

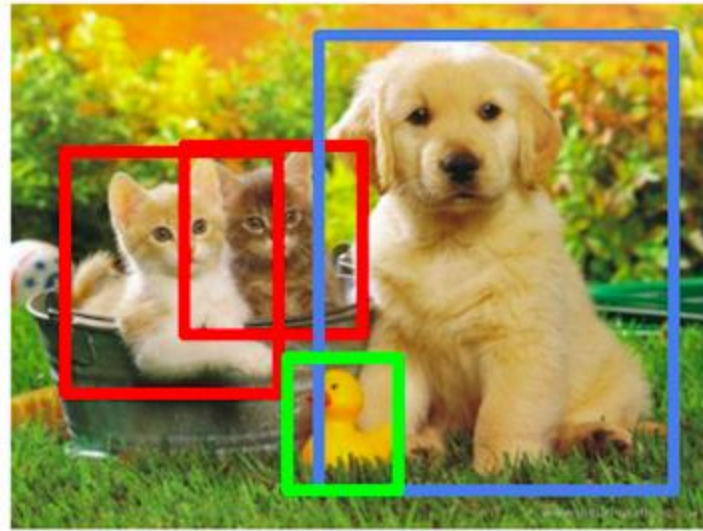
目标检测

主讲：龙良曲

Computer Vision



Classification



Object Detection

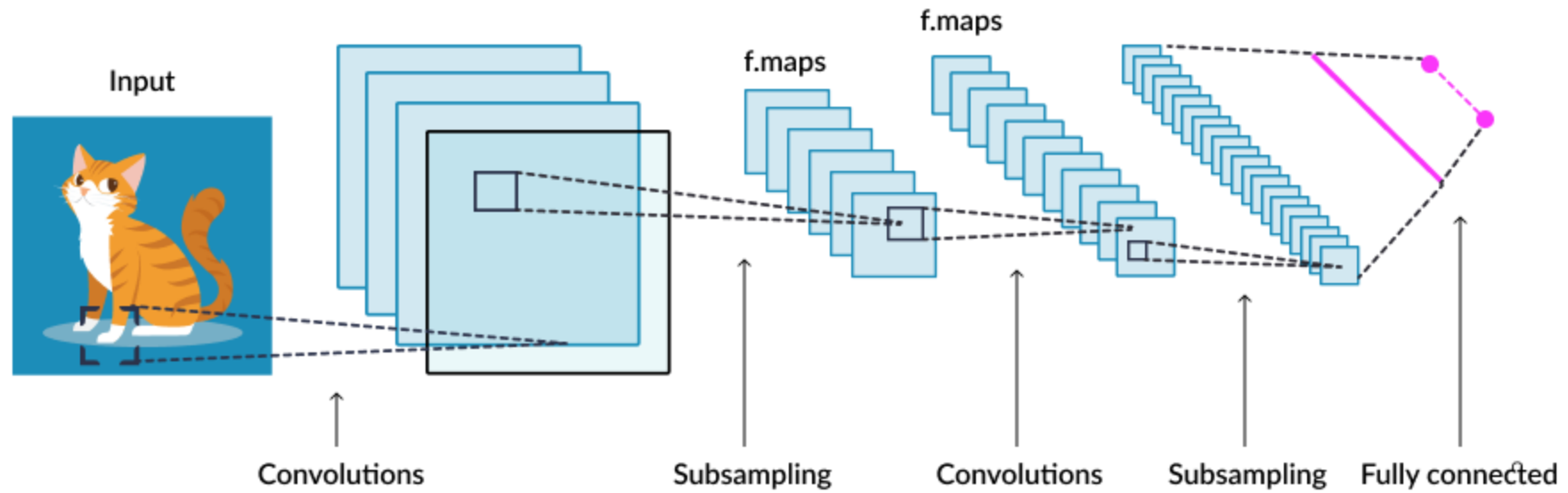


Semantic Segmentation

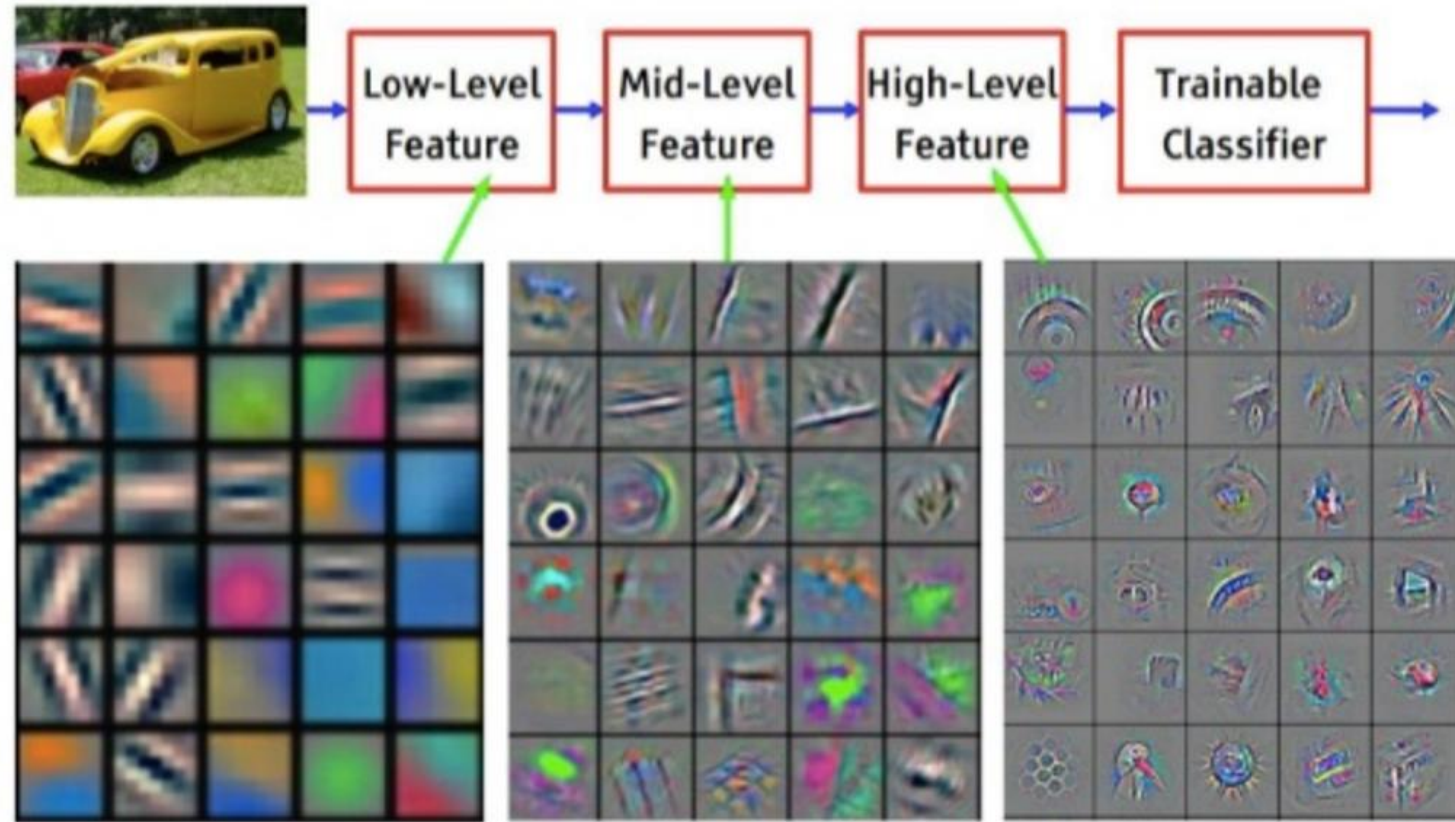
Enjoy!



