

A survey on deep learning techniques in image and video semantic segmentation

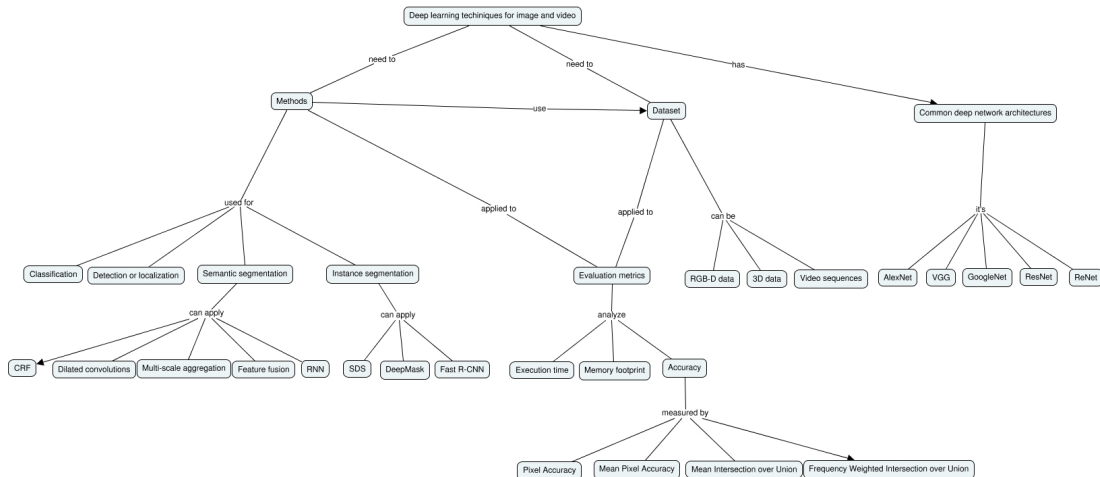
(paper analysis)

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Concept Map



CNN- How it works?

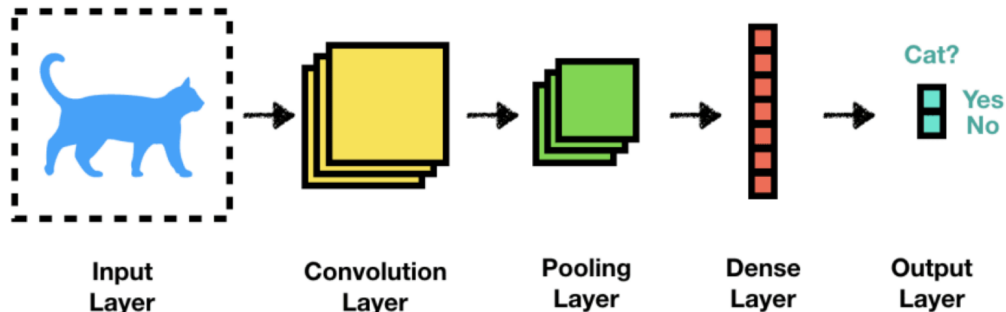


Figure: Convolutional Neural Network [Sha19]

Common deep networks architecture

COMPARATIVE FOR COMMON DEEP NETWORK ARCHITECTURES			
Network	Year champion ILSVRC*	Number of Layers	Accuracy
AlexNet	2012	3	84.6%
VGG	2013	16	92.7%
GoogleNet	2014	22	93.3%
ResNet	2016	152	96.4%

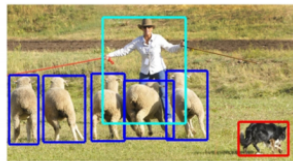
Table: Deep network architectures. [GGEO+18]

*ILSVRC (ImageNet Large Scale Visual Recognition Challenge)

Methods to image analysis



(a) Image classification



(b) Object localization



(c) Semantic segmentation



(d) Instance segmentation

Figure: Methods to image analysis. [LMB⁺14]

Evaluation Metrics

Execution time

Memory footprint

Accuracy



Accuracy



Figure: Accuracy evaluation. [Ros16]

Accuracy results

ACCURACY RESULTS (METHODS AND DATASETS) (%)									
Method / Dataset	PASCAL VOC-2012	Pascal- Person- Part	CamVid	CityScapes	Stanford Background	SiftFlow	SUN3D	ShapeNet Part	Youtube- Objects
PSPNet	85,4								
DeepLab		64,94							
DAG-RNN			91,60						
rCNN					80,20				
LSTM-CF							58,50		
PointNet								83,70	
PointNet++								85,10	
DGCNN								85,10	
Clockwork Convnet									68,50
SegmPred				59,40					

Table: Accuracy results for the most relevant methods and dataset. [GGEO⁺18]

Limitations

Advantages and disadvantages





Wich cases doesn't apply deep learning?

Dataset size it isn't enough.

Not sure about the object.

Deep learning vs. Classic methods

References I

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-  Tsung-Yi Lin, Michael Maire, Serge Belongie, James Hays, Pietro Perona, Deva Ramanan, Piotr Dollár, and C Lawrence Zitnick, *Microsoft coco: Common objects in context*, European conference on computer vision, Springer, 2014, pp. 740–755.
-  Adrian Rosebrock, *Intersection over union (iou) for object detection*, 2016.
-  Shashikant, *Convolutional neural network: A step by step guide*, 2019.