

# 11.1组会

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# 目录

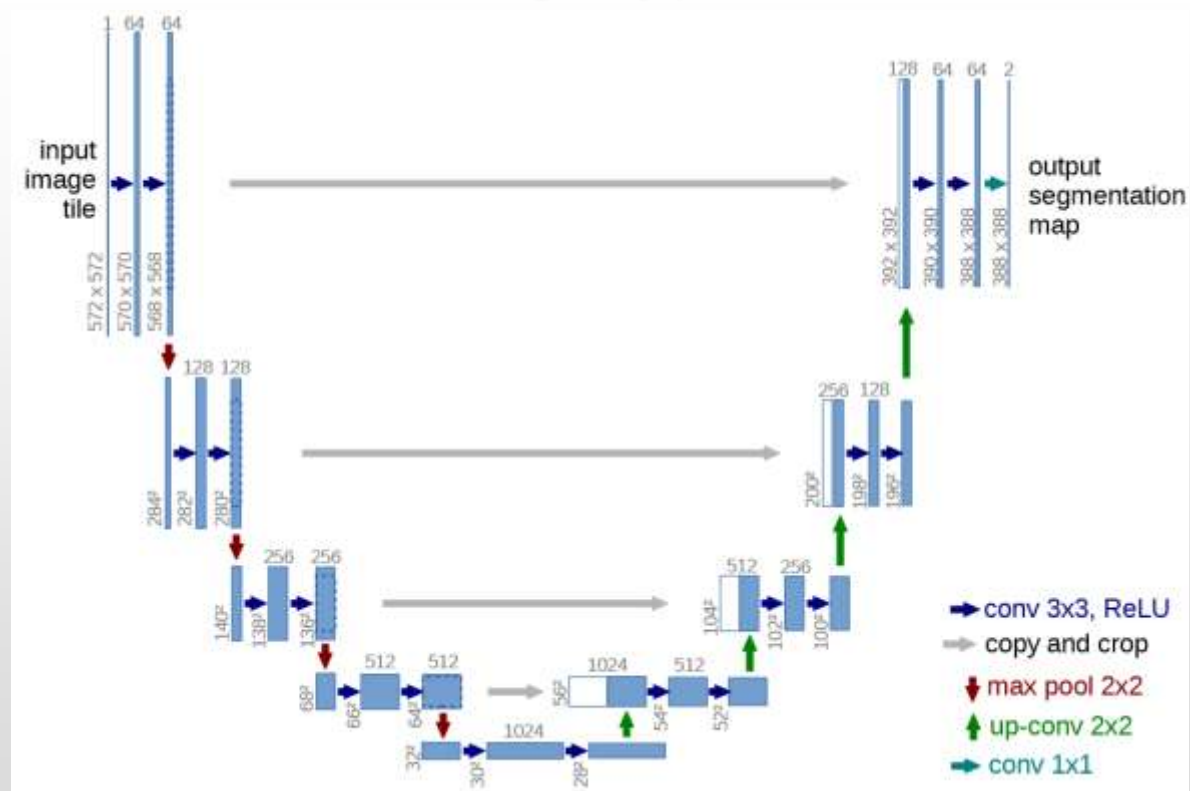
一、Unet系列

二、PSPNet

三、Deeplab系列

