

Work report

27 Aug 2021

Detectron2 for 500 instances

Deformable convolution (3x and 42.7 box AP)

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colab.research.google.com/drive/1lcX6g9JzXfNtVsj-6JwXKHST3WHE?authuser=1#scrollTo=j6y2l6x5HzE1
+ Code + Text
[08/27 09:44:40 d2.utils.events]: eta: 6:48:56 iter: 15259 total_loss: 0.476 loss_cls: 0.069 loss_box_reg: 0.192 loss_mask: 0.193 loss_rpn_cls: 0.004 loss_r
[08/27 09:45:12 d2.utils.events]: eta: 6:48:01 iter: 15279 total_loss: 0.281 loss_cls: 0.042 loss_box_reg: 0.115 loss_mask: 0.119 loss_rpn_cls: 0.001 loss_r
[08/27 09:45:49 d2.utils.events]: eta: 6:47:49 iter: 15299 total_loss: 0.426 loss_cls: 0.060 loss_box_reg: 0.180 loss_mask: 0.151 loss_rpn_cls: 0.002 loss_r
[08/27 09:46:23 d2.utils.events]: eta: 6:47:43 iter: 15319 total_loss: 0.326 loss_cls: 0.043 loss_box_reg: 0.133 loss_mask: 0.143 loss_rpn_cls: 0.001 loss_r
[08/27 09:46:56 d2.utils.events]: eta: 6:47:18 iter: 15339 total_loss: 0.367 loss_cls: 0.061 loss_box_reg: 0.156 loss_mask: 0.149 loss_rpn_cls: 0.001 loss_r
[08/27 09:47:29 d2.utils.events]: eta: 6:46:51 iter: 15359 total_loss: 0.342 loss_cls: 0.041 loss_box_reg: 0.146 loss_mask: 0.141 loss_rpn_cls: 0.001 loss_r
[08/27 09:48:03 d2.utils.events]: eta: 6:45:56 iter: 15379 total_loss: 0.502 loss_cls: 0.069 loss_box_reg: 0.190 loss_mask: 0.197 loss_rpn_cls: 0.001 loss_r
[08/27 09:48:38 d2.utils.events]: eta: 6:44:55 iter: 15399 total_loss: 0.415 loss_cls: 0.051 loss_box_reg: 0.169 loss_mask: 0.175 loss_rpn_cls: 0.001 loss_r
[08/27 09:49:10 d2.utils.events]: eta: 6:44:15 iter: 15419 total_loss: 0.384 loss_cls: 0.041 loss_box_reg: 0.139 loss_mask: 0.159 loss_rpn_cls: 0.001 loss_r
[08/27 09:49:43 d2.utils.events]: eta: 6:44:14 iter: 15439 total_loss: 0.474 loss_cls: 0.074 loss_box_reg: 0.195 loss_mask: 0.180 loss_rpn_cls: 0.001 loss_r
[08/27 09:50:17 d2.utils.events]: eta: 6:43:46 iter: 15459 total_loss: 0.388 loss_cls: 0.045 loss_box_reg: 0.159 loss_mask: 0.164 loss_rpn_cls: 0.001 loss_r
[08/27 09:50:49 d2.utils.events]: eta: 6:42:28 iter: 15479 total_loss: 0.453 loss_cls: 0.042 loss_box_reg: 0.130 loss_mask: 0.162 loss_rpn_cls: 0.000 loss_r
[08/27 09:51:25 d2.utils.events]: eta: 6:42:18 iter: 15499 total_loss: 0.360 loss_cls: 0.055 loss_box_reg: 0.147 loss_mask: 0.161 loss_rpn_cls: 0.001 loss_r
[08/27 09:51:57 d2.utils.events]: eta: 6:41:16 iter: 15519 total_loss: 0.400 loss_cls: 0.033 loss_box_reg: 0.178 loss_mask: 0.158 loss_rpn_cls: 0.001 loss_r
[08/27 09:52:29 d2.utils.events]: eta: 6:40:10 iter: 15539 total_loss: 0.328 loss_cls: 0.042 loss_box_reg: 0.142 loss_mask: 0.135 loss_rpn_cls: 0.000 loss_r
[08/27 09:53:03 d2.utils.events]: eta: 6:40:00 iter: 15559 total_loss: 0.507 loss_cls: 0.067 loss_box_reg: 0.209 loss_mask: 0.204 loss_rpn_cls: 0.001 loss_r
[08/27 09:53:37 d2.utils.events]: eta: 6:39:34 iter: 15579 total_loss: 0.306 loss_cls: 0.041 loss_box_reg: 0.120 loss_mask: 0.172 loss_rpn_cls: 0.002 loss_r
[08/27 09:54:16 d2.utils.events]: eta: 6:39:31 iter: 15599 total_loss: 0.438 loss_cls: 0.062 loss_box_reg: 0.169 loss_mask: 0.166 loss_rpn_cls: 0.002 loss_r
