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

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

path = "/content/drive/MyDrive/vision/New folder/rubiks_cube.png"

img = cv.imread(path)

img = cv.resize(img,(300,300))

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


print("enter kernel height: ")

k_h = int(input())

print("enter kernel weidth: ")

k_w = int(input())

kernel = np.zeros((k_h,k_w), np.float32)

a = kernel.shape[0] // 2
b = kernel.shape[1] // 2

pi = 3.1416

sigma = 75.0
```

```
    s = 2*sigma*sigma

    for i in range(-a,a+1):
        for j in range(-b,b+1):
            r = math.sqrt(i*i+j*j)
            r/=s
            r = math.exp(-(r))
            r/=(pi*s)
            kernel[i+a][j+b] = r

img = img/255

m = img.shape[0]
n = img.shape[1]

op = np.zeros((m,n),np.float32)

for i in range(m):
    for j in range(n):
        val = 0.0
        kernel_tem = np.zeros((k_h,k_w), np.float32)

        for x in range(-a,a+1):
            for y in range(-b,b+1):
                if i-x>=0 and i-x<m and j-y>=0 and j-y<n:
                    r = img[i][j] - img[i-x][j-y]
                    r = math.sqrt(r*r)
                    r/=s
                    r=math.exp(-(r))
                    r/=(pi*s)
                    kernel_tem[x+a][y+b]=kernel[x+a][y+b]*r

        for x in range(-a,a+1):
            for y in range(-b,b+1):
                if i-x>=0 and i-x<m and j-y>=0 and j-y<n:
                    val += kernel_tem[x+a][y+b]*img[i-x][j-y]
```

```
        ksum = kernel_tem.sum()

        val/=ksum
        op[i][j] = val

   op = op*255
```
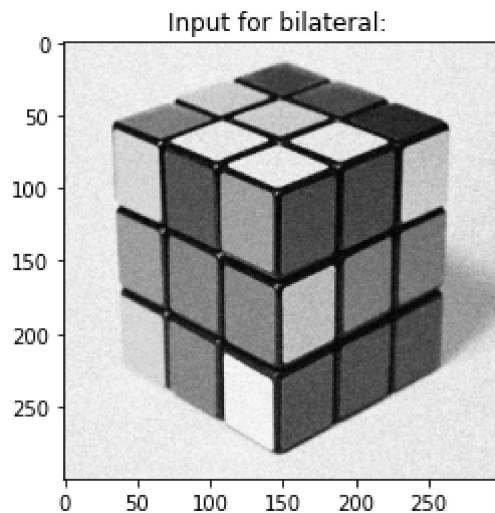
```
    enter kernel height:
    7
    enter kernel weidth:
    7
```

```
plt.imshow(img,'gray')

plt.title("Input for bilateral: ")

plt.show()
```


Input for bilateral:

```
plt.imshow(op,'gray')

plt.title("Output for bilateral: ")
```

```
plt.show()
```

Output for bilateral: