

```
In [1]: import numpy as np
import sys
import cv2
cv2.__version__
```

Out[1]: '4.5.1'

```
In [4]: src = cv2.imread('/Users/illbumjung/YGL/5. Vision/OneDrive-2021-11-02/Ch_4_Hi:
cv2.IMREAD_COLOR)

src_ycrb = cv2.cvtColor(src, cv2.COLOR_BGR2YCrCb)

y, cr, cb = cv2.split(src_ycrb)
y = cv2.equalizeHist(y)

src_ycrb = cv2.merge([y, cr, cb])

src_bgr = cv2.cvtColor(src_ycrb, cv2.COLOR_YCrCb2BGR)

cv2.imshow('src', src)
cv2.imshow('src_bgr', src_bgr)

cv2.waitKey()
cv2.destroyAllWindows()
cv2.waitKey(1)
```

Out[4]: -1

```
In [11]: src = cv2.imread('/Users/illbumjung/YGL/5. Vision/OneDrive-2021-11-02/Ch_4_Hi:
cv2.IMREAD_COLOR)

dst_rgb = cv2.inRange(src, (50,0,0), (255, 170, 170))

dst_hsv = cv2.cvtColor(src, cv2.COLOR_BGR2HSV)
dst_hsv = cv2.inRange(dst_hsv, (100,100,0), (135,255,255))

cv2.imshow('src', src)
cv2.imshow('dst_rgb', dst_rgb)
cv2.imshow('dst_hsv', dst_hsv)

cv2.waitKey()
cv2.destroyAllWindows()
cv2.waitKey(1)
```

Out[11]: -1

```
In [14]: img = cv2.imread('/Users/illbumjung/YGL/5. Vision/OneDrive-2021-11-02/Ch_4_Hi:

x, y, w, h = cv2.selectROI(img)

img_ycrb = cv2.cvtColor(img, cv2.COLOR_BGR2YCrCb)

crop = img_ycrb[y:y+h, x:x+w]
hist = cv2.calcHist([crop], [1,2], None, [64, 64], [0, 256, 0, 256])

backproj = cv2.calcBackProject([img_ycrb], [1,2], hist, [0, 256, 0, 256], 1)

dst = cv2.copyTo(img, backproj)
```

```
cv2.imshow('img', img)
cv2.imshow('backproj', backproj)
cv2.imshow('dst', dst)

cv2.waitKey()
cv2.destroyAllWindows()
cv2.waitKey(1)
```

Out[14]: -1

```
In [17]: src = cv2.imread('/Users/illbumjung/YGL/5. Vision/OneDrive-2021-11-02/Ch_5_fi
          cv2.IMREAD_GRAYSCALE)

kernel_3 = np.ones((3,3), dtype=np.float32)/9.
kernel_5 = np.ones((5,5), dtype=np.float32)/25.
kernel_11 = np.ones((11,11), dtype=np.float32)/121.

dst = cv2.filter2D(src, -1, kernel_3)
dst1 = cv2.filter2D(src, -1, kernel_5)
dst2 = cv2.filter2D(src, -1, kernel_11)

dst_blur = cv2.blur(src, (5,5))

cv2.imshow('src', src)
cv2.imshow('dst', dst)
cv2.imshow('dst1', dst1)
cv2.imshow('dst2', dst2)
cv2.imshow('dst_blur', dst_blur)

cv2.waitKey()
cv2.destroyAllWindows()
cv2.waitKey(1)
```

Out[17]: -1

```
In [19]: src = cv2.imread('/Users/illbumjung/YGL/5. Vision/OneDrive-2021-11-02/Ch_5_fi
          cv2.IMREAD_GRAYSCALE)

dst_mean = cv2.blur(src, (7,7))
dst_gaussian = cv2.GaussianBlur(src, (0,0), 1)
dst_gaussian2 = cv2.GaussianBlur(src, (0,0), 2)

cv2.imshow('src', src)
cv2.imshow('dst_mean', dst_mean)
cv2.imshow('dst_gaussian', dst_gaussian)
cv2.imshow('dst_gaussian2', dst_gaussian2)

cv2.waitKey()
cv2.destroyAllWindows()
cv2.waitKey(1)
```

Out[19]: -1

```
In [21]: src = cv2.imread('/Users/illbumjung/YGL/5. Vision/OneDrive-2021-11-02/Ch_5_fi
          cv2.IMREAD_GRAYSCALE)

src_gblur = cv2.GaussianBlur(src, (0,0), 1)
```

```
dst_sharp = cv2.addWeighted(src, 2, src_gblur, -1, 0)

cv2.imshow('src', src)
cv2.imshow('src_gblur', src_gblur)
cv2.imshow('dst_sharp', dst_sharp)

cv2.waitKey()
cv2.destroyAllWindows()
cv2.waitKey(1)
```

Out[21]: -1

```
In [36]: src = cv2.imread('/Users/illbumjung/YGL/5. Vision/OneDrive-2021-11-02/Ch_5_fi
          cv2.IMREAD_GRAYSCALE)

salt_pepper_1 = np.random.choice((0,255), src.shape, p = (0.95, 0.05)).astype
salt_pepper_2 = np.random.choice((0,255), src.shape, p = (0.95, 0.05)).astype

src_noise = src + salt_pepper_1 - salt_pepper_2

src_noise = np.clip(src_noise, 0, 255).astype(np.uint8)

cv2.imshow('src_noise', src_noise)

cv2.waitKey()
cv2.destroyAllWindows()
cv2.waitKey(1)
```

Out[36]: -1

```
In [22]: print(src.shape)
```

(790, 1200)

```
In [38]: src = cv2.imread('/Users/illbumjung/YGL/5. Vision/OneDrive-2021-11-02/Ch_5_fi
          cv2.IMREAD_GRAYSCALE)

src_gaussian = cv2.GaussianBlur(src, (0,0), 3.0)
dst_bilateral = cv2.bilateralFilter(src, -1, 10, 3)

cv2.imshow('src', src)
cv2.imshow('src_gaussian', src_gaussian)
cv2.imshow('dst_bilateral', dst_bilateral)

cv2.waitKey()
cv2.destroyAllWindows()
cv2.waitKey(1)
```

Out[38]: -1

In [ ]: