deeplearning.ai

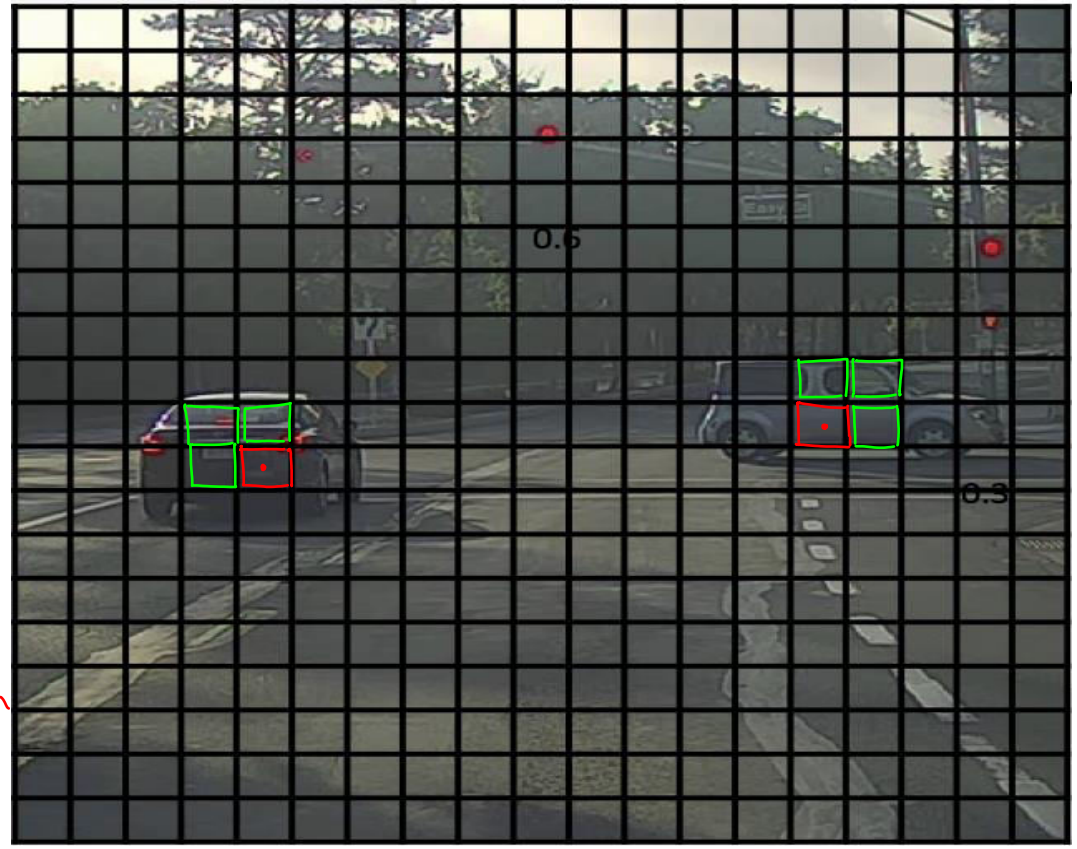
Object Detection

Non-max suppression

Non-max suppression example

Classic example - detect cars/pedestrians etc.

