Coding Assignment 5

Department of Electronics & Electrical Communication Engineering, IIT Kharagpur.

Course: EC60002, Computer Vision

Academic Term: Spring 2020-21

Maximum Marks: 20 (8% of Total)

Deadline: 12th April, 2021, 10pm

Instructions:

- Do not use downloaded or inbuilt functions related to the implementations required in order to get proper results.
- You are free to use any coding language provided that it can be run in Google Colab.
- All the deliverables must be submitted in a single zip file at the relevant Google form.

Data Supplied:

- 3 uncorrupted grayscale images, 3 degraded images per uncorrupted image.
  Filename indicates (x is a number): x – Uncorrupted, xB – blurred, xG – Gaussian noise, xL – Laplacian noise.

Relevant Expressions:

$$SSIM(x,y) = \frac{2\mu_x\mu_y \times 2\sigma_{xy}}{\left(\mu_x^2 + \mu_y^2\right)\left(\sigma_x^2 + \sigma_y^2\right) + C}, C \ll 1$$

Choose x and y regions of sizes such that an entire image is represented by at least 200 such non-overlapping regions. The corresponding smaller regions are used to compute multiple SSIM values, which are averaged considering all the regions.

Task:

Use ONLY two appropriate order statistic (OS) filters (not weighted OS) to perform the restoration of the three degraded images. Compute the SSIM values of the restored images using both the order statistic filters along with that of the degraded images [total 9 SSIM values per uncorrupted image].

Tabulate and compare the SSIM values obtained for each image to justify your OS filter choices.

Note – The filters and SSIM must be coded (must no use inbuilt or downloaded ones)

Deliverables (in a single .zip file):

1. A document containing all the findings (including visual results) asked under the task given along with a discussion using not more than 300 words.
2. Codes used to generate the findings along with a command sequence to generate all the findings.