VIT-AP UNIVERSITY

LAB ASSIGMENT - 2

TITLE- Write and execute programs to remove noise using spatial filters

(a) Understand 1-D and 2-D convolution process

(b) Use 3*3 mask for low and high pass filter

COURSE CODE: CSE4047

COURSE NAME : COMPUTER VISION

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Steps:

- **Read and convert the image to grayscale:**
  - Read the image using imread.
  - Convert it to grayscale using rgb2gray.
  - Display the grayscale image with imshow and add a title.

· **Add Gaussian noise:**

  - Use imnoise to add Gaussian noise to the grayscale image.
  - Display the noisy image with imshow and add a title.

· **Define filters:**

  - · Use fspecial to define Gaussian, average, and Laplacian filters.

· **Apply filters to the noisy image:**

  - ·Apply the Gaussian filter using imfilter.
  - Apply the average filter using imfilter.
  - Apply the median filter using medfilt2.
  - Apply the Laplacian filter using imfilter and enhance edges by subtracting the filtered image from the noisy image.

· **Display and compare results:**

  - Use subplot and imshow to display the noisy and filtered images side by side with titles.

· **Save images:**

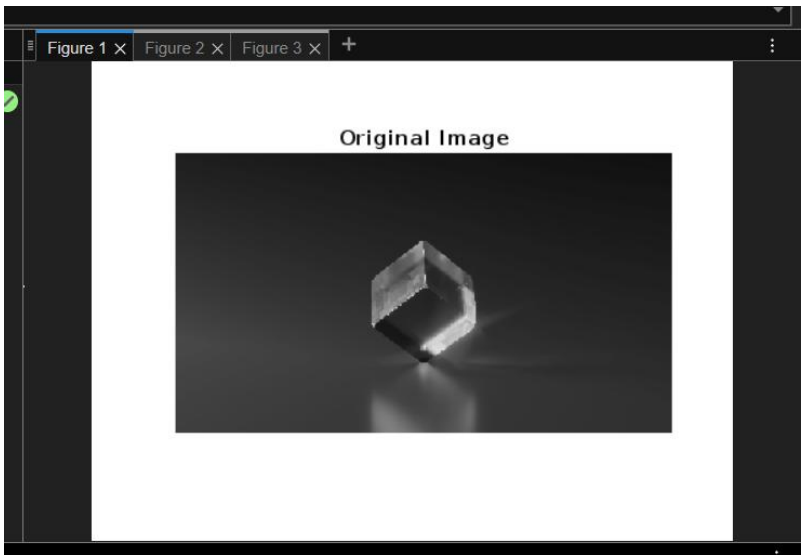
  - Save the noisy and filtered images using imwrite.

