Workshop on Embodied Interaction: Theory and Practice in HCI

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Abstract

For over ten years researchers in human-computer interaction (HCI) have explored an embodied perspective that seeks to describe and explain the fundamental role played by the physical body in how we experience, interact with and understand computation in the world we live in. Recently, such a perspective has been used to discuss human actions and interactions with a range of computational applications including tangibles, mobiles, wearables, tabletops and interactive environments. This workshop aims to enable participants to critically explore the different approaches to incorporating an embodied perspective in HCI research, and to develop a shared set of understandings and identification of differences, similarities and synergies between our research approaches.

Keywords

Embodied interaction, embodiment, tangible computing, social computing, physicality.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g. HCI): Miscellaneous.

General Terms

Human Factors, Theory.

Introduction

In 2011 it will be 10 years since the publication of Where the Action Is, where Paul Dourish set out a theoretical foundation for HCI grounded in phenomenological theories of embodiment. His approach, termed embodied interaction, rejects the cognitivist models of the previous generation of HCI theory, embracing work in phenomenology and emphasizing practical social and physical action. The CHI community has shown an increasing interest and focus on embodiment as an alternative perspective on human computer interaction. This is reflected in a variety of design and research projects concerned specifically with bodily action, human experiences, and physicality, in the context of interaction with and through a world comprised of computationally mediated artifacts and environments [1-5, 9, 12, 14-16]. This workshop capitalizes on this growing body of work by bringing together a community of researchers who are currently creating interactive technologies to investigate and design for embodied human-computer interaction.

The workshop aims to address a series of challenges, which we see as essential to overcome in order for a discourse grounded on embodiment to become fully integrated into the HCI community. These challenges include the following:

What do we mean when we say "embodiment"?
The first goal of this workshop is to work towards a common understanding of the meanings of "embodiment" in the context of HCI. From a perspective of cognitive science, Rohrer describes a dozen different uses of the term embodiment in the literature [18]. The concept of embodiment also has several usages in the HCI literature. Ethnomethodological studies of activity

and social action have emphasized the embodied nature of meaning making (e.g. [10, 11]). Mechanisms underlying intuitive meaning making in various settings, such as embodied metaphors, have been applied in interaction models (e.g. [1-4]). The concept of embodiment is also used in tangible user interfaces to describe how physical objects may be used simultaneously as input and output for computational processes (e.g. [9]) and in wearables research focused on how we experience our bodies in interaction (e.g. [19]). The term has also been used loosely to classify the extent that the user perceives computation is embodied within a particular physical form [8]. In all cases, the ideas of embodiment provide a fundamentally different perspective than a Cartesian or information processing perspective on interaction. What is needed is a shared understanding that includes how each can be used as a theoretical foundation that informs research and design practices.

Moving beyond description
Understanding an embodied perspective requires moving beyond descriptions of concepts. It requires explanations that are developed based on mechanisms that underlay an embodied approach to cognition. The mechanisms of embodiment reach from Von Uexkull's ticks to complex social systems [6]. In humans, these mechanisms operate a variety of scales from the neurological and the individual through to distributed social groups, each in dynamic interplay with the surrounding environment.

Important interpersonal and intrapersonal explanatory theories that have emerged to date in HCI include: affordances [17]; dynamic couplings [7]; representational forms as resources [16]; embodied metaphors [1-4] and conceptual blends [13]. In this

workshop we will identify and explore some key *explanatory concepts* from theories of embodied cognition through sharing of research and design in embodied HCI. A common language including both descriptive and explanatory theories is essential to create shared understandings across subfields of HCI and design.

Moving beyond interpretation
An embodied view on interaction provides us with an interpretive perspective that can be used to describe and explain the actions and interactions of users with a range of applications including mobile, tangible, wearable, tabletop and interactive environments, as well as more conventional laptop or PC based applications. However, to date, there has been more work that deconstructs existing systems than empirical research that generates guidelines that can inform the design of such systems [1]. While Dourish [7] provided some high level design principles based on embodied interaction, these principles require further exploration and empirical validation. In this workshop we will share and discuss different research prototypes that have been built to explore and generate guidelines for various aspects of embodied HCI.

Goals
The primary goals for the workshop are:

- To bring together a *community* of researchers and designers who are creating interactive technologies based on embodied interaction;

- To present and discuss design and research projects that have a *theoretical* foundation based on different perspectives on embodiment;

- To share and discuss concepts and prototypes that have been designed to explore embodied interaction in *empirical* work;

- To identify fundamental differences, similarities and synergies between different *design and research approaches* that have been employed to study embodied interaction in HCI.

Structure
Before the workshop potential participants submit one of: 4 page position paper, 2 page position paper + poster, or proposal for a demonstration, related to their own experiences with workshop issues, themes and goals. Authors are to include a working definition of how the term "embodiment" is used as a foundation for their own work. Participants are expected to read all other accepted submissions prior to the workshop.

At the workshop: The one day workshop is split into five sections. In the first section of the morning we will have introductions and a keynote talk by Prof. David Kirsh (UCSD, USA). After a break, the second section of the workshop will be run as a mini-conference with CHI Madness style presentations from all participants. Workshop participants will have a very short opportunity to present a highlight of their paper or poster focusing on how a theoretical perspective of embodiment is reflected in their own concrete research practice. After the lunch break we will have two sections, each with small group discussions focusing on break out themes, followed by future research agendas. During the final section, we will have interactivity demonstrations and videos of prototypes that enable different kinds of embodied interaction. After the workshop: Workshop participants will be invited to submit longer versions of their work to a special issue of *ACM Transactions on*

Computer-Human Interaction (ToCHI) which will be edited by Drs. Antle, Marshall and van den Hoven and will include a guest editorial by Dr. Paul Dourish.

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