CS 586: Image Processing and Pattern Recognition

Prof. Qiang Shawn Cheng

Department of Computer Science
Southern Illinois University Carbondale
Spring 2014
Syllabus

Lectures. Dr. Qiang Shawn Cheng

- MWF 2:00 - 2:50pm, QUIG 140B
- Attendance is required.
- Office hours: MWF 12:00-1:00pm, and 3:00-4:00pm, QUIG 140B or Faner 2140. Other times, appointment needed.
- Email: qcheng@cs.siu.edu; Phone: 618-453-6056

Teaching Assistant: Chong Peng
- Office Hours of TA: TBA; Office: Faner 2143
- Email: pchong@siu.edu; Office Phone: 618-453-6630
Background and Books

Prereq. Linear Algebra, and some Programming courses. Or instructor's permission (see me after class).

- Available at university bookstore.
- Other editions may work but the HW will be based on the 3rd ed.

Additional books:
Grades

Grading.
- "Weekly" or biweekly problem sets, due in class. No late homework will be accepted.
- Class participation, staff discretion for borderline cases.
- Projects: required. 15 points. On applications of image processing techniques, or anything related to class materials. Plan for about 40-50 hours. Presentation will be required.
- Encourage to submit papers using the course project materials; if submitted or accepted will lead to bonus points.
- Two midterm exams, one optional final.
- Grade determination: test 30% + 30%, HW: 15%, Machine problem 10%, project 15%

Course grades.
- Will do curve, but I believe that You are on the top…
Collaboration

Collaboration policy. (ask if unsure)

- Course materials are always permitted.
- You are encouraged to attend office hours as needed.
- External resources, e.g., Google, YouTube...

"Collaboration permitted" problem sets and projects.

- Default permission level, unless otherwise stated.
- Can form study group of up to 3 students.
- Study group must work on each problem jointly.
- You must write up solutions individually for homework problems; for projects, can write a report together.

"No collaboration" problem sets.

- Can always consult course staff.

You need “independently” work out problems in tests:

- Text book is permitted.
- Class notes are permitted. No other book is permitted.
Useful Website and Resources

Image databases:


Course website and resources:

http://cs.siu.edu/~cs586

http://www.imageprocessingplace.com/DIP-3E/dip3e_main_page.htm

http://www.imageprocessingplace.com
1. **Pattern Recognition Homepage:**

2. **Machine Learning Database:**

3. **CMU Artificial Intelligence Repository**
   [http://www.cs.cmu.edu/afs/cs.cmu.edu/project/ai-repository/ai/0.html](http://www.cs.cmu.edu/afs/cs.cmu.edu/project/ai-repository/ai/0.html)

4. **MNIST Database**
Tentative Outline

- Introduction (Chapter 1)
- Digital Image Fundamentals (DIP, Chapter 2) and matlab
- Point processing
- Color perception and color correction
- Fourier transform, and convolution
- Frequency filtering (DIP, Chapter 3 & 4, selected)
- Sharpening
- Pixelization and quantization
- Restoration and reconstruction (DIP, Chapter 5)
- Sampling aliasing and re-sampling
- Rotation
- Noise and median filters
- Morphology
- Segmentation (DIP, Chapter 10)