image_filters

May 9, 2021

Image processing

Our Core Python Libraries

[1]:
```
import cv2
import numpy as np
from matplotlib import pyplot as plt
```

Load one sample image

[2]:
```
img = cv2.imread('/home/jayanthikishore/Downloads/ML_classwork/Week5_srrt/
↪image1.png')
```

Prepare kernal for analysis

[3]:
```
kernel = np.ones((5,5),np.float32)/25
dst = cv2.filter2D(img,-1,kernel)
```

Original and Average plot

[4]:
```
plt.subplot(121),plt.imshow(img),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(dst),plt.title('Average')
plt.xticks([]), plt.yticks([])
plt.show()
```

Original and Blurred Image

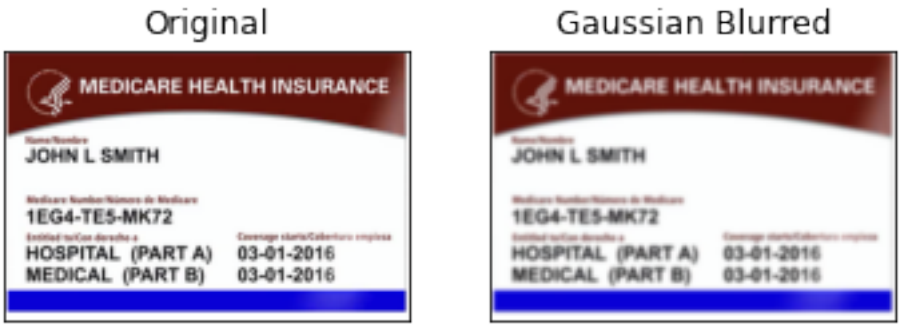
[5]:
```
blur = cv2.blur(img,(5,5))
```

[6]:
```
plt.subplot(121),plt.imshow(img),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(blur),plt.title('Blurred')
plt.xticks([]), plt.yticks([])
plt.show()
```

Original and Gaussian Blurred Image

[7]:
```
gauss = cv2.GaussianBlur(img,(5,5),0)
```

[8]:
```
plt.subplot(121),plt.imshow(img),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(gauss),plt.title('Gaussian Blurred')
plt.xticks([]), plt.yticks([])
plt.show()
```



Original and Bilateral Image

[9]:
```
bilat = cv2.bilateralFilter(img,9,75,75)
```

[10]:
```
plt.subplot(121),plt.imshow(img),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(bilat),plt.title('Bilateral')
plt.xticks([]), plt.yticks([])
plt.show()
```

Load sample Image

[11]:
```
imgloc= '/home/jayanthikishore/Downloads/ML_classwork/Week5_srrt/
 ↪Sydney_Opera_House.jpg'
opera = plt.imread(imgloc)
plt.axis('off')
plt.imshow(opera);
```

[12]:
```
def gray(im):
    lum = np.zeros((1, 1, 3))
    lum[0, 0, :] = [0.2126, 0.7152, 0.0722]
    return np.uint8(np.round(np.sum(lum*im, axis = 2)))
operag = gray(opera)
plt.subplot(121),plt.imshow(opera),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(operag, cmap='gray'),plt.title('Gray scale')
plt.xticks([]), plt.yticks([])
plt.show()
```

Image intensity histograms

[13]:
```
#Histograms
def hist(im):
    h = np.zeros((256))
    for p in im.ravel():
        h[p] += 1
    return h

histo_opera = hist(opera)
histo_operag = hist(operag)

plt.subplot(121),plt.plot(histo_opera),plt.title('Original')

plt.subplot(122), plt.plot(histo_operag),plt.title('Gray scale')
# plt.xticks([]), plt.yticks([])
plt.show()
```

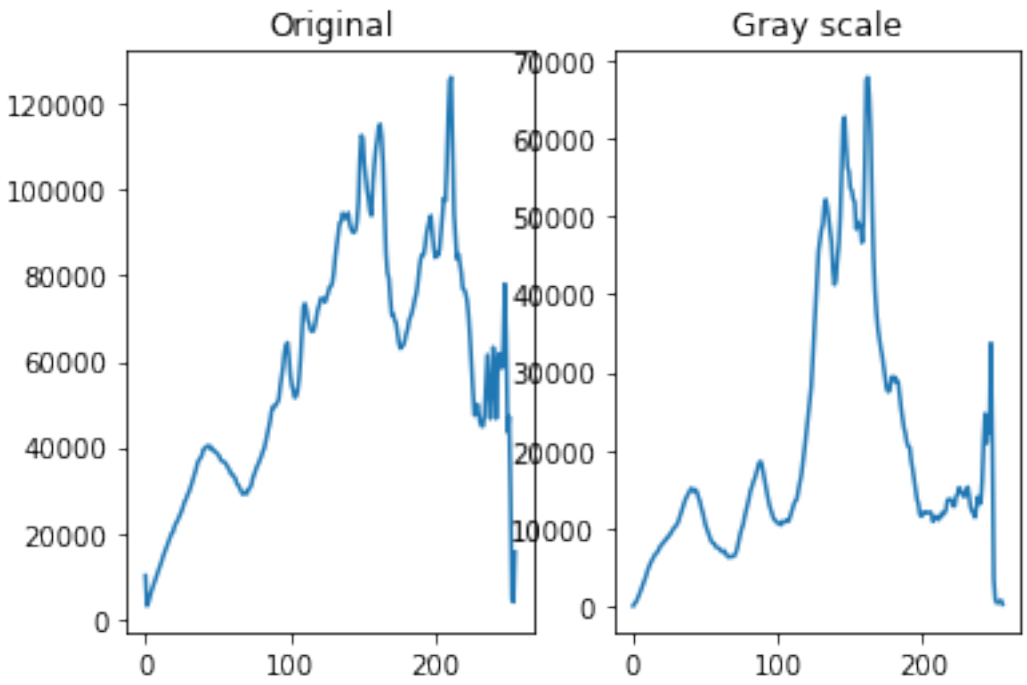


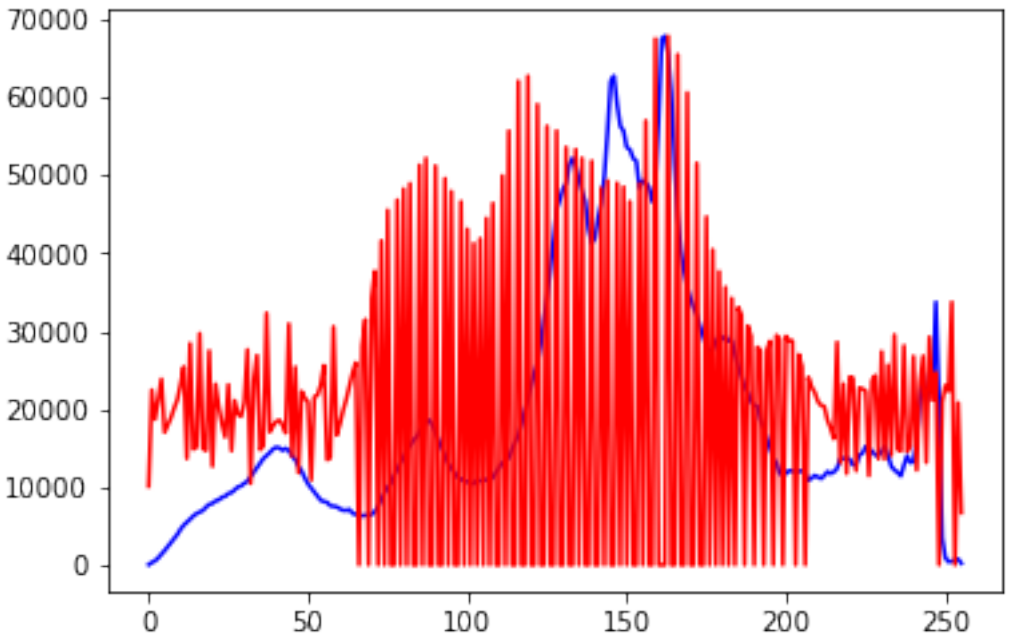
Image Histogram and equalizers

[14]:
```
#Histogram equalizer
def densite(h):
    s = 0
    res = np.zeros_like(h)
    for i in range(len(h)):
        res[i] = s
        s += h[i]
    return res/s


def egaliser(im):
    d_im = densite(hist(im))
    im_eq = np.zeros_like(im)
    for i in range(im.shape[0]):
        for j in range(im.shape[1]):
            im_eq[i,j] = np.round(d_im[im[i, j]] * 255)
    return im_eq

opera_eg = egaliser(operag)
plt.axis('off')
plt.imshow(opera_eg, cmap = "gray");
```

[15]:
```
plt.plot(histo_operag, color = "blue")
plt.plot(hist(opera_eg), color = "red");
```



[ ]:
```

```