[08/27 09:54:47 d2.utils.events]: eta: 6:38:20 iter: 15619 total_loss: 0.359 loss_cls: 0.046 loss_box_reg: 0.169 loss_mask: 0.152 loss_rpn_cls: 0.001 loss_r
[08/27 09:55:21 d2.utils.events]: eta: 6:37:55 iter: 15639 total_loss: 0.436 loss_cls: 0.062 loss_box_reg: 0.172 loss_mask: 0.172 loss_rpn_cls: 0.002 loss_r
[08/27 09:55:54 d2.utils.events]: eta: 6:37:31 iter: 15659 total_loss: 0.388 loss_cls: 0.044 loss_box_reg: 0.150 loss_mask: 0.157 loss_rpn_cls: 0.001 loss_r
[08/27 09:56:28 d2.utils.events]: eta: 6:37:49 iter: 15679 total_loss: 0.370 loss_cls: 0.057 loss_box_reg: 0.170 loss_mask: 0.156 loss_rpn_cls: 0.003 loss_r
[08/27 09:57:02 d2.utils.events]: eta: 6:36:37 iter: 15699 total_loss: 0.299 loss_cls: 0.032 loss_box_reg: 0.116 loss_mask: 0.132 loss_rpn_cls: 0.000 loss_r
[08/27 09:57:34 d2.utils.events]: eta: 6:36:35 iter: 15719 total_loss: 0.431 loss_cls: 0.046 loss_box_reg: 0.175 loss_mask: 0.172 loss_rpn_cls: 0.001 loss_r
[08/27 09:58:08 d2.utils.events]: eta: 6:36:30 iter: 15739 total_loss: 0.336 loss_cls: 0.048 loss_box_reg: 0.145 loss_mask: 0.146 loss_rpn_cls: 0.000 loss_r
[08/27 09:58:41 d2.utils.events]: eta: 6:36:15 iter: 15759 total_loss: 0.462 loss_cls: 0.064 loss_box_reg: 0.184 loss_mask: 0.172 loss_rpn_cls: 0.002 loss_r
[08/27 09:59:15 d2.utils.events]: eta: 6:35:41 iter: 15779 total_loss: 0.453 loss_cls: 0.063 loss_box_reg: 0.188 loss_mask: 0.162 loss_rpn_cls: 0.000 loss_r
[08/27 09:59:49 d2.utils.events]: eta: 6:34:29 iter: 15799 total_loss: 0.388 loss_cls: 0.056 loss_box_reg: 0.157 loss_mask: 0.160 loss_rpn_cls: 0.002 loss_r
[08/27 10:00:23 d2.utils.events]: eta: 6:33:49 iter: 15819 total_loss: 0.377 loss_cls: 0.049 loss_box_reg: 0.146 loss_mask: 0.163 loss_rpn_cls: 0.001 loss_r
[08/27 10:00:56 d2.utils.events]: eta: 6:33:07 iter: 15839 total_loss: 0.383 loss_cls: 0.055 loss_box_reg: 0.174 loss_mask: 0.166 loss_rpn_cls: 0.001 loss_r
[08/27 10:01:31 d2.utils.events]: eta: 6:32:52 iter: 15859 total_loss: 0.339 loss_cls: 0.049 loss_box_reg: 0.146 loss_mask: 0.144 loss_rpn_cls: 0.001 loss_r
[08/27 10:02:05 d2.utils.events]: eta: 6:32:30 iter: 15879 total_loss: 0.311 loss_cls: 0.048 loss_box_reg: 0.124 loss_mask: 0.136 loss_rpn_cls: 0.001 loss_r
[08/27 10:02:38 d2.utils.events]: eta: 6:31:14 iter: 15899 total_loss: 0.491 loss_cls: 0.073 loss_box_reg: 0.192 loss_mask: 0.178 loss_rpn_cls: 0.003 loss_r
[08/27 10:03:11 d2.utils.events]: eta: 6:31:24 iter: 15919 total_loss: 0.412 loss_cls: 0.066 loss_box_reg: 0.167 loss_mask: 0.176 loss_rpn_cls: 0.002 loss_r
[08/27 10:03:34 d2.engine.hooks]: Overall training speed: 5932 iterations in 2:44:38 (1.6654 s / it)
[08/27 10:03:34 d2.engine.hooks]: Total training time: 2:46:59 (0:02:20 on hooks)
```

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

```
DONE (t=0.57s)
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: PR curve has output to bbox_pr_curve folder.
[08/14 05:42:23] ppdet.engine INFO: Total sample number: 1093, average FPS: 13.546782759184328
```