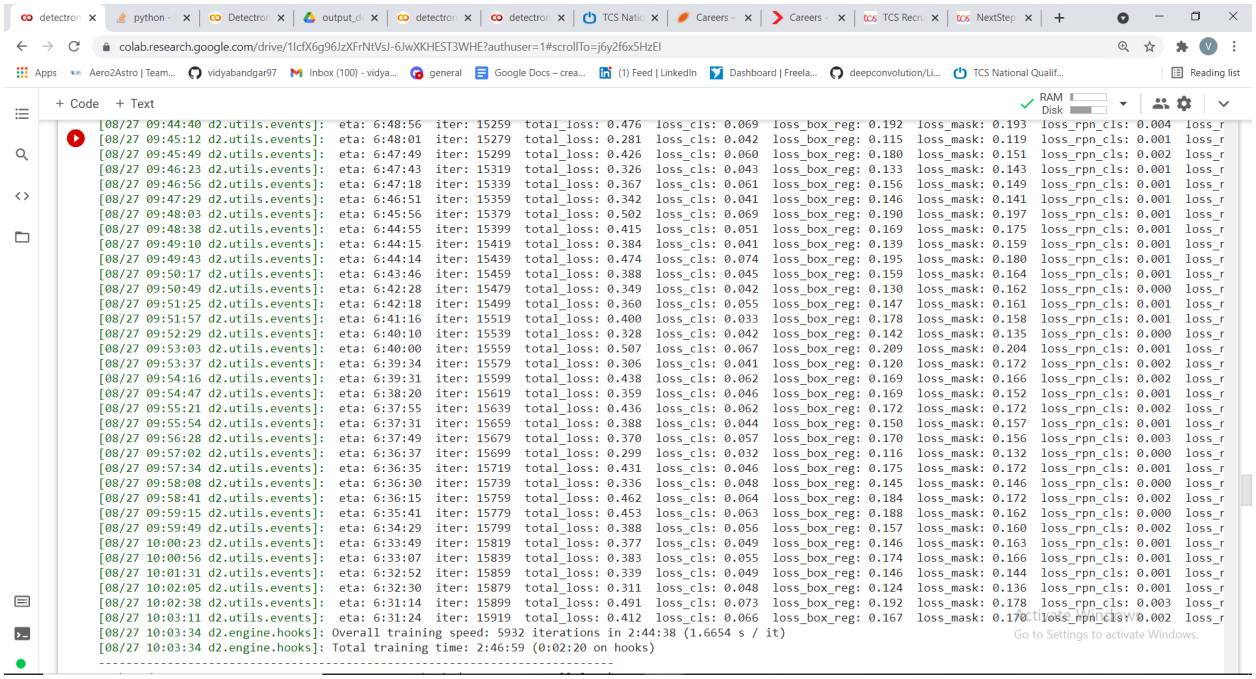
Work report

27 Aug 2021

Detectron2 for 500 instances
Deformable convolution (3x and 42.7 box AP)



1. Train evaluation:

```
 Average Precision  (AP) @[ IoU=0.50:0.95 | area=   all | maxDets=100 ] = 0.759
 Average Precision  (AP) @[ IoU=0.50      | area=   all | maxDets=100 ] = 0.962
 Average Precision  (AP) @[ IoU=0.75      | area=   all | maxDets=100 ] = 0.867
 Average Precision  (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.683
 Average Precision  (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.826
 Average Precision  (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.894
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=  1 ] = 0.316
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets= 10 ] = 0.778
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=100 ] = 0.808
 Average Recall     (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.735
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.871
 Average Recall     (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.935
[08/27 10:22:06 d2.evaluation.coco_evaluation]: Evaluation results for bbox:
|   AP   |  AP50  |  AP75  |  APs   |  APm   |  APl   |
|:------:|:------:|:------:|:------:|:------:|:------:|
| 75.933 | 96.238 | 86.674 | 68.259 | 82.620 | 89.433 |
[08/27 10:22:06 d2.evaluation.coco_evaluation]: Per-category bbox AP:
| category   | AP     | category   | AP     | category      | AP     |
|:-----------|:-------|:-----------|:-------|:--------------|:-------|
| aeroplane  | 90.811 | car        | 72.100 | chair         | 76.317 |
| cow        | 81.540 | person     | 75.195 | traffic_light | 59.638 |
```

2. Test evaluation:

```
 Average Precision  (AP) @[ IoU=0.50:0.95 | area=   all | maxDets=100 ] = 0.335
 Average Precision  (AP) @[ IoU=0.50      | area=   all | maxDets=100 ] = 0.506
 Average Precision  (AP) @[ IoU=0.75      | area=   all | maxDets=100 ] = 0.351
 Average Precision  (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.174
 Average Precision  (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.442
 Average Precision  (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.580
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=  1 ] = 0.204
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets= 10 ] = 0.471
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=100 ] = 0.495
 Average Recall     (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.320
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.577
 Average Recall     (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.777
[08/27 10:10:08 d2.evaluation.coco_evaluation]: Evaluation results for bbox:
|   AP   |  AP50  |  AP75  |  APs   |  APm   |  APl   |
|:------:|:------:|:------:|:------:|:------:|:------:|
| 33.535 | 50.591 | 35.133 | 17.360 | 44.175 | 57.989 |
[08/27 10:10:08 d2.evaluation.coco_evaluation]: Per-category bbox AP:
| category   | AP     | category   | AP     | category      | AP     |
|:-----------|:-------|:-----------|:-------|:--------------|:-------|
| aeroplane  | 54.622 | car        | 21.737 | chair         | 25.720 |
| cow        | 55.997 | person     | 17.900 | traffic_light | 25.232 |
```

yolov4 for 1000 instances.
Epochs 32303
Map
1.train

```
 calculation mAP (mean average precision)...
 Detection layer: 139 - type = 28
 Detection layer: 150 - type = 28
 Detection layer: 161 - type = 28
1192
 detections_count = 17173, unique_truth_count = 9852
class_id = 0, name = bird, ap = 85.69%          (TP = 359, FP = 106)
class_id = 1, name = book, ap = 78.50%          (TP = 788, FP = 199)
class_id = 2, name = bottle, ap = 95.00%        (TP = 946, FP = 80)
class_id = 3, name = car, ap = 90.15%           (TP = 4847, FP = 512)
class_id = 4, name = person, ap = 98.29%        (TP = 976, FP = 40)
class_id = 5, name = chair, ap = 96.68%         (TP = 960, FP = 50)

 for conf_thresh = 0.25, precision = 0.90, recall = 0.90, F1-score = 0.90
 for conf_thresh = 0.25, TP = 8876, FP = 987, FN = 976, average IoU = 77.70 %

 IoU threshold = 50 %, used Area-Under-Curve for each unique Recall
 mean average precision (mAP@0.50) = 0.907192, or 90.72 %
Total Detection Time: 683 Seconds
```

2. Test

```
 calculation mAP (mean average precision)...
 Detection layer: 139 - type = 28
 Detection layer: 150 - type = 28
 Detection layer: 161 - type = 28
180
 detections_count = 2164, unique_truth_count = 1995
class_id = 0, name = bird, ap = 12.87%           (TP = 31, FP = 25)
class_id = 1, name = book, ap = 0.09%            (TP = 1, FP = 72)
class_id = 2, name = bottle, ap = 12.56%         (TP = 39, FP = 50)
class_id = 3, name = car, ap = 4.83%     (TP = 126, FP = 294)
class_id = 4, name = chair, ap = 11.40%          (TP = 27, FP = 59)
class_id = 5, name = person, ap = 4.13%          (TP = 12, FP = 63)

 for conf_thresh = 0.25, precision = 0.30, recall = 0.12, F1-score = 0.17
 for conf_thresh = 0.25, TP = 236, FP = 563, FN = 1759, average IoU = 24.12 %

 IoU threshold = 50 %, used Area-Under-Curve for each unique Recall
 mean average precision (mAP@0.50) = 0.076448, or 7.64 %
Total Detection Time: 103 Seconds
```

Pp-yolo for 1000 instances

```
creating index...
index created!
Running per image evaluation...
Evaluate annotation type *bbox*
DONE (t=7.72s).
Accumulating evaluation results...
DONE (t=1.40s).
 Average Precision  (AP) @[ IoU=0.50:0.95 | area=   all | maxDets=100 ] = 0.039
 Average Precision  (AP) @[ IoU=0.50      | area=   all | maxDets=100 ] = 0.111
 Average Precision  (AP) @[ IoU=0.75      | area=   all | maxDets=100 ] = 0.017
 Average Precision  (AP) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.037
 Average Precision  (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.051
 Average Precision  (AP) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.031
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=  1 ] = 0.047
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets= 10 ] = 0.147
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=100 ] = 0.210
 Average Recall     (AR) @[ IoU=0.50:0.95 | area= small | maxDets=100 ] = 0.160
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=100 ] = 0.260
 Average Recall     (AR) @[ IoU=0.50:0.95 | area= large | maxDets=100 ] = 0.243
[08/14 05:42:22] ppdet.metrics.coco_utils INFO: Per-category of bbox AP:
+----------+-------+----------+-------+----------+-------+
| category | AP    | category | AP    | category | AP    |
+----------+-------+----------+-------+----------+-------+
| bird     | 0.011 | book     | 0.015 | bottle   | 0.124 |
| car      | 0.002 | chair    | 0.016 | person   | 0.064 |
+----------+-------+----------+-------+----------+-------+
[08/14 05:42:22] ppdet.metrics.coco_utils INFO: per-category PR curve has output to bbox_pr_curve folder.
[08/14 05:42:23] ppdet.engine INFO: Total sample number: 1093, averge FPS: 13.546782759184328
```