Visual Information Analysis

Education Objectives
The course introduces recent advances in tasks, principles, methods, and applications for visual data analysis. We will also cover topics related to bio-medical image analysis.

Basic Course Information
- Instructor: Haibin Ling (hbling@temple.edu, Wachman Hall, Room 305)
- Lecture Time: Mon 5:30-8:00pm, TL 0001B
- Office Hours: Mon 3:30-5:30pm, or by appointment
- Credits: 3

Prerequisites
A general familiarity and basic level of comfort with matrix operation, probability and statistics is essential, and will be assumed. Any of the following courses: Math 3033, CIS 3219, 4296, CIS 8525, 8526, 8527, 9601, 9603, 9664, or permission of the instructor.

Textbook
The major textbook for the class is:
  Recommended:
- Papers assigned in the class.

Lecture Topics
Note: Due to the rapid advance in the fields and the wide range of application, the following listed topics are tentative and subject to change. In addition, we allow “topics on demand” to allow students propose vote for revising the following lists.
1. General Introduction
   o Background
   o Topics in visual information analysis
   o Applications
   o Related fields
2. Commonly used research tools
   o Statistical tools
   o Optimization
   o Other advanced tools
3. Recognition and detection
   o Binary images - shape matching classification
o Intensity images - face recognition
  o Face detection

4. Video analysis
  o Visual tracking
  o Activity analysis

5. Medical imaging analysis
  o Background introduction: problem formulation, data acquisition
  o Anatomic structure detection
  o Anatomic structure segmentation

Grading
- Homework: 10%
- Class participation: 10%
- Paper presentation: 30%
- Projects: 50%
  - Proposal: 10%
  - Presentation: 20%
  - Report: 20%

Paper presentation
Each student is required to present one research paper (selected from a list provided by the instructor). The presentation will be about 30 minutes, plus about 10 minutes in class discussion.

Homework
There are about 10 classes scheduled for the presentation of papers. Prior to each of these classes, students must turn in a one page review summary and critique of one of the papers (exclude the one the student will presents) to be discussed. Late submission will not be accepted, since the goal of these reviews is to get you to think about papers before we discuss them. However, each student need only turn in reports for 8 of these papers.

Project
A list of project ideas will be suggested during the course of the semester, but students are free to suggest their own, especially if they relate to their current research. Course projects will be undertaken in small teams (2-3 students), or individually (as agreed with the instructor). Each team member will receive the same grade for the project; it is up to the team members to divide the work fairly.

Course Policy
- Homework: should be submitted at the beginning of the class on the corresponding due date. Late submission is not allowed.
- Final project: project reports (including middle and final reports) deadlines will be at 11:59pm of the corresponding due date. Late submission will be punished at 10% per day and up to 7 days.
- Class participation: students are expected to attend all classes.
- Cheating: cheating in assignment may result in a grade of F in the course.
- Plagiarism: plagiarism is strictly forbidden.