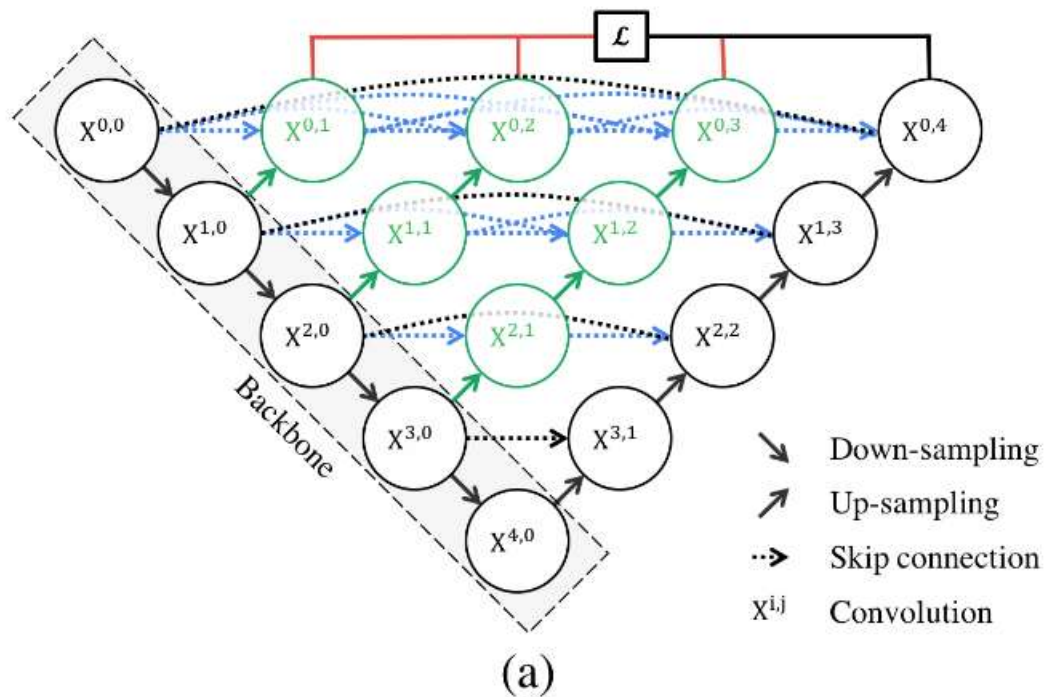
# UNet系列

# UNet



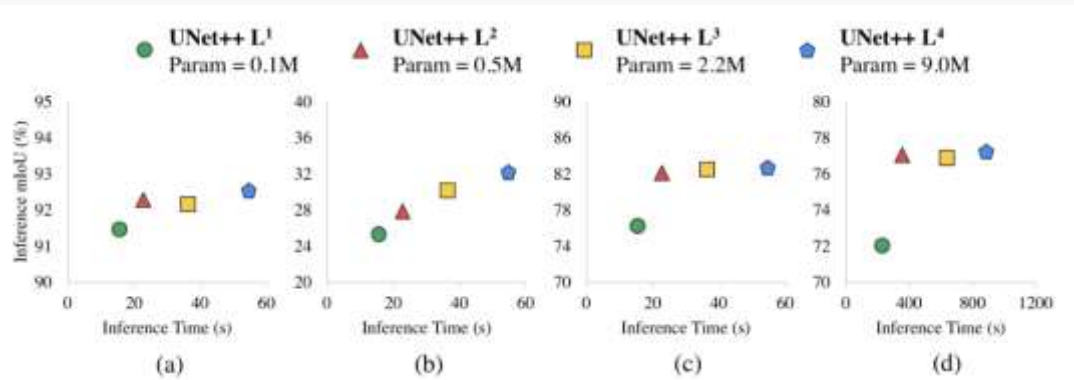
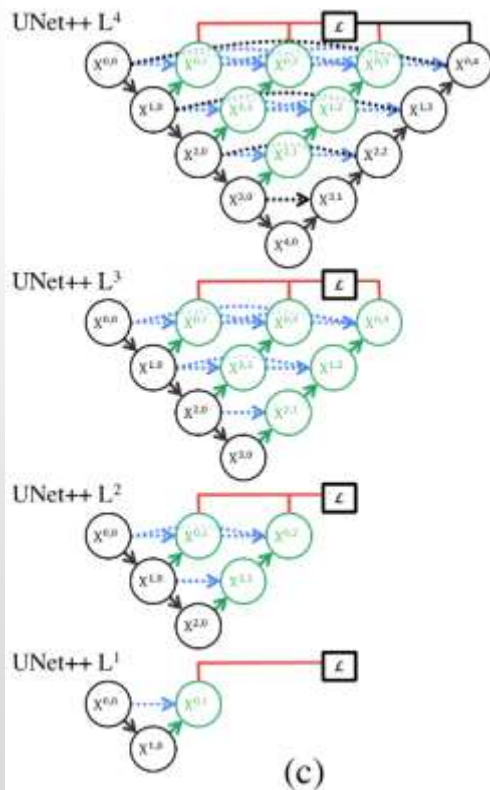
Encoder-Decoder结构

