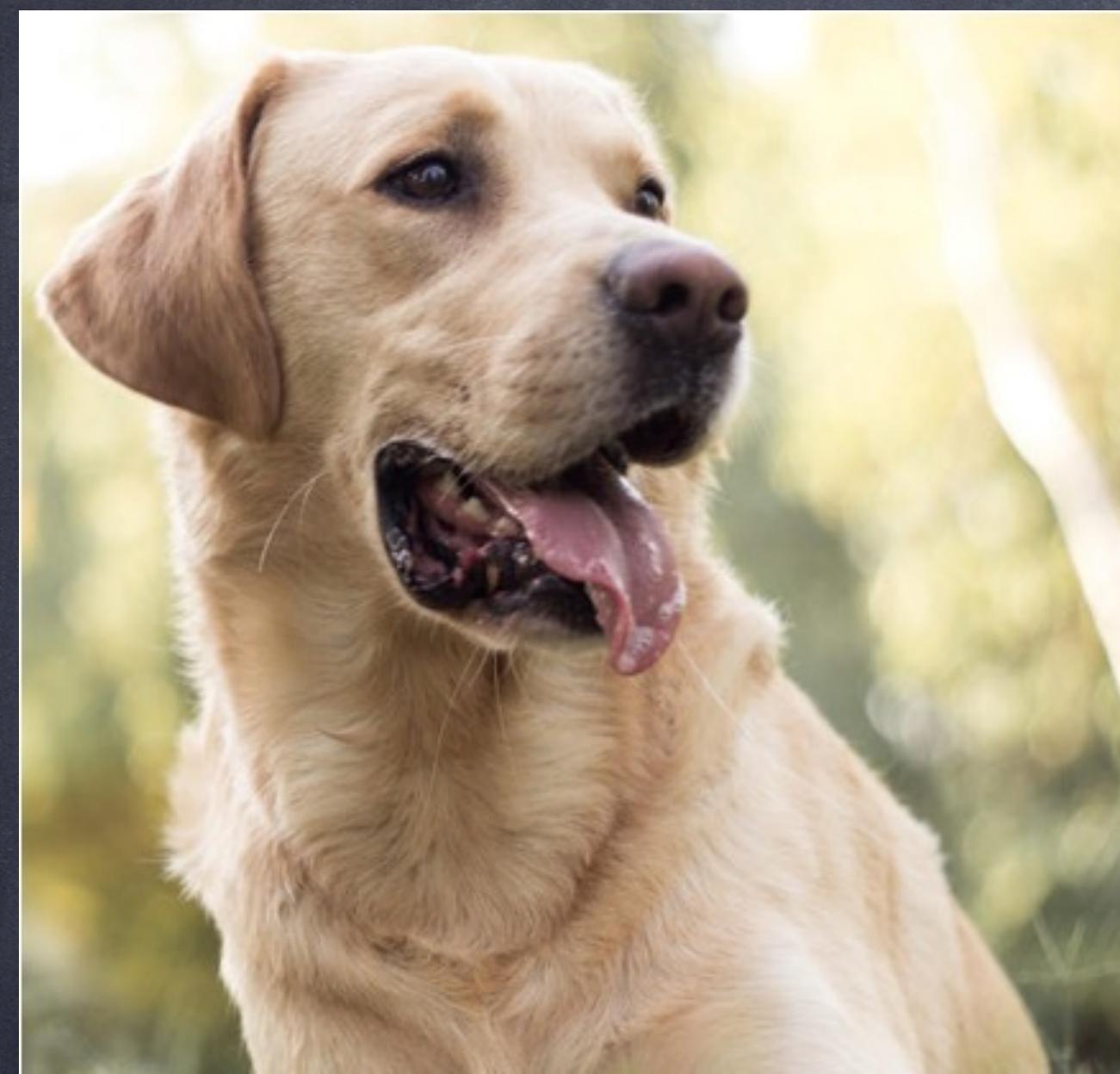


14

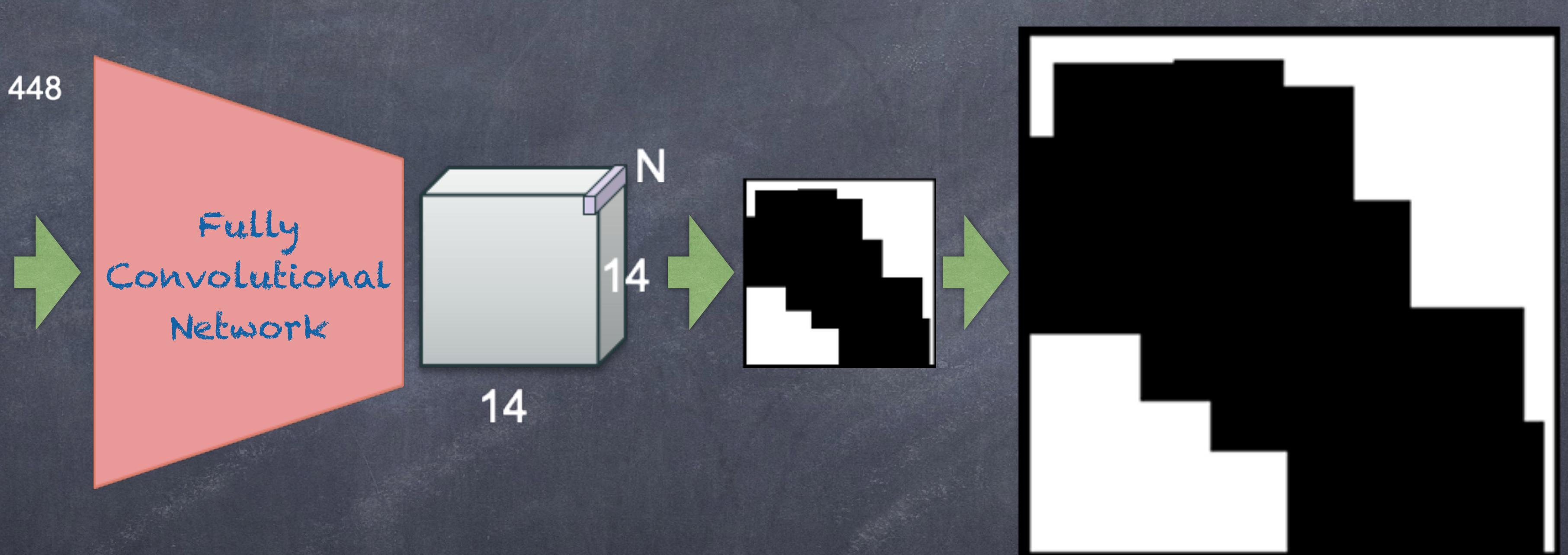


$N = \text{number of classes}$

Fully Convolutional Networks

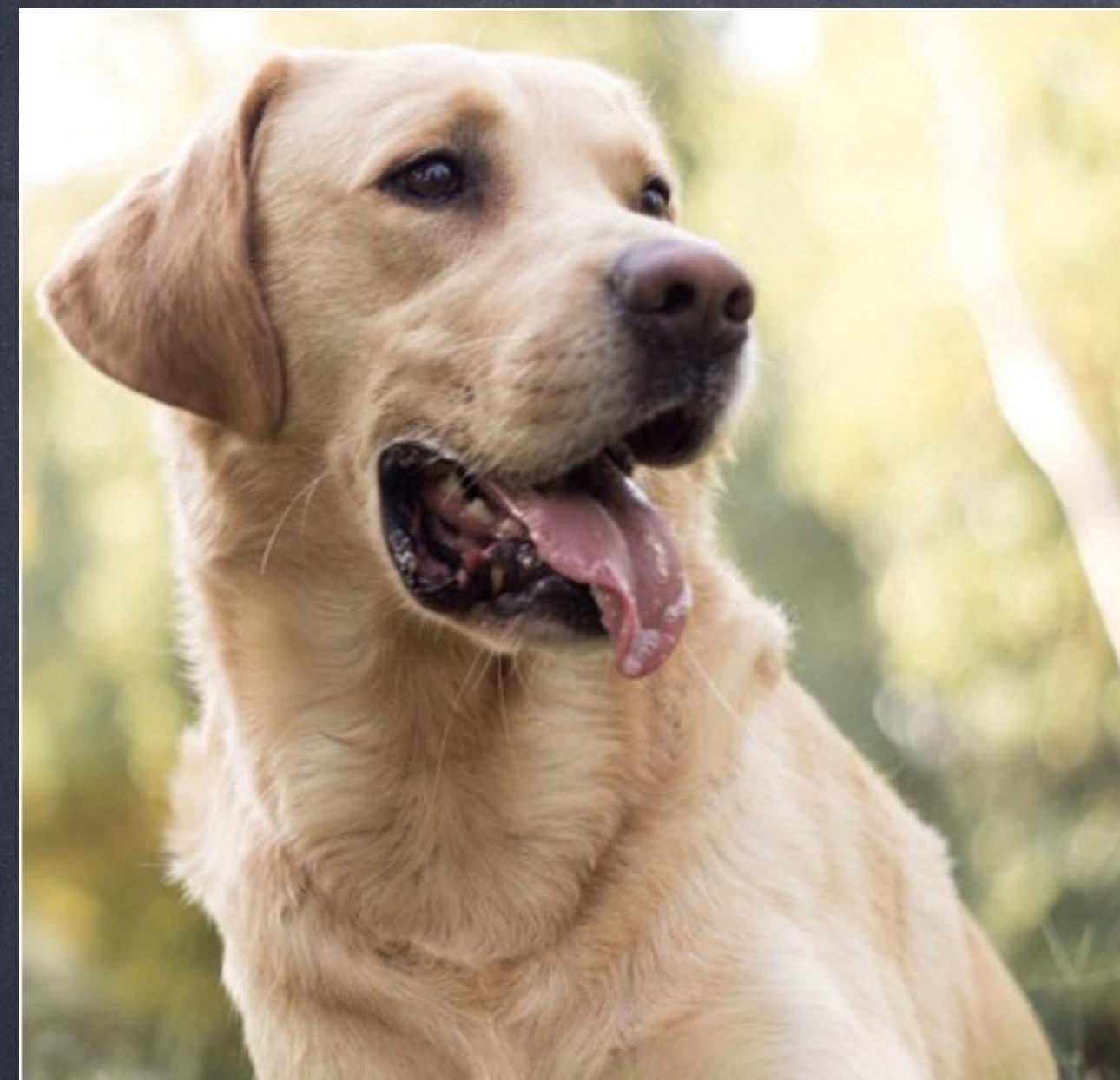


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