

Overfeat :

Integrated Recognition, Localization and Detection using
Convolutional Networks

paper seminar

2 조

Object detection?

Classification



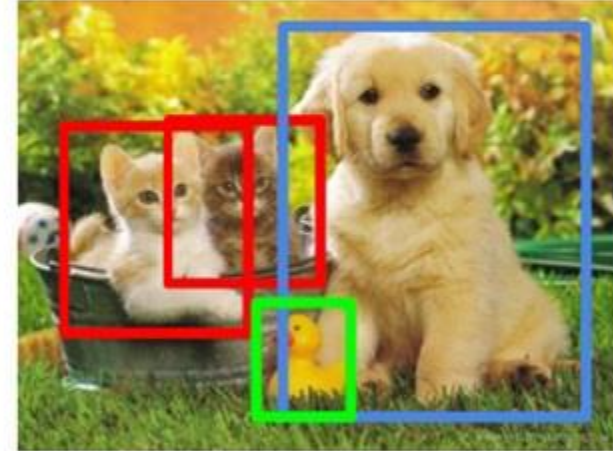
CAT

**Classification
+ Localization**



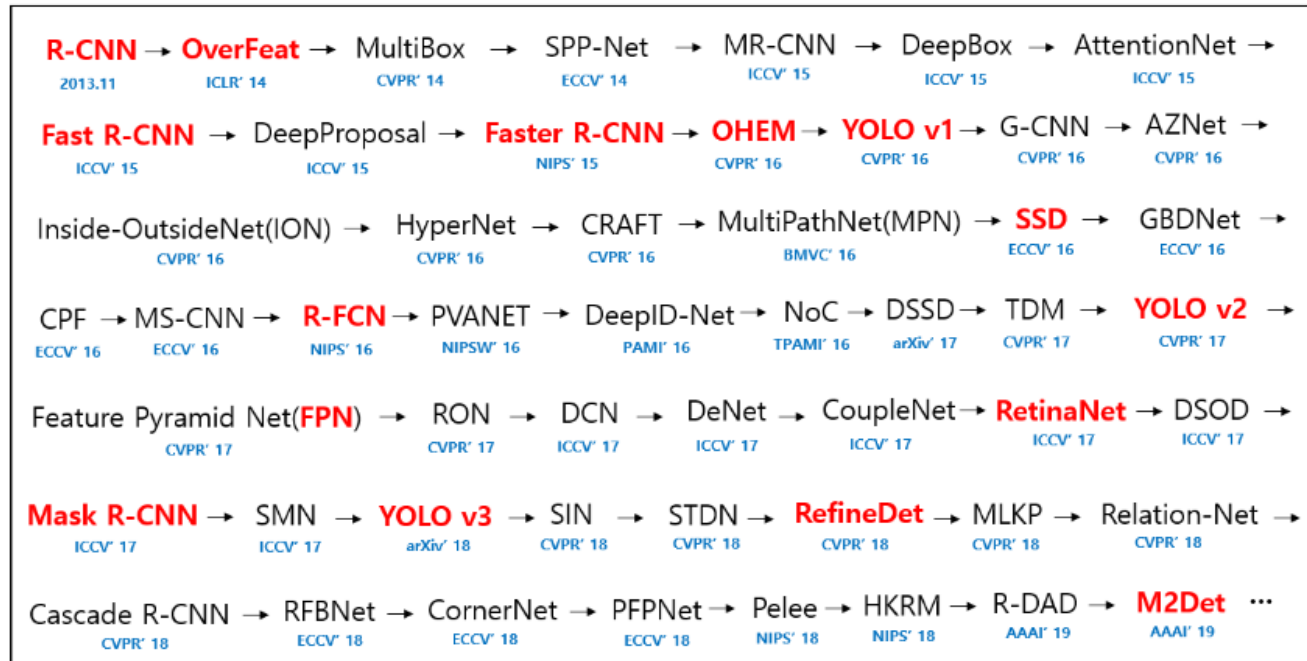
CAT

Object Detection



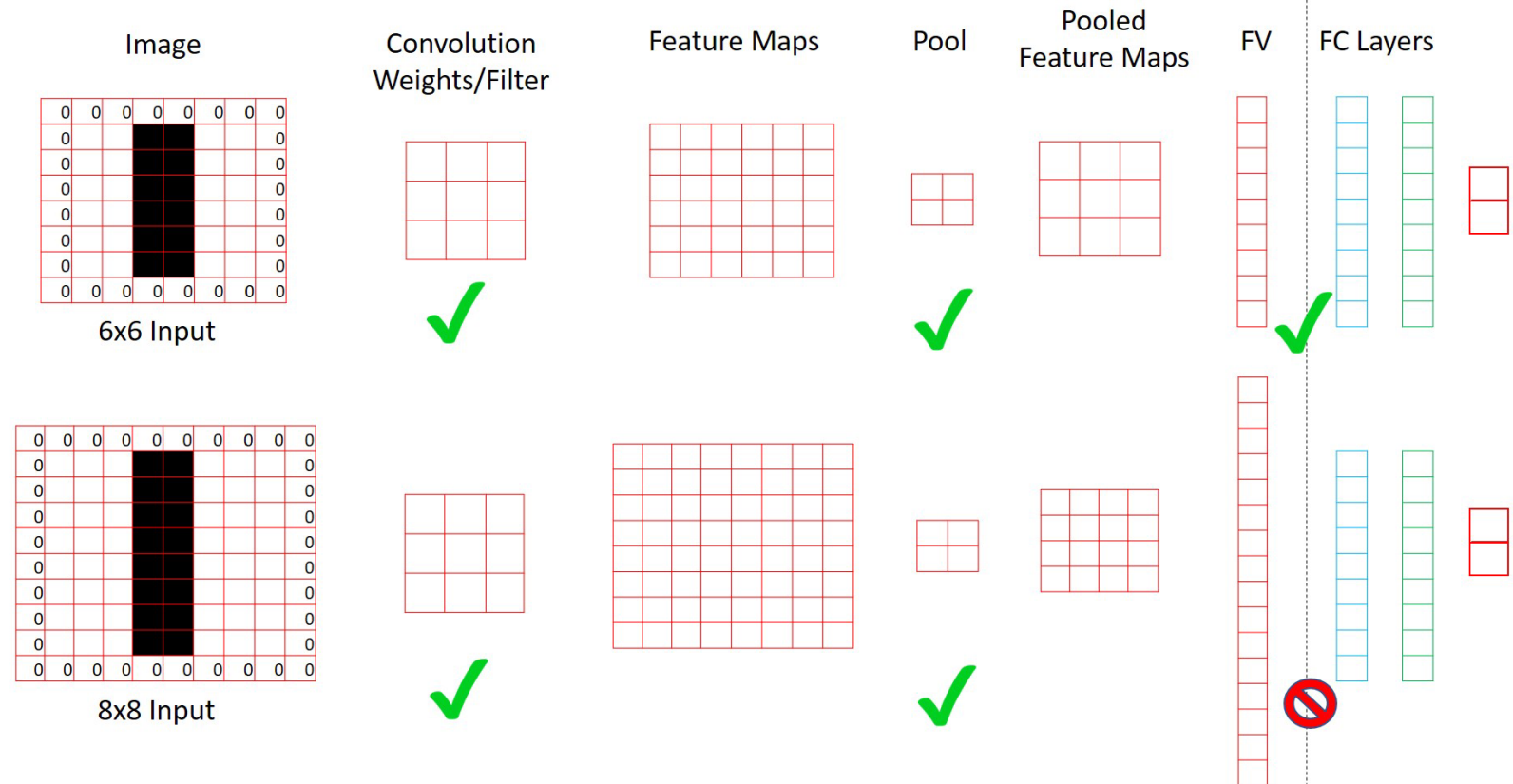
CAT, DOG, DUCK

Object detection?



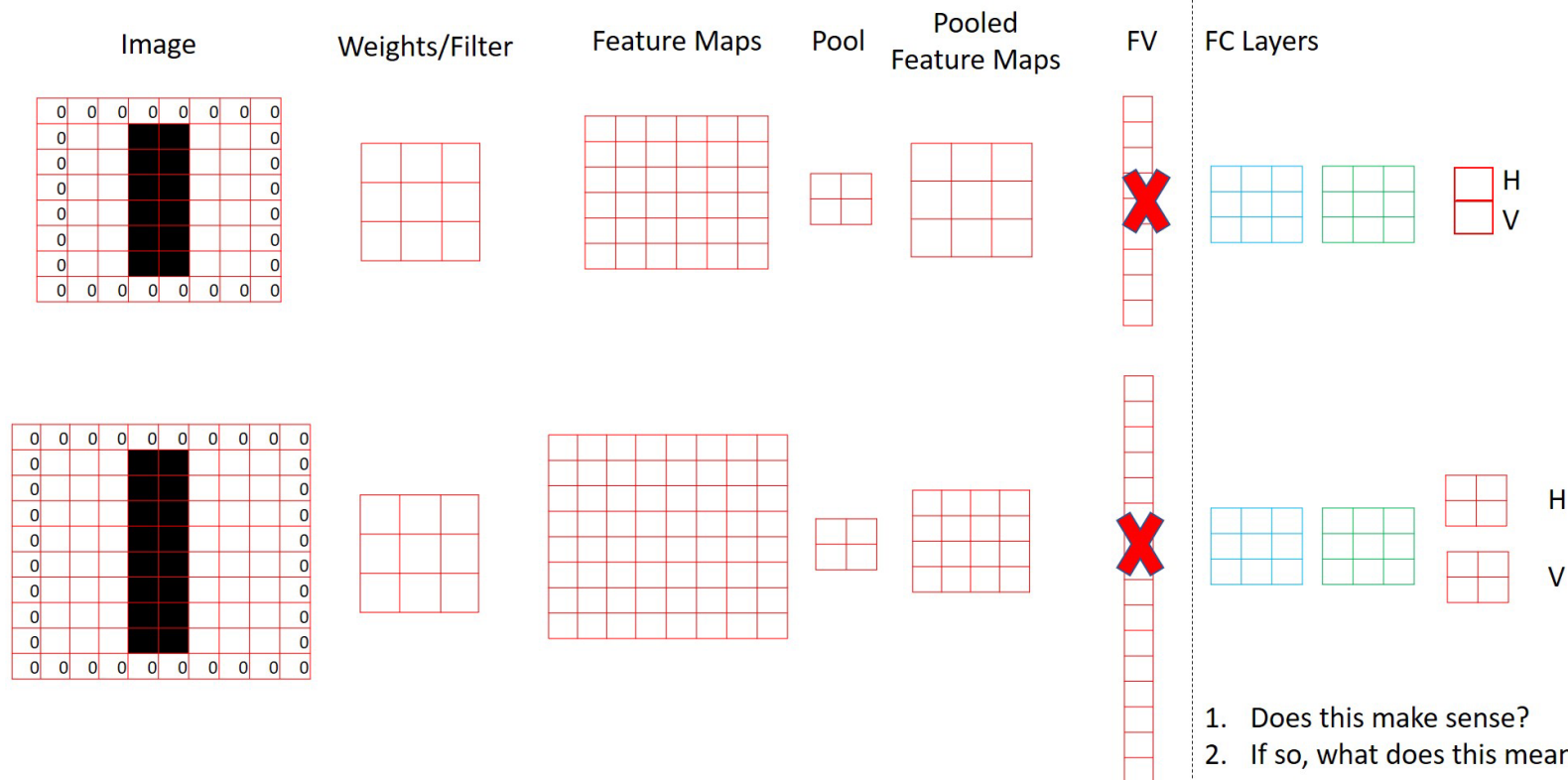
Convnet's input size constraints Problem?

