



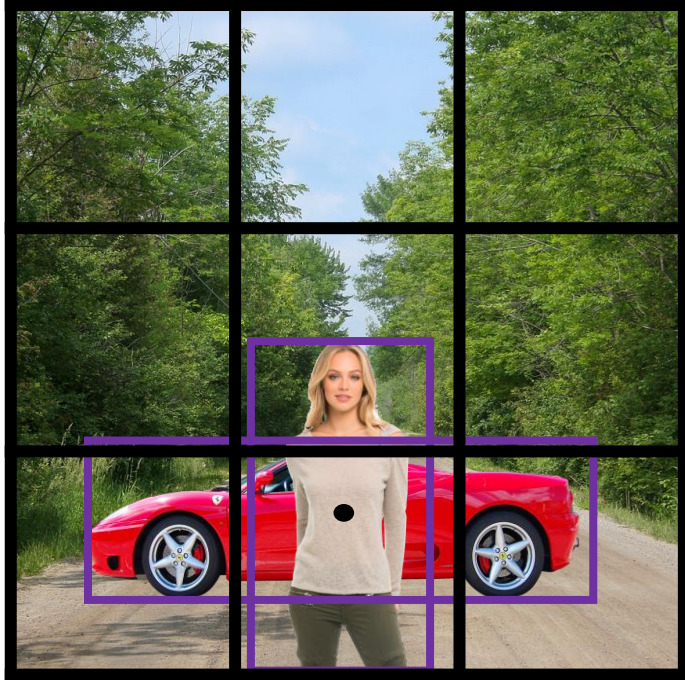
deeplearning.ai

# Object Detection

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## Anchor boxes

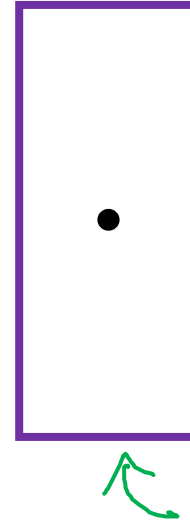
# Overlapping objects:



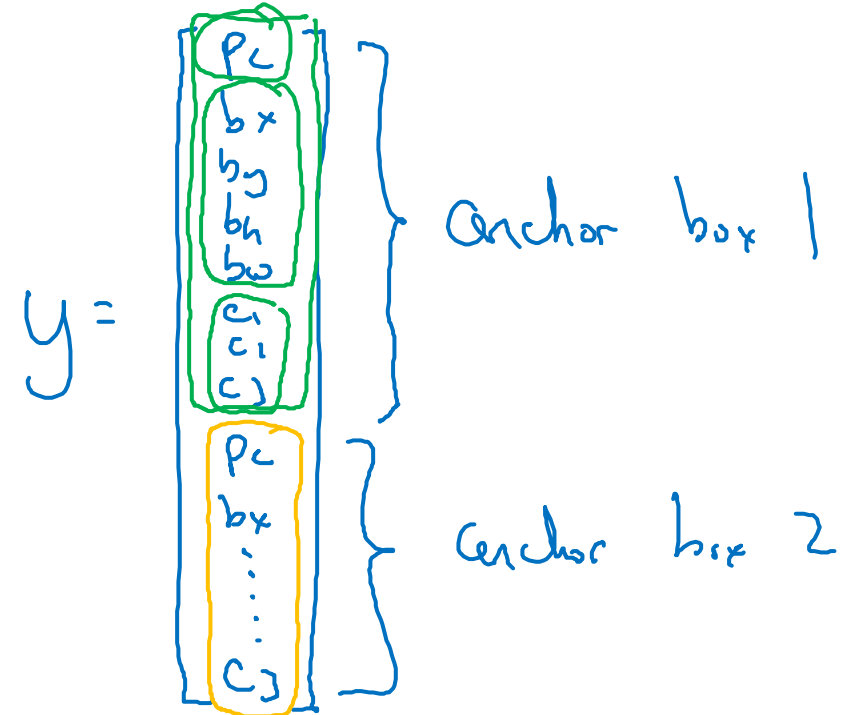
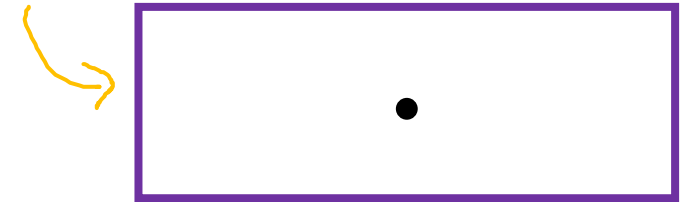
$$y = \begin{bmatrix} p_c \\ b_x \\ b_y \\ b_h \\ b_w \\ c_1 \\ c_2 \\ c_3 \end{bmatrix}$$

Arrows point from the labels in the vector  $y$  to the corresponding parts of the bounding box in the image above:  $p_c$  to the center dot,  $b_x$  and  $b_y$  to the top-left corner,  $b_h$  and  $b_w$  to the height and width, and  $c_1, c_2, c_3$  to the class label.

Anchor box 1:



Anchor box 2:

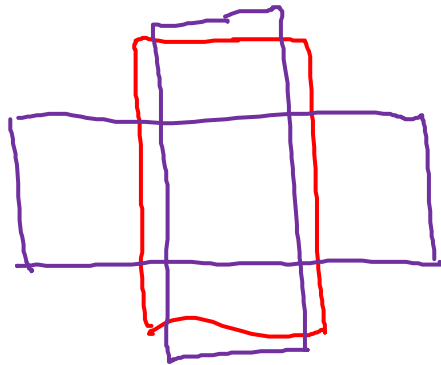


# Anchor box algorithm

Previously:

Each object in training image is assigned to grid cell that contains that object's midpoint.

Output  $y$ :  
 $3 \times 3 \times 8$



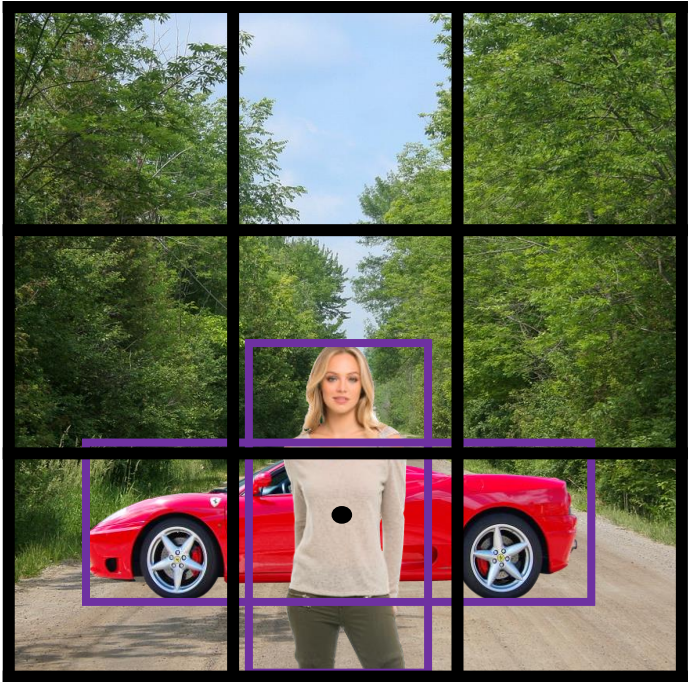
With two anchor boxes:

Each object in training image is assigned to grid cell that contains object's midpoint and anchor box for the grid cell with highest IoU.

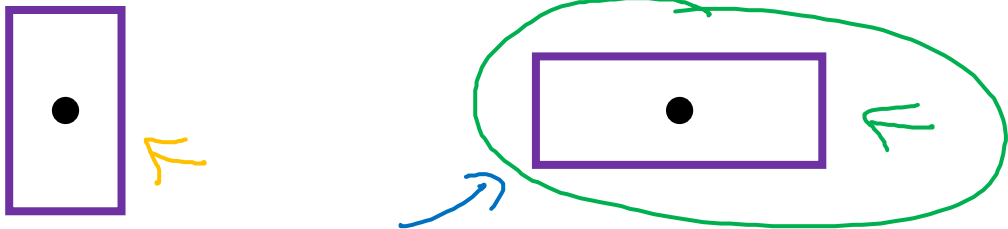
(grid cell, anchor box)

Output  $y$ :  
 $3 \times 3 \times 16$   
 $3 \times 3 \times 2 \times 8$

# Anchor box example



Anchor box 1:      Anchor box 2:



y =

