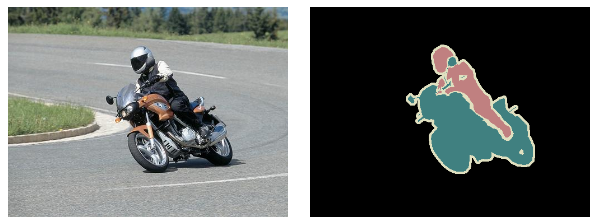
# CNN for Semantic Segmentation

# （语义分割，论文，代码，数据集，标注工具，blog）

在FCN网络在2104年提出后，越来越多的关于图像分割的深度学习网络被提出，相比传统方法，这些网络效果更好，运算速度更快，已经能成熟的运用在自然图像上。语义分割显然已经是计算机视觉领域的一个热门研究领域，也是通往实现完全场景理解的道路之一，被广泛应用于无人驾驶、人机交互、医疗图像、计算摄影、图像搜索引擎、增强现实等应用领域。语义分割是像素级分类问题，将同一类物体像素点归为一类，如图所示。



左：输入图像，右：输出分割图像

存在的挑战：1.池化或者卷积步长造成的特征图分辨率减小；2.图像中存在不同尺度的目标；3.错误匹配关系；4.类别混淆；5.类别不明显。

方法：1.dilated convolution；2.图像金字塔；3.编码解码结构；4.级联结构；5.空间金字塔池化。

一、数据集

2D数据集

1.1 PASCAL Visual Object Classes (VOC)

1.2 PASCAL Context

1.3 PASCAL Part

1.4 Semantic Boundaries Dataset (SBD)

1.5 Microsoft Common Objects in Context (COCO)

1.6 SYNTHetic Collection of Imagery and Annotations (SYNTHIA)

1.7 Cityscapes

1.8 CamVid

1.9 Youtube-Objects

1.10 Adobe’s Portrait Segmentation Adobe’s Portrait Segmentation

1.11 Materials in Context (MINC)

1.12 Densely-Annotated VIdeo Segmentation (DAVIS)

1.13 Stanford background

1.14 SiftFlow

2.5D数据集

1.15 NYUDv2

1.16 SUN3D

1.17 SUNRGBD

1.18 RGB-D Object Dataset

3D数据集

1.19 ShapeNet Part

1.20 Stanford 2D-3D-S

1.21 A Benchmark for 3D Mesh Segmentation

1.22 Sydney Urban Objects Dataset

1.23 Large-Scale Point Cloud Classification Benchmark

二、图像标注工具

2.1 labelme: Image Annotation Tool with Python

2.2 labelImgPlus

2.3 PS

2.4 OpenSurfaces Segmentation UI

2.5 ImageSegmentation

2.6 JS Segment Annotator

三、Papers

2017

LinkNet

https://arxiv.org/pdf/1707.03718.pdf

https://github.com/e-lab/LinkNet

ICNet

https://arxiv.org/pdf/1704.08545.pdf

https://github.com/hszhao/ICNet

DeepLabv3

https://arxiv.org/pdf/1706.05587v3.pdf

Mask-RCNN

https://arxiv.org/pdf/1703.06870.pdf

https://github.com/jasjeetIM/Mask-RCNN

ERFNet

http://www.robesafe.uah.es/personal/eduardo.romera/pdfs/Romera17iv.pdf

https://github.com/Eromera/erfnet

Large Kernel Matters

https://arxiv.org/pdf/1703.02719

2016

Fully-Convolutional Network (FCN)

https://arxiv.org/pdf/1605.06211.pdf

https://github.com/shelhamer/fcn.berkeleyvision.org

DeepLab

https://arxiv.org/pdf/1606.00915.pdf

https://bitbucket.org/deeplab/deeplab-public/

ENet

https://arxiv.org/pdf/1606.02147.pdf

https://github.com/TimoSaemann/ENet

PixelNet

https://arxiv.org/pdf/1609.06694.pdf

https://github.com/aayushbansal/PixelNet

RefineNet

https://arxiv.org/pdf/1611.06612.pdf

https://github.com/guosheng/refinenet

PSPNet

https://arxiv.org/pdf/1612.01105.pdf

https://github.com/hszhao/PSPNet

FCIS

https://arxiv.org/pdf/1611.07709.pdf

https://github.com/msracver/FCIS

MultiNet

https://arxiv.org/pdf/1612.07695.pdf

https://github.com/MarvinTeichmann/MultiNet

2015

U-Net

https://arxiv.org/pdf/1505.04597.pdf

https://lmb.informatik.uni-freiburg.de/people/ronneber/u-net/

SegNet

https://arxiv.org/pdf/1511.00561.pdf

https://github.com/alexgkendall/caffe-segnet

DilatedNet

https://arxiv.org/pdf/1511.07122.pdf

https://github.com/nicolov/segmentation\_keras

DeepMask

https://arxiv.org/pdf/1506.06204.pdf

https://github.com/facebookresearch/deepmask

CRFasRNN

http://www.robots.ox.ac.uk/%7Eszheng/papers/CRFasRNN.pdf

https://github.com/torrvision/crfasrnn

Dilated convolution

https://arxiv.org/pdf/1511.07122.pdf

https://github.com/fyu/dilation

DeconvNet

https://arxiv.org/pdf/1505.04366.pdf

https://github.com/HyeonwooNoh/DeconvNet

MNC

https://arxiv.org/pdf/1512.04412.pdf

https://github.com/daijifeng001/MNC

Zoomout Semantic Segmentation

https://www.cv-foundation.org/openaccess/content\_cvpr\_2015/papers/Mostajabi\_Feedforward\_Semantic\_Segmentation\_2015\_CVPR\_paper.pdf

https://bitbucket.org/m\_mostajabi/zoom-out-release

4.Blog

A 2017 Guide to Semantic Segmentation with Deep Learning

Semantic Segmentation using Fully Convolutional Networks over the years

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