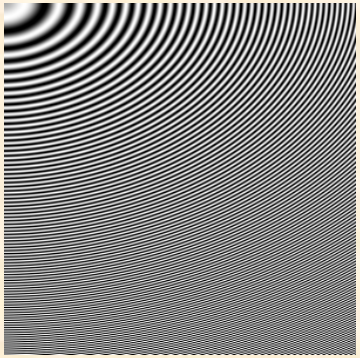
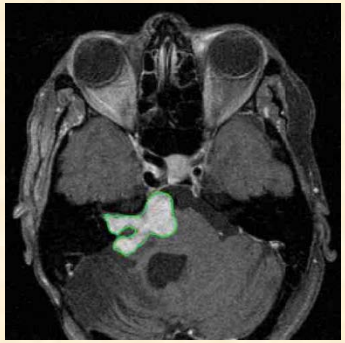
EE3206 Intro to Computer Vision and Image Processing



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What this module is about

The use of computers to process and analyze digital images has many applications in such diverse areas as industry, medicine, digital media and entertainment. This module introduces the fundamental concepts, techniques and algorithms in computer vision and digital image processing, and will be of interest to those who wish to proceed to biomedical engineering, intelligent systems and multimedia signal processing.

Outline

- Introduction
- Image acquisition
- Image transforms (Fourier transform)
- Noise reduction
- Enhancement of images
- Edge detection
- Segmentation
- Shape representation and description
- Morphological processing
- Image compression
- Object recognition

Assessment

- Lab + formal report (2): 20%
- Final exam: 80%, closed book with A4 cheat sheet

Note: You will be informed of the dates/times of the lab sessions in due course and asked to register online.

Reference Books

- RC Gonzalez, RE Woods, *Digital Image Processing, 3rd Edition*, Prentice Hall, 2010
- M Sonka et al., *Image Processing, Analysis and Machine Vision, 4th edition*, Cengage, 2014
- SE Umbaugh, *Digital Image Processing and Analysis*, *2nd edition*, CRC Press, 2011
- WK Pratt, *Digital Image Processing, 4th edition*, John Wiley, 2007
- RC Gonzalez, RE Woods, SL Eddins, *Digital Image Processing Using MATLAB*, Prentice Hall, 2004
- LG Shapiro, GC Stockman, *Computer Vision*, Prentice Hall, 2001
- JC Russ, *The Image Processing Handbook, 4th edition*, CRC Press, 2002
- B Jahne, *Digital Image Processing, 6th edition*, Springer, 2005
- C Steger et al., *Machine Vision Algorithms and Applications*", Wiley, 2007
- M Seul et al., *Practical Algorithms for Image Analysis*, Cambridge University Press, 2000

Image processing resources are available from numerous websites .....

CVIP Resources

Websites:

- http://homepages.inf.ed.ac.uk/rbf/CVonline/
- http://www.cs.cmu.edu/~cil/vision.html
- http://www.efg2.com/Lab/Library/ImageProcessing/index.html

Software:

- MATLAB + Image Processing Toolbox (commercial)
- Adobe Photoshop (commercial)
- ImageJ (open source)
- GIMP (open source)
- UTHSCSA ImageTool (open source)
- Intel OpenCV (open source computer vision library)