

Assignment 3

Assignment due: **03/26/2023 11:59 PM EST**

Late submission due: 04/02/2023 11:59 PM EST with 10% grade penalty

Submissions after 04/02/2023 11:59 PM EST will not be accepted

Submission format: please submit your codes with a readme file for Task 1 & 2 and a report in .pdf for all tasks. Do not include the dataset in your code submission. You are encouraged to submit a **github repo link** which includes all your code.

Task 1 : Simple Linear Iterative Clustering - 50%

Implement Simple Linear Iterative Clustering Superpixels in Python without using any official algorithmic API (you definitely can use some basic libraries like numpy). Try not to copy any source code from GitHub. Add necessary documentation or annotations to help TA understand the philosophy of your implementation.

Choose an image of Brandeis (e.g., campus), compare the results between your implementation and SLIC in scikit-image. Include the code and two results in your submission. Compare your codes and scikit-image or GitHub open source codes, illustrate the pros and cons (primarily in cons) of your implementation.

Task 2 : Visual Attention in Deep Neural Networks - 50%

Read the paper ‘Grad-CAM: Visual Explanations from Deep Networks via Gradient-based Localization,’ and check <https://github.com/kazuto1011/grad-cam-pytorch##references>.

Follow the instructions and generate attention maps in Demo 1 and 2 of your own images. In Demo 1 you need to provide the Grad-CAM, Vanilla backpropagation, and Guided Grad-CAM of one class, but no need in different models. In Demo 2 you need to provide the layers in relu, layer1, layer2, layer3, and layer4. Try to rotate the input image or add some perturbations to see if the attention maps are still accurate.

Please include all the figures of attention maps in your submission with corresponding captions.