CMPT 733 Assignment 3 SSD

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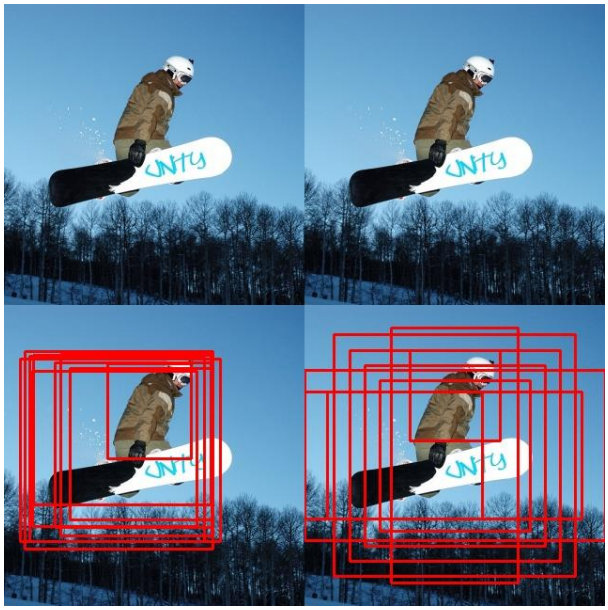
Note: For visualizations, the upper left should be the ground truth bounding box; the upper right should be the default boxes that carries the object; the lower left should be the predicted bounding boxes (before or after NMS); and the lower right should be the default boxes predicted by the network (before or after NMS).

For *test* data set, we don't have the ground truth annotations, so the upper left and the upper right images have no bounding boxes.

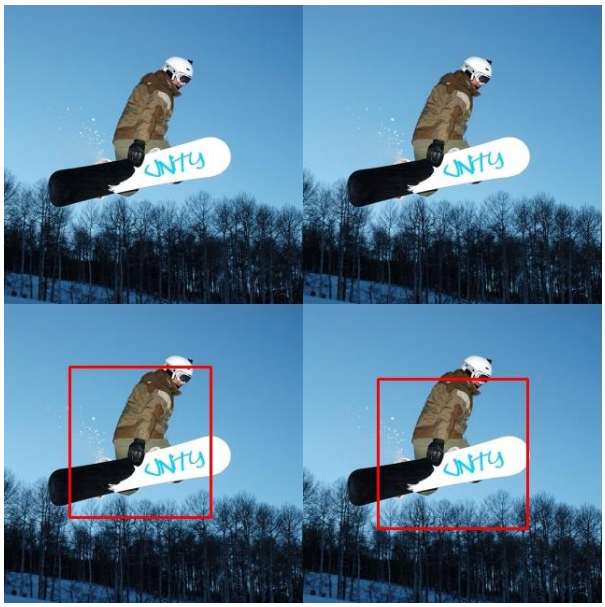
The *validation* set is constructed by 05753.jpg ~ 06391.jpg under 'train' folder, and the *training* set is constructed by 00000.jpg~05752.jpg under 'train' folder.

1. Visualization of Results on Test Data Set:

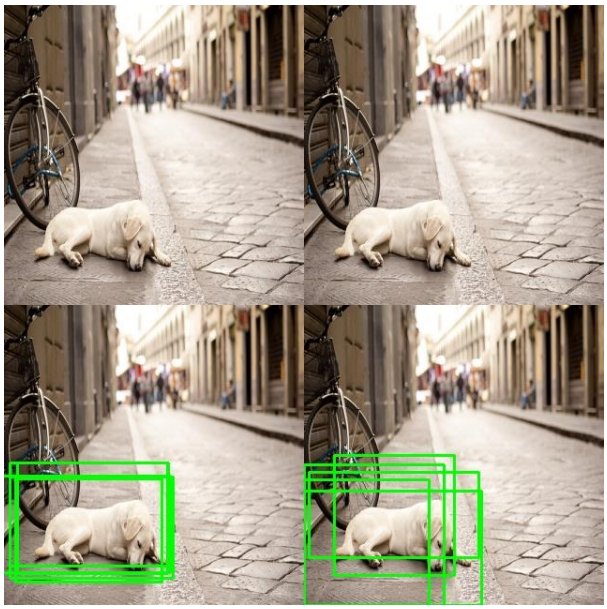
Person Class Before NMS



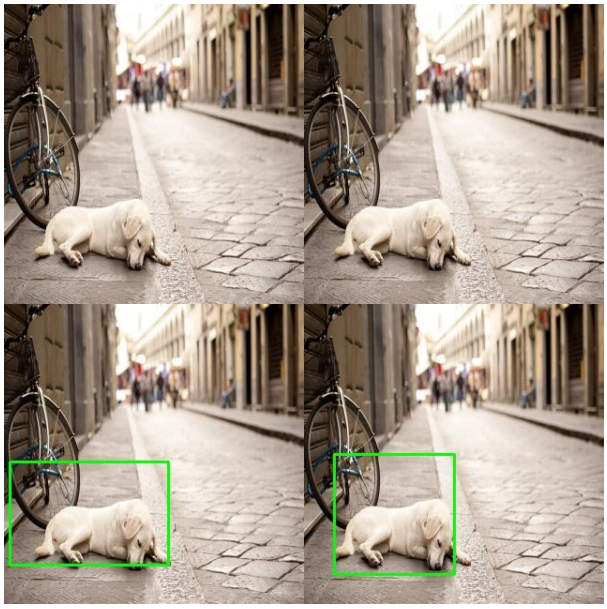
Person Class After NMS



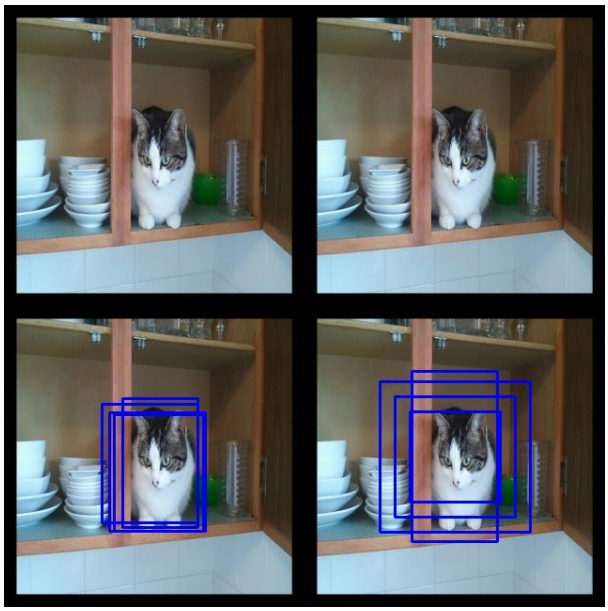
Dog Class Before NMS



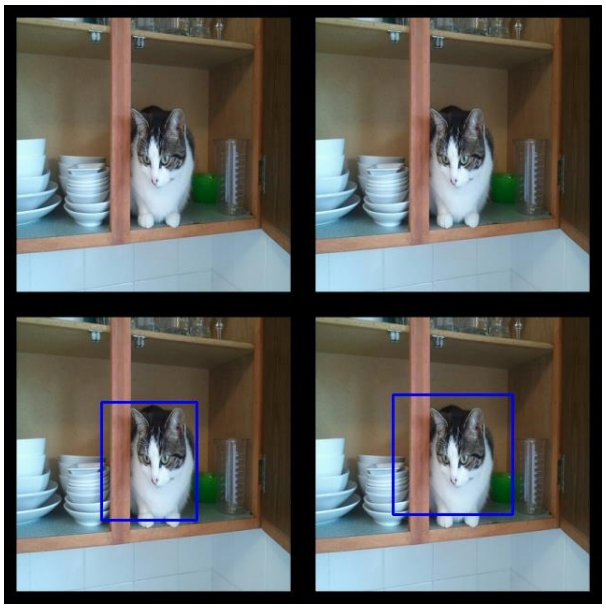
Dog Class After NMS



Cat Class Before NMS



Cat Class After NMS

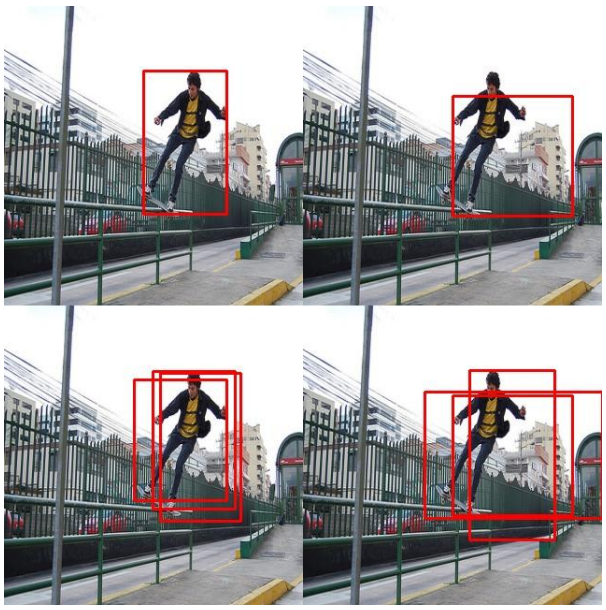


Multiple Object (two Persons) Before NMS

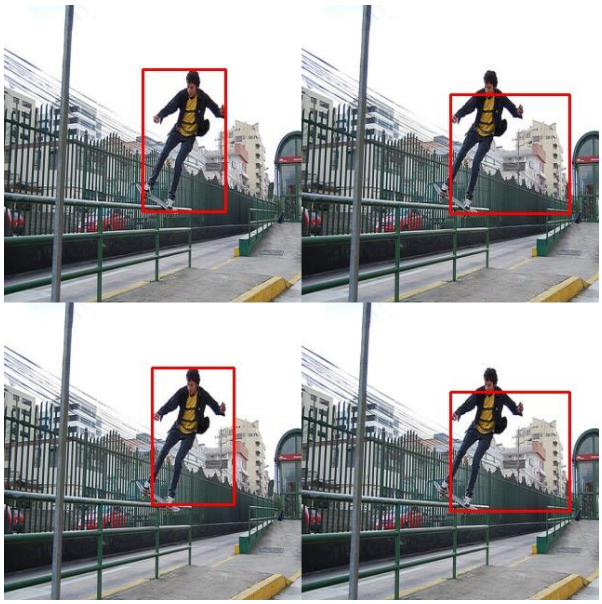
Multiple Object (two Persons) After NMS

2. **Visualization of Results on Validation Data Set:**

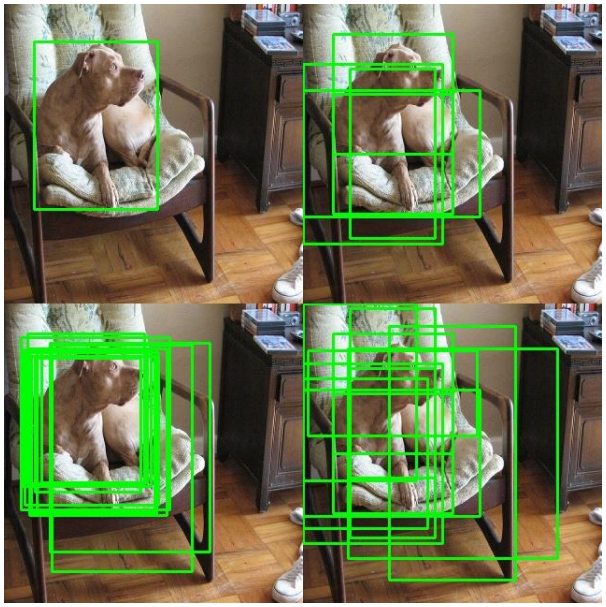
Person Class Before NMS



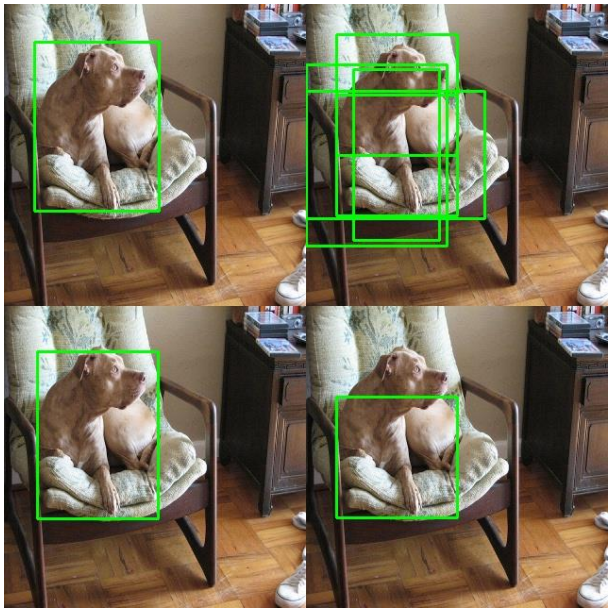
Person Class After NMS



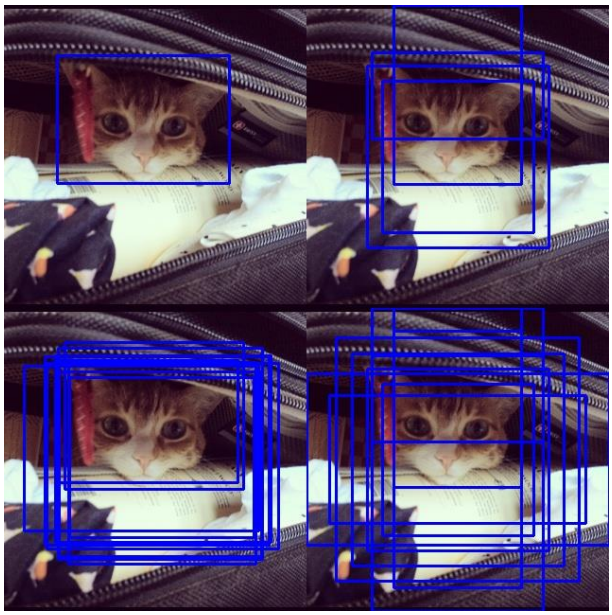
Dog Class Before NMS



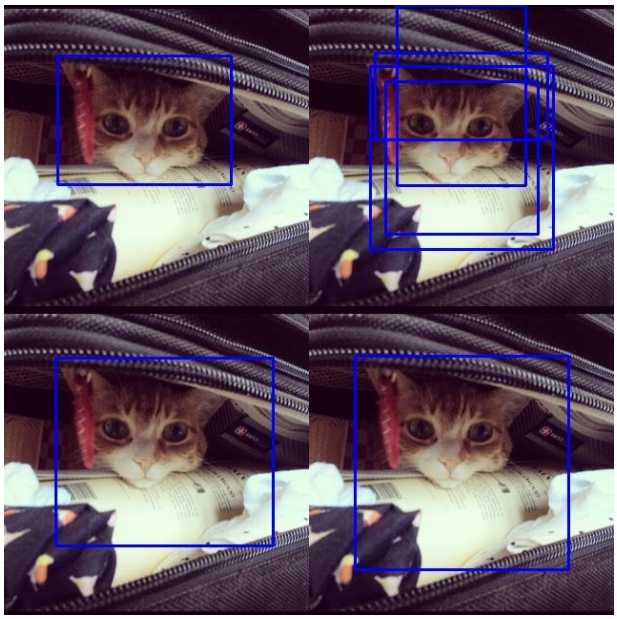
Dog Class After NMS



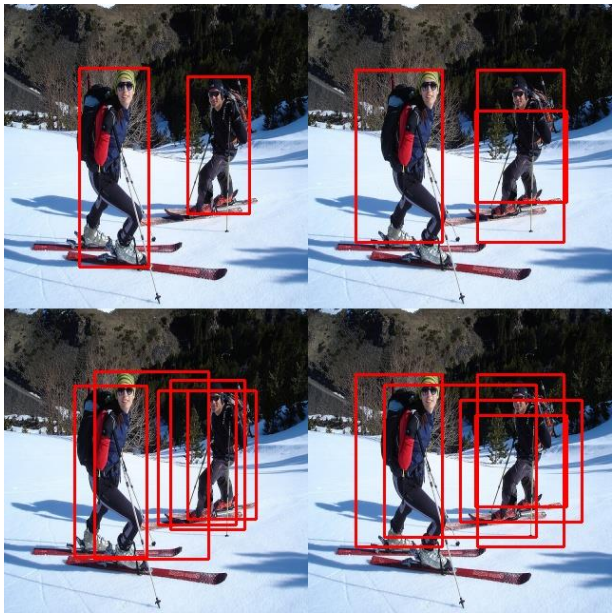
Cat Class Before NMS



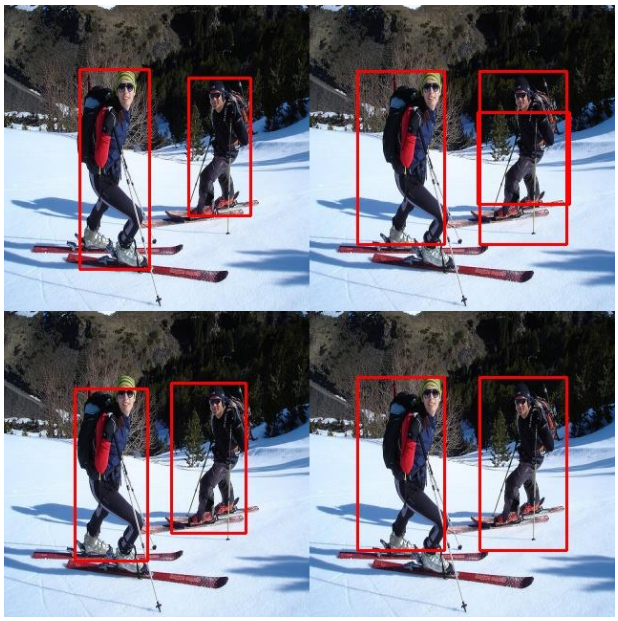
Cat Class After NMS



Multiple Object (two Persons) Before NMS



Multiple Object (two Persons) After NMS



3. Hyperparameters

Learning Rate: 1.0×10^{-4}

Number of Epochs: 160

LR scheduler Settings: No LR scheduler is used, and the learning rate is not changed during training

Optimizer Settings:

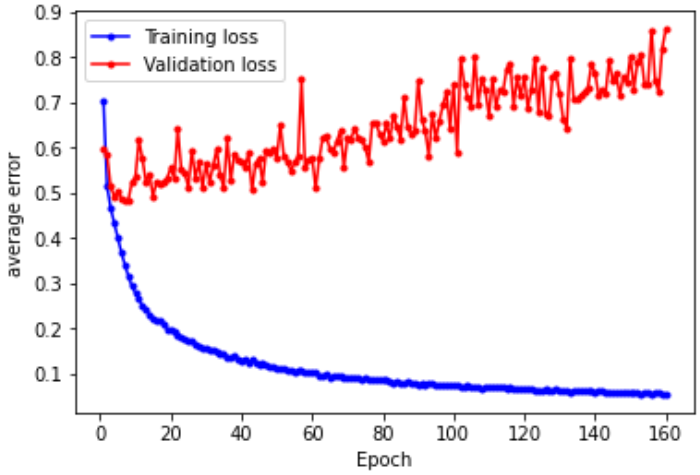
Optimizer: Adam

betas: (0.9, 0.999) (default value)

eps: 1.0×10^{-8} (default value)

weight_decay: 0 (default value)

4. Training and Validation Loss



5. F1 score on the Validation set

Here, "false positive" is defined as the number of predicted bounding boxes who can't find any ground truth annotations that satisfy 1) the predicted classification is same to the ground truth classification; and 2) the predicted bounding box and the annotation bounding box have an IoU of at least 0.5.

"false negative" is defined as the number of ground truth bounding boxes who can't find any predicted bounding boxes that satisfy 1) the predicted classification is same to the ground truth classification; and 2) the predicted bounding box and the annotation bounding box have an IoU of at least 0.5.

According to the above definition, I obtained that the F1 score on validation set is: **0.6904**.

6. List of Data Augmentation: Random Crop, Horizontal Flip