

## Assignment01 Histogram Equalization

Histogram is a graphical representation of the intensity distribution of an image. It captures the occurrence frequency of pixel intensity values with which multiple image statistics can be calculated. Many image processing methods make use of image histograms for different purposes.

Histogram Equalization (HE) is an image processing technique that has been widely adopted to improve the contrast in images. It accomplishes this by spreading out the most frequent intensity values, i.e. stretching out the intensity range of the image. It usually increases the global contrast of images when the image pixels fall within a narrow range of intensity values. This allows for areas of lower local contrast to gain a higher contrast.

This assignment consists of the following tasks:

- 1) Implement the HE algorithm in Matlab or Python or other computer programming languages, and apply your implemented HE algorithm to the 8 sample images. The submission of your solution should include your source-code algorithm implementation as well as the enhanced sample images by your implemented algorithm.
- 2) Discuss the pro and con of histogram equalization algorithm according to the enhanced sample images by your implemented HE algorithm. Discuss possible causes of unsatisfactory contrast enhancement.
- 3) Discuss possible improvements of the basic HE algorithm. Implement and verify your ideas over the provided test images. This subtask is **optional**, and there will be bonus marks if you can address this subtask well.

You need to submit your solution report in **PDF format**, and there are no standard templates for your report. Ensure you include your **name** and **matriculation number** clearly in the cover page of your report. If completed by a group (**max with 3** group members), **only one group member needs to submit** but ensure to include the names and matriculation numbers of all group members on the coverage page of the assignment report.

Similar to the literature review, your report will be evaluated according to both contents and report presentation.

Please submit your solution through **NTULearn** before the deadline on **Sept 15<sup>th</sup> 2023**. There will be penalty for late submissions.