Research Plan
Summer Undergraduate Research in Engineering

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1 CoSke - An Exploration in Collaborative Sketching

Description  CoSke stands for collaborative sketching. The idea is to create an environment where multiple users have access to one image or document and can use sketching to edit it simultaneously. A user can be using a sketch program from multiple platforms, such as a tablet laptop, desktop computer, or mobile device such as a BlackBerry or iPhone, and they will all be recognized as input by the host program. Potential features of the program will include gesture recognition, erasing, multiple users, and error correction, as well as its own editing technique.

Figure 1: An example of CoSke execution. In this example, two tablet laptops (red and green pens), a desktop computer (yellow pen), and mobile device (blue pen) are all sketching over a picture of flowers. Each user can sketch on their own device and the result appears on each display. The resulting image with the sketches is shown.

Purpose  I chose this project because it would be a great introduction to computer-human interaction (CHI), a field I am interested in pursuing in graduate school. The project will explore how users interact with the program and how collaborative sketching can benefit different environments.

Project Goals and Implications  Through this project, I hope to learn about multiple fields in sketch recognition by conquering problems such as error correction, gesture recognition, etc. This project will contribute to the field by giving new insight on how people
draw together. A user study analyzing the techniques and habits of collaborative sketching can help in technical development of the product. One application of collaborative sketching would be for advertising companies, graphic designers, or product designers who are in development stages and wish to use a more interactive environment to give comments and feedback on a design or advertisement.

**Personal Goals**  By the end of the program, I hope to increase my knowledge in various programming languages I will be using such as Java and XML, become exposed to algorithms common in sketch recognition, improve my research techniques such as technical writing and getting more out of research papers, and help better prepare myself for graduate school programs.

**Approach**  I am currently in contact with Aaron Adler, a recent PhD graduate at MIT, who has done research on a project similar to what I wish to accomplish. He is working on sending us the code, and once the code is received we will attempt to run it to get a feel for how it works. Then we can begin to analyze what has already been accomplished and what features we would like to improve or implement. Daily activities will include determining which features we would like to work on and discuss the progress on, issues with, and methods for solving different problems. We also hope to run user studies to see how people use the environment and discover what they like or dislike to help with further improvements.

**Method and Materials**  One of the main pieces of software that we will need is the code from Aaron, which we will hopefully be receiving by June 12th. An IDE such as Eclipse or Microsoft Visual Studio will be used to work on the code, which is currently in C Sharp and Java but may change as research progresses. We will be using tablet computers and mobile devices with stylus input for the hardware side of testing.

**Work Schedule**  I will have office hours from 9AM to 5PM Monday through Friday. At 11AM MWF and 10AM TuTh I will be at a meeting with the entire lab to talk about goals for the day, reading assignments, project presentations, etc. I will also be able to come in on the weekends if needed.

**Deliverables and Dates**

- June 11th, 2009 - Project Plan Due
- July 23rd, 2009 - Abstract Due
- August 3rd, 2009 - Research Poster Due
- August 6th, 2009 - Research Paper Due