# Unet++



极致的密集连接，特征融合

# Unet++

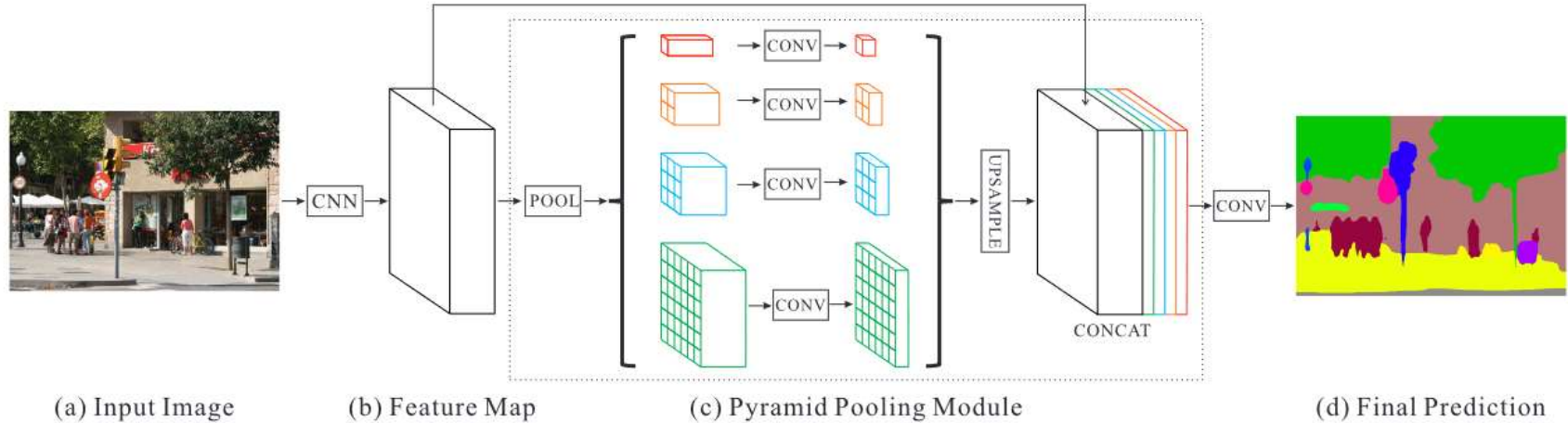


不同深度的Unet++模型在不同数据上的表现，可以根据模型学习能力进行剪枝

PSPNet

# Pipeline

## With Pyramid Pooling Module



Important Observations:

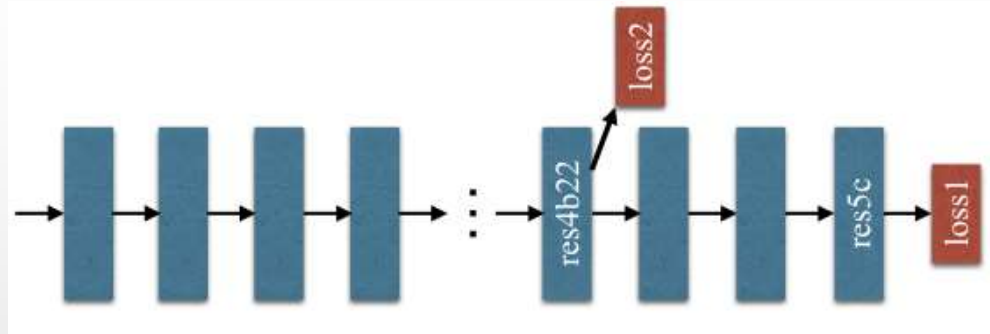
Mismatched Relationship

Confusion Categories

Inconspicuous Classes



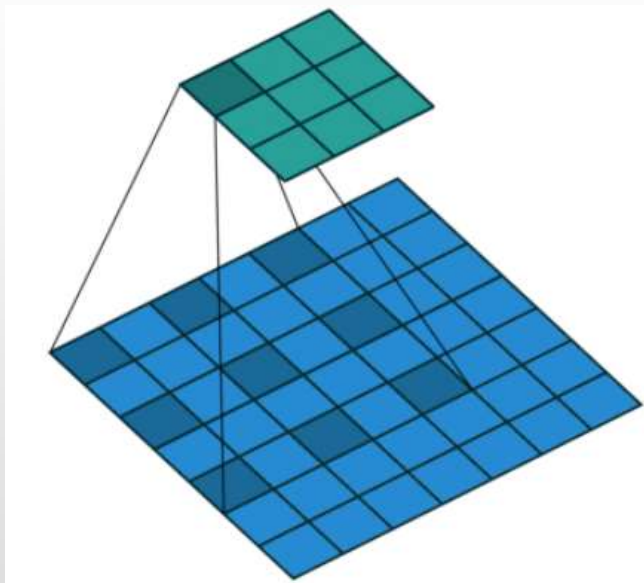
# Auxiliary loss



$$Loss = Loss_1 + 0.4 * Loss_2$$

# DeepLab系列

# Dilated Convolution



空洞卷积，避免下采样的情况下获得更大感受野

# DeepLabV1

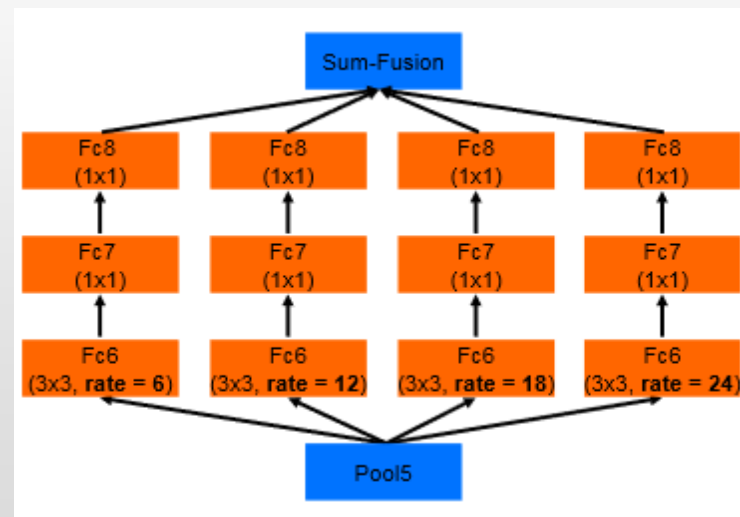
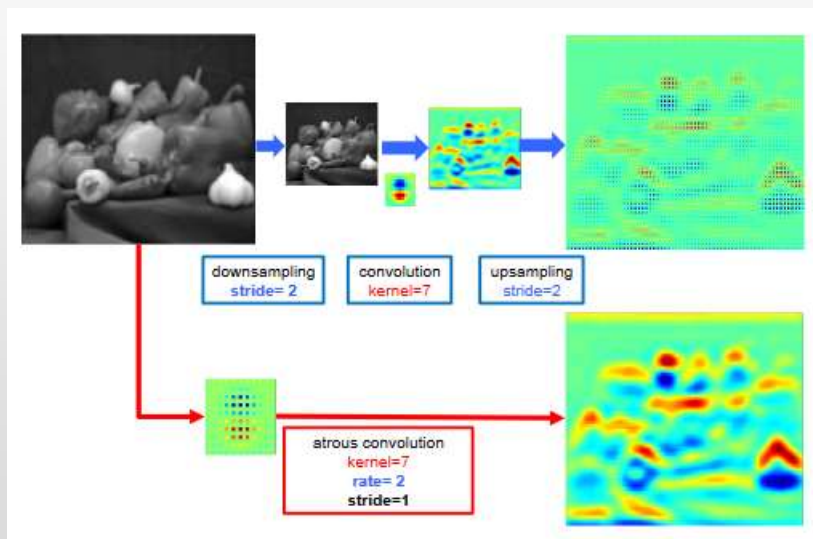
Method	mean IOU (%)
MSRA-CFM	61.8
FCN-8s	62.2
TTI-Zoomout-16	64.4
DeepLab-CRF	66.4
DeepLab-MSc-CRF	67.1
DeepLab-CRF-7x7	70.3
DeepLab-CRF-LargeFOV	70.3
DeepLab-MSc-CRF-LargeFOV	71.6

