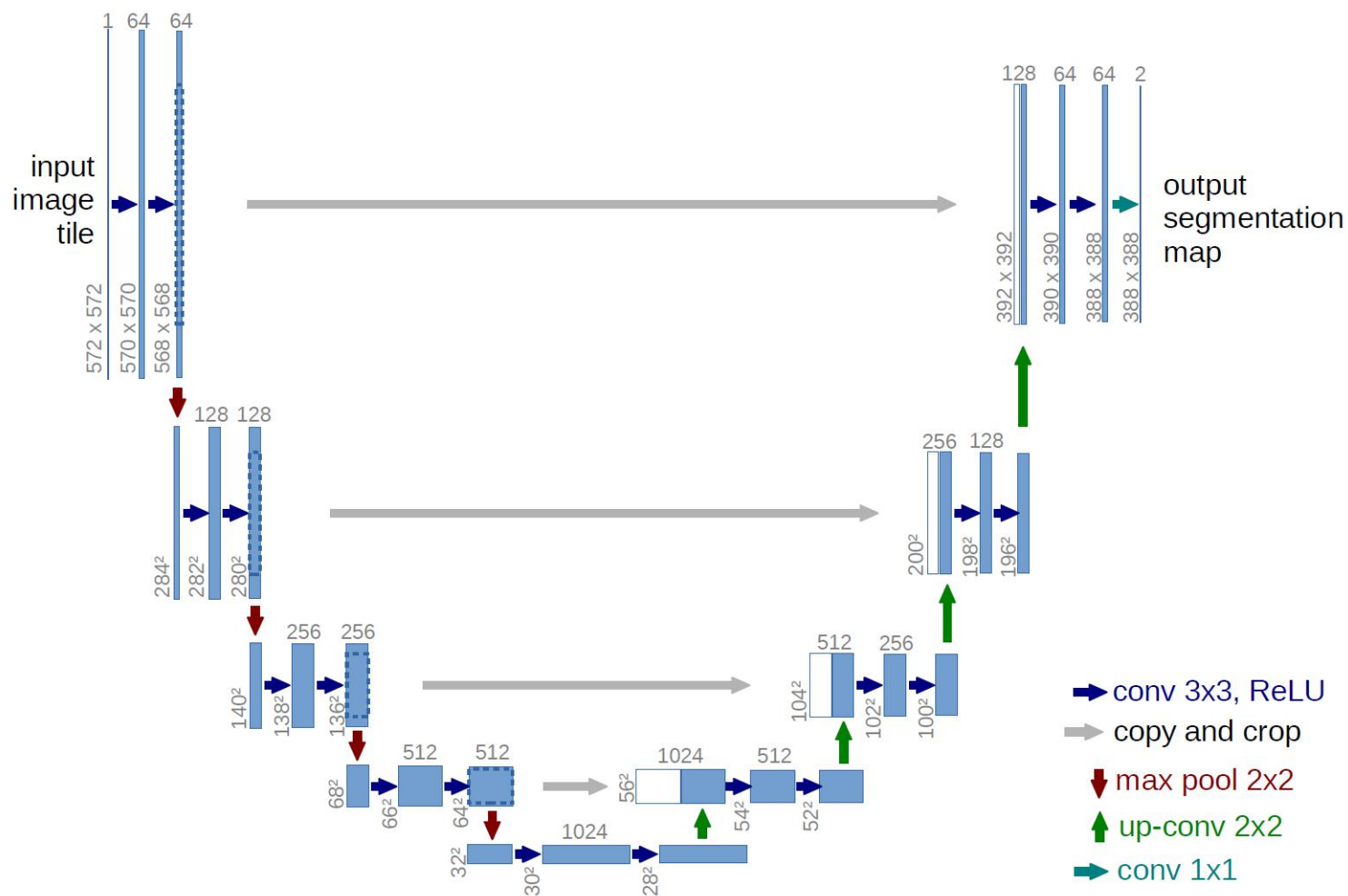


# Lane Segmentation Week 3

HCT CV Course

# 主要内容



# 学习目标

- 掌握U-Net的原理和实现

# Pytorch 1.4



<https://pytorch.org/blog/pytorch-1-dot-4-released-and-domain-libraries-updated/>

# Tensor

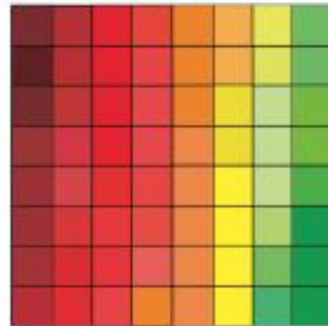
tensor = multidimensional array

vector



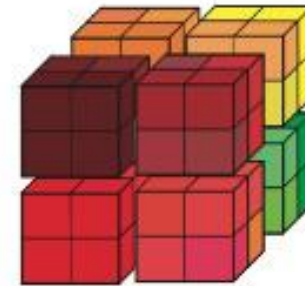
$$\mathbf{v} \in \mathbb{R}^{64}$$

matrix



$$\mathbf{X} \in \mathbb{R}^{8 \times 8}$$

tensor



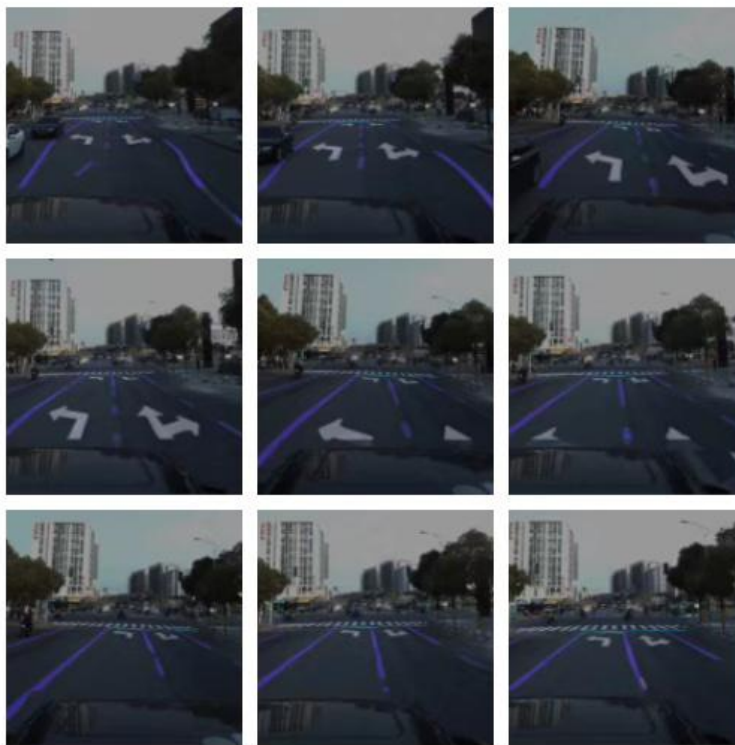
$$\mathbf{X} \in \mathbb{R}^{4 \times 4 \times 4}$$

Make  
your  
hand  
dirty



Howard Chow

✌️ 第一个完整手撸的工程。深度神经网络真的太神奇了，它咋知道那就是车道线呀😂



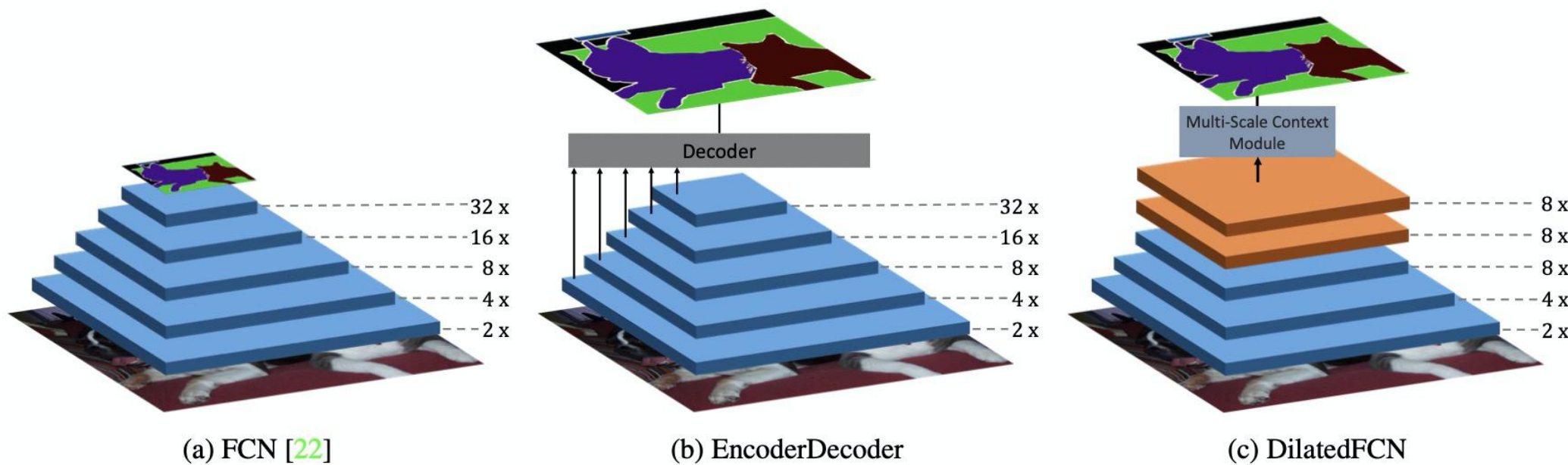
1小时前



♥️ Alan Wang, AI-King

Rongfan Leo: 效果还挺好的

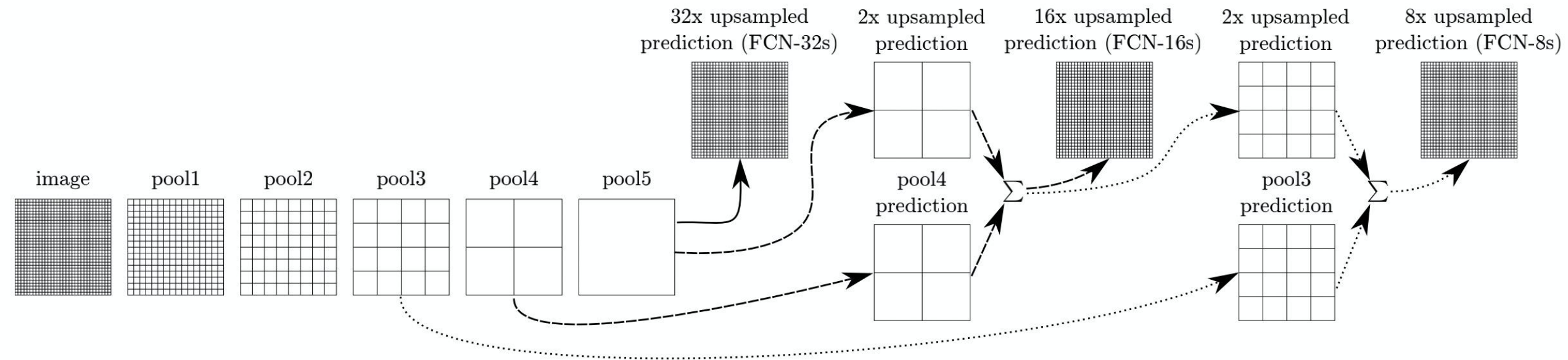
# Semantic Segmentation



# Notes

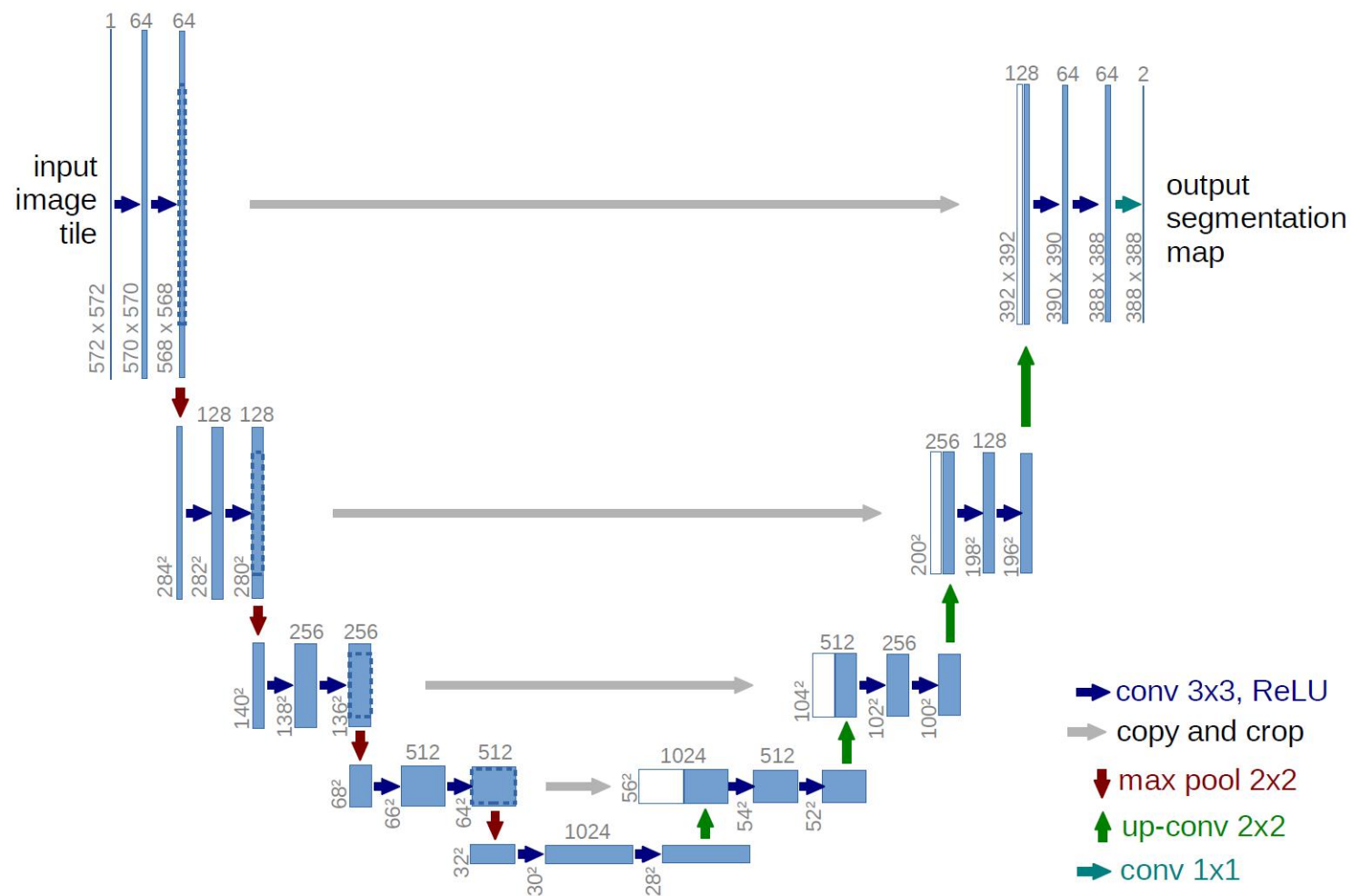


# FCN



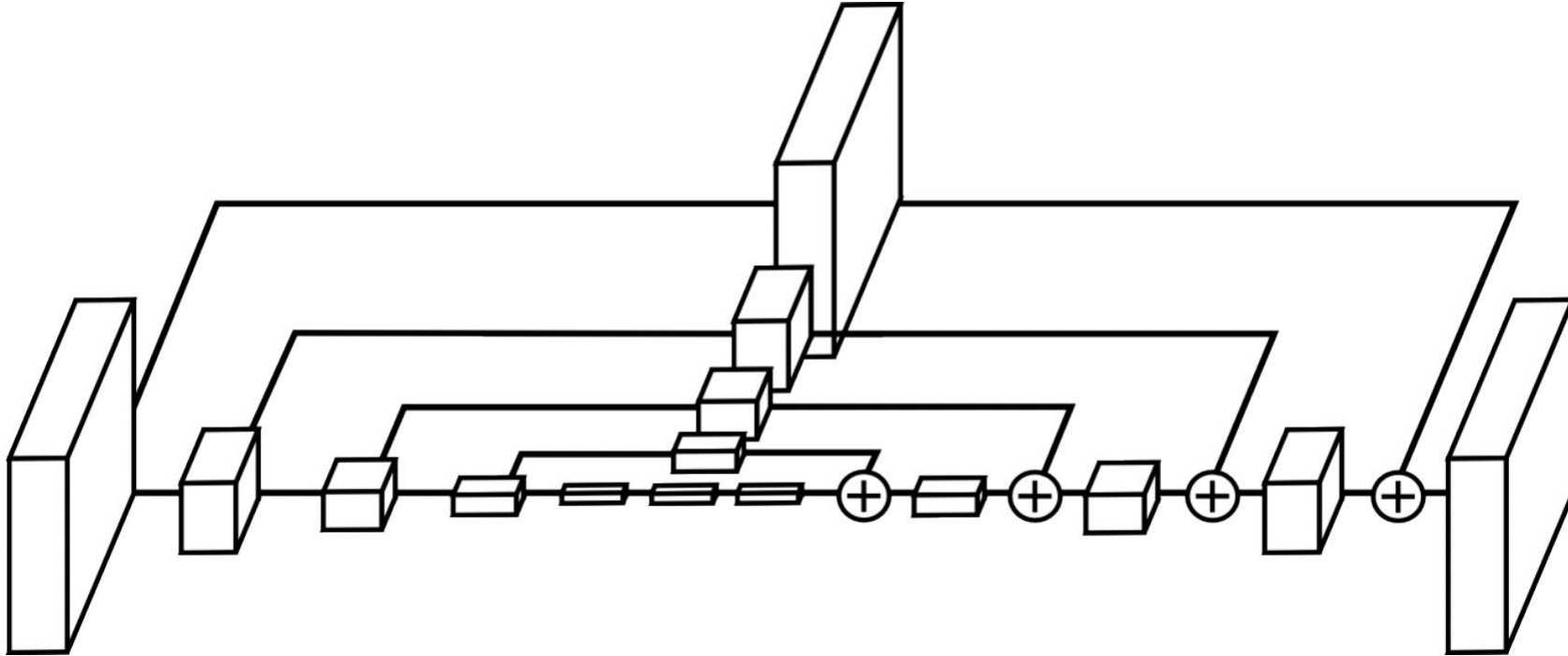
# Notes

# U-Net

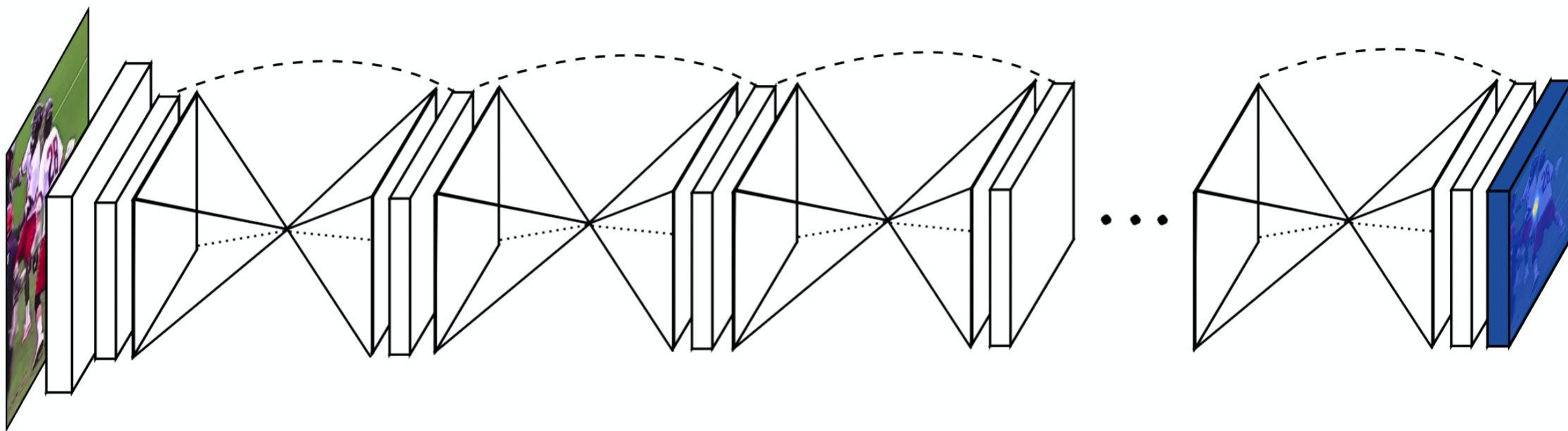


# Notes

# Human Pose Estimation



# Human Pose Estimation



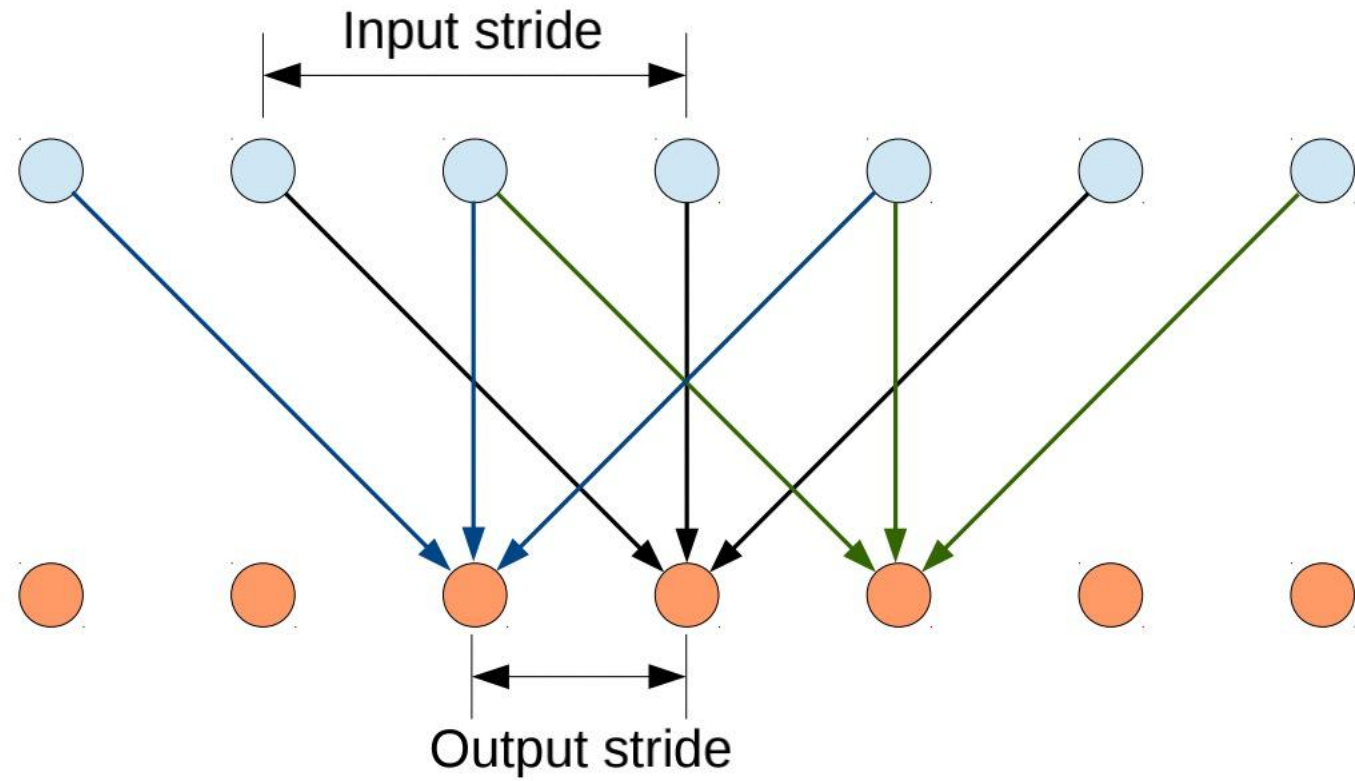
# Human Pose Estimation



# Notes

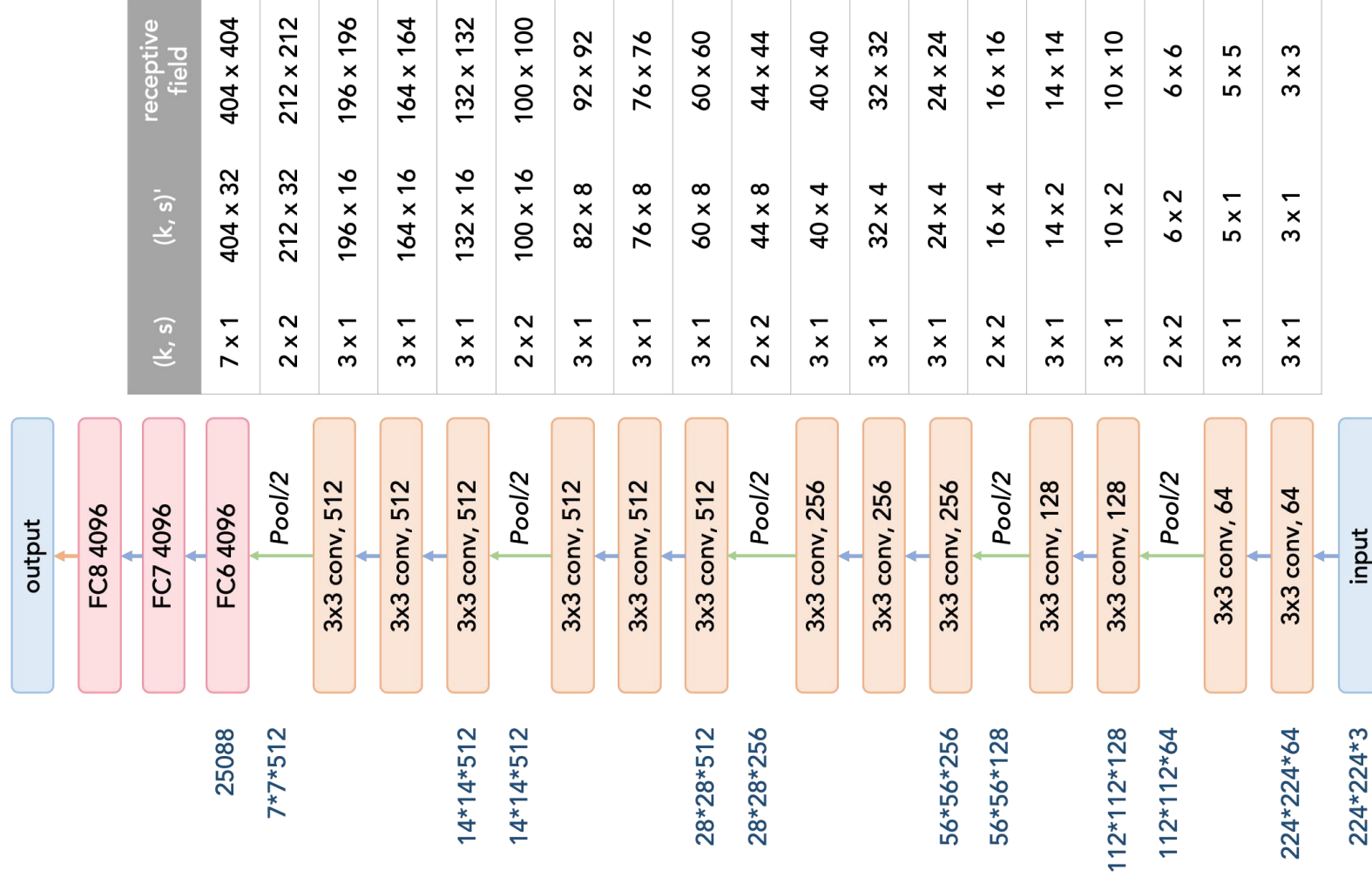


# Stride



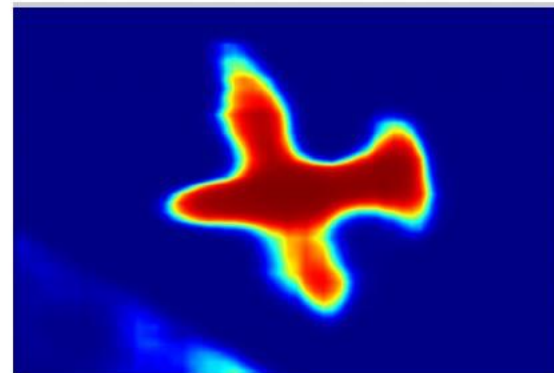
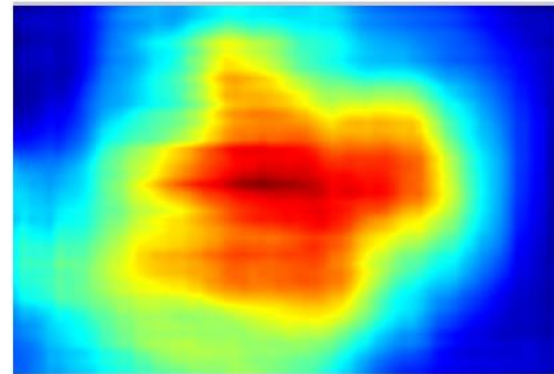
# Notes

# receptive field



# Notes

# Coarse Output



Image/G.T.

DCNN output

# Notes

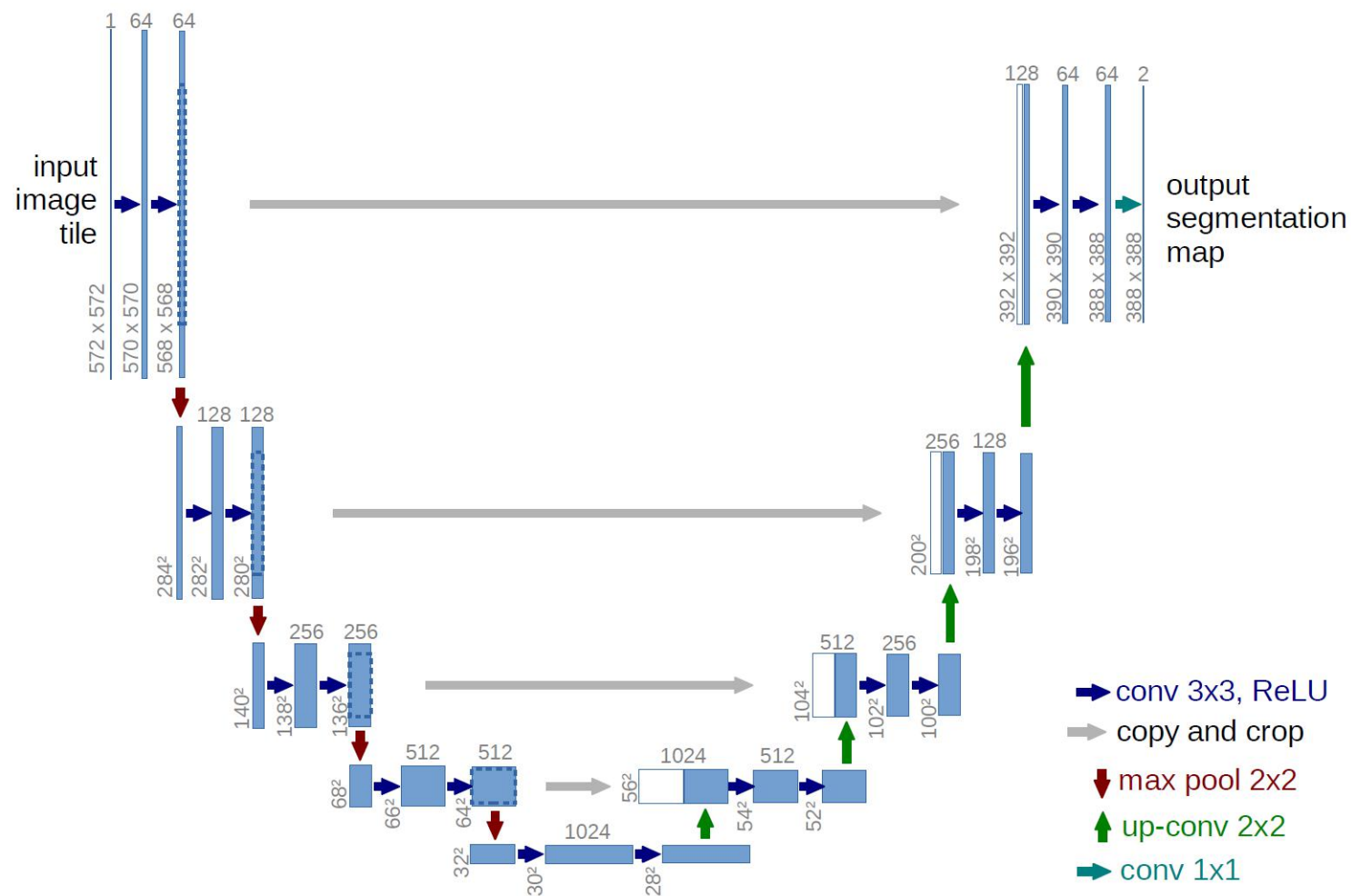
# U-Net Architecture

- Encoder-Decoder
- Skip Connection

# Notes



# Encoder



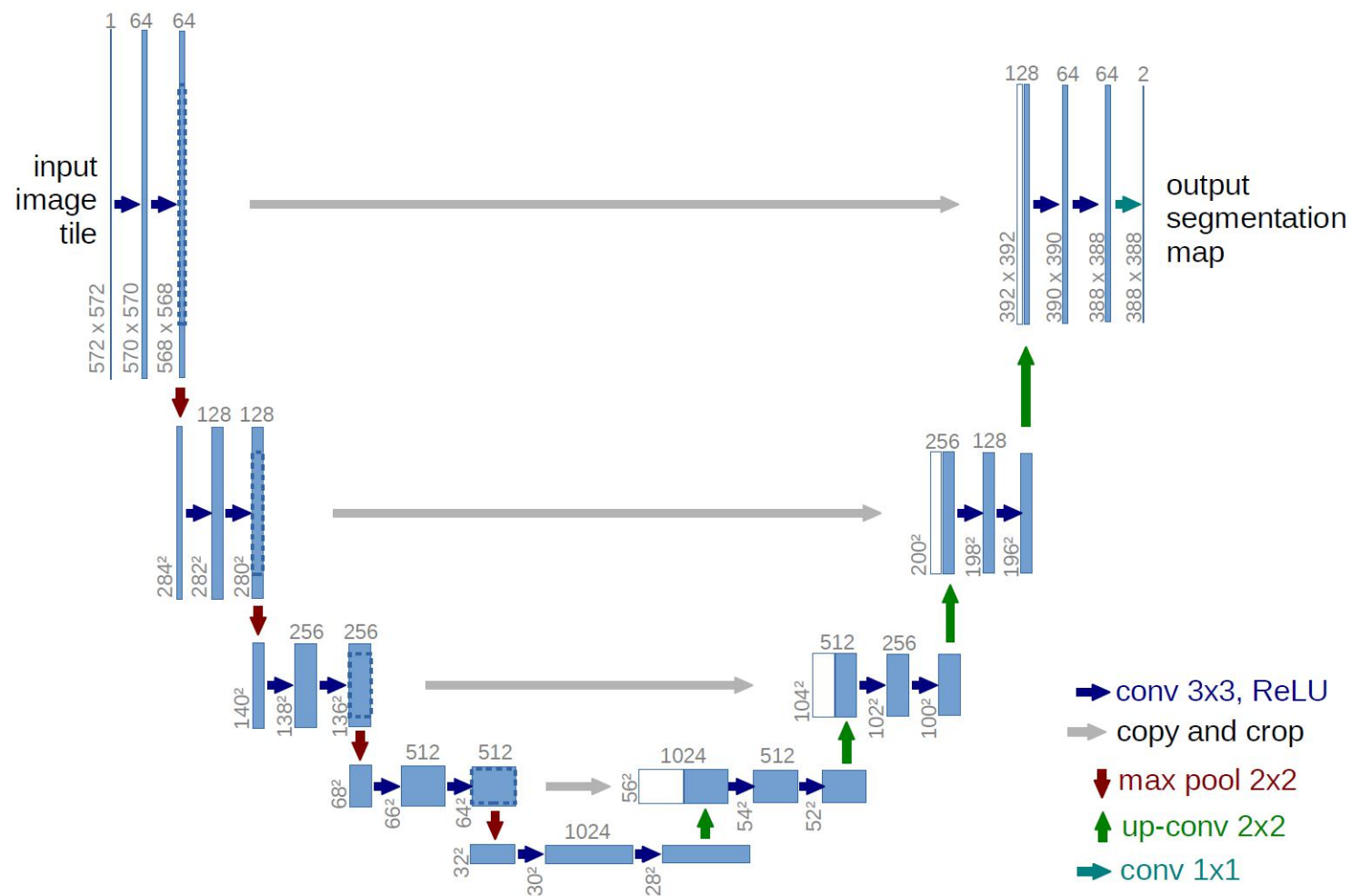
# Notes

# Encoder

- Pre-Trained Model

# Notes

# Decoder



# Notes

# Decoder

- Deeper

# Notes

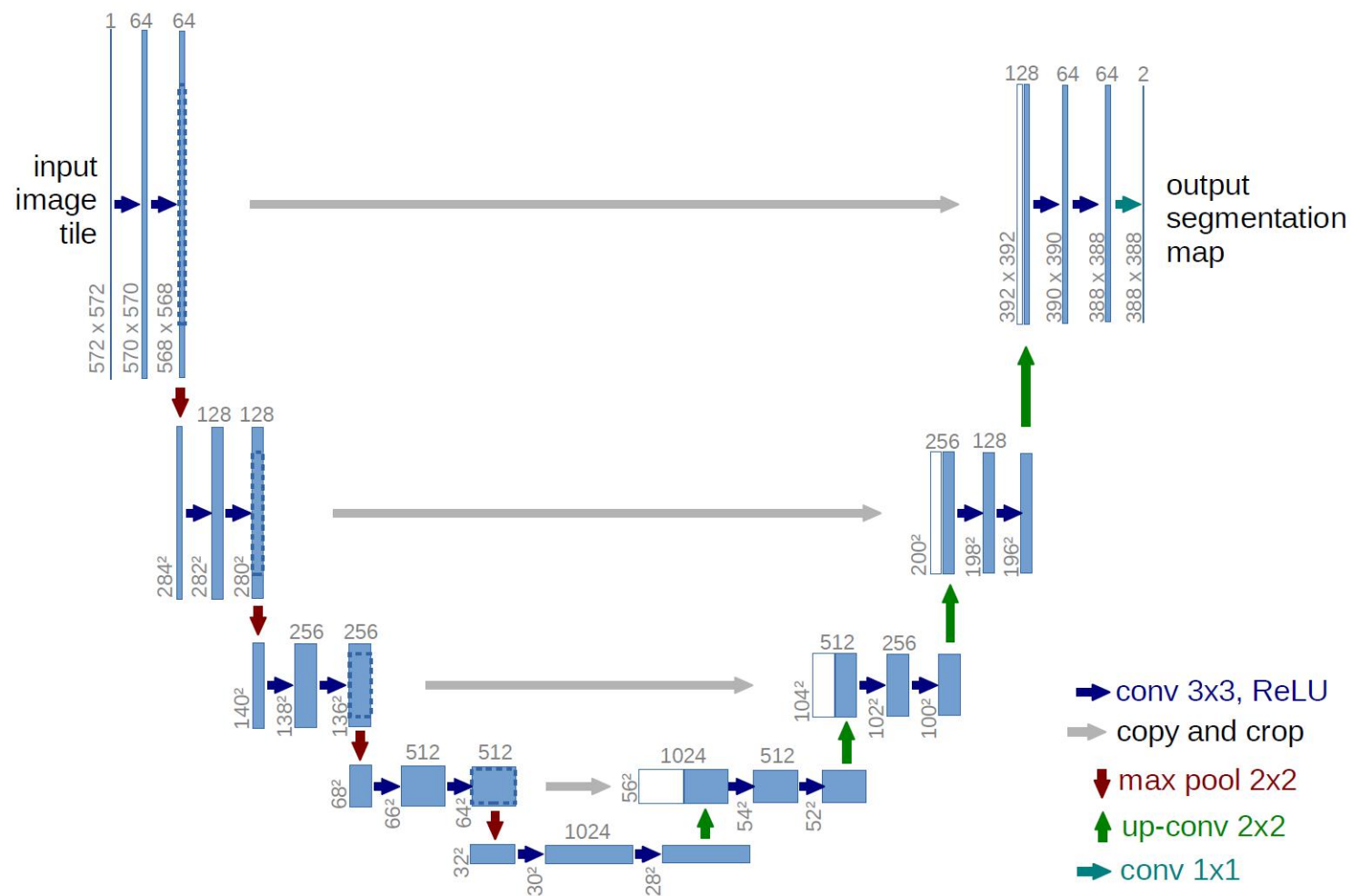


# Decoder

- bilinear interpolation
- transposed convolution

# Notes

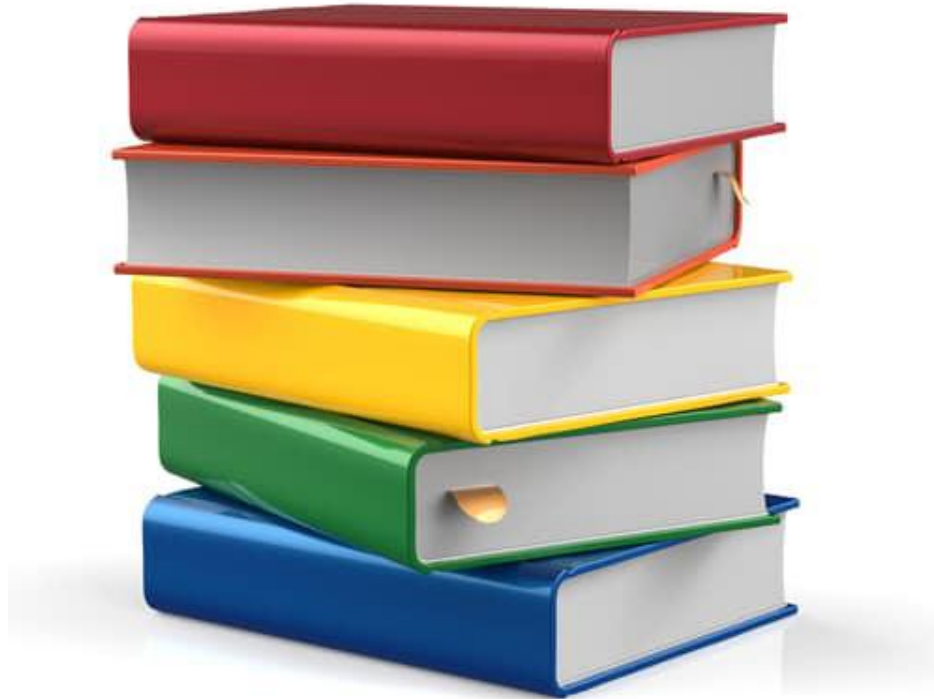
# Skip Connection



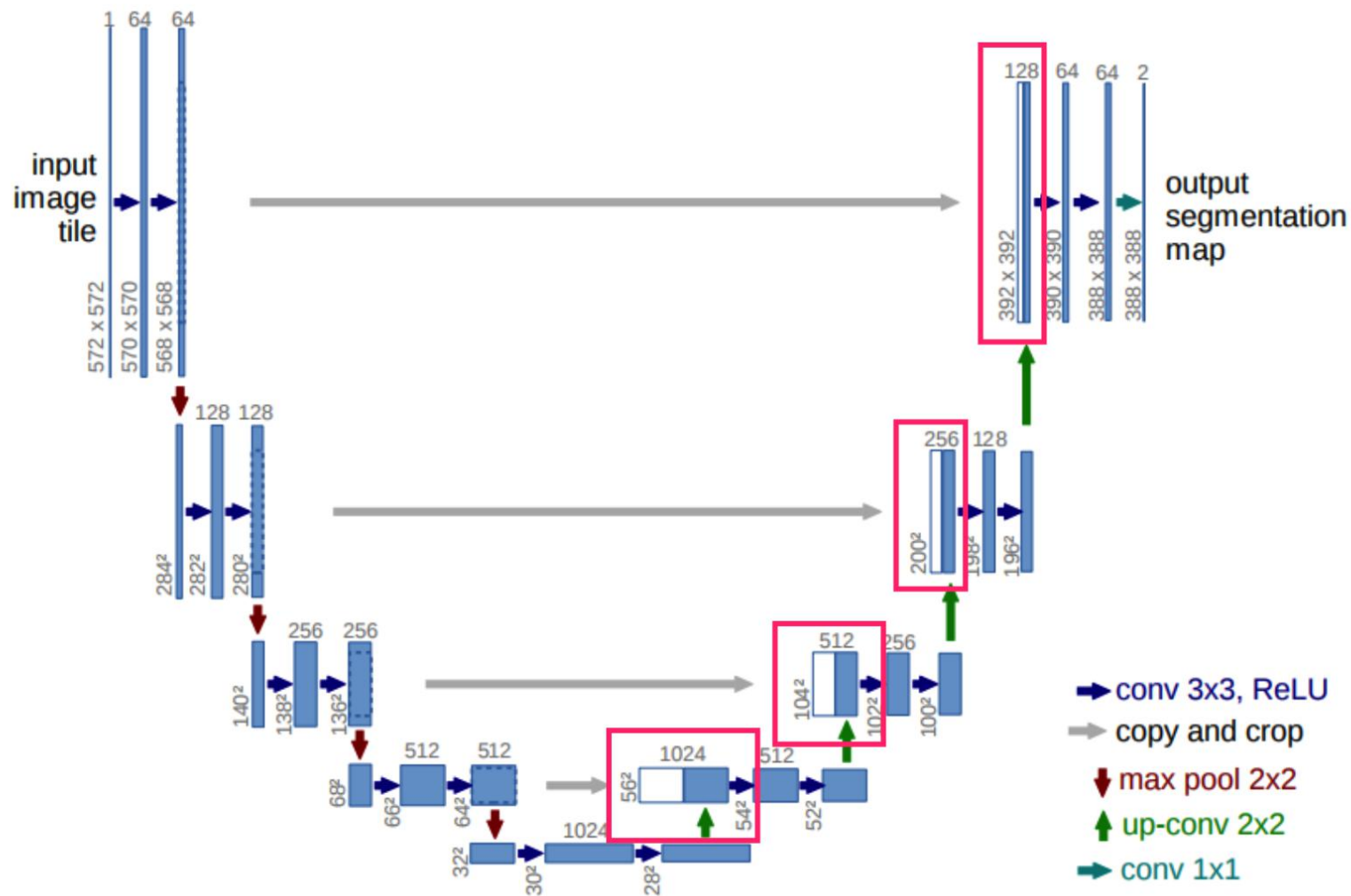
# Notes

# Skip Connection

- Concat



# concat



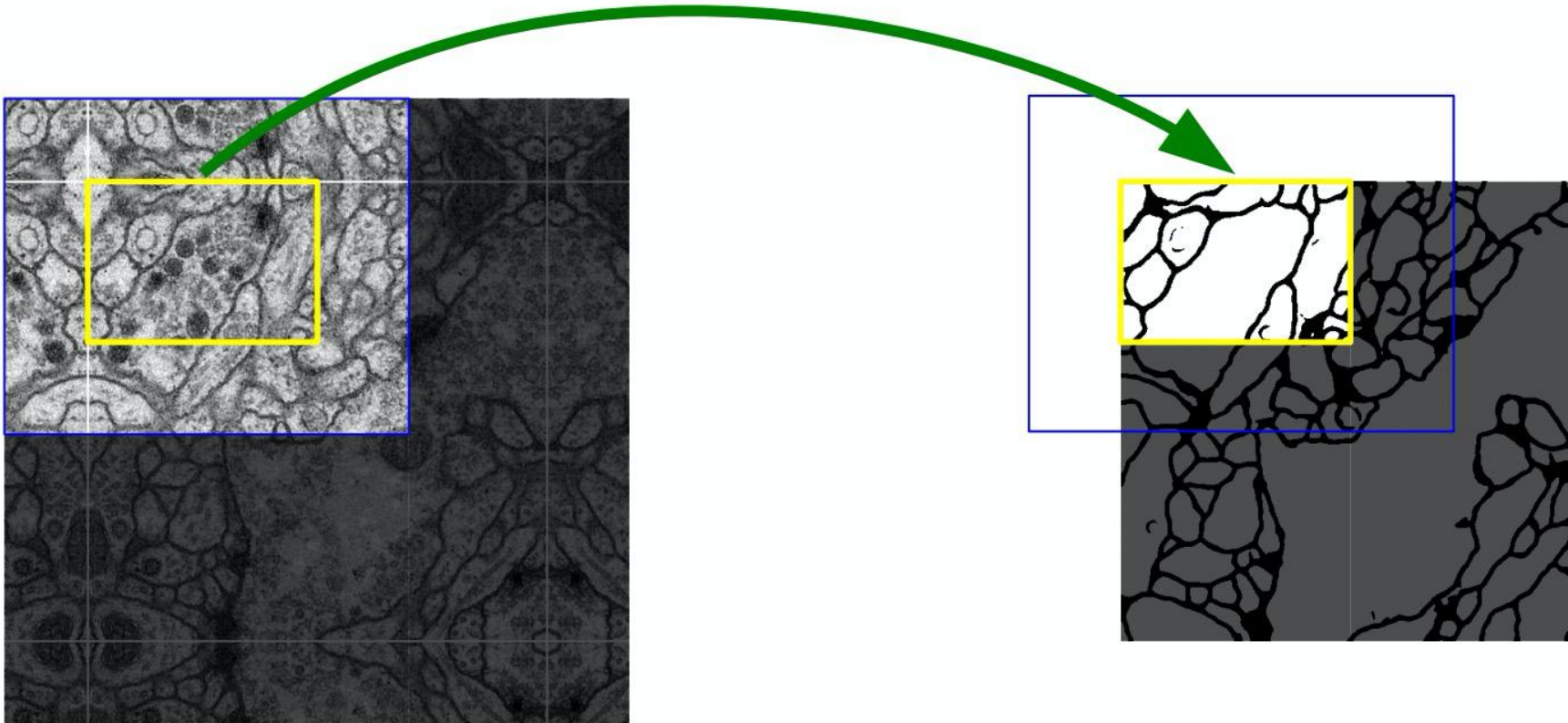
# Notes

# Overlap-tile strategy

- seamless segmentation of arbitrary large images



# Overlap-tile strategy



# Notes

# Padding

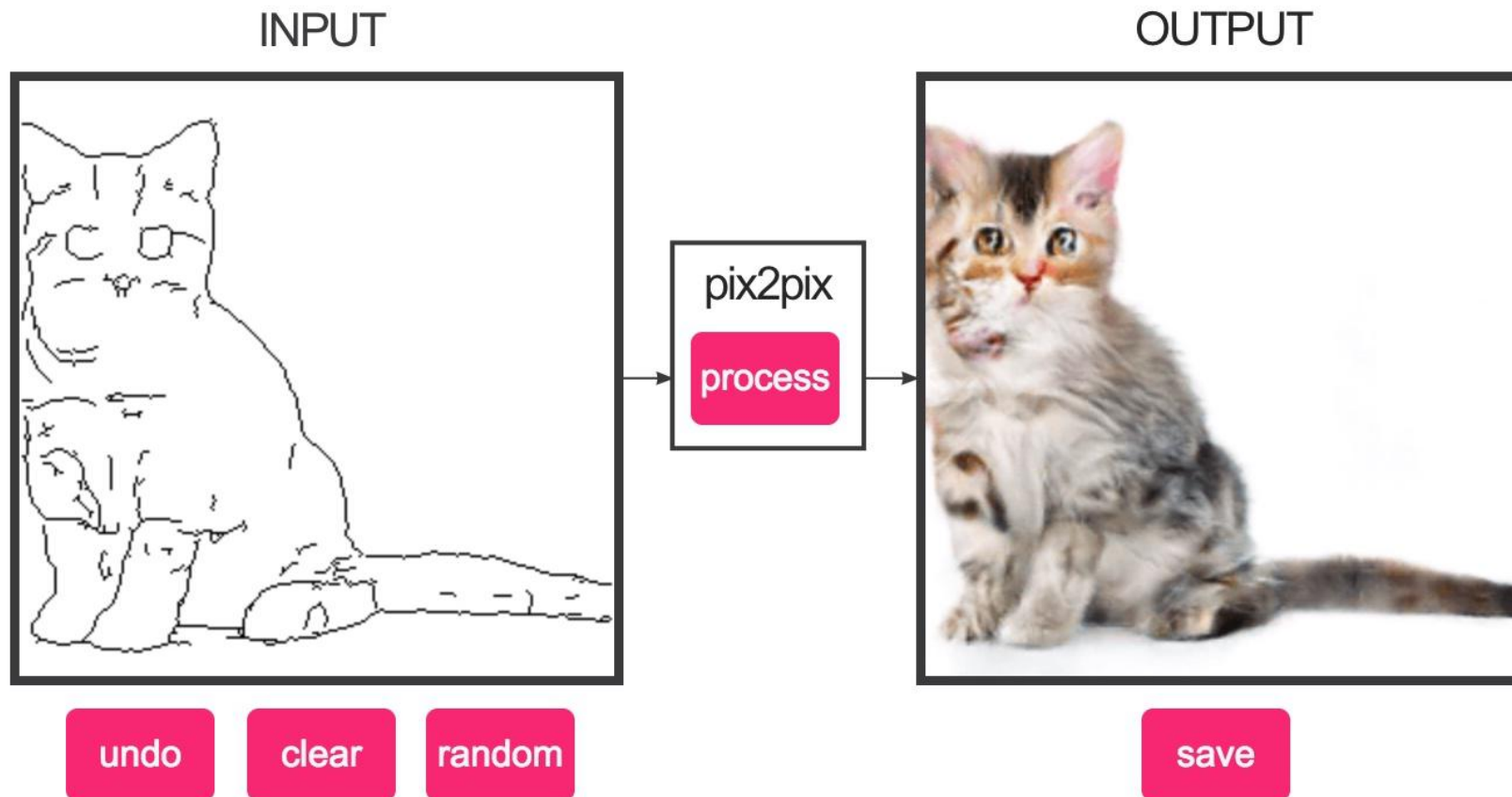
- same
- valid

# Notes

# Pix2Pix

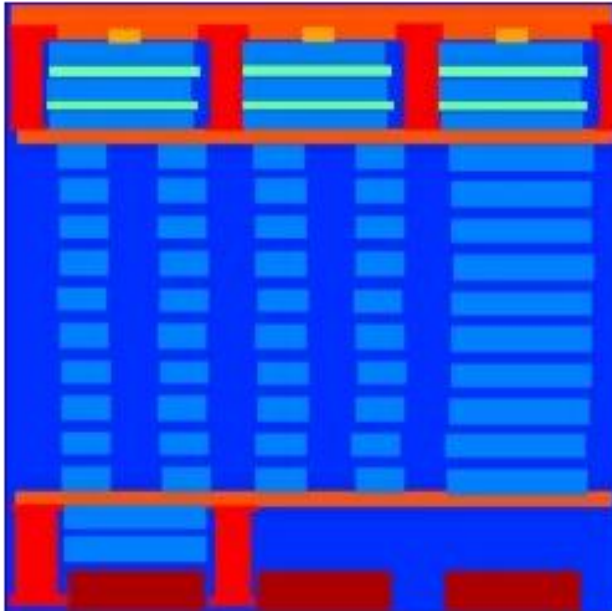
- The Pix2Pix Generative Adversarial Network, or **GAN**, is an approach to training a deep convolutional neural network for image-to-image translation tasks.

