Lê Văn Hiếu

MSSV: 17103271

Thực hành môn xử lý ảnh

LAB 9

In [160]:

```
pip install scikit-image
```

```
Collecting scikit-image
  Downloading scikit_image-0.17.2-cp38-cp38-manylinux1_x86_64.whl (1
2.4 MB)
     |████████████████████████████████| 12.4 MB 334 kB/s eta 0:00:01
Requirement already satisfied: numpy>=1.15.1 in /home/hiha/jupyter/j
upyter/lib/python3.8/site-packages (from scikit-image) (1.18.5)
Collecting networkx>=2.0
  Downloading networkx-2.4-py3-none-any.whl (1.6 MB)
     |████████████████████████████████| 1.6 MB 898 kB/s eta 0:00:01
Collecting imageio>=2.3.0
  Downloading imageio-2.8.0-py3-none-any.whl (3.3 MB)
     |████████████████████████████████| 3.3 MB 591 kB/s eta 0:00:01
|████████                        | 890 kB 842 kB/s eta 0:00:03
Requirement already satisfied: matplotlib!=3.0.0,>=2.0.0 in /home/hi
ha/jupyter/jupyter/lib/python3.8/site-packages (from scikit-image)
(3.2.1)
Collecting pillow!=7.1.0,!=7.1.1,>=4.3.0
  Downloading Pillow-7.1.2-cp38-cp38-manylinux1_x86_64.whl (2.1 MB)
     |████████████████████████████████| 2.1 MB 367 kB/s eta 0:00:01
Collecting PyWavelets>=1.1.1
  Downloading PyWavelets-1.1.1-cp38-cp38-manylinux1_x86_64.whl (4.4
MB)
     |████████████████████████████████| 4.4 MB 340 kB/s eta 0:00:01
Collecting scipy>=1.0.1
  Downloading scipy-1.4.1-cp38-cp38-manylinux1_x86_64.whl (26.0 MB)
     |████████████████████████████████| 26.0 MB 561 kB/s eta 0:00:01
|████████████████████████████    | 23.8 MB 1.0 MB/s eta 0:00:03
Collecting tifffile>=2019.7.26
  Downloading tifffile-2020.6.3-py3-none-any.whl (133 kB)
     |████████████████████████████████| 133 kB 411 kB/s eta 0:00:01
Requirement already satisfied: decorator>=4.3.0 in /home/hiha/jupyte
r/jupyter/lib/python3.8/site-packages (from networkx>=2.0->scikit-im
age) (4.4.2)
Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.
0.1 in /home/hiha/jupyter/jupyter/lib/python3.8/site-packages (from
matplotlib!=3.0.0,>=2.0.0->scikit-image) (2.4.7)
Requirement already satisfied: kiwisolver>=1.0.1 in /home/hiha/jupyt
er/jupyter/lib/python3.8/site-packages (from matplotlib!=3.0.0,>=2.
0.0->scikit-image) (1.2.0)
Requirement already satisfied: python-dateutil>=2.1 in /home/hiha/ju
pyter/jupyter/lib/python3.8/site-packages (from matplotlib!=3.0.0,>=
2.0.0->scikit-image) (2.8.1)
Requirement already satisfied: cycler>=0.10 in /home/hiha/jupyter/ju
pyter/lib/python3.8/site-packages (from matplotlib!=3.0.0,>=2.0.0->s
cikit-image) (0.10.0)
Requirement already satisfied: six>=1.5 in /home/hiha/jupyter/jupyte
r/lib/python3.8/site-packages (from python-dateutil>=2.1->matplotli
b!=3.0.0,>=2.0.0->scikit-image) (1.15.0)
Installing collected packages: networkx, pillow, imageio, PyWavelet
s, scipy, tifffile, scikit-image
Successfully installed PyWavelets-1.1.1 imageio-2.8.0 networkx-2.4 p
illow-7.1.2 scikit-image-0.17.2 scipy-1.4.1 tifffile-2020.6.3
Note: you may need to restart the kernel to use updated packages.
```

IMPORT LIBRARIES

In [ ]:

```
import pandas
import cv2
import numpy as np
import matplotlib.pyplot as plt
from collections import deque
```

II - HOLE FILLING AS DUAL TO SMALL REGION REMOVAL

BACKGROUND FILLING FUNCTION

In [120]:

```
def dfs(img,visited,x,y,direct):
    stack = []
    stack.append(x)
    stack.append(y)
    while len(stack)!=0:
        y=stack.pop()
        x=stack.pop()
        visited[x][y]=255
        for i in direct:
            xx = x + i[0]
            yy = y + i[1]
            if xx>=0 and xx<img.shape[0] and yy>=0 and yy<img.shape[1] and visit
ed[xx][yy]==0 and img[xx][yy]==0:
                stack.append(xx)
                stack.append(yy)
```