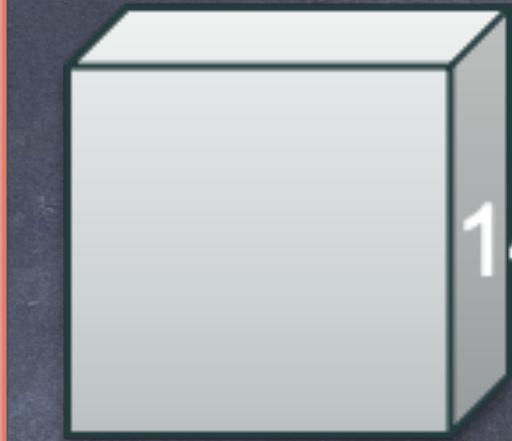
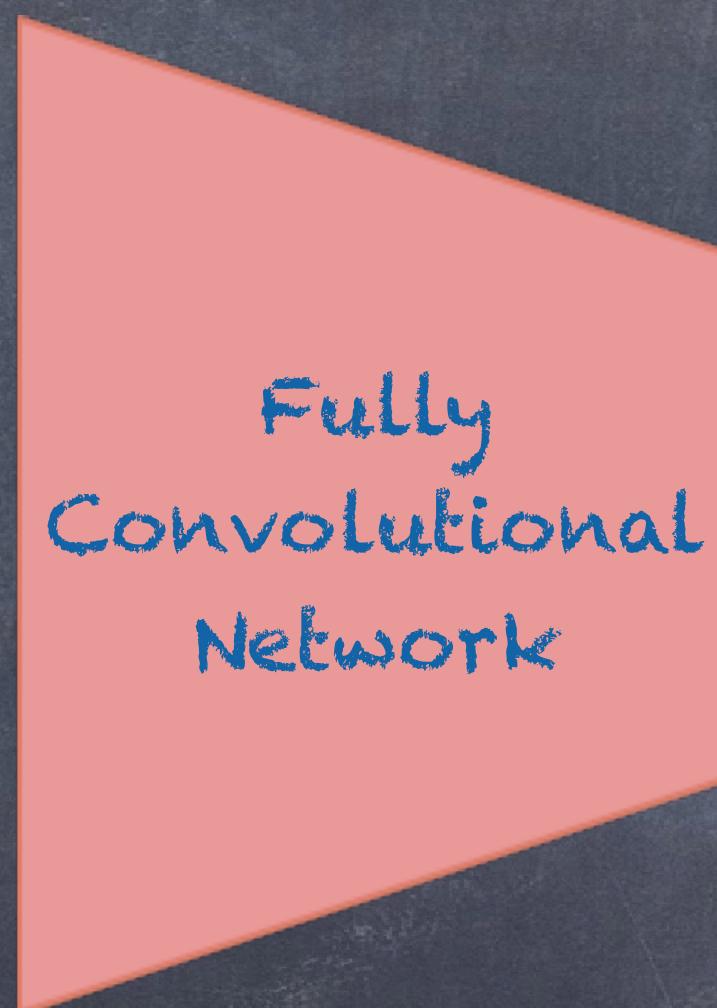
$N = \text{number of classes}$

