

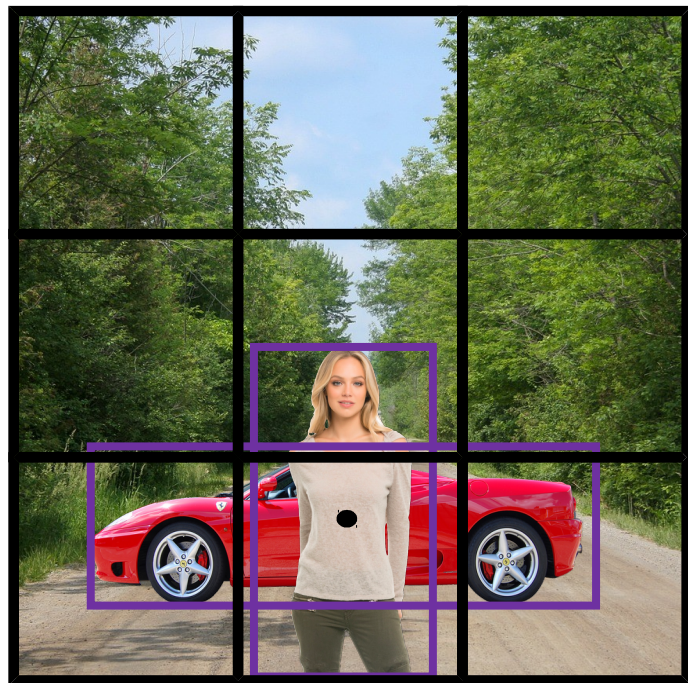


deeplearning.ai

Object Detection

Anchor
boxes

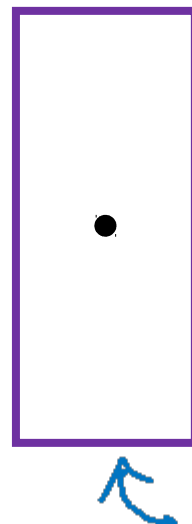
Overlapping objects:



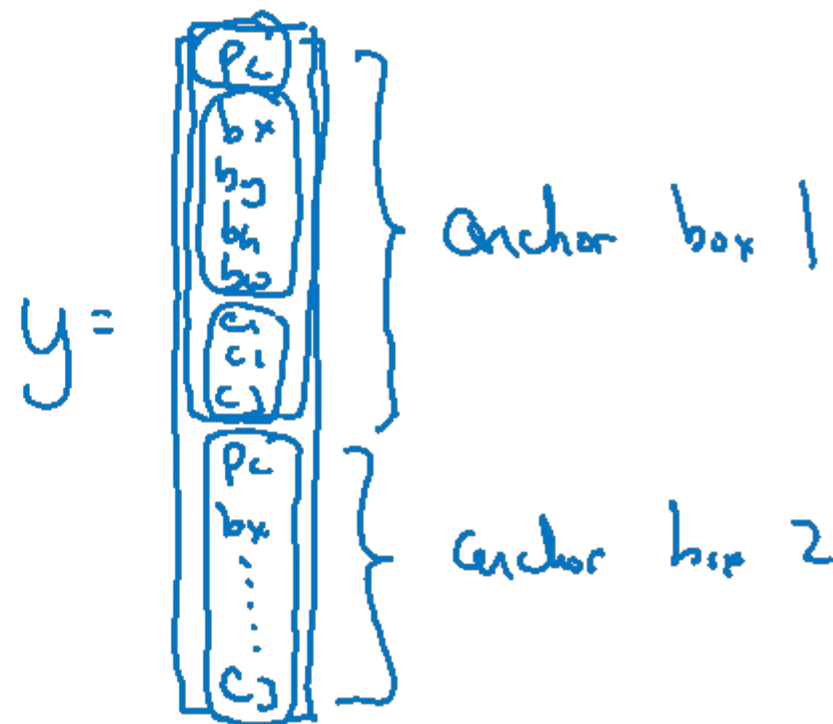
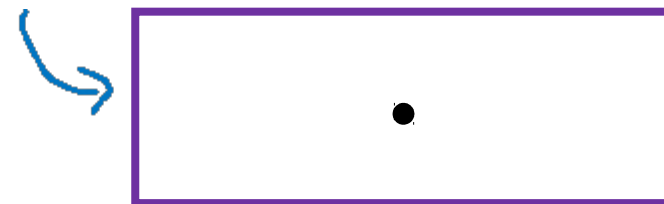
$$y = \begin{bmatrix} p_c \\ b_x \\ b_y \\ b_h \\ b_w \\ c_1 \\ c_2 \\ c_3 \end{bmatrix}$$