Imread Image into program

In [88]:

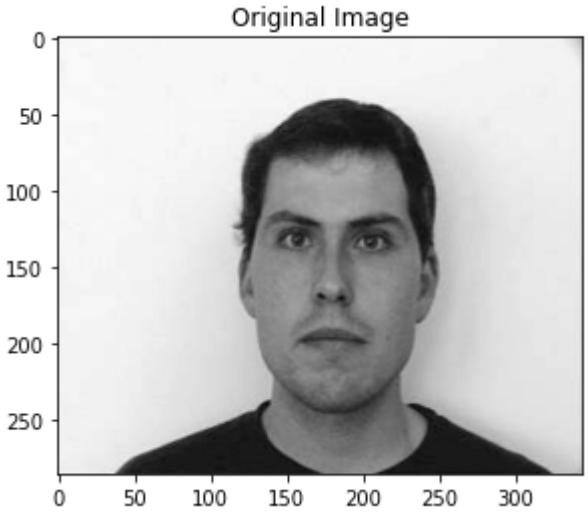
```
img = cv2.imread('../images/LAB9/peter.png')
img = cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
```

In [129]:

```
plt.imshow(img,cmap='gray')
plt.title('Original Image')
```

Out[129]:

```
Text(0.5, 1.0, 'Original Image')
```



Convert to Image Binary with thresh hold = 100

In [128]:

```
ret,binary_img = cv2.threshold(img,100,255,cv2.THRESH_BINARY_INV)
```

In [103]:

```
background_img = np.zeros((img.shape[0],img.shape[1]))
```

In [104]:

```
direct = [[0,-1],[0,1],[-1,0],[1,0]]
```

In [121]:

```
dfs(binary_img,background_img,0,0,direct)
```

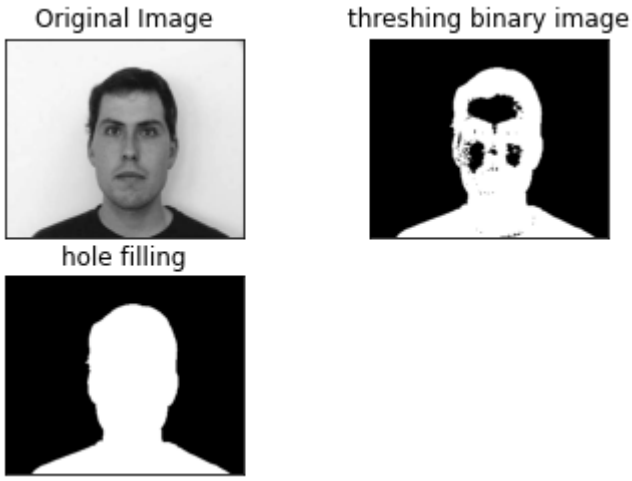
Show Result of Hole Filling Object

In [130]:

```
plt.subplot(221),
plt.imshow(img, cmap='gray'),
plt.title('Original Image')
plt.xticks([]), plt.yticks([])

plt.subplot(222),
plt.imshow(binary_img, cmap='gray'),
plt.title('threshing binary image')
plt.xticks([]), plt.yticks([])

plt.subplot(223),
plt.imshow((255-background_img), cmap='gray'),
plt.title('hole filling')
plt.xticks([]), plt.yticks([])

# plt.subplot(224),
# plt.imshow(Vertical, cmap='gray'),
# plt.title('Vertical')
# plt.xticks([]), plt.yticks([])
```

Out[130]:

```
(([], <a list of 0 Text major ticklabel objects>),
 ([], <a list of 0 Text major ticklabel objects>))
```



III - REGION LABELING AND COUNTING

In [136]:

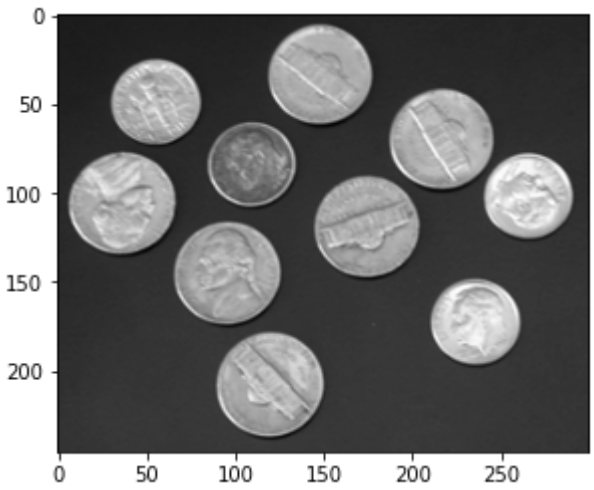
```
img = cv2.imread('../images/LAB9/coin.png')
img = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
```

