CMPG-767 Image processing and Analysis
Project 1

Student: Emeshe Sotak SA1/1

Goals:

1) To learn how to measure statistical characteristics of an image
2) To develop programming skills related to image processing and 2-D arrays processing

1. Design the following Matlab functions:

a) A function for statistical analysis of an image, which calculates and returns min, max, mean, standard deviation, variance, and SNR (signal-to-noise ratio) of an image.
File: image_statistical_analysis.m

b) A function, which calculates, returns and plots a histogram of an image.
File: plot_histogram.m

c) A function, which accepts an image, performs its histogram equalization and returns an image with an equalized histogram (you may assume that the range of an image is {0,..., 255}
File: histogram_equalization.m

d) A function, which accepts an image, its desirable mean and desirable standard deviation, performs its linear contrast correction and returns an image with corrected contrast.
File: linear_contrast_correction.m

2. Choose a gray-scale image f xy (,).

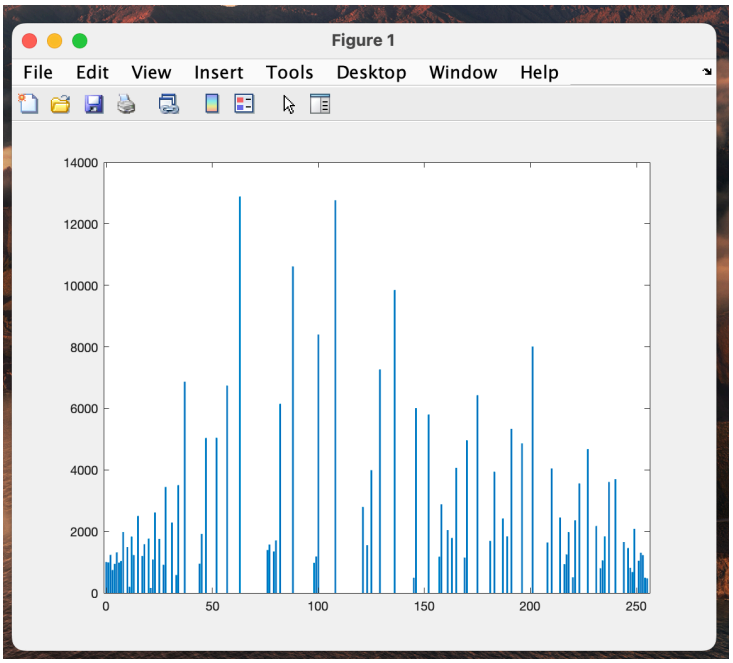
Design a Matlab script utilizing the following (use the functions, which you designed) for the image:

a) Evaluate its statistical characteristics.
b) Enhance its contrast using histogram equalization.
c) Enhance its contrast using linear contrast correction.
d) Evaliate statistical characteristics of the enhanced images, plot their histograms and display them in the separate figure windows.
Original image. File: 1.png

Statistical analysis

```
Command Window
>> main
Min - 0
Max - 198
Mean - 8.195727e+01
Standart deviation - 5.715592e+14
Variance - 3.266799e+29
Signal-to-noise ratio - 1.433924e-13
fx >>
```

Histogram



Enhancing contrast using histogram equalization

Enhancing contrast using linear contrast correction

3. Repeat steps 2 a)-d) for another gray-scale image.

Original

Histogram equalization

linear contrast corr..

3. Write a brief technical report summarizing your results.
4. Turn your source code, resulting images and the report