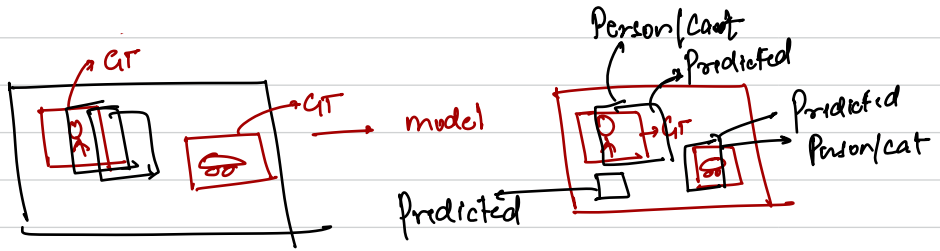


"How to measure the object detection model's accuracy
mean average Precision and Intersection over Union."

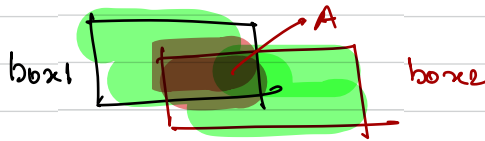
Precision = $TP / \text{all detections}$ Recall = $TP / \text{Ground Truths}$



Whenever we are evaluating object detection models.

- ① Class of the object we detect
- ② Location of the bounding box comparison

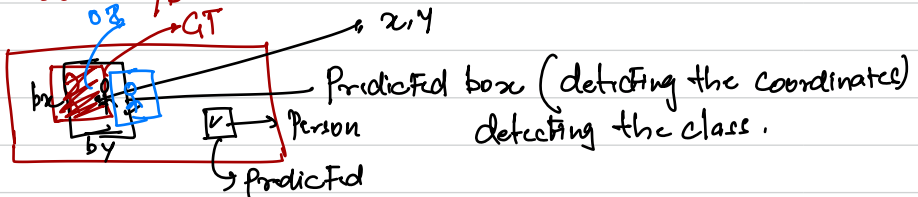
Intersection over Union



Red part (Intersection area) = A
Green part (Total area) = B

$$IoU = A / B$$

0.5



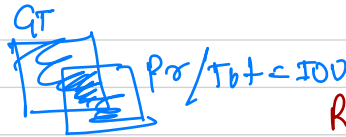
Per class (Person) Image level

Precision : $\frac{\text{True Positive}}{\text{all detections}} \rightarrow ??$

actual and predicted along

$\frac{1}{2}$

Predict Person Actual Person overlapping
if the IOU b/w the predicted box and the GT box $>$ threshold
C, TP



Recall = $TP / \text{Ground Truths}$

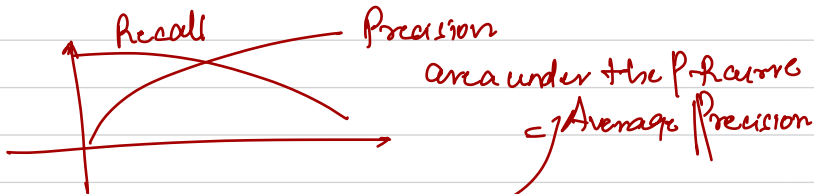
Precision of class Person = 0.5

IOU = 0.5

Recall of class Person = $\rightarrow 1 / \underline{1} = 1$

Person class

Threshold	IOU	Precision	Recall
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓



Person, Cat

$\left(\sum_{i=1}^k \frac{1}{k} |AP_i| \right) = \underline{\underline{map}}$ (we need to evaluate for all classes)

for multiple images

↳ class - person

Precision = TP / detections (Person class)

Recall = TP / Ground truths (Person class)



Class = cat → AP

↙
↘

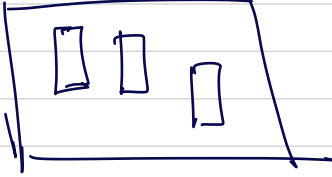
Class = → AP

↙
↘

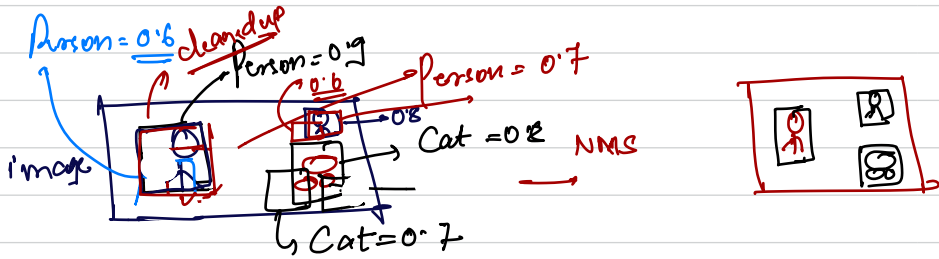
$$mAP = \frac{\sum_{i=1}^K AP_i}{K}$$

Non-max suppression

image



Given the region proposals
you detect multiple instances of
the same object



Cleanup process:

- Remove all prediction boxes with class probability < 0.7 .

① Choose one class

Person

② Find the predicted box which has the highest confidence \rightarrow max box = 0.9

③ Remove all boxes of the person class which have IoU > 0.5 with the max box.

④ Do the same thing for the cat class.

Yolo (You only look once)