

Aero2Astro
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Today i had trained Yolo v4 model upto 21800 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 = 1140, unique_truth_count = 663
class_id = 0, name = tower_lattice, ap = 99.95%      (TP = 273, FP = 10)
class_id = 1, name = tower_tucohy, ap = 98.20%      (TP = 166, FP = 8)
class_id = 2, name = tower_wooden, ap = 99.82%      (TP = 216, FP = 7)

for conf_thresh = 0.25, precision = 0.96, recall = 0.99, F1-score = 0.98
for conf_thresh = 0.25, TP = 655, FP = 25, FN = 8, average IoU = 83.30 %

IoU threshold = 20 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.20) = 0.993251, or 99.33 %
Total Detection Time: 52 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 = 388, unique_truth_count = 202
class_id = 0, name = tower_lattice, ap = 87.44%      (TP = 75, FP = 9)
class_id = 1, name = tower_tucohy, ap = 82.27%      (TP = 35, FP = 7)
class_id = 2, name = tower_wooden, ap = 63.76%      (TP = 41, FP = 10)

for conf_thresh = 0.25, precision = 0.85, recall = 0.75, F1-score = 0.80
for conf_thresh = 0.25, TP = 151, FP = 26, FN = 51, average IoU = 67.30 %

IoU threshold = 20 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.20) = 0.778247, or 77.82 %
Total Detection Time: 16 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 = 205, unique_truth_count = 103
class_id = 0, name = tower_lattice, ap = 83.65%      (TP = 33, FP = 7)
class_id = 1, name = tower_tucohy, ap = 86.24%      (TP = 12, FP = 4)
class_id = 2, name = tower_wooden, ap = 69.45%      (TP = 27, FP = 3)

for conf_thresh = 0.25, precision = 0.84, recall = 0.70, F1-score = 0.76
for conf_thresh = 0.25, TP = 72, FP = 14, FN = 31, average IoU = 67.88 %

IoU threshold = 20 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.20) = 0.797798, or 79.78 %
Total Detection Time: 7 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 = 1140, unique_truth_count = 663
class_id = 0, name = tower_lattice, ap = 99.15%      (TP = 272, FP = 11)
class_id = 1, name = tower_tucohy, ap = 96.90%      (TP = 165, FP = 9)
class_id = 2, name = tower_wooden, ap = 97.70%      (TP = 212, FP = 11)

for conf_thresh = 0.25, precision = 0.95, recall = 0.98, F1-score = 0.97
for conf_thresh = 0.25, TP = 649, FP = 31, FN = 14, average IoU = 82.92 %

IoU threshold = 60 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.60) = 0.979187, or 97.92 %
Total Detection Time: 52 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 = 388, unique_truth_count = 202
class_id = 0, name = tower_lattice, ap = 72.49%      (TP = 67, FP = 17)
class_id = 1, name = tower_tucohy, ap = 74.70%      (TP = 33, FP = 9)
class_id = 2, name = tower_wooden, ap = 41.51%      (TP = 30, FP = 21)

for conf_thresh = 0.25, precision = 0.73, recall = 0.64, F1-score = 0.69
for conf_thresh = 0.25, TP = 130, FP = 47, FN = 72, average IoU = 61.80 %

IoU threshold = 60 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.60) = 0.628998, or 62.90 %
Total Detection Time: 16 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 = 205, unique_truth_count = 103
class_id = 0, name = tower_lattice, ap = 78.67%      (TP = 33, FP = 7)
class_id = 1, name = tower_tucohy, ap = 67.71%      (TP = 11, FP = 5)
class_id = 2, name = tower_wooden, ap = 46.61%      (TP = 22, FP = 8)

for conf_thresh = 0.25, precision = 0.77, recall = 0.64, F1-score = 0.70
for conf_thresh = 0.25, TP = 66, FP = 20, FN = 37, average IoU = 64.46 %

