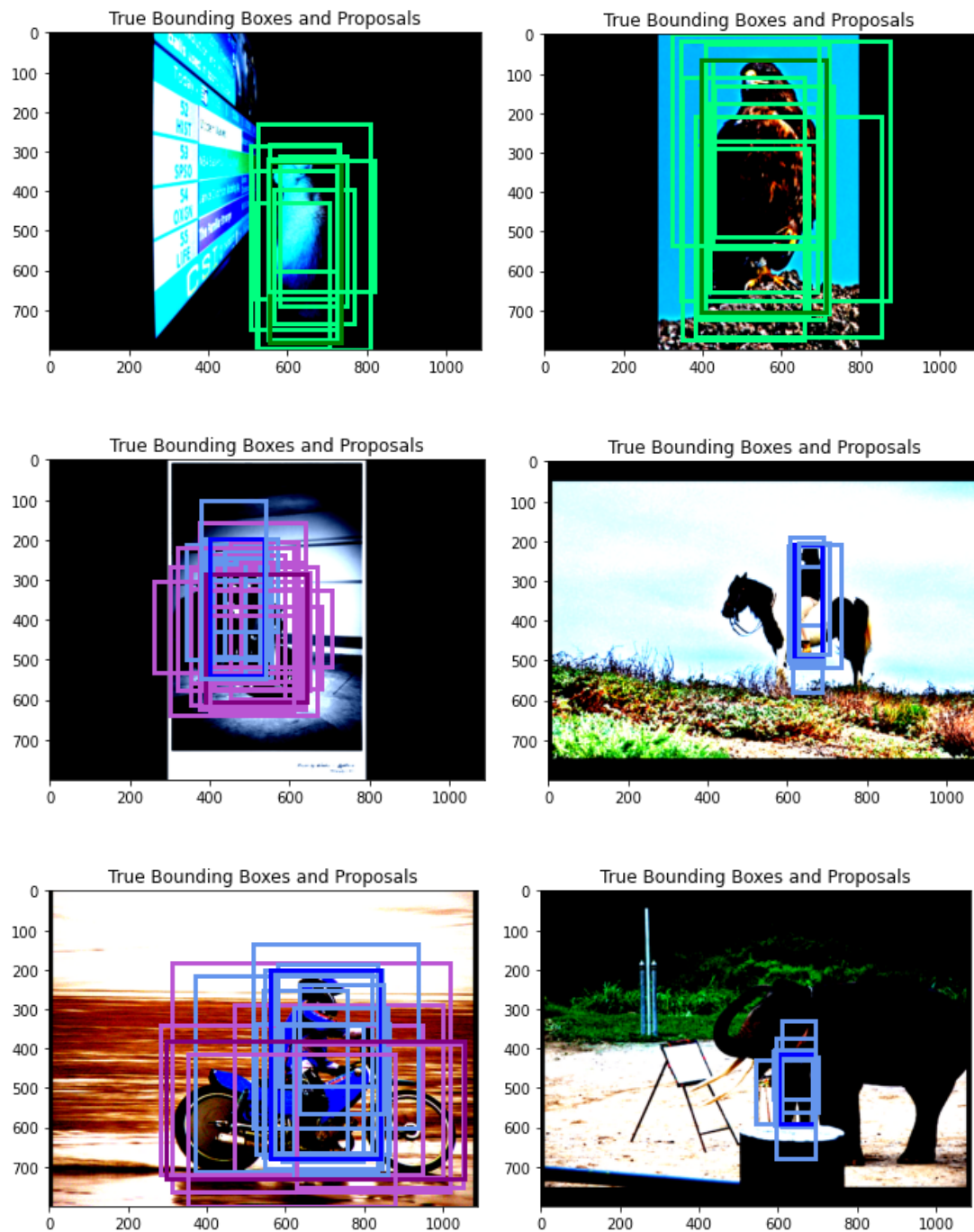
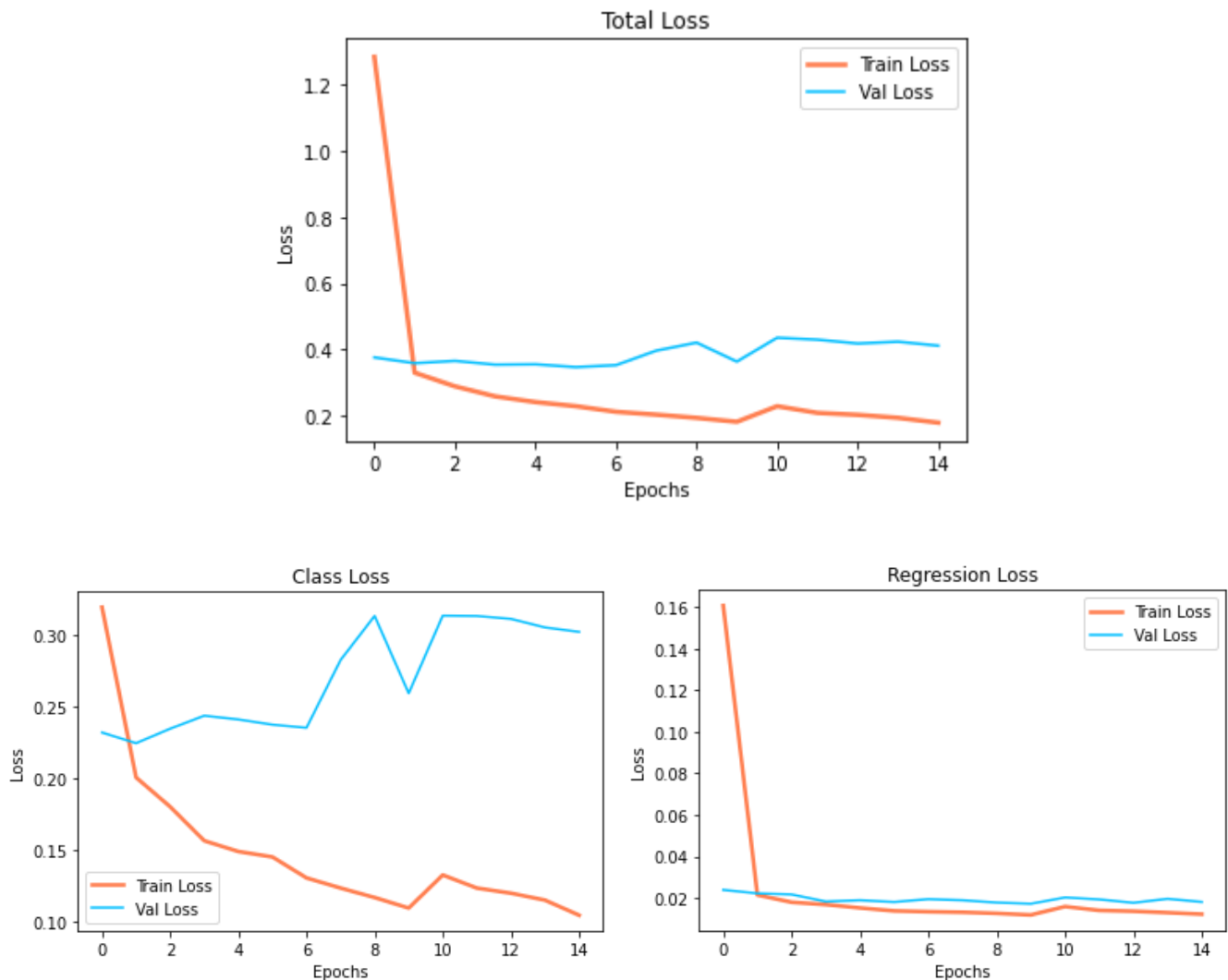