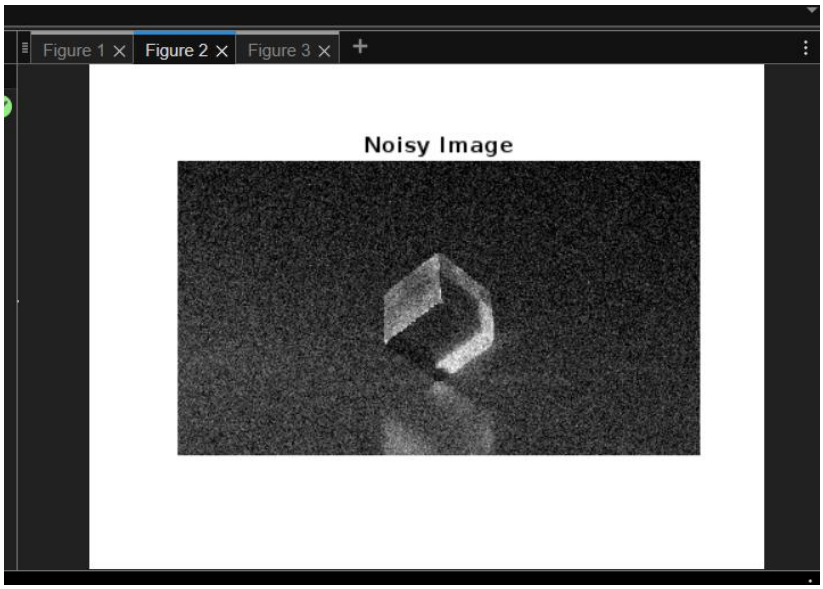
Code:

```
img = imread('3dBoxBg.jpg');
img = rgb2gray(img);

figure; imshow(img); title('Original Image');

noisyImg = imnoise(img, 'gaussian', 0, 0.01);

figure; imshow(noisyImg); title('Noisy Image');

gaussianFilter = fspecial('gaussian', [3 3], 1);

averageFilter = fspecial('average', [3 3]);

laplacianFilter = fspecial('laplacian', 0.2);

imgGaussian = imfilter(noisyImg, gaussianFilter, 'replicate');

imgAverage = imfilter(noisyImg, averageFilter, 'replicate');
```

```
imgMedian = medfilt2(noisyImg, [3 3]);

imgLaplacian = imfilter(noisyImg, laplacianFilter, 'replicate');
imgLaplacian = noisyImg - imgLaplacian;
figure;
subplot(3,3,1); imshow(noisyImg); title('Noisy Image');
subplot(3,3,2); imshow(imgGaussian); title('Gaussian Filtered');
subplot(3,3,3); imshow(imgAverage); title('Average Filtered');
subplot(3,3,4); imshow(imgMedian); title('Median Filtered');
subplot(3,3,5); imshow(imgLaplacian); title('Laplacian Filtered');

imwrite(noisyImg, 'noisy_image.png');
imwrite(imgGaussian, 'filtered_gaussian.png');
imwrite(imgAverage, 'filtered_average.png');
imwrite(imgMedian, 'filtered_median.png');
imwrite(imgLaplacian, 'filtered_laplacian.png');
```

Output:





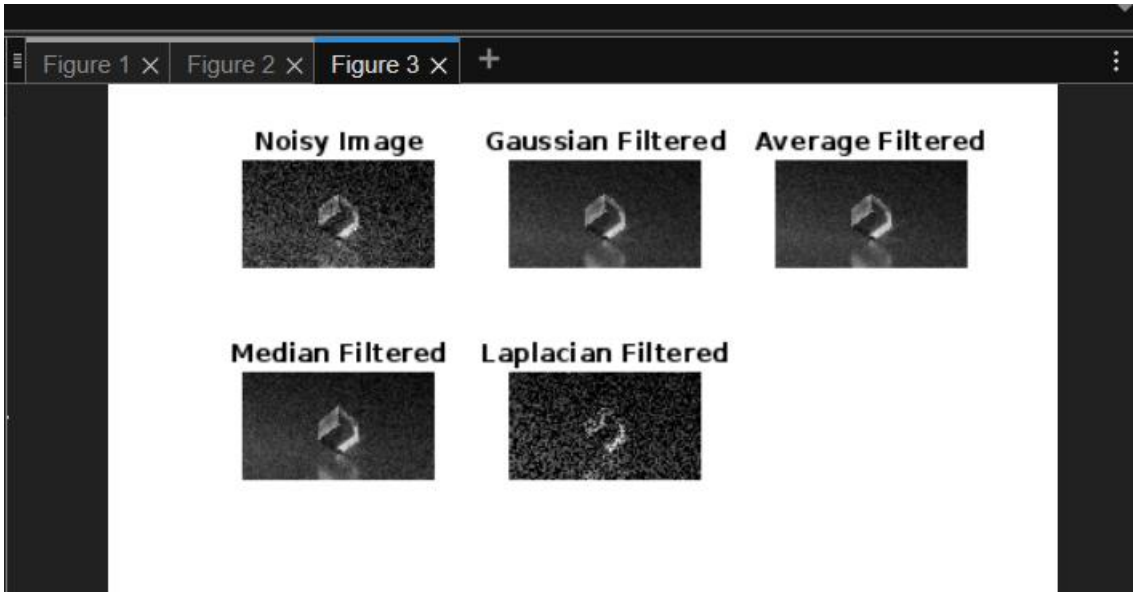


Figure 1
Figure 2
Figure 3
Noisy Image
Gaussian Filtered
Average Filtered
Median Filtered
Laplacian Filtered