

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

NORTHEASTERN UNIVERSITY

ECE U692 INTRO TO SUBSURFACE SENSING AND IMAGING Spring 2004

**Project Assignment**

As announced, students will be required to complete a group project (instead of a final) for this course. Groups should ideally be self-organized and consist of 4 people, although we will consider groups of 3 or 5 upon request. We will figure out the details in class. Completing a project involves accomplishing certain deliverables, according to the description and schedule at the end of this assignment.

We are open to a wide variety of ideas for types of projects, and we encourage you to be creative. The main requirement (aside from the obvious one that your project be related to Subsurface Sensing and Imaging) is that you need to do something active, not just summarizing things you have read. This can range from a physical experiment, to a numerical simulation, to writing some software, to simply doing some calculations based on applying ideas discussed in class to a problem area your group reads about. Some ideas to get you started are:

- Do something specific with the data your group has collected. Suggestions include developing a volume visualization program, writing and testing a clustering algorithm, etc.
- Read about an SSI modality of interest and then extend your reading in some active manner according to the requirement above.
- Work with a CenSSIS researcher (one of us or anyone else we can put you in contact with) on a (limited) project of interest. This project could involve reading, plus playing with simulated or real data, or circuit design, or software development, or whatever is in the interest area of the group.
- Look at modeling and/or algorithms and/or hardware for some SSI problem, and do some active derivation or code writing and testing or calculations, etc.

There are two generic ways to come up with a project idea:

1. Start with an idea and recruit a group, and
2. Start with a group and find an idea.

If you have an idea and want to follow the first approach, feel free to use the class ECE listserve and/or Blackboard and/or talking to the instructors as means to recruit group members. We may even devote some class time to allow people to present ideas to the class.

A good approach to developing a project idea, given a group, might be to choose one or two application areas, or a technical area—for example sensing in a particular modality, or signal processing, or pattern recognition, or software development, or . . . , send us a brief email description, and then we can brainstorm together on how to turn this into a project idea.

The requirements for completing the project are:

### 1. **Proposal:**

- (a) Each group needs to hand in a 3-4 page proposal by **Feb. 2**. The proposal will count for **10%** of the project grade.

The purpose of the proposal is three-fold:

- i. Ensure that your group starts planning early,
- ii. Ensure that each person has a task of sufficient substance that we can use it as a basis for a grade.
- iii. Ensure that the project has a reasonable scope, keeping in mind that even a semester is shorter than we tend to think it will be.

It should include

- the names of the group members,
- the general theme of the project, and the specific goals you hope to achieve,
- as much of a plan as you can manage for how you are going to carry out the proposed project,
- an initial definition of each team member's role,
- specific milestones that you plan to accomplish spaced no more than every 3 weeks apart, and
- complete citations to the extent possible, as well as information on how you plan to obtain further reference material as needed.

To help you develop your proposal, you are invited to submit an (optional) pre-proposal by **Jan. 26**. We will reply to your pre-proposal as quickly as we can, allowing you a chance to incorporate our comments into your actual proposal. The pre-proposal should include as much of the above information as possible; if you are considering more than one idea at that point, describe them all.

We strongly suggest that each group discuss your ideas with us before writing your proposal. Email is a good way to start discussion. The better thought-through the proposal, is the more likely the project will be a success. We will give a specific response to each proposal.

- (b) Each group will revise their proposal taking into considerations the feedback you receive by us, and hand in this revision by **Feb. 9**. The revision will contribute to the grade for the proposal.

2. **Progress Report:** Each group will send us a progress report by **Mar. 8**, describing their progress so far, in particular describing where they are with respect to planned milestones, and any revisions of goals and milestones that they think are necessary. The progress report will be worth **5%** of the project grade. The progress report is an essential part of the completing the project and your project will not be considered complete if you do not submit it as required.

### 3. **Final Report:**

- (a) Each group will write a final report describing their project. We are requiring that you hand in a draft of your report by **Apr. 12**. This report should be complete and professional, and will be graded. However to give you a chance to practice revising such

a written report, we will give the report back to you with comments and you will then have the opportunity to hand in a revised version during finals week (exact date to be determined).

- (b) We expect that your reports will be on the order of 5-10 pages long, but length can vary considerably depending on the particular project. The report should be a reasonably complete description of the group's work, and **must** include an assessment of the project and the results obtained. Reports should be professional-quality documents; they should be well organized, typeset, and have the usual structure of an introduction, a body, conclusions, and references. All figures should be clearly labeled, have meaningful captions, be referred to in the text, and have a clear purpose. Citations should be complete enough that the reader could find the reference material. Web citations are ok but should include at least a complete URL, a title of the web page, author and site information, and a date if at all possible.

4. **Project Presentations:** Each group will present their work on their project during finals week. We'll find a mutually agreeable time as we get closer to the end of the quarter. This should be a powerpoint (or other computer-driven) presentation of about 15 to 20 minutes in length. Each member of the group should play an active role in the presentation, and each member should be prepared to answer questions on the whole project.

**Submissions:** Everything you hand in for the project should be submitted both electronically, by email to both instructors, and in hardcopy.

**Grading:** Instead of grading you separately on the reports and the presentations, we will combine the two together. Your grade for the project will be distributed as follows:

1. Proposal: 10%
2. Progress Report: 5%
3. Technical Content: 30%
4. Effort: 25%
5. Creativity: 15%
6. Clarity of Presentation: 15%

The schedule for the project is as follows:

|           |  |
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| 26 Jan    | Optional project pre-proposals due.                                      |
| 2 Feb     | Project proposals due  |
| 9 Feb     | Revised proposals due  |
| 8 Mar     | Progress reports due   |
| 12 Apr    | Project reports due  |
| 20-23 Apr | Finals week starts — presentations and revised reports due at a date TBD |