Program and Agenda for
Multitouch and Surface Computing Workshop

Revision 1.0.0
SIG CHI '09
Boston, MA

Program

Location: Room 309

9:00 Meet, Greet, Introductions

9:20 **Theme A. System:** objects, device, software development, etc.

9:20 to 9:40	Unobtrusive Tabletops: Linking Personal Devices with Regular Tables
9:40 to 10:00	Reflections on enhancing interaction in surface computing using real-world objects
10:00 to 10:20	Understanding and Designing Surface Computing with ZOIL and Squidy
10:20 to 10:40	Heuristics to support design of new software for interaction attabletops

10:40 10-min break

10:50 **Theme B. Field**: Deployment, user assistance, real-world application, etc.

11:00 to 11:20	A Field Study of Users' Reaction to Microsoft Surface in the Commercial Context
11:20 to 11:40	The MultiTouch Cell: Deploying multitouch screens through flexibility and modularity

11:40 Group lunch (~1.5 hours)

1:10 to 1:30	TouchGhosts: Guides for Improving Visibility of Multi-Touch Interaction
1:30 to 1:50	Scientists' Discovery Room: Touch to Discover and Learn
1:50 to 2:10	Multitouch is Dead, Long Live Multitouch

2:10 10-min break

2:10 **Theme C. User:** Input, gestures, ergonomics, etc.

2:10 to 2:30	Assisting Gesture Interaction on Multi-Touch Screens
2:30 to 2:50	Smart Pointing with Click Again
2:50 to 3:10	Finger Contact Anthropometry for Touch Interface Design
3:10 to 3:30	Know Thy Toucher

3:30 10-min break

3:40 General discussions

5:30 End of Workshop

Papers Abstracts

Theme A. System: objects, device, software development, etc.

Unobtrusive Tabletops: Linking Personal Devices with Regular Tables

Sven Kratz, Michael Rohs

In this paper we argue that for wide deployment, interactive surfaces should be embedded in real environments as unobtrusively as possible. Rather than deploying dedicated interactive furniture, in environments such as pubs, cafés, or homes it is often more acceptable to augment existing tables with interactive functionality. One example is the use of robust camera-projector systems in real-world settings in combination with spatially tracked touch-enabled personal devices. This retains the normal usage of tabletop surfaces, solves privacy issues, and allows for storage of media items on the personal devices. Moreover, user input can easily be tracked with high precision and low latency and can be attributed to individual users.

Reflections on enhancing interaction in surface computing using real-world objects

Peter Vandoren, Chris Raymaekers, Frank Van Reeth

The popularity of interactive surfaces has increased significantly in the past years. The development of several interactive surfaces (e.g. MERL DiamondTouch, Microsoft Surface, Philips Entertaible, Han's MultiTouch table) has stimulated research on interaction techniques, group collaboration, information visualization techniques, technology alternatives, ... Furthermore, a number of applications were realized, mostly focusing on sorting (e.g. pictures), planning (e.g. agenda's, projects, GIS), sketching, brainstorming or games. Here, touch input and gestures form theprincipal method of interaction, whereas additional input devices are rather seldom used. On the other hand, a number of researchers have been working on tangible user interfaces (TUI) in the past decade. Their research has led to quite some innovative interfaces in a wide range of application areas. Working with tangible I/O objects is experienced as quite intuitive, notwithstanding the fact that many objects are newly created artifacts. These objects have form factors of their real-world counterpart (if any) and thus help facilitating embodied interaction.

Understanding and Designing Surface Computing with ZOIL and Squidy

Hans-Christian Jetter, Werner A. König, Harald Reiterer

In this paper we provide a threefold contribution to the Surface Computing (SC) community. Firstly, we will discuss frameworks such as "Reality-based Interaction" which provide a deeper theoretical understanding of SC. Secondly, we will introduce our ZOIL user interface paradigm for SC on mobile, tabletop or wall-sized devices. Thirdly, we will describe our two software tools "Squidy" and "ZOIL UI Framework" which have supported and facilitated our iterative design of SC prototypes.

Heuristics to support design of new software for interaction at tabletops

Trent Apted, Anthongy Collins, Judy Kay

Heuristic Evaluation is a “discount” usability test that can support improved design decisions early in the development cycle. It is particularly a technique to support software design for tabletop interaction because the field is so new and there is potential to explore many new ideas for interaction. This makes Heuristic Evaluation particularly valuable. Many sets of heuristics have been proposed in the past, both for interfaces in general (not just computing interfaces), and ones that are more specialised. For tabletop, and other horizontal interactive interfaces, current sets of heuristics fall short. In this paper, we build from previous sets of relevant heuristics, to formulate a new set of heuristics for software design for tabletop interaction.

Theme B. Field: Deployment, user assistance, real-world application, etc.

A Field Study of Users’ Reaction to Microsoft Surface in the Commercial Context

Jennifer McCormick, Celine Aston-Smith

A series of field studies were conducted to observe and understand the general public’s reaction and response to the presence of Microsoft Surface within multiple commercial environments. The deployment sites observed included a bar/lounge in Las Vegas, and 4 different hotel lobbies New York, Seattle, Chicago, and Boston, as well and hotel lounges in New York, Chicago, and Boston. Qualitative data was collected and analyzed to determine several themes of use and reaction to the interactive surface computers. Observational data point to consistent user reactions to the Microsoft Surface platform across themes of initial attraction, patterns of use, and social use. The data collected contradicts previous observations into patterns of use and adoption of large multitouch technologies and possible reasons are discussed. The outcome of the study indicates a potential for wide use and adoption of the surface computing platform by the general public, as well as a successful commercial sales tool. Detailed opportunities areas for application and hardware development that leverage the uniquely social and beneficial qualities of interactive tabletops are discussed.

The MultiTouch Cell: Deploying multitouch screens through flexibility and modularity

Tommi Ilmonen

The MultiTouch Cell is a modular screen using different LCD sizes and it can be positioned in portrait or landscape mode. The Cells can be flexibly and easily composed into large multi-touch walls or table screens. The MultiTouch Cell sees multiple hands and not only points of contact, can be used simultaneously by any number of users, and works in all light conditions.

TouchGhosts: Guides for Improving Visibility of Multi-Touch Interaction

Davy Vanacken, Kris Luyten, Karin Coninx

Multi-touch interfaces are becoming increasingly fashionable in public spaces, but the majority of users are not familiar with multi-touch interaction. While multi-touch interfaces try to support intuitive interaction, techniques beyond the traditional move-rotate-scale are often inaccessible to the general public. Moreover, users typically interact with interfaces in public spaces over short time-spans, and thus have limited time to explore the interface. To counter the specific requirements on the accessibility of a multi-touch interface, we introduce *TouchGhosts*: visual guides embedded in the interface, demonstrating interaction techniques to the user. TouchGhosts are activated while operating the interface, providing guidance on the fly and within the context-of-use. Configurable strategies decide how a TouchGhost should be activated and which visualisation will be presented to the user.

Scientists' Discovery Room: Touch to Discover and Learn

Chia Shen, Michael Horn, Daniel Wigdor, Hao Jiang

The Scientists' Discovery Room (SDR) lab aims to create a cross-disciplinary, walk-up-and-share interaction space for educators, scientists, and students. SDR will combine coordinated visualization across multiple interactive surfaces including multi-touch tabletops and large data walls. To date these emerging display environments and surfaces have only been used for special purpose domains such as control rooms, kiosks, casual information browsing, photo sharing, and TV station broadcast presentations, with limited interaction and application capabilities. The key objective of our research is to leverage the perceptual, cognitive, and bimanual input advantages of these emerging displays, to develop human-computer interfaces and visualization techniques for engaged and involved exploration, discovery, critical thinking, and learning with many types of science data.

Multitouch is Dead, Long Live Multitouch

Johannes Schöning, Antonio Krüger, Patrick Olivier

Interest in multi-touch interaction with large and small displays surfaces has seen a recent explosion. We describe key moments in "multi-touch's" latest history and rank "multi-touch" in Gartner's five-phase hype cycle. We also (re)highlight the issues that designers have to take into account when designing multi-touch applications on multi-touch sensitive surfaces to address the ensuing period of "disillusionment". At this peak in the hype, many well-known concepts of multitouch and bimanual interaction were ignored and we describe these low points for interaction design. Bill Buxton's multi-touch webpage provides a list of these "traps'' of which people who are starting out with multitouch interaction should be aware. Based on Buxton's framework, we draw conclusions about how researchers should assess and be inspired to develop the next generation of multi-touch applications.

Theme C. User: Input, gestures, ergonomics, etc.

Assisting Gesture Interaction on Multi-Touch Screens

Writser Cleveringa, Maarten van Veen, Arnout de Vries, Arnoud de Jong, Tobias Isenberg

TNO is the national research organization in the Netherlands that applies scientific knowledge with the aim of strengthening the innovative power of industry and government. In this paper

we briefly introduce two projects from TNO that address collaboration on tabletop devices, after which we present our research on gesture previews. This project aims to increase the usability of gestural interfaces and to support collaboration on multi-touch screens and is conducted together with the University of Groningen.

Smart Pointing with Click Again

Thomas Herrmann, Tillmann Neben, Marc Turnwald

Smart Pointing is an interaction design for the selection of graphical items which meets the special requirement to support both a mouse-controlled desktop computer as well as touching on a large interactive screen, where item selection can be done with a finger or a pen.

Finger Contact Anthropometry for Touch Interface Design

Mohamed A Nainar, Nada Matic

Finger contact area changes with position and orientation of the targets. This affects the accuracy of the selection in touch interaction devices. In order to develop interface that take into account these variations, we need anthropometric data on finger contact area. This paper presents such data on index finger based touch interaction using an imaging setup. It is expected that this data can be used for imaging based touch devices to design interface objects that not only improve selection accuracy but also leverage on the information from contact area variability.

Know Thy Toucher

Dominik Schmidt

Most of current academic and commercial surface computing systems are capable of multitouch detection and hence allow simultaneous input from multiple users. Although there are so far only few applications in this area which rely on identifying the user, we believe that the association of touches to users will become an essential feature of surface computing as applications mature, new application areas emerge, and the enabling technology is readily available. As the capacitive technology used in present user identification enabled tabletops is limited with respect to the supported number of users and screen size, we outline a user identification enabled tabletop concept based on computer vision and biometric hand shape information, and introduce the prototype system we built to further investigate this concept. In a preliminary consideration, we derive concepts for identifying users by examining what new possibilities are enabled and by introducing different scopes of identification.

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