IoU threshold = 60 %, used Area-Under-Curve for each unique Recall
mean average precision (mAP@0.60) = 0.643309, or 64.33 %
Total Detection Time: 7 Seconds
```


Image: 08_1830.jpg



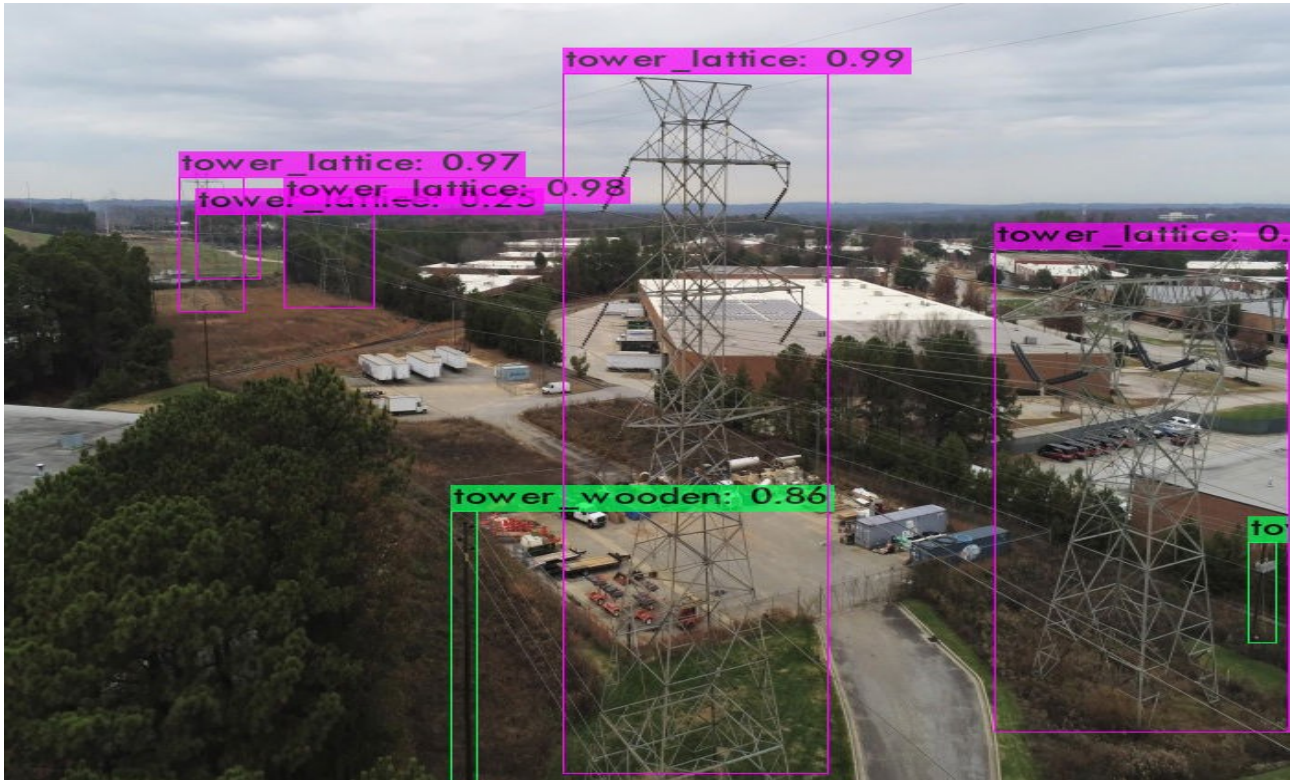
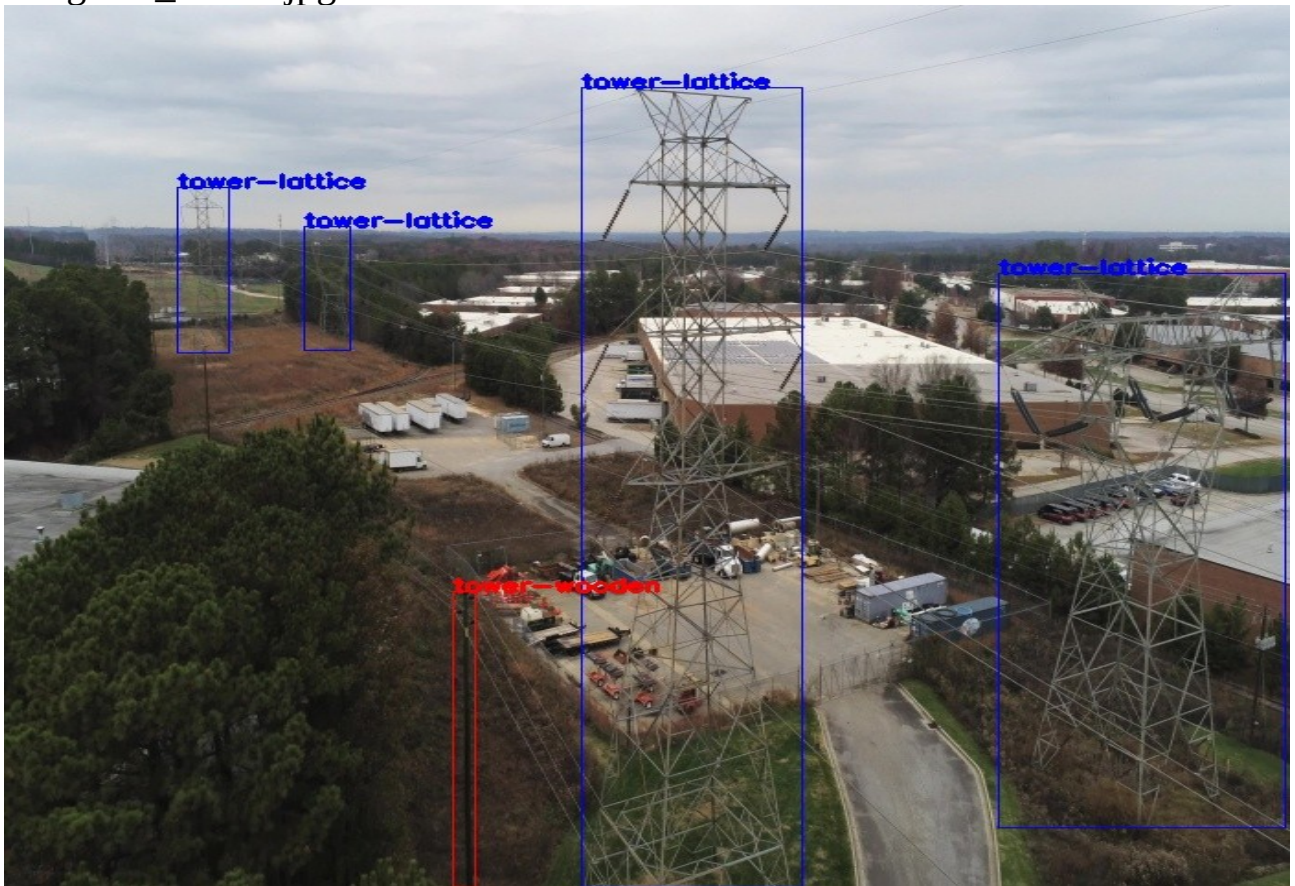
Correctly detected.

Image:14_01171.jpg



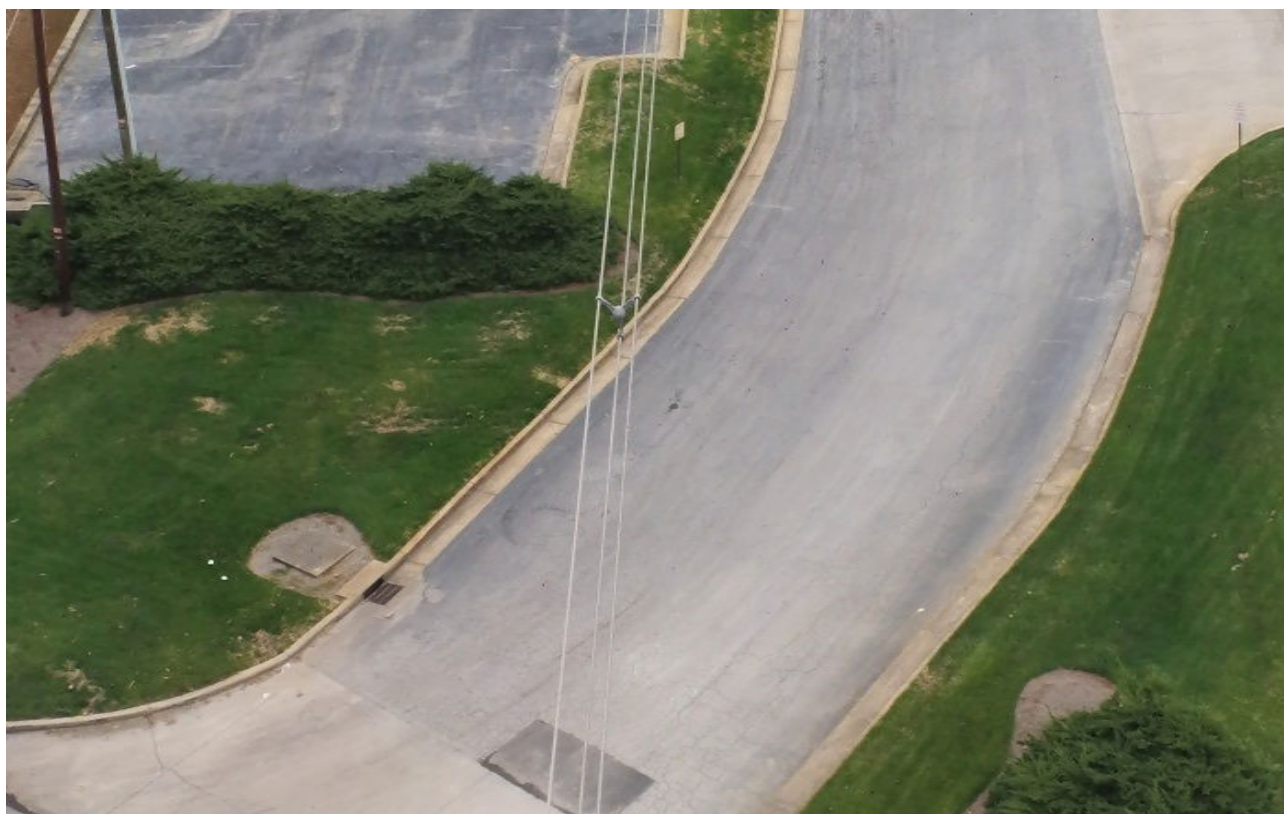
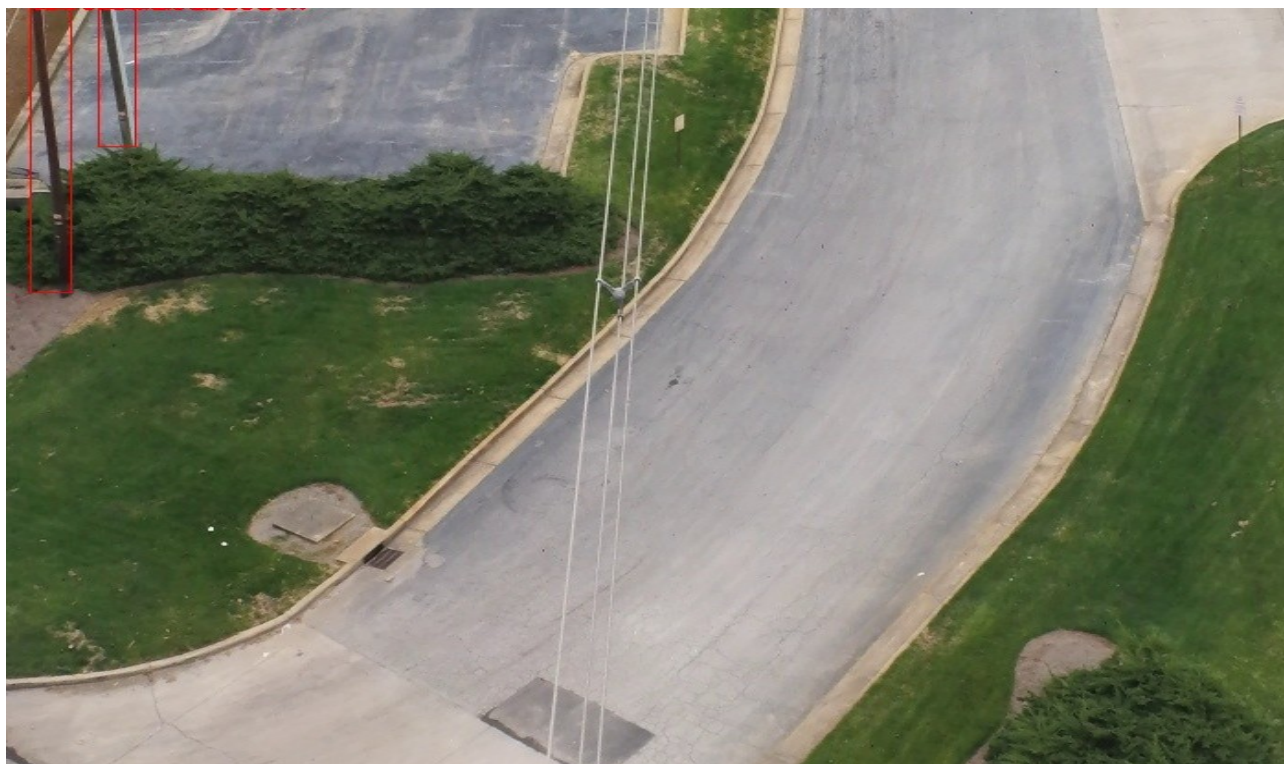
Some wooden towers are not detected.

Image:19_00137.jpg



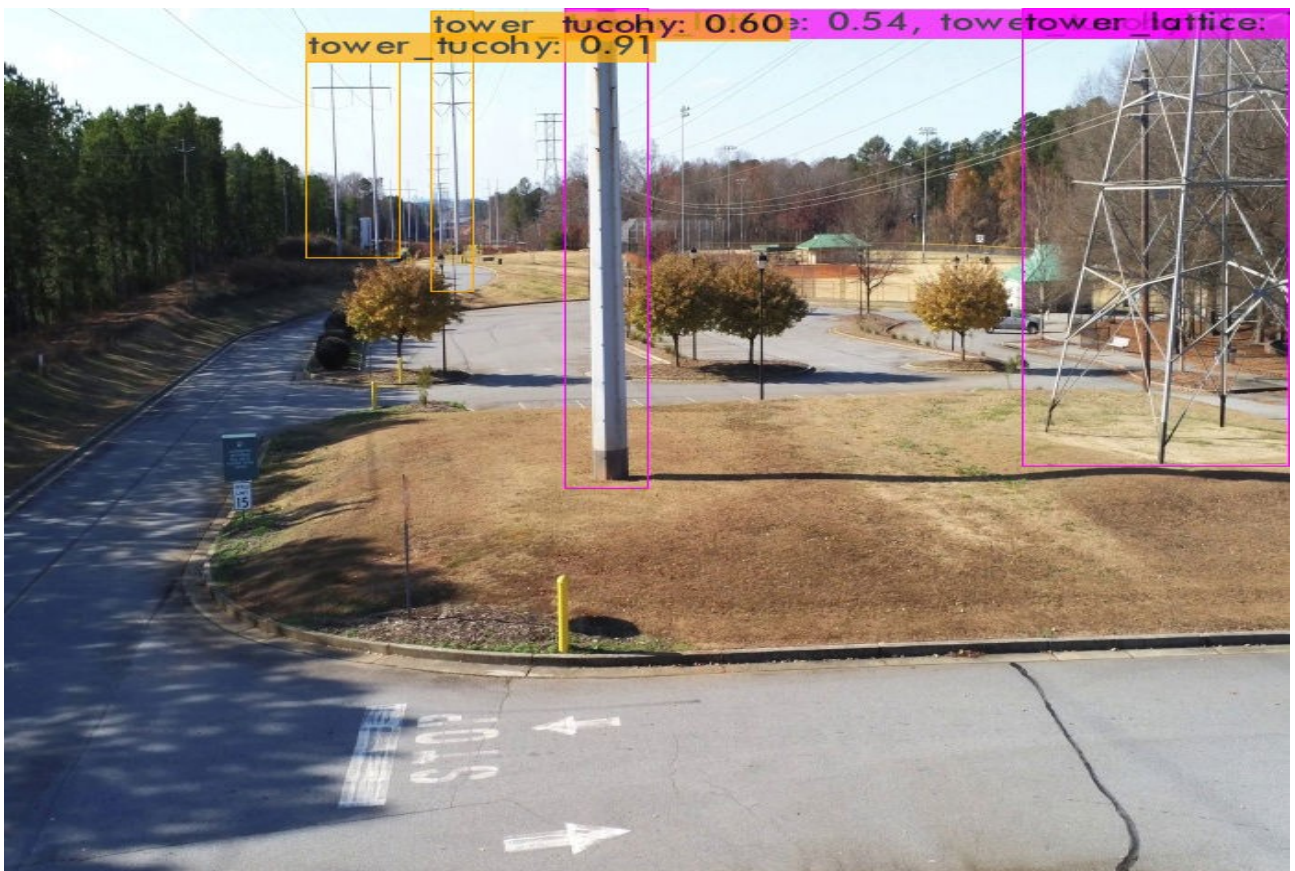
