Large-scale Interaction Deployment: Approaches and Challenges

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ABSTRACT

The increasing acceptance and innovation in Natural User Interfaces (NUIs) promise a widespread adoption of interactive systems following this paradigm. Although dozens of novel interaction techniques are being proposed every year, the currently applied approaches for designing and implementing NUI-based systems are greatly challenged. This workshop aims at outlining and discussing some of those emerging challenges based on four general research perspectives, namely large-scale and dynamic runtime deployment of interaction techniques; adequate long-term dissemination of interaction techniques; in-situ adaptation of interaction techniques; and dynamic interaction ensembles.

Author Keywords

Ambient Assisted Living; Ambient Interactions; Natural User Interfaces; Kinetic Interactions; Dynamic Interaction Deployment; Sharing Interactions; Interaction Dissemination; Gestures

ACM Classification Keywords

H.5.2 Information Interfaces and Presentation (e.g. HCI): User Interfaces - ergonomics, interaction styles, input devices and strategies.; H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous

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WORKSHOP TOPIC

Advances in Human Computer Interaction continue to enrich NUI research. An unprecedented interest in implying full potential of human body's sensory and motor systems for interactivity is manifested by new market initiatives for motion gestures, brain interfaces, touch gestures, etc.

Whilst the NUI paradigm provides rich interaction possibilities and fertile ground for innovation, its increasing popularity imposes new critical challenges for large scale adoption of interaction techniques in real-world pervasive and ubiquitous computing ecosystems (named shortly as ambient spaces). Recent advancement in interactivity in ambient spaces clearly demonstrate the need for (1) dynamic runtime deployment of interaction techniques, (2) adequate dissemination strategies of interaction techniques; (3) in-situ adaptation of interaction techniques; (4) adequate learning methods and intelligibility in highly dynamic and adaptive interactive systems; and (5) interaction ensembles (where multiple interactions are combined together at runtime). The aforementioned needs and challenges are mainly caused by increased user mobility, increased heterogeneity of available interaction resources, and increased diversity of physical abilities (i.e., diversity of user population).

In this workshop, we are mainly interested in exposing those challenges and potential approaches for tackling them. The workshop aims to stimulate a discussion on the aforementioned core research questions by inviting position papers on any of the the following topics (other related topics are welcomed as well):

- Architectural concepts for dynamic runtime deployment of interaction techniques
- Formal languages, notations, and concepts for describing interactions for NUIs
- Designing and implementing highly adaptive interaction techniques

- Studies on users' diversity in NUI, including age, physical limitations, etc.
- Studies on user challenges in highly adaptive interactive environments
- Analysis of limitations of existing NUI middleware frameworks and systems
- Analysis and evaluation of HCI community practices and norms for disseminating interaction techniques
- Discussion on open challenges for designing and implementing middleware frameworks and systems for NUI
- Adjustable, customizable, and modular interactive systems
- Novice and end user interaction programming

WORKSHOP GOALS

The workshop aims at discussing emerging issues and challenges in designing and implementing deployable natural user interfaces, interactions, and systems on a large scale. We aim to unveil and analyze the community applied practices, current and future trends, potential approaches and guidelines for designing truly deployable and adaptive interactive systems.

WORKSHOP FORMAT

Structure

We propose a full-day workshop with a duration of approximately 8 hours. The workshop will be split into two main sessions: (a) Morning session will cover an invited keynote speech, which will be followed by presentations and discussion of accepted contributions. The session will contain one 20 minutes coffee break and will last until the launch break. (b) Afternoon session, called innovative trend analysis, will utilize Visual Roadmapping methods to discuss and analyze the discussed approaches and trends based on the workshop's core research questions. The session will last 3 hours and will contain one 15 minutes coffee break. Finally, the main conclusions of the workshop will be summarized in a 30 minutes conclusion and outlook session.

Submissions reviews and handling

Submissions should be between 4 and 6 pages in length and should be sent to the workshop's email address. Papers should be formatted according to the standard ACM SIGCHI template. All papers should contain full author names and affiliations. The papers will be juried by the organizers and selected external reviewers. Submissions will be chosen according to relevance, quality, and likelihood that they will stimulate and contribute to the discussion.

At least one author of each accepted paper has to register for the workshop by the early-bird registration deadline. Accepted papers will be made publicly available on the workshop website along with the material generated during the workshop. Moreover, we are planning to publish the workshop proceedings as part of an online open access Workshop Proceedings to enhance and maintain a high standard of accessibility to the workshop proceedings. This is especially important if the workshop proceedings are not published by the conference itself.

ORGANIZERS

- **Bashar Altakrouri**: Bashar Altakrouri is a senior researcher at the Ambient Computing Group at the Institute of Telematics at the University of Luebeck. His research interests are mainly focused on runtime deployment of natural interaction techniques, interactions with smart objects in the IoT (Interaction of Things), and middleware design for Kinetic Interactions. Moreover, he is interested in various other topics such as prototyping future ambient scenarios in Ambient Assisted Living and mobile computing applications.
- **Andreas Schrader**: Andreas Schrader is professor for Ambient Computing at the Institute of Telematics at the University of Luebeck and head of the Ambient Computing Group. His current research interest is currently focused at the development of concepts for Ambient Assisted Living as a means for serving an ageing society. His most recent research includes the development of frameworks for context-aware development on mobile devices, dynamic composition of interaction channels in spontaneous device ensembles and the creation of solutions for ambient health monitoring.
- **Simo Hosio**: Simo Hosio is a postdoctoral researcher at University of Oulu, Finland. He focuses on interactive deployments in the public space around us. Hosio's previous work includes research themes such as integrating social networking services into urban areas, distributed user interfaces, civic engagement in smart cities, and multipurpose public displays.
- **Martin Christof Kindsmüller**: Martin Christof Kindsmüller is professor for Human Computer Interactions at the Brandenburg University of Applied Sciences. His main interest lies in Human Computer Interaction, Mobile Computing, Engineering Psychology, Cognitive Psychology, and Cognitive Ergonomics.
- **Beat Signer**: Beat Signer is professor of Computer Science at the Vrije Universiteit Brussel (VUB) in Belgium, where he is a co-director of the Web & Information Systems Engineering laboratory (WISE). His work is investigating cross-media information spaces and architectures (CISA), interactive paper and augmented reality solutions as well as multimodal and multi-touch interaction frameworks.

PROGRAM COMMITTEE

In addition to the organizers, the following researchers are in the workshop's program committee: Ulf Blanke (ETH Zürich, Switzerland), Daniel Burmeister (University of Luebeck, German), Mirko Fetter (University of Bamberg, Germany), Mehmet Aydın Baytaş (Koç University, Turkey), and Jo Vermeulen (University of Birmingham, UK).

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[1]The German Federal Ministry of Education and Research (BMBF)
[2]https://www.itm.uni-luebeck.de/research/projects/ensembles/