

영상정보처리 13주차 과제 템플리트

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입력 이미지: 자유

▼ 구글 드라이브 마우팅 및 작업 경로로 이동

- 다음 셀에 필요한 작업을 하시오.

```
from google.colab import drive
drive.mount('/gdrive')
%cd /gdrive/MyDrive/Classroom/[영상정보처리] 2000004793-2021-1/Report Week 13
%ls ../
```

```
↳ Mounted at /gdrive
/gdrive/MyDrive/Classroom/[영상정보처리] 2000004793-2021-1/Report Week 13
2021-1-Midterm-SampleImages/ 'Report Week 13' / 'Report Week 6' /
Dongkeun-OpenCV-ImgData/ 'Report Week 2' / 'Report Week 7' /
'Report Week 10' / 'Report Week 3' / 'Report Week 9' /
'Report Week 11' / 'Report Week 4' / solution/
'Report Week 12' / 'Report Week 5' / Test/
```

▼ 문제 1

수업 시간에 배운 다음의 방법들을 함수화 하고, 자유롭게 선택된 이미지를 이용하여 테스트 하시오.

1. HoughLinesP 를 이용한 직선 성분 찾기

2. contour 관련 함수들

- 하나의 세그먼트에 대한 외곽선 그리기
- 하나의 이미지에 있는 모든 세그먼트에 대한 외곽선 그리기
- 하나의 세그먼트에 대한 외곽선 그리기 영역 계산하기
- 하나의 컨투어에 대한 centroid 찾기
- 하나의 컨투어에 대한 bounding rectangle 찾기
- 하나의 컨투어에 대한 rotated rectangle 찾기
- 하나의 컨투어에 대한 convex hull 찾기
- 하나의 컨투어에 대한 convexity defects 찾기

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

img_path = '../Dongkeun-OpenCV-ImgData/opencv.jpg'
```

```

def show_with_matplotlib_gray(img, title):
    plt.title(title)
    plt.axis('off')
    plt.imshow(img, cmap='gray')

img = cv2.imread(img_path)

def find_line_by_hough():
    img = cv2.imread(img_path)
    gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)

    edge = cv2.Canny(gray, 50, 200)
    lines = cv2.HoughLinesP(edge, rho=1, theta=np.pi/180, threshold=50, minLineLength=10, maxLineGap=

    for line in lines:
        x1, y1, x2, y2 = line[0]
        cv2.line(img, (x1, y1), (x2, y2), (255, 0, 0), 4)
    show_with_matplotlib_gray(img, 'HoughLinesP')

def draw_contour(mode, method, flag):
    img = cv2.imread(img_path)
    gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)

    contours, hierarchy = cv2.findContours(gray, mode, method)
    cv2.drawContours(img, contours, -1, (0, 0, 255), 4)

    area = 0
    if flag == 1:
        for cnt in contours:
            area = cv2.contourArea(cnt)
    elif flag == 2:
        for cnt in contours:
            M = cv2.moments(cnt)
            if M["m00"] != 0:
                cx = int(M["m10"] / M["m00"])
                cy = int(M["m01"] / M["m00"])
            else:
                cx, cy = 0, 0
            cv2.circle(img, (cx, cy), 10, (255, 0, 0), -1)
    elif flag == 3:
        for cnt in contours:
            x, y, w, h = cv2.boundingRect(cnt)
            cv2.rectangle(img, (x, y), (x+w, y+h), (0, 255, 0), 4)
    elif flag == 4:
        for cnt in contours:
            rect = cv2.minAreaRect(cnt)
            box = cv2.boxPoints(rect)
            box = np.int0(box)
            cv2.drawContours(img, [box], 0, (255, 0, 0), 4)
    elif flag == 5:
        for cnt in contours:
            hull = cv2.convexHull(cnt)
            cv2.drawContours(img, [hull], 0, (255, 0, 255), 5)
    elif flag == 6:

```

```

    icnt = 0
    for cnt in contours:
        hull = cv2.convexHull(cnt, returnPoints=False)
        defects = cv2.convexityDefects(cnt, hull)

        icnt += 1
        for i in range(defects.shape[0]):
            s, e, f, d = defects[i, 0]
            start, end = tuple(cnt[s][0]), tuple(cnt[e][0])
            far = tuple(cnt[f][0])

            if d > 500:
                cv2.line(img, start, end, [255, 0, 255], 5)
                cv2.circle(img, far, 5, [0, 0, 255], -1)

    return img, area

plt.figure(figsize=(15, 20))
plt.subplot(521)
show_with_matplotlib_gray(cv2.cvtColor(img, cv2.COLOR_BGR2GRAY), 'original image')
plt.subplot(522)
find_line_by_hough()
plt.subplot(523)
show_with_matplotlib_gray(draw_contour(cv2.RETR_EXTERNAL, cv2.CHAIN_APPROX_SIMPLE, 0)[0], 'contour')
plt.subplot(524)
show_with_matplotlib_gray(draw_contour(cv2.RETR_LIST, cv2.CHAIN_APPROX_SIMPLE, 0)[0], 'contour list')
plt.subplot(525)
show_with_matplotlib_gray(draw_contour(cv2.RETR_LIST, cv2.CHAIN_APPROX_SIMPLE, 1)[0], 'contour area')
format(draw_contour(cv2.RETR_LIST, cv2.CHAIN_APPROX_SIMPLE, 1)[1]))
plt.subplot(526)
show_with_matplotlib_gray(draw_contour(cv2.RETR_LIST, cv2.CHAIN_APPROX_SIMPLE, 2)[0], 'contour cent')
plt.subplot(527)
show_with_matplotlib_gray(draw_contour(cv2.RETR_LIST, cv2.CHAIN_APPROX_SIMPLE, 3)[0], 'contour boun')
plt.subplot(528)
show_with_matplotlib_gray(draw_contour(cv2.RETR_LIST, cv2.CHAIN_APPROX_SIMPLE, 4)[0], 'contour rota')
plt.subplot(529)
show_with_matplotlib_gray(draw_contour(cv2.RETR_LIST, cv2.CHAIN_APPROX_SIMPLE, 5)[0], 'contour conv')
plt.subplot(5, 2, 10)
show_with_matplotlib_gray(draw_contour(cv2.RETR_LIST, cv2.CHAIN_APPROX_SIMPLE, 6)[0], 'contour conv')
plt.show()

```

original image



HoughLinesP



contour external



contour list



contour area : 34669.0



contour centroid



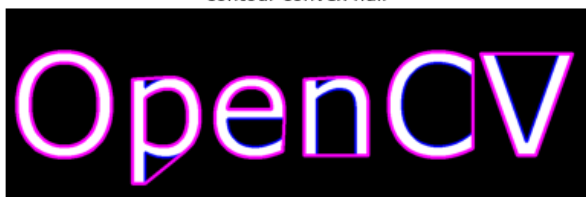
contour bounding rectangle



contour rotated rectangle



contour convex hull



contour convexity defects

