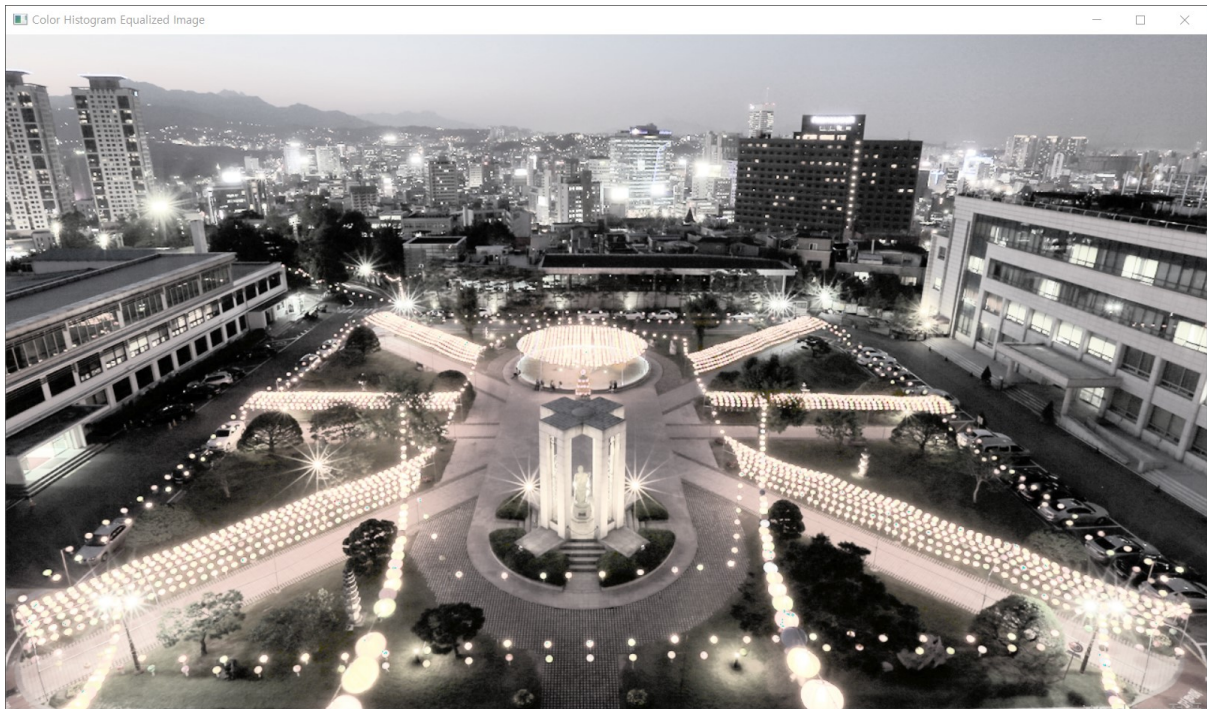


Assignment5

Color Histogram Equalization

2017113547 이정근



#Color Histogram Equalization.py

#2017113547 이정근

```
import cv2
```

```
import numpy as np
```

```
NUM_INTENSITY = 256
```

```
def HistogramEqualize(img):
```

```
    height, width = img.shape
```

```
    num_pixels = height*width
```

```
    # making histogram
```

```
    histogram = np.zeros((NUM_INTENSITY,))
```

```
    for y in range(height):
```

```
        for x in range(width):
```

```
            histogram[img[y, x]] = histogram[img[y, x]] + 1
```

```
    # normalizing histogram
```

```
    normalized_histogram = np.divide(histogram, num_pixels)
```

```

# making cdf
cdf = np.zeros((NUM_INTENSITY,))
cdf[0] = normalized_histogram[0]
for k in range(1, NUM_INTENSITY, 1):
    cdf[k] = cdf[k-1] + normalized_histogram[k]

# finding output gray level
output_gray_level = np.multiply(NUM_INTENSITY-1, cdf)
output_gray_level = np.round(output_gray_level)

# convert image to equalized image
result = np.zeros((height, width), np.uint8) # result image
for y in range(height):
    for x in range(width):
        result[y, x] = output_gray_level[img[y, x]]

return result

```

```

img = cv2.imread('dgu_night_color.png', cv2.IMREAD_COLOR) # img2numpy
imgYCC = cv2.cvtColor(img, cv2.COLOR_BGR2YCR_CB)
imgYCC_out = np.zeros(imgYCC.shape, np.uint8)
imgYCC_out[:, :, 0] = HistogramEqualize(imgYCC[:, :, 0])

```

```

row, col = imgYCC_out[:, :, 0].shape

```

```

# divide by zero error preventing
for i in range(row):
    for j in range(col):
        if imgYCC[i, j, 0] == 0:
            imgYCC[i, j, 0] = 1

```

```

s = 0.095

```

```

img_out = np.zeros(img.shape, np.uint8)

```

```

img_out[:, :, 0] = np.multiply(imgYCC_out[:, :, 0], np.divide(img[:, :, 0], imgYCC[:, :, 0])**s)
img_out[:, :, 1] = np.multiply(imgYCC_out[:, :, 0], np.divide(img[:, :, 1], imgYCC[:, :, 0])**s)
img_out[:, :, 2] = np.multiply(imgYCC_out[:, :, 0], np.divide(img[:, :, 2], imgYCC[:, :, 0])**s)

```

```
cv2.imshow("Color Histogram Equalized Image", img_out)
cv2.waitKey()
```