電腦視覺 HW1 report

D10922012 資工所 王傳啟

Part1. Write a program to do the following requirement.

(a) upside-down lena.bmp

解釋: 根據 row 的一半 為對稱軸, 將各個 pixel 上下交換即可。

```
for i in range(int(row / 2)):
    for j in range(col):
        tmp = np_img_a[i][j]
        np_img_a[i][j] = np_img_a[row - i - 1][j]
        np_img_a[row - i - 1][j] = tmp
```

(b) right-side-left lena.bmp

解釋: 根據 col 的一半 為對稱軸, 將各個 pixel 左右交換即可。

```
for i in range(row):
    for j in range(int(col/2)):
        tmp = np_img_b[i][j]
        np_img_b[i][j] = np_img_b[i][col - j -1]
        np_img_b[i][col - j -1] = tmp
```

(c) diagonally flip lena.bmp

解釋: 根據 斜對角 為對稱軸, 將各個 pixel 沿軸交換即可。

```
for i in range(row):
    for j in range(i):
        tmp = np_img_c[i][j]
        np_img_c[i][j] = np_img_c[j][i]
        np_img_c[j][i] = tmp
```

Part2. Write a program or use software to do the following requirement.

(d) rotate lena.bmp 45 degrees clockwise

解釋: 透過 PILOW 套件, 將圖片旋轉 45 度

```
angle = -45
img_d = img_d.rotate(angle)
```

(e) shrink lena.bmp in half

解釋: 透過 PILOW 套件, 將圖片解析度壓縮成一半

```
img_e = img_e.resize((int(row/2), int(col/2)))
```

(f) binarize lena.bmp at 128 to get a binary image

解釋: 迴圈掃整張圖片矩陣, 將值超過 128 以上的設定為 255 其他歸 0。

```
for i in range(row):
    for j in range(col):
        np_img_f[i][j] = 255 if(np_img_f[i][j] >= 128) else 0
```