Principles and Applications of Digital Image Processing

Fall, 2021

作業一

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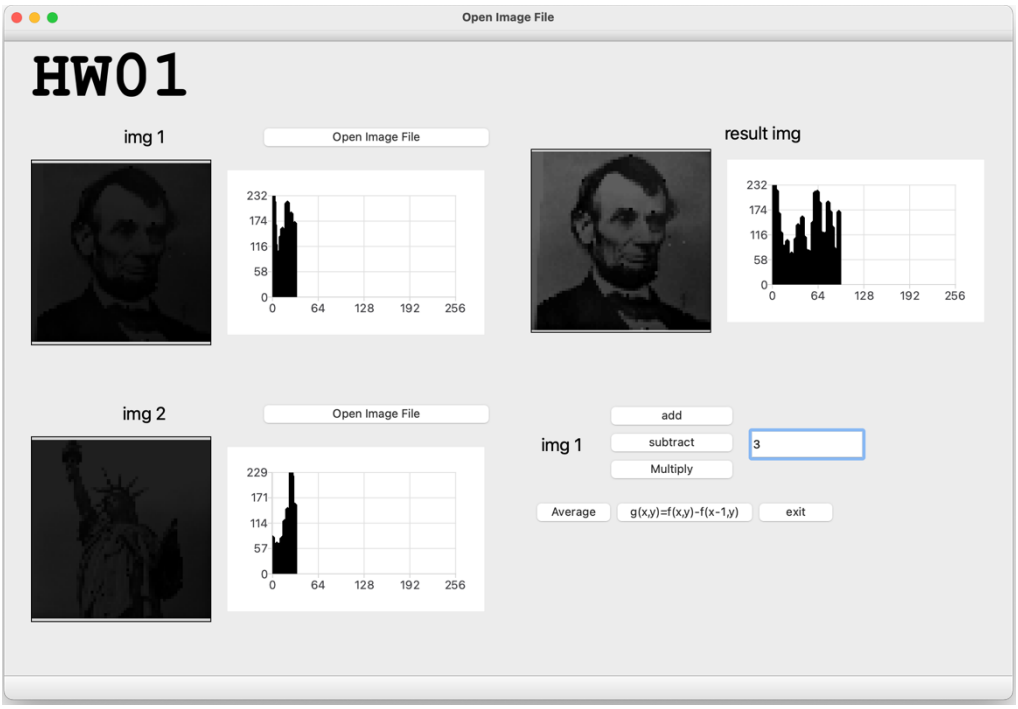

Part 1: Histogram of an Image

Method:

First, I create a map<char, int> as a table to map data from 0-V to 0-32, then I store the result in a Mat which size is 64 by 64 in CV_8U type. Next, I transform the Mat in a QImage in Format_Grayscale8, which means gray scale from 0 to 255. Last, for convenient to see, I scale up the image to 200 by 200.

For Histogram, I create a function (calCalHist) in class (imgprocess). It will go through the whole Mat and count and plus 1 when the value equals any integer from 0 to 255. Than I use QbarSet QChart QChartView to draw the histogram.

Result: (just show one to reprensent)

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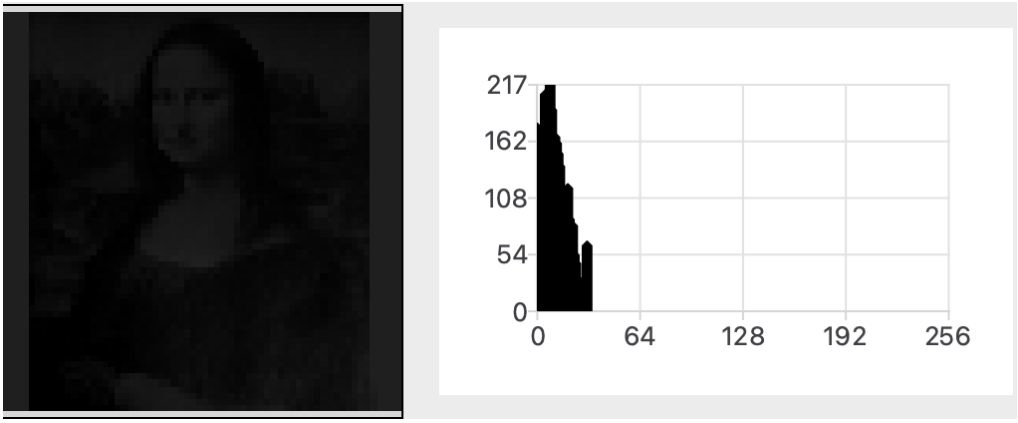


Discussion:

I let a image with value range (0-32) show in grayscale 8bit (0-255), so that result look a little bit dark.