Fully Convolutional Networks



448

448



14

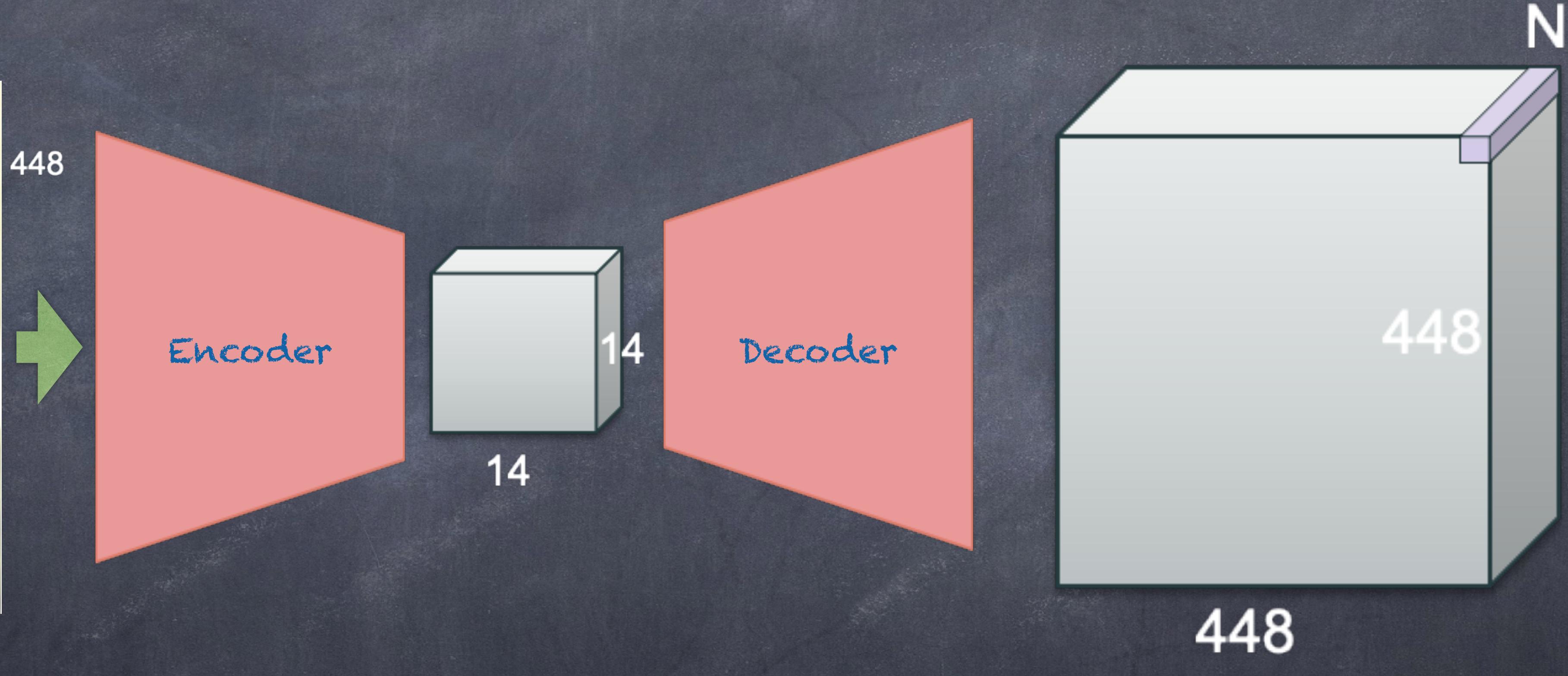


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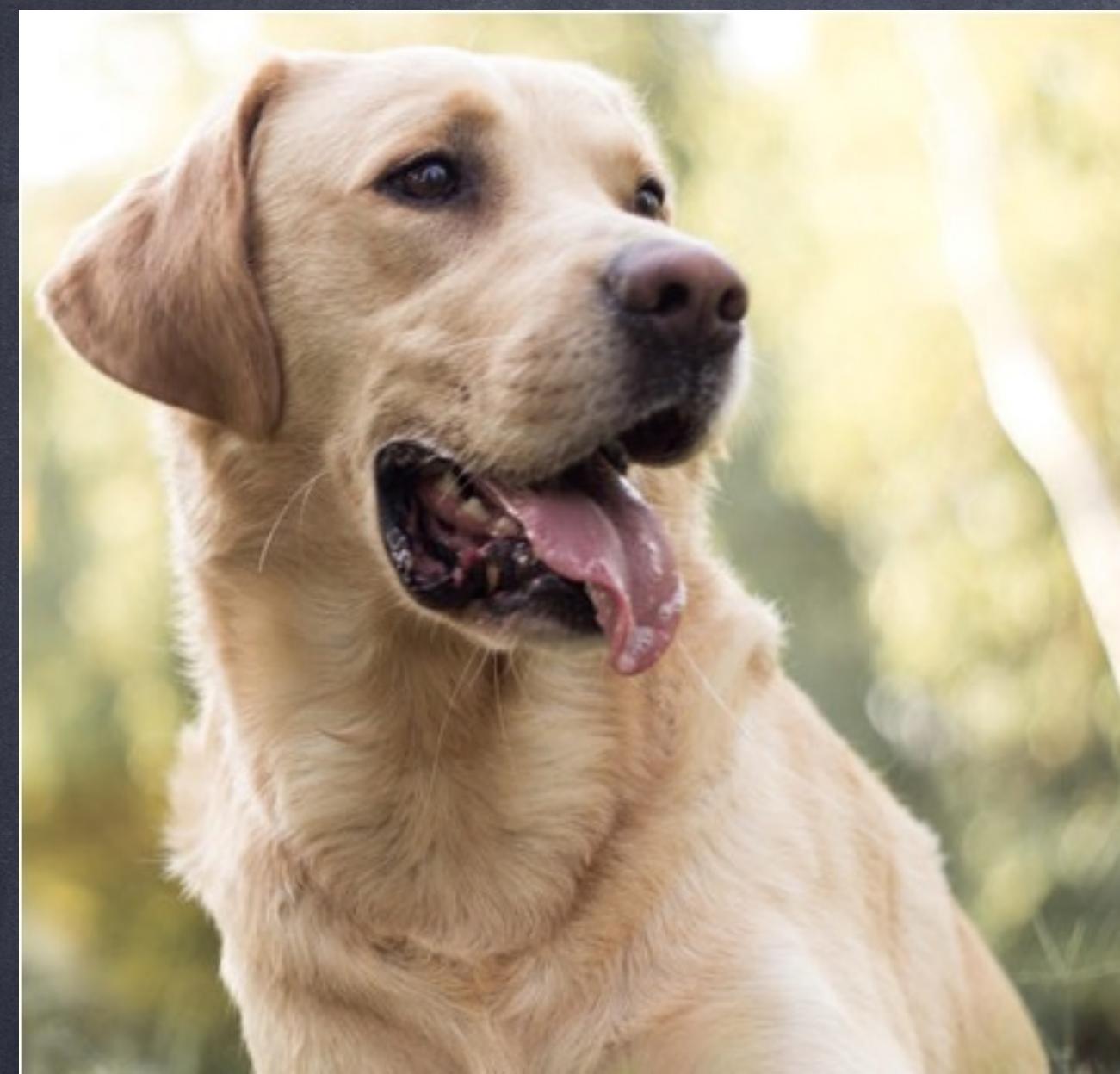
Fully Convolutional Networks



