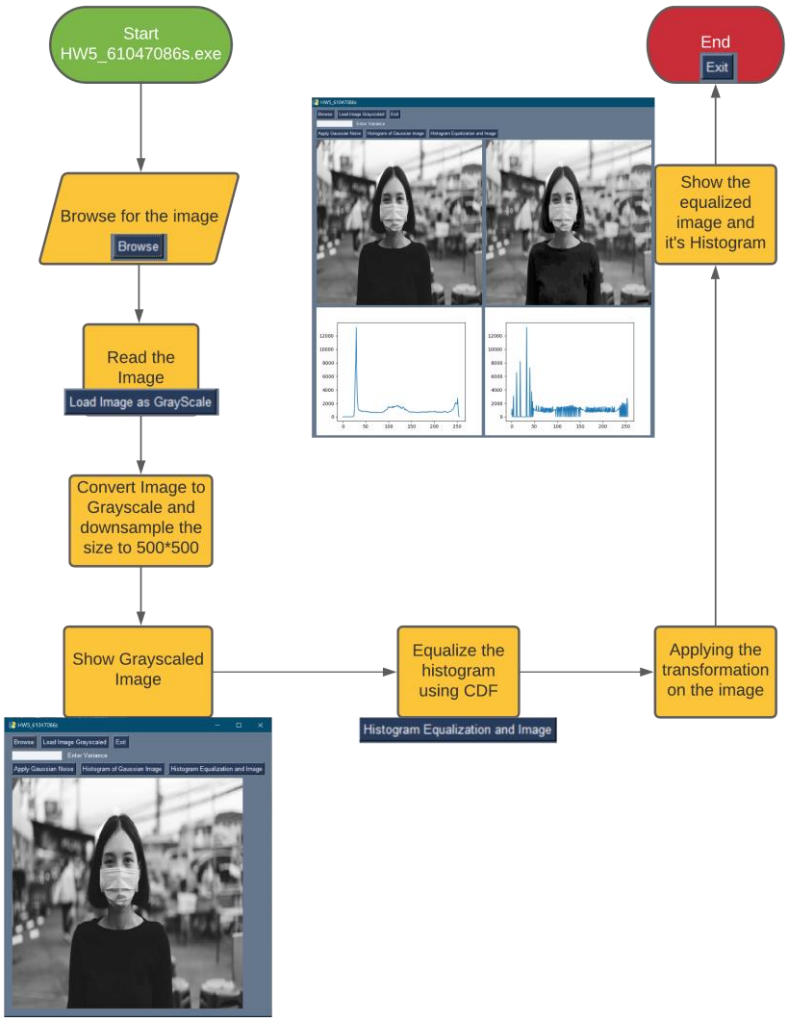
Advance Image Processing
Homework 5

Student No: 61047086s Name: ROHIT DAS

1. Project topic: Image Histogram Equalization
2. Programming language and Compiler: Python 3.7.8
3. Library- OpenCV Latest, Numpy Latest, PySimpleGUI- Latest, Matplotlib- Latest
4. The main functions of the program:
    (a) Read image files: including JPG files, BMP files, PPM files and PNG files
    (b) Equalize the Histogram
    (c) Show the Equalized Image
5. The flowchart of the program:



6. Testing results (4 examples)

Example: 1

(Input Image) (Output Result)

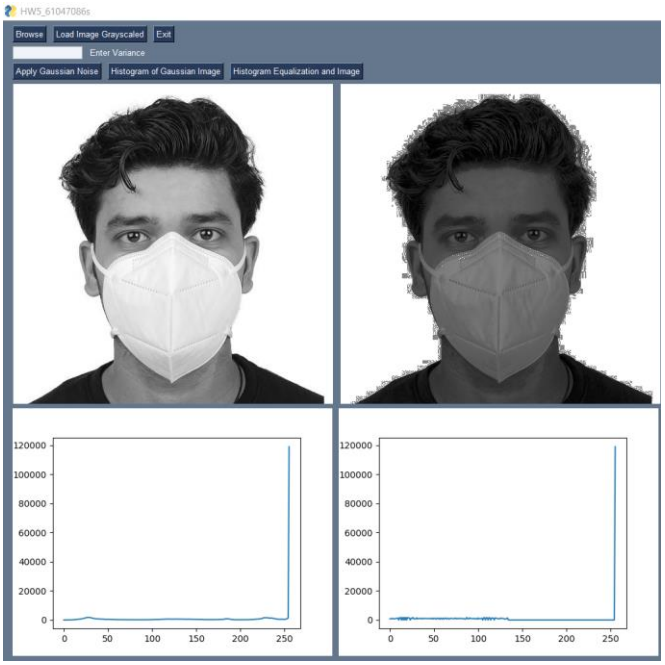
Example: 2

(Input Image) (Output Result)

Example: 3

(Input Image) (Output Result)

Example: 4



(Input Image) (Output Result)

7. What you have learned in this homework?

   This homework taught me 4 important things:

   1. To create CDF of a histogram and convert it to transformation table.
   2. To map the transformation table on the equalized image.
   3. Updating the GUI with new image every time new photo gets uploaded in the system.
   4. Understanding Image Equalization algorithm.

   The challenges I faced during this assignments are as follows:

   - Applying the cdf on Histogram – The cumsum function though easy in theory was a little bit complicated to implement.
   - Setting the transformation table was another challenge. Cause we need to change the minimum of every pixel in cdf histogram to the minimum of original histogram.
   - The challenge I faced the most is updating the image and histogram simultaneously in pysimplegui. It was quite daunting but the solution came out and I am satisfied.

   In the end I would like to mention that this assignment taught me a lot and I am quite satisfied with it. I am looking for more challenges like this.