Math/CS 445
Image Processing and Pattern Recognition
Spring 2009
Tuesdays 4 - 7 PM
Ojai Hall 1964

Instructor: Kathryn Leonard
BTW 2245
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Office hours: M 10:30 - 11:30 AM.
T 4 - 5 PM & by appt.

Book: Digital Image Processing with Medical Applications, by Geoff Dougherty

Course Objectives: This course is an introduction to image processing in which students approach the problem as scientists trying to build an image processing system. Students will present material in class that they find interesting or relevant to the problem and will work together to build a successful image processing system. The course will be organized in a workshop structure around three-week blocks. In the first week, students will present new material. In the second week, students will work in class with Matlab on the techniques presented in the first week. In the third week, students will present their algorithms, successes and failures, and will brainstorm possible improvements.

Learning Outcomes: The successful student will be able to:

- explain the principles and basic concepts of pattern recognition.
- demonstrate the limitations in extracting and quantifying pattern content.
- apply image segmentation methods to partition an image into disjoint, connected sets of pixels.
- store the segmented image as a membership map, as a boundary chain code, or by line segment encoding.
- use features for classification that are discriminative, reliable, independent and few in number.
- establish representative and unbiased classifier parameters for a training set.
- apply critical reasoning skills in the application of physical principles and choice of appropriate technique.
Grading: Because the course is styled after a workshop, much of the course grade is in class participation:
- Class participation: 40%
- Presentations: 20%
- Projects and reports: 20%
- Final project and report: 20%

Class participation is more than speaking in class. It means being actively engaged in the material, asking questions when you don’t understand something (by email or in office hours or in class), helping other students when possible, paying attention to the course instead of the internet. It will be evaluated based on the criteria we set out on the first day:

<table>
<thead>
<tr>
<th>Teachers</th>
<th>Students</th>
<th>Group Members</th>
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<tbody>
<tr>
<td>show interest</td>
<td>show interest</td>
<td>show interest</td>
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<tr>
<td>be engaging</td>
<td>be engaged</td>
<td>share ideas</td>
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<tr>
<td>use activities</td>
<td>ask questions</td>
<td>listen to others</td>
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<td>address the students (not the board)</td>
<td>do your work</td>
<td>communicate effectively</td>
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<tr>
<td>give alternate explanations</td>
<td>come prepared</td>
<td>share equal work</td>
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<td>be responsible</td>
<td>be responsible</td>
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For the presentations and projects, a large part of your grade will come from peer evaluation. Basically, if you come to class and actively participate, you should do well in the course.

Grades will be the standard $A = 90-100\%$, .... I will award ± grades as a discretionary measure only, to bump someone up for displaying desirable qualities (like showing great improvement during the semester) or to bump someone down for displaying undesirable qualities (like whining). I will update grades on Blackboard as a courtesy to you, but the only true grade sheet is my grade sheet—any mistakes on Blackboard are, well, just mistakes.

Note: You are encouraged to work together, but be sure to acknowledge all collaborators and outside references consulted.

Accommodations: If you need special accomodations, please contact 805.437.8528.

Course Schedule: All relevant course info, including the schedule, may be found on the course website, accessible via Blackboard or faculty.csuci.edu/kathryn.leonard.
Academic Honesty

Work on exams must be your own.

At all other times, I strongly encourage you to collaborate. If someone helps you, give her or him the credit, and write your own explanation. Each member of every group is responsible for his or her own understanding of the work submitted.

All work that students submit as their own work must, in fact, be their own work. For example, if a paper presents ideas of others, it must clearly indicate the source. Word-for-word language taken from other sources books, papers, web sites, people, etc., must be placed in quotation marks and the source identified. Likewise, work on tests and exams must be the student’s own work, not copied or taken from other students’ work, and students must comply with instructions regarding use of books, notes, and other materials.

In accordance with the CSUCI policy on academic dishonesty, students in this course who submit the work of others as their own (plagiarize), cheat on tests and examinations, help other students cheat or plagiarize, or commit other acts of academic dishonesty will receive appropriate academic penalties, up to and including failing the course.

Papers with plagiarized ideas or language will be graded F and must be rewritten with proper use of quotations and referencing. The grade of F will remain the recorded grade on that assignment.

Plagiarism or cheating on tests and exams will result in an F on the test or exam, very likely resulting in a lower or possibly a failing final grade in the course. To complete course requirements, students must retake the test or exam during the instructors scheduled office hours.

In cases where the cheating or plagiarism was premeditated or planned, students may receive an F for the course.