

Aero2Astro

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Today I had started to training Faster Rcn with Detectron 2 framework. Totally trained upto 5600 itertaions and evaluated with both training and test data. Result looks good with compare to previous two model in less epochs.

Model -1 (PP-yolo v1)

ins = 1000

bs = 8

lr = 0.0002

Training Data:

```
Accumulating evaluation results...
DONE (t=0.85s).
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.454
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.751
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.499
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.359
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.588
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 ] = 0.173
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.479
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.580
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.498
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.699
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.710
[08/15 07:11:53] ppdet.metrics.coco_utils INFO: Per-category of bbox AP:
+-----+-----+-----+-----+-----+
| category | AP | category | AP | category | AP |
+-----+-----+-----+-----+-----+
| bird | 0.451 | book | 0.315 | bottle | 0.601 |
| car | 0.173 | chair | 0.616 | person | 0.567 |
+-----+-----+-----+-----+-----+
[08/15 07:11:53] ppdet.metrics.coco_utils INFO: per-category PR curve has output to bbox
[08/15 07:11:53] ppdet.engine INFO: Total sample number: 1093, average FPS: 18.4354342262
```

Test Data:

```
Accumulating evaluation results...
DONE (t=0.15s).
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.056
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.113
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.049
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.044
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.066
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.130
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.051
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.134
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.179
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.144
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.231
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.201
[08/13 14:25:45] ppdet.metrics.coco_utils INFO: Per-category of bbox AP:
+-----+-----+-----+-----+-----+
| category | AP | category | AP | category | AP |
+-----+-----+-----+-----+-----+
| bird | 0.146 | book | 0.007 | bottle | 0.175 |
| car | 0.007 | person | 0.000 | chair | 0.000 |
+-----+-----+-----+-----+-----+
[08/13 14:25:45] ppdet.metrics.coco_utils INFO: per-category PR curve has output to bbox_pr_curve folder.
[08/13 14:25:45] ppdet.engine INFO: Total sample number: 177, average FPS: 18.61171957113853
```

Model – 2 :(PP-Yolo v2)

ins = 500

bs = 8

lr = 0.0002

Training Data :

```
Accumulating evaluation results...
DONE (t=0.64s).
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.622
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.944
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.730
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.538
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.724
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.738
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.260
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.670
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.739
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.662
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.820
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.848
[08/17 12:37:24] ppdet.metrics.coco_utils INFO: Per-category of bbox AP:
+-----+-----+-----+-----+-----+
| category | AP | category | AP | category | AP |
+-----+-----+-----+-----+-----+
| aeroplane | 0.704 | car | 0.584 | chair | 0.644 |
| cow | 0.676 | person | 0.601 | traffic_light | 0.522 |
+-----+-----+-----+-----+-----+
[08/17 12:37:24] ppdet.metrics.coco_utils INFO: per-category PR curve has output to bbox_pr_curve
[08/17 12:37:24] ppdet.engine INFO: Total sample number: 689, average FPS: 11.880296439736922
```

Test data :

```
Accumulating evaluation results...
DONE (t=0.20s).
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.191
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.362
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.167
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.117
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.257
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.307
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.137
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.334
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.409
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.259
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.490
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.643
[08/17 12:34:19] ppdet.metrics.coco_utils INFO: Per-category of bbox AP:
+-----+-----+-----+-----+-----+
| category | AP | category | AP | category | AP |
+-----+-----+-----+-----+-----+
| aeroplane | 0.343 | car | 0.100 | chair | 0.132 |
| cow | 0.352 | person | 0.055 | traffic_light | 0.164 |
+-----+-----+-----+-----+-----+
[08/17 12:34:19] ppdet.metrics.coco_utils INFO: per-category PR curve has output to bbox_pr_curve
[08/17 12:34:19] ppdet.engine INFO: Total sample number: 190, average FPS: 5.877382970685596
```


Current Model:(Faster Rcnnc)

Backbone = Faster_rcnn_X_101_32x8d_FPN_3x

bs = 4

lr = 0.001

ins = 500

Train Data:

```
[08/18 13:16:39 d2.evaluation.fast_eval_api]: COCOeval opt.accumulate() finished in 0.05 seconds.
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.578
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.791
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.646
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.480
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.674
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.763
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.294
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.676
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.721
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.625
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.793
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.879
[08/18 13:16:39 d2.evaluation.coco_evaluation]: Evaluation results for bbox:
| AP | AP50 | AP75 | APs | APm | APl |
|-----|-----|-----|-----|-----|-----|
| 57.807 | 79.095 | 64.582 | 48.046 | 67.350 | 76.253 |
[08/18 13:16:39 d2.evaluation.coco_evaluation]: Per-category bbox AP:
| category | AP | category | AP | category | AP |
|-----|-----|-----|-----|-----|-----|
| aeroplane | 83.800 | car | 48.632 | chair | 59.314 |
| cow | 70.914 | person | 42.397 | traffic_light | 41.785 |
```

```
[08/18 13:16:39 d2.evaluation.evaluator]: Total inference time: 0:03:09.665885 (0.277289 s / iter per device, on 1 devices)
[08/18 13:16:39 d2.evaluation.evaluator]: Total inference pure compute time: 0:03:07 (0.274814 s / iter per device, on 1 devices)
```

Test Data:

```
[08/18 13:10:54 d2.evaluation.fast_eval_api]: COCOeval opt.accumulate() finished in 0.02 seconds.
Average Precision (AP) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.396
Average Precision (AP) @[ IoU=0.50 | area= all | maxDets=100 ] = 0.580
Average Precision (AP) @[ IoU=0.75 | area= all | maxDets=100 ] = 0.434
Average Precision (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.247
Average Precision (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.516
Average Precision (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.589
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 1 ] = 0.228
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets= 10 ] = 0.557
Average Recall (AR) @[ IoU=0.50:0.95 | area= all | maxDets=100 ] = 0.607
Average Recall (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.447
Average Recall (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.707
Average Recall (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.837
[08/18 13:10:54 d2.evaluation.coco_evaluation]: Evaluation results for bbox:
| AP | AP50 | AP75 | APs | APm | APl |
|-----|-----|-----|-----|-----|-----|
| 39.616 | 58.030 | 43.366 | 24.692 | 51.622 | 58.949 |
[08/18 13:10:54 d2.evaluation.coco_evaluation]: Per-category bbox AP:
| category | AP | category | AP | category | AP |
|-----|-----|-----|-----|-----|-----|
| aeroplane | 66.080 | car | 26.503 | chair | 32.564 |
| cow | 57.518 | person | 23.183 | traffic_light | 31.847 |
OrderedDict([('bbox',
```

```
[08/18 13:10:53 d2.evaluation.evaluator]: Total inference time: 0:00:52.227104 (0.282309 s / iter per device, on 1 devices)
[08/18 13:10:53 d2.evaluation.evaluator]: Total inference pure compute time: 0:00:51 (0.279476 s / iter per device, on 1 devices)
```

Notebook link :

https://github.com/Panneer003/Aero2astro_code/blob/main/Detectron_2/Detectron2_aug_18_500_ins.ipynb