



deeplearning.ai

Object Detection

Object localization

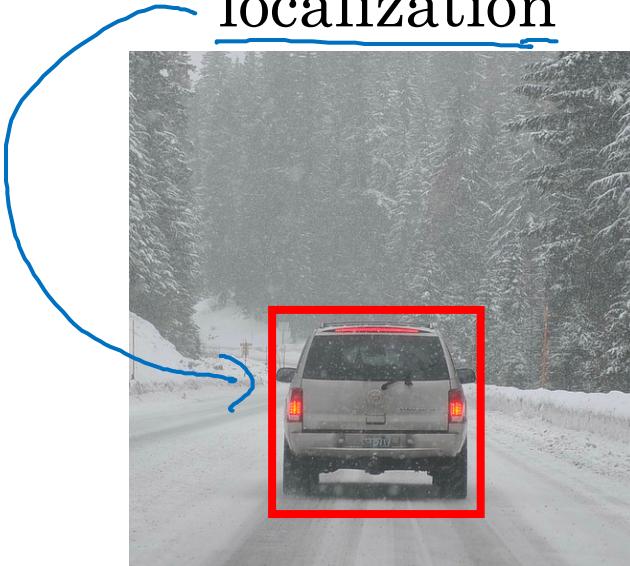
What are localization and detection?

Image classification



"Car"

Classification with
localization



"Car"

