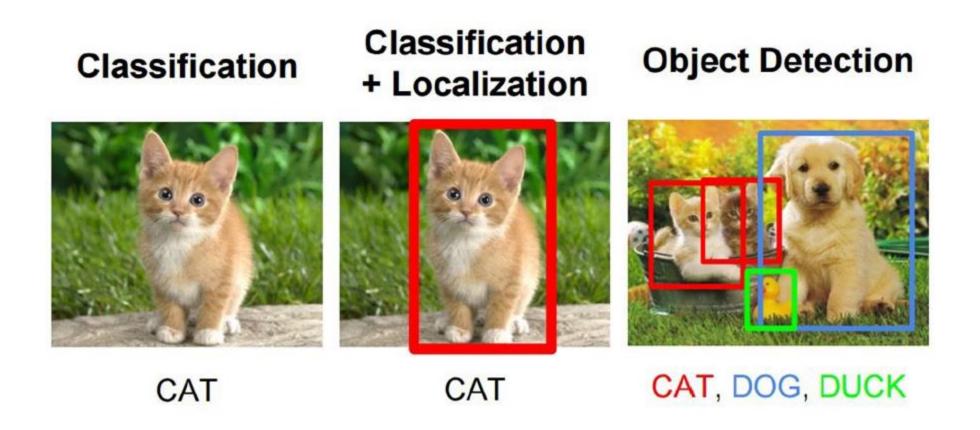
Overfeat:

Integrated Recognition, Localization and Detectionusing Convolutional Networks

paper seminar

2조

Object detection?

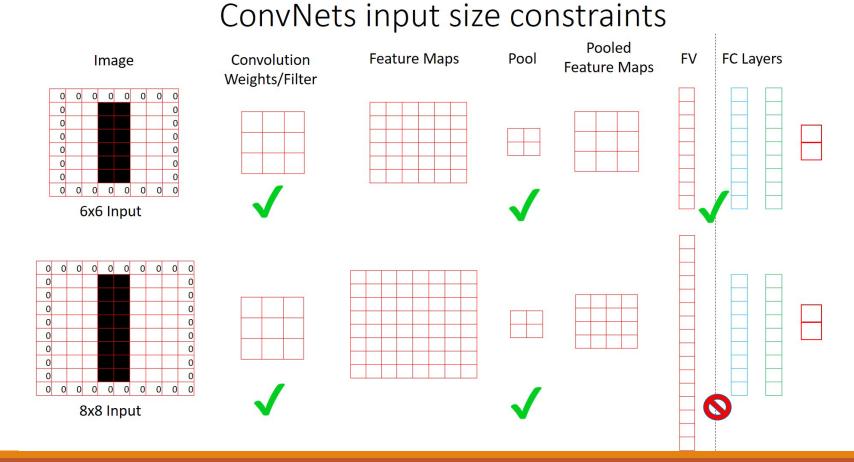


Object detection?

```
SPP-Net → MR-CNN → DeepBox → AttentionNet →
 R-CNN → OverFeat → MultiBox →
                                                                                                  → AZNet →
Fast R-CNN → DeepProposal → Faster R-CNN → OHEM → YOLO v1 → G-CNN
                                                                                                       CVPR' 16
                         ICCV' 15
    ICCV' 15
Inside-OutsideNet(ION) \rightarrow HyperNet \rightarrow CRAFT \rightarrow MultiPathNet(MPN) \rightarrow
                                                                                         ECCV' 16
                                                                                                       ECCV' 16
           CVPR' 16
                                   CVPR' 16
CPF \rightarrow MS-CNN \rightarrow R-FCN \rightarrow PVANET \rightarrow DeepID-Net \rightarrow NoC \rightarrow DSSD \rightarrow
                                                                                                       CVPR' 17
                                                DCN → DeNet → CoupleNet → RetinaNet → DSOD →
                                    RON →
Feature Pyramid Net(FPN) →
                                                                                            ICCV' 17
                                                                                                         ICCV" 17
                                                                           ICCV' 17
                                                             ICCV' 17
            CVPR' 17
                                                          STDN → RefineDet → MLKP → Relation-Net →
    ICCV' 17
                     ICCV' 17
Cascade R-CNN \rightarrow RFBNet \rightarrow CornerNet \rightarrow PFPNet \rightarrow Pelee \rightarrow HKRM \rightarrow R-DAD \rightarrow M2Det ...
                                                                                                      AAAI' 19
                                                                                         AAAl' 19
                        ECCV" 18
                                                      ECCV" 18
      CVPR' 18
```

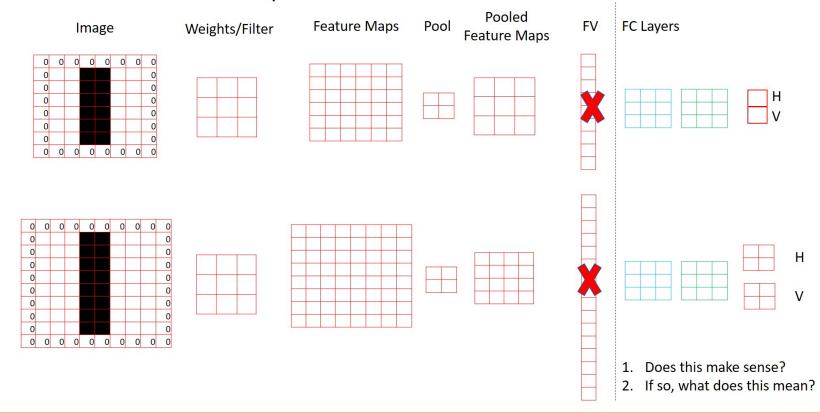
Convnet's input size constraints Problem?

