Computer Vision HW5

R12922054 資工所 邱信瑋

Description

- kernel的大小也設成3-5-5-5-3的大小，並且value設成0

1. Dilation Image

How to implement :

把原圖所有的點遍歷一遍，然後根據課程中的公式將遍歷的點設成kernal範圍中的最大值(如果做擴展的當下擴展後的圖片大小已經超過原圖大小則可以直接忽略該點)

```python
def dilation(np_img, kernel, row_size, col_size):
    dilation_img = np.zeros((row_size, col_size), dtype=int)
    for i in range(row_size):
        for j in range(col_size):
            max_value = 0
            for k in kernel:
                new_i = i - k[0]
                new_j = j - k[1]
                if new_i >= 0 and new_i < row_size and new_j >= 0 and new_j < col_size:
                    local_value = np_img[new_i][new_j] + k[2]
                    if max_value < local_value:
                        max_value = local_value
            dilation_img[i][j] = max_value
    return dilation_img
```

Figure 1: image for Dilation.

2. Erosion Image

How to implement :

把原圖所有的點遍歷一遍，然後根據課程中的公式將遍歷的點設成kernal範圍中的最小值(同樣，如果做擴展的當下擴展後的圖片大小已經超過原圖大小則可以直接忽略該點)

```python
def erosion(np_img, kernel, row_size, col_size):
    erosion_img = np.zeros((row_size, col_size), dtype=int)
    for i in range(row_size):
        for j in range(col_size):
            min_value = 256
            for k in kernel:
                new_i = i + k[0]
                new_j = j + k[1]
                if new_i >= 0 and new_i < row_size and new_j >= 0 and new_j < col_size:
                    local_value = np_img[new_i][new_j] - k[2]
                    if local_value < min_value:
                        min_value = local_value
            if min_value < 0:
                min_value = 0
            erosion_img[i][j] = min_value
    return erosion_img
```

Figure 2: image for Erosion.

3. Opening Image

How to implement :

先做ersion再做dilation

```
np_opening_img = dilation(erosion(np_img, kernel, row_size, col_size), kernel, row_size, col_size)
```

Figure 3: image for Opening.

4 Closing Image

How to implement :

先做dilation再做erosion

```
np_clsoing_img = erosion(dilation(np_img, kernel, row_size, col_size), kernel, row_size, col_size)
```

Figure 4: image for Closing.