Method	kernel size	input stride	receptive field	# parameters	mean IOU (%)	Training speed (img/sec)
DeepLab-CRF-7x7	$7 \times 7$	4	224	134.3M	67.64	1.44
DeepLab-CRF	$4 \times 4$	4	128	65.1M	63.74	2.90
DeepLab-CRF-4x4	$4 \times 4$	8	224	65.1M	67.14	2.90
DeepLab-CRF-LargeFOV	$3 \times 3$	12	224	20.5M	67.64	4.84

消融实验，验证DeepLabV1相关组件作用

# DeepLabV2

## Atrous convolution for upsampling & Atrous Spatial Pyramid Pooling



## Learning rate policy : poly

$$lr \times \left(1 - \frac{iter}{max\_iter}\right)^{power}$$

Learning policy	Batch size	Iteration	mean IOU
step	30	6K	62.25
poly	30	6K	63.42
poly	30	10K	64.90
poly	10	10K	64.71
poly	10	20K	65.88

使用poly学习率更新策略

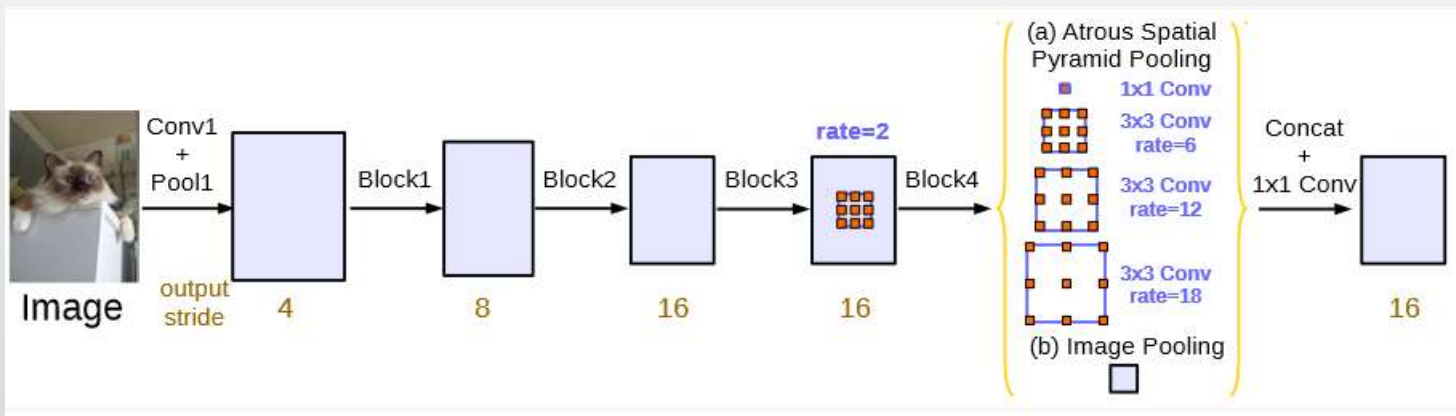
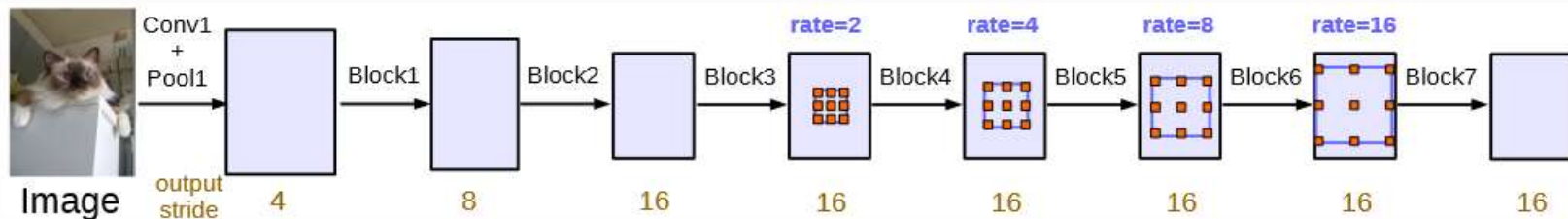
# Experiments