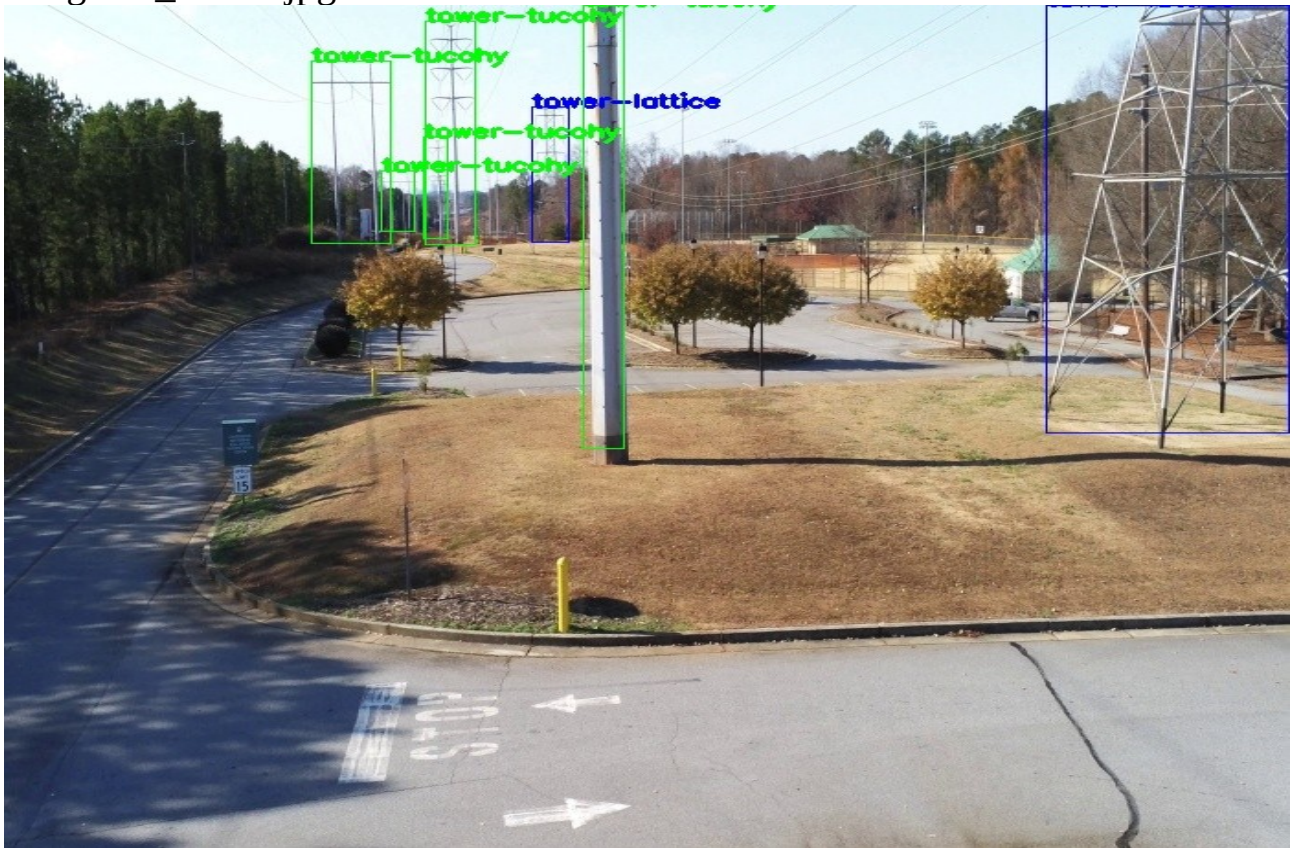
Right side wooden tower is wrong detection.

Image : 20_7215.jpg



Wooden tower is not detected.

Image:25_00029.jpg



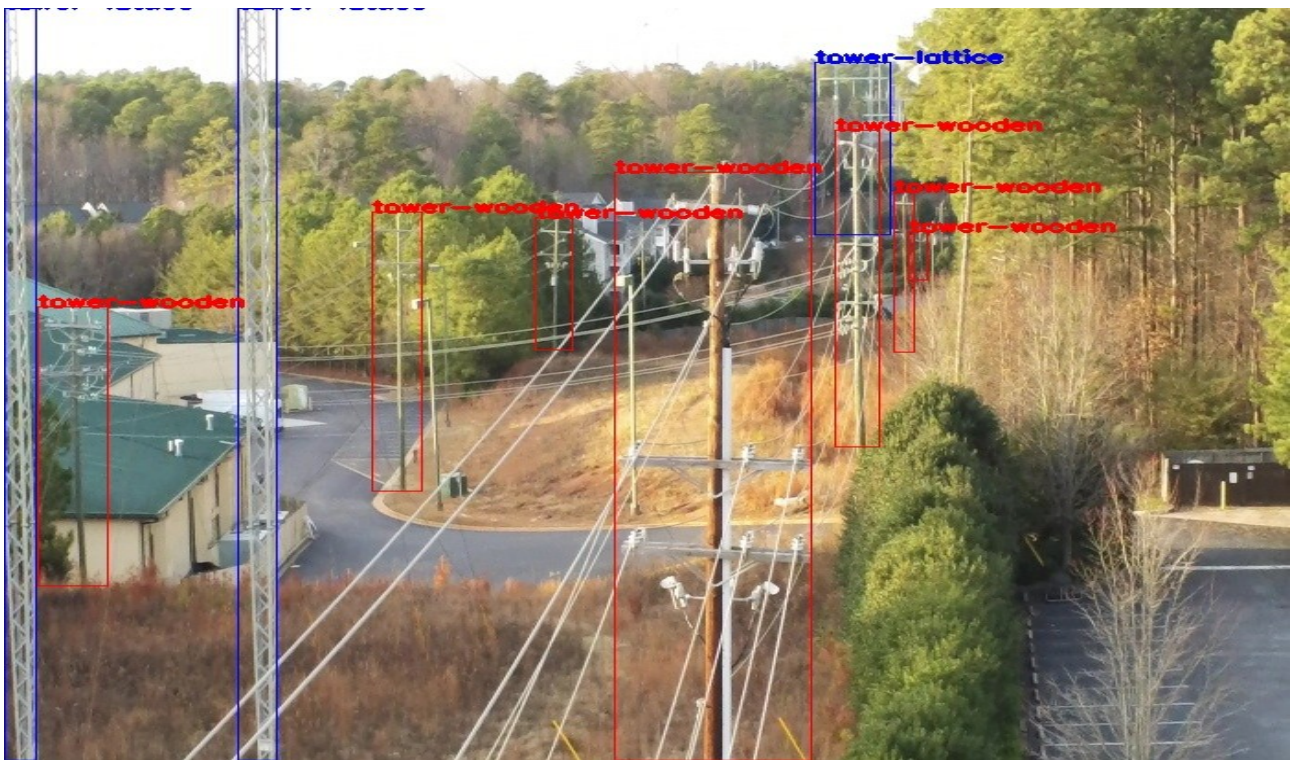
Tucohy tower is mis-classified as Lattice. And also one lattice tower is not detected .

Image :43_00591.jpg



Wooden tower is not detected.

Image:58_00956.jpg



Some lattice towers are not detected, and wooden is mis-classified as tucohy.

Image: 66_00191.jpg



Some lattice towers are mis-classified as tucohy.