Image noise

To add noise to image use *imnoise* function

J = imnoise(I,type,parameters)

Where:

I : Input Image

J: Output image (noisy image)

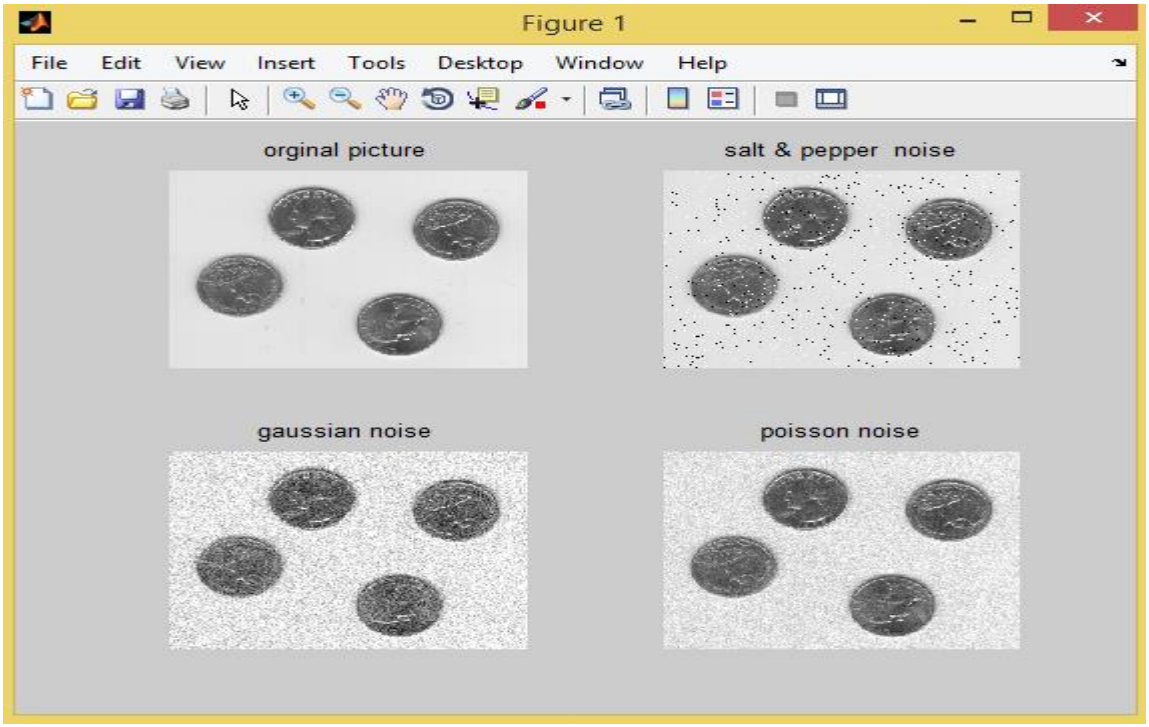
Type: - 'gaussian', 'localvar', 'poisson', 'salt & pepper', 'speckle'

Value	Description
`'gaussian'`	Gaussian white noise with constant mean and variance
`'localvar'`	Zero-mean Gaussian white noise with an intensity-dependent variance
`'poisson'`	Poisson noise
`'salt & pepper'`	On and off pixels
`'speckle'`	Multiplicative noise

Parameters: additional parameters needed given the type of noise

EX:

```
I = imread('eight.tif');%Read in image
J = imnoise(I,'salt & pepper',0.03);%Add 3% (0.03) salt and pepper noise
g= imnoise(I,'gaussian',0.02);%Add Gaussian noise (with 0.02 variance)
g1= imnoise(I,'poisson');%Add poisson noise
subplot(2,2,1),imshow(I), title('orginal picture');  %Display image
subplot(2,2,2), imshow(J), title('salt & pepper  noise');
subplot(2,2,3), imshow(g), title('gaussian noise');
subplot(2,2,4), imshow(g1), title('poisson noise');
```

