E9 241 Digital Image Processing

Assignment 05

Due Date: November 24, 2023 - 11:59 pm **Total Marks:** 30

Instructions:

For all the questions, write your own functions. Use library functions for comparison only.

- Your function should take the specified parameters as inputs and output the specified results.
- Also provide the wrapper/demo code to run your functions. Your code should be self-contained, i.e., one should be able to run your code as is without any modifications.
- For Python, if you use any libraries other than numpy, scipy, scikit-image, opencv, pillow, matplotlib, pandas, and default modules, please specify the library that needs to be installed.
- Along with your code, also submit a PDF with all the **results** (images or numbers) and **inferences** (very important: you may not be explicitly asked to give inferences in each question. You should always include your inferences from what you have observed). Include answers to subjective questions, if any.
- Put all your files (code files and a report PDF) into a single zip file and submit the zip file. Name the zip file with your name.

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1. **KNN Classifier with deep features:** In this assignment, you will learn to use a pre-trained deep neural network. You are given a set of training images and test images. Load a pre-trained model of your choice (ResNet, etc) and extract deep features for every image from the last fully connected layer. Then compute the image classification accuracy for the test set using KNN classifier (k=3).

   (**20 Marks**)

2. **Fine-tuning:** Fine-tune the last layer using the available data and small learning rate and repeat the same experiment.

   (**10 Marks**)