PROJECT REPORT

PROJECT 1

Avijeet Mishra
UNIVERSITY AT BUFFALO
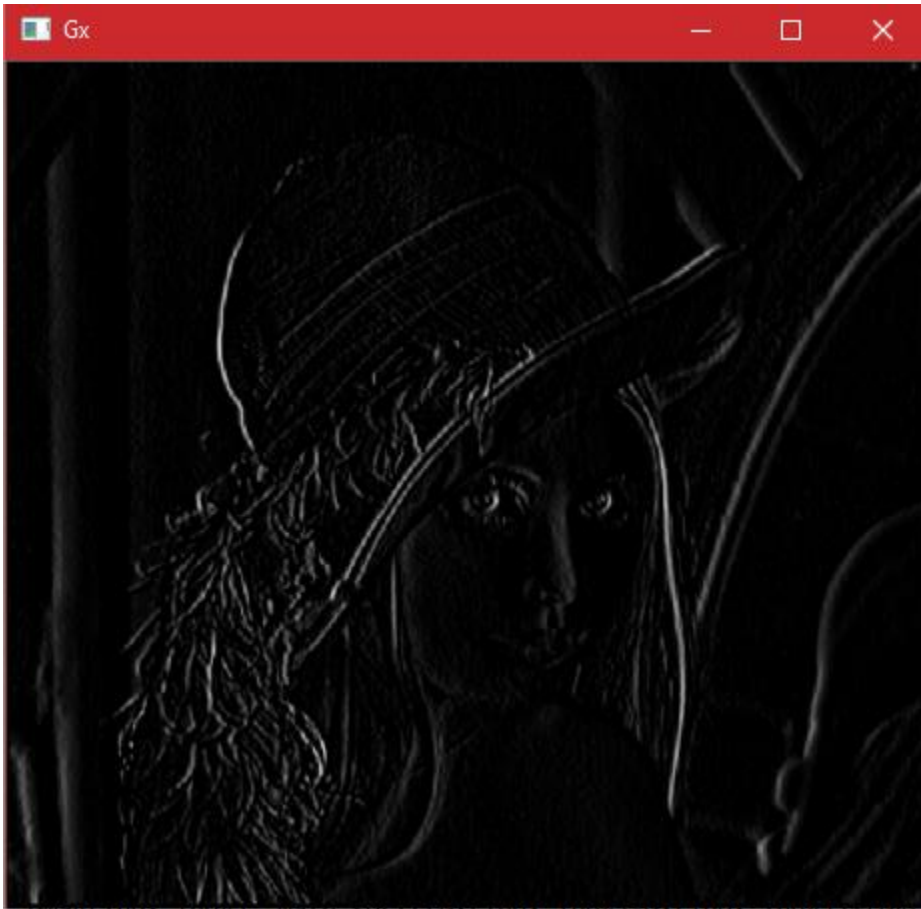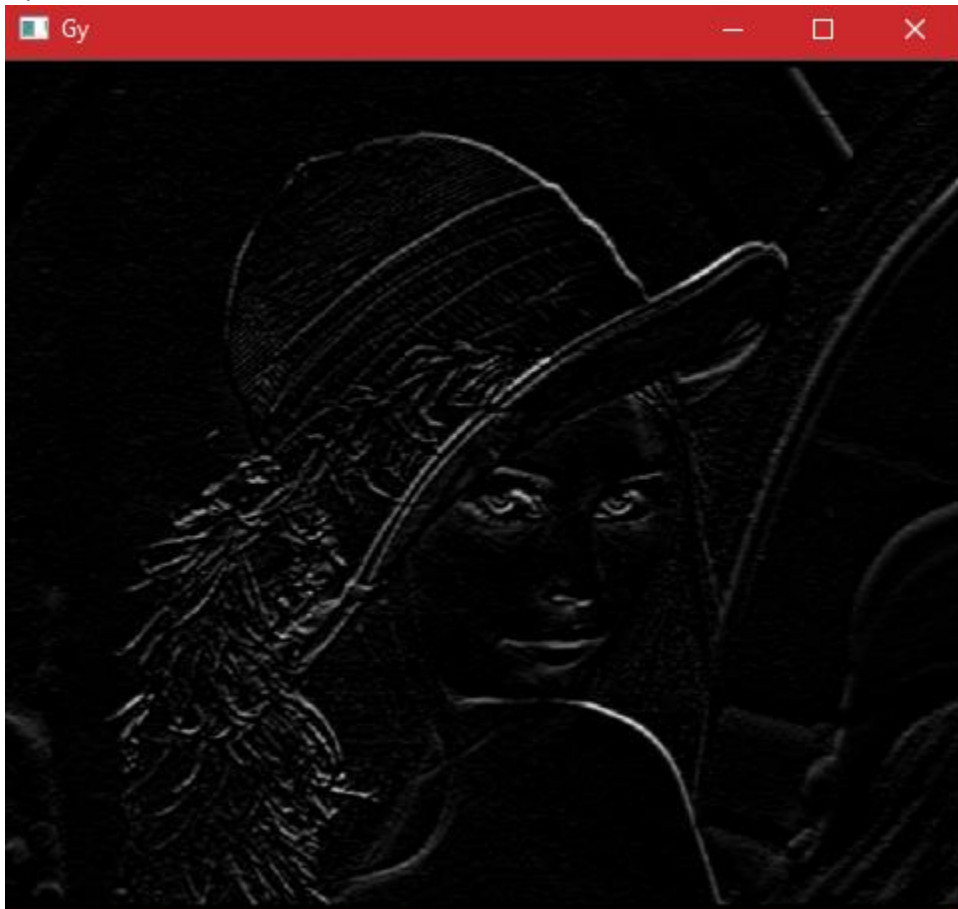50169242
AVIJEETM@BUFFALO.EDU

Contents

PROBLEM 1

Original Image

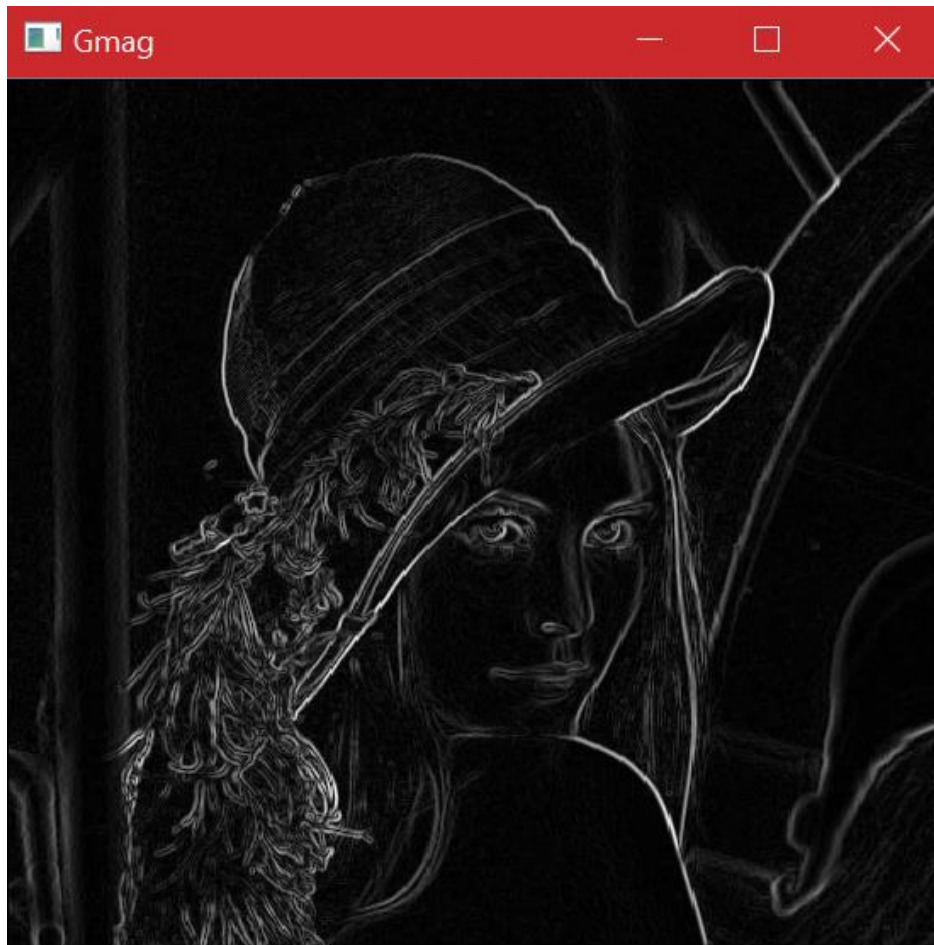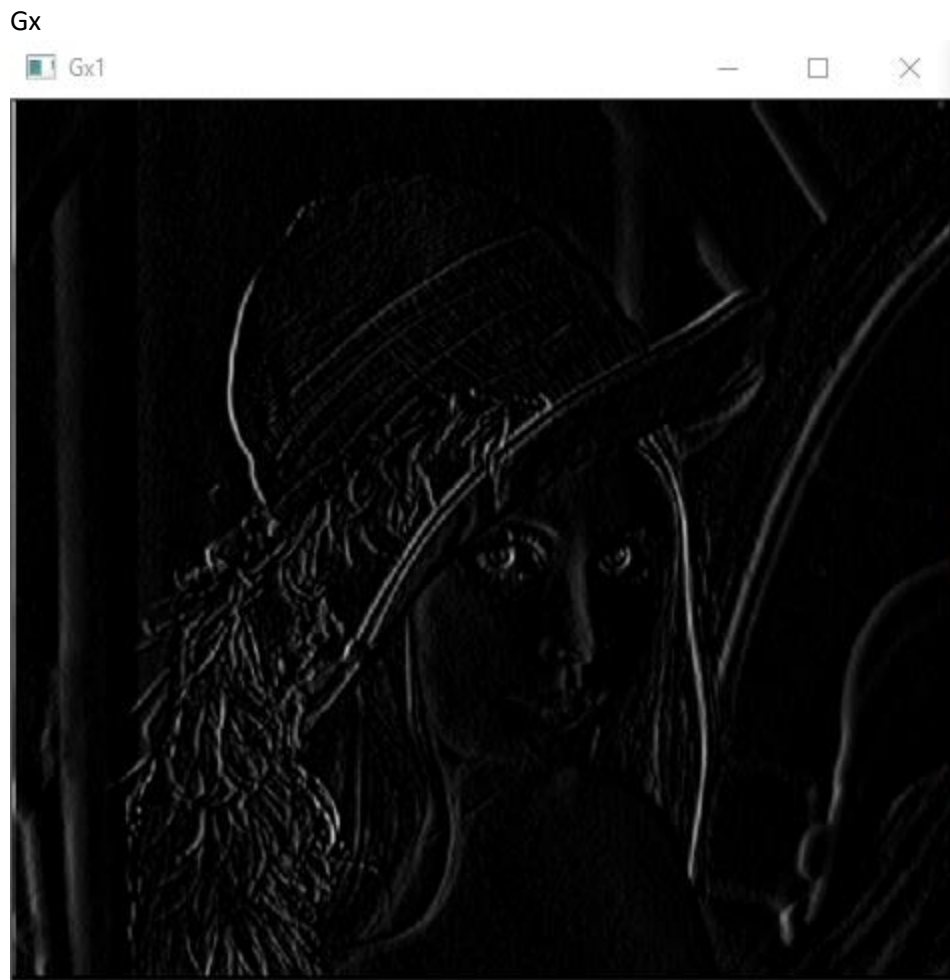**A.** 2D Convolution : Images after 2D Convolution

