

Aero2Astro
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Today i had trained Yolo v4 model upto 16600 epochs with jitter = 0.45. And also evaluated with both training ,val and test dataset.

Size: 608x608 (resized)

Threshold_IOU = 0.2

Train :

```
calculation mAP (mean average precision)...
Detection layer: 139 - type = 28
Detection layer: 150 - type = 28
Detection layer: 161 - type = 28
396
detections_count = 1341, unique_truth_count = 663
class_id = 0, name = tower_lattice, ap = 99.88%      (TP = 273, FP = 9)
class_id = 1, name = tower_tucohy, ap = 98.28%      (TP = 163, FP = 7)
class_id = 2, name = tower_wooden, ap = 99.13%      (TP = 212, FP = 6)

for conf_thresh = 0.25, precision = 0.97, recall = 0.98, F1-score = 0.97
for conf_thresh = 0.25, TP = 648, FP = 22, FN = 15, average IoU = 83.68 %

IoU threshold = 20 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.20) = 0.990981, or 99.10 %
Total Detection Time: 47 Seconds
```

Test:

```
Detection layer: 139 - type = 28
Detection layer: 150 - type = 28
Detection layer: 161 - type = 28
124
detections_count = 432, unique_truth_count = 202
class_id = 0, name = tower_lattice, ap = 90.08%      (TP = 76, FP = 7)
class_id = 1, name = tower_tucohy, ap = 87.96%      (TP = 39, FP = 7)
class_id = 2, name = tower_wooden, ap = 64.08%      (TP = 40, FP = 10)

for conf_thresh = 0.25, precision = 0.87, recall = 0.77, F1-score = 0.81
for conf_thresh = 0.25, TP = 155, FP = 24, FN = 47, average IoU = 68.31 %

IoU threshold = 20 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.20) = 0.807058, or 80.71 %
Total Detection Time: 15 Seconds
```

Val :

```
calculation mAP (mean average precision)...
Detection layer: 139 - type = 28
Detection layer: 150 - type = 28
Detection layer: 161 - type = 28
56
detections_count = 204, unique_truth_count = 103
class_id = 0, name = tower_lattice, ap = 86.04%      (TP = 34, FP = 6)
class_id = 1, name = tower_tucohy, ap = 84.00%      (TP = 12, FP = 4)
class_id = 2, name = tower_wooden, ap = 61.06%      (TP = 23, FP = 4)

for conf_thresh = 0.25, precision = 0.83, recall = 0.67, F1-score = 0.74
for conf_thresh = 0.25, TP = 69, FP = 14, FN = 34, average IoU = 66.75 %

IoU threshold = 20 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.20) = 0.770362, or 77.04 %
Total Detection Time: 6 Seconds
```

Threshold_IoU = 0.6

Train :

```
calculation mAP (mean average precision)...
Detection layer: 139 - type = 28
Detection layer: 150 - type = 28
Detection layer: 161 - type = 28
396
detections_count = 1341, unique_truth_count = 663
class_id = 0, name = tower_lattice, ap = 98.81%      (TP = 271, FP = 11)
class_id = 1, name = tower_tucohy, ap = 96.13%      (TP = 160, FP = 10)
class_id = 2, name = tower_wooden, ap = 97.60%      (TP = 210, FP = 8)

for conf_thresh = 0.25, precision = 0.96, recall = 0.97, F1-score = 0.96
for conf_thresh = 0.25, TP = 641, FP = 29, FN = 22, average IoU = 83.20 %

IoU threshold = 60 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.60) = 0.975126, or 97.51 %
Total Detection Time: 48 Seconds
```

Test:

```
calculation mAP (mean average precision)...
Detection layer: 139 - type = 28
Detection layer: 150 - type = 28
Detection layer: 161 - type = 28
124
detections_count = 432, unique_truth_count = 202
class_id = 0, name = tower_lattice, ap = 75.94%      (TP = 67, FP = 16)
class_id = 1, name = tower_tucohy, ap = 84.45%      (TP = 39, FP = 7)
class_id = 2, name = tower_wooden, ap = 46.08%      (TP = 32, FP = 18)

for conf_thresh = 0.25, precision = 0.77, recall = 0.68, F1-score = 0.72
for conf_thresh = 0.25, TP = 138, FP = 41, FN = 64, average IoU = 64.56 %

IoU threshold = 60 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.60) = 0.688250, or 68.82 %
Total Detection Time: 15 Seconds
```

Val :

```
calculation mAP (mean average precision)...
Detection layer: 139 - type = 28
Detection layer: 150 - type = 28
Detection layer: 161 - type = 28
56
detections_count = 204, unique_truth_count = 103
class_id = 0, name = tower_lattice, ap = 78.37%      (TP = 32, FP = 8)
class_id = 1, name = tower_tucohy, ap = 71.89%      (TP = 10, FP = 6)
class_id = 2, name = tower_wooden, ap = 44.83%      (TP = 20, FP = 7)

for conf_thresh = 0.25, precision = 0.75, recall = 0.60, F1-score = 0.67
for conf_thresh = 0.25, TP = 62, FP = 21, FN = 41, average IoU = 63.42 %

IoU threshold = 60 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.60) = 0.650291, or 65.03 %
Total Detection Time: 6 Seconds
```

