CSC498/698: Computational Vision

General Information

Instructor:	Prof. Richard Mann
Email:	mannr@cs.uwaterloo.ca
Office Hour:	F 1:00-2:00, DC2510
Lectures:	TR 1:00-2:30, EL204 (Eng. lecture hall)
Tutorials:	F 3:30-4:30, MC4058
Course Homepage:	http://www.cs.uwaterloo.ca/˜mannr (follow CS498/698 link from there.)
Text:	None. See homepage for readings.

Marking

4 Assignments:	60%
Project:	40%

Course Outline (Winter 2000)

1. Image Formation
   - Reflection models for light
   - Image formation and lens models
2. Image Measurement
   - Sampling and filtering
   - Wavelet (multiscale) representations
3. Edge and Feature Extraction
   - Feature detection, parameter estimation, and search
4. Image Matching
   - Robust estimation techniques for matching images
   - Application to view-based tracking and image composting
5. Stereo
   - Baseline stereo
   - Epipolar geometry representation for stereo and motion
6. Motion
   - Optical flow estimation
   - Estimating 3D structure from motion
7. Shape from Single Image Cues
   - Shape from Shading and Texture
8. Object Recognition
   - View-based object recognition
   - Model-based object recognition
   - Primitive-based object recognition
9. Perceptual Inference
   - Probabilistic models of visual inference

Books

Main Reference:

- E. Trucco and A. Verri, *Introductory Techniques for 3D Computer Vision*, Prentice-Hall, 1998.

Other References:

- V. S. Nalwa, *A Guided Tour of Computer Vision*, Addison-Wesley, 1993.
- B. K. P. Horn, *Robot Vision*, MIT Press, 1986.
- D. Marr, *Vision*, D. H. Freeman, 1982.
- O. Faugeras, *Three-Dimensional Computer Vision*, MIT Press, 1993.
- I. Rock, *The Perceptual World*, Scientific American Library, 1988.