Part 2 Arithmetic Operations of an Image Array

Method:

Simply go through whole array and do the operation.

For add, subtract and multiply, do the operation pixel by pixel.

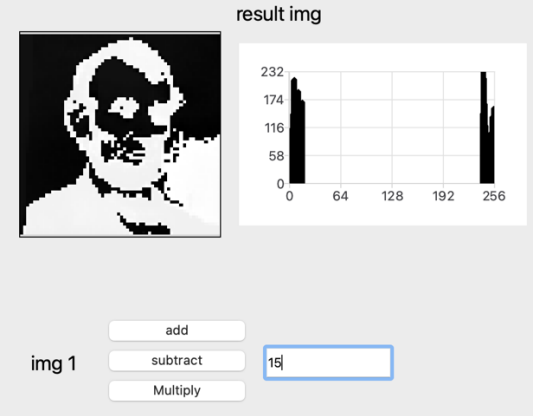
For average, I sum and divide by 2 of two input image pixel by pixel.

For the function: g(x, y) = f(x, y) – f(x-1, y), I use the function on image 1 pixel by pixel.

Result:

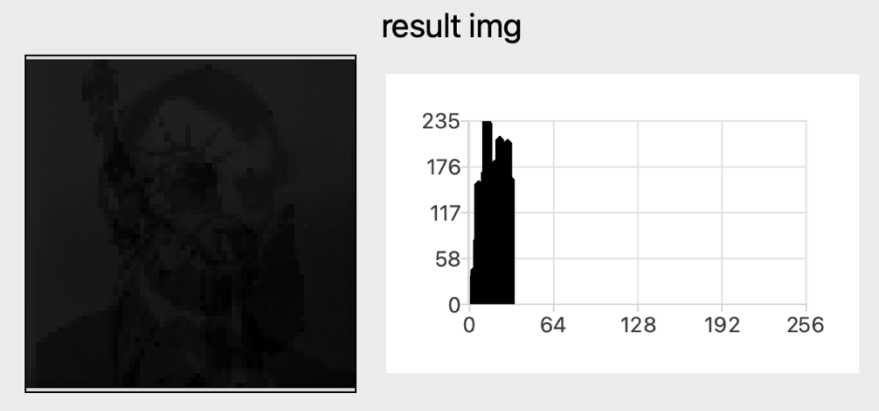
Add 50

Subtract 15

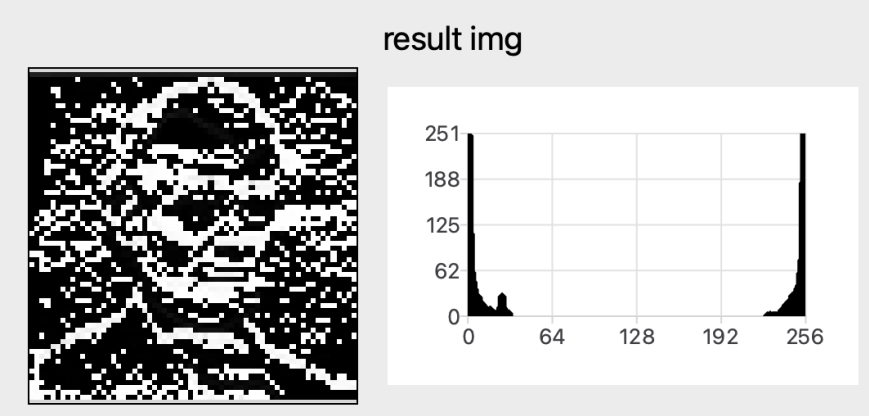


Multiply 3

Average LINCOLN with LIBERTY



The function: g(x, y) = f(x, y) – f(x-1, y)



Discussion:

For add 50, you can see the whole pixels move right from the histogram, and make the new image brighter.

For subtract 15, cause I make the negative value from positive max value(255) start to minus, so you can see the whole pixel move to the left and the negative value showing from 255. The image become darker and the nearly white part is the dark part from origin image.

For multiply, you can see the pixels spread out from the histogram, making the dark and bright part of image easier to discern.

For average, you can see nebulously two image at the same time.

For g(x, y) = f(x, y) – f(x-1, y), you can see somewhat the image been move to left a little bit.