1. Mean Filter

In [20]:

```
import numpy as np
import cv2
from matplotlib import pyplot as plt
# from PIL import Image, ImageFilter

NOISE_IMG_PATH = 'img_train/noise/'
```

1.1 Gaussian Noise

In [21]:

```
%matplotlib inline
image = cv2.imread(NOISE_IMG_PATH + 'kocenglucu/gaussian_kocenglucu.jpg') # reads the image
image = cv2.cvtColor(image, cv2.COLOR_BGR2HSV) # convert to HSV
figure_size = 9 # the dimension of the x and y axis of the kernal.
new_image = cv2.blur(image,(figure_size, figure_size))
plt.figure(figsize=(11,6))
plt.subplot(121), plt.imshow(cv2.cvtColor(image, cv2.COLOR_HSV2RGB)),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(cv2.cvtColor(new_image, cv2.COLOR_HSV2RGB)),plt.title('Mean filter')
plt.xticks([]), plt.yticks([])
plt.show()
```

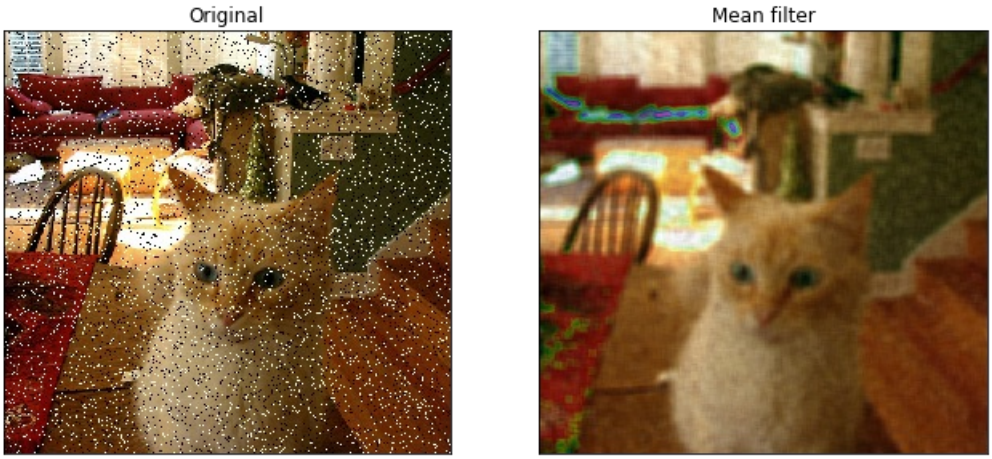
In [22]:

```
# The image will first be converted to grayscale
image2 = cv2.cvtColor(image, cv2.COLOR_HSV2BGR)
image2 = cv2.cvtColor(image2, cv2.COLOR_BGR2GRAY)
figure_size = 9
new_image = cv2.blur(image2,(figure_size, figure_size))
plt.figure(figsize=(11,6))
plt.subplot(121), plt.imshow(image2, cmap='gray'),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(new_image, cmap='gray'),plt.title('Mean filter')
plt.xticks([]), plt.yticks([])
plt.show()
```

1.2 Salt-Pepper Noise

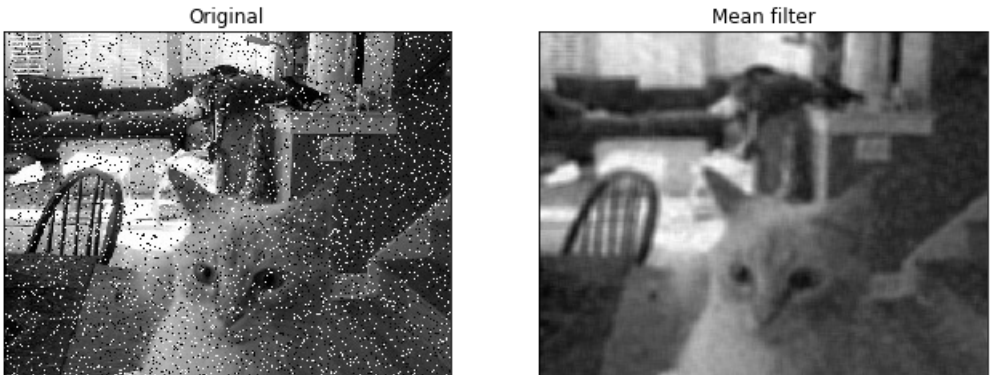
In [23]:

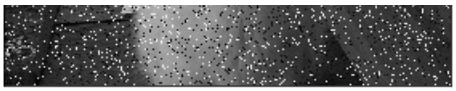
```
%matplotlib inline
image = cv2.imread(NOISE_IMG_PATH + 'kocenglucu/salt-pepper_kocenglucu.jpg') # reads the image
image = cv2.cvtColor(image, cv2.COLOR_BGR2HSV) # convert to HSV
figure_size = 9 # the dimension of the x and y axis of the kernal.
new_image = cv2.blur(image,(figure_size, figure_size))
plt.figure(figsize=(11,6))
plt.subplot(121), plt.imshow(cv2.cvtColor(image, cv2.COLOR_HSV2RGB)),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(cv2.cvtColor(new_image, cv2.COLOR_HSV2RGB)),plt.title('Mean filter')
plt.xticks([]), plt.yticks([])
plt.show()
```



In [24]:

```
# The image will first be converted to grayscale
image2 = cv2.cvtColor(image, cv2.COLOR_HSV2BGR)
image2 = cv2.cvtColor(image2, cv2.COLOR_BGR2GRAY)
figure_size = 9
new_image = cv2.blur(image2,(figure_size, figure_size))
plt.figure(figsize=(11,6))
plt.subplot(121), plt.imshow(image2, cmap='gray'),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(new_image, cmap='gray'),plt.title('Mean filter')
plt.xticks([]), plt.yticks([])
plt.show()
```





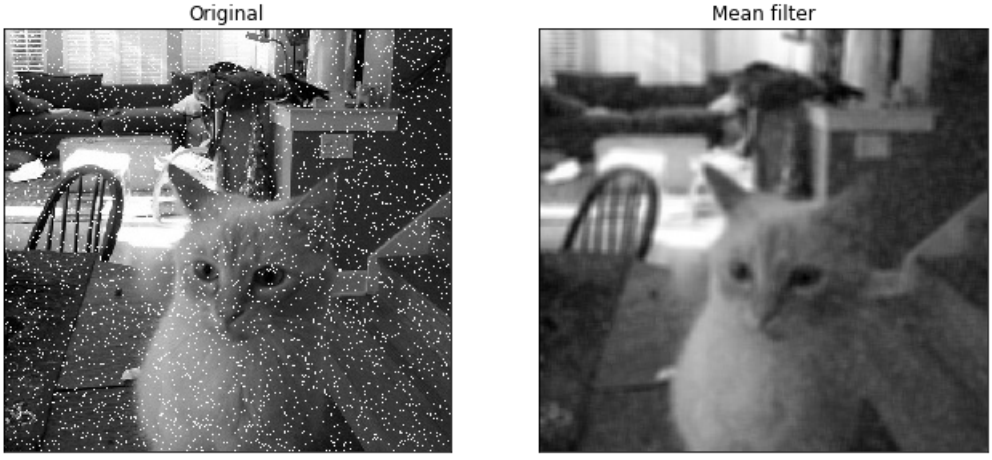

1.3 Salt Noise

In [25]:

```
%matplotlib inline
image = cv2.imread(NOISE_IMG_PATH + 'kocenglucu/salt_kocenglucu.jpg') # reads the image
image = cv2.cvtColor(image, cv2.COLOR_BGR2HSV) # convert to HSV
figure_size = 9 # the dimension of the x and y axis of the kernal.
new_image = cv2.blur(image,(figure_size, figure_size))
plt.figure(figsize=(11,6))
plt.subplot(121), plt.imshow(cv2.cvtColor(image, cv2.COLOR_HSV2RGB)),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(cv2.cvtColor(new_image, cv2.COLOR_HSV2RGB)),plt.title('Mean filter')
plt.xticks([]), plt.yticks([])
plt.show()
```

In [26]:

```
# The image will first be converted to grayscale
image2 = cv2.cvtColor(image, cv2.COLOR_HSV2BGR)
image2 = cv2.cvtColor(image2, cv2.COLOR_BGR2GRAY)
figure_size = 9
new_image = cv2.blur(image2,(figure_size, figure_size))
plt.figure(figsize=(11,6))
plt.subplot(121), plt.imshow(image2, cmap='gray'),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(new_image, cmap='gray'),plt.title('Mean filter')
plt.xticks([]), plt.yticks([])
plt.show()
```