ConvNet의 입력 크기 제약 조건 (Alexnet 224)

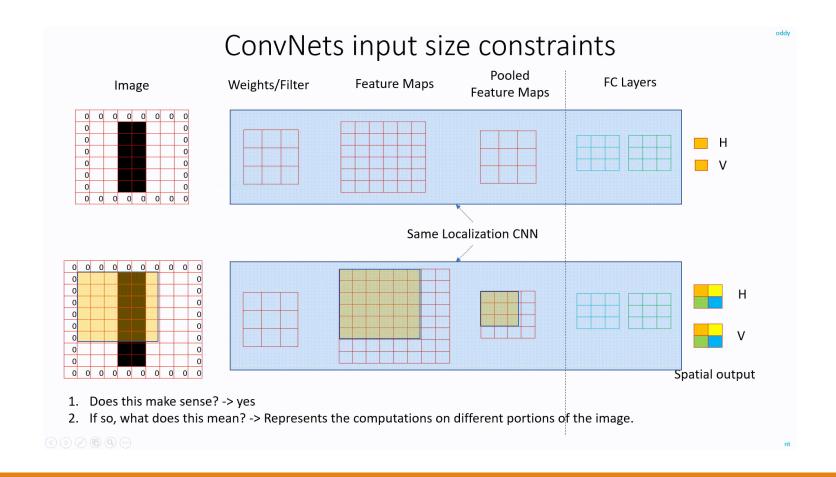


Receptive field and spatial output

ConvNets input size constraints – FC as Conv

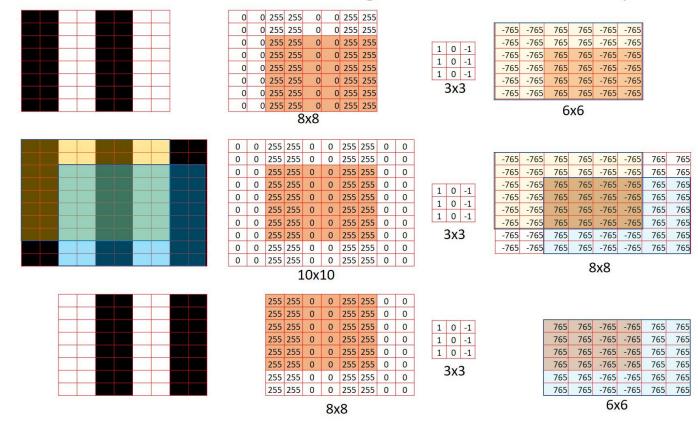


Receptive field and spatial output

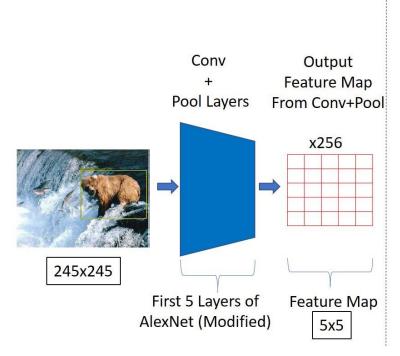


Convnet and sliding window efficiency

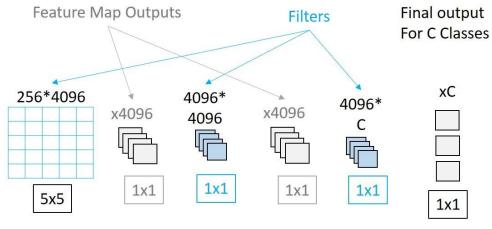
ConvNets and Sliding Window Efficiency

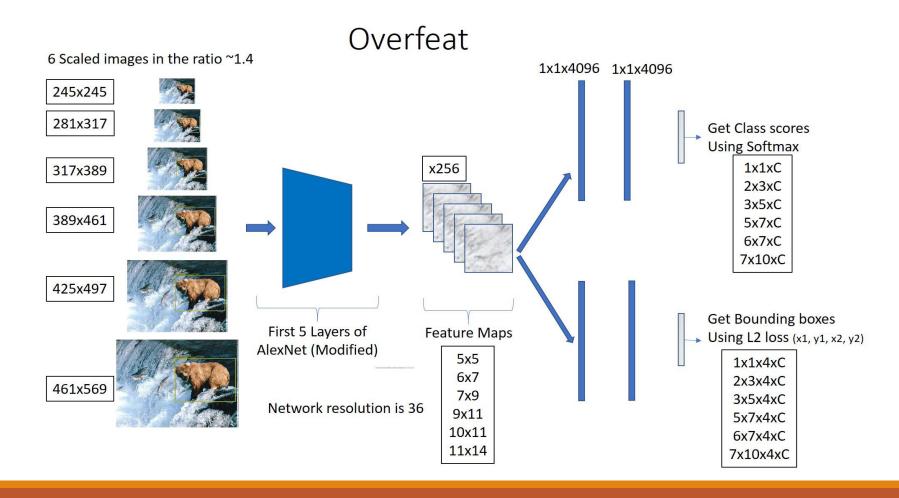


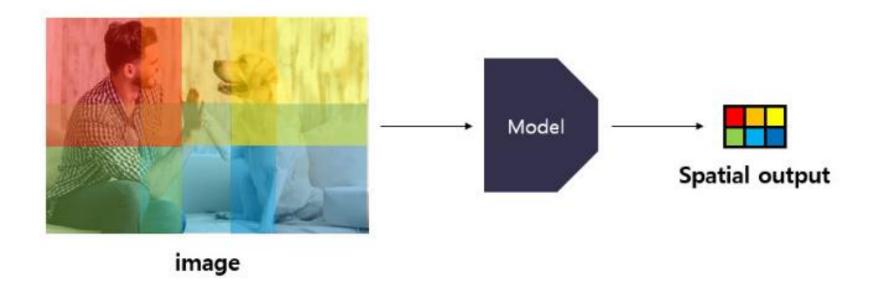
Overfeat



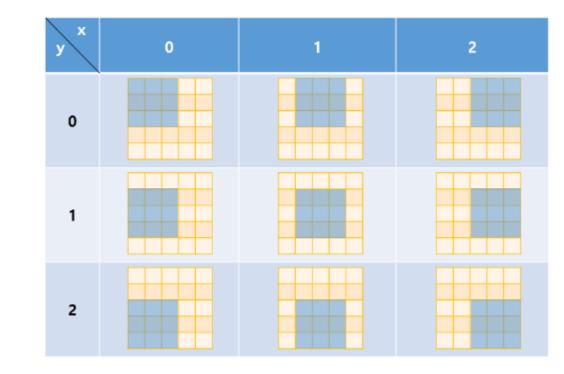
Fully Connected layer implemented as a convolution layer







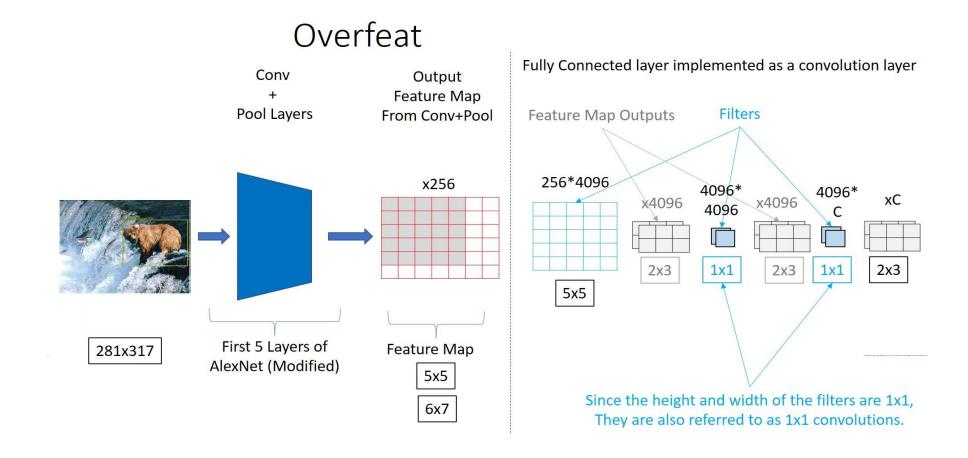
Spatial output example

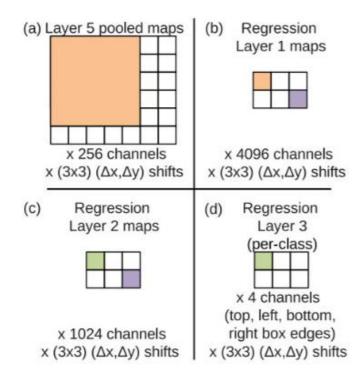




Scale	Input size	Layer 5 pre-pool	Layer 5 post-pool	Classifier map (pre-reshape)	Classifier map size
1	245x245	17x17	(5x5)x(3x3)	(1x1)x(3x3)xC	3x3xC
2	281x317	20x23	(6x7)x(3x3)	(2x3)x(3x3)xC	6x9xC
3	317x389	23x29	(7x9)x(3x3)	(3x5)x(3x3)xC	9x15xC
4	389x461	29x35	(9x11)x(3x3)	(5x7)x(3x3)xC	15x21xC
5	425x497	32x35	(10x11)x(3x3)	(6x7)x(3x3)xC	18x24xC
6	461x569	35x44	(11x14)x(3x3)	(7x10)x(3x3)xC	21x30xC

Spatial dimension of multi scale approach





Bounding box regressor Inference Process



일부 경계 상자 예측 예



- 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