```
# -*- coding: utf-8 -*-
"""
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"""

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

g_a = np.zeros(256,np.float32)

m_a = 87.0

sd_a = 25.0

for i in range(256):
        r = i-m_a
        r = r*r
        r = r/(sd_a*sd_a)
        r = math.exp(-(r))
        r = r/(sd_a*math.sqrt(2*3.1416))
        g_a[i] = r

plt.plot(g_a)

plt.title("Gaussian function 1")
 plt.show()

 g_b = np.zeros(256,np.float32)

 m_b = 187.0

 sd_b = 30.0

 for i in range(256):
        r = i-m_b
        r = r*r
        r = r/(sd_b*sd_b)
        r = math.exp(-(r))
        r = r/(sd_b*math.sqrt(2*3.1416))
        g_b[i] = r

 plt.plot(g_b)

 plt.title("Gaussian function 2")

 plt.show()

 gauss = g_a+g_b

 plt.plot(gauss)

 plt.title("Added Gaussian function")
```

```
    plt.show()

    fr_g = gauss

    t_fr = gauss.sum()

    pdf_g = np.zeros(256,np.float32)

    for i in range(256):
        pdf_g[i] = fr_g[i]/t_fr

    cdf_g = np.zeros(256,np.float32)

    cdf_g[0] = 0.0

    for i in range(1,255):
        cdf_g[i] = cdf_g[i-1]+pdf_g[i]


    for i in range(256):
        cdf_g[i] = round(cdf_g[i]*255)

    path = "F:/Online Class/4-1/zLabs/Vision/zz.jpg"

    img = cv.imread(path)

    img = cv.cvtColor(img, cv.COLOR_BGR2GRAY)

    plt.imshow(img,'gray')


plt.title("Input image for matching")

plt.show()

plt.hist(img.ravel(),256,(0,256))

plt.title("Input image histogram")

plt.show()

freq = np.zeros(256,np.int32)

for i in range(img.shape[0]):
    for j in range(img.shape[1]):
        pix = int(img[i][j])
        freq[pix]+=1

pdf = np.zeros(256,np.float32)

for i in range(256):
    pdf[i] = freq[i]/(img.shape[0]*img.shape[1])

cdf = np.zeros(256,np.float32)

cdf[0] = pdf[0]

for i in range(1,256):
    cdf[i] = cdf[i-1]+pdf[i]
```

```
    for i in range(256):
            cdf[i] = round(cdf[i]*255.0)


    for i in range(img.shape[0]):
            for j in range(img.shape[1]):
                    pix = int(img[i][j])
                    m = cdf[pix]

                    dis = 10000
                    res=pix
                    # ch=0
                    for k in range(256):
                            x=cdf_g[k]-m
                            if x<0:
                                    x*=-1
                            if(x<dis):
                                    dis = x
                                    res=k

                    m=res

                    img[i][j] = m

    plt.imshow(img,'gray')

    plt.title("Output for matching")

plt.show()


plt.hist(img.ravel(),256,(0,256))

plt.title("Output histogram")

plt.show()

freq_op = np.zeros(256)

for i in range(img.shape[0]):
        for j in range(img.shape[1]):
                pix = int(img[i][j])
                freq_op[pix]+=1

plt.plot(freq_op)

plt.title("Plot of intensity frequencies of output image:")

plt.show()
```