Experiment 1

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BBM 415

Fundamentals of Image Processing Lab

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Introduction

In this experiment, there are two part tasks that we have to complete. Chapter 1 is about quantizing and dithering an image with different values. Quantization is a discretization method that can cause errors due to limited density resolution. An image can lose a lot of visual content when that image is quantified. Floyd-Steinberg dithering is a dithering algorithm. As a result, we are expected to apply the quantization algorithm and the Floyd-Steinberg Dither algorithm to a grayscale image and comment about them.

Part 1

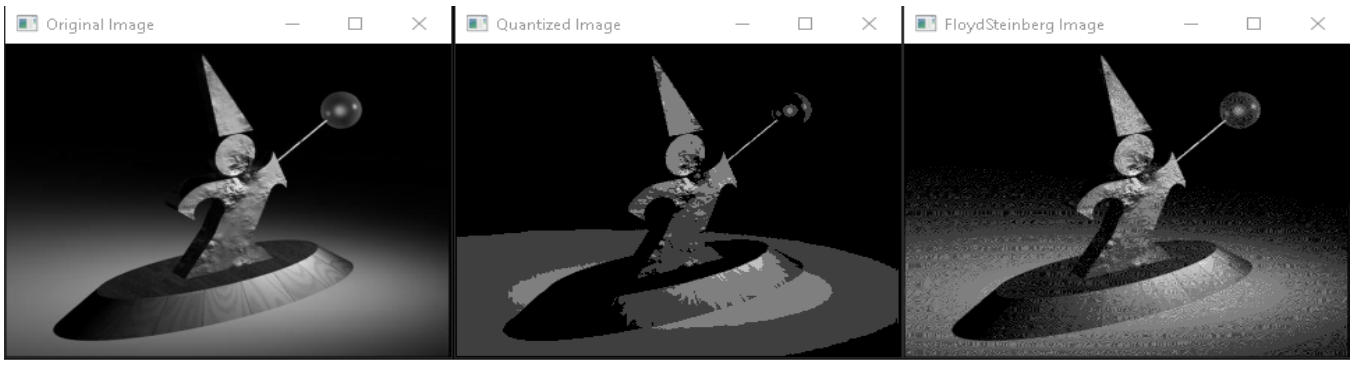
his has two tasks that need to be added. First, we read a grayscale image for quantization and dithering. After reading the image, we quantize it with our content. Finally, we read the original review to examine the Floyd-Steinberg Dithering to showcase it. To achieve this we call the function for the Floyd-Steinberg Dithering.
There are Q parameters for quantization and the Floyd-Steinberg function. Results in these functions are calculated based on this parameter. Quantization replaces a bit with the given parameter Q. When one is humiliated, it can be designed, well mitigated, and limits. The beautified calculations of the pixels of Floyd-Steinberg dithering cameras add the quantization error to the pixels using error diffusion after this calculation. In this complement it scans for pixels transferred to neighboring pixels and for quantization error. This way rounds up and down pixels pretty much up. With this application, the distortion of visual content is minimized.

For example, calculating a pixel with Floyd-Stein-Steinberg, completing the calculated quantized complements at different rates. down or vice versa. With this situation, quantization generally opposes zero.
Given time, I vibrated a few pictures with different Q. Write examples of these trials for you.
You can see Different Q Parameters for the same imag below:

Q = 2


Original Image
Quantized Image
FloydSteinberg Image

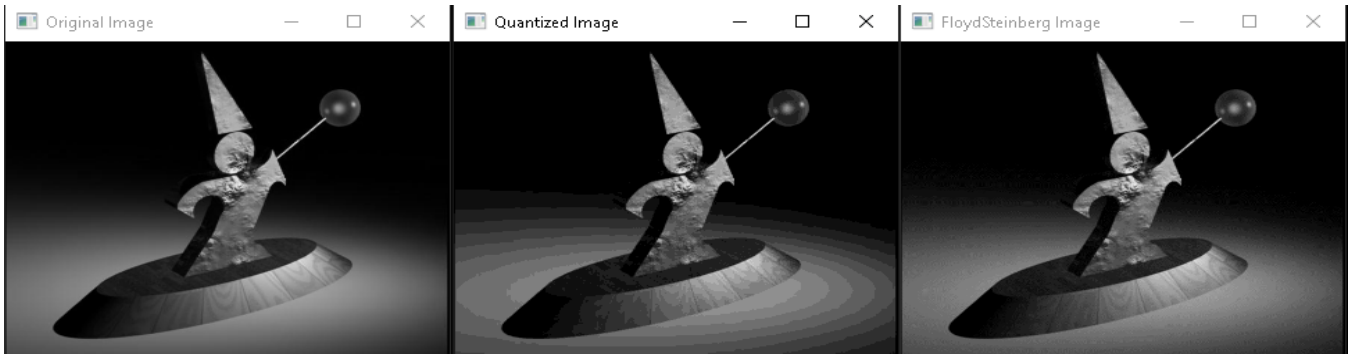
Q = 4


Original Image
Quantized Image
FloydSteinberg Image

Q = 8


Original Image
Quantized Image
FloydSteinberg Image

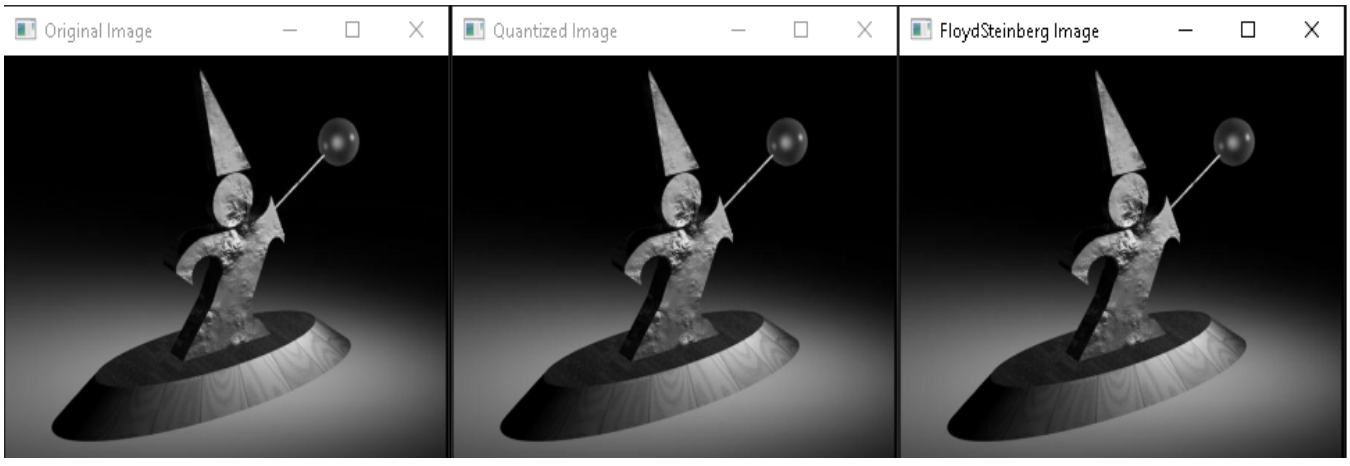
Q = 16


Original Image
Quantized Image
FloydSteinberg Image

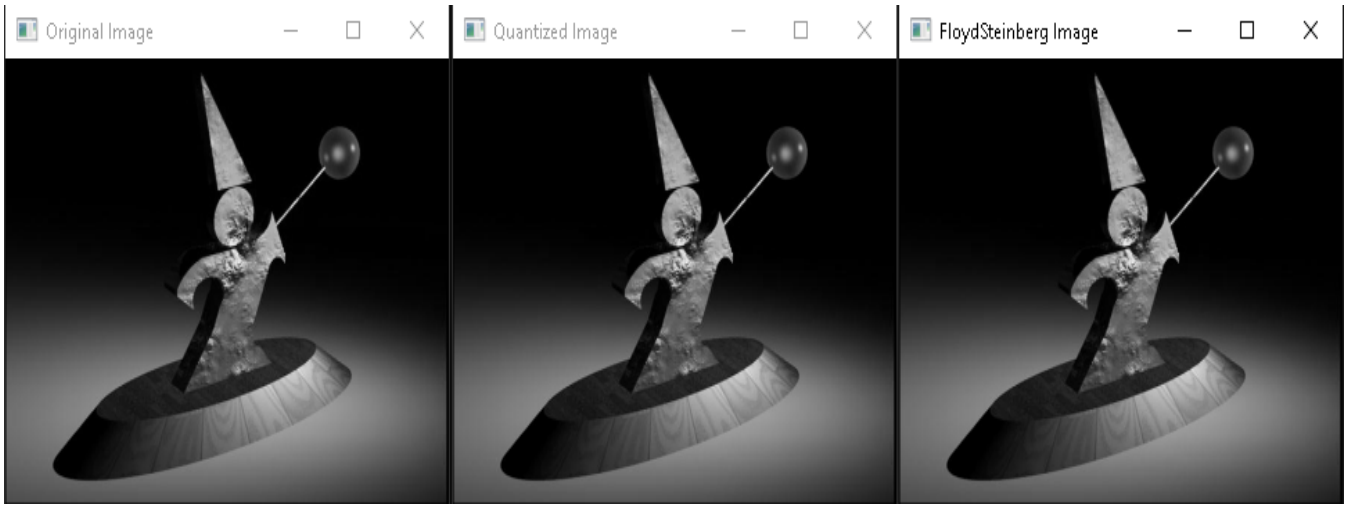
Q = 32


Original Image
Quantized Image
FloydSteinberg Image

Q = 128


Original Image
Quantized Image
FloydSteinberg Image

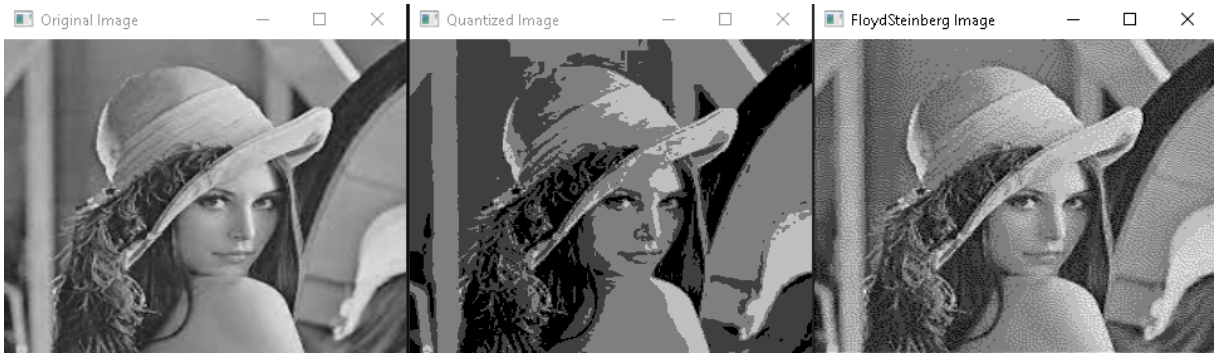
Q = 256



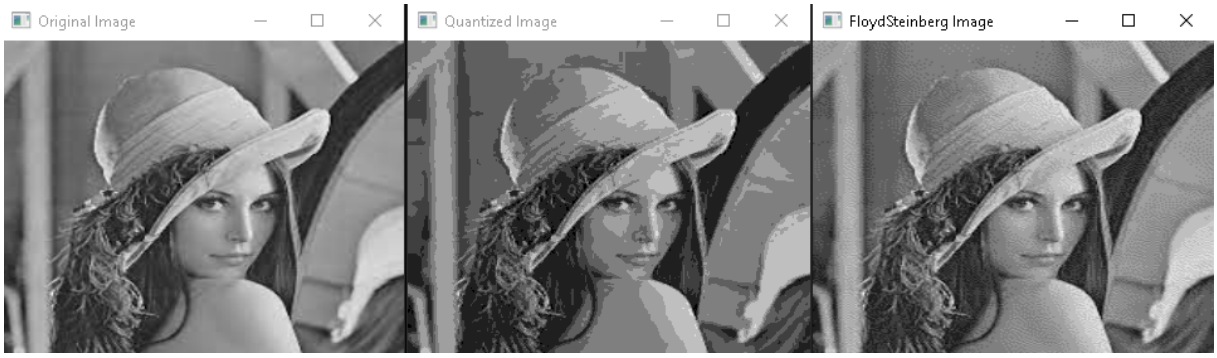
The another examples are below:

Q = 2

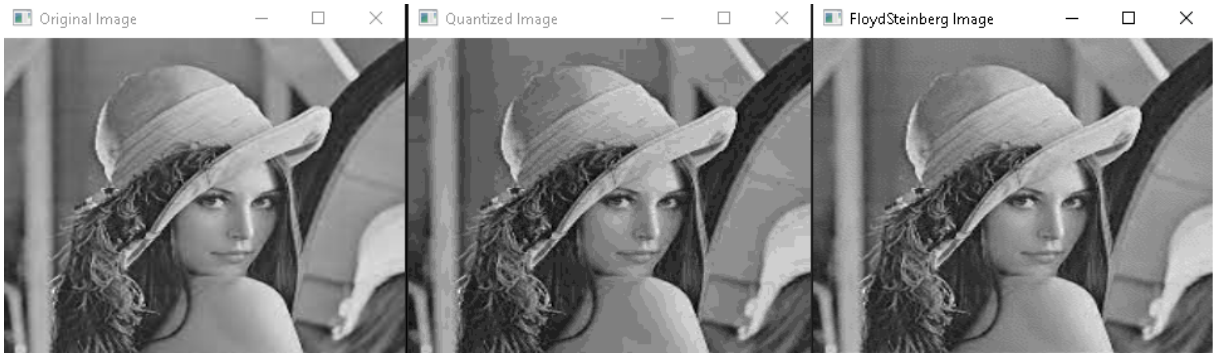
Q = 4



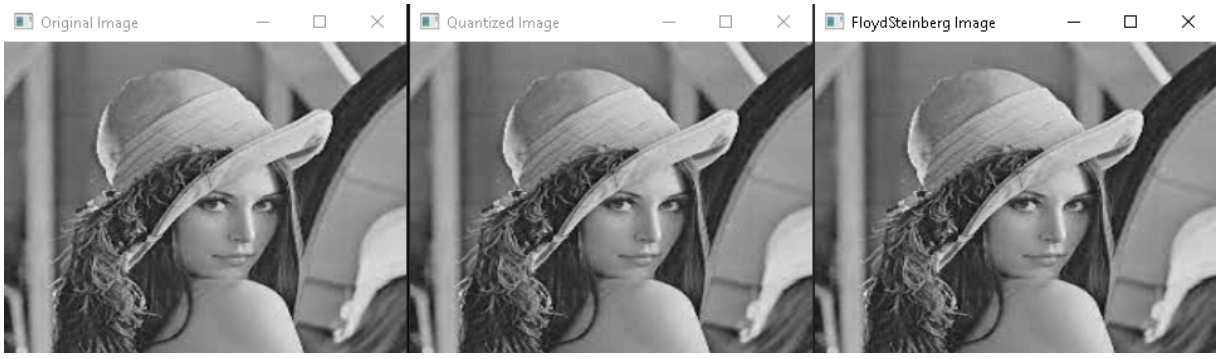
Q = 8


Original Image
Quantized Image
FloydSteinberg Image

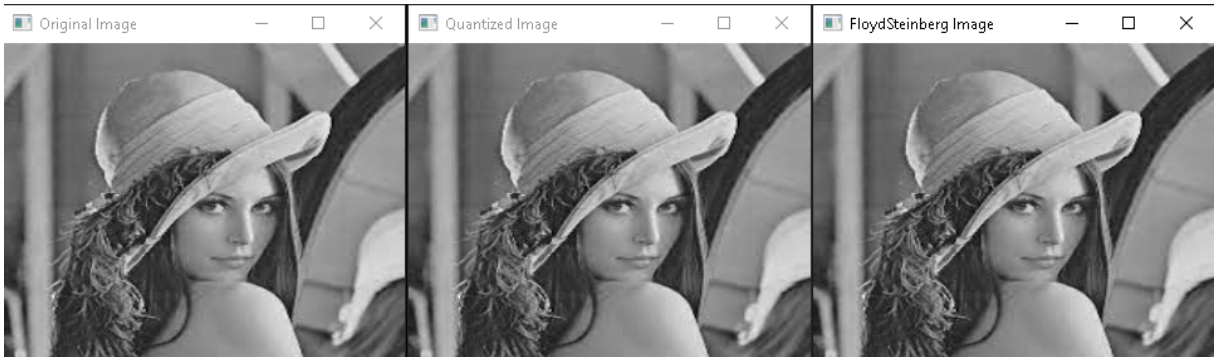
Q = 16


Original Image
Quantized Image
FloydSteinberg Image

Q = 64


Original Image
Quantized Image
FloydSteinberg Image

Q = 128



In the second example, we can see the same thing like in the first example, too. When the q value is increased, the bit level of quantized image increases, and also the quality of image is better than small q value in the bigger q value.

Another example is below:

Q = 2

Q = 4

Q = 8

Q = 16

Q = 32

Q = 64

Q = 128


Original Image
Quantized Image
FloydSteinberg Image

Q = 256


Original Image
Quantized Image
FloydSteinberg Image