Gx

Gy

Gmag

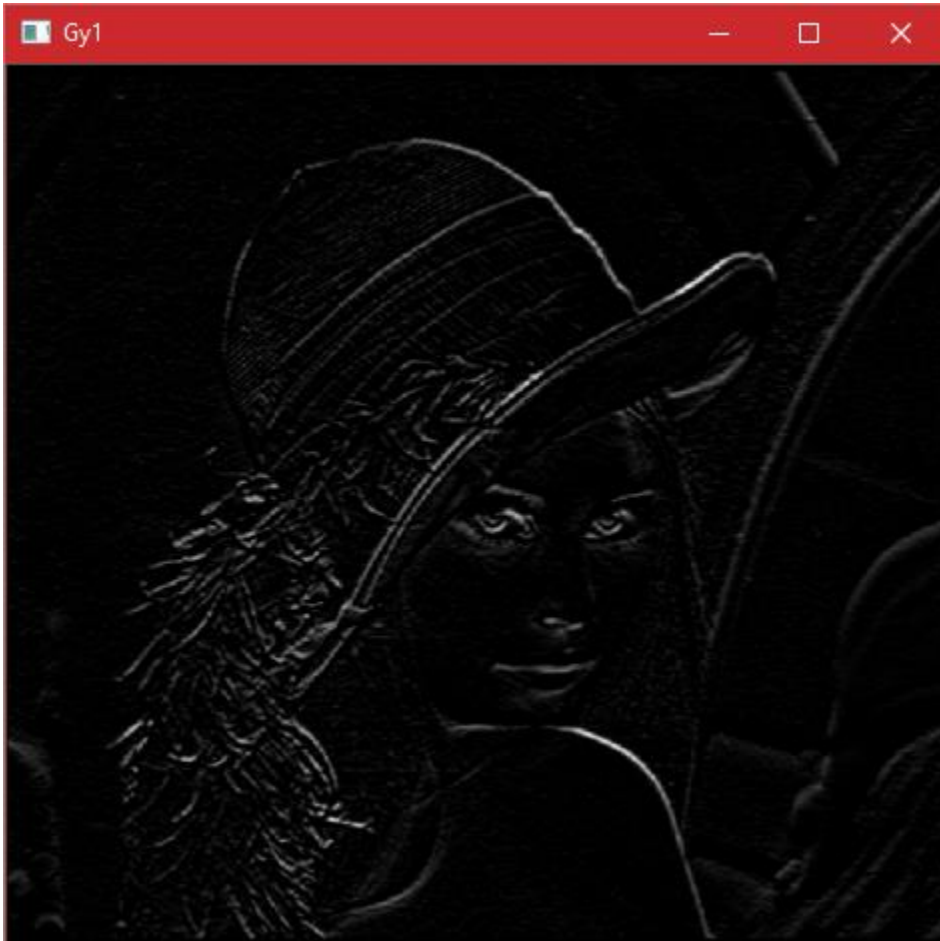