



HOMEWORK 6 REPORT

CSCI 677

Object Detection, Faster RCNN, Retinanet, Detectron2

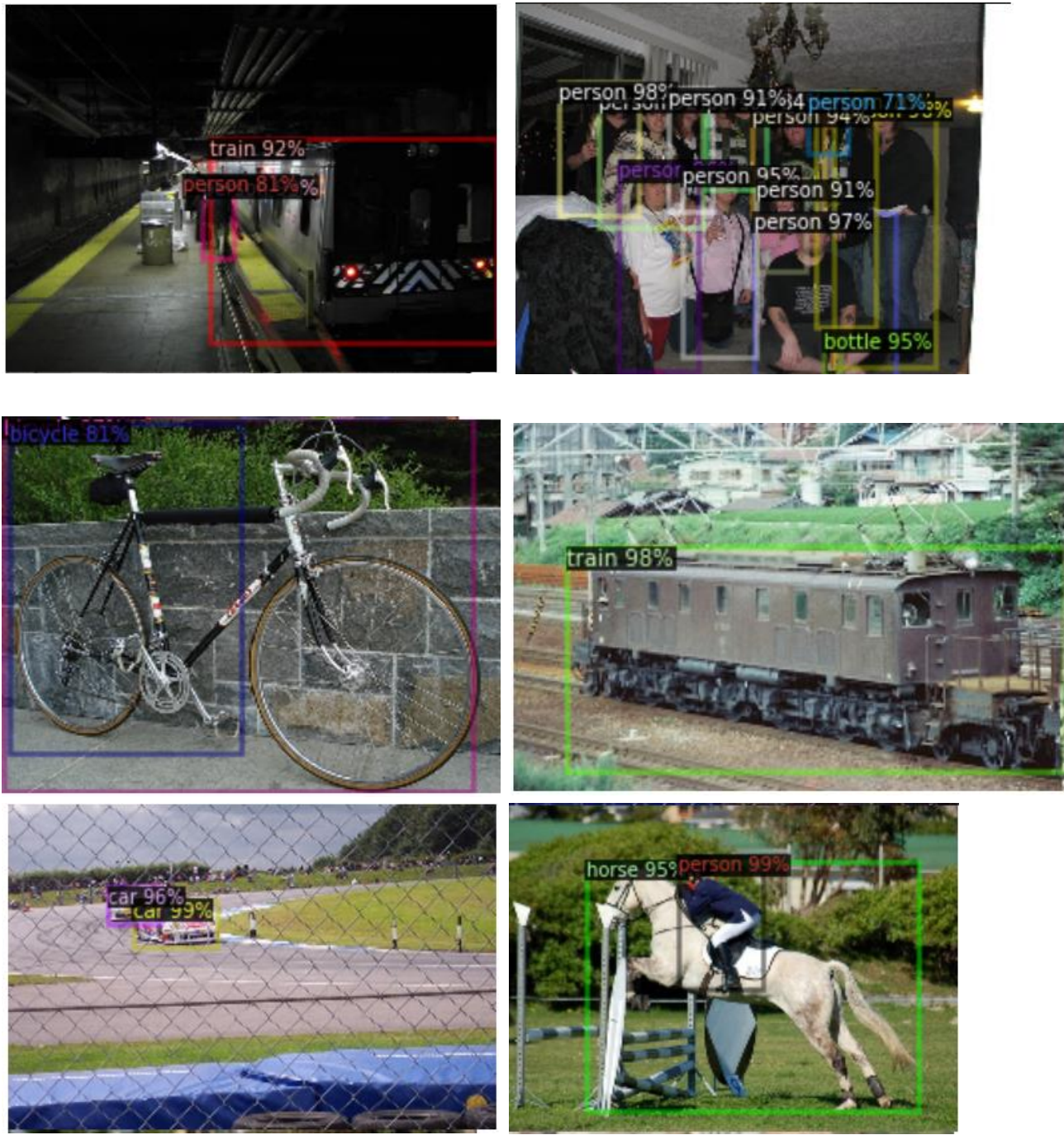
Hardik Prajapati

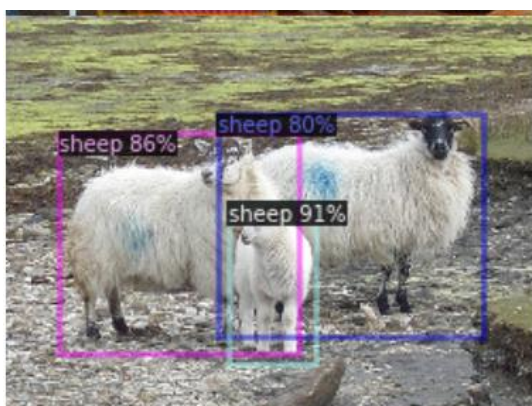
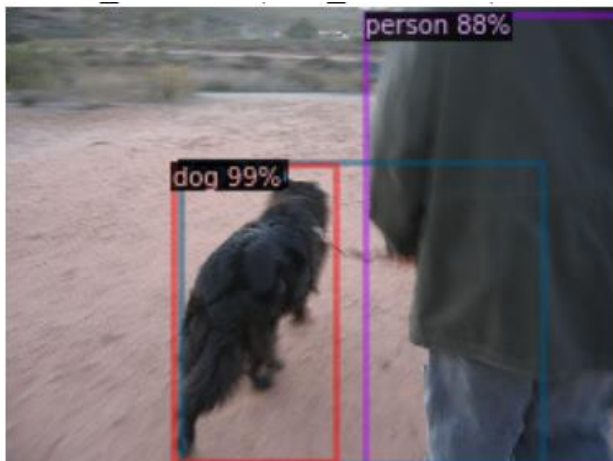
USC ID: 2678294168

Parameter	Faster RCNN (lr=0.00025)	Retinanet (lr=0.0001)	Retinanet (lr=0.0001)	Retinanet (lr=0.00025)
Training time	29:22 min	35:15 min	35:15 min	34:59 min
