

## **Digital Image Processing: Lab Assignment 2**

### **#1: Image Histogram and Equalization [100points]**

Issue date: 10-01-20

Due date: 17-01-2020

### **Instructions**

- Do not copy code from any other source (internet or friend). In case, any plagiarism detected, strictly zero mark will be assigned for that assignment.
- Show your results on sample images given in the assignment. Any other won't be considered for evaluation.
- Clearly state your name and Entry number on the lab report.
- Any additional materials used during the completion of the assignment must be cited. Failure to correctly reference sources will result in mark deduction(-10p/day).
- Submit a PDF file with proper. If the report is handed in more than three days after the deadline, the assignment will be marked zero marks. Up to five bonus points may be awarded to the student for very good lab assignments that comply with the criteria described below:
  - +1p ← Report is clearly written and easy to follow.
  - +1p ← Code is well documented.
  - +1p ← Explanations and Observations are well written.
  - +1p ← For overall exceptional reports, that confirm to all scientific writing standards.
  - +1p ← Extra experiments performed on other set of images for better understanding.

# 1 Image Histograms

**1.1** Write a program (in MATLAB or PYTHON) to compute the histogram of an intensity RGB image. File name should be "EntryNo\_hist". **[15point]**

NOTE: Do not use inbuilt functions (like imhist or hist)

**1.2** Find the following parameters using histogram of image.

- (a) Mean
- (b) Standard Deviation
- (c) Energy
- (d) Entropy
- (e) Third moment (skewness)
- (f) Fourth moment (Kurtosis) **[30point]**

**1.3** Compute cumulative distribution function (CDF) of your histogram. Also, normalize your CDF so that the range is 0 to 255. **[15point]**

Plot the original image, the histogram, the cumulative distribution function. Mention any mathematical equation used with reference while writing report.

# 2 Image Equalizations

**2.1** Write a program (in MATLAB or PYTHON) to improve the image contrast of a grayscale image using various mentioned methods. Don't use inbuilt functions.

- (a) Using Contrast Stretching
- (b) Using Gamma Correction
- (c) Using Histogram Equalization
- (d) Using Unsharp masking

Plot the results for all methods and compare their performance. Write down your observations in detail. **Marks will be awarded based on your observations. [40point]**

## 2 Sample Images:

