Computer Vision Homework 3 Report B06507002 材料二 林柏勳

Assignment

Write a program to generate images and histograms:

(a) original image and its histogram

(b) image with intensity divided by 3 and its histogram

(c) image after applying histogram equalization to (b) and its histogram

Introduction

B06507002_HW3_ver1.zip contains

1. HW3_B06507002.pdf

2. HW3_B06507002.py

where 1. is the report and 2. is my source code.

One can reproduce this assignment by putting "lena.bmp" and
"HW3_B06507002.py" in the same folder and running "HW3_B06507002.py". Then,
five image data :"Lena Histogram.png", "Dark Lena Histogram.png", "High Contrast
Lena Histogram.png", "lena_d.bmp", "lena_s.bmp" can be dumped in the same
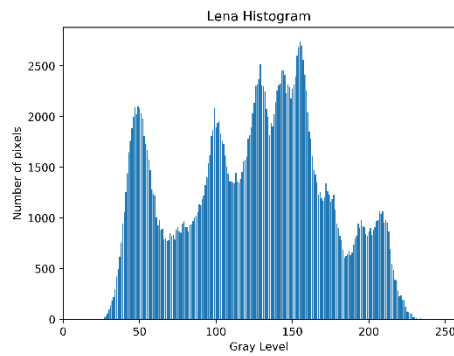folder.

Original lena.

lena.bmp

Tools

Language: Python3

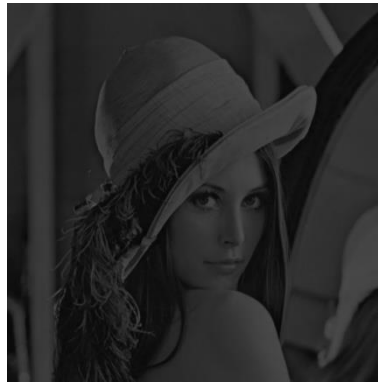| Package	Purpose
numpy	Matrix calculation
matplotlib	Plot histogram
opencv	Reading and Writing image

Solution

(a)

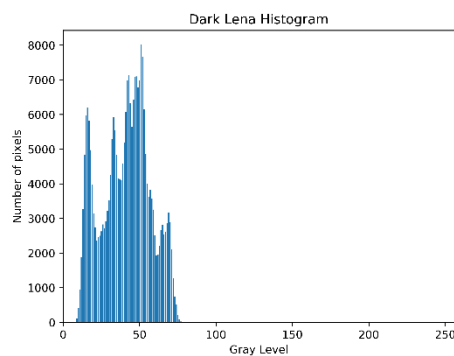I count the number of each brightness, and plot them into "Lena Histogram.png"

Lena Histogram.png

(b) I divide 3 to the brightness of each pixel, and dump the image "lena_d.bmp"

lena_d.bmp

Then, I do the same procedure as (a) to plot the histogram.

Dark Lena Histogram.png

(c)

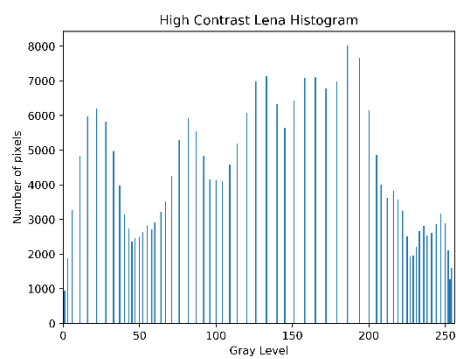I use the equation taught in class to conduct histogram equalization

$$s_k = 255 \sum_{j=0}^{k} \frac{n_j}{n}$$

where k is an integer whose range is from 0 to 255, n is the total number of pixel and n_j is the number of pixels with intensity j.

As a result, every pixel whose brightness is k before the equalization will be s_k after the equalization.

Lena_s.bmp

High Contrast Lena Histogram.png