Non-max suppression example



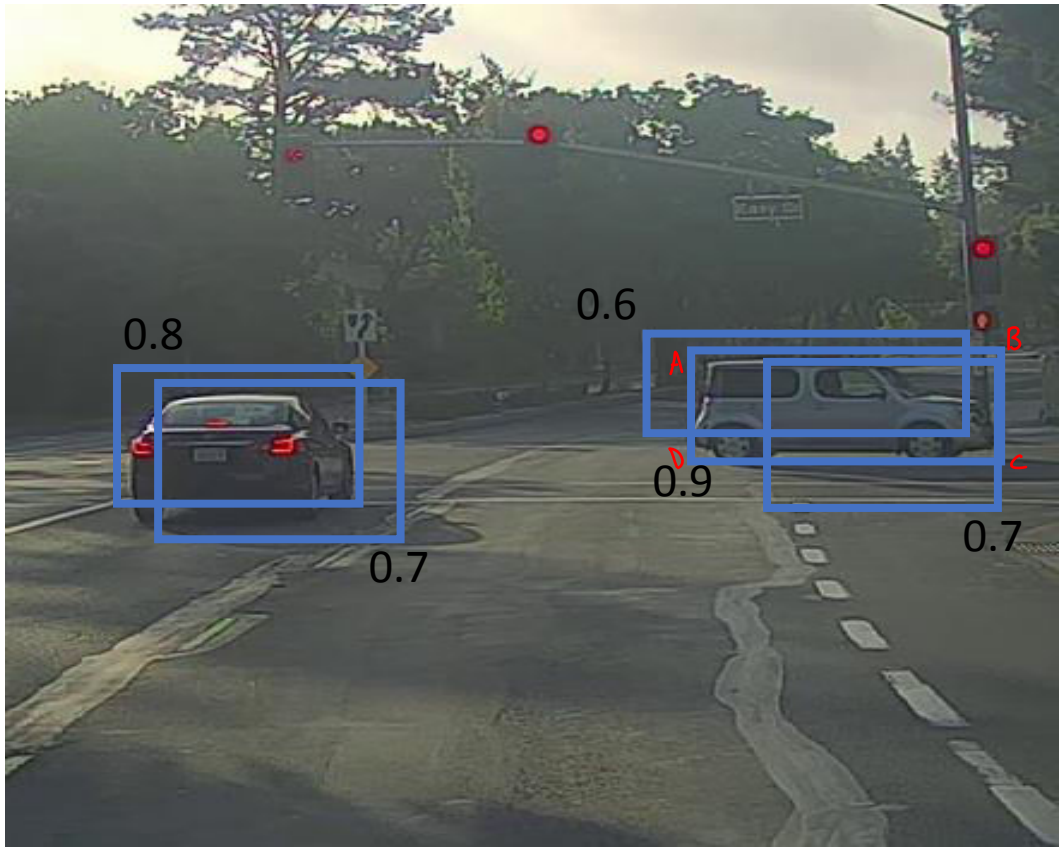
19 X 19 grid

⇒ You'll run object detection on 361 grid cells

- In this example, only 1 of the boxes has the mid point of the car as indicated by □
- But the surrounding boxes may also predict they have a car in them. ⇒ P_c values for each of the Red + Green Boxes will be high

⇒ You end up w/ multiple detections of each object (4 each in this case)

Non-max suppression example



- The many bounding boxes show that the Algo detected same object multiple times

- Non Max Suppression does the following:
  * It considers each of the bounding boxes and their P_c score, it takes the highest P_c score & says "that is my highest confidence prediction" (ground truth)
  * Then it performs an IoU (Intersection over Union) on the other boxes & all boxes w/ a high IoU get suppressed

Why?

High IoU Implies that the other boxes were trying to predict the same object

Which is what we're trying to Avoid!

We're trying to retain the ground truth & discard other similar preds.

We retain the 0.9 (ABCD) box & Remove 0.6 & 0.7 box

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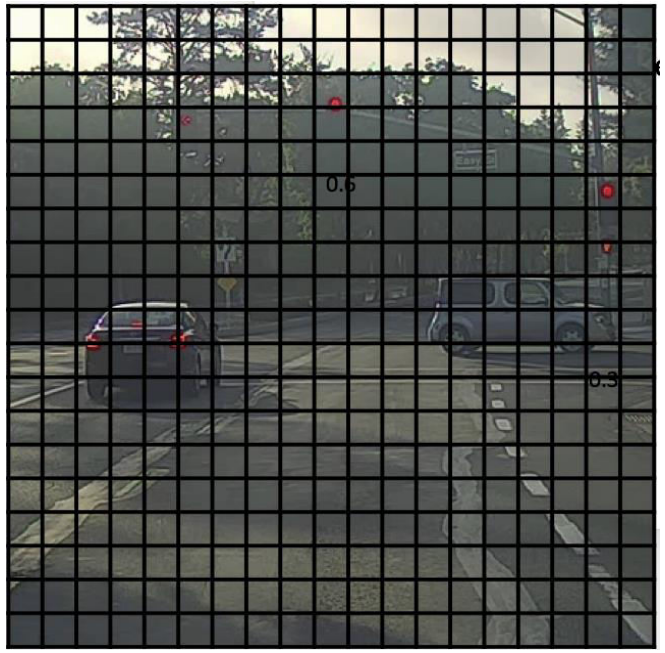
Non-max suppression algorithm



19× 19

Each output prediction is: $\begin{bmatrix} p_c \\ b_x \\ b_y \\ b_h \\ b_w \end{bmatrix}$ ⇒ o/p dim is 19×19×5

We dont predict c_1, c_2, c_3 classes

① Discard all boxes with $p_c \leq 0.6$

② While there are any remaining boxes: (19×19) times

- Pick the box with the largest p_c
  Output that as a prediction.
- Discard any remaining box with IoU ≥ 0.5 with the box output in the previous step

$y = \begin{bmatrix} p_c \\ b_x \\ b_y \\ b_H \\ b_W \\ c_1 \\ c_2 \\ c_3 \end{bmatrix}$ 19×19×8

← This time the Algo will out put

- This is done Assuming that There is only 1 object per box
- If there are potentially more, then you carry out the same Algo multiple time, each time looking for a specific object

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