

# Assignment 8 – CMPUT 328

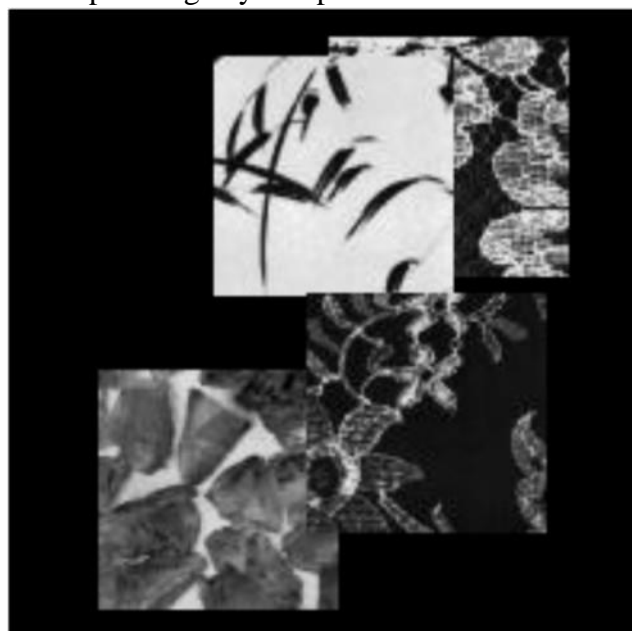
## Semantic Segmentation

### Semantic Segmentation on Texture Images dataset:

**Introduction:** The Texture Images dataset was created by placing these 4 texture images randomly on blank images of size 196x196:



A sample image by this procedure is shown below:



The dataset can be found inside the “**TextureImagesDataset**” folder in your code directory. There are 2000 samples in the train set and 500 samples in the test set.

Each sample consists of an RGB image of size (1, 196, 196, 3) and a mask of size (1, 196, 196, 1). They are both of uint8 type. The mask tells us which texture each pixel belongs to. It will have value from 0 to 4: 0 is the background class (i.e. that pixel belong to no class), 1-4 are for the 4 classes of the 4 texture.

The whole train set will have shape (2000, 196, 196, 3) for the images and (2000, 196, 196, 1) for the mask. Similarly, test set will have shape (500, 196, 196, 3) for the images and (500, 196, 196, 1) for the mask.

**Task:** Your task in this question is to do semantic segmentation on this dataset. To be specific, you just have to write the structure of the semantic segmentation network in the function **SemSeg()**. Everything else has been done for you. Remember, the returned output for this function must have size (<batch\_size>, 5, 196, 196). There are no architecture requirements or guidelines.

### MARKING:

**25% Marks:** Online lab quiz will be performed during (Monday, Nov 4 – Friday, Nov 8). Note that you must have to be present in your designated lab section. *You will not get any mark for this part if you don't attend in your own lab section.*

**75% Marks:** The due date is Friday, November 8 by 11:55 pm. Your mark will scale linearly with the pixel accuracy of your segmentation, starting from 90.5% (0 mark) and cap at 98.5% (75 Marks)

### SUBMISSION:

You need to submit the complete solution of file: '**Assignment\_8\_StudentID.ipynb**'. Also, the model file '**model.pt**' as well. Write down your student name and student id at the top of the file. **Keep the output block of the final section while submitting your solution. The output block may look like this:**

```
Training...
▶ epch 1 / 25: Test Pixel Accuracy = 0.865 max_accuracy = 0.865 in epoch 1
↳ epch 2 / 25: Test Pixel Accuracy = 0.945 max_accuracy = 0.945 in epoch 2
epch 3 / 25: Test Pixel Accuracy = 0.938 max_accuracy = 0.945 in epoch 2
epch 4 / 25: Test Pixel Accuracy = 0.975 max_accuracy = 0.975 in epoch 4
epch 5 / 25: Test Pixel Accuracy = 0.981 max_accuracy = 0.981 in epoch 5
epch 6 / 25: Test Pixel Accuracy = 0.982 max_accuracy = 0.982 in epoch 6
epch 7 / 25: Test Pixel Accuracy = 0.583 max_accuracy = 0.982 in epoch 6
epch 8 / 25: Test Pixel Accuracy = 0.959 max_accuracy = 0.982 in epoch 6
epch 9 / 25: Test Pixel Accuracy = 0.762 max_accuracy = 0.982 in epoch 6
epch 10 / 25: Test Pixel Accuracy = 0.864 max_accuracy = 0.982 in epoch 6
epch 11 / 25: Test Pixel Accuracy = 0.941 max_accuracy = 0.982 in epoch 6
epch 12 / 25: Test Pixel Accuracy = 0.963 max_accuracy = 0.982 in epoch 6
epch 13 / 25: Test Pixel Accuracy = 0.954 max_accuracy = 0.982 in epoch 6
epch 14 / 25: Test Pixel Accuracy = 0.821 max_accuracy = 0.982 in epoch 6
epch 15 / 25: Test Pixel Accuracy = 0.846 max_accuracy = 0.982 in epoch 6
epch 16 / 25: Test Pixel Accuracy = 0.967 max_accuracy = 0.982 in epoch 6
epch 17 / 25: Test Pixel Accuracy = 0.945 max_accuracy = 0.982 in epoch 6
epch 18 / 25: Test Pixel Accuracy = 0.971 max_accuracy = 0.982 in epoch 6
epch 19 / 25: Test Pixel Accuracy = 0.985 max_accuracy = 0.985 in epoch 19
epch 20 / 25: Test Pixel Accuracy = 0.980 max_accuracy = 0.985 in epoch 19
epch 21 / 25: Test Pixel Accuracy = 0.986 max_accuracy = 0.986 in epoch 21
epch 22 / 25: Test Pixel Accuracy = 0.988 max_accuracy = 0.988 in epoch 22
epch 23 / 25: Test Pixel Accuracy = 0.989 max_accuracy = 0.989 in epoch 23
epch 24 / 25: Test Pixel Accuracy = 0.982 max_accuracy = 0.989 in epoch 23
epch 25 / 25: Test Pixel Accuracy = 0.987 max_accuracy = 0.989 in epoch 23
Done training. Weights saved to: model.pt
Evaluating on test set
Test Pixel Accuracy = 0.987
```