Computer Vision I _2018

Homework assignment #3

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```python
#使用 python
#import 套件
import numpy as np
import cv2
%matplotlib inline
import matplotlib.pyplot as plt


#用灰階讀檔
original = cv2.imread("lena.bmp", 0)


#用來 count original 裡面的灰階值的，用來畫 histogram，nj 的意思
count = np.zeros(256, np.int)


#填好 count
for i in range (512):
    for j in range (512):
        count[original[i,j]] += 1


#histogram equalization
#先 new 一個空 numpy array 來接收 equalization 後的圖，cv2 的 image 可
以直接接收 numpy array
#算一下 equlized 後的 s 陣列，還有總 pixels 數 numberofpixels
equalized_histogram = np.zeros([512,512], int)
#計算 s 用相關參數
rows, columns = original.shape
numberofpixels = rows * columns
s = np.zeros(256)
summationnow = 0
denominator = 255 / float(numberofpixels)
```

```
#計算 s
for i in range (256):
    summationnow += count[i]
    s[i] = summationnow * denominator


#把 s 轉進二階矩陣以便輸出 equalized 後之 lena
for i in range (512):
    for j in range (512):
        equalized_histogram[i, j] = int(round(s[original[i,j]]))


#儲存 equalized_lena.jpg
cv2.imwrite("equalized_lena.jpg", equalized_histogram)


#作 equalized_histogram 的圖
x = np.linspace(0,255,256, endpoint = True, dtype=np.int)
ax = plt.figure(figsize=(8,4))
ax.set_facecolor((1, 0.8, 0.4))
plt.axes(facecolor='k')
plt.hist(equalized_histogram.flatten(), bins = x, density=False, color='w')
plt.xlabel("gray level value")
plt.ylabel("count")
plt.title("equalized_histogram")
plt.xlim(0, 255)
#plt.ylim(0, max(count))


#儲存 equalized_histogram 的圖
ax.savefig("equalized_histogram.jpg",facecolor=ax.get_facecolor(),
edgecolor='none')
```