V Convolutional Neural Networks

Convolutional Neural Networks

Computer Vision

Image Classification

Object Detection

Neural Style Transfer

Deep Learning

Edge Detection

Vertical Edge Detection

Horizontal Edge Detection

Convolution Operation

Sobel Filter

Scharr Filter

Padding

Valid Convolutions

Same Convolutions (by adding padding)

Strided Convolution

Convolution: padding p, stride s

Associativity of Convolution

Double-mirror flipping operation of filter

Channels

Convolution over Volumes

Multiple Filters

Convolutional Neural Networks

Convolution Layer (CONV)

Pooling Layer (POOL)

Fully Connected Layer (FC)

Pooling layer

Max-Pooling

Average-Pooling

Hyperparameter Tuning for Pooling: filter size f, stride s, padding usually = 0, max or avg pooling

CONV-POOL-CONV-POOL-FC-FC-FC-SOFTMAX

CNN: Activation Shape, Activation Size, # Parameters

Cost function for CNN

Classic Networks: LeNet-5

Classic Networks: AlexNet

Classic Networks: VGG

ResNet (Residual Networks)

Inception Network

Local Response Normalization (LRN)

1x1 Convolutions

Bottleneck Layer

Inception Module

Transfer Learning

Data Augmentation

Object Detection

Object Localization

Object Classification with Localization

Boundary box of the object

Landmark Detection (special points on image)

Sliding Windows Detection

Sliding Window Stride

Convolution Implementation of Sliding Windows

Bounding Box Prediction

Intersection over Union (IoU)

Non-max Suppression Algorithm

Overlapping objects

Anchor Box

YOLO Algorithm

Region Proposal

R-CNN

Segmentation Algorithm

Fast R-CNN

Faster R-CNN

Face Recognition

Face Verification

One-shot Learning

Siamese Network

Triplet Loss

Choosing triplets Anchor, Positive and Negative

Face verification and Binary classification

Chi-square Similarity

Neural Style Transfer (Content Style and Generated image)

Deep ConvNets

Visualizing deep layers

Neural Style Transfer Cost Function

Content Cost Function

Style Matrix

Style Cost Function

Convolution operation 3d generalization