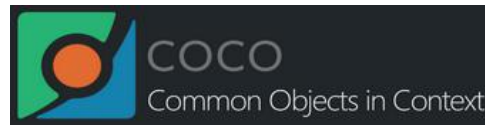


目标检测中常见指标

COCO Evaluation Result



Accumulating evaluation results...

DONE (t=3.40s).

IoU metric: bbox

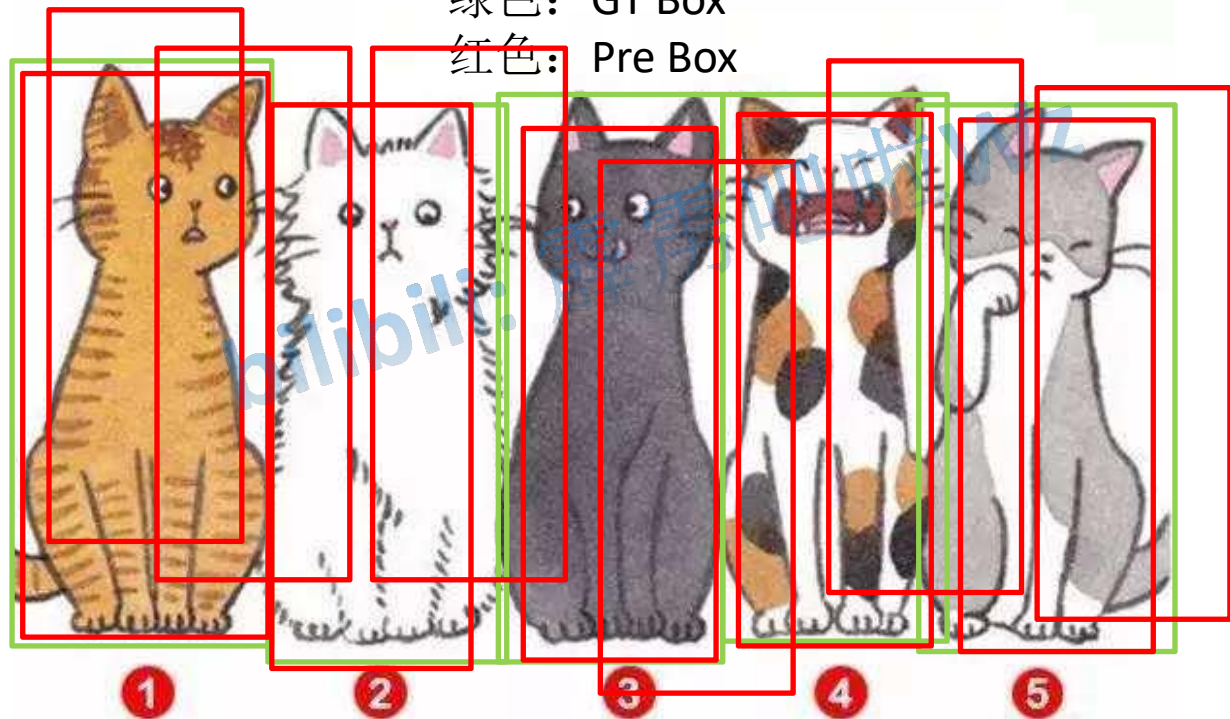
Average Precision	(AP) @[IoU=0.50:0.95 area= all maxDets=100]	= 0.526
Average Precision	(AP) @[IoU=0.50 area= all maxDets=100]	= 0.807
Average Precision	(AP) @[IoU=0.75 area= all maxDets=100]	= 0.590
Average Precision	(AP) @[IoU=0.50:0.95 area= small maxDets=100]	= 0.231
Average Precision	(AP) @[IoU=0.50:0.95 area=medium maxDets=100]	= 0.416
Average Precision	(AP) @[IoU=0.50:0.95 area= large maxDets=100]	= 0.579
Average Recall	(AR) @[IoU=0.50:0.95 area= all maxDets= 1]	= 0.452
Average Recall	(AR) @[IoU=0.50:0.95 area= all maxDets= 10]	= 0.633
Average Recall	(AR) @[IoU=0.50:0.95 area= all maxDets=100]	= 0.640
Average Recall	(AR) @[IoU=0.50:0.95 area= small maxDets=100]	= 0.342
Average Recall	(AR) @[IoU=0.50:0.95 area=medium maxDets=100]	= 0.539
Average Recall	(AR) @[IoU=0.50:0.95 area= large maxDets=100]	= 0.688