ConvNet의 입력 크기 제약 조건
(Alexnet 224)

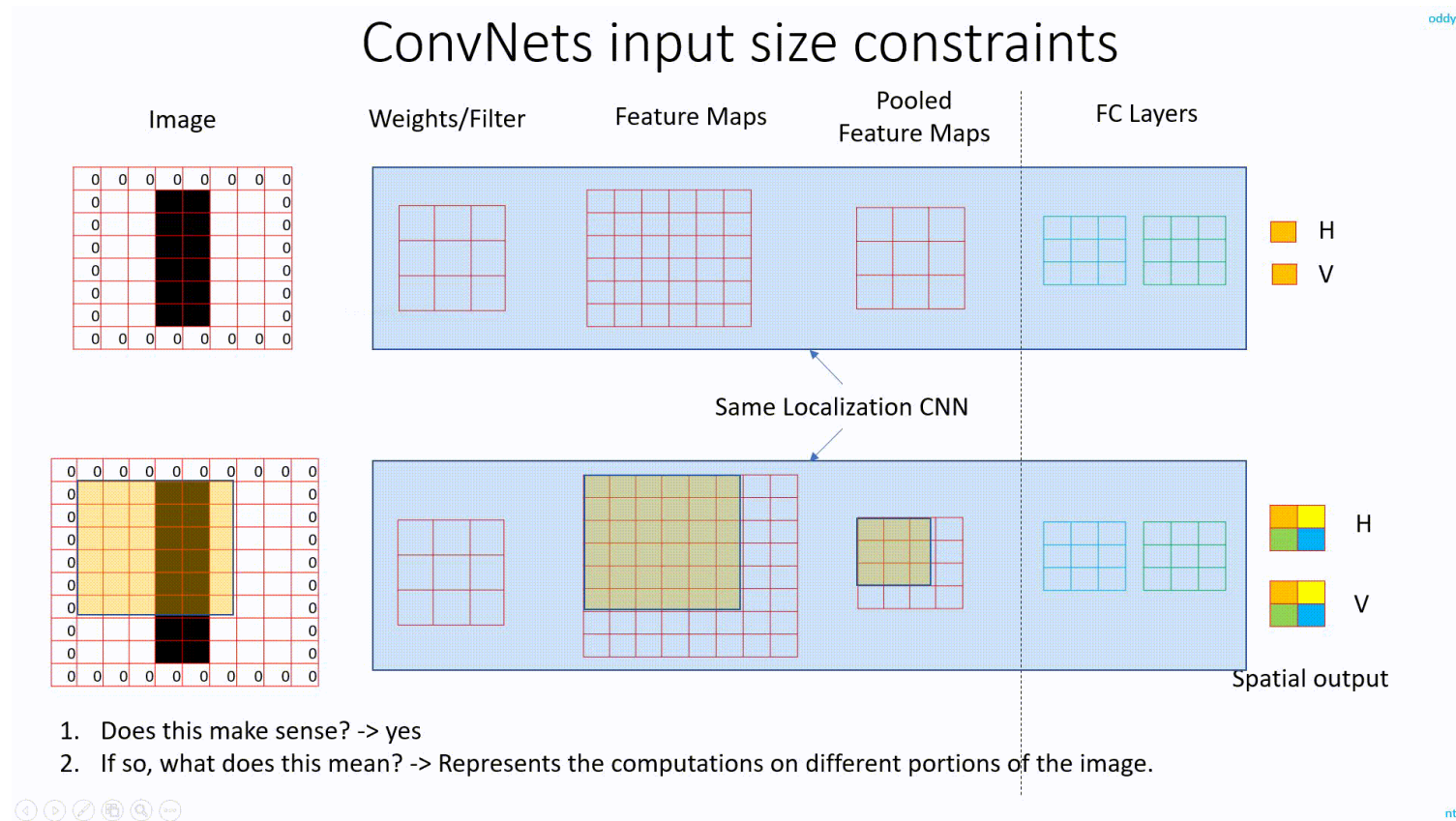


Receptive field and spatial output

ConvNets input size constraints – FC as Conv

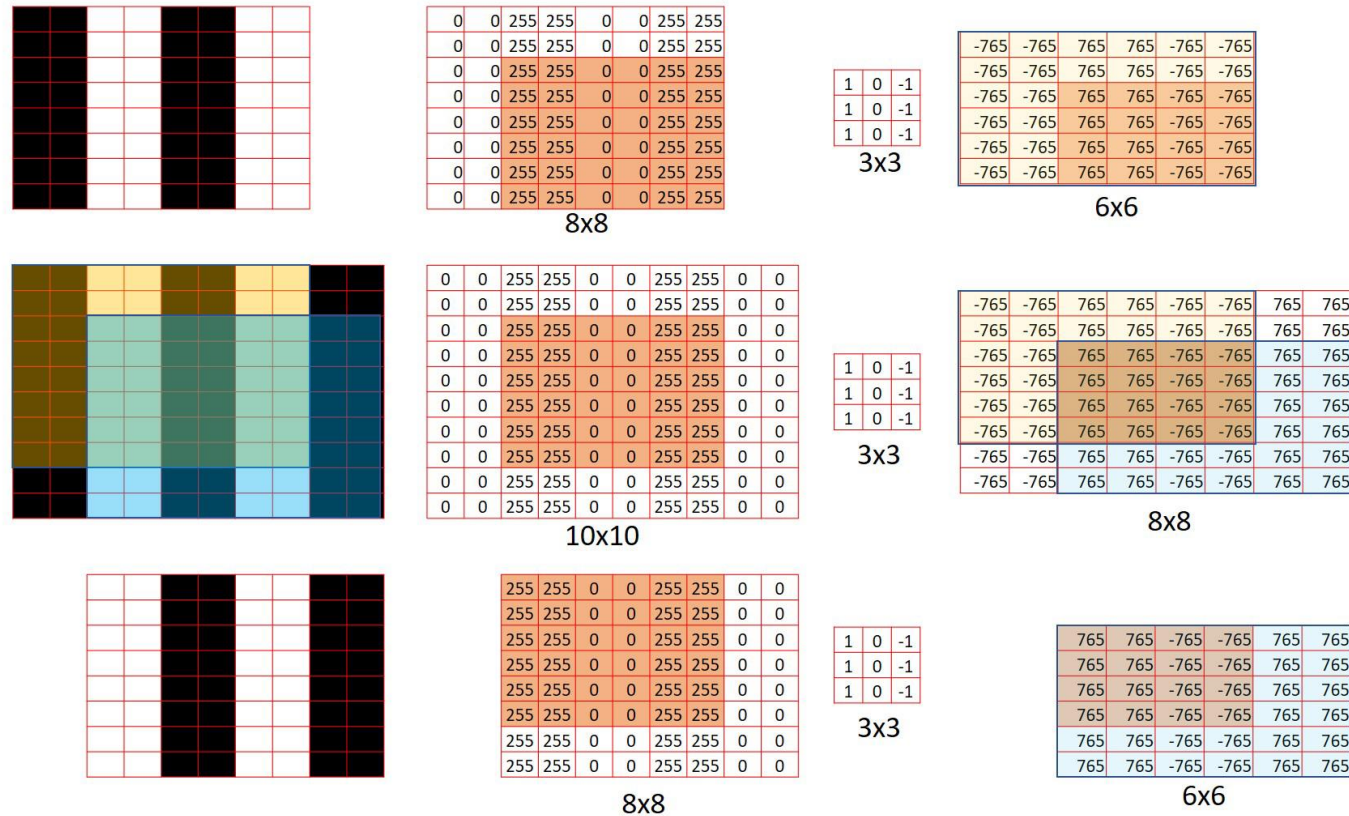


Receptive field and spatial output



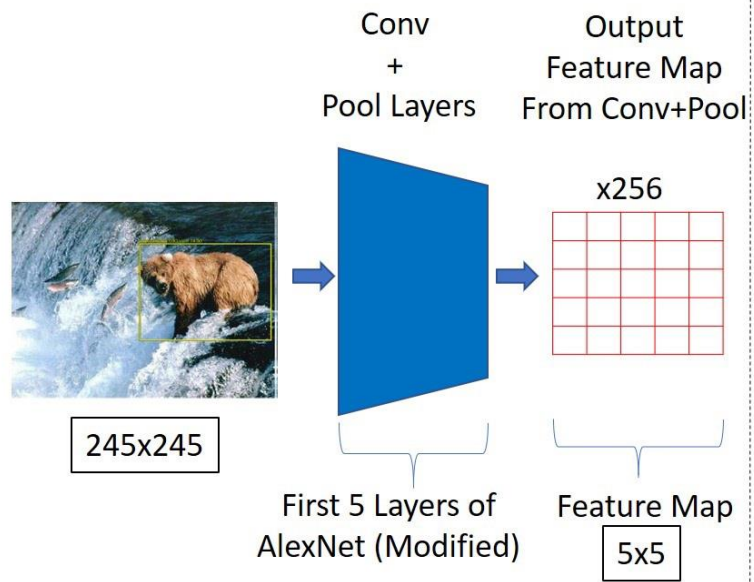
Convnet and sliding window efficiency

ConvNets and Sliding Window Efficiency

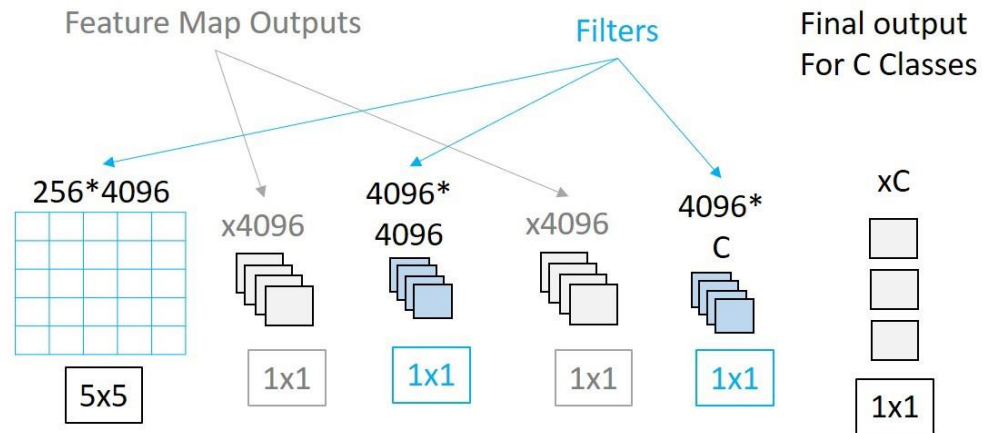


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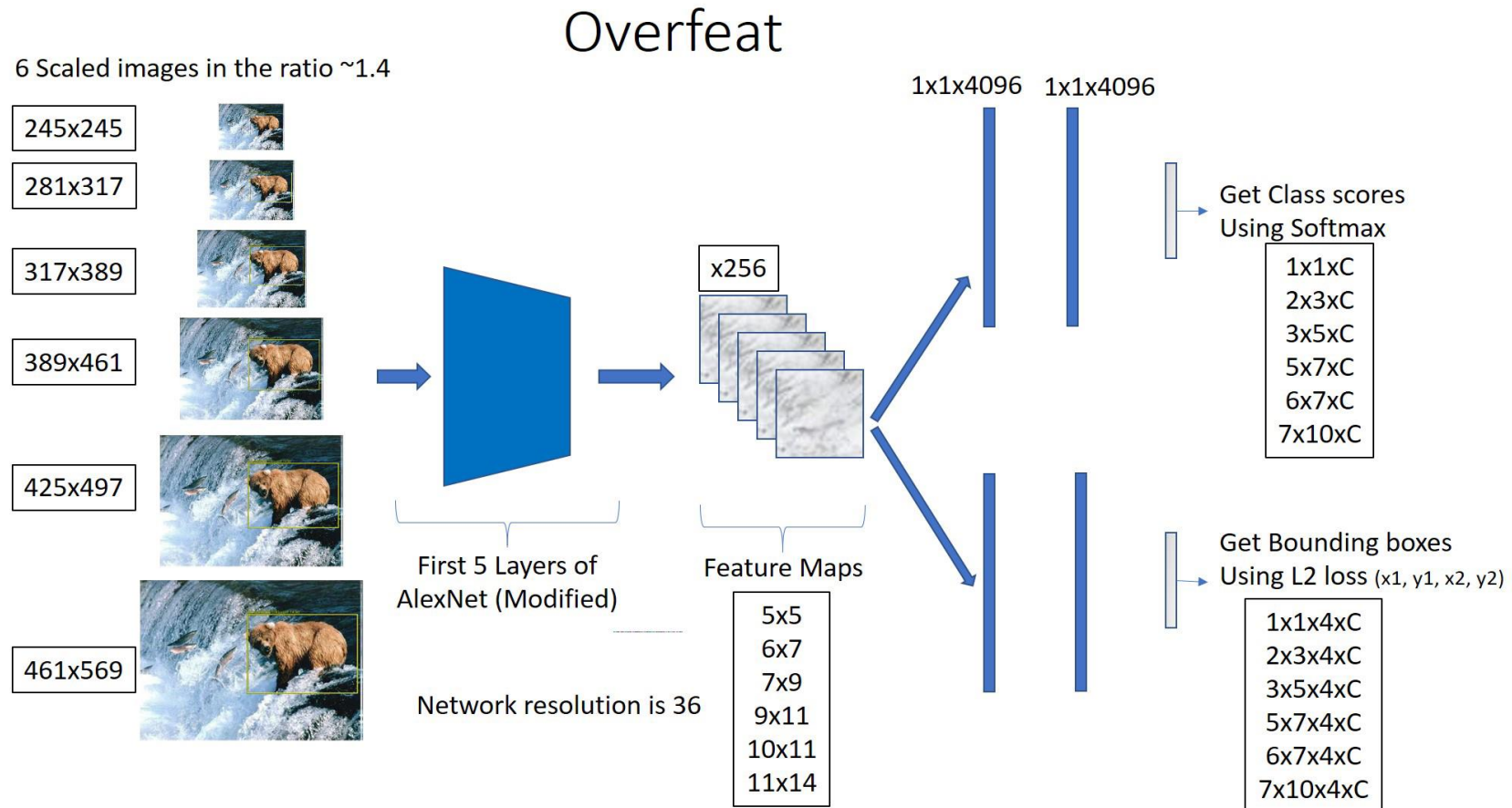
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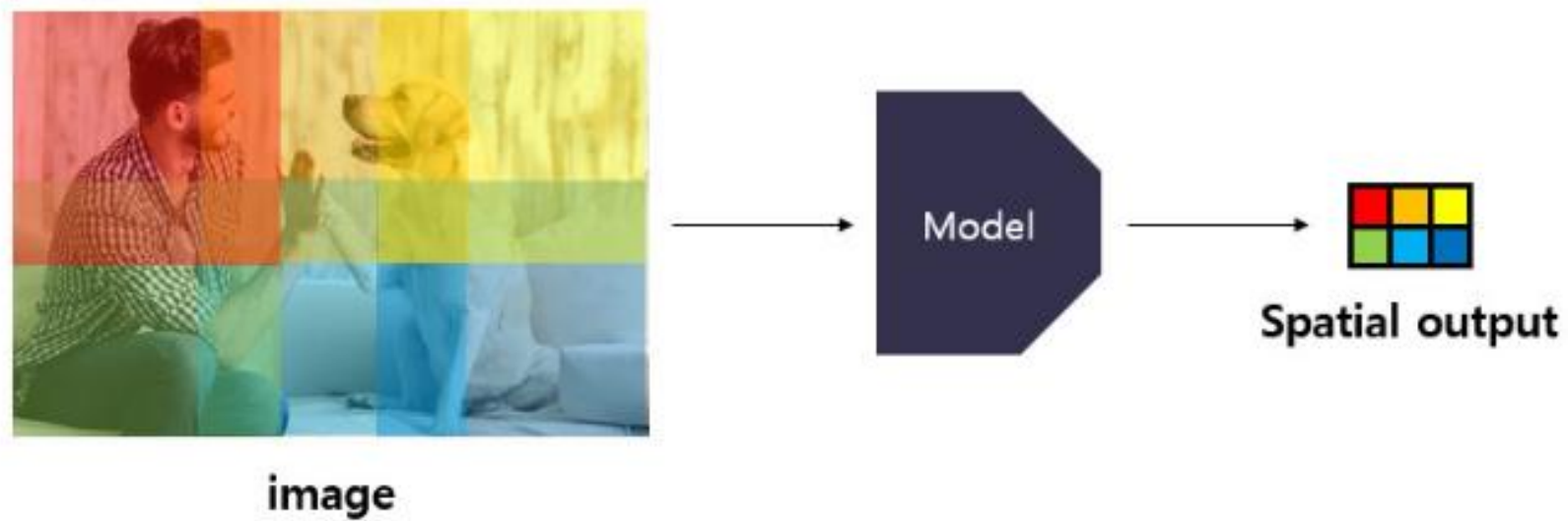
Fully Connected layer implemented as a convolution layer



