

## Assignment 3 Object Detection (100 Pts)

### Due Date: Monday 11/27 11:59PM EST

In this assignment, we will finetune pretrained [Mask R-CNN](#) model to perform object detection on the [Oxford-IIIT Pet](#) dataset. You may follow [this tutorial](#) which demonstrates how one can deploy Mask R-CNN on the PennFudan dataset. In particular, the primary steps of this assignment involve the following:

- ☐ Define the dataset in PyTorch. You may use the built-in datasets in `torchvision.datasets.OxfordIIITPet`. Its parameters and `__getitem__` method are documented [here](#). Depending on how you pass the pre-built dataset into your Mask R-CNN, it could be helpful and necessary to check the [source code](#) for this dataset.
- ☐ Define the Mask R-CNN model. You will use the pretrained Mask R-CNN, which are available in `torchvision.models.detection`. Please refer to the tutorial on how to initiate an instance of the object detector and download the pretrained weights. There are additional models which are documented [here](#).
- ☐ Write your own training function. This step assembles the datasets, dataloaders, optimizers, and loss functions to perform the full training/validation. The tutorial provides comprehensive details about each part.
- ☐ Evaluate the finetuned object detector on the test set. In this step, you must compute standard metrics for object detection models such as Average Precision, Average Recall, mAP, and IoU scores. In addition to quantitative results, you should also visualize some predictions (i.e., predicted bounding boxes) on the test set to get some qualitative understanding about how well your model performs.

In the Mask R-CNN model part, please choose a DIFFERENT object detector that has not been used in the tutorial. That is, **DO NOT use `Ffasterrcnn_resnet50_fpn` and `mobilenet_v2`**. Use any other available object detectors from [here](#).

Your complete code must be zipped and submitted on Canvas. ***Please include your final model checkpoints and exclude the datafile.***