

✓ Image Smoothing / Blurring

```
from google.colab import drive
drive.mount('/content/drive')
```

Mounted at /content/drive

```
import cv2
import numpy as np
import matplotlib.pyplot as plt
```

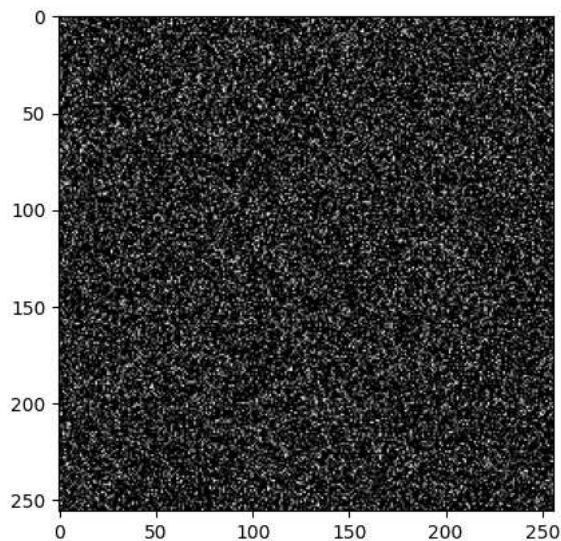
```
# Load the image
img = cv2.imread('/content/drive/MyDrive/FIPLab/Dataset/cameraman.jpg',0)
```

```
img.shape
```

(256, 256)

```
# Generate random Gaussian noise
mean = 0
stddev = 100
noise = np.zeros(img.shape, np.uint8)
cv2.randn(noise, mean, stddev)
plt.imshow(noise, 'gray')
```

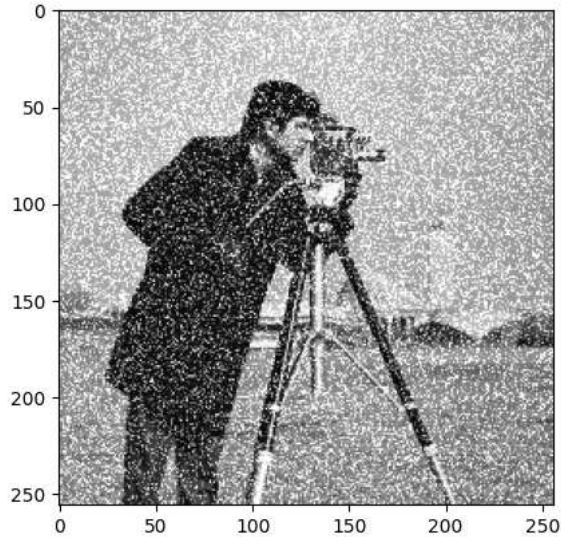
<matplotlib.image.AxesImage at 0x7b52b02fc910>




```
# Add noise to image
noisy_img = cv2.add(img, noise)
```

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

 <matplotlib.image.AxesImage at 0x7b52ae21a050>



```
# Smoothing/low-pass filter kernel
kernel = np.ones((3,3),np.float32)/9
kernel
```

 array([[0.11111111, 0.11111111, 0.11111111],
 [0.11111111, 0.11111111, 0.11111111],
 [0.11111111, 0.11111111, 0.11111111]], dtype=float32)

```
# Smoothing/low-pass filter using filter2D command
dst = cv2.filter2D(noisy_img,-1, kernel)
```

```
plt.subplot(231), plt.imshow(img,'gray'), plt.title('Original Image'),plt.axis('off')
plt.subplot(232), plt.imshow(noisy_img,'gray'), plt.title('Noisy Image')
plt.subplot(233),plt.imshow(dst, 'gray'),plt.title('Average Filtered Image')
plt.subplot(234),plt.hist(img.ravel(),256,[0,256]),plt.title('hist of original')
plt.subplot(235),plt.hist(noisy_img.ravel(),256,[0,256]),plt.title('hist of noisy')
plt.subplot(236),plt.hist(dst.ravel(),256,[0,256]),plt.title('hist of reconstructed')
plt.show()
```