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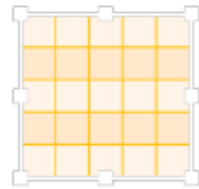


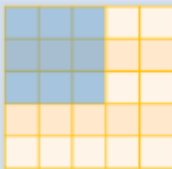
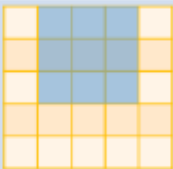
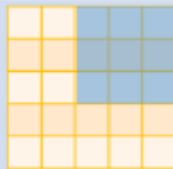
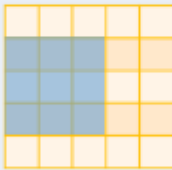
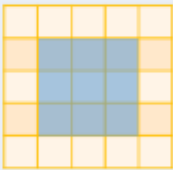
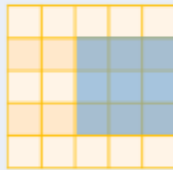
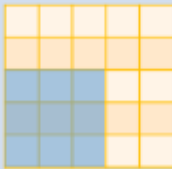
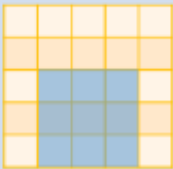
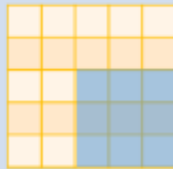
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Spatial output example

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<div><div>y</div><div>x</div></div>	0	1	2
0			
1			
2			

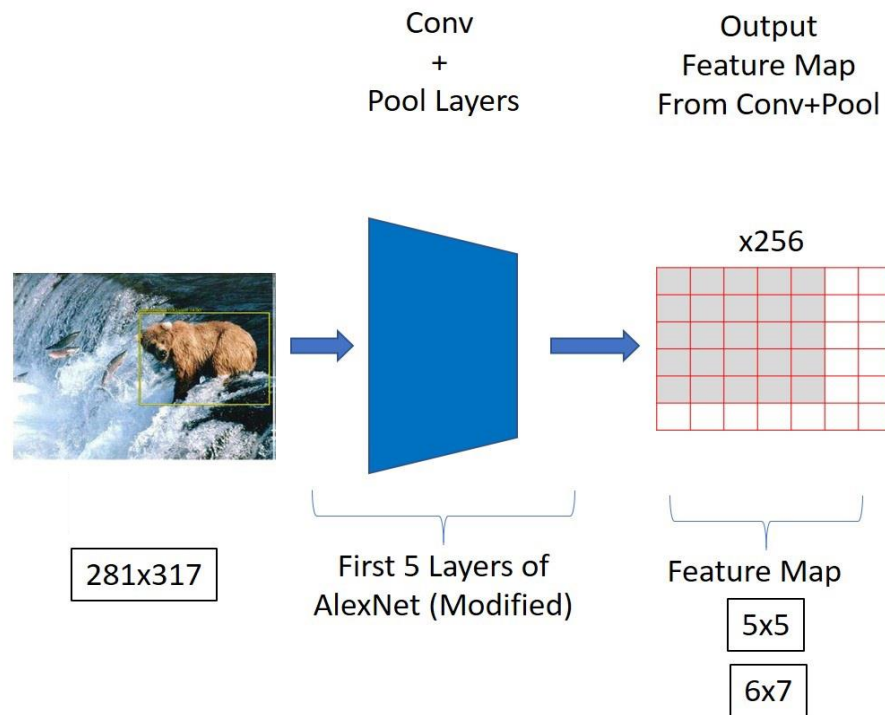
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Scale	Input size	Layer 5 pre-pool	Layer 5 post-pool	Classifier map (pre-reshape)	Classifier map size
1	245x245	17x17	(5x5)x(3x3)	(1x1)x(3x3)x C'	3x3x C'
2	281x317	20x23	(6x7)x(3x3)	(2x3)x(3x3)x C'	6x9x C'
3	317x389	23x29	(7x9)x(3x3)	(3x5)x(3x3)x C'	9x15x C'
4	389x461	29x35	(9x11)x(3x3)	(5x7)x(3x3)x C'	15x21x C'
5	425x497	32x35	(10x11)x(3x3)	(6x7)x(3x3)x C'	18x24x C'
6	461x569	35x44	(11x14)x(3x3)	(7x10)x(3x3)x C'	21x30x C'

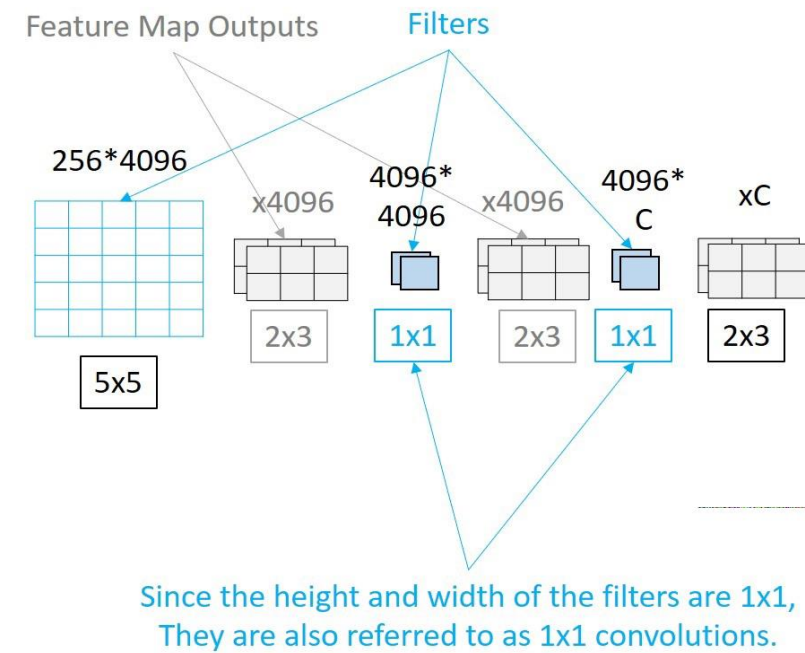
Spatial dimension of multi scale approach

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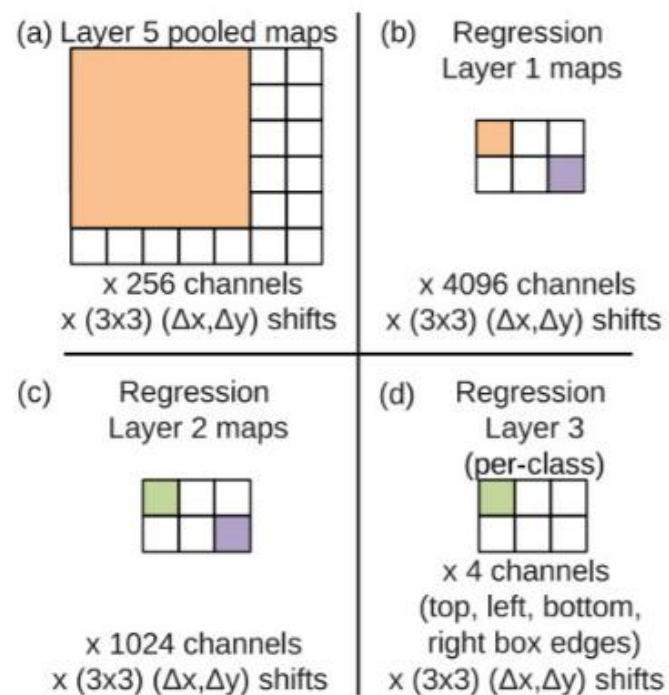
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Fully Connected layer implemented as a convolution layer

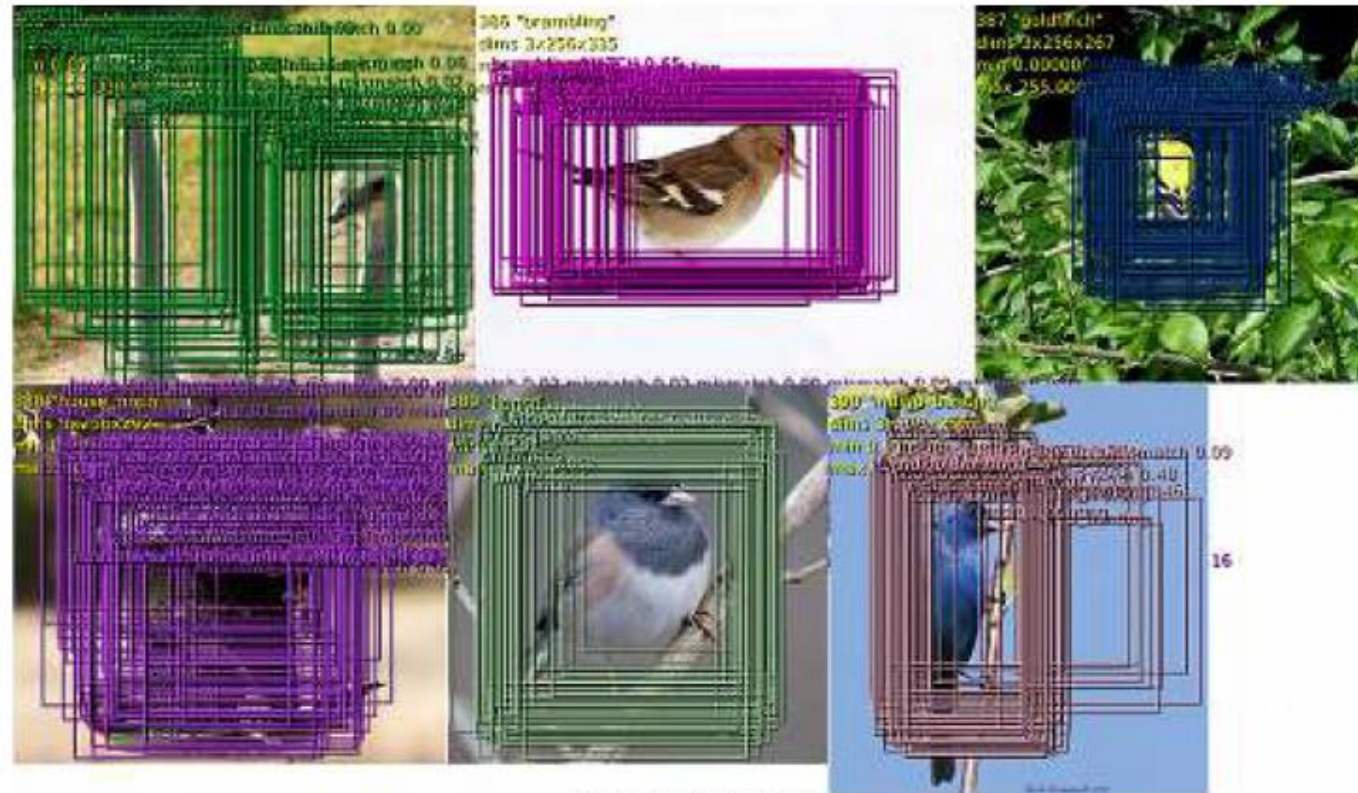


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Bounding box regressor Inference Process

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일부 경계 상자 예측 예

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1. Receptive Field
2. Implementing FC layers as convolution operation
3. ConvNet's Sliding Window Efficiency
4. 1x1 Convolution
5. Spatial Output
6. Effective Stride
7. Confidence score thresholding
8. Non Max Suppression and IoU

Thank You

INTEGRATED RECOGNITION, LOCALIZATION AND
DETECTION USING CONVOLUTIONAL NETWORKS