Aero2Astro
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Today i had trained Yolo v4 model upto 9000 epochs with jitter = 0.45. And also evaluated with both training and test dataset.

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 = 1760, unique_truth_count = 663
class_id = 0, name = tower_lattice, ap = 99.85%        (TP = 269, FP = 9)
class_id = 1, name = tower_tucohy, ap = 97.58%         (TP = 163, FP = 27)
class_id = 2, name = tower_wooden, ap = 99.09%         (TP = 211, FP = 11)

 for conf_thresh = 0.25, precision = 0.93, recall = 0.97, F1-score = 0.95
 for conf_thresh = 0.25, TP = 643, FP = 47, FN = 20, average IoU = 75.42 %

 IoU threshold = 20 %, used Area-Under-Curve for each unique Recall
 mean average precision (mAP@0.20) = 0.988389, or 98.84 %
Total Detection Time: 50 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 = 588, unique_truth_count = 202
class_id = 0, name = tower_lattice, ap = 90.14%        (TP = 74, FP = 9)
class_id = 1, name = tower_tucohy, ap = 79.90%         (TP = 37, FP = 18)
class_id = 2, name = tower_wooden, ap = 63.20%         (TP = 39, FP = 11)

 for conf_thresh = 0.25, precision = 0.80, recall = 0.74, F1-score = 0.77
 for conf_thresh = 0.25, TP = 150, FP = 38, FN = 52, average IoU = 59.34 %

 IoU threshold = 20 %, used Area-Under-Curve for each unique Recall
 mean average precision (mAP@0.20) = 0.777461, or 77.75 %
Total Detection Time: 15 Seconds

 Set -points flag:
```

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 = 1760, unique_truth_count = 663
class_id = 0, name = tower_lattice, ap = 96.30%          (TP = 265, FP = 13)
class_id = 1, name = tower_tucohy, ap = 89.82%           (TP = 155, FP = 35)
class_id = 2, name = tower_wooden, ap = 94.14%           (TP = 200, FP = 22)

 for conf_thresh = 0.25, precision = 0.90, recall = 0.94, F1-score = 0.92
 for conf_thresh = 0.25, TP = 620, FP = 70, FN = 43, average IoU = 73.71 %

 IoU threshold = 60 %, used Area-Under-Curve for each unique Recall
 mean average precision (mAP@0.60) = 0.934204, or 93.42 %
Total Detection Time: 49 Seconds

Set -noints flag:
```

Train :

```
 calculation mAP (mean average precision)...
 Detection layer: 139 - type = 28
 Detection layer: 150 - type = 28
 Detection layer: 161 - type = 28
 124
 detections_count = 588, unique_truth_count = 202
class_id = 0, name = tower_lattice, ap = 73.37%          (TP = 65, FP = 18)
class_id = 1, name = tower_tucohy, ap = 72.95%           (TP = 35, FP = 20)
class_id = 2, name = tower_wooden, ap = 39.26%           (TP = 30, FP = 20)

 for conf_thresh = 0.25, precision = 0.69, recall = 0.64, F1-score = 0.67
 for conf_thresh = 0.25, TP = 130, FP = 58, FN = 72, average IoU = 55.02 %

 IoU threshold = 60 %, used Area-Under-Curve for each unique Recall
 mean average precision (mAP@0.60) = 0.618603, or 61.86 %
Total Detection Time: 15 Seconds
```

