

Aero2Astro
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Today i had trained Yolo v4 model upto 20000 epochs. And also evaluated with both train and test dataset.

Train :

Threshold_IoU = 0.2

```
calculation mAP (mean average precision)...
Detection layer: 139 - type = 28
Detection layer: 150 - type = 28
Detection layer: 161 - type = 28
396
detections_count = 1259, unique_truth_count = 663
class_id = 0, name = tower_lattice, ap = 99.90%      (TP = 274, FP = 11)
class_id = 1, name = tower_tucohy, ap = 98.56%      (TP = 161, FP = 5)
class_id = 2, name = tower_wooden, ap = 99.51%      (TP = 214, FP = 14)

for conf_thresh = 0.25, precision = 0.96, recall = 0.98, F1-score = 0.97
for conf_thresh = 0.25, TP = 649, FP = 30, FN = 14, average IoU = 83.35 %

IoU threshold = 20 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.20) = 0.993221, or 99.32 %
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 = 430, unique_truth_count = 202
class_id = 0, name = tower_lattice, ap = 85.66%      (TP = 76, FP = 11)
class_id = 1, name = tower_tucohy, ap = 77.71%      (TP = 35, FP = 12)
class_id = 2, name = tower_wooden, ap = 63.28%      (TP = 36, FP = 8)

for conf_thresh = 0.25, precision = 0.83, recall = 0.73, F1-score = 0.77
for conf_thresh = 0.25, TP = 147, FP = 31, FN = 55, average IoU = 65.98 %

IoU threshold = 20 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.20) = 0.755472, or 75.55 %
Total Detection Time: 20 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 = 222, unique_truth_count = 103
class_id = 0, name = tower_lattice, ap = 82.32%      (TP = 34, FP = 6)
class_id = 1, name = tower_tucohy, ap = 80.20%      (TP = 11, FP = 9)
class_id = 2, name = tower_wooden, ap = 60.42%      (TP = 23, FP = 6)

for conf_thresh = 0.25, precision = 0.76, recall = 0.66, F1-score = 0.71
for conf_thresh = 0.25, TP = 68, FP = 21, FN = 35, average IoU = 61.99 %

IoU threshold = 20 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.20) = 0.743141, or 74.31 %
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 = 1259, unique_truth_count = 663
class_id = 0, name = tower_lattice, ap = 99.16%      (TP = 272, FP = 13)
class_id = 1, name = tower_tucohy, ap = 96.00%      (TP = 158, FP = 8)
class_id = 2, name = tower_wooden, ap = 97.17%      (TP = 211, FP = 17)

for conf_thresh = 0.25, precision = 0.94, recall = 0.97, F1-score = 0.96
for conf_thresh = 0.25, TP = 641, FP = 38, FN = 22, average IoU = 82.80 %

IoU threshold = 60 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.60) = 0.974436, or 97.44 %
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 = 430, unique_truth_count = 202
class_id = 0, name = tower_lattice, ap = 68.16%      (TP = 65, FP = 22)
class_id = 1, name = tower_tucohy, ap = 72.43%      (TP = 34, FP = 13)
class_id = 2, name = tower_wooden, ap = 40.98%      (TP = 29, FP = 15)

for conf_thresh = 0.25, precision = 0.72, recall = 0.63, F1-score = 0.67
for conf_thresh = 0.25, TP = 128, FP = 50, FN = 74, average IoU = 61.59 %

IoU threshold = 60 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.60) = 0.605242, or 60.52 %
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 = 222, unique_truth_count = 103
class_id = 0, name = tower_lattice, ap = 74.21%      (TP = 31, FP = 9)
class_id = 1, name = tower_tucohy, ap = 66.02%      (TP = 10, FP = 10)
class_id = 2, name = tower_wooden, ap = 48.01%      (TP = 21, FP = 8)

for conf_thresh = 0.25, precision = 0.70, recall = 0.60, F1-score = 0.65
for conf_thresh = 0.25, TP = 62, FP = 27, FN = 41, average IoU = 58.59 %

IoU threshold = 60 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.60) = 0.627494, or 62.75 %
Total Detection Time: 9 Seconds
```

Detection Result : At 19600 epochs.
Threshold_detection = 0.2
Image : 08_1725.jpg



Tree is classified as wooden tower.

