Syllabus
EEL6562: Image Processing and Computer Vision (Spring 2004)

Instructor: Michael C. Nechyba

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Class web page: http://mil.ufl.edu/~nechyba/eel6562

Class meeting: T: 5th & 6th; Th: 6th, NEB 201.

References:

- Linda G. Shapiro and George C. Stockman, *Computer Vision*, Prentice-Hall, Inc., Upper Saddle River, New Jersey, 2001 (ISBN 0-13-030796-3).
- Emanuele Trucco and Alessandro Verri, *Introductory Techniques for 3-D Computer Vision*, Prentice-Hall, Inc., Upper Saddle River, New Jersey, 1998 (ISBN 0-13-261108-2).
- *The Computer Vision Homepage* (http://www-2.cs.cmu.edu/~cil/vision.html)
- *CVonline: The Evolving, Distributed, Non-Proprietary, On-Line Compendium of Computer Vision* (http://www.dai.ed.ac.uk/CVonline)
- Additional readings, including lecture notes, slides, tutorials and selected papers from the literature will be posted periodically on the class web site.

Prerequisites:

- *EEL6825: Pattern Recognition*
- Previous programming experience (e.g. C/C++, Java, Matlab, Mathematica, etc.)

Course objectives:

This class introduces methods in image processing and computer vision. In recent years, with the growth in available computing power, the world wide web, and digital photography/video, and the need for automated analysis of images and video in diverse areas, such as robotics, content-based image retrieval and anti-terrorism applications, research in image processing and computer vision has exploded in recent years. While a one-semester course does not allow for comprehensive treatment of all this research, in this course, we will cover methods and algorithms in the following major areas:

- Image processing (e.g. image filtering, denoising)
- Feature extraction (e.g. color, texture, wavelets)
- Image segmentation and object recognition (e.g. face detection)
- Video and motion analysis (e.g. optical flow, detection of moving objects)
- Multi-view algorithms for 3D vision (e.g. stereo, structure from motion)

The basic goal of this course is for you to (1) know and understand the most common and successful methods and algorithms in image processing and computer vision developed to date; and (2) understand when and how these algorithms can be applied successfully to particular applications and images/video.

Grading:

Your grade in this course will be entirely based on your work on approximately three assigned mini-projects as well as a semester project whose scope and area of application you define:

- 60%: Assigned mini-projects
- 40%: Semester project

Class e-mail:

Many class announcements, clarifications and answers to student questions will be distributed primarily via e-mail. To get on the class e-mail list, you should send an e-mail to <nechyba@mil.ufl.edu> with the *subject* of the e-mail being **EEL6562**; be sure to include your full name in the body of the e-mail.

Programming:

All assigned mini-projects and the semester project will require extensive programming on your part. You are free to use whatever programming environment suits you best (e.g. C/C++, Java, Matlab, Mathematica, etc.). Throughout the semester, some code will be provided for you; most often, this code will be either in C or Mathematica. In particular, Mathematica will be used extensively for in-class demonstrations and examples, as it is the most sophisticated general purpose mathematical software package available, allowing text, equations, graphics, images, numerical and symbolic mathematics to be seamlessly integrated into notebooks. These notebooks will be distributed on-line, and can be viewed with free software (MathReader) available from Wolfram, Inc., the developer of Mathematica. To modify and experiment with the Mathematica notebooks, however, will require that you have access to a copy of Mathematica.

Academic honesty:

All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action.

This statement is a reminder to uphold your obligation as a student at the University of Florida and to be honest in all work submitted and exams taken in this class and all others.