HW4 - FasterRCNN

1. Image plots that showcase the proposals with the no-background classes and their ground truth boxes. (Section 6.1) [at least 4] (15%)



2. Training and Validation curves that show the total loss, the loss of the classifier and the loss of the regressor of the Box Head. (Section 6.4) (20%)



We chose the lambda for the loss to be 6, hence the formula:

$$\text{Total Loss} = \text{Class Loss} + \text{Regression loss} * 6$$

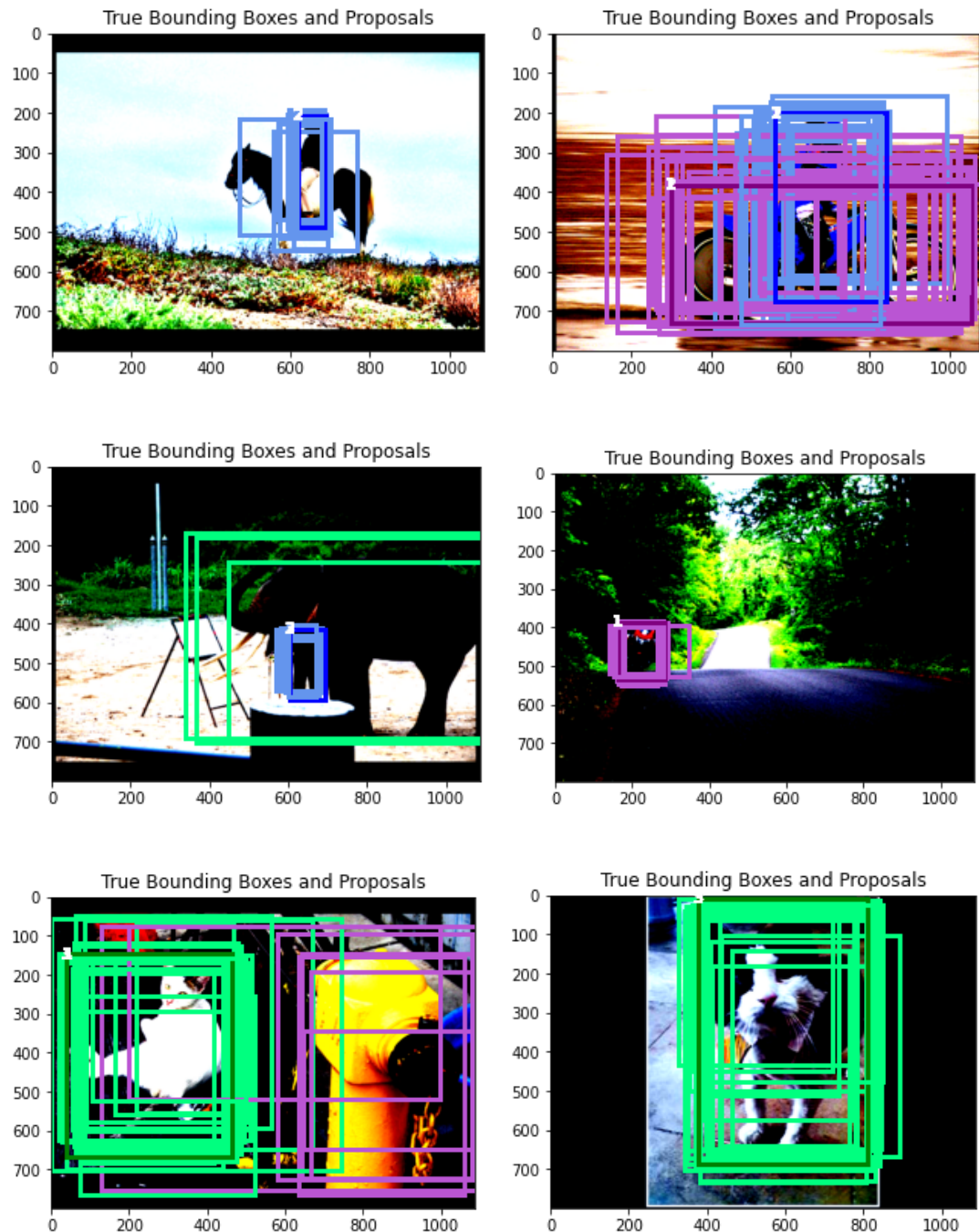
While training the model, we could notice an evident trend of overfitting for the classification loss. Hence we added regularisation parameters (we tried different LR schedulers, weight decay parameters and optimizers) but even they did not seem to help. Hence we chose to use the model saved at Epoch 5 - using validation loss and using observation of the loss curves - since overfitting starts after epoch 6.

3. Image plots that contain the top 20 boxes produced by the Box Head for some images of the test set (Section 6.4) [at least 4] (15%)

Plotting the top 20 boxes in each class -

[Note: For the boxes Blue colour: Person, Purple: Vehicle, Green: Animal]

Where the darker colour denotes the Ground truth bounding box and lighter colour denotes the predictions]



4. **Report of the APs and the mAP. More details about how you should evaluate your model will be published soon. Points will be provided both for the implementation of the mAP computation and the performance of your network (Section 6.5) (30%)**

[Note: These values are provided on the test set only]

Mean Average Precision

$$\text{mAP}_{50} = 0.52$$

Average Precision per class

$$\text{AP}_{\text{background}} = 0.9982$$

$$\text{AP}_{\text{Class}_1} = 0.4021$$

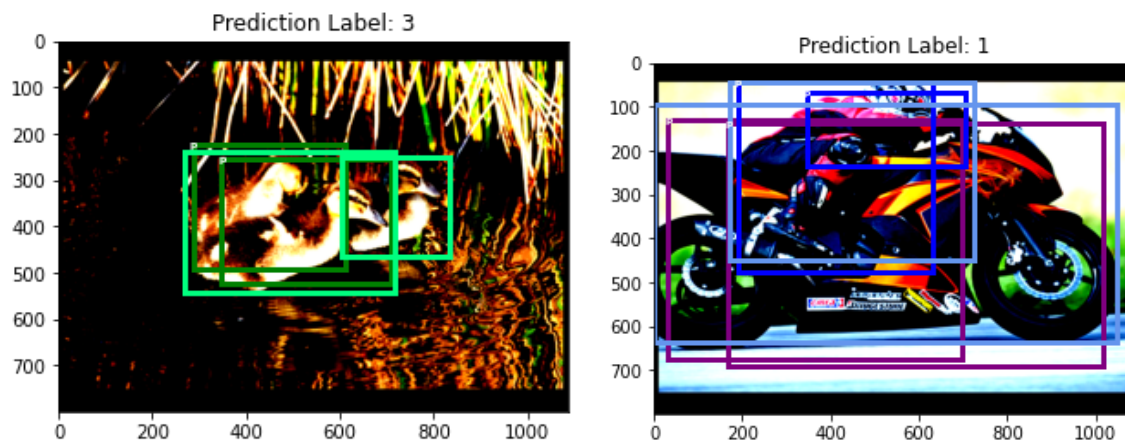