Handwritten blue arrows point from the labels p_c , b_x , b_y , b_h , and b_w to the corresponding elements in the vector y . A blue bracket groups the last three elements c_1 , c_2 , and c_3 .

Anchor box 1:



Anchor box 2:

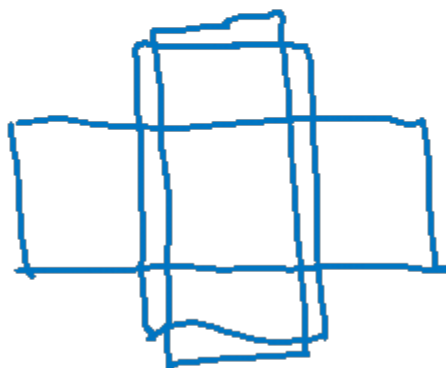


Anchor box algorithm

Previously:

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

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



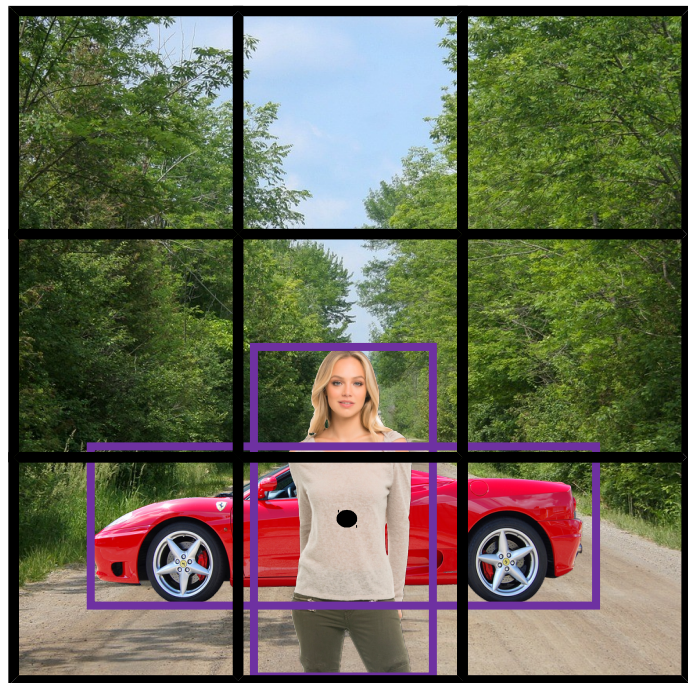
With two anchor boxes:

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.

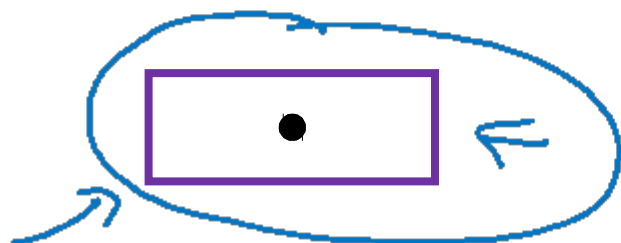
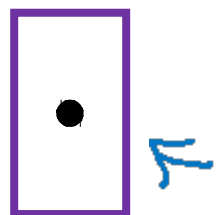
(grid cell, anchor box)

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

Anchor box example



Anchor box 1: Anchor box 2:



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

$$\begin{bmatrix} 1 \\ b_x \\ b_y \\ b_h \\ b_w \\ 0 \\ 0 \\ 0 \\ c_1 \\ c_2 \\ c_3 \end{bmatrix}$$

car only?

$$\begin{bmatrix} 0 \\ b_x \\ b_y \\ b_h \\ b_w \\ 0 \\ 0 \\ 0 \\ c_1 \\ c_2 \\ c_3 \end{bmatrix}$$

anchor box 1

anchor box 2