Human-Computer Interaction
Project and Workshop

Workshop overview

We have been discussing a variety of next-generation user interfaces and interaction techniques in class. We have seen user interfaces with physiological computing, tangible user interfaces, brain computer interfaces, attentive user interfaces, as well as odor and skin as communication channels. We have also been taking a look at current user interface software tools and description languages, which are still mainly focused on GUIs.

Our goal is for you to explore issues in the design and implementation processes of next-generation user interfaces, sometimes called non-WIMP or post-WIMP, with a particular emphasis on *implicit interfaces*, like those we discussed that exploit brain or physiological measurements as a secondary or orthogonal, pervasive input.

Your first step is to pick a next-generation user interface style or modality or a new interaction technique for your project. It can be the one you presented, others we discussed, or any other one you prefer.

Some of these may be easy to design and build with current GUI tools; others are harder or more awkward. What kinds of new structures, concepts, or abstractions do you think would be useful for building the new interfaces? For example, GUIs were eventually handled with new concepts like widgets and callbacks. Propose what you think would help for the next generation interactions you have chosen.

Then invent an *imaginary* new language, interactive tool, or other approach to designing and building such interfaces using your concepts. You do not have to build this! Try to make it fairly general, not just tailored for exactly the interfaces you studied, but generalize to some larger class. Think of ideas (tools) that would help to design or implement the interface or technique you picked. They might be software tools, such as an IDE, an textual or graphical programming language, a modeling tool with abstraction techniques or description languages to help with each design phase.

Then "program" some examples or key software elements of your interface style using your imaginary tool. (You are writing notional programs for an imaginary tool or compiler.) Also program some of them using the techniques that would otherwise be

used for building these interfaces, either actually or notionally. Try to evaluate your tool by comparing your two sets of programs.

Finally, present your work in the form of a skeleton scientific paper, which has the form and some of the ingredients of a regular paper but, of course, lacks an actual implementation and user study.

Procedure

This project will consist of two parts: 1) Writing a project document; and 2) Presenting your project idea and leading discussions in class. There will be two sessions with a two-week gap in between. In the first, you will present an initial proposal and get feedback from the group; in the second, you will present your final work. You are welcome to work individually or with a partner. You (or your team) will present your project idea and lead discussion of it on the first day, mainly to brainstorm and to get feedback from the class. On the second day you (or your team) will present your completed project.

1) Project document

Your document should follow the format of an ACM CHI or UIST conference paper, like those we have read. It should include the following sections:
- **One-sentence summary** of your project
- **Category** of user interface/interaction technique you pick
- **Target audience** of your project
- **Introduction** - e.g. How your project is related to your interests. What is your motivation behind your project? What is your project focus area? What problem are you trying to address? How does your project extend or how is it different from existing ideas? How does your project relate to existing ideas? What is the scientific or technical novelty of your project, compared to previous work?
- **Technique** (main content of your idea)
  - **Idea (Tool)**: What your idea (tool) does. What your idea (tool) is for. How your idea (tool) addresses the issues you found.
  - **Reference papers**: Which research papers introduce supportive tools / description languages / models / concepts for the interface/interaction you pick.
  - **Discussion**: Benefits and drawbacks of your new approach. Arguments for why you think it is helpful compared to existing ideas. Plans for how to evaluate that question (more below).
- **Method**: How would you propose to evaluate your idea? Describe an experiment design, independent and dependent variables.

- **Evaluation**: What is your hypothesis or expected results? How would you define a success of this project?
- **Summary**: Restate the scientific or technical contribution you claim this work would make to the field, how would it advance previous work. How did you demonstrate or prove you claim (hypothetically, if you didn't actually do an experiment). What problems remain open for future work?

2) Presentation format

- ★ Day 1 (Nov. 22th): 15 minutes total (8 minutes for presenting your project idea + 7 minutes for brainstorm and discussion)
- ★ Day 2 (Dec. 6th): 15 minutes total (12 minutes for presenting your completed project + 3 minutes for questions)

Deliverables

1) (Due on Nov. 21 midnight, email to tshibata@cs.tufts.edu)
   Your presentation slides for Day 1, which should cover the sections other than Method, Evaluation and Summary. Think of it as an elevator pitch of your project. After your presentation, you will also be in charge of leading a discussion to get feedback from the class. If you use an online system, like Google Presentation, you can just email the link. If you use Powerpoint, please convert to PDF since we will run it on a Mac that has only Keynote and OpenOffice.

2) (Due on Dec. 6 before class)
   Your completed project document in PDF format.