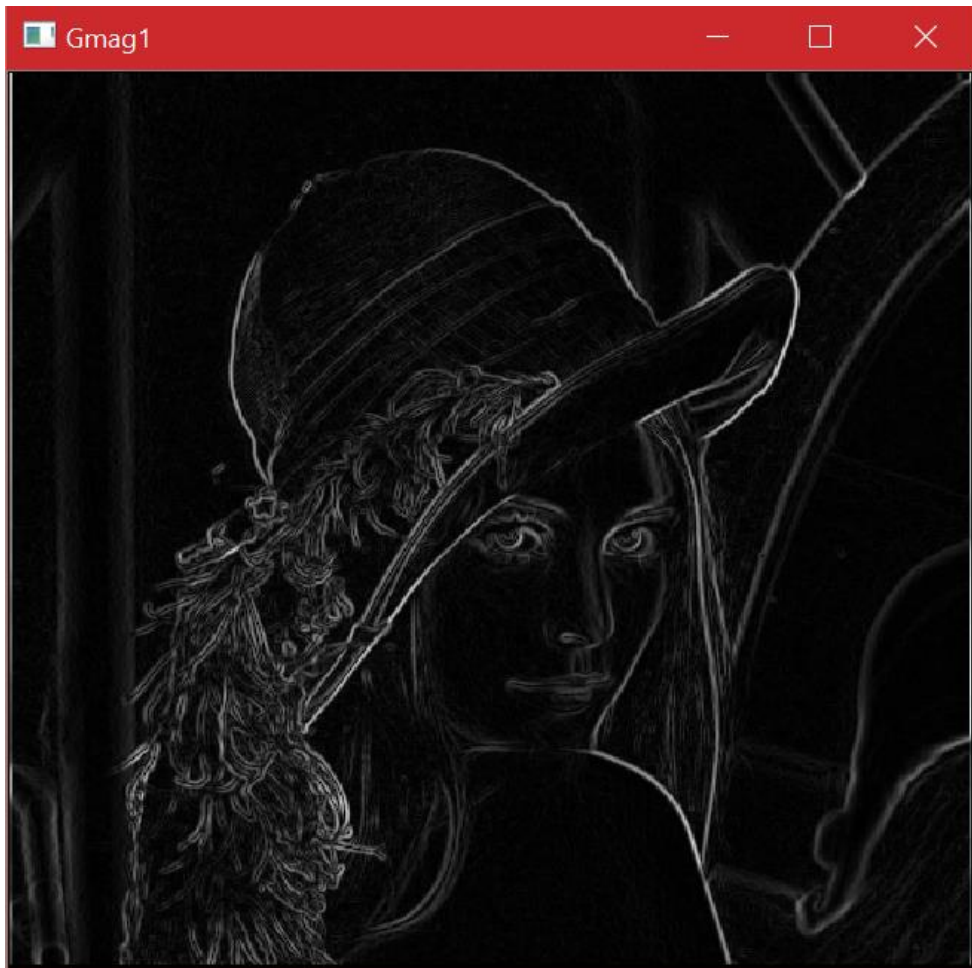**B.** 1D Convolution : Images after 2D Convolution

