CSE586/EE554: Computer Vision II

Spring 2012 Course Overview

Instructor: Dr. Robert Collins, *email:* rcollins@cse.psu.edu
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Course Description: Introduction of mathematical methods commonly used in computer vision along with examples of how to apply them. Some topics covered in previous semesters include: mixture models and the EM algorithm; Monte Carlo methods; graphical models and belief propagation; Procrustes shape analysis; subspace methods (PCA/LDA/ICA); graph cuts and spectral methods.

Prerequisites: CMPEN/EE 454 Computer Vision I; Matlab programming; familiarity with basic concepts of linear algebra / matrices and probability theory is assumed.

Class Schedule: Tues, Thurs 9:45 -- 11:00 Willard 371
Credits: 3

Textbook: There is no textbook for this course. I will make reference materials and conference/journal papers available on the Angel course site as we need them.

Grading:

Midterm (in-class):	**20%**	(problem solving / definitions / understanding concepts)
Final Project:	**20%**	(project exploring an application of your choice)
Homework:	**30%**	(includes "theory" and "programming" assignments)
Written Critiques:	**20%**	(mini-review/summary of conference/journal papers)
Oral Presentation (1):	**10%**	(10 min presentation of a technical paper)

Course Approach: In Computer Vision I we organized the course by vision topics such as feature extraction, stereo and motion. In this course we organize material by mathematical methods used, rather than by topic. The underlying vision material is ultimately the same, but we are indexing it differently and refocusing our effort towards better understanding of the underlying optimization techniques.

Course Goals: We have two main goals: 1) Gaining practical knowledge in Computer Vision. This is achieved by focusing on solution methods, understanding the underlying math, and learning when/how to apply available methods. 2) Developing skills for being a successful grad student / researcher. This is achieved through applied programming assignments, reading research papers, technical writing (paper critiques) and oral presentations.

Academic Integrity: Although you are encouraged to talk to each other to understand the course material and homework instructions, when it comes time to doing the assignments, every student is expected to submit their own original work. For programming, standard and publicly available code libraries (such as simple signal processing or linear algebra libraries) may be used after seeking consent of the course instructor. Keep in mind: I can do Google too!