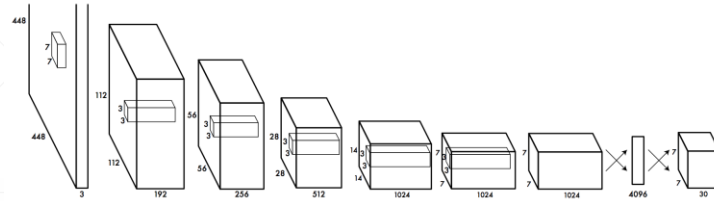
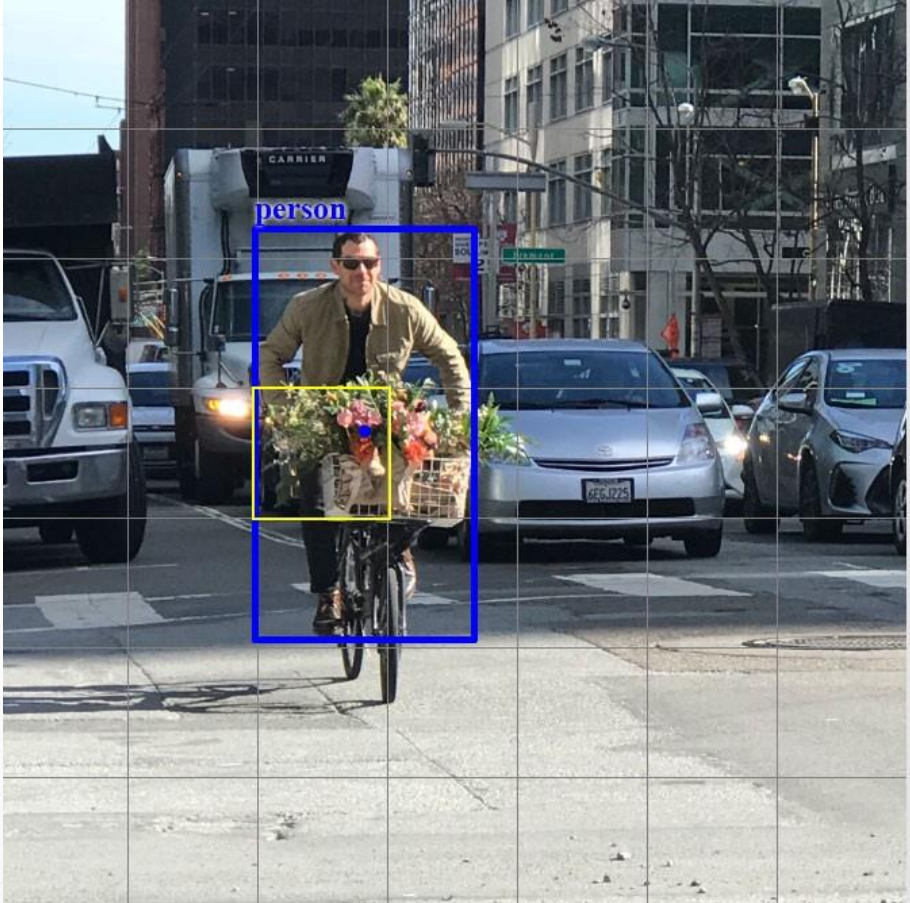
Review: Classification



CNN keep spatial info



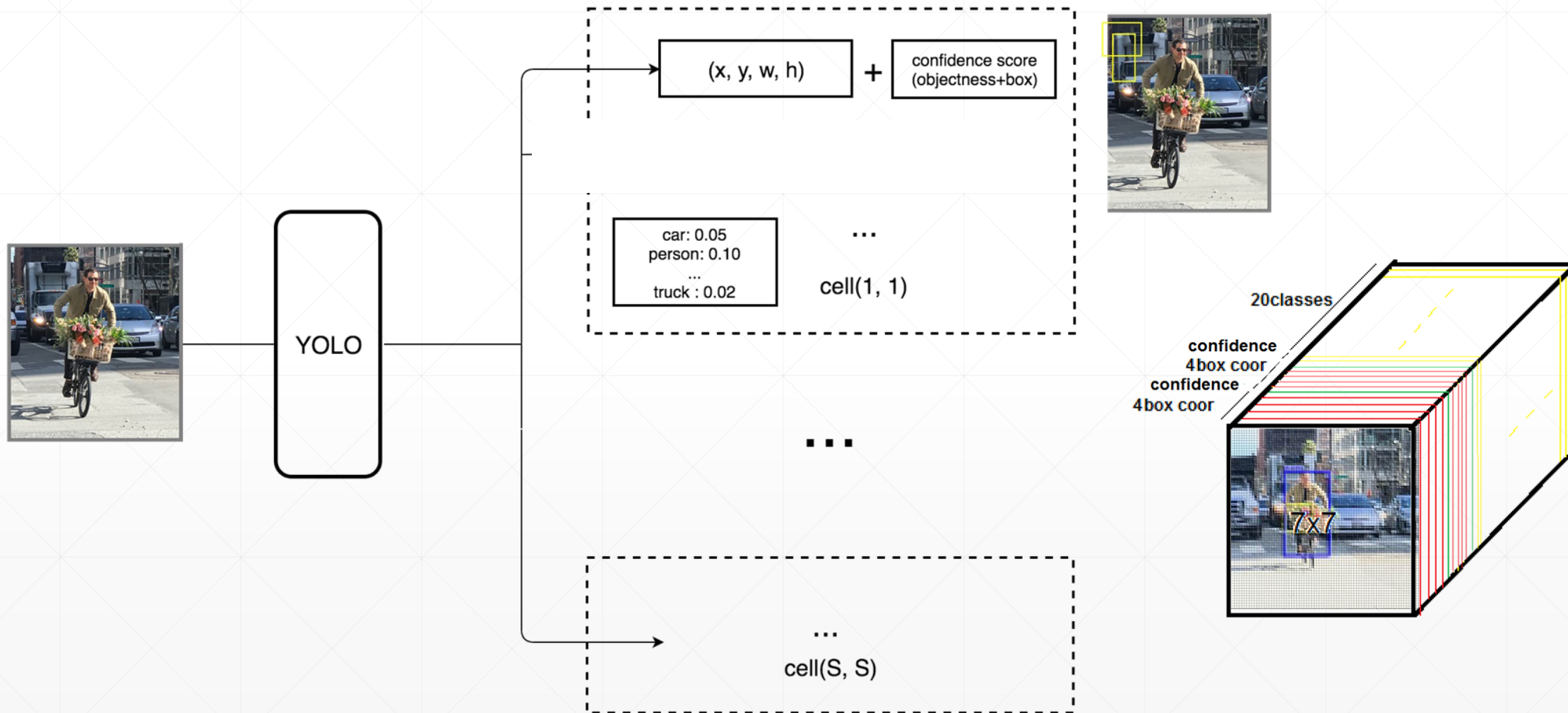
Confidence 1 or 0?