Gx

Gy

Gmag

Gx, Gy and Gmag of 1D and 2D convolution is similar.

C. Computational Complexity

For M*N Image and P*Q Filter, Computational complexity of performing 2D Convolution would be **O (M*N*P*Q)** because each pixel would be computed in P*Q computation.

For M*N Image and P*Q Filter, Computational complexity of performing separable 1D Convolution would be **O (M*N*(P+Q))** because each pixel would be computed in P+Q computation.

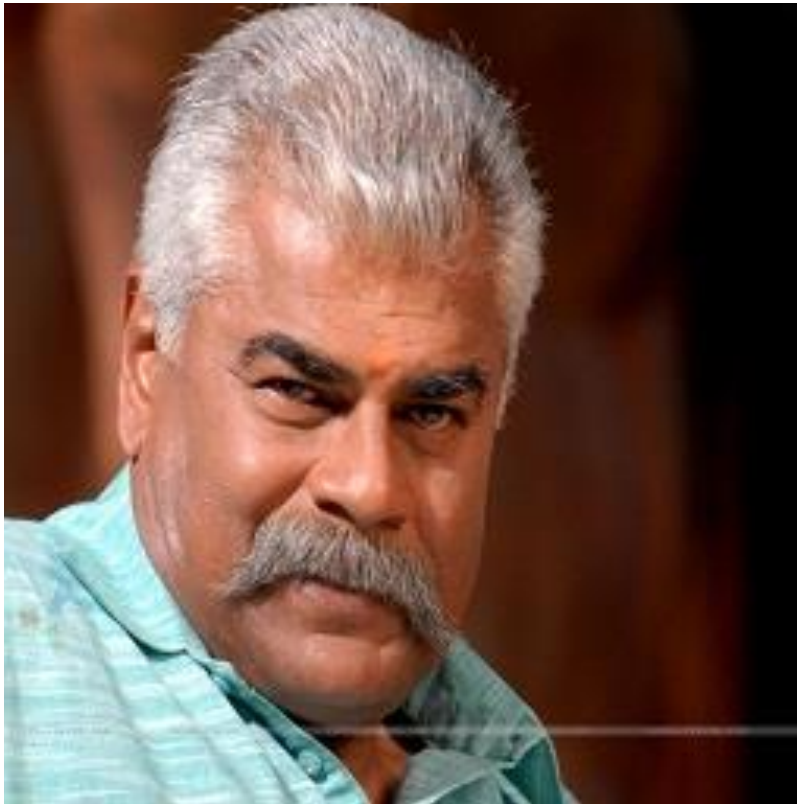For Example, an image with 256*256 size and filter of 3*3 would take following number of operations:

2D Convolution: 256*256*3*3 =   589284

1D Convolution: 256*256*(3+3) = 393216

So computational complexity of performing 2D convolution is greater than 1D convolution.

PROBLEM 2

Original Image

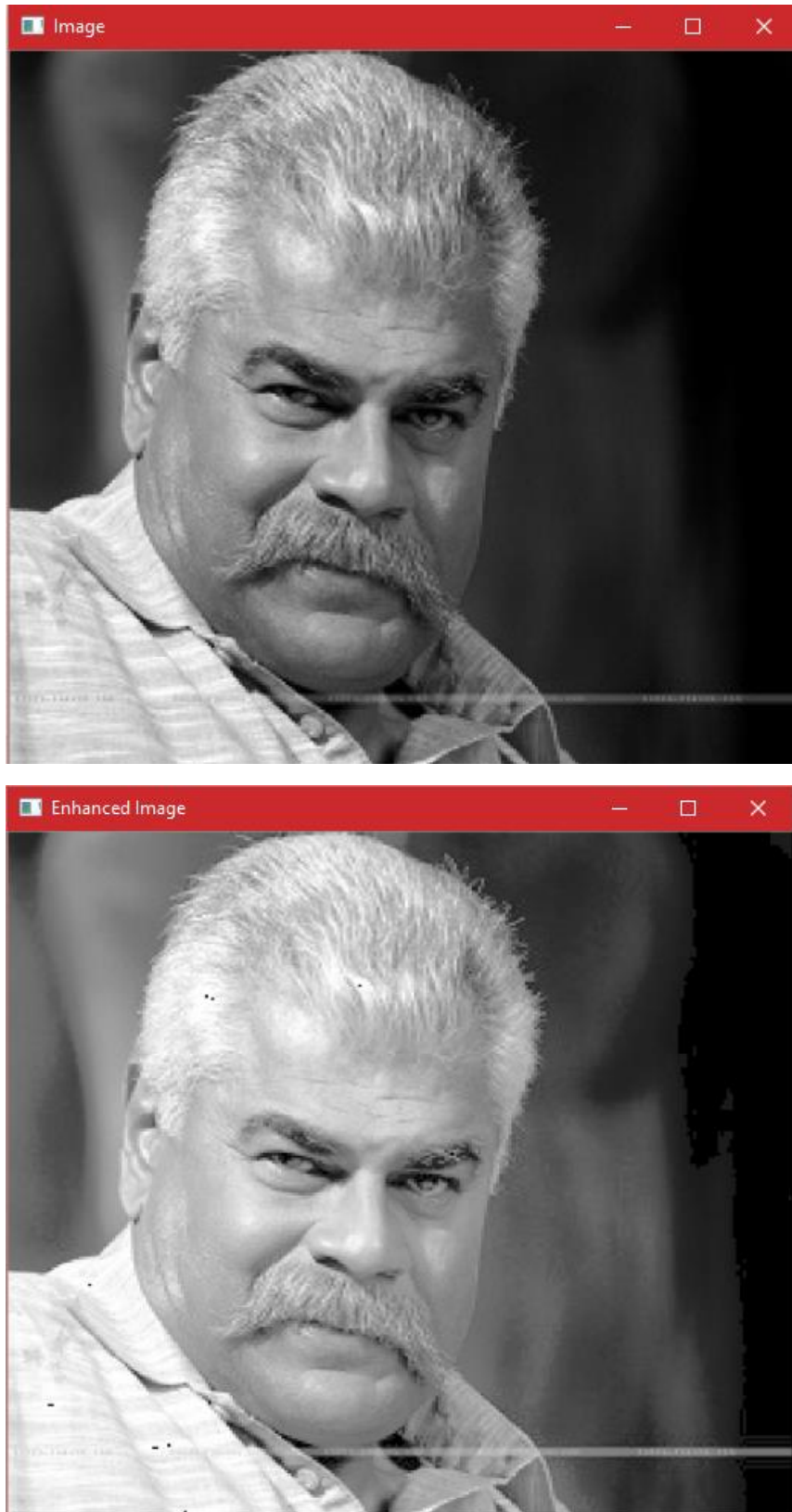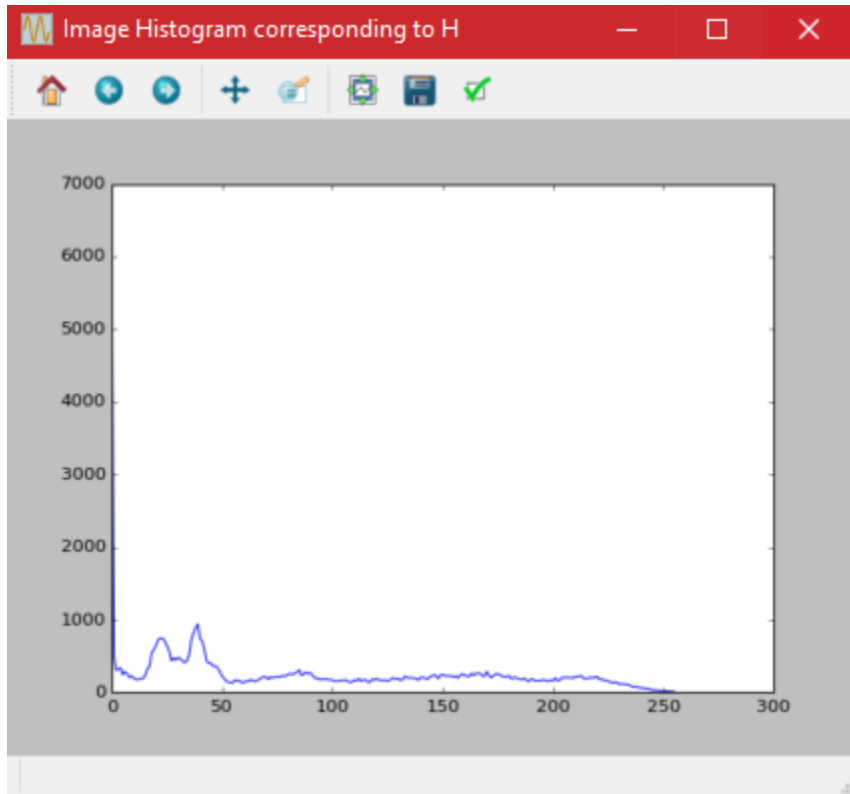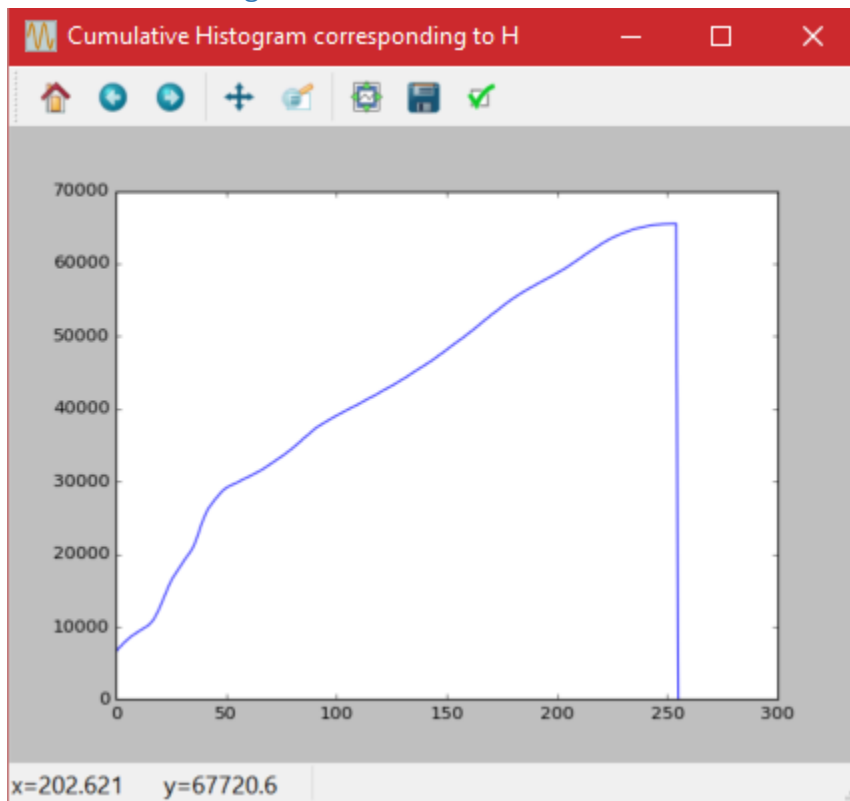