컴퓨터 비전

과제 #3

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학 과 : 전자공학과

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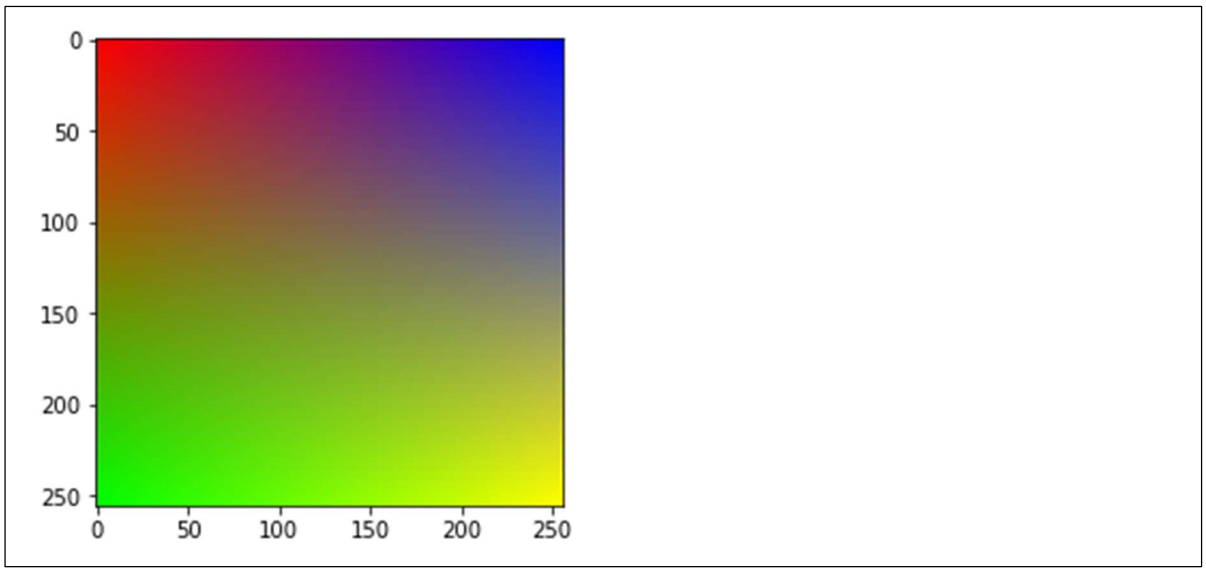
1. Bilinear(양선형) interpolation

코드

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

def color_rect():
    g = np.zeros((256,256,3), np.uint8)
    for i in range(256):
        for j in range(256):

            p_r = (255*(255-j)/255) + (0*j/255)
            p_b = (0*(255-j)/255) + (255*j/255)
            p_g = (0*(255-j)/255) + (0*j/255)

            q_r = (0*(255-j)/255) + (255*j/255)
            q_b = (0*(255-j)/255) + (0*j/255)
            q_g = (255*(255-j)/255) + (255*j/255)

            g_r = (p_r*(255-i)/255) + (q_r*i/255)
            g_b = (p_b*(255-i)/255) + (q_b*i/255)
            g_g = (p_g*(255-i)/255) + (q_g*i/255)

            g[i,j,:] = (g_b, g_g, g_r)
    return g

g = color_rect()

col = cv.cvtColor(g, cv.COLOR_BGR2RGB)
plt.imshow(col)
plt.show()
```

결과



2. Sobel 에지 검출

코드

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

cap = cv.VideoCapture("video.mp4")

if cap.isOpened():
    #file_path = 'x_edges.mp4'
    #file_path = 'y_edges.mp4'
    file_path = 'gradient_magnitude.mp4'

    fps = 120.0
    fourcc = cv.VideoWriter_fourcc(*'DXVA')
    width = cap.get(cv.CAP_PROP_FRAME_WIDTH)
    height = cap.get(cv.CAP_PROP_FRAME_HEIGHT)
    size = (int(width), int(height))

    out = cv.VideoWriter(file_path, fourcc, fps, size)

    while True:
        ret, frame = cap.read()
        if ret:
            gray = cv.cvtColor(frame, cv.COLOR_BGR2GRAY)

            x_edges = cv.Sobel(gray, -1, 1, 0, ksize=5)
            y_edges = cv.Sobel(gray, -1, 0, 1, ksize=5)
            gradient_magnitude = cv.addWeighted(x_edges, 0.5, y_edges, 0.5, 0)

            #out.write(x_edges)
            #out.write(y_edges)
            out.write(gradient_magnitude)

            if cv.waitKey(int(1000/fps)) != -1:
                break
        else:
            print("END")
            break
    out.release()
else:
    print("can't open")

cap.release()
cv.destroyAllWindows()
```