448

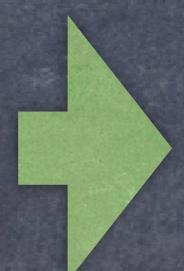


Fully Convolutional Networks

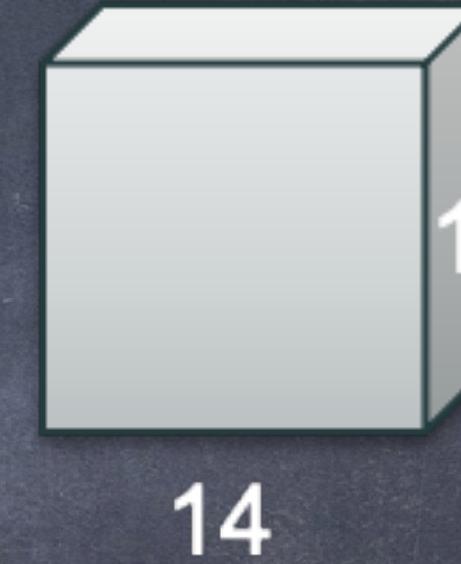


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Encoder



Decoder



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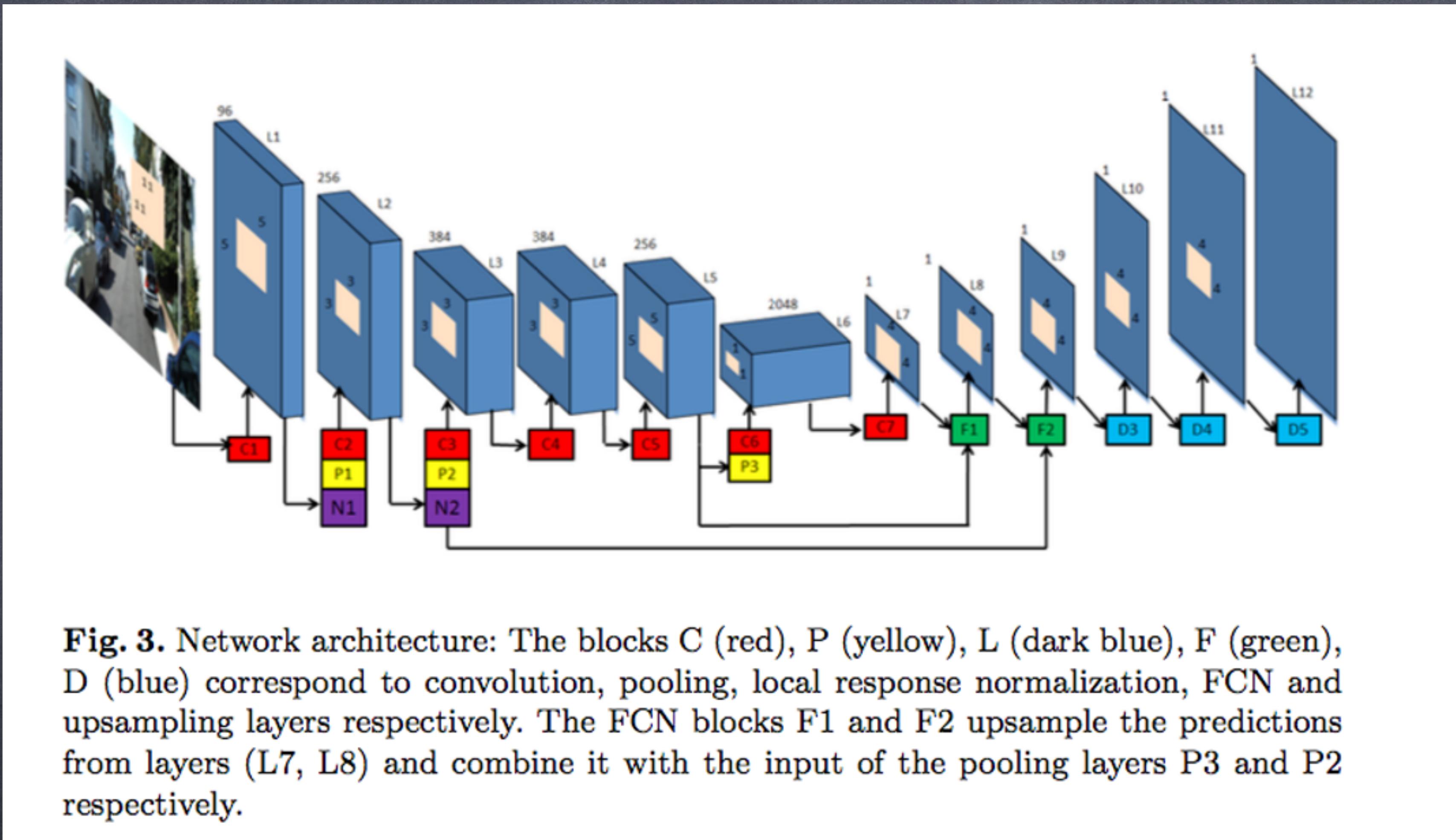
Encoder Part

