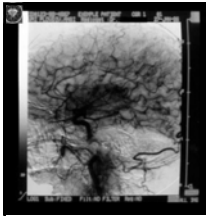


# Digital Image Processing



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Human eye processes all images as logarithmic sensor

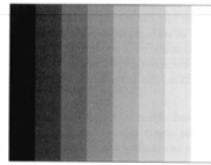


Figure 2.8a Mach band effect—when you view this gray-scale step image from left to right, the apparent brightness dips just before each step, and appears to increase after each step.

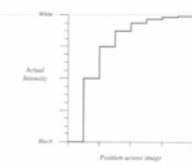


Figure 2.8b The actual intensity of the gray-scale steps.

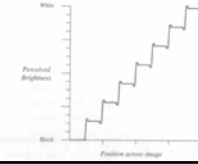


Figure 2.8c The perceived brightness of the gray-scale steps.

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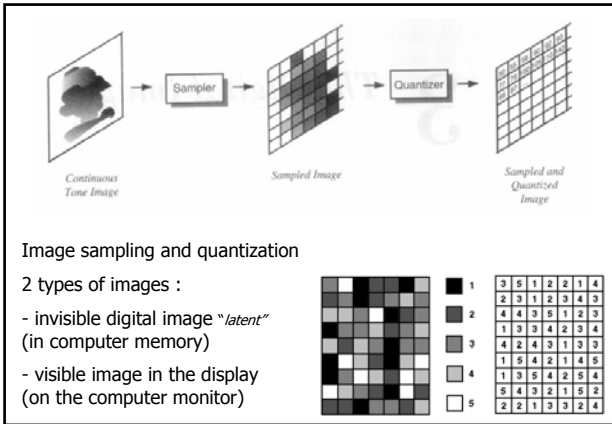


Image acquisition control  
 Sampling and Quantisation

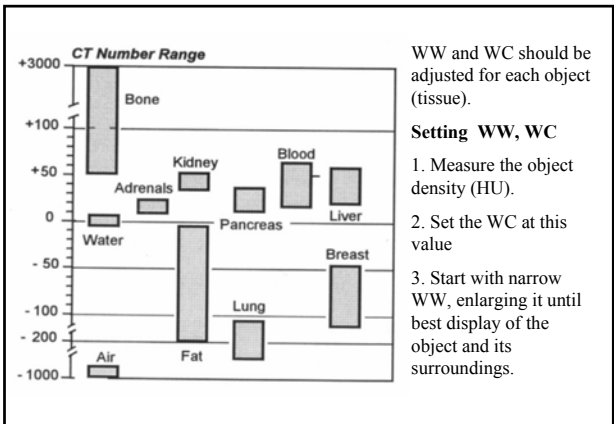
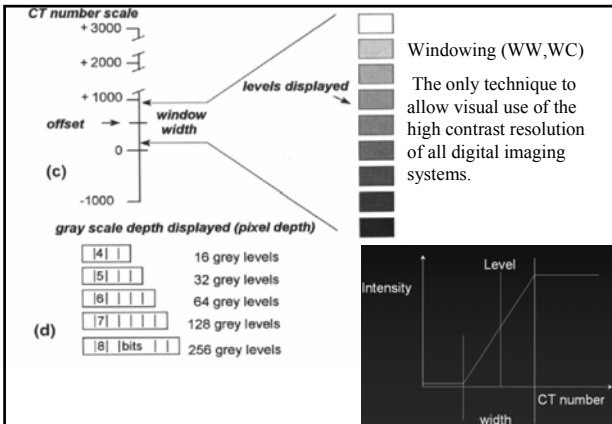
Image reconstruction  
 Back-projection

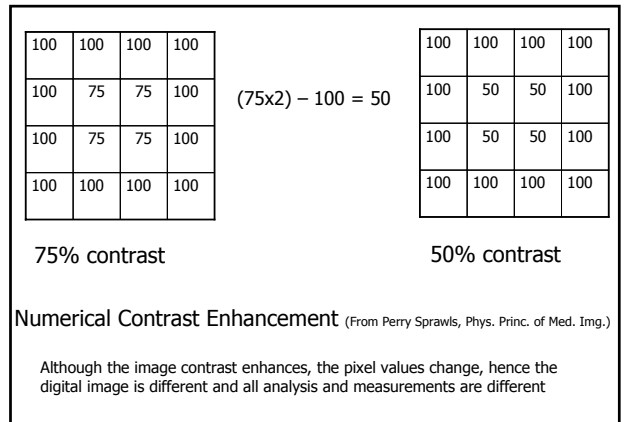
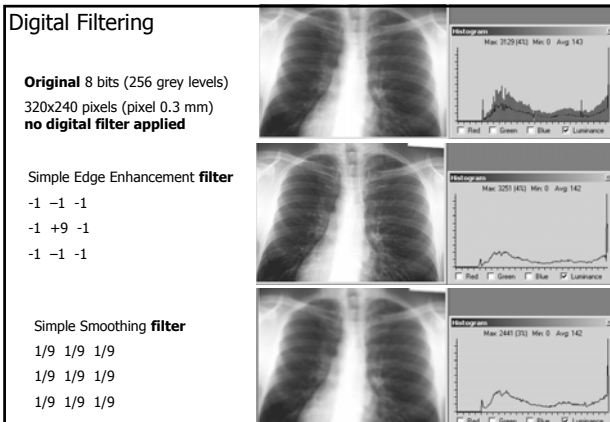
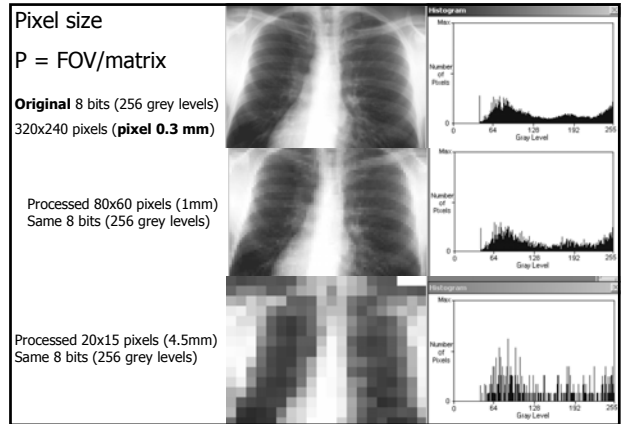
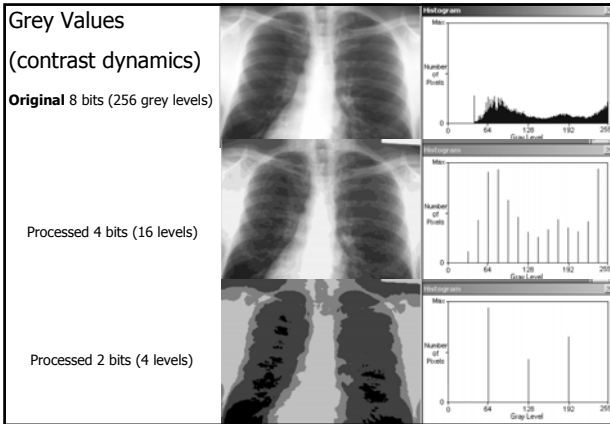
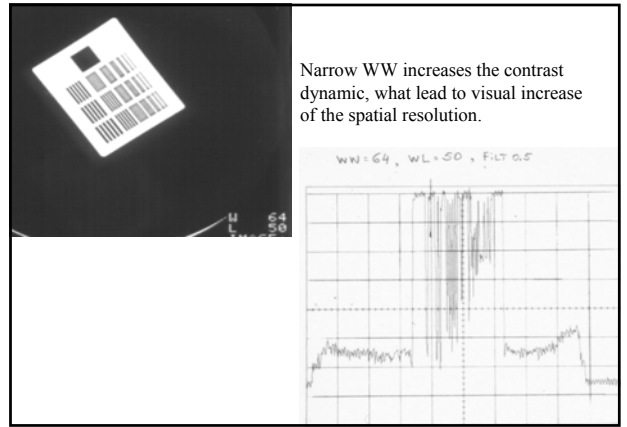
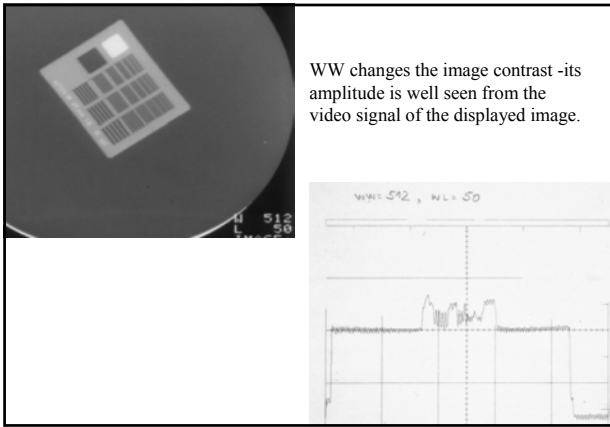
Image storage and retrieval  
 computer memory and PACS

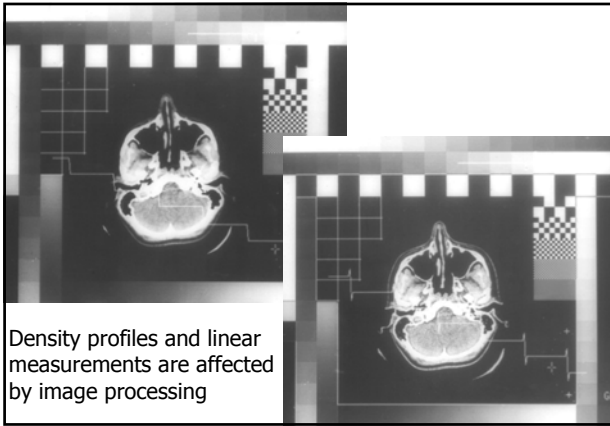
Image processing  
 Filtering, Feature extraction, Enhancing, etc

Image analysis  
 Histogram, Linear and Density Measurements

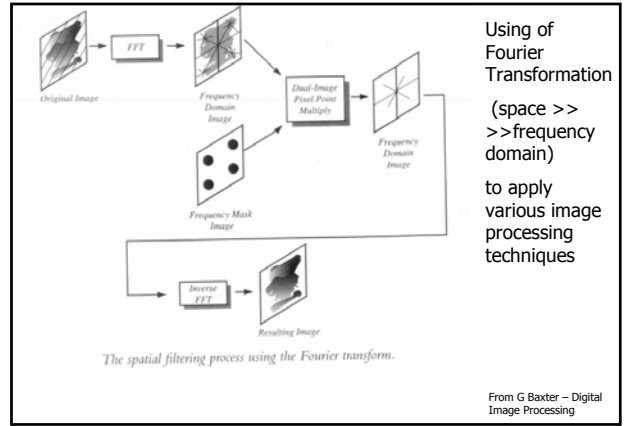
Image Pre-processing and Post-processing  
 Windowing







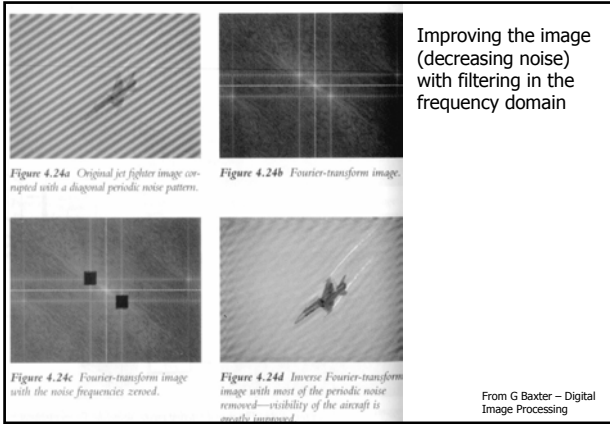
Density profiles and linear measurements are affected by image processing



Using of Fourier Transformation (space >> >> frequency domain) to apply various image processing techniques

The spatial filtering process using the Fourier transform.

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Improving the image (decreasing noise) with filtering in the frequency domain

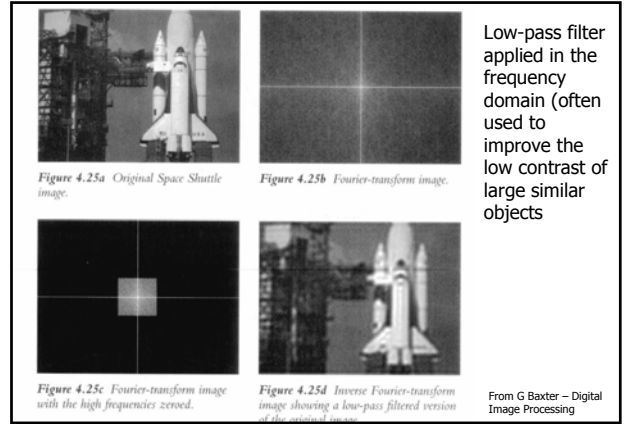
Figure 4.24a Original jet fighter image corrupted with a diagonal periodic noise pattern.

Figure 4.24b Fourier-transform image.

Figure 4.24c Fourier-transform image with the noise frequencies zeroed.

Figure 4.24d Inverse Fourier-transform image with most of the periodic noise removed—visibility of the aircraft is greatly improved.

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Low-pass filter applied in the frequency domain (often used to improve the low contrast of large similar objects)

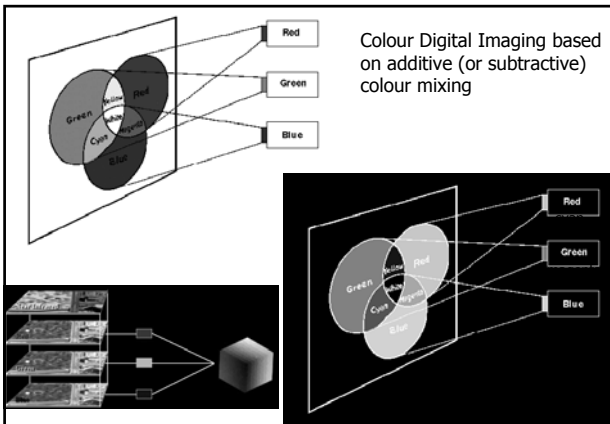
Figure 4.25a Original Space Shuttle image.

Figure 4.25b Fourier-transform image.

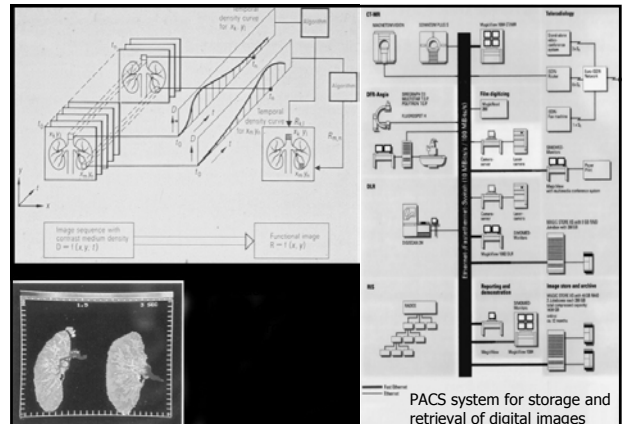
Figure 4.25c Fourier-transform image with the high frequencies zeroed.

Figure 4.25d Inverse Fourier-transform image showing a low-pass filtered version of the original image.

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Colour Digital Imaging based on additive (or subtractive) colour mixing



PACS system for storage and retrieval of digital images