Detected Results : At 9000 epochs

Image : 08_1725.jpg

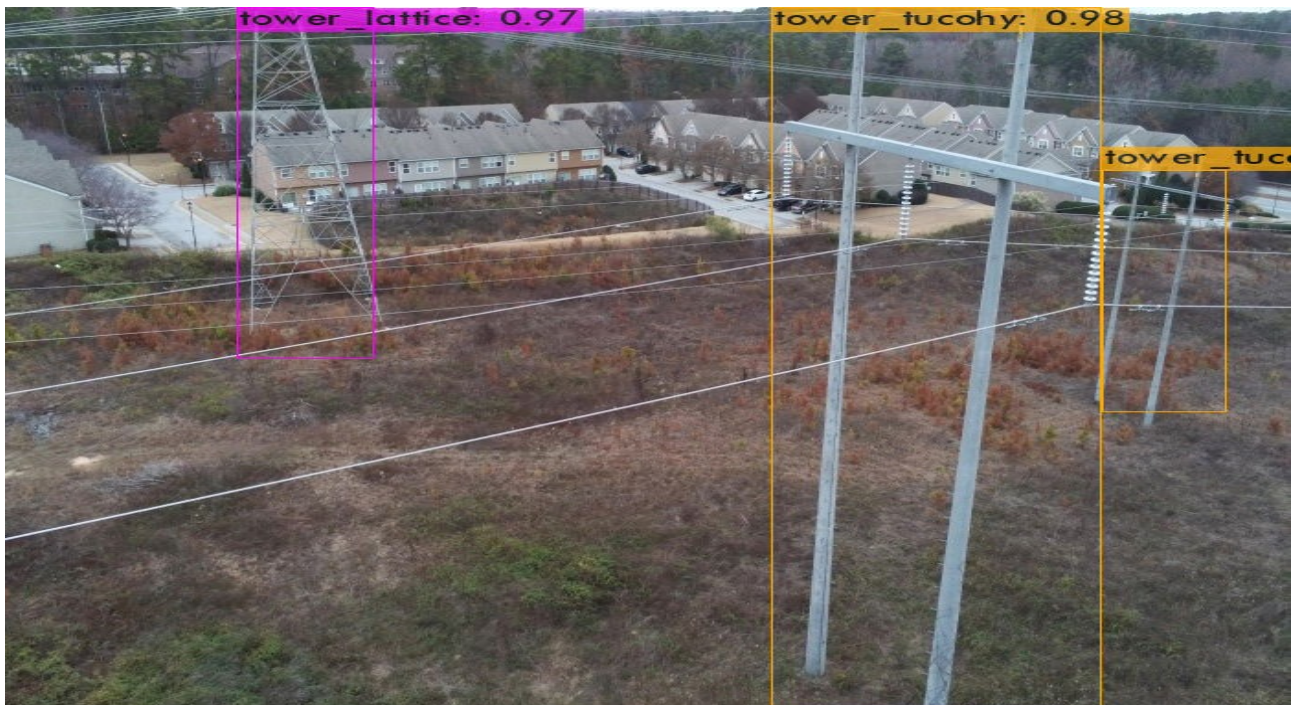Wooden tower is mis-classified as Tucohy tower.

Image : 14_00051.jpg

Tower wooden not detected. And multiple detections for lattice tower (due to less treshold).

Image : 14_02226.jpg

Some lattice towers not detected.

Image : 22_00331.jpg

Wooden tower is mis-classified as Tucohy tower.
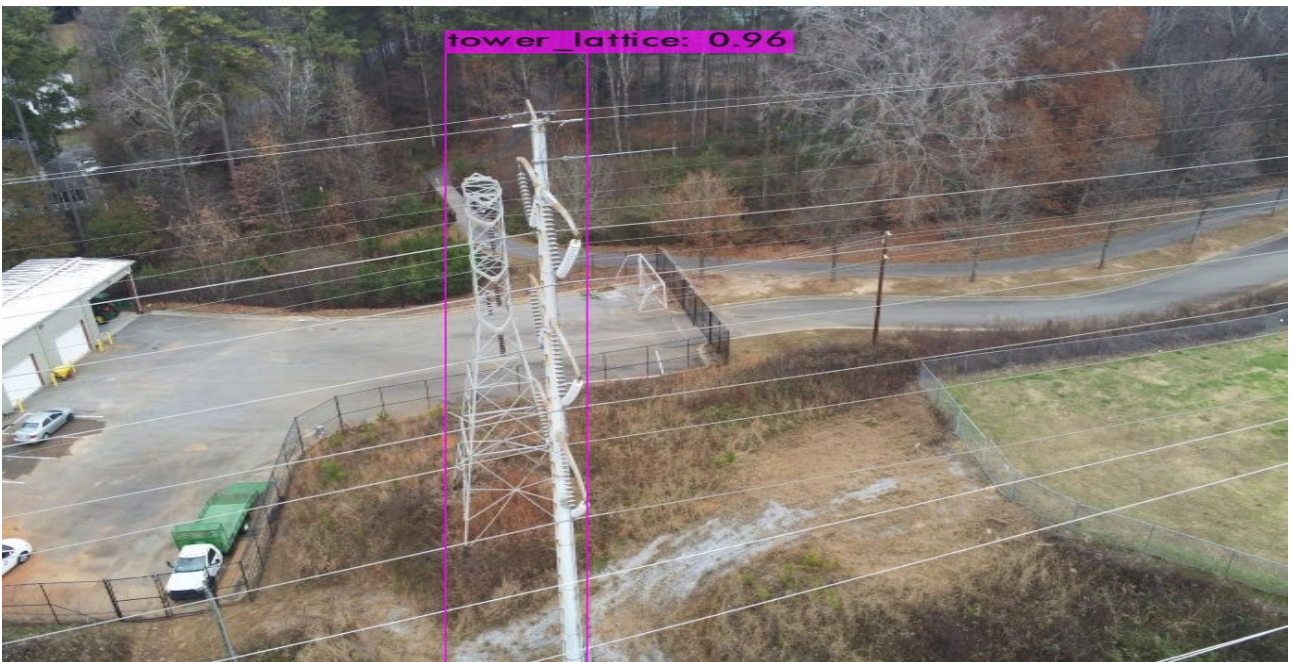
Image : 22_01901.jpg

Tower wooden is mis-classified as Tucohy tower.
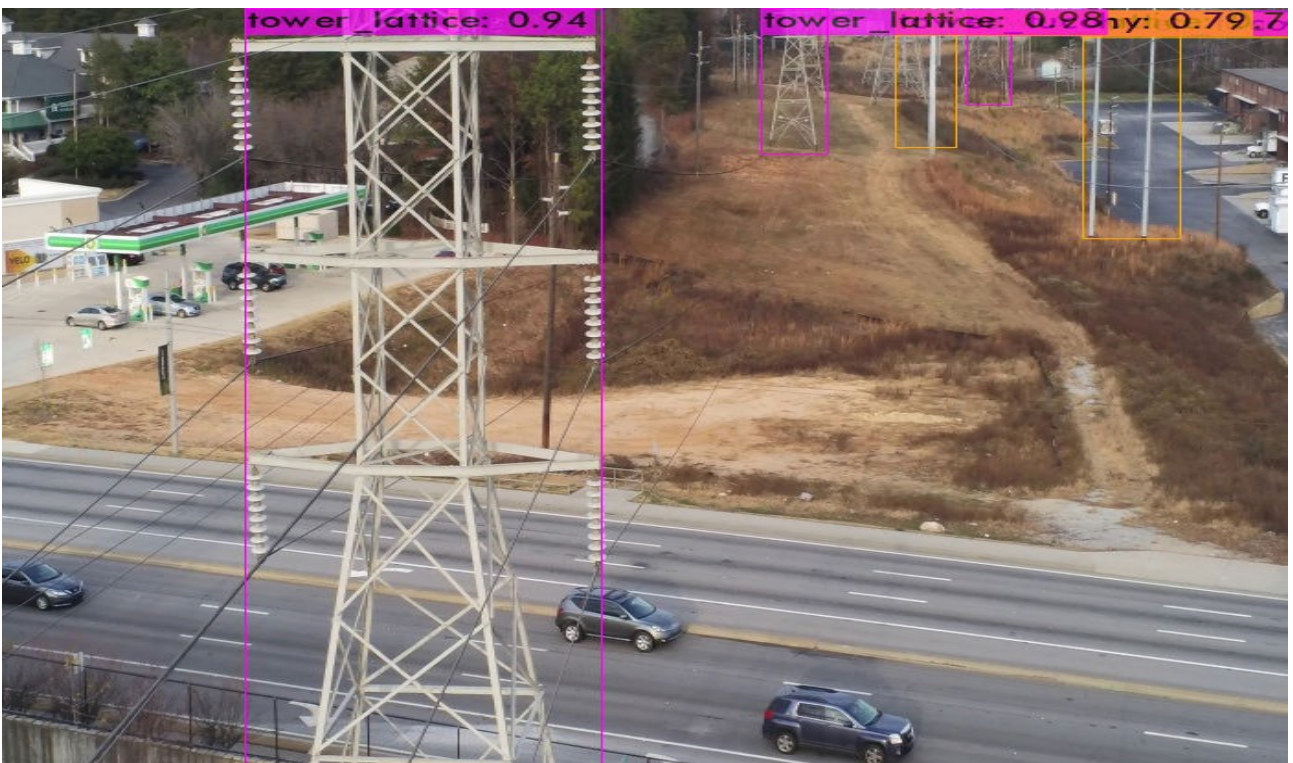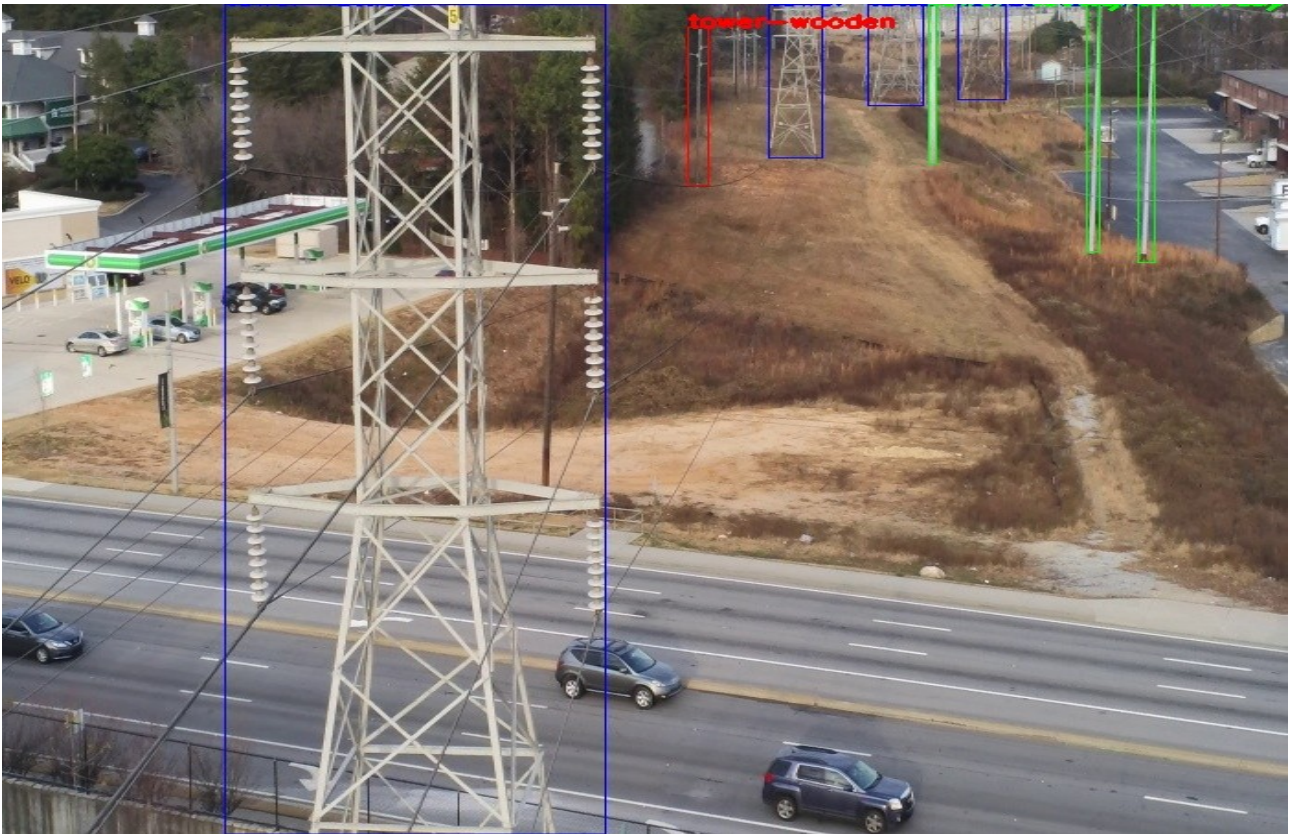
Image : 26_1050.jpg

Wooden Tower has less confidence.

Image : 32_6285.jpg

Wooden and Tucohy towers are not detected.

Image : 36_825.jpg

Wooden tower is not detected and Tucohy tower is detected as single detection instead of separate detection.

Image : 63_00891.jpg

All are correct detections.

Image : 70_01114.jpg

All are correct detections.

Image : 91_15.jpg

Wooden and Tucohy towers are not detected.