

CSC487/2503: Foundations of Computer Vision, 2007F

Professor: Allan Jepson
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Offices: D.L. Pratt Bldg, Rooms 283D
Office hours: Thurs. 3-4
Lectures: Thursday 1:10-3:00pm, LM 157
Tutorial: Monday 12:10-1:00pm, LM 157
No tutorial on Sept. 10, first tutorial on Mon. Sept. 17.
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

Recommended:

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

Lecture notes, posted on course website.

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 professor.

Assignments

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

Assignment Dates and Grading:

Assignment	Date Out	Date Due	Grade
#1	Mon Oct 1	Mon Oct 15 (before tutorial)	15%
#2	Mon Oct 15	Mon Oct 29 (before tutorial)	15%
#3	Mon Oct 29	Mon Nov 12 (before tutorial)	15%
#4	Mon Nov 12	Thurs Dec 7 (before lecture)	15%

Late Penalty: Assignments are due at the beginning of the tutorial (i.e. Mon. at 12:10). 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	Required Reading
#1	Sept. 13	Introduction to Computer Vision; Lighting Models	Notes and Chps. 4,5,6
#2	Sept. 20	Camera Models; Image Filtering	Notes and Chps. 1, 2, 7
#3	Sept. 27	Image Filtering and Fourier Transforms	Notes and Chp. 7
#4	Oct. 4	Image Pyramids and Edge Detection	Notes and Chps. 7, 8, 9.1-2
#6	Oct. 11	Robust Estimation	Notes and Chp. 15
#5	Oct. 18	View-Based Models	Notes and Sec. 22.3
#7	Oct. 25	Image Displacement, Motion, and EM	Notes and Chp. 16
#8	Nov. 1	Local Image Features and Multi-view Geometry	Notes and Chps. 10.1, 11
#9	Nov. 8	Affine and Projective Reconstruction	Notes and Chps. 12.1-4, 13 (but not 13.3.2)
#10	Nov. 15	Image Segmentation	Notes and Chp. 14
#11	Nov. 22	Tracking and Bayes Filtering	Notes and Chp. 17
#12	Nov. 29	Object Recognition	Notes and Chp. 18.1-5
#13	Dec. 6	Summary and Review	

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.