컴퓨터 비전

과제 #4

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학　과 : 전자공학과

학　년 : 4학년

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한국외국어대학교
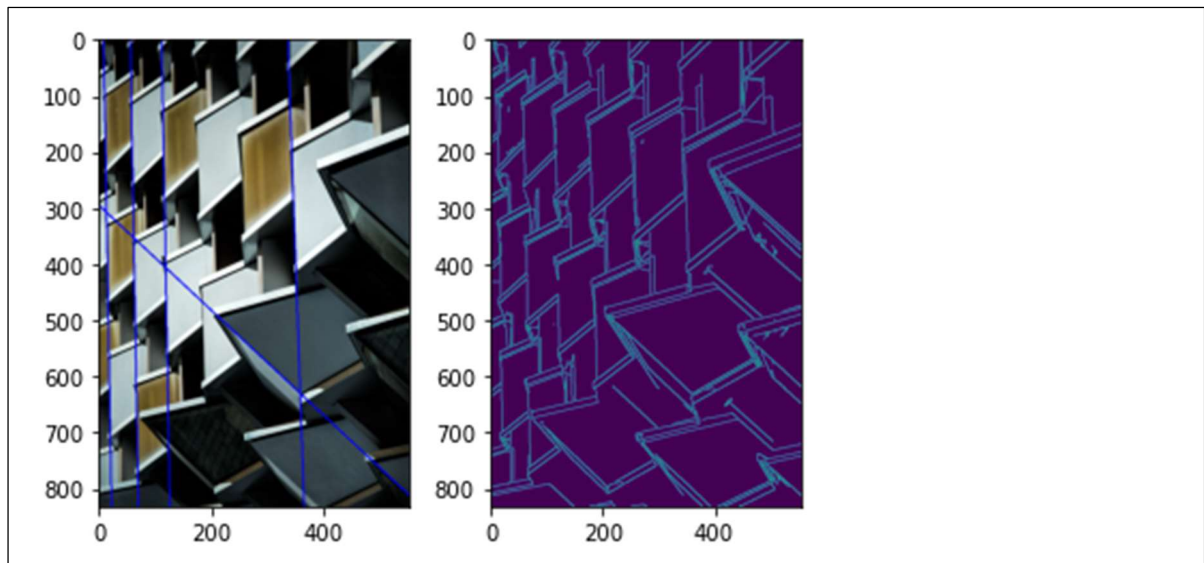### HANKUK UNIVERSITY OF FOREIGN STUDIES

1. Hough 변환

코드

```python
import cv2 as cv
import numpy as np
import matplotlib.pyplot as plt

img = cv.imread('building1.jfif')
gray = cv.cvtColor(img,cv.COLOR_BGR2GRAY)
edges = cv.Canny(gray,50,150,apertureSize = 3) # 에지 검출
lines = cv.HoughLines(edges,1,np.pi/180,200) # 허프 변환 수행
for line in lines[:30]: # 검출된 선들을 영상 위에 표시
    rho,theta = line[0]
    a = np.cos(theta)
    b = np.sin(theta)
    x0 = a*rho
    y0 = b*rho
    x1 = int(x0 + 1000*(-b))
    y1 = int(y0 + 1000*(a))
    x2 = int(x0 - 1000*(-b))
    y2 = int(y0 - 1000*(a))
    cv.line(img,(x1,y1),(x2,y2),(0,0,255),2)

plt.subplot(1,2,1)
plt.imshow(img)
plt.subplot(1,2,2)
plt.imshow(edges)
plt.show()
```

결과

코드

```
import cv2 as cv
import numpy as np
import matplotlib.pyplot as plt

img = cv.imread('building1.jfif')
gray = cv.cvtColor(img,cv.COLOR_BGR2GRAY)
edges = cv.Canny(gray,50,150,apertureSize = 3)
lines = cv.HoughLinesP(edges,1,np.pi/180,100,minLineLength=100,maxLineGap=10)

for line in lines:
    x1,y1,x2,y2 = line[0]
    cv.line(img,(x1,y1),(x2,y2),(0,255,0),2)

plt.subplot(1,2,1)
plt.imshow(img)
plt.subplot(1,2,2)
plt.imshow(edges)
plt.show()
```
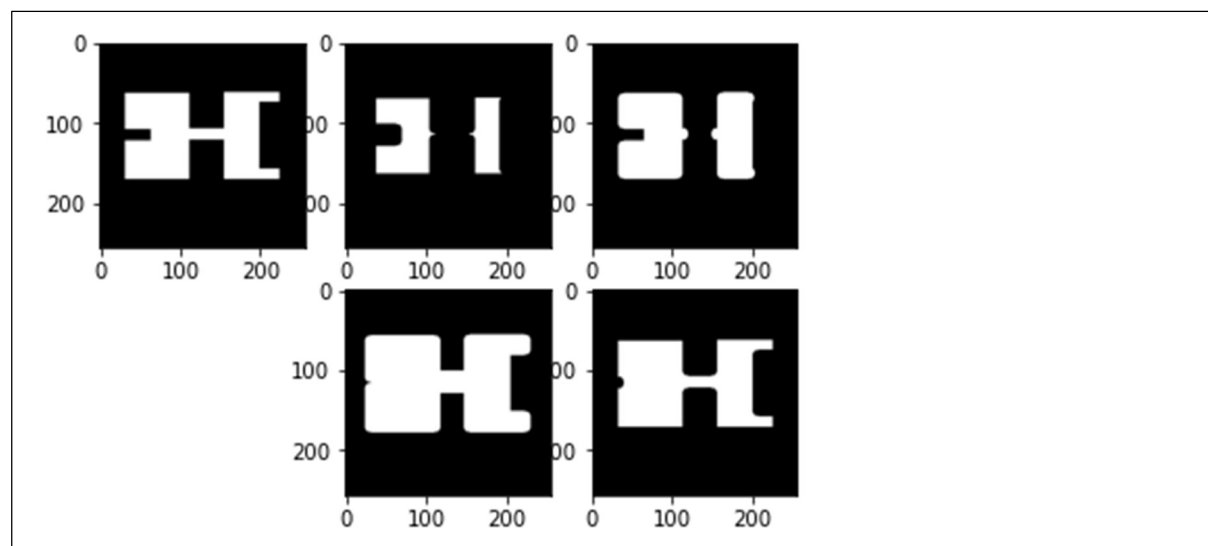
결과
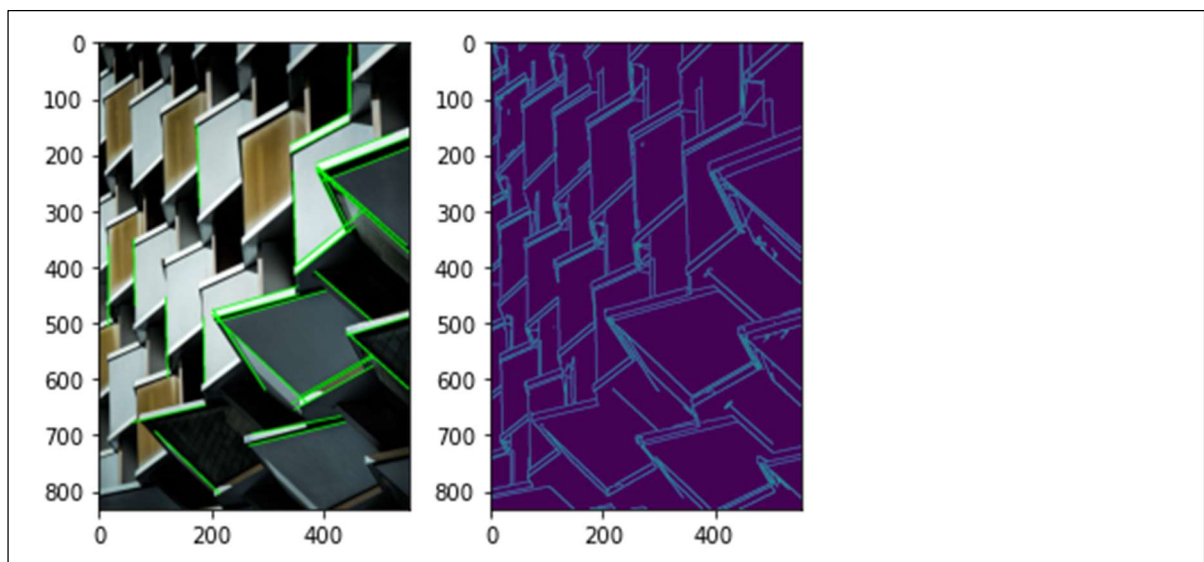
2. 실습 1

코드

```
import cv2 as cv
import matplotlib.pyplot as plt

gray = cv.imread('pattern.png')
kernel = cv.getStructuringElement(cv.MORPH_ELLIPSE,(15,15))
erosion = cv.erode(gray, kernel, iterations = 1)
opening = cv.morphologyEx(gray, cv.MORPH_OPEN, kernel)
dilation = cv.dilate(gray, kernel, iterations = 1)
closing = cv.morphologyEx(gray, cv.MORPH_CLOSE, kernel)

plt.subplot(2,3,1)
plt.imshow(gray)
plt.subplot(2,3,2)
plt.imshow(erosion)
plt.subplot(2,3,3)
plt.imshow(opening)
plt.subplot(2,3,5)
plt.imshow(dilation)
plt.subplot(2,3,6)
plt.imshow(closing)
plt.show()
```
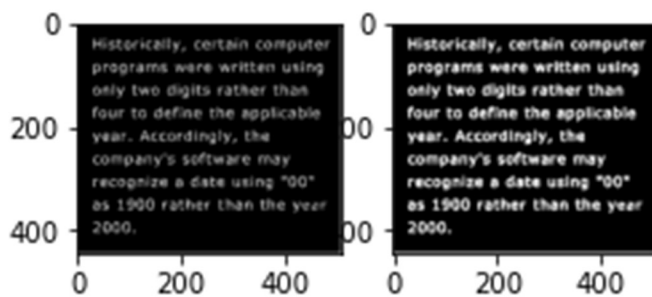
결과

3. 실습2

코드

```
import cv2 as cv
import matplotlib.pyplot as plt

gray = cv.imread('0907.png')
kernel = cv.getStructuringElement(cv.MORPH_CROSS,(3,3))
dilation = cv.dilate(gray, kernel, iterations = 1)



plt.subplot(1,3,1)
plt.imshow(gray)
plt.subplot(1,3,2)
plt.imshow(dilation)
plt.show()
```
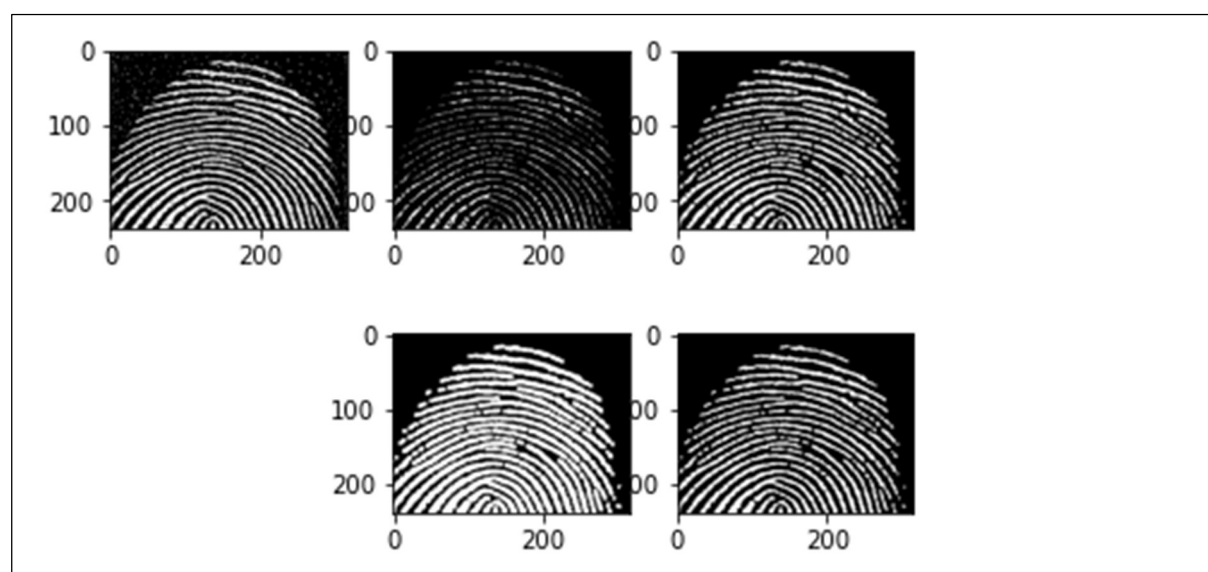
결과

4. 실습3

코드

```python
import cv2 as cv
import matplotlib.pyplot as plt

gray = cv.imread('0911.png')
kernel = cv.getStructuringElement(cv.MORPH_RECT,(3,3))
erosion1 = cv.erode(gray, kernel, iterations = 1)
dilation1 = cv.dilate(erosion1, kernel, iterations = 1)
dilation2 = cv.dilate(dilation1, kernel, iterations = 1)
erosion2 = cv.erode(dilation2, kernel, iterations = 1)

plt.subplot(2,3,1)
plt.imshow(gray)
plt.subplot(2,3,2)
plt.imshow(erosion1)
plt.subplot(2,3,3)
plt.imshow(dilation1)
plt.subplot(2,3,5)
plt.imshow(dilation2)
plt.subplot(2,3,6)
plt.imshow(erosion2)
plt.show()
```

결과

5. 실습4

코드

```
import cv2 as cv
import matplotlib.pyplot as plt

gray = cv.imread('0914.png')
kernel = cv.getStructuringElement(cv.MORPH_RECT,(3,3))
erosion = cv.erode(gray, kernel, iterations = 1)
new=gray-erosion

plt.subplot(1,3,1)
plt.imshow(gray)
plt.subplot(1,3,2)
plt.imshow(new)
plt.show()
```

결과