Image Processing

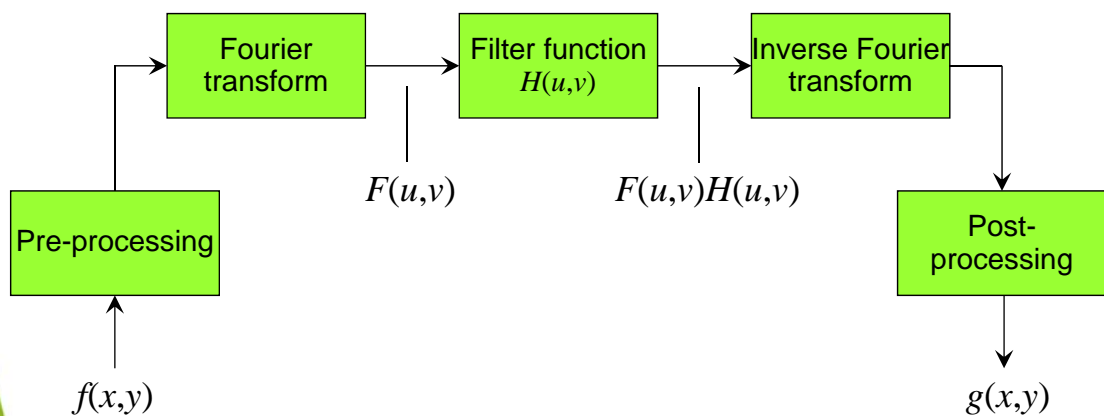**Frequency Domain Processing (Part II)**

Pattern Recognition and Image Processing Laboratory (Since 2012)

Filtering in the Frequency Domain

Basic Steps in DFT Filtering

Fourier transform	→	Filter function $H(u,v)$	→	Inverse Fourier transform

$F(u,v)$ $\qquad$ $F(u,v)H(u,v)$

Pre-processing

Post-processing

$f(x,y)$ $\qquad\qquad\qquad\qquad\qquad\qquad$ $g(x,y)$

Filtering in the Frequency Domain

>> ex4_03 % See demonstration

Filtering in the Frequency Domain

Obtaining Frequency Domain Filters
from Spatial Filters

>> ex4_04 % See demonstration

Filtering in the Frequency Domain

Generating Filters Directly in the Frequency
Domain

>> ex4_05 % See demonstration

Filtering in the Frequency Domain

Sharpening Frequency Domain Filters:
Basic Highpass Filter

>> ex4_06 % See demonstration

Filtering in the Frequency Domain

High-frequency emphasis filtering

$$H_{hfe}(u,v) = a + bH_{hp}(u,v)$$

>> ex4_07 % See demonstration

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Note: Parameters a and b are equivalent to brightness and
contrast adjustments in the spatial domain.

The end of part II