# Computer Vision

## Programming Task 04

Implement the histogram matching discussed in class today using MATLAB or Python.

**Tasks to be implemented:**

Define a function **histogram_matching(image, reference_image)**. This function takes two grayscale images as input:

- **image**: The image whose histogram needs to be matched.
- **reference_image**: The reference image with the desired histogram distribution.

The function should perform the following steps:

- Compute the histogram of both the **image** and **reference_image**.
- Calculate the Cumulative Distribution Functions (CDFs) for both image and reference histograms.
- Create the mapping function. This builds a lookup table that maps each intensity value in the original image to its corresponding new intensity value obtained from the reference image's CDF.
- Apply the mapping and compute the new (adjusted) image.
- Plot the histograms of both the original and histogram-matched images.
- Return the final image.

**Evaluation:**

Anytime after CV mid-term exam.

Maximum Points: 10