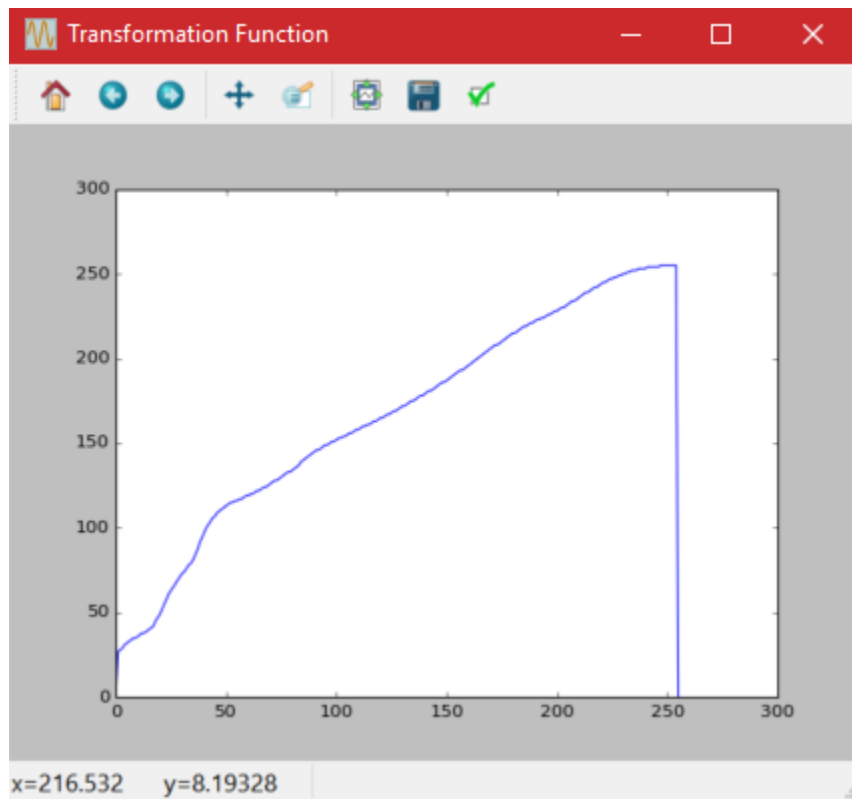## Comparison of Original Greyscale and Enhanced Image

Image Histogram

Cumulative Histogram

Transformation Function

Final Histogram