The Role of Engineering Work in CHI

Philippe Palanque

University of Toulouse

Toulouse

palanque@irit.fr

Fabio Paternò

CNR-ISTI, HIIS Laboratory

Via Moruzzi 1

56124 Pisa Italy

fabio.paterno@isti.cnr.it

Jeffrey Nichols

IBM Research – Almaden

San Josè, CA, USA

jwnichols@us.ibm.com

Nuno Jardim Nunes

Madeira-ITI, University of Madeira

Campus da Penteada

9020-105 Funchal Portugal

njn@uma.pt

Brad A. Myers

Carnegie Mellon University,

5000 Forbes Avenue,

Pittsburgh, PA, USA

bam@cs.cmu.edu

Abstract

The Engineering community faces a number of issues around its role in the larger CHI community and its contribution to SIGCHI-sponsored conferences. This SIG aims to stimulate discussion and attention on the work of researchers interested in the engineering aspects of HCI. It is the forum to report progress on key issues, identify objectives for the near future, and develop plans to address them.

Keywords

Engineering HCI; User Interface Software and Technologies; Intelligent Interfaces

ACM Classification Keywords

H.5.2 [Information Interfaces and Presentation]: User Interfaces

General Terms

Human Factors, Design

Introduction

As the field of human-computer interaction (HCI) matures, engineering approaches become increasingly important. Engineering emphasizes the application of scientific knowledge and structured and rigorous design methods to predictably and reliably improve the consistency, usability, economy and safety of practical solutions.

In HCI, engineering approaches are broad, and can be divided into various areas:

- Structured and rigorous methods for interactive system design and evaluation that will enable more consistent and reliable development of new interactive technologies and systems;
- Languages and tools that embody scientific knowledge to improve interactive systems and technologies;
- Software and hardware technologies that enable effective interactive solutions to design problems;
- Studies of the performance and behavior of existing interactive systems and technologies;
- Studies of the development of interactive systems, leading to an understanding of the trade-offs between different system properties such as reliability, usability, safety, security, sustainability, etc.

These areas share the engineering values of rigor, appropriate quantification, and a concern for practical effectiveness and usefulness. The Engineering Community emphasizes applications of HCI solutions in systems in such a way as to improve their usability, or to reliably improve safety to life and property, or to improve the economics of operations. One aspect of more economical operations is the growing demand to produce software in a manner that is more methodical, and safe, with solutions that can have positive impact on many applications.

Interactive systems and technologies have always been in the forefront of important advances and achievements in computer science. From the mouse and the GUI to object-oriented and event-driven programming, model-driven design and ubiquitous computing, there is an intertwining development of engineering solutions that impact the real-world deployment of interactive systems for human-use. From an early focus on user interfaces used by a single user in a desktop environment we are currently facing complex deployments of networked enabled social services used by millions of users through different platforms and devices and impacting many different stakeholders.

Engineering Interactive Systems requires different methods, techniques and tools depending on the type of targeted systems and more precisely the socio-technical environment in which they will be deployed. For instance, engineering mass-market products such as games requires that engineers have strong network management skills and also knowledge about how the graphic display and input management can be optimized. Some of the world's most popular interactive systems and services are currently engineered as a result of commons-based peer production (sometimes known as "crowdsourcing"), which results in completely new challenges in terms of architecture, tool support, software management and evolution. For instance, these systems are usually self-governing and adaptive, and the requirements for these systems are asserted by the participants at run-time, not elicited from users at design-time. Moreover, as these systems become widespread and evolve in social networking contexts, they also pose important safety and security issues that need to be addressed.

In contrast, engineering safety critical interactive systems calls for methods and tools that provide a certain level of assurance that faults will not occur at execution time (or at least that they will not occur more than expected). The expectation level for faults may be defined by standards that, for instance, require that faults for a critical component will have a probability of occurrence lower that 10^{-9} per hour of operation. These examples show the wide variety of systems CHI engineering community can consider, and also the large set of competencies that are required to successfully engineer interactive computing systems.

WHO ARE WE?
The community of professionals who share an interest in advancing engineering in CHI is broad. We invite you to come to this SIG if you are:

- A researcher, who investigates how methods and tools that are based on the principles of science can produce usable interactive applications in a way that is more reliable and economical;
- A researcher, whose work includes investigations of advanced technology applications;
- A software engineer, developer, designer, architect, or manager, who is actively engaged in building interactive software;
- A software engineer who works on tools and systems for building interactive applications, including tools for software engineering processes.
- An educator, who prepares students for careers in the multidisciplinary field of applied HCI.

The methodical approach of engineering work lends itself well to interchanges between those who work on engineering applications and those who work in

engineering research or education. If you see your work as relevant to the Engineering Community, you are invited join us to share your experience and ideas, learn from others, and participate in this important topic.

The Plan for this SIG Meeting
This SIG is the meeting of the Engineering Community to identify key issues and begin developing positions for SIGCHI and conference leaders to address them. The issues are important to the health and success of our field. The agenda will be divided into two main sections.

HOW HAVE WE ARRIVED HERE?
In the first part of the SIG we will summarize the issues and objectives the Engineering Community chose to work on for 2013, and report our progress on them. They included:

- Recruiting highly qualified reviewers
- Defining criteria for a strong engineering contribution to papers
- Stimulate contributions and acceptance from the engineering community
- Holding a workshop in conjunction with the IFIP User Interface Engineering Working Group (http://www.se-hci.org/)
- Supporting the program selection team's process to tag engineering work for an engineering track in the CHI 2013 program

WHERE SHOULD WE GO NEXT?
While the community's progress is encouraging there is much still to do. In the second part of the SIG meeting we will conduct an open, structured forum to help

identify key issues for 2014, including but not limited to:

- What evaluation criteria are suitable for Engineering papers?
- Is it true that an Engineering contribution requires much more work than other types of contributions in order to be accepted at CHI? If so, why is this the case? Is there room for improvement of this situation?
- How much of the gap can Case Studies fill?
- Does CHI 2013 have more or less content than previous editions of CHI that was relevant to attendees with engineering interests?
- What should the relationship be between the CHI conference and specialized conferences such as EICS, UIST, IUI and VL/HCC?
- How can the Engineering Community be more effective in promoting technology transition from research to practice?
- How can the discipline of HCI work better with software engineering, the project context where our field will most be beneficial?
- Are there unmet educational needs for CHI professionals to succeed in multidisciplinary engineering projects?
- What can be done to continue engineering community interactions outside of and between CHI conferences?

THE DISCUSSION AT THE SIG
The SIG is organized by five people with long experience in the area of Engineering HCI: Philippe Palanque and Fabio Paternò are Engineering co-chair for CHI 2013, Brad Myers is a well-known member of the CHI engineering community, Jeffrey Nichols is an

active member of the UIST community and is Program Co-Chair of IUI 2013, Nuno Nunes has been active in the EICS and IUI communities. At the beginning of the SIG each of them will present in five minutes their views on the engineering community and how to strengthen its role, addressing the issues described above. Then, we will open the discussion with all the SIG participants. We will stimulate them in reporting their experiences related to how engineering HCI work is perceived at CHI, and more generally in the HCI community, and what can be done to improve such perception. We will also consider splitting into small groups focusing on specific, selected sub-topics, depending on attendance and interests.