Size : 700x700 (Original size)

Threshold_IoU = 0.2

Train :

```
calculation mAP (mean average precision)...
Detection layer: 139 - type = 28
Detection layer: 150 - type = 28
Detection layer: 161 - type = 28
396
detections_count = 1458, unique_truth_count = 663
class_id = 0, name = tower_lattice, ap = 99.57%      (TP = 269, FP = 16)
class_id = 1, name = tower_tucohy, ap = 96.34%      (TP = 154, FP = 5)
class_id = 2, name = tower_wooden, ap = 98.71%      (TP = 210, FP = 7)

for conf_thresh = 0.25, precision = 0.96, recall = 0.95, F1-score = 0.96
for conf_thresh = 0.25, TP = 633, FP = 28, FN = 30, average IoU = 79.80 %

IoU threshold = 20 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.20) = 0.982040, or 98.20 %
Total Detection Time: 69 Seconds
```

Test:

```
calculation mAP (mean average precision)...
Detection layer: 139 - type = 28
Detection layer: 150 - type = 28
Detection layer: 161 - type = 28
124
detections_count = 469, unique_truth_count = 202
class_id = 0, name = tower_lattice, ap = 89.06%      (TP = 79, FP = 9)
class_id = 1, name = tower_tucohy, ap = 86.12%      (TP = 35, FP = 7)
class_id = 2, name = tower_wooden, ap = 66.07%      (TP = 32, FP = 8)

for conf_thresh = 0.25, precision = 0.86, recall = 0.72, F1-score = 0.78
for conf_thresh = 0.25, TP = 146, FP = 24, FN = 56, average IoU = 68.28 %

IoU threshold = 20 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.20) = 0.804147, or 80.41 %
Total Detection Time: 21 Seconds
```

Val :

```
calculation mAP (mean average precision)...
Detection layer: 139 - type = 28
Detection layer: 150 - type = 28
Detection layer: 161 - type = 28
56
detections_count = 206, unique_truth_count = 103
class_id = 0, name = tower_lattice, ap = 84.96%      (TP = 33, FP = 7)
class_id = 1, name = tower_tucohy, ap = 83.25%      (TP = 13, FP = 6)
class_id = 2, name = tower_wooden, ap = 59.06%      (TP = 23, FP = 5)

for conf_thresh = 0.25, precision = 0.79, recall = 0.67, F1-score = 0.73
for conf_thresh = 0.25, TP = 69, FP = 18, FN = 34, average IoU = 62.22 %

IoU threshold = 20 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.20) = 0.757573, or 75.76 %
Total Detection Time: 9 Seconds
```

Threshold_IOU = 0.6

Train :

```
calculation mAP (mean average precision)...
Detection layer: 139 - type = 28
Detection layer: 150 - type = 28
Detection layer: 161 - type = 28
396
detections_count = 1458, unique_truth_count = 663
class_id = 0, name = tower_lattice, ap = 96.69%      (TP = 263, FP = 22)
class_id = 1, name = tower_tucohy, ap = 84.71%      (TP = 141, FP = 18)
class_id = 2, name = tower_wooden, ap = 89.65%      (TP = 193, FP = 24)

for conf_thresh = 0.25, precision = 0.90, recall = 0.90, F1-score = 0.90
for conf_thresh = 0.25, TP = 597, FP = 64, FN = 66, average IoU = 77.43 %

IoU threshold = 60 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.60) = 0.903507, or 90.35 %
Total Detection Time: 67 Seconds
```

Test :

```
calculation mAP (mean average precision)...
Detection layer: 139 - type = 28
Detection layer: 150 - type = 28
Detection layer: 161 - type = 28
124
detections_count = 469, unique_truth_count = 202
class_id = 0, name = tower_lattice, ap = 75.59%      (TP = 69, FP = 19)
class_id = 1, name = tower_tucohy, ap = 83.06%      (TP = 35, FP = 7)
class_id = 2, name = tower_wooden, ap = 40.47%      (TP = 25, FP = 15)

for conf_thresh = 0.25, precision = 0.76, recall = 0.64, F1-score = 0.69
for conf_thresh = 0.25, TP = 129, FP = 41, FN = 73, average IoU = 63.91 %

IoU threshold = 60 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.60) = 0.663714, or 66.37 %
Total Detection Time: 22 Seconds
```

Val :

```
Calculation mAP (mean average precision)...\nDetection layer: 139 - type = 28\nDetection layer: 150 - type = 28\nDetection layer: 161 - type = 28\n56\n  detections_count = 206, unique_truth_count = 103\n  class_id = 0, name = tower_lattice, ap = 73.25%          (TP = 29, FP = 11)\n  class_id = 1, name = tower_tuohy, ap = 79.80%          (TP = 11, FP = 8)\n  class_id = 2, name = tower_wooden, ap = 49.98%          (TP = 21, FP = 7)\n\n  for conf_thresh = 0.25, precision = 0.70, recall = 0.59, F1-score = 0.64\n  for conf_thresh = 0.25, TP = 61, FP = 26, FN = 42, average IoU = 58.49 %\n\n  IoU threshold = 60 %, used Area-Under-Curve for each unique Recall\n  mean average precision (mAP@0.60) = 0.676758, or 67.68 %\n  Total Detection Time: 10 Seconds
```