参考资料: <https://cocodataset.org/#detection-eval>

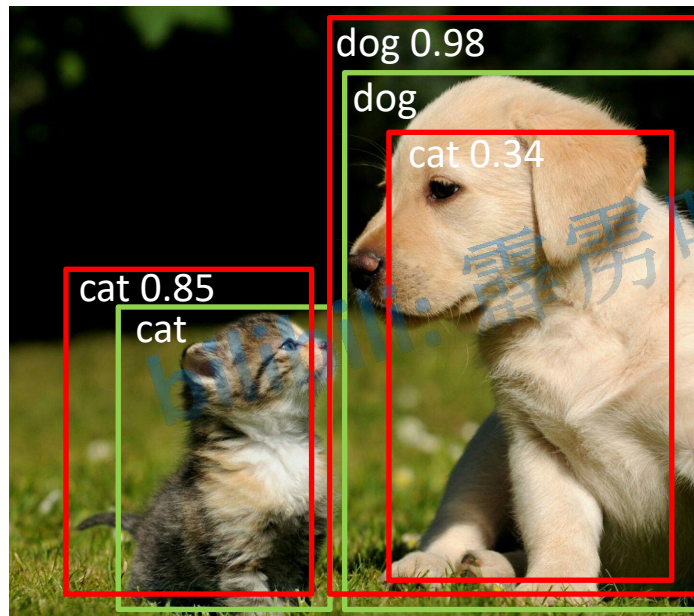
目标检测中常见指标

绿色：GT Box

红色：Pre Box



目标检测中常见指标



怎样才算检测正确？

- IOU大于指定阈值？
- 类别正确？
- confidence大于指定阈值？

目标检测中常见指标

TP(True Positive): IoU>0.5的检测框数量（同一Ground Truth只计算一次）

FP(False Positive): IoU≤0.5的检测框（或者是检测到同一个GT的多余检测框的数量）

FN(False Negative): 没有检测到的GT的数量

Precision: $TP / (TP + FP)$ 模型预测的所有目标中，预测正确的比例

查准率

Recall: $TP / (TP + FN)$ 所有真实目标中，模型预测正确的目标比例

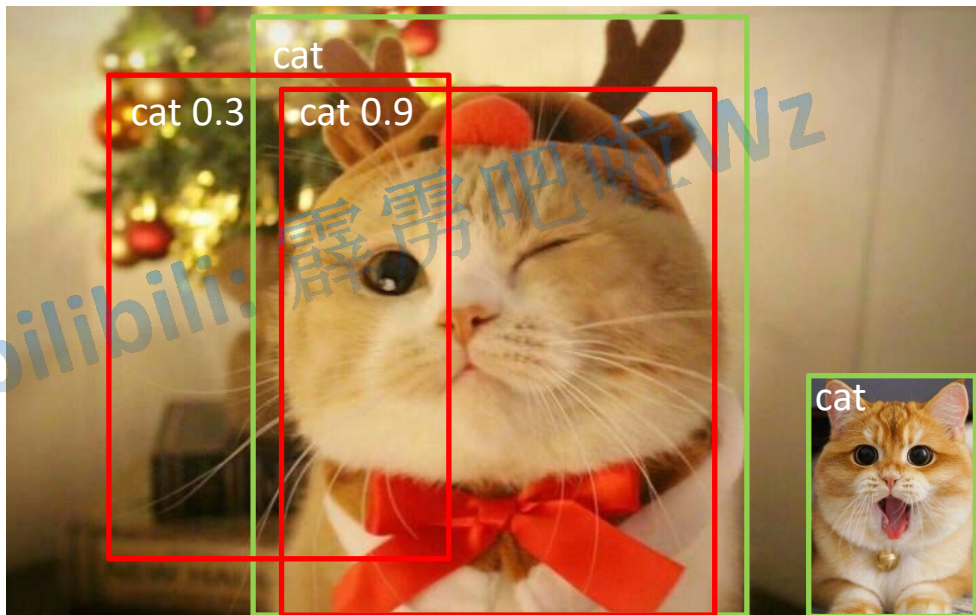
查全率

AP: P-R曲线下面积

P-R曲线: Precision-Recall曲线

mAP: mean Average Precision, 即各类别AP的平均值

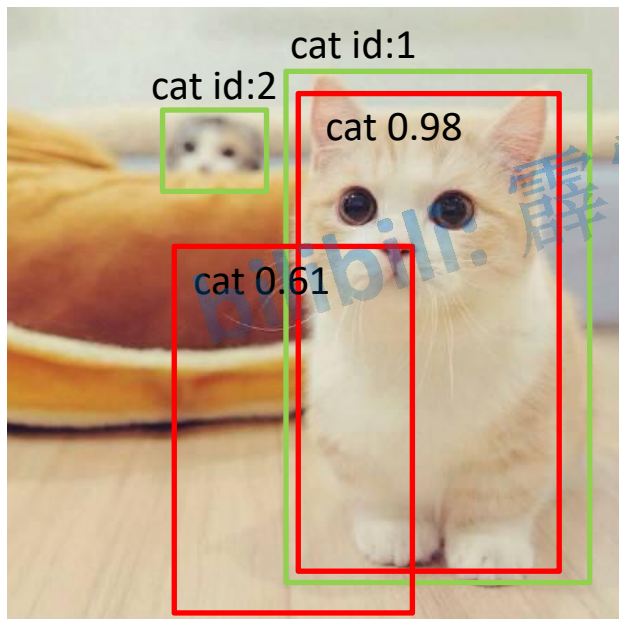
目标检测中常见指标



目标检测中常见指标



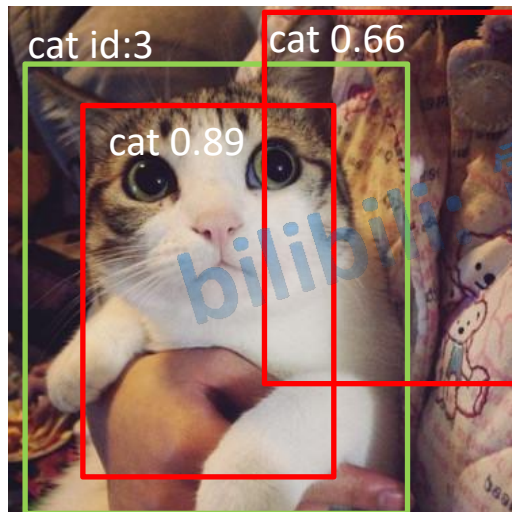
目标检测中常见指标



num_ob = 2

