CS/ECE 8690 Computer Vision

Homework 4 –Part A [40 pts]
Semantic Segmentation using Pre-trained Deep Learning Networks

Out: Tuesday Mar 21 **Spring 2023**
Part A Due: Tuesday April 4 (Please try to submit before the Spring Break)

The goal of this assignment is to get hands-on experience with

- Image segmentation using deep convolutional neural networks.
- PyTorch and TorchVision segmentation frameworks[1]
- Presentation of segmentation results using PyTorch visualization utilities [2]

DeepLabV3 [3] is a popular semantic segmentation network. Three pretrained DeepLabV3 models are available as stable models in PyTorch [4]. All three models were trained on 20-class Pascal VOC dataset.

For this homework you will use DeepLabV3_ResNet50_Weights.COCO_WITH_VOC_LABELS_V1
https://pytorch.org/vision/stable/models.html

Tasks:

1) Load DeepLabV3 model
2) Pre-process (i.e. resize) the image if necessary
3) Segment the given test images.
4) Generate (multi-class) segmentation masks on test images.

Report: Show original images, associated segmentation masks for all the test images. Interpret the results. If the model fails to correctly segment some cases: (1) point out the problem, (2) explain possible reason for failure.

Submission instructions: Your submission should include a report (including output images & your interpretation of the outputs) and associated programs (as separate files).

References:

1. https://pytorch.org/vision/main/index.html
2. https://pytorch.org/vision/stable/auto_examples/plot_visualization_utils.html#semantic-seg-output
3. Chen, Liang-Chieh, George Papandreou, Florian Schroff, and Hartwig Adam. "Rethinking atrous convolution for semantic image segmentation." *arXiv preprint arXiv:1706.05587* (2017).
4. https://pytorch.org/vision/stable/models.html