CADL2020

International Workshop on Computational Aspects of Deep Learning

ICPR 2020

Overview

Introducing Region Pooling Learning

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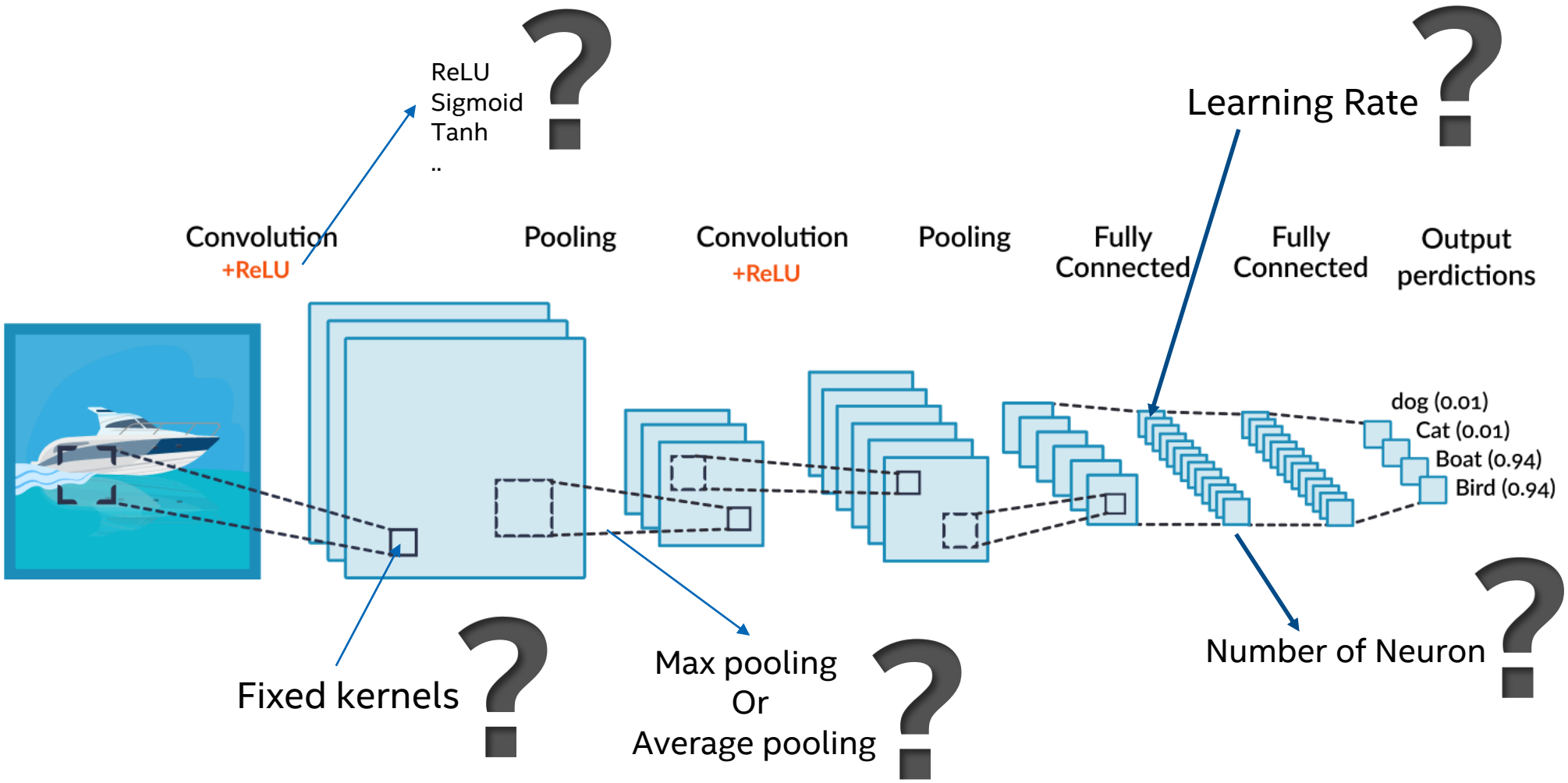
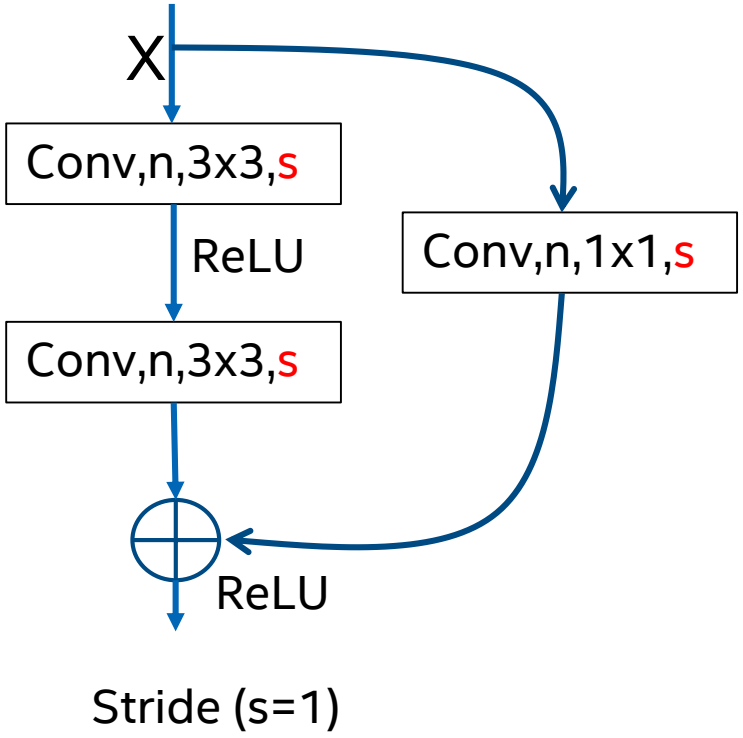
Hyper parameters of a NN model



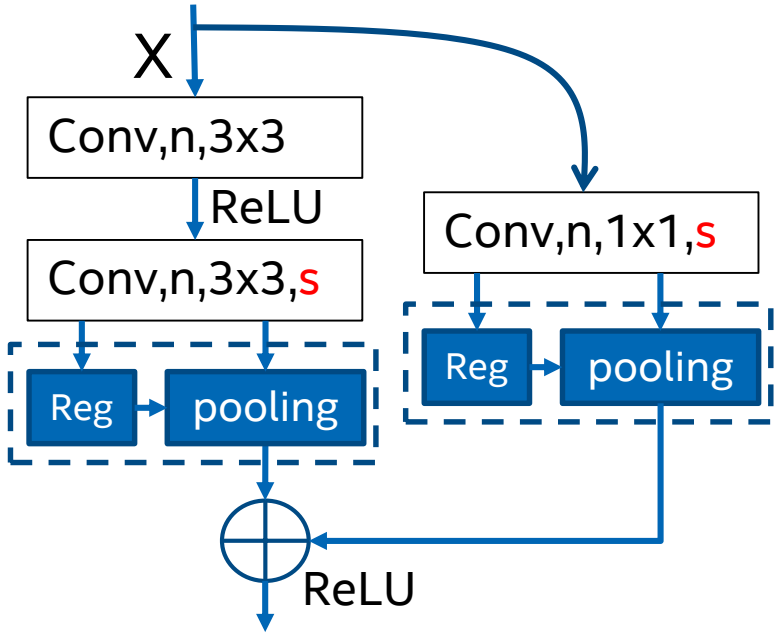
Region Pooling Learning

Resnet Block



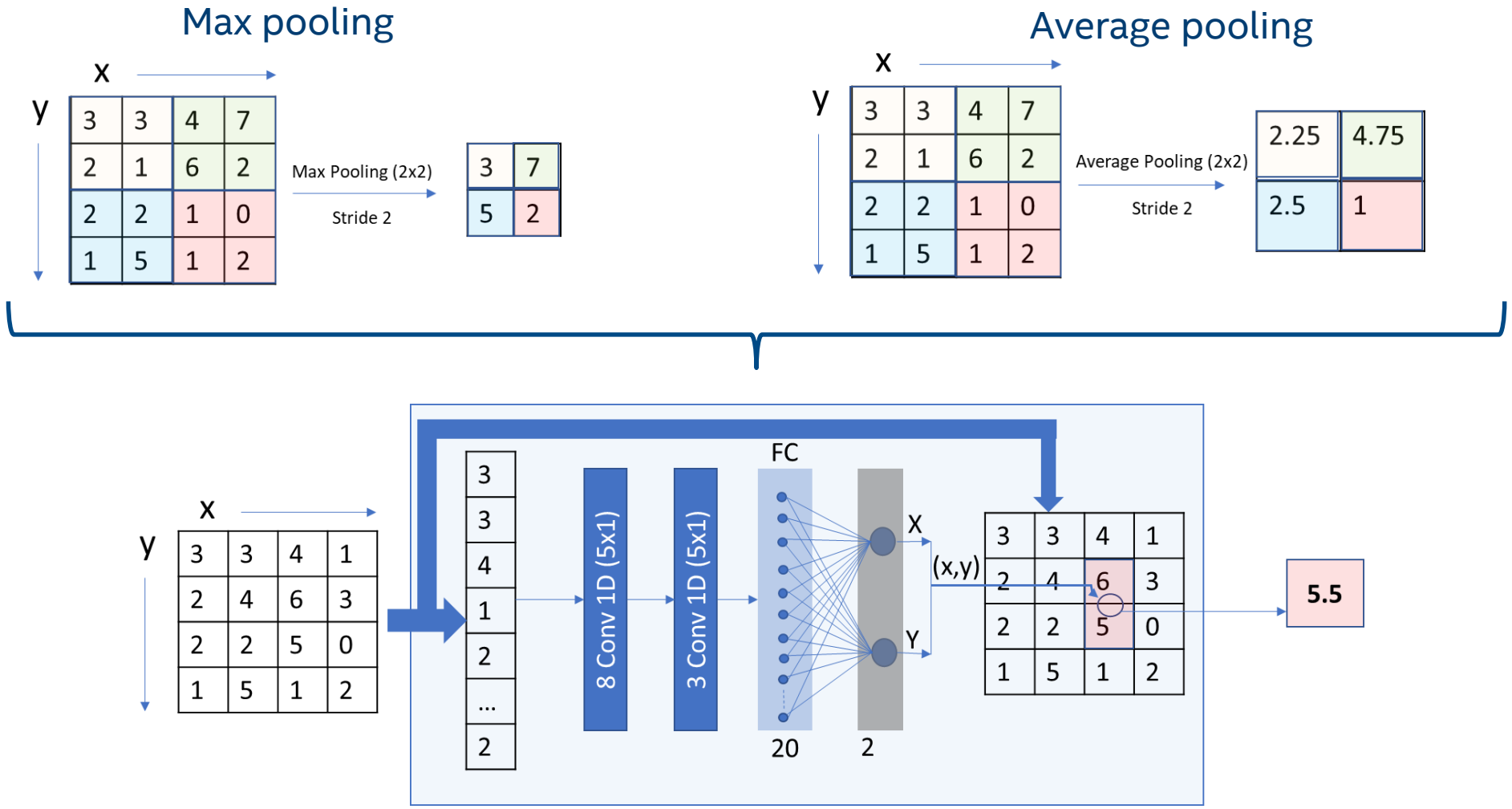
Stride (s=1)

ResNet Block & Region Pooling



Stride (s>1)

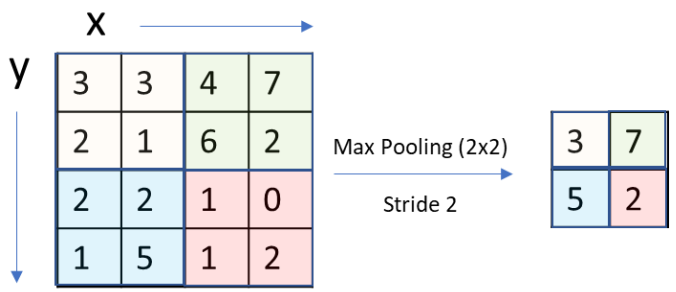
Region Pooling Learning



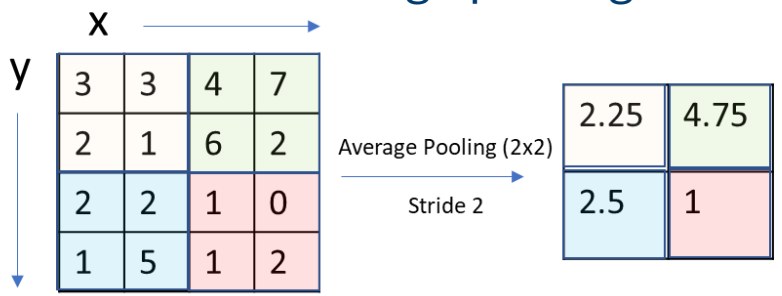
Region Pooling Learning

Classical:

