CSC487/2503: Foundations of Computer Vision, 2009F

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Offices:	D.L. Pratt Bldg, Rooms 283D, 391
Office hours:	Thurs. 3-4
Lectures:	Thursday 1:10-3:00pm, BA B024
Tutorial:	Monday 12:10-1:00pm, BA B024
Website:	www.cs.toronto.edu/~jepson/csc2503

Course Description

Introduction to vision, visual processes, and image understanding. Scene lighting and reflectance models. Camera system geometry and image acquisition. The robust estimation of edges, lines, and regions. Perceptual organization. View-based image models. Image matching and the estimation of motion in image sequences. Multi-view geometry. Projective and metric reconstructions. Object recognition.

Course Texts

Lecture notes, posted on course website.

Recommended:
David Forsyth and Jean Ponce, Computer Vision, A Modern Approach, Prentice Hall, 2003.

Required Background

The student is expected to be comfortable with elementary linear algebra, vector calculus and elementary probability theory. It is also assumed that the student is comfortable programming, and will be expected to rapidly learn to use Matlab.

Grading

The mark weighting is:

- 4 Assignments – 60%
- Final Exam – 40%

The assignments will be marked by the TA; the final examination will be marked by the professors.

Assignments

Assignments involve both theoretical problems as well as implementation of algorithms.

Assignment Dates and Grading:

Assignment	Date Out	Date Due	Grade
#1	Mon Sept 21	Mon Oct 5 (before tutorial)	15%
#2	Thurs Oct 8	Mon Oct 26 (before tutorial)	15%
#3	Mon Oct 26	Mon Nov 9 (before tutorial)	15%
#4	Mon Nov 9	Mon Nov 30 (before tutorial)	15%

Late Penalty: Assignments are due at the beginning of the tutorial or lecture on the due date (i.e., Mon. at 12:10, or Thurs. at 1:10). The penalties for lateness are:

- 10% for each 24 hr period, or any part thereof.
- 100% after one week.

Late hard copies of assignments must be submitted in Pratt, Rm. 283 during business hours, and must be signed for with a date and time.

Course Schedule

A tentative lecture schedule is:

Week	Date	Topic	Readings (those from text, optional)
#1	Sept. 10	Introduction to Computer Vision; Lighting Models	Notes and Chps. 4,5,6
#2	Sept. 17	Camera Models; Image Filtering	Notes and Chps. 1, 2, 7
#3	Sept. 24	Fourier Transforms, Sampling and Image Pyramids	Notes and Chp. 7
#4	Oct. 1	Edge Detection and PCA	Notes and Chps. 8, 9.1-2, 22.3
#5	Oct. 8	Robust Estimation	Notes and Chp. 15
#6	Oct. 15	Image Displacement, Motion, and EM	Notes and Chp. 16
#7	Oct. 22	Local Image Features and Multi-view Geometry	Notes and Chps. 10.1, 11
#8	Oct. 29	Affine and Projective Reconstruction	Notes and Chps. 12.1-4, 13 (but not 13.3.2)
#9	Nov. 5	Tracking and Bayes Filtering	Notes and Chp. 17
Brk	Nov. 12	Fall break. No class.	
#10	Nov. 19	Image Segmentation	Notes and Chp. 14
#11	Dec. 26	Object Recognition	Notes and Chp. 18.1-5, 22
#12	Dec. 3	TBA	

Most of the notes will be available from the course website prior to the lecture. We encourage the students to print these and bring them to class. Some lectures will be blackboard presentations and not available in electronic form.

Getting Started

Students need a CDF account in order to access the course bulletin board. Undergrad students will be given one automatically, if they don't have one already, upon registration in this course. Graduate students registered in this course must send email to the instructor, with their name and student number, requesting a CDF account.