- Convolution
- Pooling
- Strided convolution
- Dilated convolution

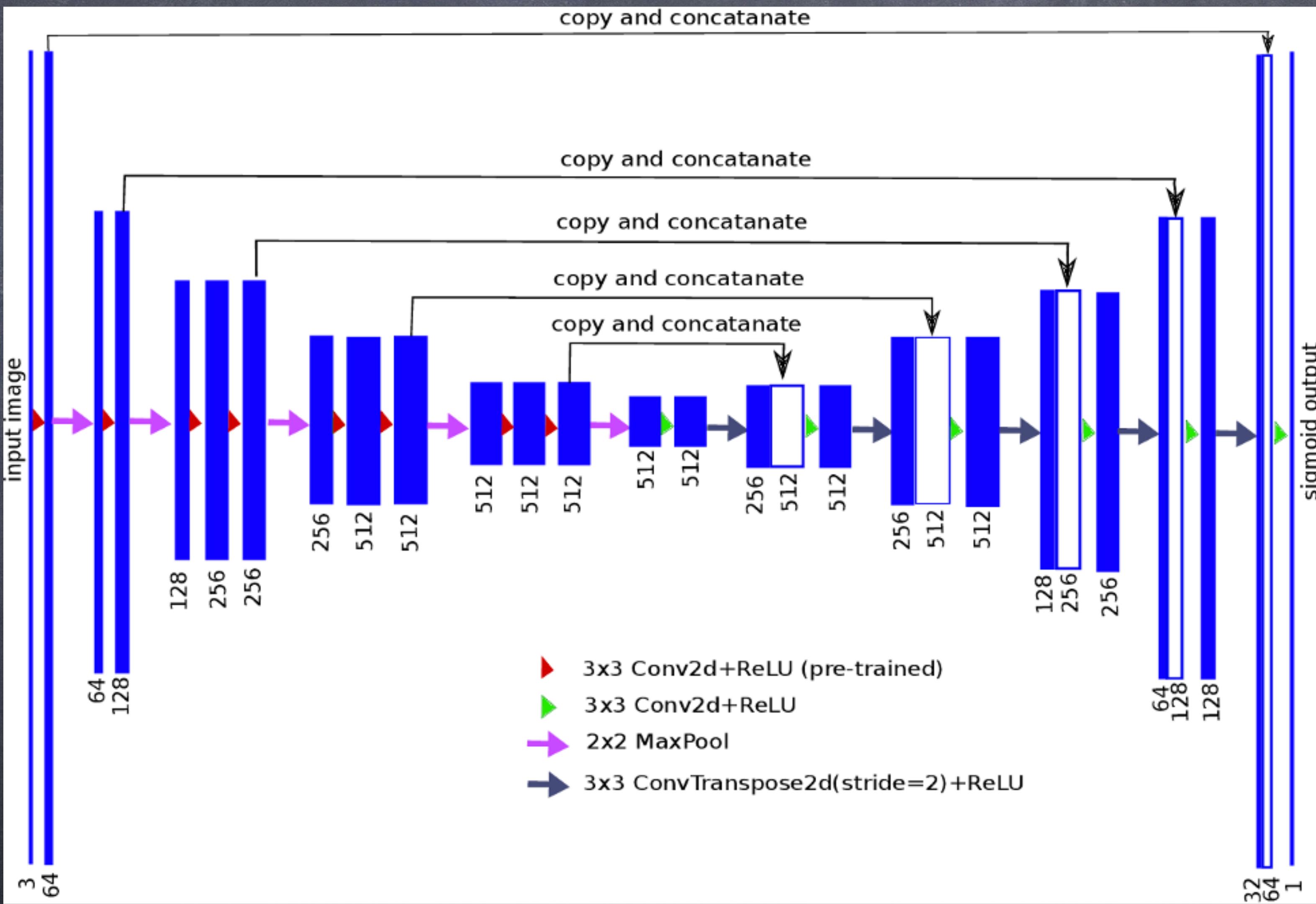
Decoder Part

- Upsampling
- Fractionally-strided convolution/transpose convolution

Skip Connections



Skip Connections



Thank You!