In [137]:

```
plt.imshow(img,cmap='gray')
```

Out[137]:

```
<matplotlib.image.AxesImage at 0x7f54f951a9a0>
```



In [150]:

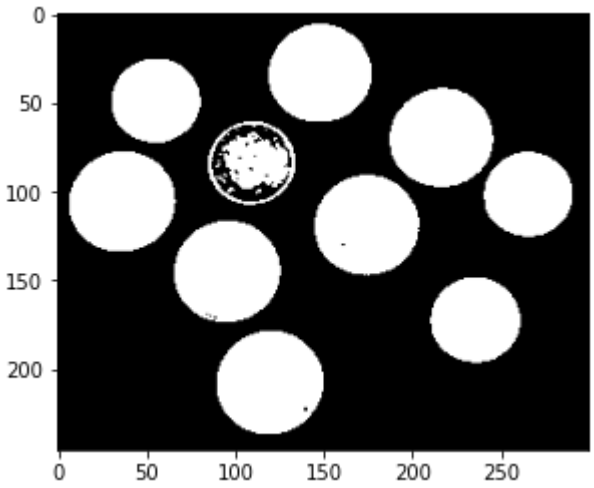
```
ret,binary_img = cv2.threshold(img,120,255,cv2.THRESH_BINARY_INV)
```

In [151]:

```
plt.imshow(255-binary_img,cmap='gray')
```

Out[151]:

```
<matplotlib.image.AxesImage at 0x7f54faf1f580>
```



In [152]:

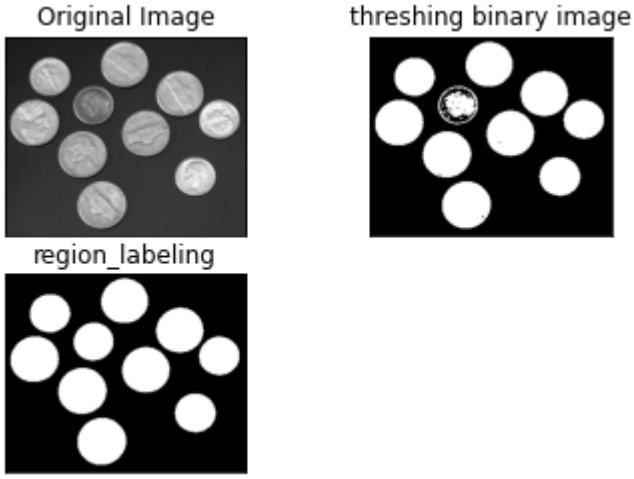
```
img_region_label = np.zeros((img.shape[0],img.shape[1]))
dfs(255-binary_img,img_region_label,0,0,direct)
```

In [154]:

```
plt.subplot(221),
plt.imshow(img, cmap='gray'),
plt.title('Original Image')
plt.xticks([]), plt.yticks([])

plt.subplot(222),
plt.imshow(255-binary_img, cmap='gray'),
plt.title('threshing binary image')
plt.xticks([]), plt.yticks([])

plt.subplot(223),
plt.imshow((255-img_region_label), cmap='gray'),
plt.title('region_labeling')
plt.xticks([]), plt.yticks([])
```

Out[154]:

```
(([], <a list of 0 Text major ticklabel objects>),
 ([], <a list of 0 Text major ticklabel objects>))
```



LAB 10

In [163]:

```
import skimage
```

In [156]:

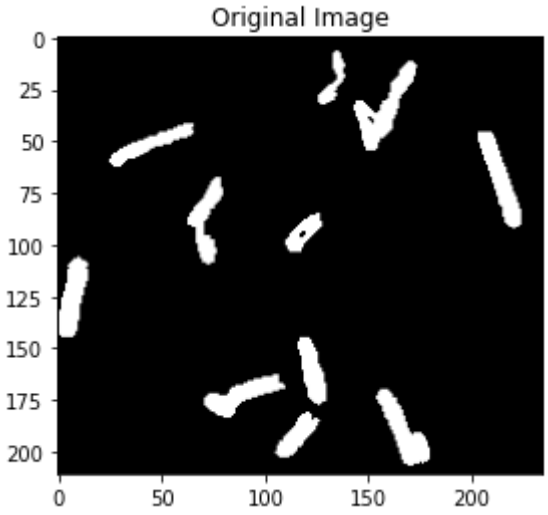
```
img = cv2.imread('../images/LAB9/bacteria.png')
img = cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
```

In [158]:

```
plt.imshow(img,cmap='gray')
plt.title('Original Image')
```

Out[158]:

```
Text(0.5, 1.0, 'Original Image')
```



In [ ]: