mean Average Precision

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□ Note that

· An object detector produces a bounding box with a confidence score that represents its confidence about being an object.
· IoU, object category should be considered.

□ Procedure for computing mAP

● For all the testing images, gather all the bounding boxes (produced by an object detector with zero detection threshold for a confidence score), where each box has a confidence score. We will call the detection threshold *confidence threshold*.

● With ground-truth bounding boxes, choose true positive bounding boxes among the produced bounding boxes.
Q. How can we deal with bounding boxes overlapped with one certain ground-truth bounding boxes?
→ [4] says that "If multiple detections of the same object are detected, it counts the first one as positive while the rest as negatives.
→ Does it mean that the rest are just gone?

● Sort the produced bounding boxes according to the confidence score.

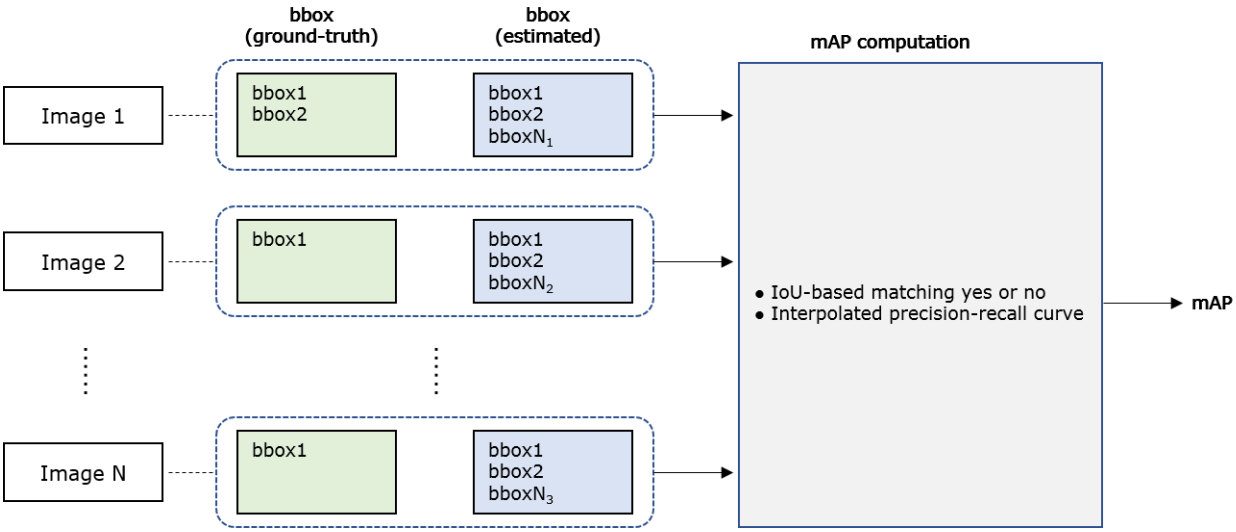
● Draw precision-recall curve, while varying the confidence threshold.

● Obtain the interpolated precision-recall curve, where the recall is [0.0, 1.0] with step 0.1.
Q. Why do we use the interpolated precision-recall curve?
→ In order to reduce wiggles in the curve.

● Compute average precision(AP) for one certain object category, by averaging the precisions at each 0.1 steps of recall, i.e., [0.0, 0.1, ⋯, 1.0].

● Compute mean AP from APs for all object category.

□ Software module



References

[1] mAP(Mean Average Precision) - Object Detection 성능 측정 지표
http://blog.naver.com/PostView.nhn?blogId=sogangori&logNo=221224276320#
(Written in Korean)

[2] mAP (Mean Average Precision) 정리
http://eehoeskrap.tistory.com/
(Written in Korean)

[3] Code linked in [2]
https://github.com/penny4860/object-detector/blob/master/object_detector/evaluate.py

[4] mAP (mean Average Precision) for Object Detection
https://medium.com/@jonathan_hui/map-mean-average-precision-for-object-detection-45c121a31173

[5] P. Henderson, et al., "End-to-end training of object class detectors for mean average precision

[6] M. Everingham, et al., "The PASCAL Visual Object Classes (VOC) Challenge", IJCV 2010