CENTRO FEDERAL DE EDUCAÇÃO TECNOLÓGICA DE MINAS GERAIS

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Problem Set 2

Problem Set proposed by Flávio Luis Cardeal Pádua for the Computer Vision course from Computer Department of CEFET-MG

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1 Variations of Histogram Equalization

For this study, I used a noisy gray scale image, showned below:

Figure 1: Noisy picture

Note the histogram, slightly displaced to the right of the chart, and the CDF, also displaced to the right.
Then, I applied a histogram equalization on it:

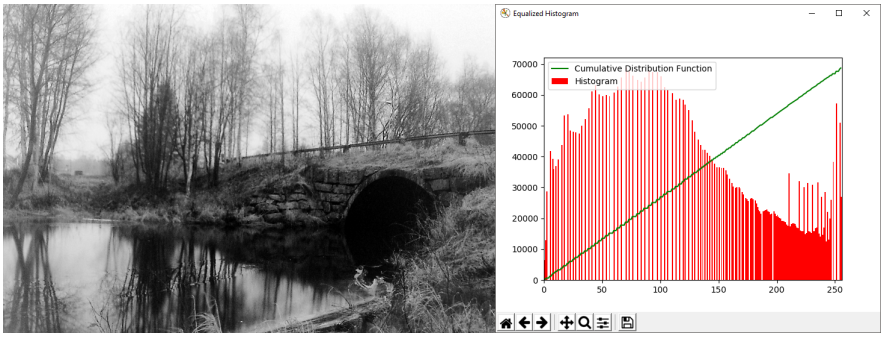

Figure 2: Noisy picture equalizated

Now we can see that the CDF approaches a linear function, and the histogram is more spread out on the chart, like expected.
For now on, I can mess around with the cumulative summation, applying the r filter to it and seeing the results.

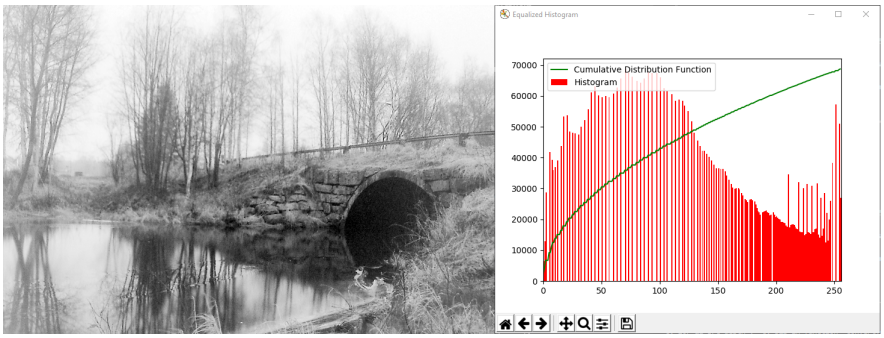

Figure 3: Having r = 0.5

For an r > 1, for instance, r = 1.5:

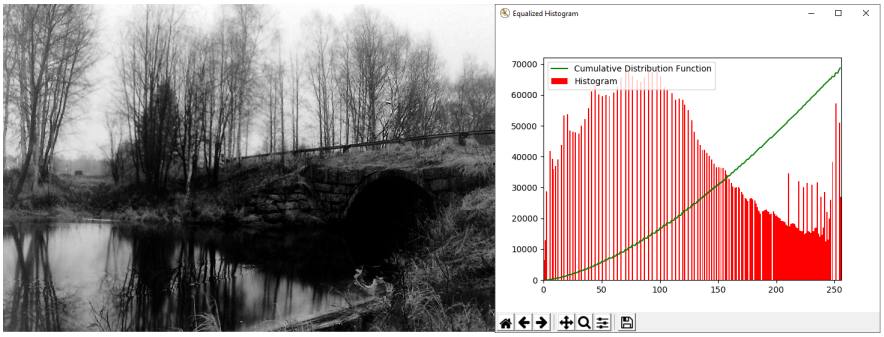

Figure 4: Having r = 1.5

We can notice that smaller values of r turns the image more brighter. On the other hand, increasing the r value turns the image more darker. For r decreasing near zero, the image is completely blank, and for r increasing to infinite, the image tends to turn black.

2 Developing an Edge Detector by Combining Different Strategies

The strategy used was to convolve the image with a matrix, like in Sobel Operation, but with a different matrix. The matrix used was chosen arbitrarily, and in a way that represents the best results above all tested.
Here are some results:

Figure 5: Edge Detection: Example 1

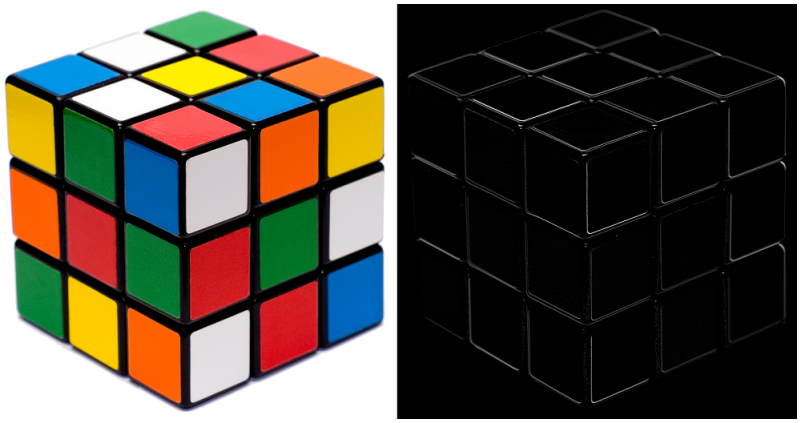

Figure 6: Edge Detection: Example 2

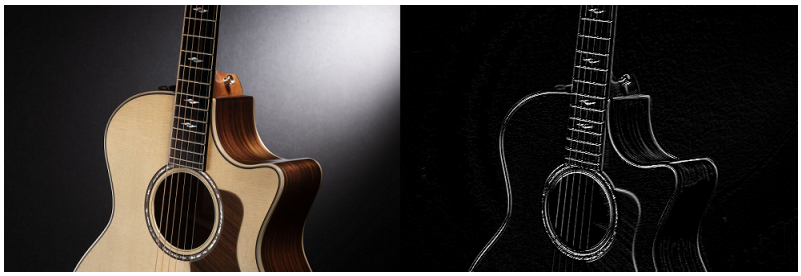

Figure 7: Edge Detection: Example 3