SRM University – AP, Andhra Pradesh, India

CSE 314: Digital Image Processing
Semester: 6th
Instructor: Dr. Jatindra Kumar Dash

Lab 06: Frequency Domain Filtering

The basic idea of frequency domain filtering is shown in the block diagram given below.

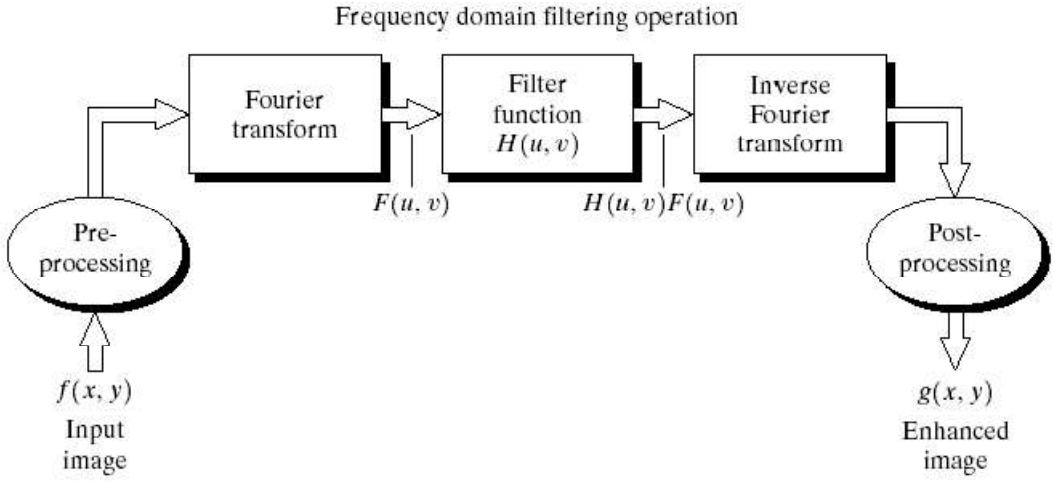

FIGURE 4.5 Basic steps for filtering in the frequency domain.

1. Develop programs to implement frequency domain smoothing filters (Ideal, Butterworth and Gaussian) and apply these filters on a gray scale image.
    a. Compare/comment on the output of Ideal, Butterworth and Gaussian Low pass Filters having the same radii (cutoff frequency) value.
    b. Consider a suitable gray scale image and demonstrate the ringing effect on the output of Ideal low pass frequency domain filter.
    c. Compare the output of Butterworth low pass filters (order n=2) for different cut-off frequencies (5, 15, 30, 90, 120).
    d. Compare the output of Gaussian low pass filters for different cut-off frequencies (5, 15, 30, 90, and 120).

2. Develop programs to implement frequency domain sharpening/High pass filters (Ideal, Butterworth and Gaussian) and apply these filters on a gray scale image.

a. Compare/comment on the output of Ideal, Butterworth and Gaussian High pass Filters having the same radii (cutoff frequency) value.
b. Consider a suitable gray scale image and demonstrate the ringing effect on the output of Ideal high pass frequency domain filter.
c. Compare the output of Butterworth high pass filters (order n=2) for different cut-off frequencies (5, 15, 30, 90, 120).
d. Compare the output of Gaussian high pass filters for different cut-off frequencies (5, 15, 30, 90, and 120).