CS663 Assignment 2 Question 1

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September 26, 2020

This document describes the findings regarding question 1 of assignment 2. For each section in the question, we have added the relevant comments and output images.

1 Overview

In this question, we will implement the Unsharp Masking algorithm in order to increase the sharpness of the given example images superMoonCrop.mat and lionCrop.mat.

The parameters for Gaussian blur and scalling of the blurred images are then manually chosen to achieve a resulting sharp image which is shown in the results section.

2 Code Implementation

The overall code for this algorithm is divided into two parts, the first part is mainly concerned with the calculation of a blurred image from the input using a Gaussian mask whose standard deviation(sigma) is set manually.

In second part, after the blurred image is obtain, we subtract the blurred image from the input image in order to obtain the "unsharp mask". Then this unsharp mask is scaled up by a factor and added to the original image.

The function requires the parameters "sigma" and "scale" as input from the user. For performance comparison purposed both the input and output(sharped) image are linear contrast stretched to [0,1] interval.

3 Results and Comments

We have discussed the resultant sharpened images and the corresponding tuned parameters for the given two input images.

3.1 superMoonCrop.mat as input

The result of the algorithm implementation is shown in the below figure 1. The tuned parameters for this particular image is sigma = 1.5, scale = 5.

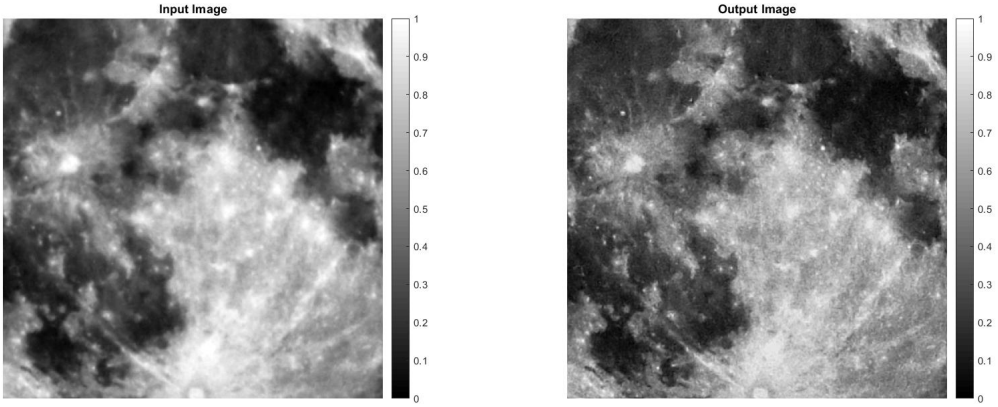

Figure 1: Results of image sharpening on superMoonCrop image

In the output image shown above, certain parts of the image are sharpened. The darker part of the edge becomes darker and the brighter part becomes more bright.

3.2 lionCrop.mat as input

We repeat the same process as the previous section, this time the tuned parameters comes out to be sigma = 1, scale = 3. The resultant image is shown in the below figure 2.

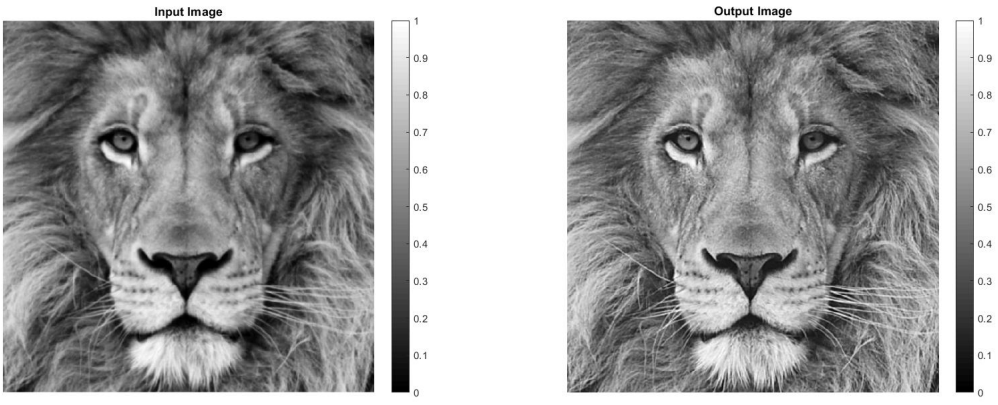

Figure 2: Results of image sharpening on lionCrop image

The sharpening algorithm has enhanced the image quality. For different images, we will have to manually choose the best parameter to obtained a sharpened output image.