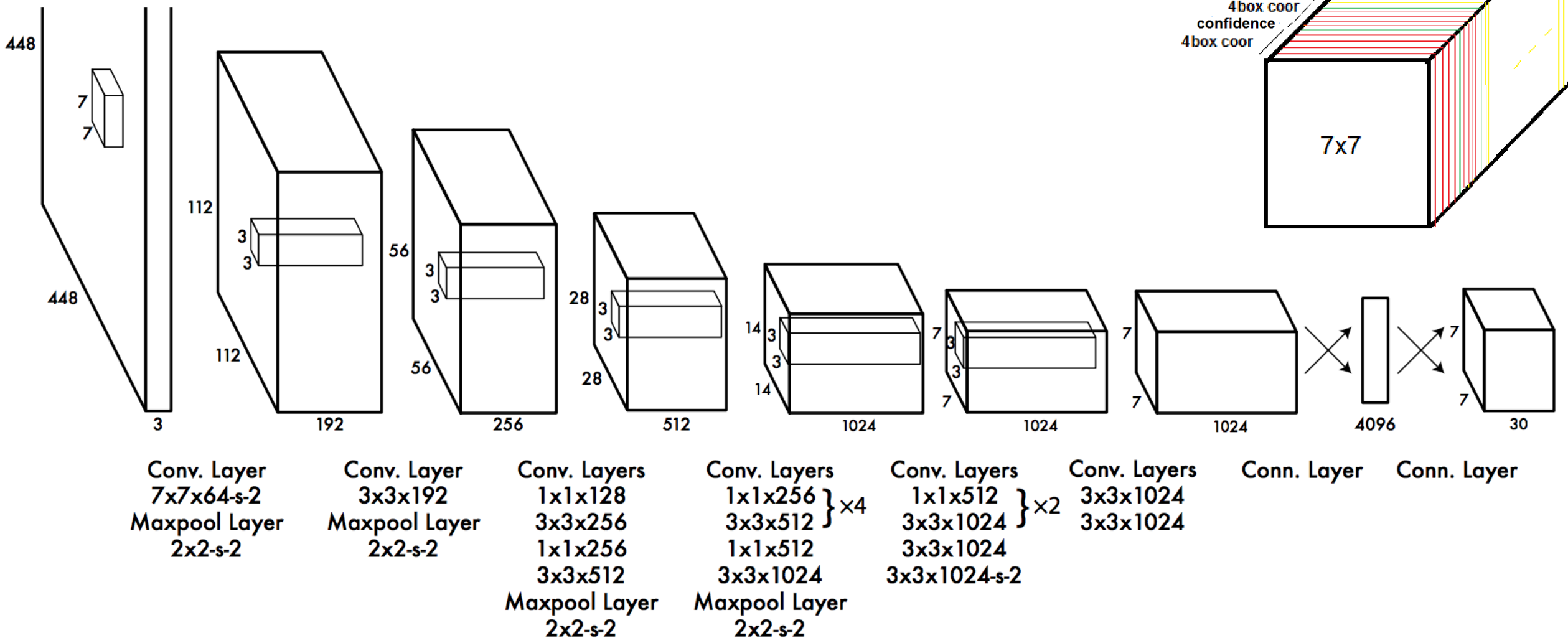
Problems

- (x, y, w, h) prediction
 - Class information
-

YOLO: You only look once



YOLO model

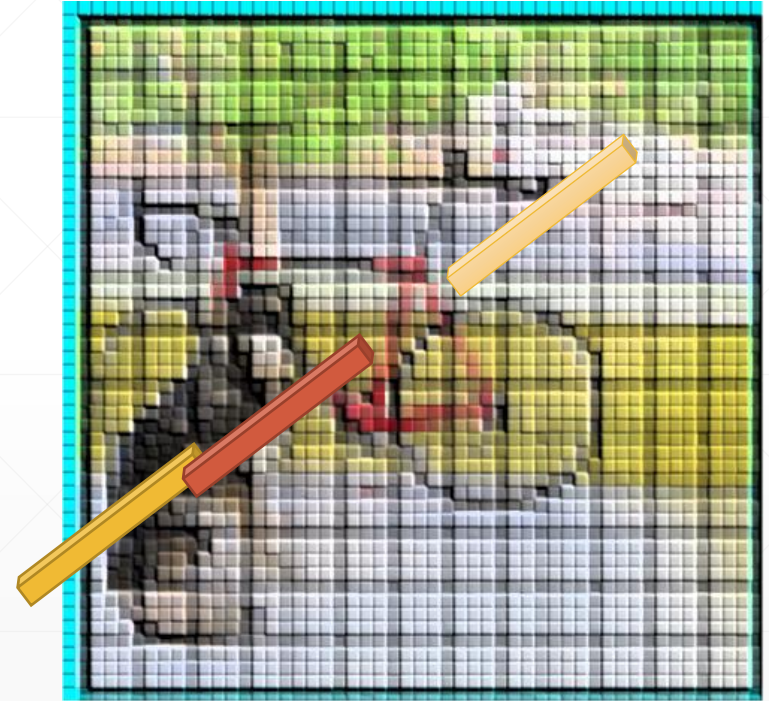
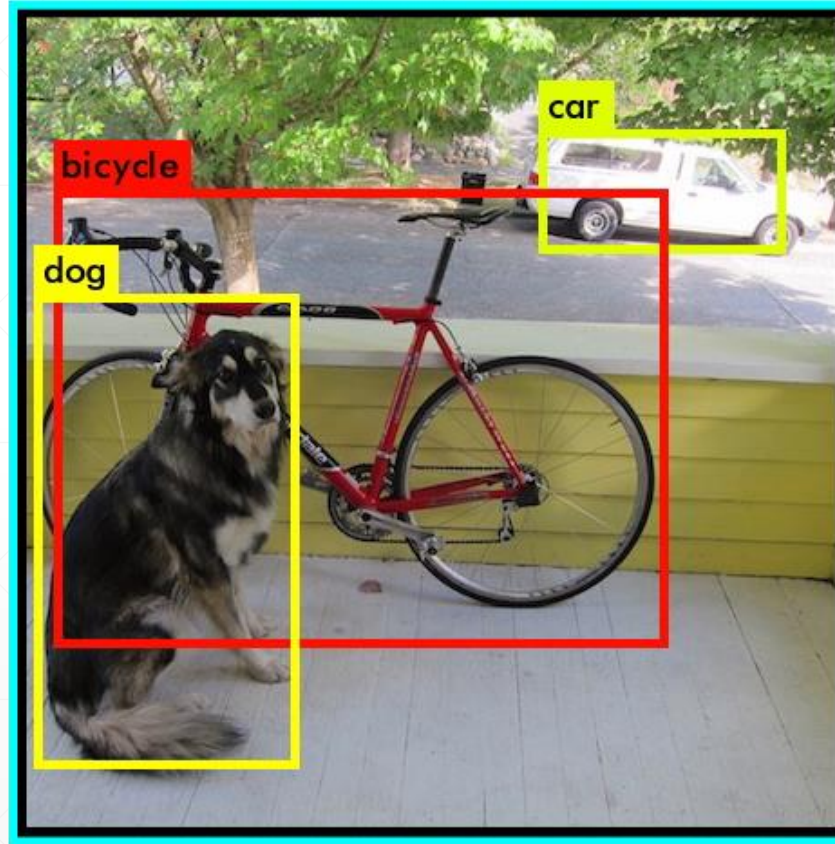


