Natural User Interfaces: The Prospect and Challenge of Touch and Gestural Computing

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Abstract
Natural User Interfaces show great promise to define new and potentially large niches of interactive computing. The promise of Natural Computing Interfaces (touch and gesture) stems from at least two sources -- the prospect of touch and gestural computing becoming as ubiquitous as currently dominant paradigms (e.g. GUI.) and technical breakthroughs. However, this new field of research and commercial development faces significant challenges. For example the challenge of developing a common terminology and framework while fostering innovation and creativity. The workshop will begin the process of addressing some of the challenges by (1) enumerating them, (2) listing potential ways to address them. As such our aim is to foster the evolution of NUI community of researchers and practitioners.

Keywords
Multitouch, surface computing, touch computing, surface, gesture, natural user interface, NUI

ACM Classification Keywords
H.5.2. Information interfaces and presentation

General Terms
Algorithms, Design, Human Factors

Introduction
There is little doubt that there has been a surge of interest in research on natural user interfaces (NUI) such as multitouch and gestural computing. That surge of research interest has been accompanied by excitement about the commercial possibilities of these interfaces. A community of researchers and commercial companies is forming to understand and develop this new generation of interfaces. To facilitate the growth of a "NUI" community, proposed workshop aims to map out the research and commercial challenges of NUI and begin the dialog toward addressing them. For example encouraging a common language to describe hardware capabilities, software implementation issues and to refer to user accessible interface elements is one such problem. A related problem is encouraging the spirit of innovation and discovery that characterize both the research and development community at present. The goal of the work is to enumerate these challenges and to explore possible solutions. As such the workshop builds on last year's workshop and SIG.

Related Work
Recent and prominent work in this area that provides a glimpse into the multifaceted nature of this topic was presented by researchers at a workshop in CHI 2009. Over 13 researchers and practitioners presented their work. The scope was quite broad ranging across heuristics for design, feedback, linking computing devices into the broader computing ecology, large scale public deployments, hardware techniques, and social acceptance. In addition to sharing their work the participants and organizers were able to develop a broad framework which encompassed this range. A follow-up SIG showed both broad interests in the area of touch computing. There is clearly excitement about this topic in the CHI community. But the lack of consensus on a number of fundamental issues, e.g. agreement on a common set of terms, could fragment the community and reduce its impact. At the same time, there were concerns that any form of "standardization" would stifle innovation. It was even proposed to "let the market" settle these issues.

Neither the workshop nor the SIG provided sufficient time to explore these emergent issues in any depth. However, there was broad consensus that continued dialog was needed and would be productive. It is important that the research community and the practitioner/commercial community collaborate on addressing issues like common terminology and some agreed on standards. Without these the field stands the risk of being fragmented and unproductive. The workshop combined with a follow-up SIG provides a basis to begin such a dialog. It's also, important that the community of researchers and practitioners meet on a regular basis in order to keep abreast of these developments.

Goals for the workshop
There are goals for the work shop: (a) enumerating the current challenges to forming coherent community (b) proposing directions to address those challenges.

Current challenges

The current challenges to the NUI community emerge from the concerns of the research and practitioner community. While they are divergent in some ways they are also related. For example the development of a common language to describe the underlying hardware systems and software layers would benefit both communities. Researchers would benefit from greater communication and practitioners could more easily understand and apply research results. . Such steps lay the ground work for future endeavors such a defining flexible standards for touch computing.

Proposed directions

The directions and futures will emerge from the workshop participants. The workshop will be organized and facilitated around reaching common ground within the time frame of the workshop. Common ground is achievable in even this short time frame by enumerating as many possibilities as possible and then focusing on those that where we share the greatest consensus. For example pursuing a neutral set of common terms is more likely to gain wide support and make some initial headway than attempting to develop standard prematurely. A good case can be made that any standards work depends on having shared terms.

Outcomes

During the workshop a poster will be produced to be presented during CHI. The desired workshop outcome will be an edited book on multitouch and surface computing.