

Experiment 3

Frequency Domain Transformation

Write python modular functions for this experiment.

Q1. Write your own function for computing Fast Fourier Transform (FFT) and inverse FFT of an Image with any random spatial dimension

Input: An Image

Output: Visualization of Magnitude and phase spectrum of that image

Q2. Read the image dip.tiff, and perform the following operation on the image.

1. Multiply the image by $(-1)^{x+y}$
2. Compute the FFT
3. Compute the Complex Conjugate of resultant FFT.
4. Compute Inverse FFT (iFFT) of the Complex Conjugate. (Which you got in step 3.)
5. Multiply the real part of the result by $(-1)^{x+y}$

Use the FFT and inverse FFT functions (Your own function) of Q1 for this experiment

Output: Show the resultant image. Explain the rationality behind the output.

Note

1. Do not hardcode the filenames and/or image size into the code.
2. Use proper code commenting and documentation.
3. Use self-explanatory identifiers for variables/functions etc.

References

1. Gonzalez, Woods "Digital image processing" 3/e, Chapter 3, Prentice Hall.
2. NPTEL Lectures on Digital Image Processing by Prof. P.K.Biswas.