Project – 150 points total

Important Dates:

1. Proposal (15 points): Due October 27th: Five page problem introduction (with references). Turn in a hard copy in class and submit a copy via the normal method. *In your writeup, use blue italics for statements that are dreams (rather than actually completed research). Use green bold font for statements which reflect your original ideas.*

2. Elevator Speech on Research (10 points): Due October 27th. This is an oral, 3 minutes presentation of what you intend to do. No powerpoints or visuals are used for this.

3. Research Paper (100 points): Due December 16th. Turn in a hard copy in class and submit a copy via Eagle. With this, turn in your research diary (which contains links to papers or the pdf itself). See project grading guide so you know how it will be graded.

4. Presentation (15 points) Due December 15th. You will present the paper during the final examination period. Plan on about a twenty minute time period (and about 12 power point slides) with five minutes for questions. See the presentation grading guide so you know how it will be graded.

5. Critique (10 points) Due December 15th. You will be given points for your ability to give helpful criticism during project critique. You will also be rewarded for your ability to ask important questions at the end of the project presentation.

*Introduction to Project*

For our project, we will do a research paper. It will be done by one person (12 pages, single spaced, double column). The research paper should take the form of a (long) published conference paper, including abstract, appropriate sections, and references.

*Proposal*

The research proposal should be written well enough to be used as the introduction to your final paper. Use the document “Format of Paper” to give you the format of the paper.

Read 5-10 strong papers in the area so you become familiar with what has been done. In the short time of this course, you have little time to actually do the innovative research, but you should complete some of it and sketch out what you would want to do (if you had more time). You will write the abstract and proposal as though you HAVE done it already. Look “Writing Articles” for some hints about writing, particularly about plagiarism. The goal of the proposal is not just to identify a research area, but to determine the kind of work that would be publishable.
Research Paper

This paper is to be longer in length but the same style as a research paper submitted to a conference. See the class webpage for the appropriate paper style. The first part of the paper should be a finished version of the paper. It should be edited by someone with some English skills (perhaps the writing center).

Clearly identify the original parts of the research project. Original ideas or statements are to be printed using a green bold font so it is obvious what you have done, versus ideas you are copying from others. Statements that are what you would do, versus what you have done or what others have done, are to be written in blue italics. Be sure that at least half of your paper is original (work completed by you, work proposed, or projected results).

The last part of the paper (where you tell about your technique and your results) will be somewhat sketchy. You should be able to generate at least some results. In addition, explain what you would do: how you would set up your tests and what kind of results you would expect. To differentiate between what you have actually done and what you would hope to do, use blue italics for the part that you are just faking. Make sure that you only sketch work that you would be able to complete in about two months time. You must complete at least some of the research.

While it is not expected that you will have completed a research project, you should have some original ideas. Original ideas or statements are to be printed using a green bold font so it is obvious what you have done. You should have explored the ideas well enough (through reading and implementation) that you are reasonably certain they are worth pursuing. I am expecting a well written paper, which is suitable for publication (once the results section is filled in). Many a student has seen their final grade plummet by not taking this assignment seriously enough.

I am hopeful that most of you will use this paper as a springboard to an actual research paper.

Presentation

The presentation will be given during the final examination period. Presentation guidelines can be found in the document “GradingPresent”.

How to Do Research

1. Be efficient. There will be lots of articles to pick from. Read the abstract and conclusion first to determine if the paper is one you want to read.
2. Plan on reading everything only once. Really good material will require you to go back and reread it (perhaps several times), but lots of things can be summarized fairly well with one reading. If you have a paper copy of the article, highlighting
key phrases is helpful. If you have an electronic copy of the paper, creating a file of notes for each paper (giving complete reference, basic ideas, and your reaction to them) can save a lot of time. Summarize as you read. Write down the strengths and weaknesses of each paper after you read it. Also, jot down ideas that you have for improving upon the work.

3. What makes a good topic? I would go for something that is interesting to you. Other criteria are: understandable (something you have the background to read), easy to find material, lends itself to implementation, something you have your own ideas about.

4. Have a plan. Ask yourself, “How would I demonstrate to others that my ideas are valid? If I could show these results, why would anyone care?” Pick an area that is important for some reason. Tweak what has already been done to create something original. Design tests to validate your ideas.

**Form of the Research Project**

Research goes through the following stages:

1. reading basic material (such as from a textbook or an online introduction to the topic)
2. finding important articles relating to the topic
3. understanding articles
4. forming your own opinion about what is good and bad about what has been done
5. forming your own opinion about what should be done next
6. testing your ideas - implementation or paper analysis

For a small project, you may get all the way through each stage this semester. For larger projects, you may only do the first four stages, or you may do an incomplete version of the first stages so you can get to later stages. You get to decide exactly what you do.

You should answer the following kinds of questions about each article. Answering the questions will not only keep you awake while you read, it will make the final analysis easier.

1. Do I believe what the author has to say? Why or why not?
2. What is his/her main point?
3. Why it is important?
4. What remains to be done? What would be the perfect follow-on research?
5. What references that he/she cites do I need to read?
6. What questions do I have after reading the article?
7. On a scale of 1 to 10, how important is this article to my research?

The basic rules for writing a paper are:
1. Don't just summarize what everyone has done without giving your own analysis. You must write an analytical paper, not just regurgitation.
2. Do something useful!

**Project Report (December 16th) and Presentation (December 15th)**

1. Prepare a twelve slide powerpoint presentation to highlight your work.
2. Turn in your article (both hardcopy and electronic).
3. Turn in a links to the major papers you cite via a research journal.
4. Organize your report using subheadings. Include the following sections: Abstract, Introduction, Previous Work, Concepts, Conclusions. Realize that not every one will read your paper from beginning to end. The abstract and conclusion are especially important for this reason. They should be powerful and be understandable without having read the whole paper.
5. Have a major point to your paper. Just like a good mystery leaves clues throughout the book, your paper should constantly gives clues as to where you are going and why the topic is important to the goals of the paper. Don't just present a concept or a result and assume the reader understands the importance. Clearly state what you believe to be true.
6. Present the concepts in a logical manner so that it might be comprehended by someone who has not studied the papers for two months.
7. Have at least seven important references with recent publication dates. Not everything you find in print has the same value. You need articles that appear in peer-reviewed publications (of the type found on IEEE or ACM digital libraries) rather than articles in trade magazines.
8. Have someone with good English skills read your paper and suggest changes.
9. Give credit for ideas by referencing the work. See a major CS journal for an illustration of how this is done.
10. For ideas that are your own, be sure to make it clear that this is your opinion or your analysis by using bold font.
11. Develop examples which illustrate your points.
12. Use common terminology. Don't make up new terms for common ideas. If the various papers are inconsistent in terminology, you must decide which terminology you will use throughout the paper. The reader is more concerned that you are consistent within your paper than that you use the notation used by the original author.

**How to Find Articles**

1. The ACM digital library is an excellent, searchable source of peer-reviewed articles. USU libraries has paid for the service so that you can access it without
paying. USU students have free access to the ACM digital library. Look at the AAMAS conference as it is top ranked.

2. The IEEE digital library is also an excellent, searchable source of peer-reviewed articles. USU students have free access to the IEEE digital library.

3. If you know the names of the key researchers in the area, you can do a google search to locate their homepages. Often their recent publications are listed. If they don't have links to the copies of the paper, you can email them and ask for a copy. (Obviously, you would only do this for papers not carried by the library.)

4. Once you find one article you like, look for more references at the end of that article. Sometimes the best article to read is not the one you first locate, but one which came before.