CS 491Y/691Y (Topics in Computer Vision)
Spring 2013 – Dr. Bebis

Prerequisites: Background in image processing (CS474/674), computer vision (CS485/685), pattern recognition (CS479/679), linear algebra, probabilities, and statistics. *Credit hours:* 3.0

Meets: MW 4:00-5:15 PM (SEM 234)

Instructor: Dr. George Bebis

Office: 235 SEM

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Course Webpage: http://www.cse.unr.edu/~bebis/CS491Y

Office Hours: MW 2:30 pm - 4:00 pm and by appointment

Required Text:

No text will be required in this course; all material will be drawn from research papers.

Description and Goals

Interest point detectors and descriptors are now at the core of many Computer Vision applications such as object recognition, 3D reconstruction, image retrieval and camera localization. The purpose of this course is to review recent advances in this important area by discussing research papers and attending video lectures. The course is intended for students interested in computer vision research. Good background in computer vision, linear algebra, probability, statistics, and calculus are required.

Presentations

Each student would be required to present 2-3 papers to the rest of the class during the semester. A list of papers has already been posted on the course's webpage; additional papers might be posted. Papers for presentation will be assigned to students in coordination with the instructor. The presentation of the material should be professional as if it was presented in a formal conference. Students are required to email their presentation slides to the instructor by noon on the day of their presentation. The instructor will post all presentations on the course's web page. Students are encouraged to suggest additional papers to the instructor for possible presentation.

Reports

Prior to each class, students must turn a summary and critique of the paper to be discussed on that class (one page max). The student who is responsible for presenting a paper is

expected to have a thorough understanding of the ideas discussed in the paper; however he/she does not need to turn a report on that day. A report should include the following items: (i) problem addressed, (ii) methodology, (iii) critique and, (v) possible suggestions for improvements and extensions. Reports should be typed.

Video Lectures

Certain times (mostly on Wednesdays), we will be watching and discussing video lectures, given by experts in computer vision; these are available on-line.

Project

Each student would be required to complete a research project and submit a project report. Project topics will be chosen in coordination with the instructor. In general, a student would be required to implement a technique and apply it to some real data. There would be two targeted goals behind the implementation of a particular approach. The first goal would be to verify that the approach works. Towards this goal, each student would be expected to test his/her implementation using various data (links to several databases will be provided on the course's web page). The second goal would be to identify potential weaknesses of the approach (i.e., cases where the approach fails to produce good results). Identifying ways to improve a given method will get you extra credit and might lead to possible publications. I will be flexible about the nature of projects, and students are encouraged to explore new research ideas as well.

A project proposal (i.e., problem definition, goals, objectives, datasets, experimental evaluation, and expected results) and a short presentation (10 min) will be required on 3/13/2013. Also, an interim presentation will be required on 4/10/2013. Final project reports are due on the last day of classes (5/6/2013) while project presentations will take place on 5/1/2013 and 5/6/2013.

Projects will be evaluated based upon both an oral presentation and the written report which should include the following: **(1)** Introduction and motivation, **(2)** Problem definition, including project goals, and assumptions, **(3)** Discussion of relevant literature and previous research, **(4)** Approach implemented, **(5)** Implementation details, **(6)** Experimental results and discussion, **(7)** Conclusions.

Class Participation

Everyone should participate on discussing the research papers to be presented in class.

Course Policies

- Late reports will not be accepted, since the goal of the reports is to have you to think about the problems before we discuss them.

- You should carefully read the section on Academic Dishonesty found in the UNR Student Handbook (copies of this section are available from http://www.unr.edu/stsv/acdispol.html). Your continued enrollment in this course implies that you have read it, and that you subscribe to the principles stated therein.

- No incomplete grades (INC) will be given in this course.

Disability Statement

Any student with a disability needing academic accommodations is requested to speak with me or contact the Disability Resource Center (Thompson Building, Suite 101), as soon as possible to arrange for appropriate accommodations.

Unauthorized class audio recording or video-taping

Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.

Grading Scheme

Class Participation: 10%
Paper reports: 20%
Presentations: 30%
Project: 40%

A: 90 and above, B: 80-89, C: 70-79, D: 60-69, F: <59

Important dates

February 18, 2013 – President's day (no class)
March 22, 2012 - last day to drop classes
March 16, 2013 – March 24, 2013 - Spring Break
May 7, 2013 – Last day of classes