# Pix2Pix



# Pix2Pix

Input Image



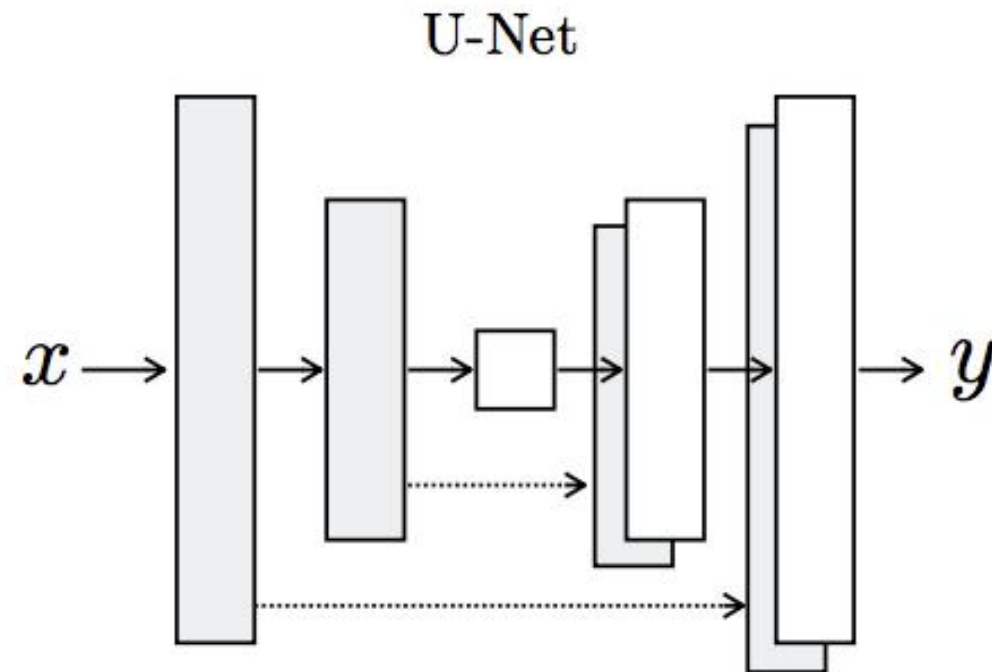
Ground Truth



Predicted Image



# U-Net





# Notes

# Global Context



(a) Image



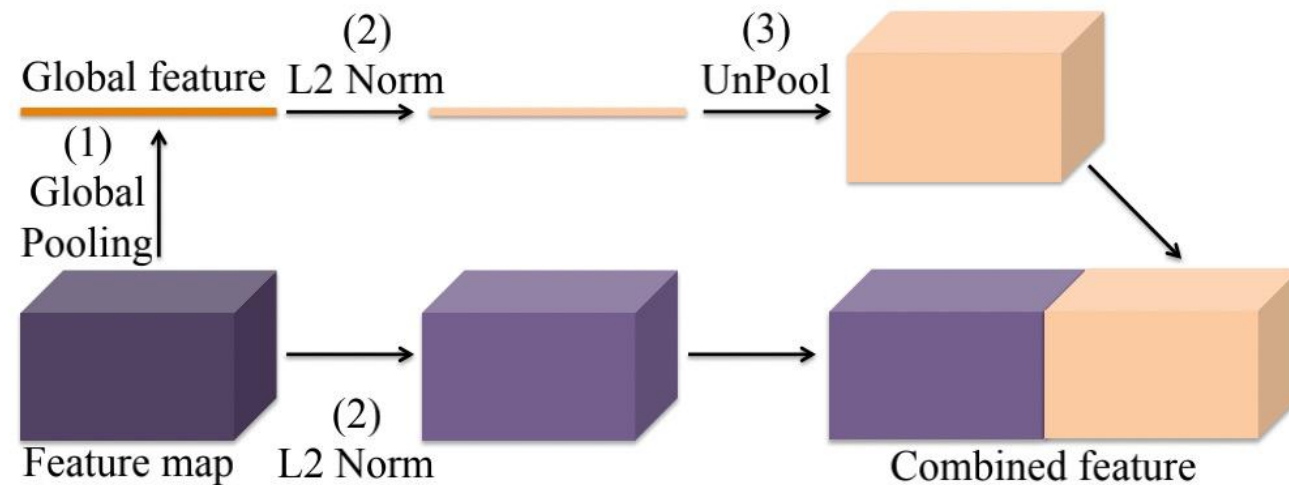
(b) Truth



(c) FCN



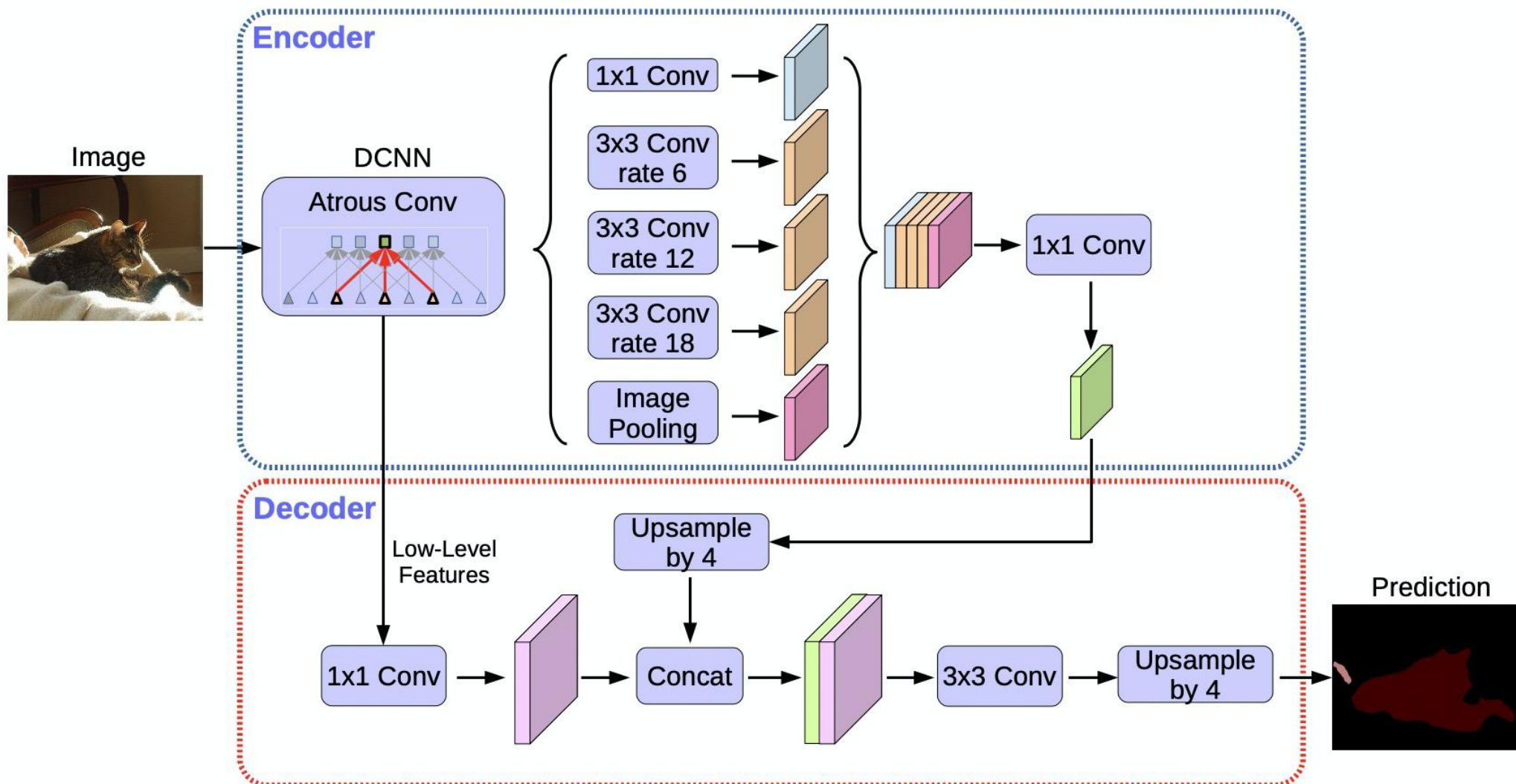
(d) ParseNet



(e) ParseNet context module overview.

# Notes

# Deeplab v3+



# Notes

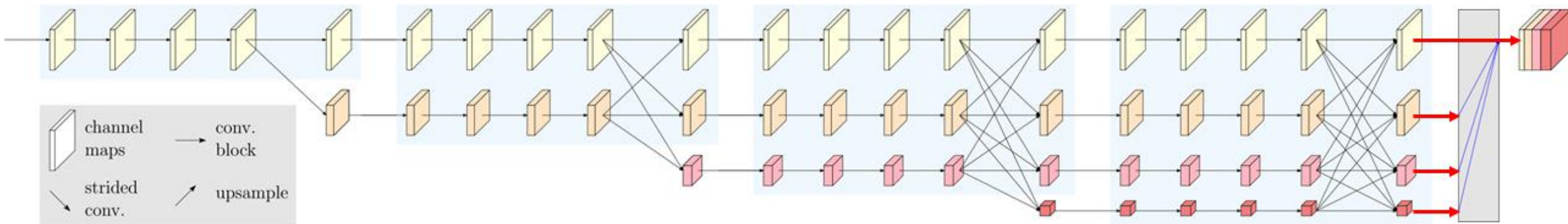
# Notes

# Notes

# Notes



# HRNet



# Notes

# 课程总结

- U-Net的原理和实现

# 重难点

- Encoder-Decoder
- Skip Connection

# 课程作业

- 借鉴ResNet的Residual Block实现U-Net

# 参考资料

- **U-Net: Convolutional Networks for Biomedical Image Segmentation**  
<https://arxiv.org/abs/1505.04597>
- **U-Net-Pytorch**  
<https://github.com/jvanvugt/pytorch-unet/blob/master/unet.py>
- **U-Net-PP**  
<https://github.com/PaddlePaddle/PaddleSeg/blob/release/v0.3.0/pdseg/models/modeling/unet.py>
- **U-Net-PP-LaneSeg**  
[https://github.com/gujingxiao/Lane-Segmentation-Solution-For-BaiduAI-Autonomous-Driving-Competition/blob/master/models/unet\\_base.py](https://github.com/gujingxiao/Lane-Segmentation-Solution-For-BaiduAI-Autonomous-Driving-Competition/blob/master/models/unet_base.py)

# Next Week: Project I

 项目 数据集 课程 **比赛** 社区 教育合作 文档 访问飞桨官网 中 | En



## 无人车车道线检测挑战赛 结束

本次PaddlePaddle-无人车车道线检测挑战赛旨在为参赛者提供一定数量的准确的车道线标注数据，让更多的研究者参与并设计出高效、准确的检测算法，以此来共同推动无人车的发展，从而造福整个社会。

已结束

奖池：¥99000

报名人数: 743

[比赛介绍](#) [赛题说明](#) [提交结果](#) [我的团队](#) [排行榜](#) [讨论区](#)

- <https://aistudio.baidu.com/aistudio/competition/detail/5>
- <https://github.com/gujingxiao/Lane-Segmentation-Solution-For-BaiduAI-Autonomous-Driving-Competition>



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