assignment05

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1 This is assignment05

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4 Link: https://github.com/pcyyyy/assignment05.git

5 import packages:

```
In [1]: import matplotlib.pyplot as plt
        import numpy as np
        from scipy import signal
        from skimage import io, color
        from skimage import exposure
```

6 Give a image

```
In [2]: file_image = 'cau.jpg'
```

7 Define a color image and a gray image

```
In [3]: im_color = io.imread(file_image)
        im_gray  = color.rgb2gray(im_color)
```

8 The x direction gradient

```
In [4]: ker1 = np.array([[-1,1,0],[0,0,0],[0,0,0]])
        im_conv1 = signal.convolve2d(im_gray, ker1, boundary='symm', mode='same')
        print(im_conv1)
```

```
[[ 0.          0.          0.         ...  0.          0.
   0.        ]
 [ 0.          0.          0.         ...  0.          0.
```

```
   0.        ]
 [ 0.          0.          0.         ...  0.          0.
   0.        ]
 ...
 [ 0.00392157  0.00784314  0.00392157 ... -0.01176471 -0.00392157
   0.        ]
 [ 0.00392157  0.00784314  0.00392157 ... -0.01176471 -0.00392157
   0.        ]
 [ 0.00392157  0.00784314  0.00392157 ... -0.01176471 -0.00392157
   0.        ]]
```

9 The y direction gradient

```
In [5]: ker2 = np.array([[-1,0,0],[1,0,0],[0,0,0]])
        im_conv2 = signal.convolve2d(im_gray, ker2, boundary='symm', mode='same')
        print(im_conv2)
```

```
[[ 0.          0.          0.         ...  0.          0.
   0.        ]
 [-0.00392157 -0.00392157 -0.00392157 ...  0.          0.
   0.        ]
 [ 0.          0.          0.         ...  0.          0.
   0.        ]
 ...
 [ 0.01568627  0.01176471  0.00392157 ... -0.01568627 -0.01960784
  -0.01960784]
 [ 0.          0.          0.         ...  0.          0.
   0.        ]
 [ 0.          0.          0.         ...  0.          0.
   0.        ]]
```

10 Have absolute value of gradient

```
In [6]: grad = im_conv1 + im_conv2
```

11 Define the smoothing kernel

```
In [7]: ker3 = np.array([[0.1,0.1,0.1],[0.1,0.1,0.1],[0.1,0.1,0.1]])
        im_conv3 = signal.convolve2d(im_gray, ker3, boundary='symm', mode='same')
```

12 Define my kernel

```
In [8]: ker4 = np.array([[1,0,1],[1,1,0],[0,0,0]])
        im_conv4 = signal.convolve2d(im_gray, ker4, boundary='symm', mode='same')
```

13 Show the color image ang gray image

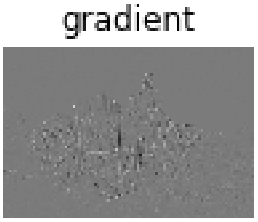
```
In [9]: p1 = plt.subplot(3,3,1)
        p1.set_title('color image')
        plt.imshow(im_color)
        plt.axis('off')

        p2 = plt.subplot(3,3,2)
        p2.set_title('gray image')
        plt.imshow(im_gray, cmap='gray')
        plt.axis('off')
```

```
Out[9]: (-0.5, 1967.5, 1346.5, -0.5)
```

14 Show the gradient image

```
In [10]: p3 = plt.subplot(3,3,3)
         p3.set_title('gradient')
         plt.imshow(grad, cmap='gray')
         plt.axis('off')
```

```
Out[10]: (-0.5, 1967.5, 1346.5, -0.5)
```



15 Show the smoothing image

```
In [11]: p4 = plt.subplot(3,3,4)
         p4.set_title('smoothing')
         plt.imshow(im_conv3, cmap='gray')
         plt.axis('off')
```

```
Out[11]: (-0.5, 1967.5, 1346.5, -0.5)
```

16 Show my image

```
In [12]: p5 = plt.subplot(3,3,5)
         p5.set_title('mine')
         plt.imshow(im_conv4, cmap='gray')
         plt.axis('off')

         plt.show()
```