결과

동영상 첨부

open cv를 통해서 만들어진 영상 용량이 너무 커져 편집하여 용량을 줄여 올렸습니다.

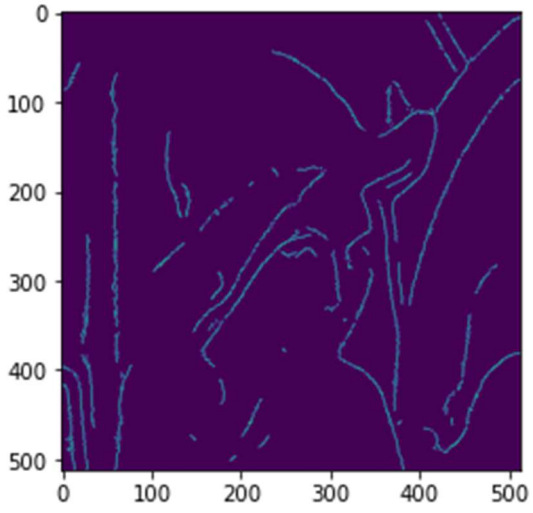
3. Canny 에지 검출

코드

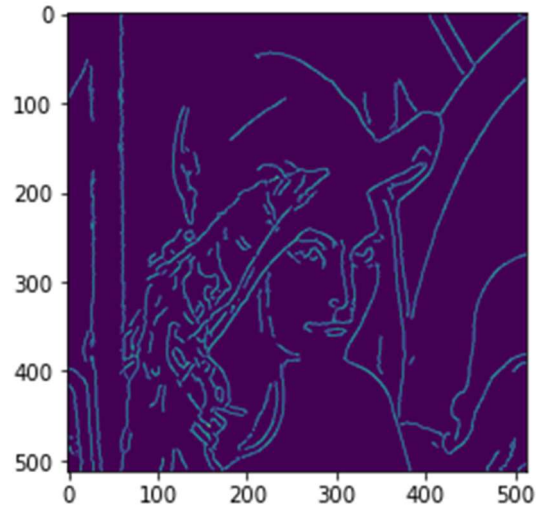
```
import numpy as np
import cv2 as cv
import matplotlib.pyplot as plt

img = cv.imread('lena512.tif')
gray = cv.cvtColor(img, cv.COLOR_BGR2GRAY)

for i in range(4):
    sigma = 1+(2*i)
    print('sigma is ',sigma)
    w = 6*sigma+1
    blur = cv.GaussianBlur(gray, (w, w), sigma)

    edges = cv.Canny(blur, 30, 50, 3)

    plt.imshow(edges)
    plt.show()
```

결과

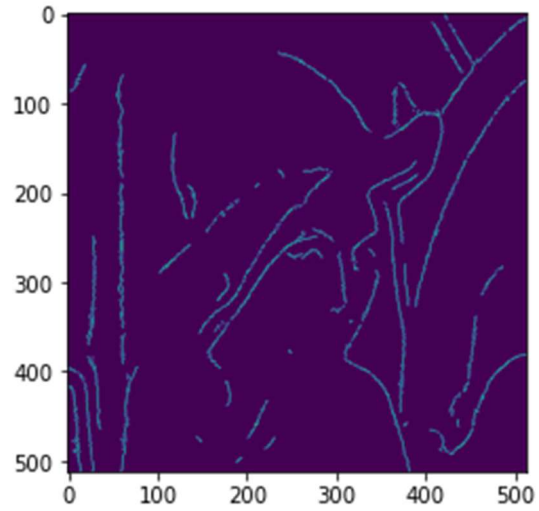
```
sigma is  5
```



sigma is 3



sigma is 5



sigma is 7