Total train loss(at end of 3000iterations)	0.667	0.3119	0.3119	0.3146
Train Loss_classification	0.2049	0.2066	0.2066	0.1406
Threshold	0.7	0.7	0.5	0.5
AP50 on test set	67.1612	14.4381	33.9588	66.7985

Faster RCNN

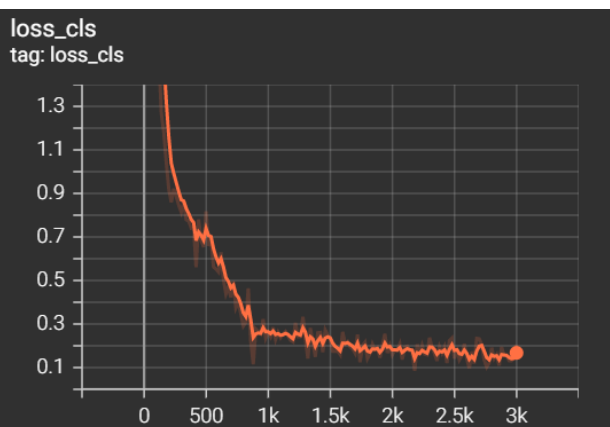
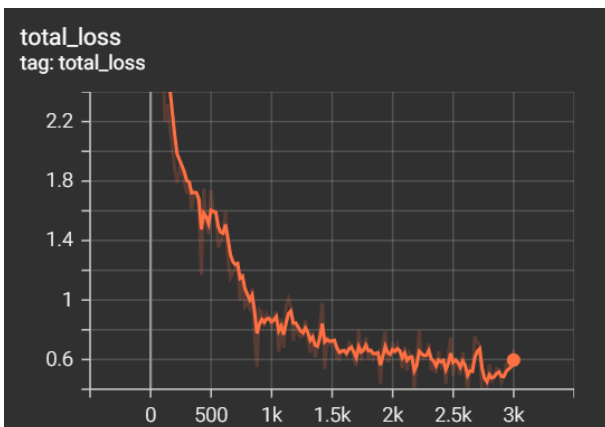
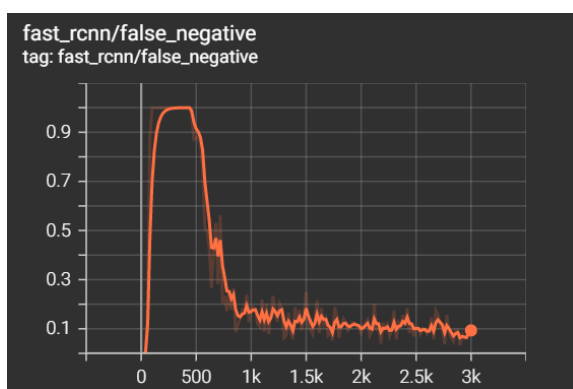
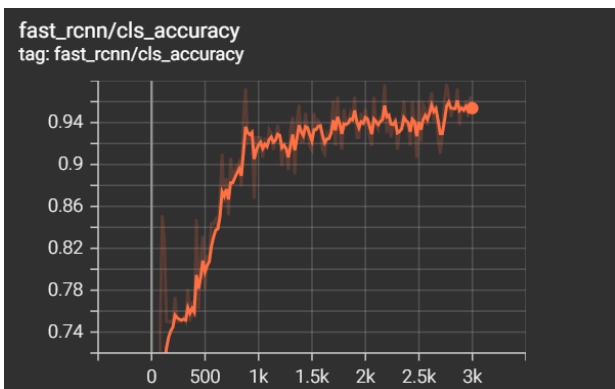
Qualitative:





Quantitative:

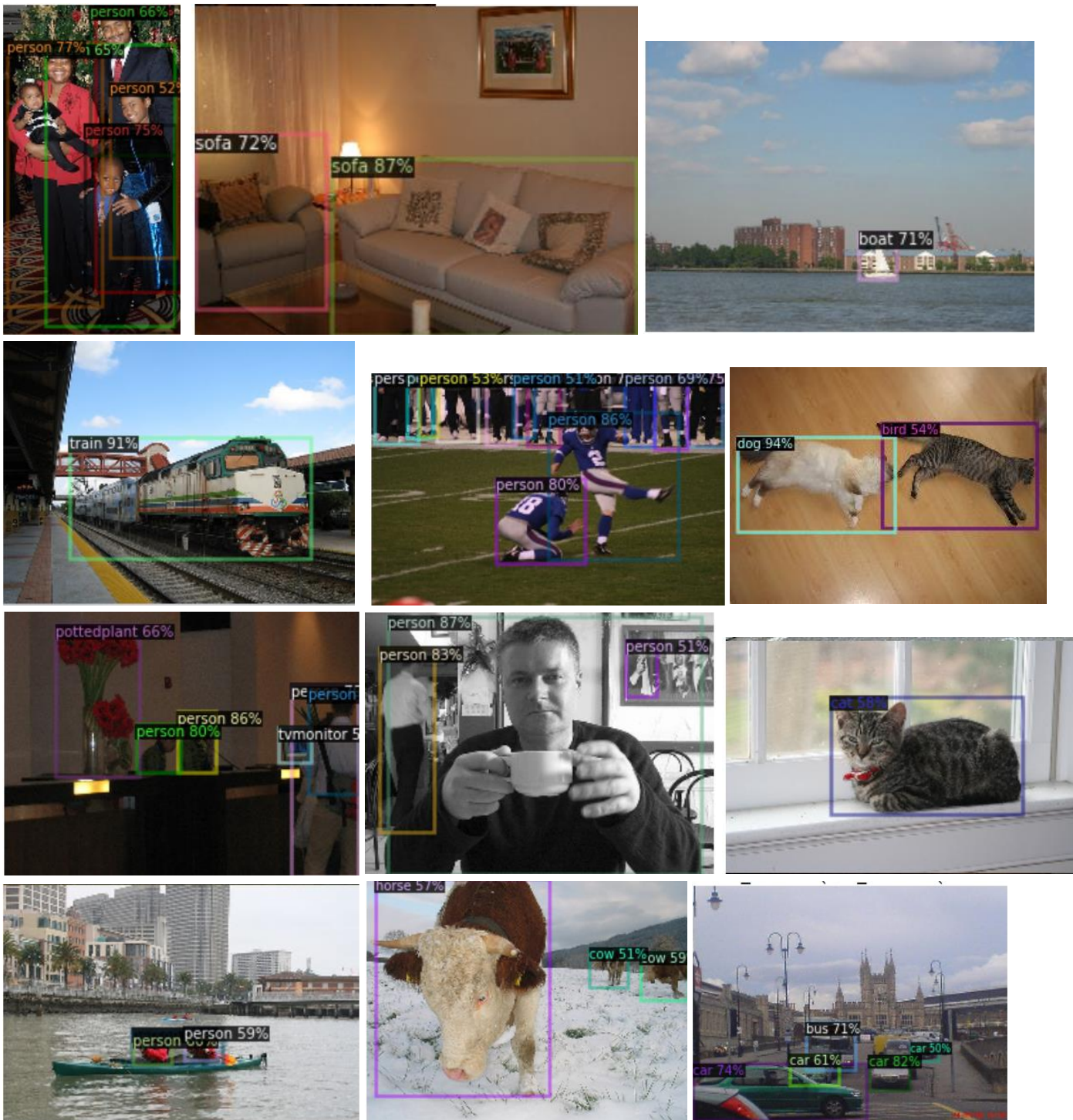
Lr=0.00025

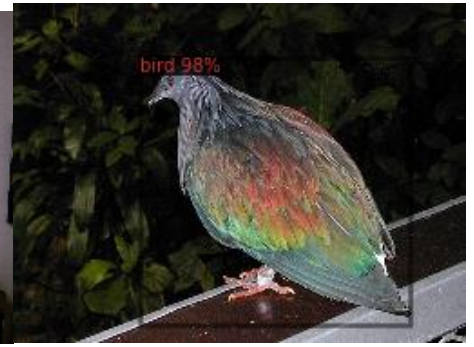


Retinanet

Qualitative

- 1) Case 1: $lr=0.00025$
 - a) Threshold =0.5



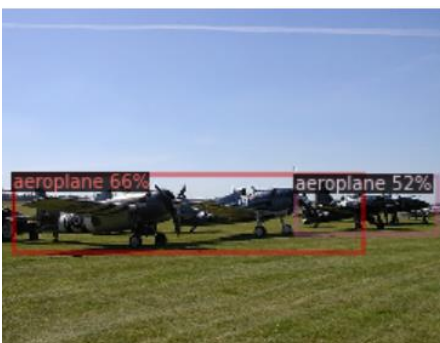


2) Case 2: $lr=0.0001$

a) Threshold = 0.7



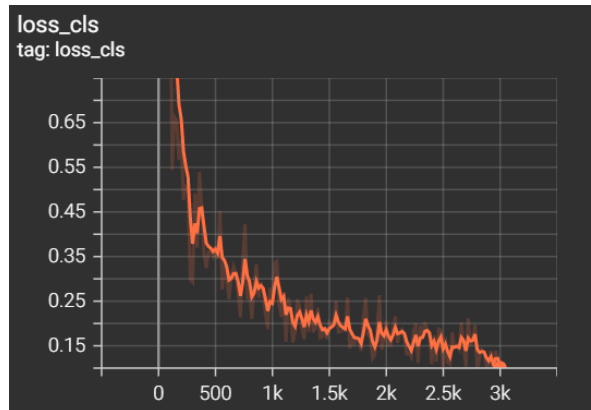
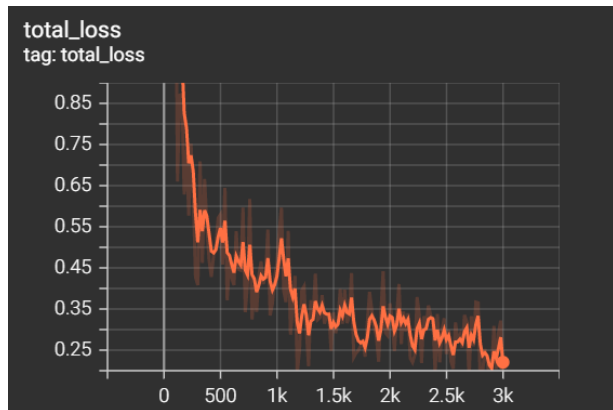
b) Threshold = 0.5



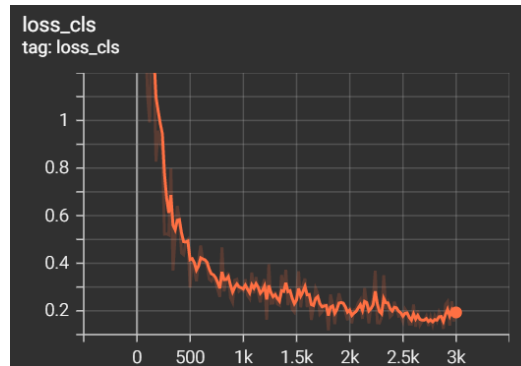
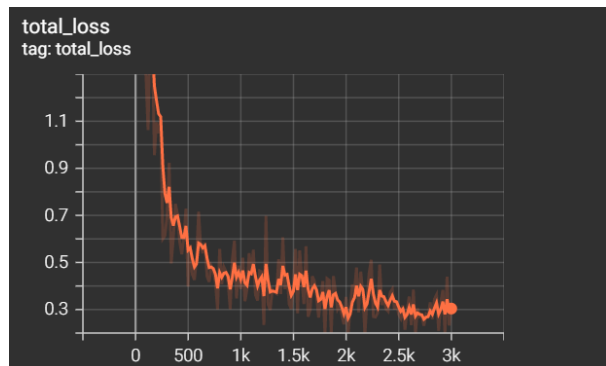


Quantitative

1) Case 1: $lr=0.00025$



2) Case 2: $lr=0.0001$



Observations:

- 1) Faster RCNN took less time for training compared to Retinanet on the same dataset.
- 2) Retinanet kind of failed to locate many objects when threshold was kept to 0.7 with LR=0.0001
- 3) When threshold was kept to 0.5 with LR=0.0001, it detected more objects but still failed to miss out few. For eg, in the above results, it failed to identify the bird in one of the photos, then a car with its orientation showing only the headlights was also missed out.

- 4) In this, LR=0.0001, threshold=0.5, Retinanet identifies the person sitting inside the train But fails to identify the train. This might be argued due to class imbalance in the training



- 5) Retinanet does much better when LR=0.00025, threshold=0.5 achieving AP50 score of 58.0239
- 6) Retinanet somehow does poorly on 'cat' and 'dogs' class.
- 7) Faster RCNN outperformed all the settings of Retinanet, achieving AP50 score of 67.1612.
- 8) One more observation was, Faster RCNN gives high confidence measure on each class predicted whereas Retinanet identifies objects with much lesser confidence.