Computer Vision HW7 楊閎喻 R09921012

Write a program which does thinning on a downsampled image

```
for i in range(img.shape[0]):
    for j in range(img.shape[1]):
        if i%8 == 0 and j%8 == 0 and img[i,j] >= 128:
            img_Downsamping[int(i/8),int(j/8)] = 255
```

- 將 lena Downshaping 成 64x64 的大小並 Binarize

```
def Yokoi(image,i:int,j:int): …

def PairRelation(image,i:int,j:int):
    x0 = x1 = x2 = x3 = x4 = 0
    x0 = image[i,j]
    if x0 != 1 and x0 != 2 :
        return 0
    if x0 != 1:
        return 'q'
    if j+1 <= 63:
        x1 = image[i,j+1]
    if i-1 >= 0:
        x2 = image[i-1,j]
    if j-1 >= 0:
        x3 = image[i,j-1]
    if i+1 <= 63:
        x4 = image[i+1,j]
    count = 0
    if x1 == 1 :
        count += 1
    if x2 == 1 :
        count += 1
    if x3 == 1 :
        count += 1
    if x4 == 1 :
```

```
        count += 1
    if count >= 1 : return 'p'
    return 'q'

def thinning(image_d,image_P,i:int,j:int):
    if image_P[i,j] == 'p' :
        if Yokoi(image_d,i,j) == 1 :
            return 0
    return 1
```

- 本次作業會使用到的三個函式：Yoiki(HW6 略)、PairRelation、thinning
- 在 PairRelation 對 Yoiki 編號為 1(edge)&2(corner)做判斷
- 在 thinning 對 PairRelation 結果中的 p 做判斷，是否為可以消除的資料點

```
for time in range(7):

    for i in range(img_Yokoi.shape[0]):
        for j in range(img_Yokoi.shape[1]):
            img_Yokoi[i,j] = Yokoi(img_Downsamping,i,j)

    for i in range(img_PairRelation.shape[0]):
        for j in range(img_PairRelation.shape[1]):
            img_PairRelation[i,j] = PairRelation(img_Yokoi,i,j)

    for i in range(img_Downsamping.shape[0]):
        for j in range(img_Downsamping.shape[1]):
            if thinning(img_Downsamping,img_PairRelation,i,j) == 0:
                img_Downsamping[i,j] = 0
```

- 在主程式中，iterate 七次產生結果