Train YOLO

- Compose GT boxes

- Forward

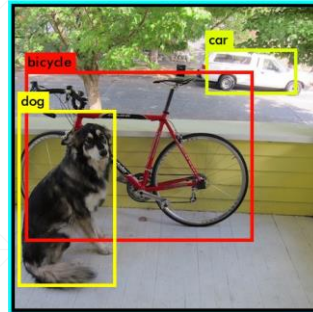
- Loss



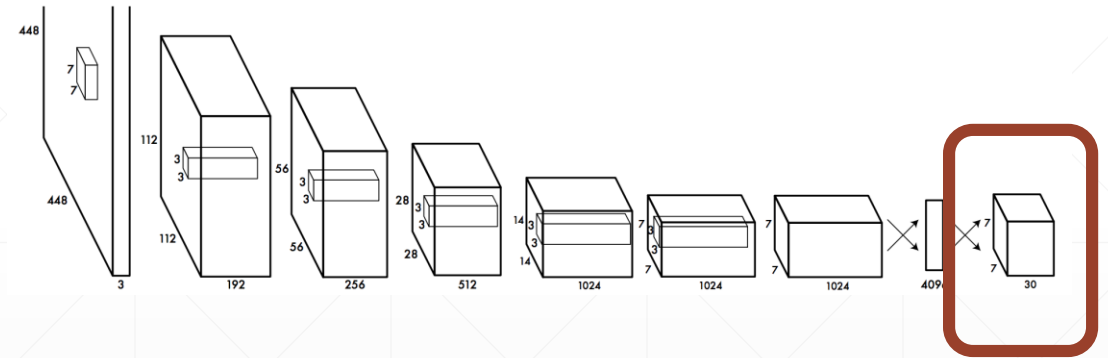
Train YOLO

- Compose GT boxes

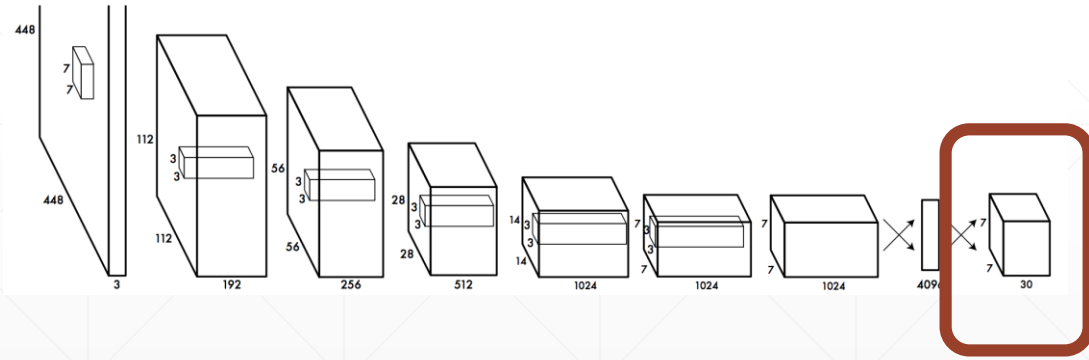
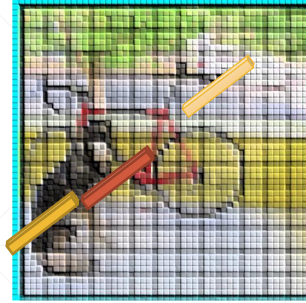
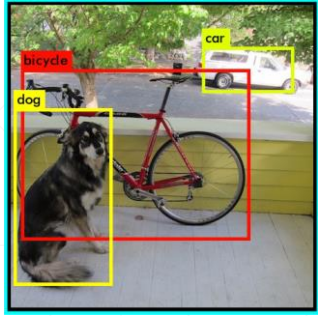
- Forward



- Loss



YOLO loss



Benchmark

Model	Train	Test	mAP	FLOPS	FPS	Cfg	Weights
Old YOLO	VOC 2007+2012	2007	63.4	40.19 Bn	45		link
SSD300	VOC 2007+2012	2007	74.3	-	46		link
SSD500	VOC 2007+2012	2007	76.8	-	19		link
YOLOv2	VOC 2007+2012	2007	76.8	34.90 Bn	67	cfg	weights
YOLOv2 544x544	VOC 2007+2012	2007	78.6	59.68 Bn	40	cfg	weights
Tiny YOLO	VOC 2007+2012	2007	57.1	6.97 Bn	207	cfg	weights
SSD300	COCO trainval	test-dev	41.2	-	46		link
SSD500	COCO trainval	test-dev	46.5	-	19		link
YOLOv2 608x608	COCO trainval	test-dev	48.1	62.94 Bn	40	cfg	weights
Tiny YOLO	COCO trainval	-	-	7.07 Bn	200	cfg	weights

Improvements-1

- Model updated: Dartnet-19

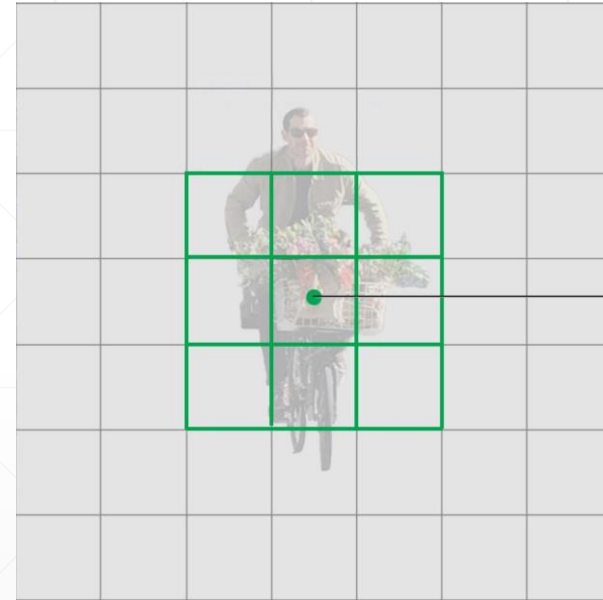
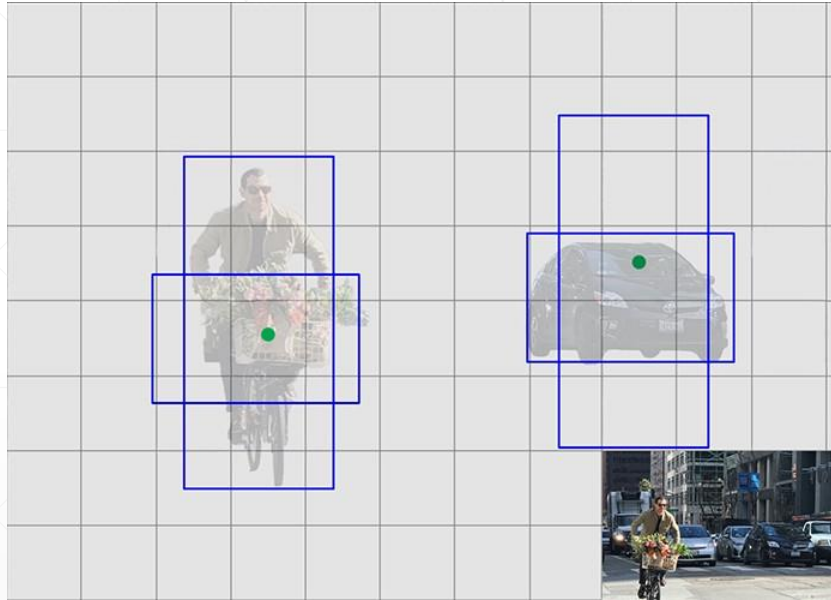
- BN

- FC

	Top 1	Top 5	FLOPs	GPU Speed
VGG-16	70.5	90.0	30.95 Bn	100 FPS
Extraction (YOLOv1)	72.5	90.8	8.52 Bn	180 FPS
Resnet50	75.3	92.2	7.66 Bn	90 FPS
Darknet19	74.0	91.8	5.58 Bn	200 FPS

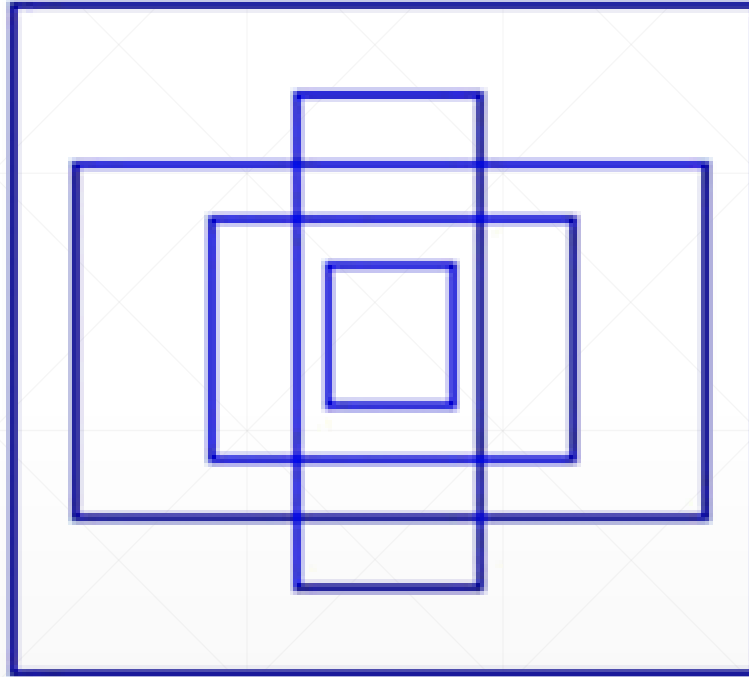
Improvement-2

- Pre-defined Anchors

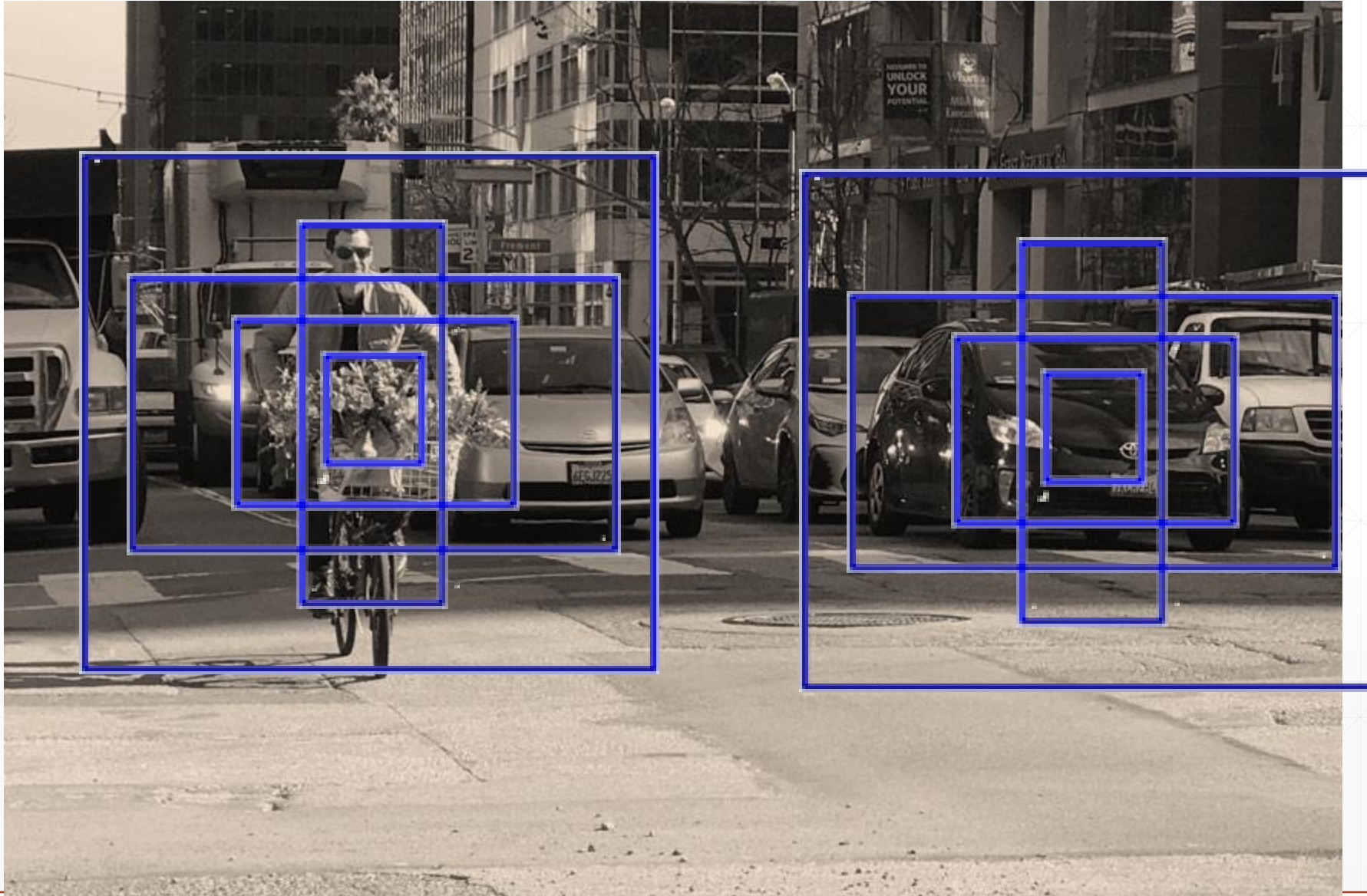


Predefined Anchors

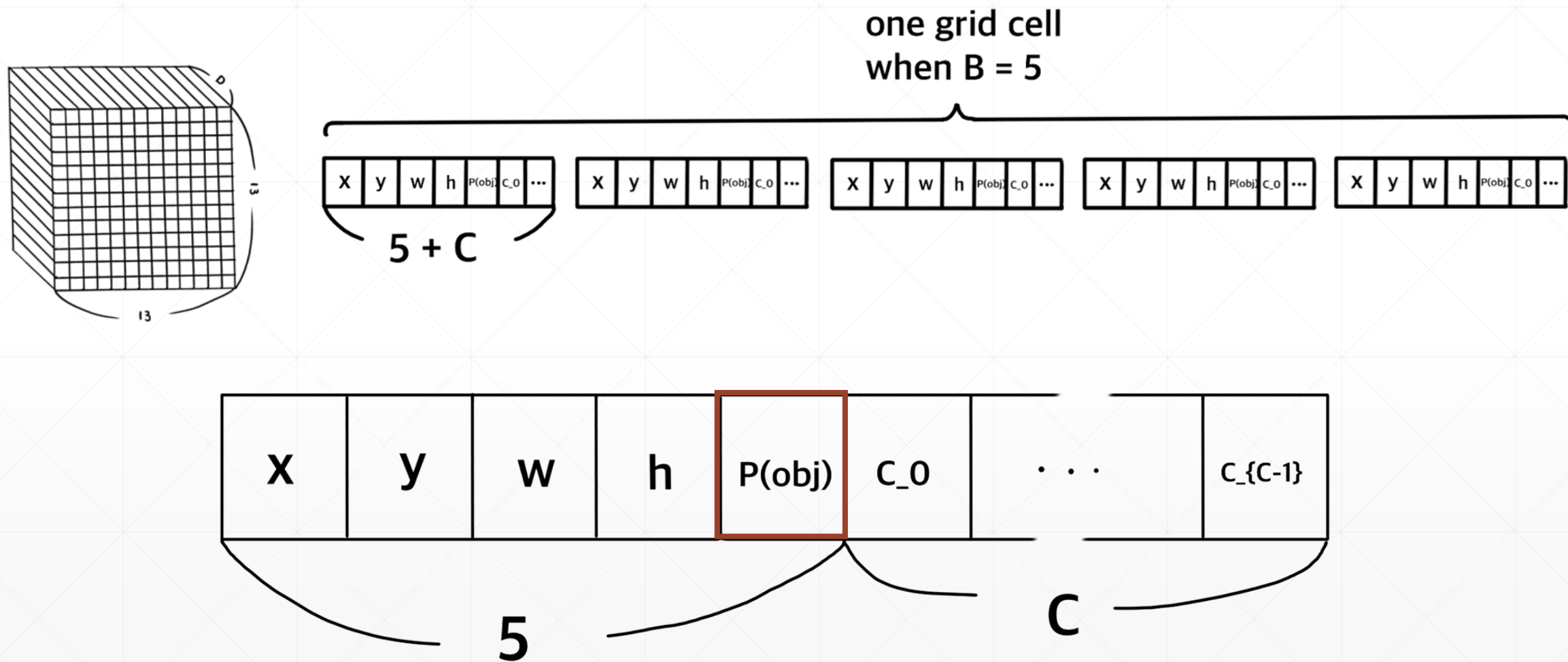
- More or less?



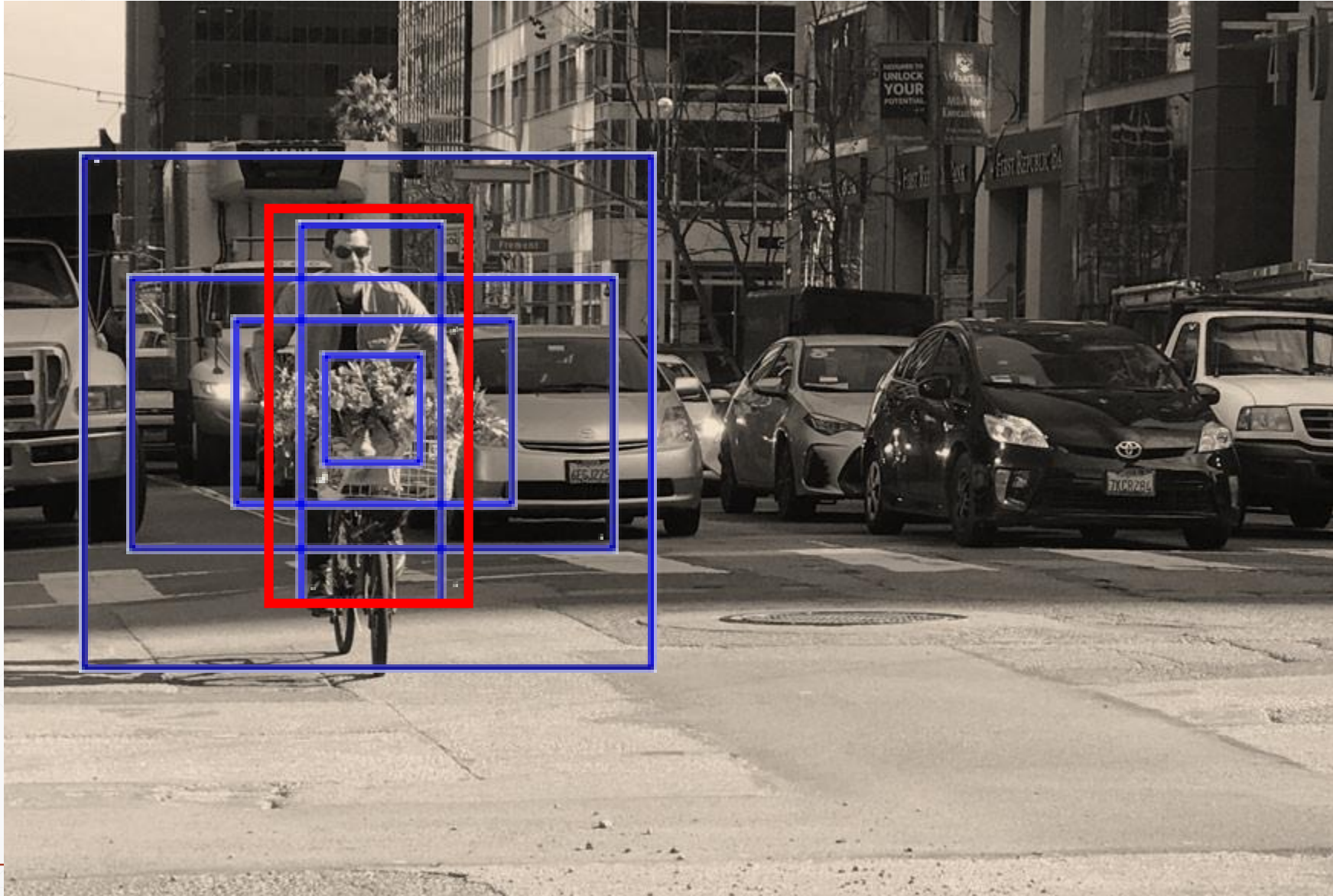
Pre-defined Anchors



Output Vector

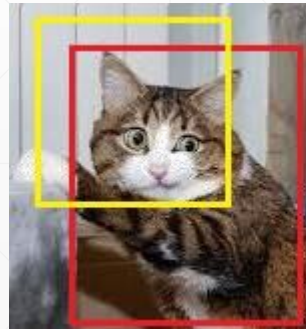
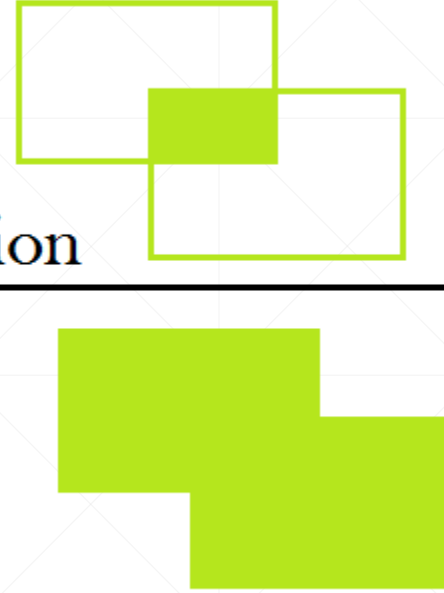


Which anchor is the best?



IOU

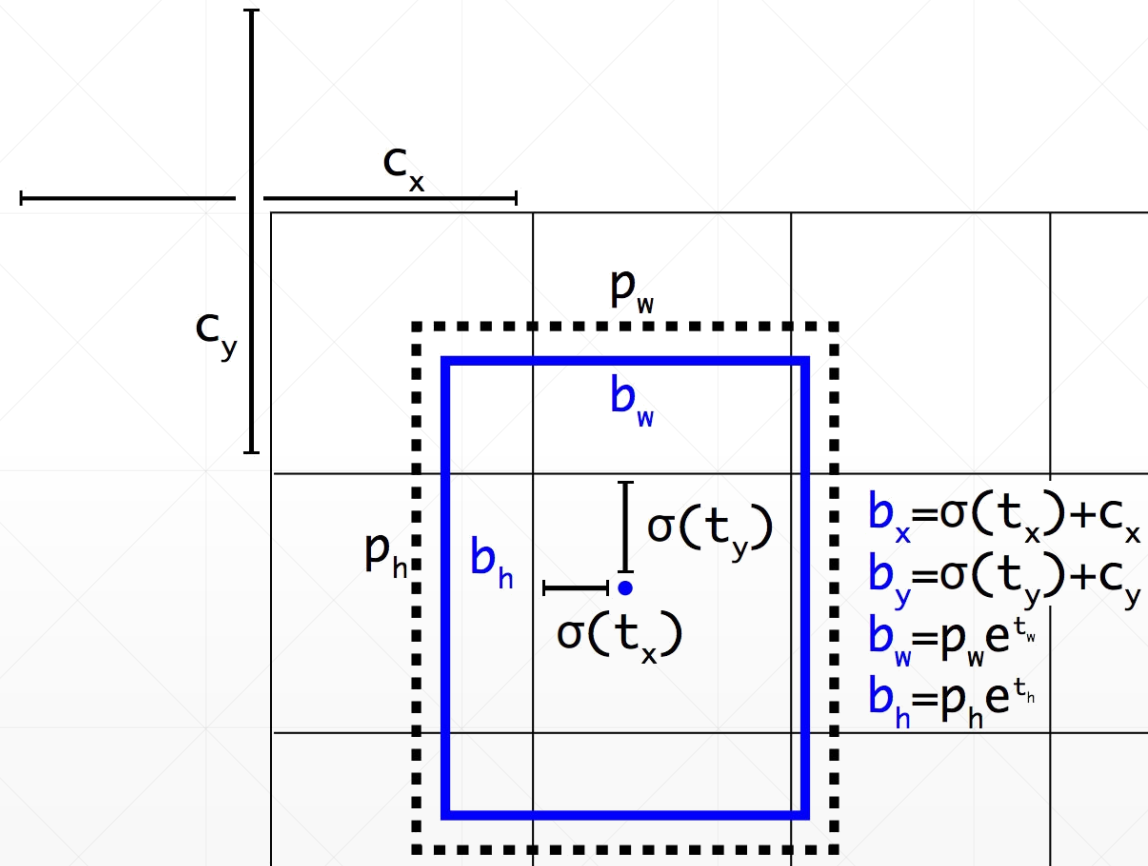
$$\text{IOU} = \frac{\text{Area of Intersection}}{\text{Area of Union}}$$



Improvements-3

- Position prediction-3

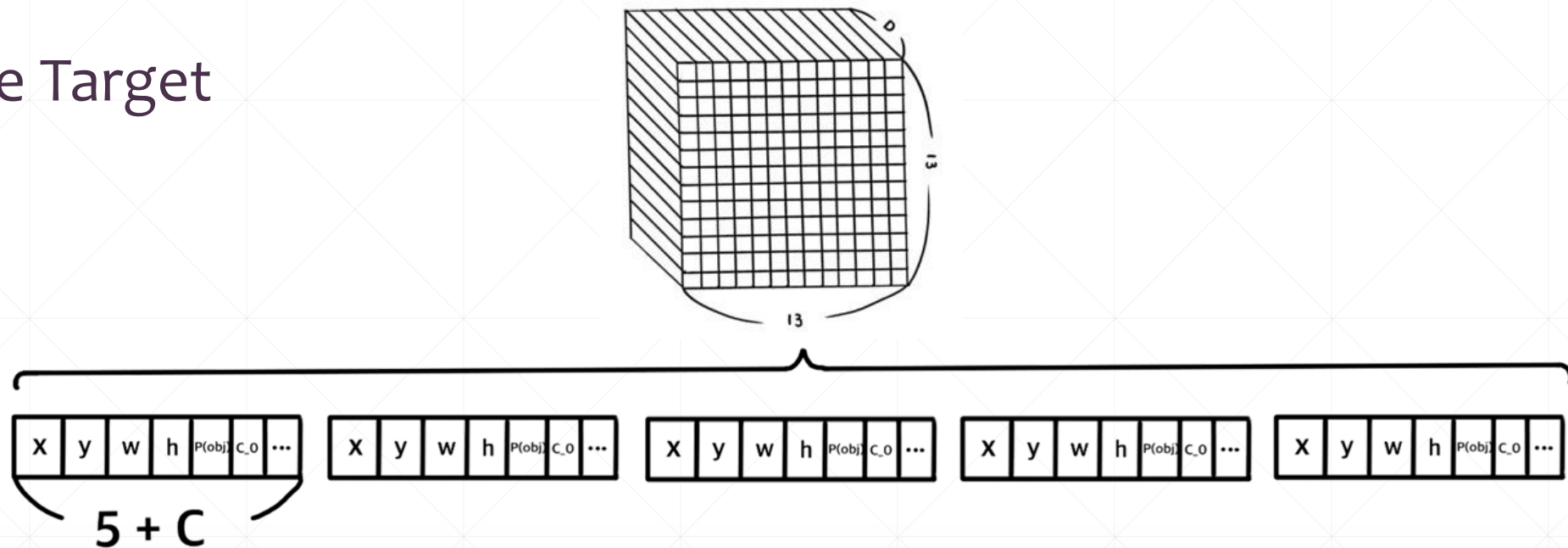
- x-y-w-h



YOLOv2

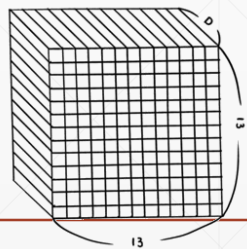
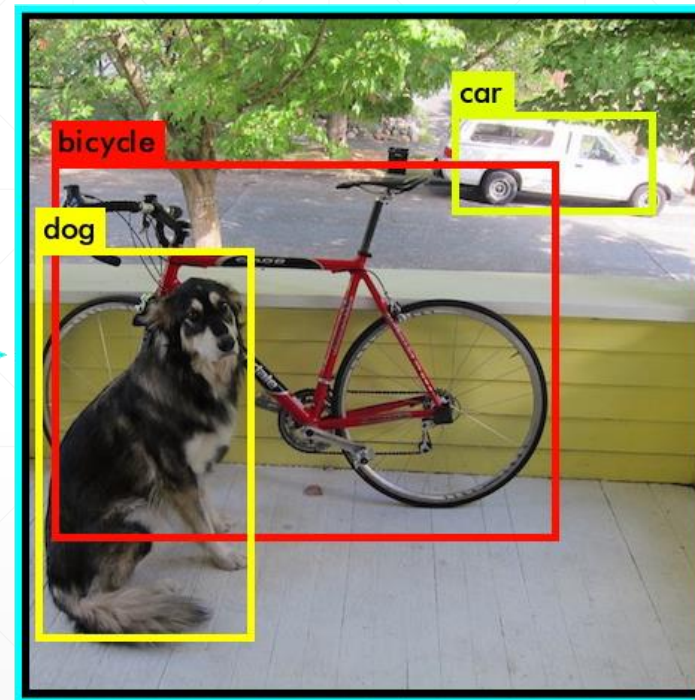
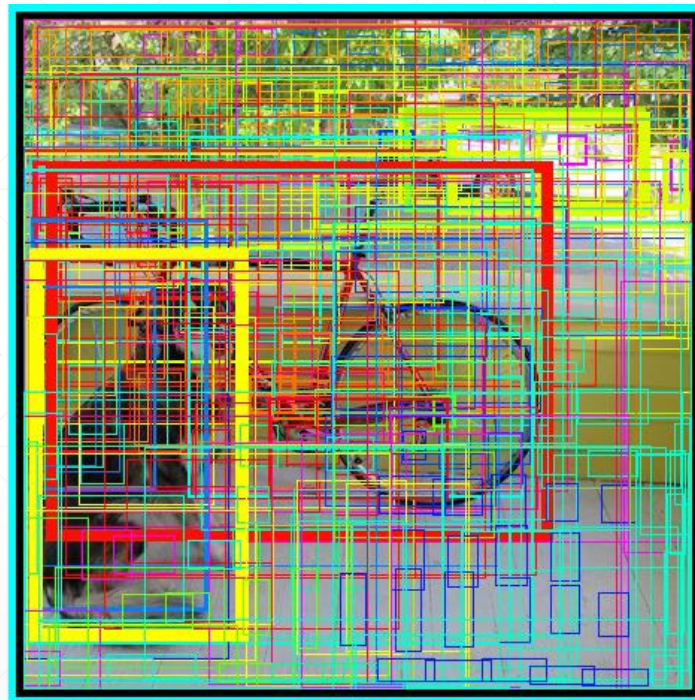
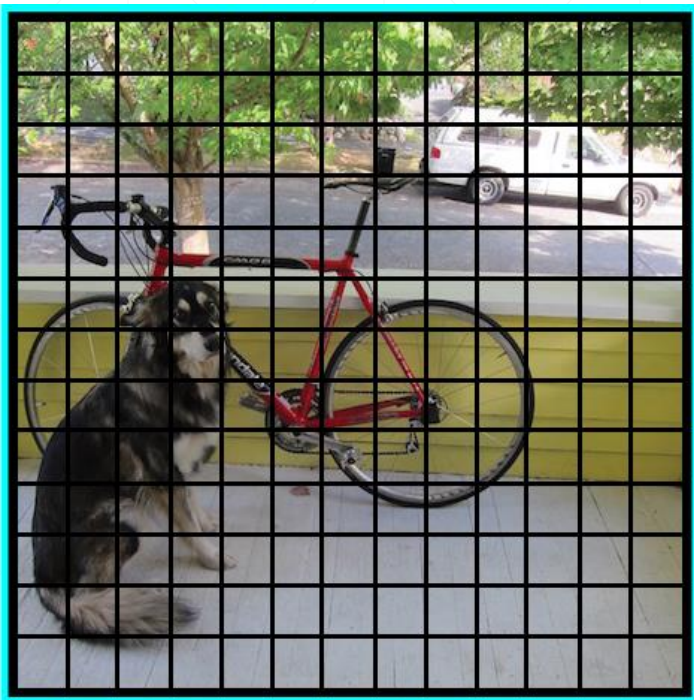
- Compose Target

- Forward

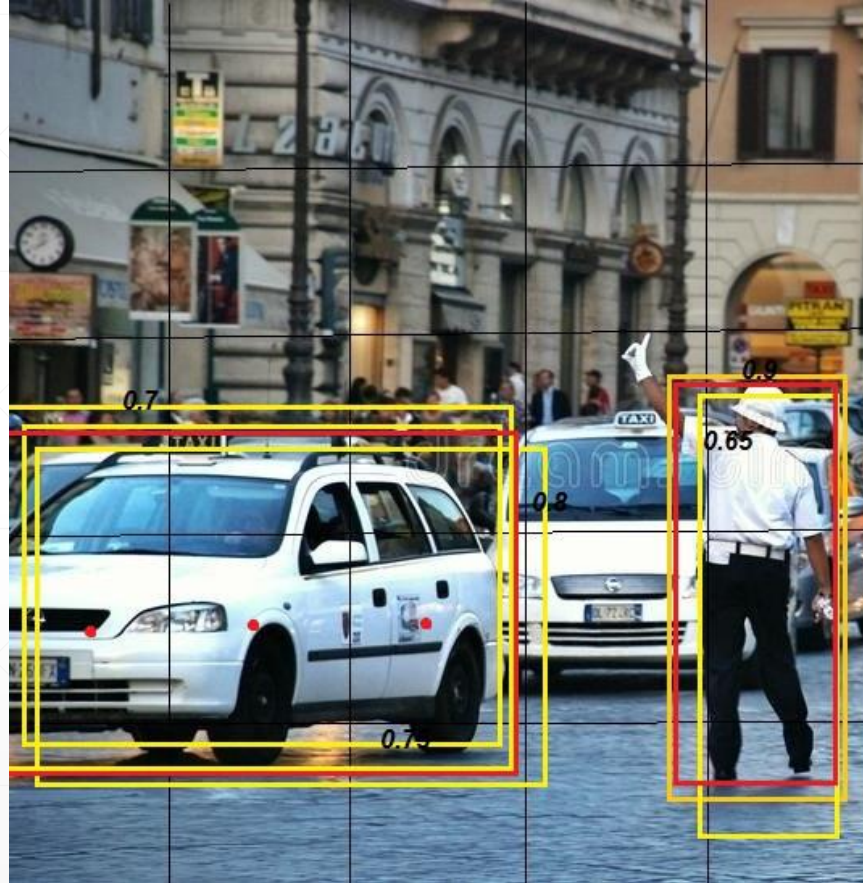


- Loss
 - Coordinate loss: x-y-w-h 4
 - Class loss: 20
 - Confidence loss: 1

Inference



Non-Max-Suppression



高能预警！

- 代码请加QQ群下载：441082251
 - 多动手练习！
-

Acknowledgement

- <https://www.jeremyjordan.me/semantic-segmentation/>
 - <https://divamgupta.com/image-segmentation/2019/06/06/deep-learning-semantic-segmentation-keras.html>
 - <https://medium.com/@y1017c121y/how-does-yolov2-work-daaaa967c5f7>
 - https://medium.com/@amrokamal_47691/yolo-yolov2-and-yolov3-all-you-want-to-know-7e3e92dc4899
-

下一课时

Thank You.