GT ID	Confidence	OB(IOUS=0.5)
1	0.98	True
1	0.61	False

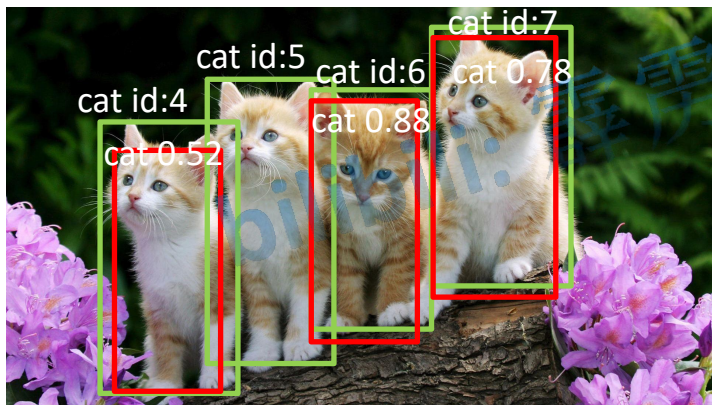
目标检测中常见指标



num_ob = 3

GTID	Confidence	OB(IOU=0.5)
1	0.98	True
3	0.89	True
3	0.66	False
1	0.61	False

目标检测中常见指标



num_ob = 7

GT ID	Confidence	OB(IOU=0.5)
1	0.98	True
3	0.89	True
6	0.88	True
7	0.78	True
3	0.66	False
1	0.61	False
4	0.52	True

目标检测中常见指标

num_ob = 7

GT ID	Confidence	OB(IOU=0.5)
1	0.98	True
3	0.89	True
6	0.88	True
7	0.78	True
3	0.66	False
1	0.61	False
4	0.52	True

Precision: $TP / (TP + FP)$ 查准率

Recall: $TP / (TP + FN)$ 查全率

TP=1; FP=0; FN=6

Rank	Precision	Recall
1	1.0	0.14

目标检测中常见指标

num_ob = 7

GT ID	Confidence	OB(IOU=0.5)
1	0.98	True
3	0.89	True
6	0.88	True
7	0.78	True
3	0.66	False
1	0.61	False
4	0.52	True