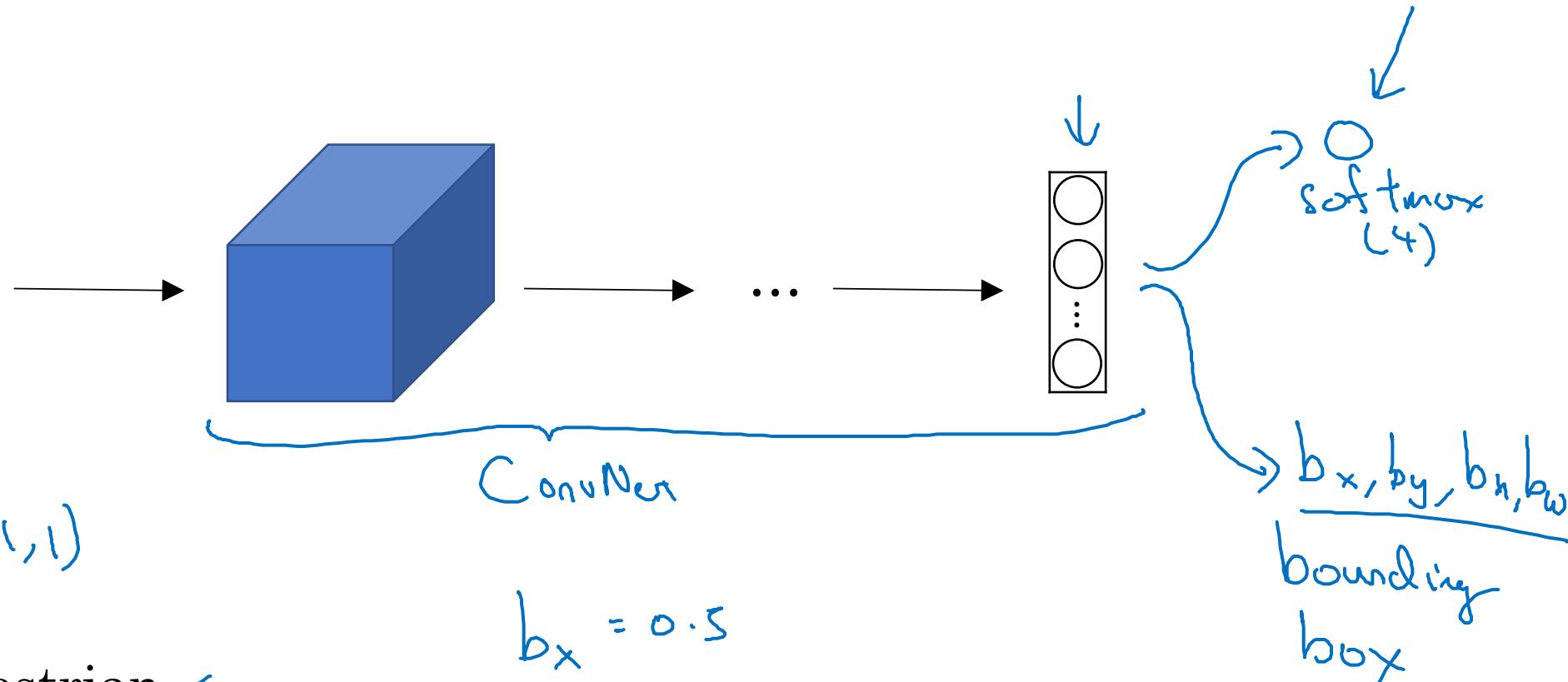
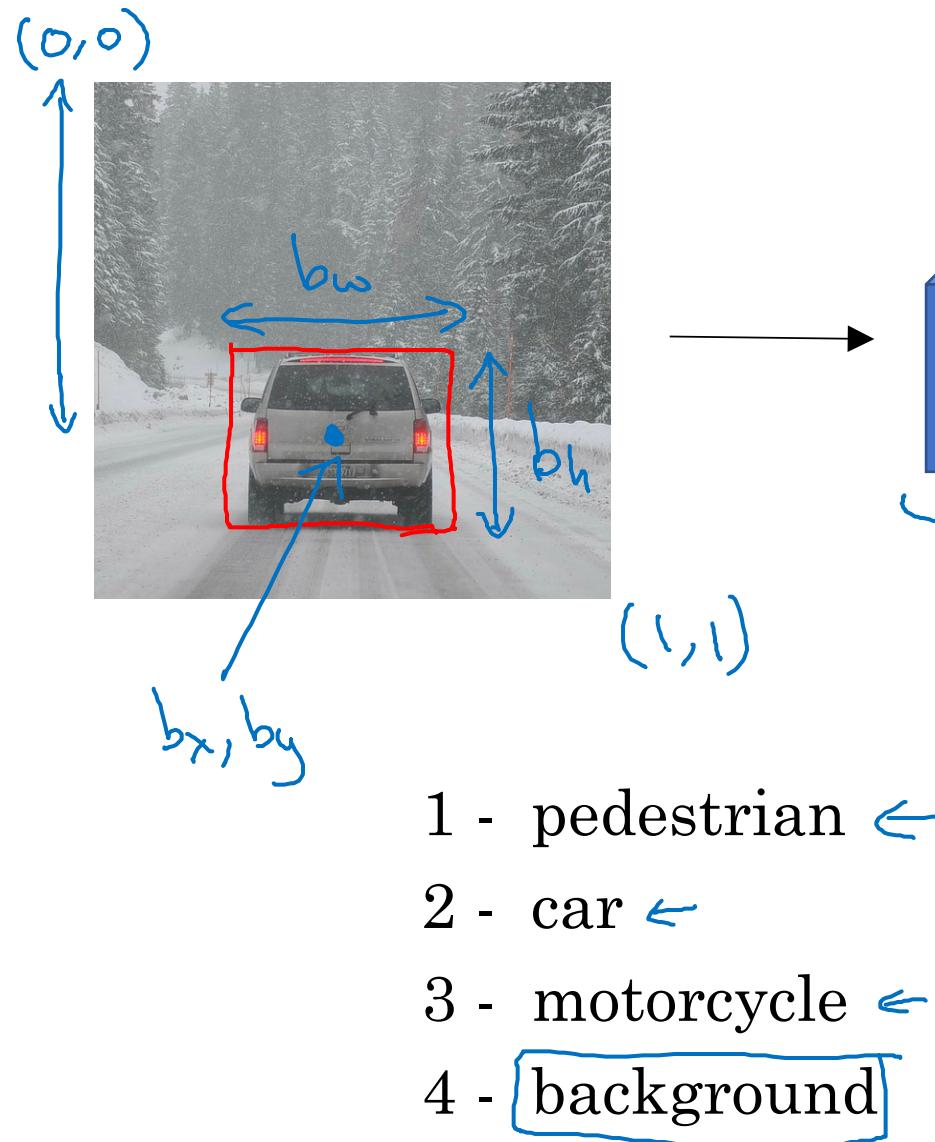
1 object

Detection



multiple
objects

Classification with localization



$$b_x = 0.5$$

$$b_y = 0.7$$

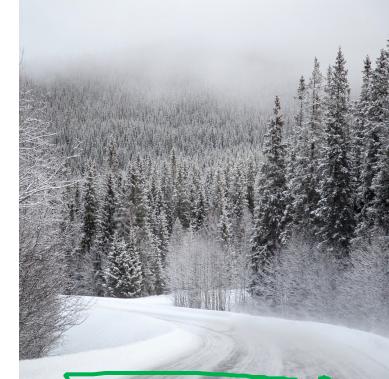
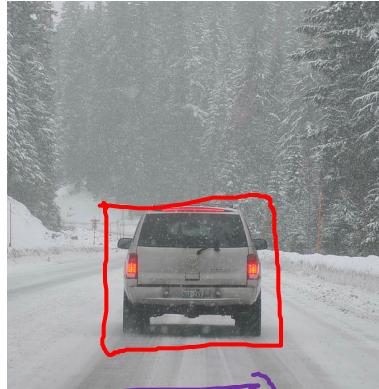
$$b_h = 0.3$$

$$b_w = 0.4$$

Defining the target label y

- 1 - pedestrian
- 2 - car 
- 3 - motorcycle
- 4 - background 

Need to output b_x, b_y, b_h, b_w , class label (1-4)

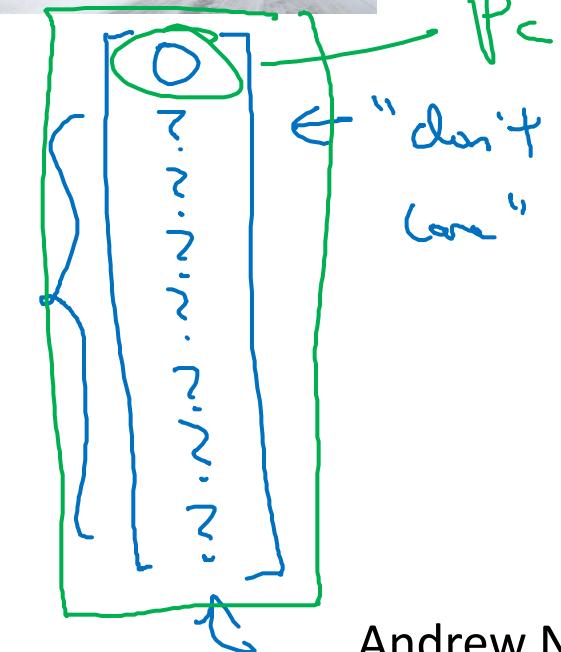
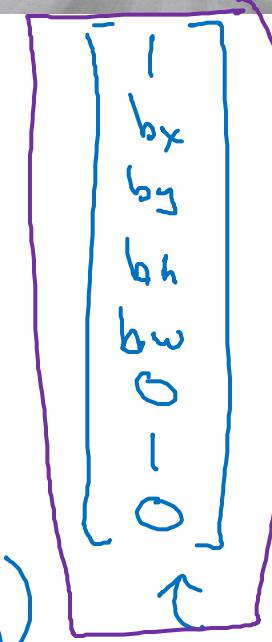


$x =$

$$L(\hat{y}, y) = \begin{cases} (\hat{y}_1 - y_1)^2 + (\hat{y}_2 - y_2)^2 \\ + \dots + (\hat{y}_8 - y_8)^2 & \text{if } \underline{y_1 = 1} \\ (\hat{y}_1 - y_1)^2 & \text{if } \underline{y_1 = 0} \end{cases}$$

$$y = \begin{bmatrix} p_c \\ b_x \\ b_y \\ b_h \\ b_w \\ c_1 \\ c_2 \\ c_3 \end{bmatrix} \quad \rightarrow \quad \left\{ \begin{array}{l} p_c \\ b_x \\ b_y \\ b_h \\ b_w \\ c_1 \\ c_2 \\ c_3 \end{array} \right\} \text{ is there any object?}$$

(x, y)



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