

## Object Detection

# Object localization

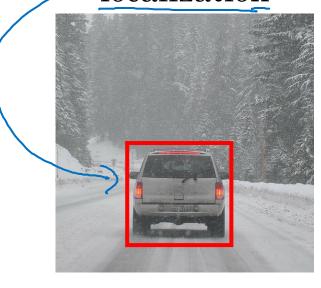
#### What are localization and detection?

Image classification



" Car"

Classification with localization

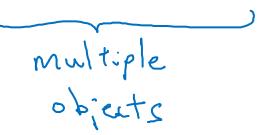


"Cw

bjert

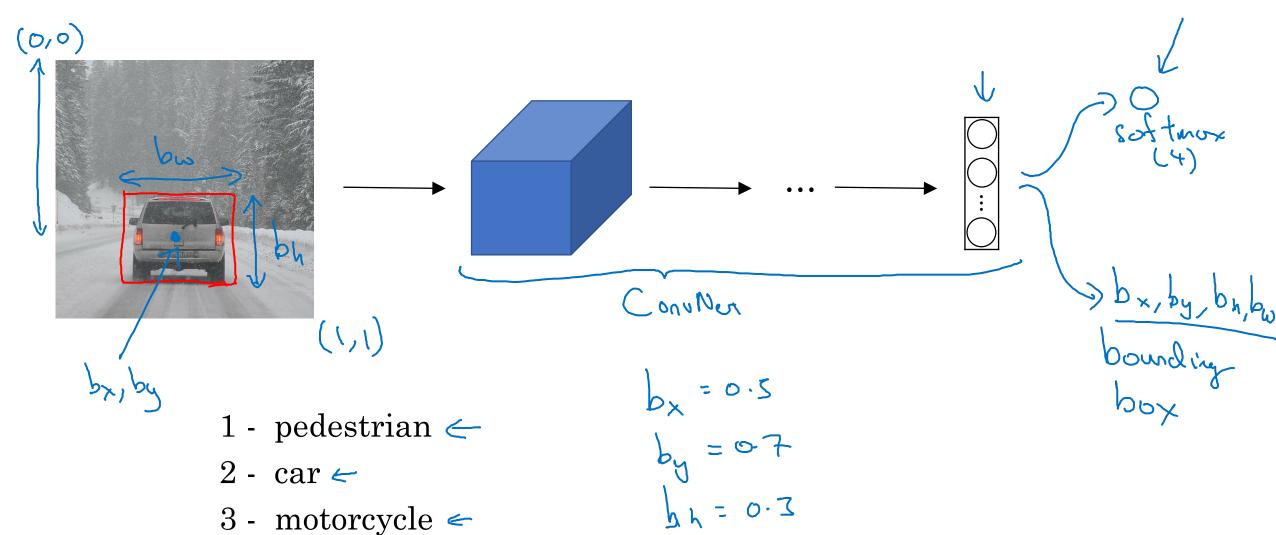
Detection





#### Classification with localization

4 - background



### Defining the target label y

- 1 pedestrian
- 2 car <
- 3 motorcycle
- 4 background  $\leftarrow$

$$\begin{cases}
(\dot{y}_{1}, y)^{2} \\
(\dot{y}_{1} - y_{1})^{2} + (\dot{y}_{2} - y_{2})^{2}
\end{cases}$$

$$+ ... + (\dot{y}_{8} - y_{8})^{2} \text{ if } y_{1} = 1$$

$$(\dot{y}_{1} - y_{1})^{2}$$

$$+ ... + (\dot{y}_{8} - y_{8})^{2}$$

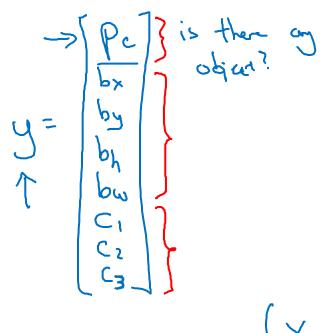
$$+ ... + (\dot{y}_{1} - y_{1})^{2}$$

$$+ ... + (\dot{y}_{1} - y_{2})^{2}$$

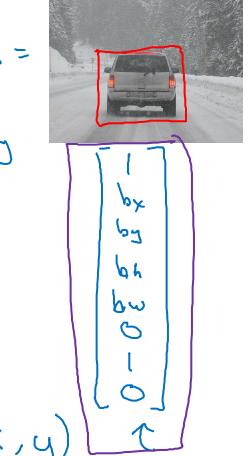
$$+ ... + (\dot{y}_{2} - y_{3})^{2}$$

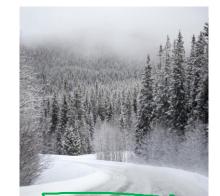
$$+ ... + (\dot{y}_{3} - y_{3})$$

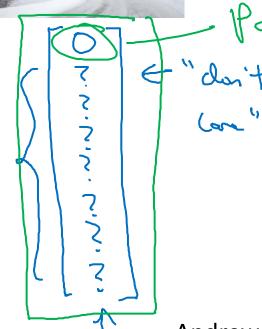
$$+$$



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







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