

The HCI Lab at UNC Charlotte

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ABSTRACT

At the Human Computer Interaction Lab (HCILab) at UNC Charlotte, we investigate novel ways for people to interact with computers, and through computers with their environments. Our research covers a broad range of areas within Human Computer Interaction, such as Novel Interaction and Multimedia, Privacy, Creativity, and Visual Analytics. We collaborate with researchers in a number of areas related to HCI, such as visualization, gaming, art, and psychology. We also study interaction in a variety of domains such as intelligent information systems, information privacy and security, image processing and graphics, and intelligence analysis.

Categories and Subject Descriptors

H.5.2 [Information Interfaces and Presentation]: User Interfaces – evaluation/methodology, user-centered design.

General Terms

Human Factors

Keywords

HCI Education, Interaction, Privacy, Visualization.

1. INTRODUCTION

The Human Computer Interaction Lab at the University of North Carolina at Charlotte is comprised of two faculty members, one affiliated faculty member, and a number of graduate and undergraduate students. We conduct a wide range of research relating to HCI, including novel interaction techniques, applications for creativity, privacy management and visual analytics. These varied research topics have grown from our emphasis on collaboration, both with each other and with faculty and students in other fields, such as intelligent systems, cognitive science, art and dance, and visualization. In the following sections we describe several of our major projects in more detail. For more information please visit our web pages at <http://hci.sis.uncc.edu/>

2. INTERACTION AND CREATIVITY

The byline of the HCI Lab at UNC Charlotte is 'Designing the Future of Work and Play'. Interaction and creativity are really at the intersection of work and play: work becomes play when the interaction becomes creative. The 'novel interaction' research projects in our lab focus on the design of interfaces that enhance the ability of an individual or a group to express themselves.



Figure 1: Using two hands and two cursors to select regions of interest for a slideshow.

The symToneKenBurns application allows users to easily create complex narratives using their still photos by applying a two-handed pan and zoom technique, as shown in Figure 1 [1]. This project is built on top of the symTone base application, a two-handed image processing application that allows users to explore tonal manipulations of individual photographs [2].

The symDraw application for two-handed vector drawing and editing has morphed into symDrawEI, a collaborative drawing program where multiple artists can work together, drawing on a shared canvas, each artist using two mice. The 'EI' in symDrawEI stands for Exquisite Interaction. This moniker pays tribute to the parlor game, Exquisite Corpse, in which various individuals jointly create a drawing by taking turns on different folds of the same sheet of paper. We have borrowed this form of collaboration and parallelized it in symDrawEI, so that the artists can collaborate 'exquisitely' by working together.



Figure 2: Dance.Draw: Exquisite Interaction.

The Exquisite Interaction concept has also sparked a completely new project in our lab that is a collaboration with the Department of Dance. The project is called

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Dance.Draw [3] and involves dancers carrying wireless, gyroscopic mice while they dance, which provide multiple streams of spatial input used to create a visualization that is projected behind the dancers, as shown in Figure 2.

While much of our work revolves around commodity devices such as computer mice (and another project involved 3D input and output using Nintendo Wiimotes [5]), we are also investigating sensor interaction for the Dance.Draw project. In addition, we are working with the Charlotte Visualization Center to research a variety of issues in multi-touch interaction on digital tables.

Finally, we have a number of ongoing projects investigating the cognitive aspects of some of these novel interaction techniques, such as the use of spatial memory cues while interacting with two hands. We are also investigating new methods for evaluating interfaces that support creative expression or performance interaction.

3. PRIVACY

Online social communities such as Facebook, MySpace, and Flickr are experiencing tremendous user growth, with at least 84% of Internet user involvement. Users of these communities share large amounts of personal information to build stronger social relationships, yet put their privacy and identity at risk by their disclosures. We are investigating how people are sharing and protecting their information in online social networks, in order to improve the privacy mechanisms and reduce the risks of participating while still maintaining the benefits of these communities.



Figure 3: Prototype interface for managing privacy in Facebook.

For example, we have identified users' strategies and challenges in managing privacy in the community Facebook [6]. We have examined how non-student user behaviors compare and differ from students, who have been the traditional user population studied on these sites. We are also investigating new interfaces for improving privacy management, such as a tool to protect user identities in online photos by automatically blurring people's faces.

We are also prototyping a new interface for managing privacy settings in Facebook and similar sites. Our interface structures privacy settings around the notion of the audience – who can see what information – to help users better conceptualize the impact of information sharing and protection (see Figure 3). This will help the user associate privacy settings with how their information is presented to different people instead of with lists of privacy menus. Preliminary results with an early prototype demonstrated significant improvement in users' confidence and understanding of privacy settings [4].

4. VISUAL ANALYTICS

In many domains, analysts are utilizing visualizations to view and understand vast amounts of data. Yet, little research has investigated how visualizations are really used to contribute to users' decision making, and how that process of analysis can be analyzed and shared. We have instrumented one particular visualization for fraud detection, WireVis. With user studies, we are examining how the features of the visualization contribute to the analyst's task goals, how users conceptualize their behaviors and how that compares to the captured interactions. We are interested in learning how recordings of the interactions could be used for creating useful representations of user behaviors.

We are also investigating visual analytics aimed at improving the interaction with geovisualizations. As both specialized and general end users utilize a growing number of mapping tools, new interaction methods and information management approaches are needed to reduce visualization complexity and improve usability. In order to do this, we are performing exploratory user studies to understand how users interact with map visualizations in a variety of complex tasks. We have created an initial model of user behaviors based on pilot studies, and are evaluating and extending that model with more complete user evaluations.

5. HCI EDUCATION

We teach HCI classes at both the undergraduate and graduate levels. We are working to integrate critical thinking into both levels of courses, through the practice of digital artifact critiquing. We have also recently developed a hands-on undergraduate course in Rapid Prototyping and Interface Building, in addition to several graduate topics courses.

6. ACKNOWLEDGMENTS

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