Precision: $TP / (TP + FP)$ 查准率

Recall: $TP / (TP + FN)$ 查全率

TP=2; FP=0; FN=5

Rank	Precision	Recall
1	1.0	0.14
2	1.0	0.28

目标检测中常见指标

num_ob = 7

GT ID	Confidence	OB(IOUS=0.5)
1	0.98	True
3	0.89	True
6	0.88	True
7	0.78	True
3	0.66	False
1	0.61	False
4	0.52	True

Precision: $TP / (TP + FP)$ 查准率

Recall: $TP / (TP + FN)$ 查全率

TP=3; FP=0; FN=4

Rank	Precision	Recall
1	1.0	0.14
2	1.0	0.28
3	1.0	0.42

目标检测中常见指标

num_ob = 7

GT ID	Confidence	OB(IOU=0.5)
1	0.98	True
3	0.89	True
6	0.88	True
7	0.78	True
3	0.66	False
1	0.61	False
4	0.52	True

Precision: $TP / (TP + FP)$ 查准率

Recall: $TP / (TP + FN)$ 查全率

TP=4; FP=0; FN=3

Rank	Precision	Recall
1	1.0	0.14
2	1.0	0.28
3	1.0	0.42
4	1.0	0.57

目标检测中常见指标

num_ob = 7

GT ID	Confidence	OB(IOU=0.5)
1	0.98	True
3	0.89	True
6	0.88	True
7	0.78	True
3	0.66	False
1	0.61	False
4	0.52	True

Precision: $TP / (TP + FP)$ 查准率

Recall: $TP / (TP + FN)$ 查全率

TP=4; FP=1; FN=3

Rank	Precision	Recall
1	1.0	0.14
2	1.0	0.28
3	1.0	0.42
4	1.0	0.57
5	0.80	0.57

目标检测中常见指标

num_ob = 7

GT ID	Confidence	OB(IOU=0.5)
1	0.98	True
3	0.89	True
6	0.88	True
7	0.78	True
3	0.66	False
1	0.61	False
4	0.52	True

Precision: $TP / (TP + FP)$ 查准率

Recall: $TP / (TP + FN)$ 查全率

TP=4; FP=2; FN=3

Rank	Precision	Recall
1	1.0	0.14
2	1.0	0.28
3	1.0	0.42
4	1.0	0.57
5	0.80	0.57
6	0.66	0.57

目标检测中常见指标

num_ob = 7

GT ID	Confidence	OB(IOU=0.5)
1	0.98	True
3	0.89	True
6	0.88	True
7	0.78	True
3	0.66	False
1	0.61	False
4	0.52	True

Precision: $TP / (TP + FP)$ 查准率

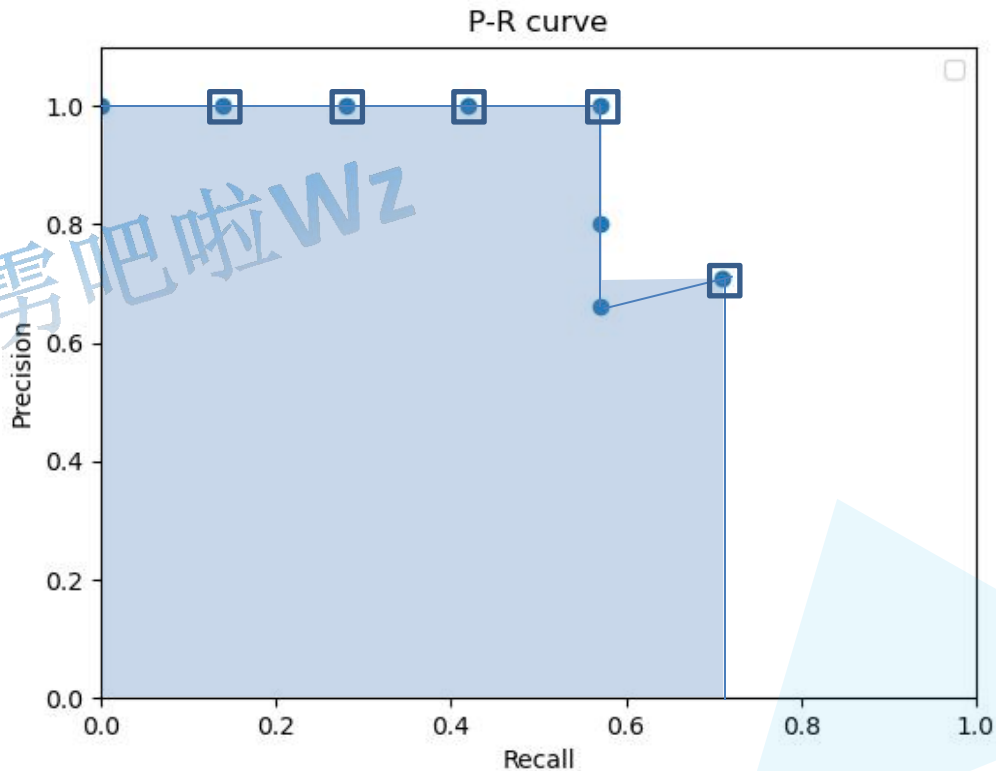
Recall: $TP / (TP + FN)$ 查全率

TP=5; FP=2; FN=2

Rank	Precision	Recall
1	1.0	0.14
2	1.0	0.28
3	1.0	0.42
4	1.0	0.57
5	0.80	0.57
6	0.66	0.57
7	0.71	0.71

目标检测中常见指标

Rank	Precision	Recall
1	1.0	0.14
2	1.0	0.28
3	1.0	0.42
4	1.0	0.57
5	0.80	0.57
6	0.66	0.57
7	0.71	0.71



$$(0.14 - 0) \times 1.0 + (0.28 - 0.14) \times 1.0 + (0.42 - 0.28) \times 1.0 + (0.57 - 0.42) \times 1.0 + (0.71 - 0.57) \times 0.71 = 0.6694$$

目标检测中常见指标

COCO Evaluation Result



Accumulating evaluation results...

DONE (t=3.40s).

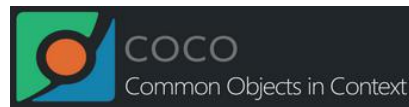
IoU metric: bbox

Average Precision	(AP) @[IoU=0.50:0.95 area=	all maxDets=100]	= 0.526
Average Precision	(AP) @[IoU=0.50 area=	all maxDets=100]	= 0.807
Average Precision	(AP) @[IoU=0.75 area=	all maxDets=100]	= 0.590
Average Precision	(AP) @[IoU=0.50:0.95 area=	small maxDets=100]	= 0.231
Average Precision	(AP) @[IoU=0.50:0.95 area=	medium maxDets=100]	= 0.416
Average Precision	(AP) @[IoU=0.50:0.95 area=	large maxDets=100]	= 0.579
Average Recall	(AR) @[IoU=0.50:0.95 area=	all maxDets= 1]	= 0.452
Average Recall	(AR) @[IoU=0.50:0.95 area=	all maxDets= 10]	= 0.633
Average Recall	(AR) @[IoU=0.50:0.95 area=	all maxDets=100]	= 0.640
Average Recall	(AR) @[IoU=0.50:0.95 area=	small maxDets=100]	= 0.342
Average Recall	(AR) @[IoU=0.50:0.95 area=	medium maxDets=100]	= 0.539
Average Recall	(AR) @[IoU=0.50:0.95 area=	large maxDets=100]	= 0.688

参考资料: <https://cocodataset.org/#detection-eval>

目标检测中常见指标

COCO Evaluation Result



Average Precision (AP):

AP % AP at IoU=.50:.05:.95 (primary challenge metric)
 $AP^{IoU=.50}$ % AP at IoU=.50 (PASCAL VOC metric)
 $AP^{IoU=.75}$ % AP at IoU=.75 (strict metric)

AP Across Scales:

AP^{small} % AP for small objects: area < 32^2
 AP^{medium} % AP for medium objects: $32^2 < \text{area} < 96^2$
 AP^{large} % AP for large objects: area > 96^2

Average Recall (AR):

$AR^{max=1}$ % AR given 1 detection per image
 $AR^{max=10}$ % AR given 10 detections per image
 $AR^{max=100}$ % AR given 100 detections per image

AR Across Scales:

AR^{small} % AR for small objects: area < 32^2
 AR^{medium} % AR for medium objects: $32^2 < \text{area} < 96^2$
 AR^{large} % AR for large objects: area > 96^2