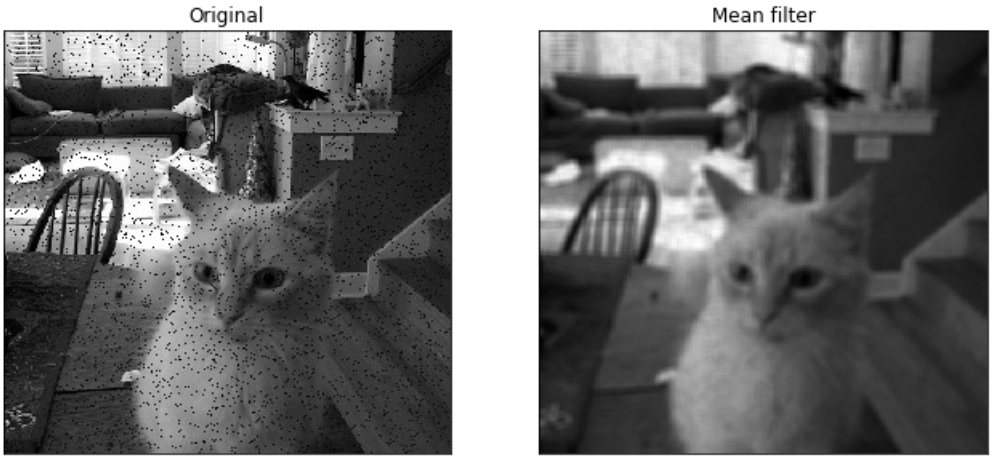
1.4 Pepper Noise

In [27]:

```
%matplotlib inline
image = cv2.imread(NOISE_IMG_PATH + 'kocenglucu/pepper_kocenglucu.jpg') # reads the image
image = cv2.cvtColor(image, cv2.COLOR_BGR2HSV) # convert to HSV
figure_size = 9 # the dimension of the x and y axis of the kernal.
new_image = cv2.blur(image,(figure_size, figure_size))
plt.figure(figsize=(11,6))
plt.subplot(121), plt.imshow(cv2.cvtColor(image, cv2.COLOR_HSV2RGB)),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(cv2.cvtColor(new_image, cv2.COLOR_HSV2RGB)),plt.title('Mean filter')
plt.xticks([]), plt.yticks([])
plt.show()
```

In [28]:

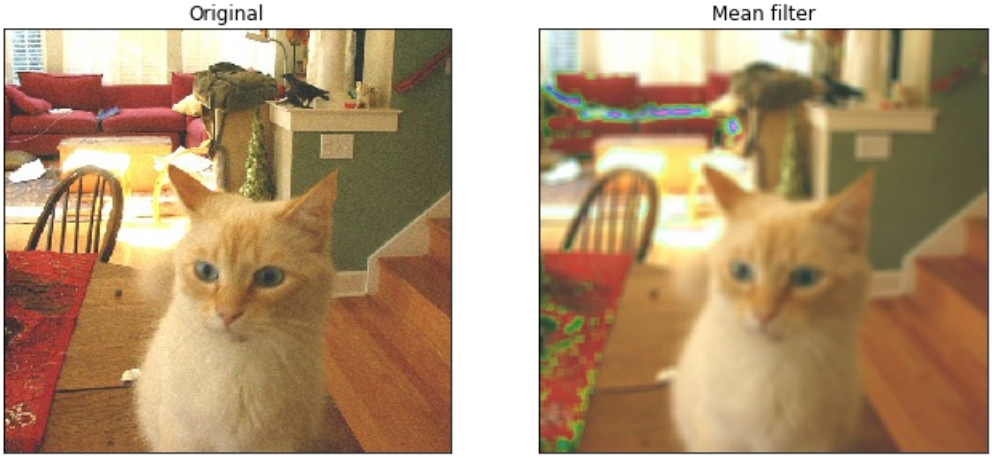
```
# The image will first be converted to grayscale
image2 = cv2.cvtColor(image, cv2.COLOR_HSV2BGR)
image2 = cv2.cvtColor(image2, cv2.COLOR_BGR2GRAY)
figure_size = 9
new_image = cv2.blur(image2,(figure_size, figure_size))
plt.figure(figsize=(11,6))
plt.subplot(121), plt.imshow(image2, cmap='gray'),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(new_image, cmap='gray'),plt.title('Mean filter')
plt.xticks([]), plt.yticks([])
plt.show()
```



1.5 Poisson Noise

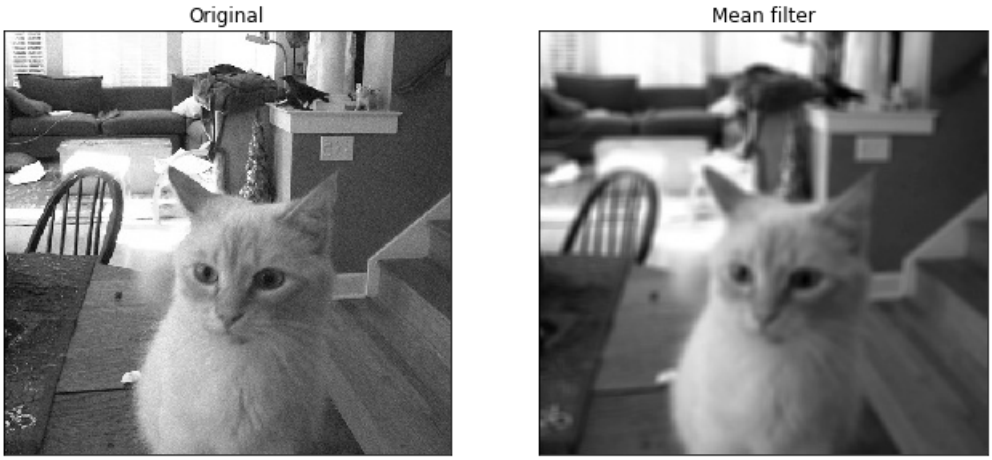
In [29]:

```
%matplotlib inline
image = cv2.imread(NOISE_IMG_PATH + 'kocenglucu/poisson_kocenglucu.jpg') # reads the image
image = cv2.cvtColor(image, cv2.COLOR_BGR2HSV) # convert to HSV
figure_size = 9 # the dimension of the x and y axis of the kernal.
new_image = cv2.blur(image,(figure_size, figure_size))
plt.figure(figsize=(11,6))
plt.subplot(121), plt.imshow(cv2.cvtColor(image, cv2.COLOR_HSV2RGB)),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(cv2.cvtColor(new_image, cv2.COLOR_HSV2RGB)),plt.title('Mean filter')
plt.xticks([]), plt.yticks([])
plt.show()
```



In [30]:

```
# The image will first be converted to grayscale
image2 = cv2.cvtColor(image, cv2.COLOR_HSV2BGR)
image2 = cv2.cvtColor(image2, cv2.COLOR_BGR2GRAY)
figure_size = 9
new_image = cv2.blur(image2,(figure_size, figure_size))
plt.figure(figsize=(11,6))
plt.subplot(121), plt.imshow(image2, cmap='gray'),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(new_image, cmap='gray'),plt.title('Mean filter')
plt.xticks([]), plt.yticks([])
plt.show()
```

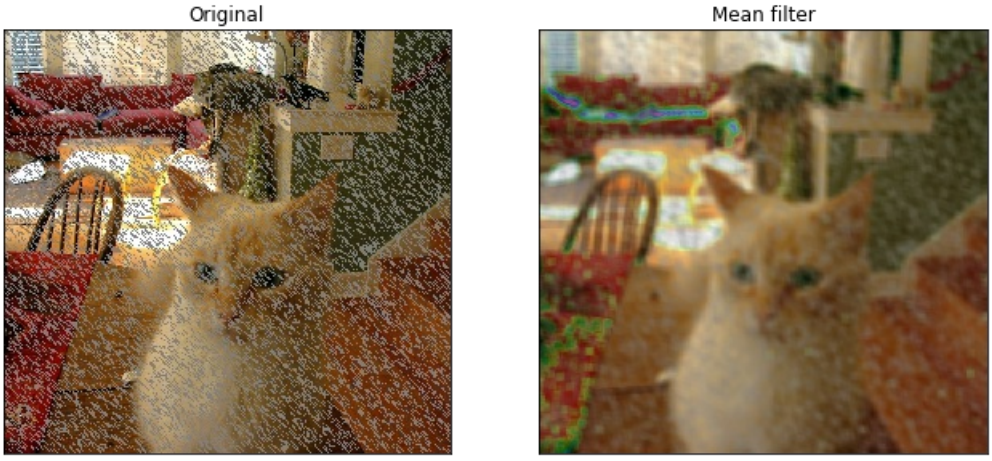


1.3 Speckle Noise

In [31]:

```
%matplotlib inline
image = cv2.imread(NOISE_IMG_PATH + 'kocenglucu/speckle_kocenglucu.jpg') # reads the image
image = cv2.cvtColor(image, cv2.COLOR_BGR2HSV) # convert to HSV
figure_size = 9 # the dimension of the x and y axis of the kernal.
new_image = cv2.blur(image,(figure_size, figure_size))
plt.figure(figsize=(11,6))
```

```
plt.subplot(121), plt.imshow(cv2.cvtColor(image, cv2.COLOR_HSV2RGB)),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(cv2.cvtColor(new_image, cv2.COLOR_HSV2RGB)),plt.title('Mean filter')
plt.xticks([]), plt.yticks([])
plt.show()
```



In [32]:

```
# The image will first be converted to grayscale
image2 = cv2.cvtColor(image, cv2.COLOR_HSV2BGR)
image2 = cv2.cvtColor(image2, cv2.COLOR_BGR2GRAY)
figure_size = 9
new_image = cv2.blur(image2,(figure_size, figure_size))
plt.figure(figsize=(11,6))
plt.subplot(121), plt.imshow(image2, cmap='gray'),plt.title('Original')
plt.xticks([]), plt.yticks([])
plt.subplot(122), plt.imshow(new_image, cmap='gray'),plt.title('Mean filter')
plt.xticks([]), plt.yticks([])
plt.show()
```