

Assignment 1

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CP - 467

Task 1:

Down sample ‘img1’ by $\frac{1}{4}$ in each dimension then up-scale it back to the original using (1) Nearest Neighbor, (2) Bilinear Interpolation, both implemented from scratch and using OpenCV

Original Image



After being downsampled and interpolated; nearest neighbor gives a jagged appearance

Nearest Neighbor from scratch



Nearest Neighbor builtin



Bilinear Interpolation smoothens more and gives visibly softer edges

Bilinear From Scratch



Bilinear builtin



Bicubic is by far the most smooth and best upscaling of all the methods done



Task2:

Apply gamma correction and bit-plane slicing on 'img2'

First was getting the original image and also finding its negative

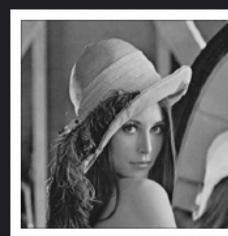
Original



Negative



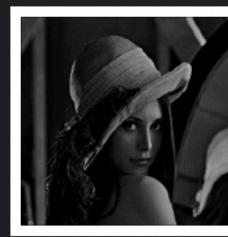
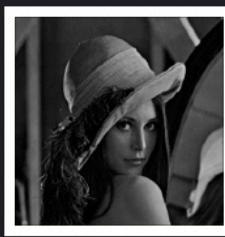
Then I applied gamma correction by using a multitude of values from 0.4 - 4.0



img2_gamma_0.
4.tif

8.tif

.tif



img2_gamma_2.
4.tif

8.tif

.tif

In the end the best value I chose for the gamma was 1.6, that gave me the following image



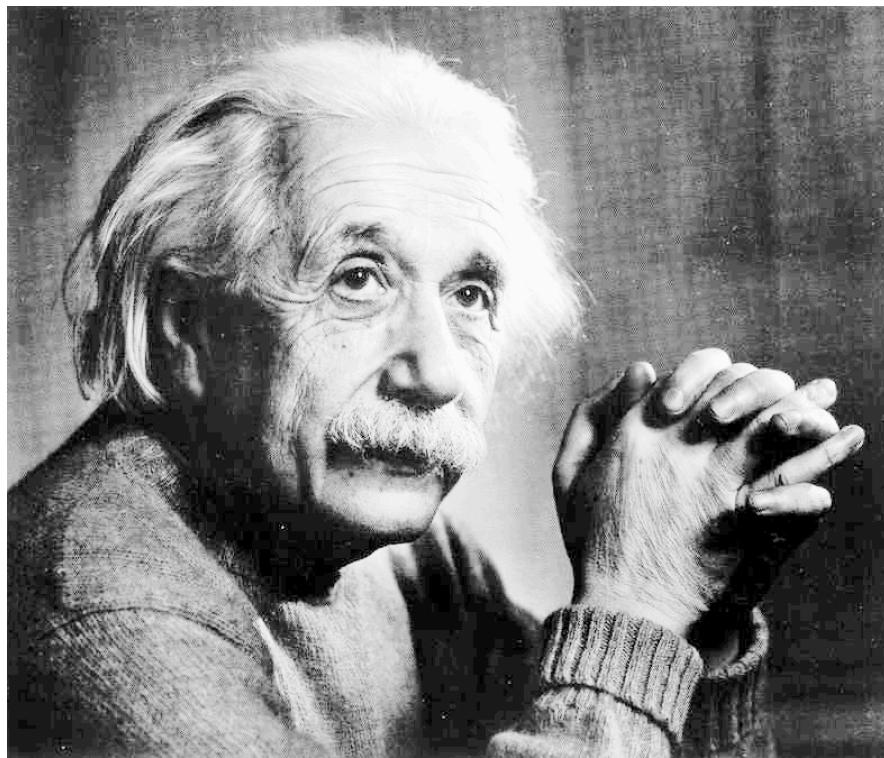
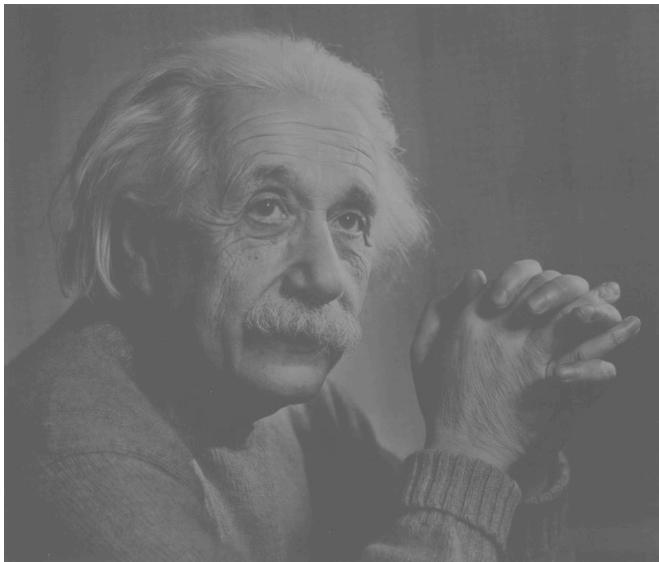
Then onto bit slicing, through the images it can be seen that high-order bits preserve overall structure while low-order bits contain more noise. The following are the bits of 1-3 and 6-8



Task 3:

Needed to equalize img3 to enhance contrast, then match img4 and img5 (not implemented as I did not figure it out)

Here is img3 and its equalized images



Task4:

Spatial Filtering of Average smooth filtering ($11 * 11$) both from scratch and builtin
As well as gaussian smoothing filter ($13 * 13$) and Sobel Sharpening filter ($3*3$)

This is the img6_average_scratch



This is img6_gaussian_cv



This is img6_sobel_cv

