Designing User Interfaces for Multi-Touch and Surface-Gesture Device

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Abstract

The Design and Research communities have access to multi-touch and gestural interfaces which have been released on a mass market scale. This allows them to design and develop new, unique, and richer design patterns and approaches. These methods are no longer confined to research projects or innovation labs, but are now offered on a large scale to millions of consumers.

The aim of this SIG is to provide a forum for Designers, Researchers, and Usability Professionals to discuss this new and emerging technology trends for multi-touch and gesture interfaces, as well as discuss current design patterns within these interfaces. Our goal is to cross pollinate ideas and current solutions from practitioners and researchers across communities to help drive awareness of this new field for those interested in, just starting in, or currently involved in the design of these systems.

Keywords

Touch, Gesture, Natural User Interface, NUI, Multi-Touch, Direct Manipulation, touch screen, user interface

ACM Classification Keywords

Interactive systems (H.5.2) User interfaces (D.2.2)

General Terms

Design, Human Factors

Introduction

In recent years, multi-touch systems have become the focus of a great deal of research and commercial activity. There have been a number of research efforts investigating compelling applications of these technologies [6,12,13,14], in examining alternative sensing technologies [4,9,10], and in the design of interaction methods [1,2,5,7,11]. In addition, a number of projects have examined gestural interaction without the requirements of contact with a display [3,8,15].

More recently, the market has seen the proliferation of hardware devices capable of multi-touch and gestural input. With this increase of devices and interfaces, comes an unfortunate increase of non-standard design patterns and methods of user interaction. While multi-touch and gesture has spurred new excitement for designers, is proper attention being paid into how touch is developed and utilized in different interfaces across multiple configurations.

Simple patterns have begun to emerge across multiple devices for interactions, such as zooming with a 'finger spreading' gesture, and panning with a single finger sliding across the display. However, we have seen already that some of these can become non-standard when applied to different situations. As an example, swiping your finger to the left on a map may pan the map over to reveal content on the right, while doing so in a browser, such as the beta release of FireFox 3.1, would result in going back to the last visited page, which is spatially recognized as being to the left of the screen in coordination with a timeline. How should designers think about using patterns within their interface systems, and what patterns are appropriate within the context of use?

Multiple methods on how touch and gesture are incorporated into computing systems have also arisen. Some systems, such as the Apple iPhone, use touch as the sole input method. Others, such as Windows 7, allow for a triad of input methods: touch, stylus, and keyboard/mouse. The ideas around how multi-touch and gestures fits into an input ecosystem will be discussed as part of this session.

Along with considering the correct method of input for tasks, it's important for designers to take the context, use, and practicality of these systems into account. For example, a wall mounted display may not be good for tasks involving long interactions, as this may tire users.

Thus far there is no standard hardware on which these interfaces are being developed. Some devices are based on camera systems and others on capacitive technologies. This can lead to multiple design approaches based on the type of capabilities of the device. Apple's track pad uses multiple gestures including a four finger touch gesture, while the HP TouchSmart can recognize track only two points of contact, and larger devices such as Microsoft Surface and the SMART Table are able to simultaneously track over 50 contact points. This range of devices offers multiple design challenges.

The aim of this SIG is to provide a forum for Designers, Researchers, and Usability Professionals to discuss this new and emerging technology for multi-touch and gesture interfaces, as well as discuss current and future design patterns for software utilizing these devices. Our goal is to cross pollinate ideas, solutions, and theories, among practitioners and researchers across the community to those interested in, just starting in, or currently involved in the design of such systems.

Related Events

This will be the first SIG to discuss the issues associated with touch and gestural interfaces, and reflects the maturity of the field. There are three related events taking place in 2010. First, ACM Interactive Surfaces and Tabletop is an ongoing conference with a focus, in part, on touch and gestural interaction. Second, ACM UIST is an annual symposium which regularly accepts and includes work in this area. Last, at CHI 2010, Seow et al. are holding a workshop with a focus on 'natural user interfaces'.

The workshop has a similar, while more specific focus: this SIG is meant to include all multi-touch and gestural systems, while the workshop has a broader focus on NUI all-up.

Audience

A goal of this SIG is to gather people interested in the field of HCI for multi-touch and gestural systems, designers working to develop interaction standards across hardware form factors, as well as researchers interested in the maturation of interaction methods. We foresee the following types of participants:

- Practitioners who work in the design, construction, testing and certification of multi-touch and gestural systems. We welcome both practitioners coming from the engineering side of interactive systems as well as practitioners with a background in user interface testing.

- Academics working or interested in the state of the art and research activities in the field of multi-touch and gestural interfaces.

SIG Organization

The activity plan for this SIG is as follows:

- Introduction of the SIG goals and participants (10 minutes)

- Presentation by the organizers of issues in the various fields related to the topic of the SIG (5 minutes per topic) (total 20 minutes)

- Gathering from the audience (as well as presenting from the SIG organizers' experience) examples and case studies (10 minutes).

- Interactive discussion with participants to list the issues related to the design and development of multi-touch and gestural interaction methods. Also, interaction principles built atop these systems and interaction techniques. Those that seem more important will be selected, and comments on the solutions will be recorded (20 minutes).

- Interactive discussions on how to avoid always designing for the 'lowest common denominator'. A designer seeking to develop applications for a multi-touch or gestural systems is faced with a choice: develop once for the least capable platform and port to others, or develop many times to get full value from all platforms. Is there an alternative? (15 minutes).

- A discussion of possible standards for touch events, gesture events, system architecture, and gesture languages, and the various forums where these standards are being proposed (15 minutes).

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