MSC	COCO	Aug	LargeFOV	ASPP	CRF	mIOU
						68.72
✓						71.27
✓	✓					73.28
✓	✓	✓				74.87
✓	✓	✓	✓			75.54
✓	✓	✓		✓		76.35
✓	✓	✓		✓	✓	77.69

TABLE 4: Employing ResNet-101 for DeepLab on PASCAL VOC 2012 *val* set. **MSC**: Employing mutli-scale inputs with max fusion. **COCO**: Models pretrained on MS-COCO. **Aug**: Data augmentation by randomly rescaling inputs.

消融实验，验证DeepLabV1相关组件作用

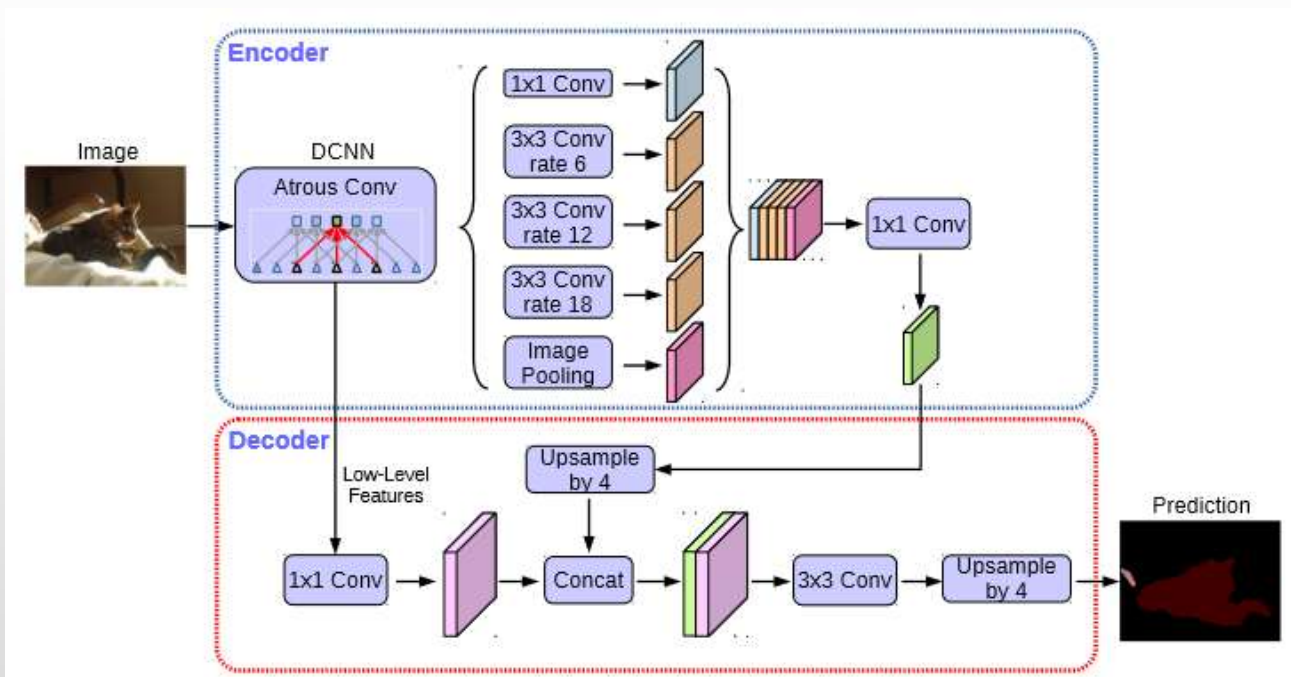
# DeepLabV3



根据VGG16修改的级联结构和新的特征金字塔

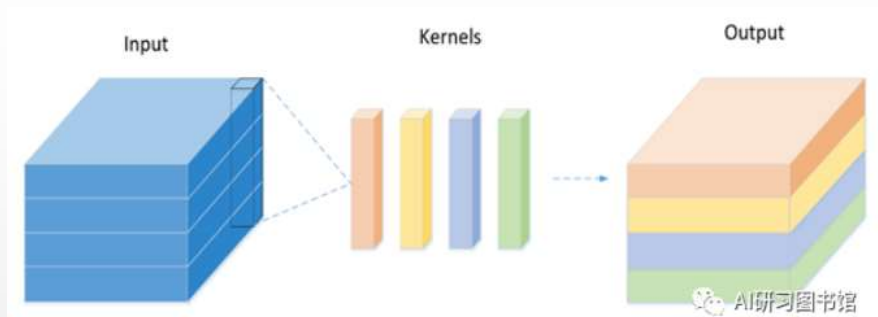


# DeepLabV3+

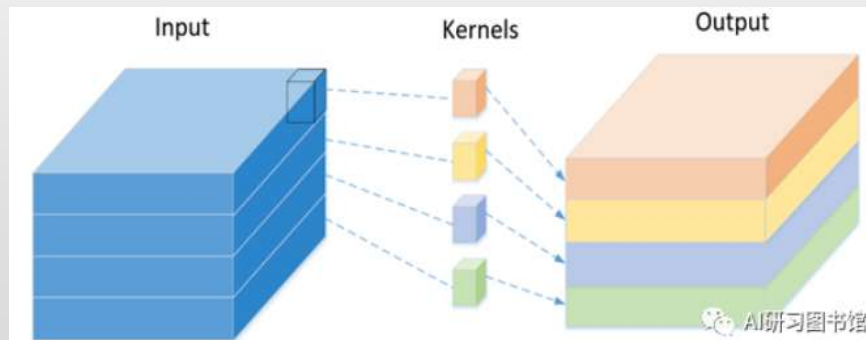


引入Encoder-Decoder思想

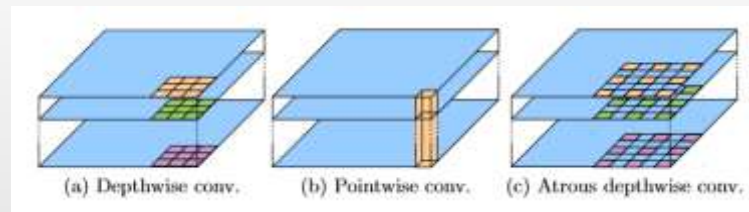
# Xception



Traditional Convolution



Depthwise Separable Convolution



改用Xception作为backbone

# Reference

Xception: Deep Learning with Depthwise Separable Convolutions

UNet++: A Nested U-Net Architecture for Medical Image Segmentation

U-Net: Convolutional Networks for Biomedical Image Segmentation

Semantic Image Segmentation with Deep Convolutional Nets and Fully Connected CRFs

Rethinking Atrous Convolution for Semantic Image Segmentation

Pyramid Scene Parsing Network

Encoder-Decoder with Atrous Separable Convolution for Semantic Image Segmentation

DeepLab: Semantic Image Segmentation with Deep Convolutional Nets, Atrous Convolution, and Fully Connected CRFs

[https://blog.csdn.net/qq\\_40092110/article/details/108498089](https://blog.csdn.net/qq_40092110/article/details/108498089)

Thank you!