Summary of the course

The applications of imaging technologies are all around us. The health industry produces an abundance of medical images; for instance, diagnostic techniques such as radiology, histopathology, and computerized tomography have produced an explosion in the number of medical images now stored by most hospitals. Military applications of imaging technology, such as recognition of enemy aircraft from radar screens, automatic identification of targets from satellite photographs, and provision of guidance systems for cruise missiles, all represent even more concrete examples which are heavily dependent on imaging techniques for accurate and timely information. Other domains that rely heavily on images are mapping, mining, urban planning, intellectual property, education and training, and fashion and design.

The course is meant to provide students with the basic techniques of image processing and manipulation, so that, after graduation, the student will possess the basic skills to qualify for a job in image processing technologies or to continue with more advanced courses in visual computing. Possible topics covered in the course include: components of an image processing system and its applications, elements of visual perception, sampling and quantization, image enhancement, color spaces, and object edge detection. The image processing techniques will be implemented using MATLAB, the most used software package in image processing. Real world hands on experience is one of the highlights of this course, in which students are expected to implement various image processing techniques in several smaller assignments and a bigger quarter long project.

Textbooks and printed resources


Textbook webpage: http://www.prenhall.com/gonzalezwoods

Prerequisites

For CSC381: MATH140 or MATH220 or Calculus
For CSC481: CSC415 or Calculus or Linear Algebra

Grading

The homework/programming assignments will be worth 25% of the course grade. There will be a midterm
exam given on Tuesday, October 14th, that will be worth 25% of the course grade; the midterm is closed book. There is no final exam, but there is a project worth 50% of the final grade: the project proposal will be 5%, the report will be 15%, the demo will be 15%, and the presentation will be 15%. Final presentations and demos will be done on November 18th and 25th. The final report will be due on November 25th.

The final grade will be assigned according to the following scale:

- **A**, 95 -100%;
- **A-**, 90 - 94%;
- **B+**, 85 - 89%;
- **B**, 80 - 84%;
- **B-**, 75 - 79%;
- **C+**, 70 - 74%;
- **C**, 65 - 69%;
- **C-**, 60 - 64%;
- **D+**, 55 - 59%;
- **D**, 50 - 54%;
- **F**, <50%;

**Software**

The image processing techniques will be implemented using MATLAB, the most used software in image processing. The software will be available for use in the Software Development laboratory (SDLAB, 6th floor, CTI building). There will be 2 lab sessions (in the second and third week of the Fall quarter) and one tutorial session for the basic concepts of Image Processing and Matlab.

**Matlab homepage:** [http://www.mathworks.com/](http://www.mathworks.com/)

**Homework/Programming Assignments and Final Project Policies**

There will be 3 homework/programming assignments, which are due at the beginning of class two weeks after they are assigned. Late assignments will be accepted up to one lecture later than the assigned due date with a 25% penalty - this penalty will be assessed in full to assignments turned in from the end of class on the day that the assignment is due up until the beginning of next lecture. No assignments will be accepted beyond the beginning of class one lecture beyond the due date.

The purpose of the final project is to demonstrate your ability to apply the knowledge and the techniques learned during this course.

**Types of Projects**

**Undergraduate:**
- Survey papers -- A survey paper should explore a specific topic of image processing. It should include several components: (a) literature search and review, (b) and significant results.

**Graduate:**
- **Applications** -- Applications of image processing to specific research area can be used as class project. An application project should contain the following: (a) explanation of the nature of the application and why image processing is needed, (b) literature review on image processing techniques that can be applied to the problem on hand, (c) related work and significant results, (d) project preliminary results.

**Deliverables:**
- Proposal -- One page proposal describing the problem, the proposed approach, and at least two
references other than text book or class notes.

- On-line Project Presentation -- Each project is to be presented using PowerPoint, and the file will have to be submitted to be published on the course web site.
- Final Project Report -- Must be submitted in both hard copy and electronic copy. The hard copy should be typed and bounded. The electronic copy should be in a zip file consisting all program source code and report itself.

Any submitted documents (homeworks, reports, etc) must be typed; no handwritten submission will be accepted.

School policies:

Online Instructor Evaluation

Course and instructor evaluations are critical for maintaining and improving course quality. To make evaluations as meaningful as possible, we need 100% student participation. Therefore, participation in the School’s web-based academic administration initiative during the eighth and ninth week of this course is a requirement of this course. Failure to participate in this process will result in a grade of incomplete for the course. This incomplete will be automatically removed within seven weeks after the end of the course and replaced by the grade you would have received if you had fulfilled this requirement.

Email

Email is the primary means of communication between faculty and students enrolled in this course outside of class time. Students should be sure their email listed under “demographic information” at http://campusconnect.depaul.edu is correct.

Plagiarism

The university and school policy on plagiarism can be summarized as follows: Students in this course, as well as all other courses in which independent research or writing play a vital part in the course requirements, should be aware of the strong sanctions that can be imposed against someone guilty of plagiarism. If proven, a charge of plagiarism could result in an automatic F in the course and possible expulsion. The strongest of sanctions will be imposed on anyone who submits as his/her own work a report, examination paper, computer file, lab report, or other assignment which has been prepared by someone else. If you have any questions or doubts about what plagiarism entails or how to properly acknowledge source materials be sure to consult the instructor.

Incomplete

An incomplete grade is given only for an exceptional reason such as a death in the family, a serious illness, etc. Any such reason must be documented. Any incomplete request must be made at least two weeks before the final, and approved by the Dean of the School of Computer Science, Telecommunications and Information Systems. Any consequences resulting from a poor grade for the course will not be considered as valid reasons for such a request.