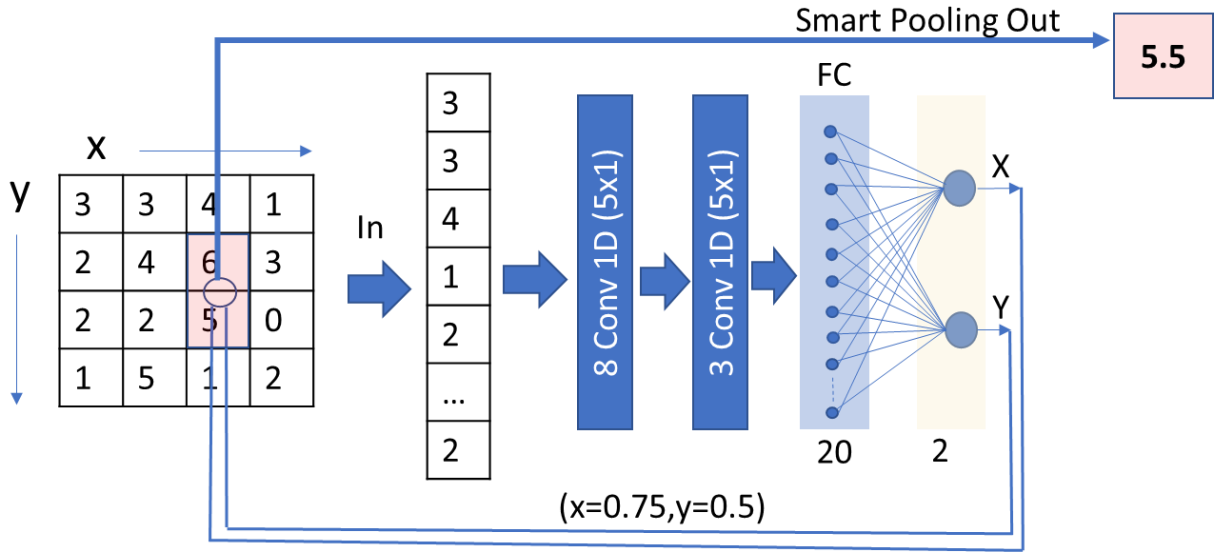
Max pooling



Average pooling

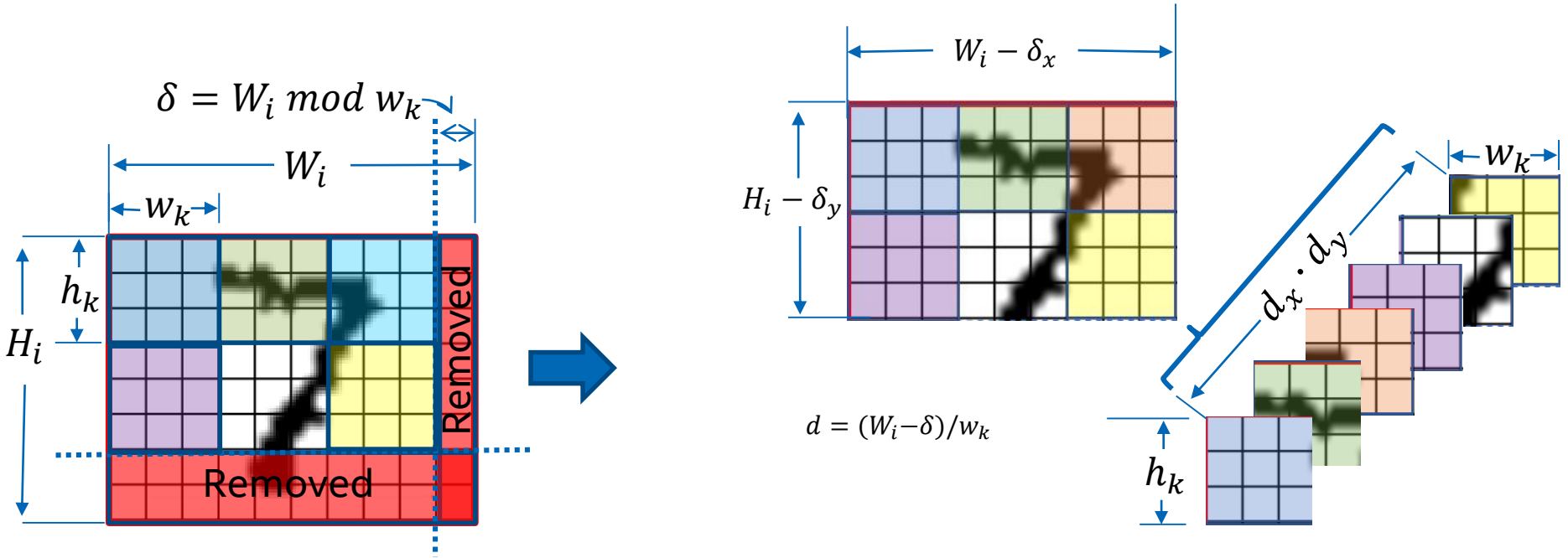


Adaptive:



Parallelization

Pooling is a process that can be easily parallelized



Smart Pooling Results

Smart Pooling Results

The results using this technology in comparison with academic state-of-the-art neural nets shows competitive performance for image recognition datasets, with much smaller parameter size.

- 163X memory compression with better accuracy
- ~3% improvement changing a single layer
- Changing a single layer produces an accuracy improvement for ImageNet

Table 2. Results for different ResNet topologies reported Vs ResNet18* with added smart pooling

Neural Network	Depth	#Parameters	Accuracy%
ResNet18	18	11M	93.02
ResNet50	50	25.6M	93.62
ResNet100	100	44.5M	93.75
ResNet18*	**18**	**0.27M**	**94.08**

Table 4. Accuracy results for ResNet18* with smart pooling Vs reported ResNet topologies for ImageNet

Neural Network	#Param	Top1%	Top5%
ResNet18	11M	69.76	89.08
ResNet50	25.6M	76.15	92.87
ResNet101	44.5M	77.37	93.56
ResNet18*	**11M**	**71.33**	**90.07**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