# **CS385 Computer Vision**

# **Lab-5: Fourier Transforms and Filtering**

# **100 points**

**Task :**

1. Read and display the image 5 images from the given dataset and Compute the 2-D FFT of the image and display one full scaled copy of the magnitude spectrum. Compute and display properly the inverse 2-D FFT of the phase component of the spectrum only. Repeat the exercise for 5 images.

1. **F**or 5 images it is required to study the ringing effect of the Butterworth lowpass filter. Design the following filters and investigate the effect of changing the filter order and cutoff frequency on ringing. You need to display the filtered images and the shape of the filters in spatial domain. A cross-sectional view of the filters in spatial domain is required. Study PSNR (Peak Signal-to-Noise Ratio) and SSIM (Structural Similarity Index), these are two commonly used metrics for evaluating the quality of images,

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| no | Order | Cut off Frequency | PSNR | SSIM |
| 1 | 1 | 50 |  |  |
| 2 | 1 | 150 |  |  |
| 3 | 5 | 100 |  |  |
| 4 | 5 | 200 |  |  |

(c ) Take some images from the dataset and create a noise version. Display the magnitude spectrum of the images. Study the type of noise in the frequency domain. Remove the noise using appropriate filter. Each case display the noise removed image and compute the PSNR and SSIM of the image .

**Submission:**

Demonstrate your work . Also submit as a single file the code and results.

<https://u.pcloud.com/#page=puplink&code=rq3kZ47X1NXkyG5V1afLjo5hE25krDumX>