CIS 680 HW 2.B: Mask RCNN

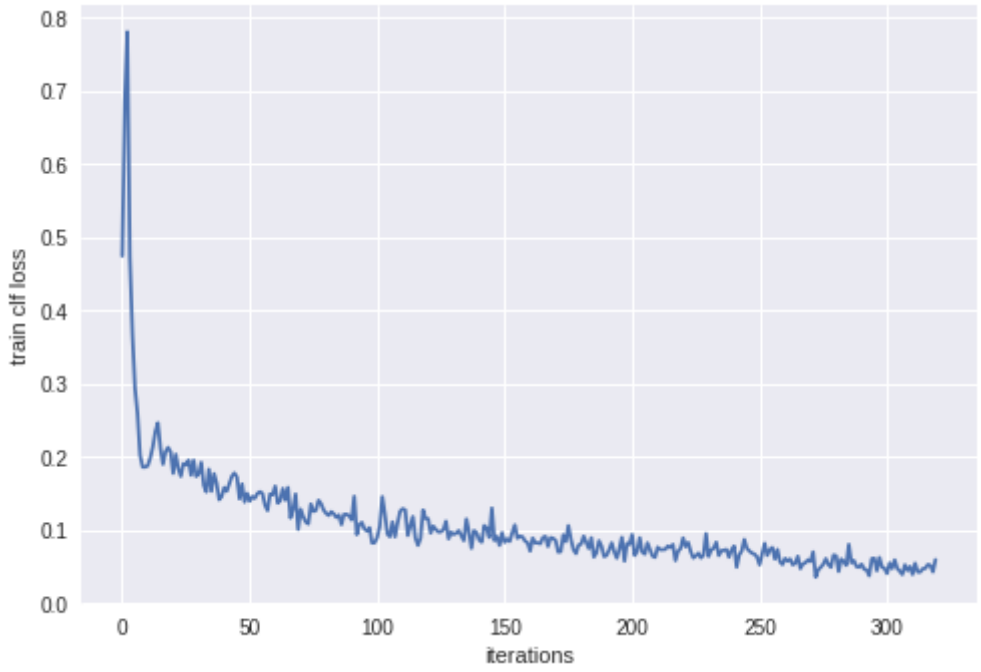
Prakash Veerasekar

Train:test split = 80:20

1.1 RPN Classifier

Parameters:
batch size – 100
optimizer – Adam; Learning rate: 0.01
Epochs – 20

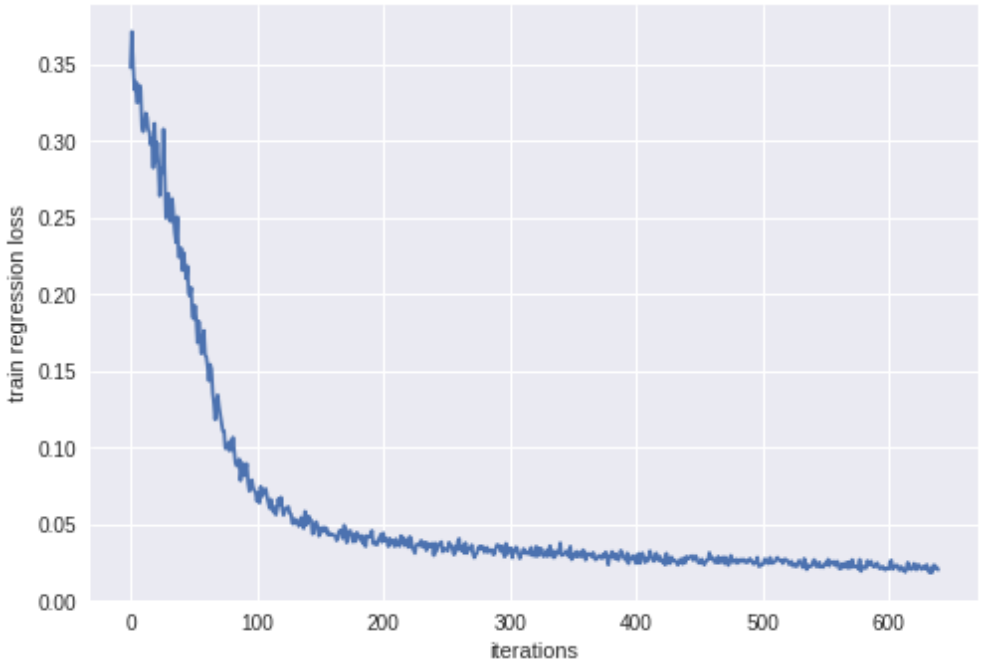
Final test accuracy (mean of all regions) – 96 percent



1.2 RPN Regressor

Parameters:
batch size – 100
optimizer – Adam; Learning rate: 0.01
Epochs – 40

Final testing regression loss – 0.019



Results:

RPN regressor

Sample prediction after training: prediction for width of bounding box.
REGRESSION O/P Prediction MASKED (cast to int) & GT REGRESSION

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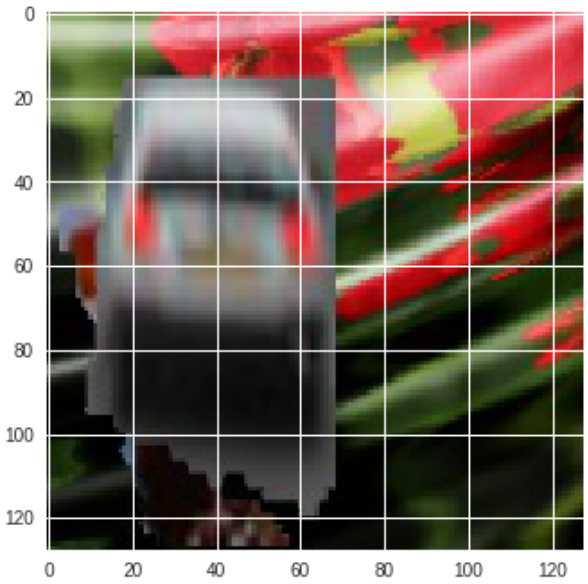
[[ 0 0 0 0 0 0 0 0]                [[ 0 0 0 0 0 0 0 0]
 [ 0 0 0 0 0 0 0 0]                [ 0 0 0 0 0 0 0 0]
 [ 0 0 0 74 58 0 0 0]              [ 0 0 0 64 64 0 0 0]
 [ 0 0 0 73 60 0 0 0]              [ 0 0 0 64 64 0 0 0]
 [ 0 0 0 61 63 89 98 0]            [ 0 0 0 64 64 89 89 0]
 [ 0 0 0 0 0 90 95 0]              [ 0 0 0 0 0 89 89 0]
 [ 0 0 0 0 0 0 0 0]                [ 0 0 0 0 0 0 0 0]
 [ 0 0 0 0 0 0 0 0]    ]           [ 0 0 0 0 0 0 0 0]]
```

We see that the regressor predictions match with the ground truth approximately

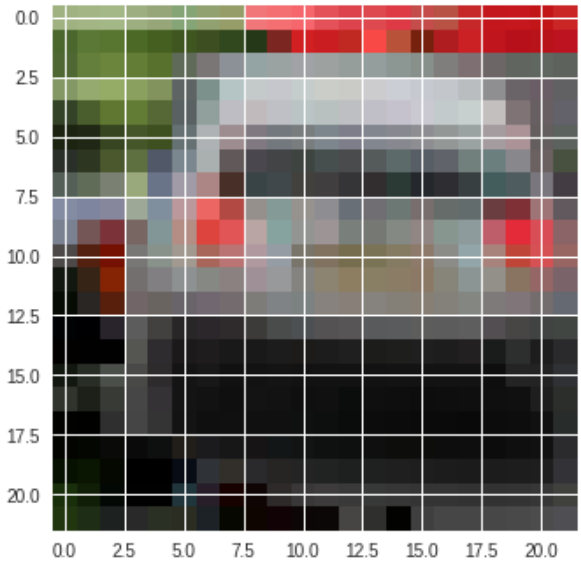
2.1 RCNN

The cropped and scaled image for a sample image (left)

Sample Image



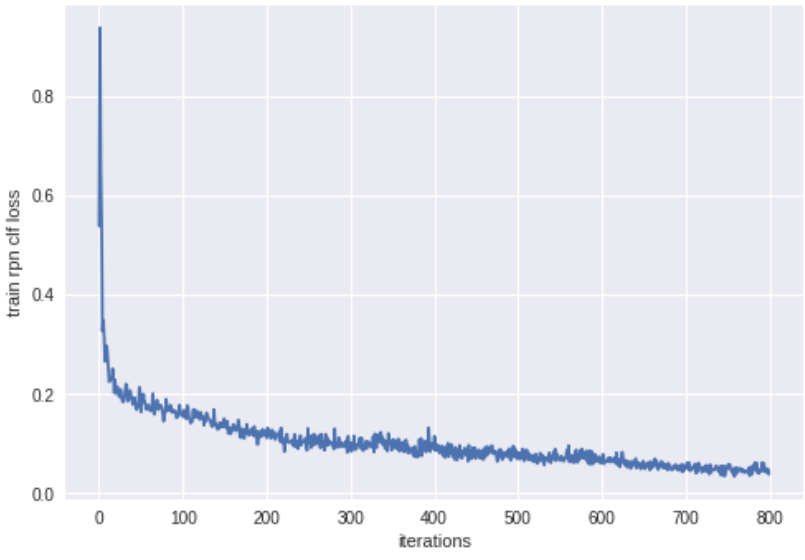
Cropped and Scaled image

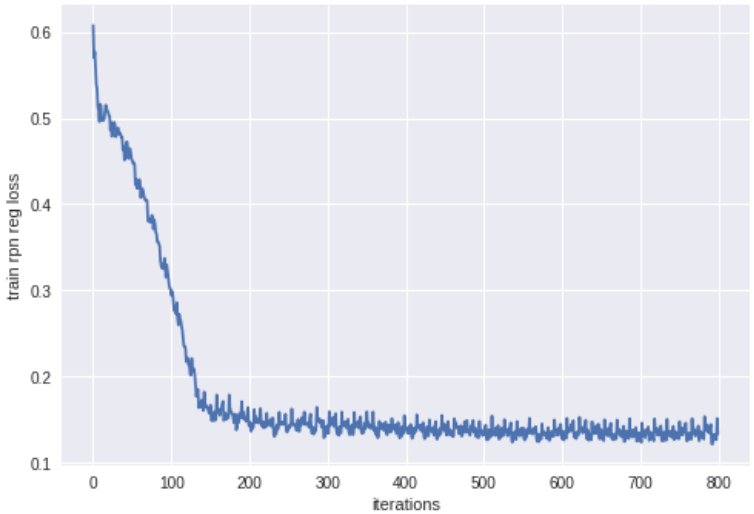


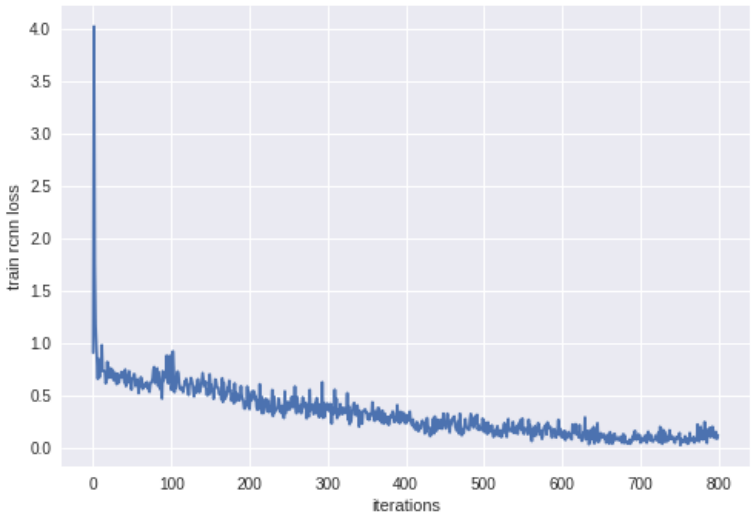
2.2 Faster RCNN
All losses were summed and jointly optimised. (RPN + RCNN)

Parameters:
batch size – 100
optimizer – Adam; Learning rate: 0.01
Epochs – 50

Final Classifier Test accuracy – 78 percent







2.3
Adopted alternate training between Mask branch and (RPN+RCNN)

Parameters:
batch size – 100
optimizer – Adam; Learning rate: 0.01
Epochs – 100
Mask size -21
Final Mask branch classification accuracy -75 percent