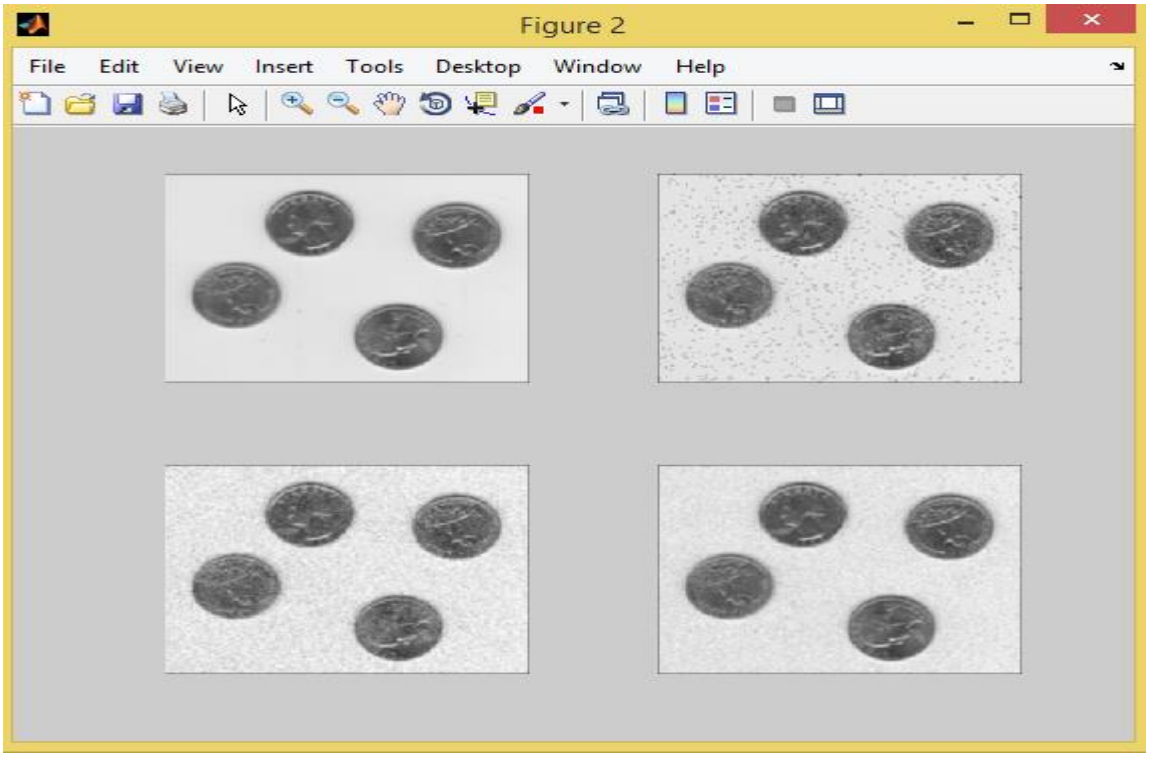


Removing Noise using Filters

Apply Mean Filtering

Mean Filtering

```
k=ones(3,3)/9;          %Define mean filter
Im=imfilter(I,k);       %Apply to original image
Ispm=imfilter(J,k);     %Apply to salt and pepper image
Igm=imfilter(g,k);      %Apply to Gaussian image
Igm1=imfilter(g1,k); %Apply to poisson image
figure,subplot(2,2,1), imshow(Im);  %Display result image
subplot(2,2,2), imshow(Ispm);       %Display result image
subplot(2,2,3), imshow(Igm);        %Display result image
subplot(2,2,4), imshow(Igm1); %Display result image
```



Apply Median Filtering

To apply median filtering to image use function:

B = medfilt2 (A, [m n])

Where:

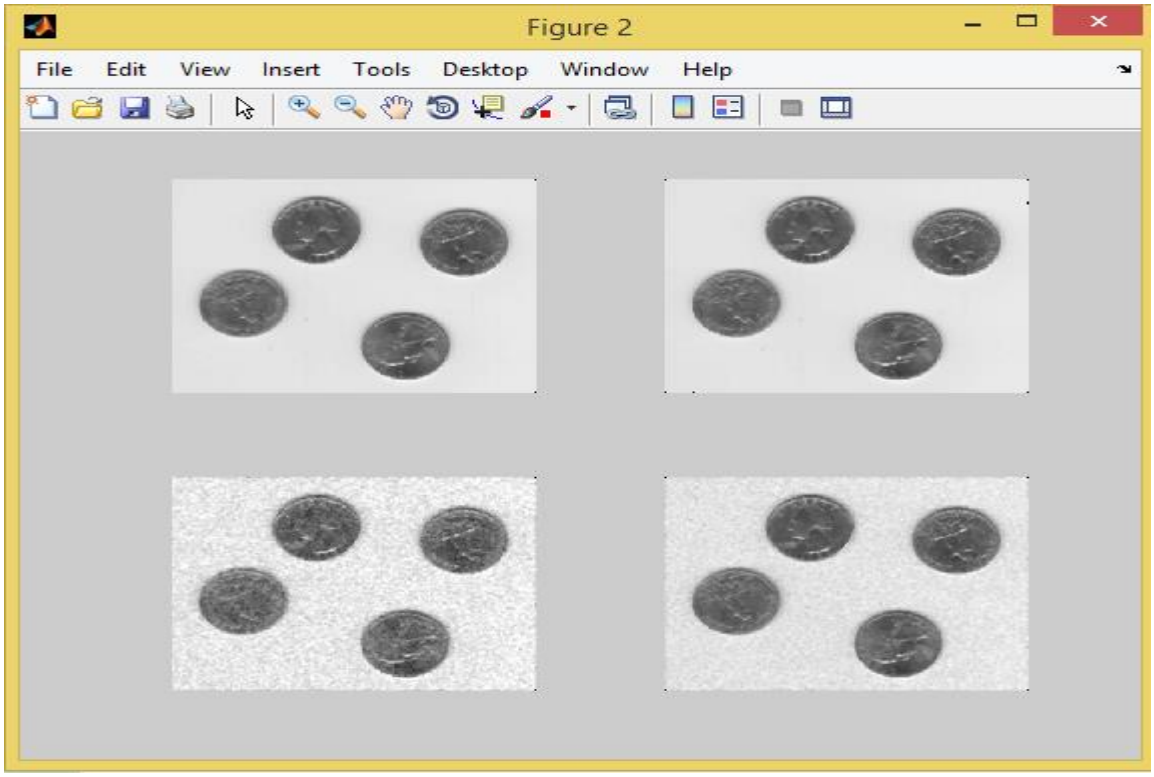
A: Input image

B: Output image

[m n] :Neighborhood block size to be used to calculate the median.

Median filtering:

```
Im=medfilt2(I,[3 3]);  %Apply to original image
Ispm=medfilt2(J,[3 3]);%Apply to salt and pepper image
Igm=medfilt2(g,[3 3]); %Apply to Gaussian image
Igm1=medfilt2(g1,[3 3]); %Apply to poisson image
figure, subplot(2,2,1), imshow(Im); %Display result image
subplot(2,2,2), imshow(Ispm); %Display result image
subplot(2,2,3), imshow(Igm);  %Display result image
subplot(2,2,4), imshow(Igm1); %Display result image
```



Apply Gaussian Filtering

Gaussian filtering

```
k=fspecial('gaussian', [5 5], 2); %Define Gaussian filter
Ig=imfilter(I,k);          %Apply to original image
Ispg=imfilter(J,k);        %Apply to salt and pepper image
Igg=imfilter(g,k);      %Apply to Gaussian image
Igg1=imfilter(g1,k);       %Apply to poisson image
figure,subplot(2,2,1), imshow(Ig);  %Display result image
subplot(2,2,2), imshow(Ispg);       %Display result image
subplot(2,2,3), imshow(Igg);          %Display result image
subplot(2,2,4), imshow(Igg1);         %Display result image
```