IIVP Practice Experiment Set-7

Instructor: Prof. Anupam Date: 01.10.2020

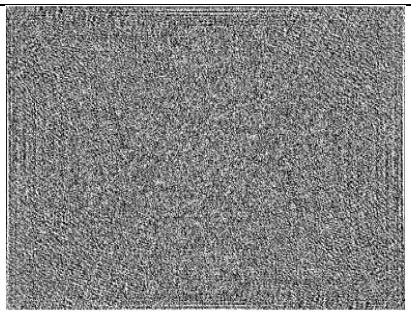
TA: GC Jana

Instructions: Use MATLAB and/or Python and/or Octave tools for the following questions. Do not use the inbuilt functions unless mentioned in the question. If input image not give or specified then you can use Lenna image (popular picture use for image processing) as a sample image.

Covered in Previous Lab Session: Bit Plane Slicing, Histogram Specification, Low pass filter, High pass filter, Zooming by interpolation and replication

Aim of this Lab Session: Two-dimensional Fourier transform, Linear filtering using convolution, apply the Sobel filter in both the spatial domain and frequency domain.

Experiment-1: Write a python program to perform the Two-dimensional Fourier transform (FT) operation over the given image. Then apply invers Fourier transform (IFT) to show the original input image. Show the input image, output image after applying FT, and output image after IFT using subplot technique.

		
Input image	After FT	After IFT

Experiment-2: Write a python program to perform the Linear filtering using convolution in an image.

Note: A convolution kernel is a correlation kernel that has been rotated 180 degrees.

For example, suppose the imag

```
A = [ 17  24 1 8 15
      23   5 7 14 16
       4   6 13 20 22
      10  12 19 21 3
      11 18 25 2 9]
```

and the convolution kernel is

```
h = [ 8   1   6
      3   5   7
      4   9   2]
```

Experiment-3: Write a python program to apply the Sobel filter to the following picture in both the spatial domain and frequency domain.

Input Image