# **CS385 Computer Vision**

# **Lab-6: Fourier Transforms and Rescaling**

# **100 points**

**Tasks :**

Develop a program to resize the image from its original size (512x512) to different reduced size (256x256, 128x128, 64x64, 32x32, 16x16) and apply appropriate filtering after zero padding to bring back to original size. Compute the 2-D FFT of the image and display one full scaled copy of the magnitude spectrum. Study PSNR (Peak Signal-to-Noise Ratio) and SSIM (Structural Similarity Index) of each case. Demonstrate for at least 2 images of your choice.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| no | Image size | Before applying filter | | After Applying Filter | | Using cv2.resize | |
| PSNR | SSIM | PSNR | SSIM | PSNR | SSIM |
| 1 | 512x512 |  |  |  |  |  |  |
| 2 | 256x256 |  |  |  |  |  |  |
| 3 | 128x128 |  |  |  |  |  |  |
| 4 | 64x64 |  |  |  |  |  |  |
| 5 | 32x32 |  |  |  |  |  |  |
| 6 | 16x16 |  |  |  |  |  |  |

2. Take 4 pairs of images , overlay the high frequency portion of one image on top of the low frequency portion of a second image. Display the magnitude spectrum and phase spectrum. Show the hybrid image with its 2D-FFT.

3. Write a function build a 5 level Gaussian pyramid and display. Demonstrate for few examples.

Submission:

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

<https://u.pcloud.com/#page=puplink&code=dVGkZY14omTcx49juRJ6nSBuabbiM2vbV>