

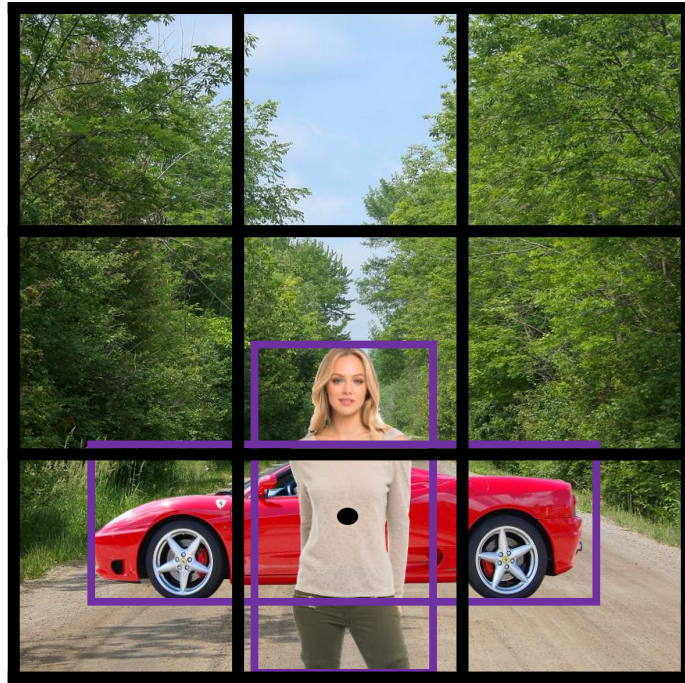


deeplearning.ai

Object Detection

Anchor boxes

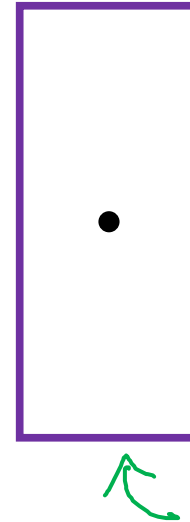
Overlapping objects:



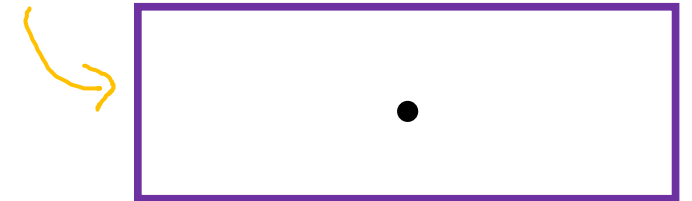
$$y = \begin{bmatrix} p_c \\ b_x \\ b_y \\ b_h \\ b_w \\ c_1 \\ c_2 \\ c_3 \end{bmatrix}$$

Handwritten annotations: A green arrow points to p_c , a blue arrow points to b_x , and a blue bracket groups c_1, c_2, c_3 .

Anchor box 1:



Anchor box 2:



$y =$

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

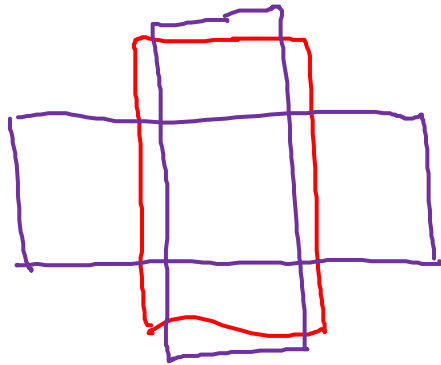
Handwritten annotations: A green box groups p_c, b_x, b_y, b_h, b_w and is labeled "Anchor box 1". A yellow box groups c_1, c_2, c_3 and is labeled "Anchor box 2". A blue bracket groups the entire vector y .

Anchor box algorithm

Previously:

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

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



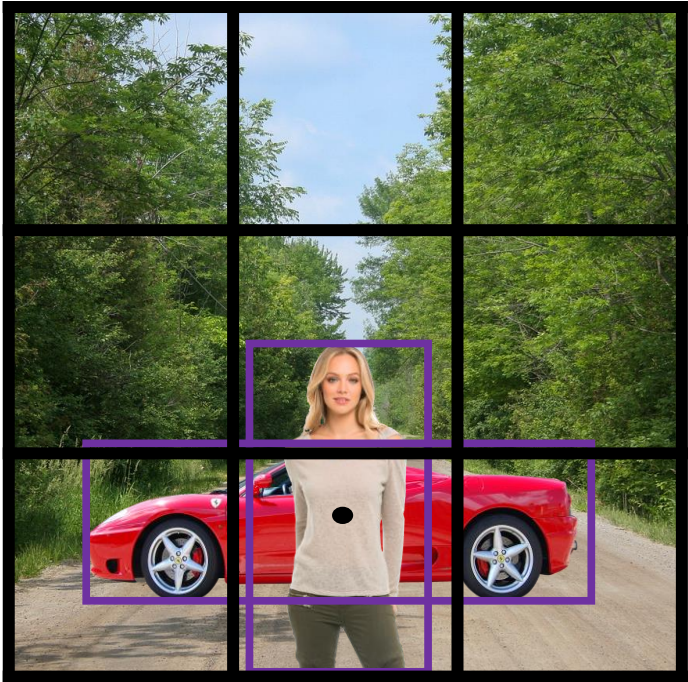
With two anchor boxes:

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.

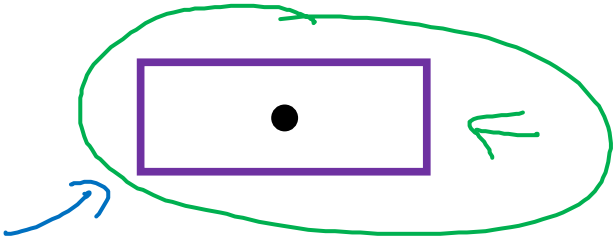
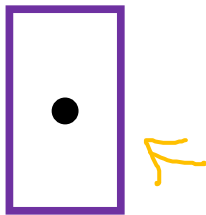
(grid cell, anchor box)

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

Anchor box example



Anchor box 1: Anchor box 2:



y =

p_c	1	car only?
b_x	b_x	
b_y	b_y	
b_h	b_h	
b_w	b_w	
c_1	1	
c_2	0	
c_3	0	
p_c	1	
b_x	b_x	
b_y	b_y	
b_h	b_h	
b_w	b_w	
c_1	0	
c_2	1	
c_3	0	

anchor box 1

anchor box 2