Image : 14_00051.jpg



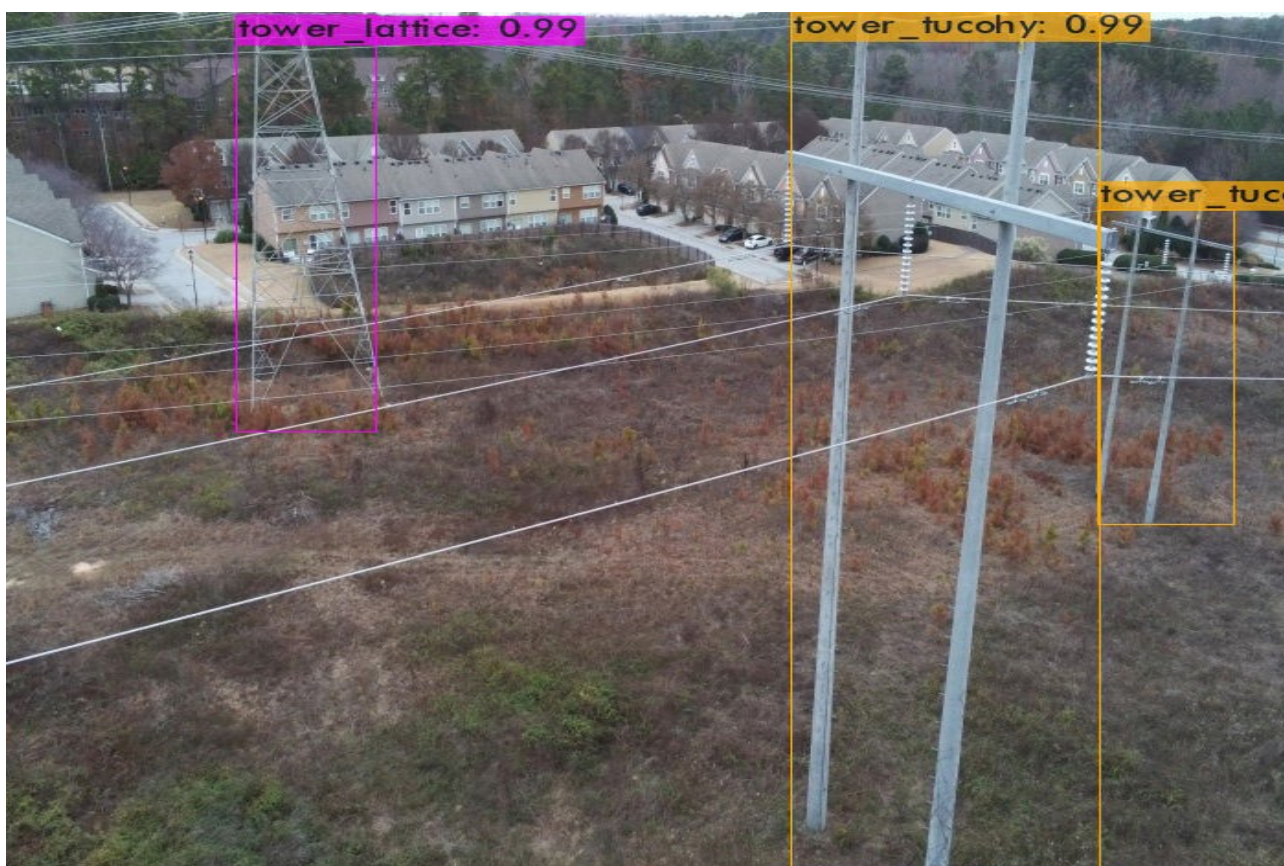
Tower wooden is not detected.

Image : 14_02226.jpg



Wooden tower and other some lattice towers are not detected. Also lattice tower has multiple detections.

Image : 22_00331.jpg



Wooden tower is mis-classified as tower tucohy.

Image : 22_01901.jpg



Wooden tower is mis-classified as Tucohy tower.