$$\text{AP}_{\text{Class}_2} = 0.5406$$

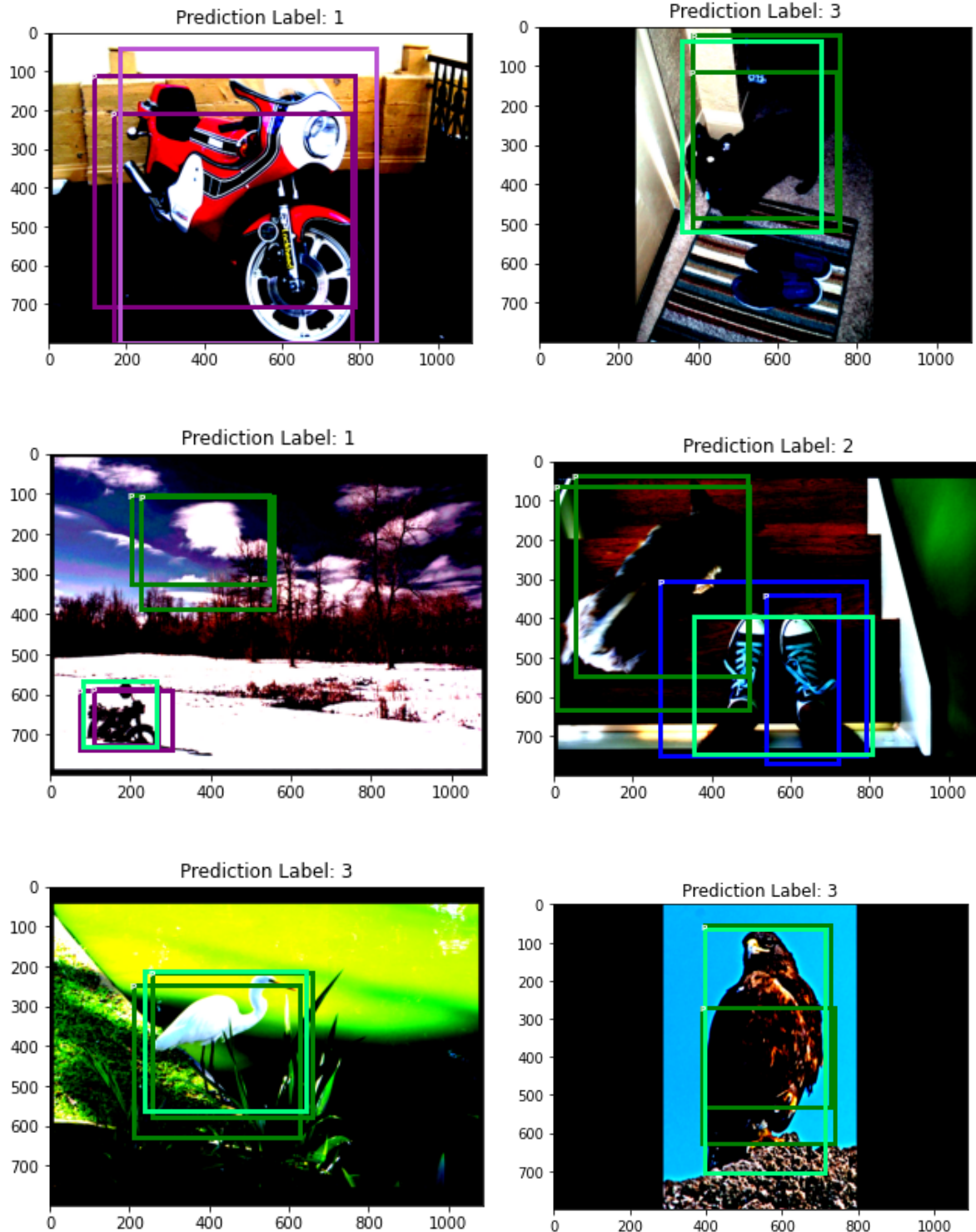
$$\text{AP}_{\text{Class}_3} = 0.6383$$

5. **Image plots of the regressed boxes after the postprocessing. (Section 6.5) [at least 4] (20%)**

[Note: For the boxes Blue colour: Person, Purple: Vehicle, Green: Animal]

Where the lighter colour denotes the Ground truth bounding box and darker colour denotes the predictions]





6. (optional) Brief explanation about specific choices of the implementation that were not mentioned in the rest of the report

- In the post-processing, we tuned the values for keepPostNMS and keepPreNMS using the mAP values. A general trend for all the classes were conservative predictions i.e. the total number of predictions for any particular class in an image did not cross 30-40 boxes (after thresholding at 0.5 confidence). Hence we finally used keepPreNMS as 20 and keepPostNMS as 2.