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Whole Body Interaction

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Abstract

In this workshop we explore the notation of whole body interaction. We bring together different disciplines to create a new research direction for study of this emerging form of interaction.

Keywords

Physicality, whole body interaction, multi-modal, motion capture

ACM Classification Keywords

Human Factors; Artificial, augmented, and virtual realities; Interaction Styles

Introduction

As Bill Buxton [1] pointed out some years ago, archaeologists digging up 21st century computers would be puzzled by how humans made use of this limited technology. 21st Century humans would seem to be equipped with two hands, no legs, one eye, limited hearing and no sense of touch or smell. His argument was for more multi-limbed and multi-modal interaction to make the best use of human abilities. Moving forward we have the technology today to make this happen, albeit in a limited way. However there is scope for further exploitation of human physical potential in

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interaction and this potential comes from developments in diverse fields.

Firstly we have developments in motion capture technology. High-end motion capture equipment is still the preserve of research labs and animation companies but we are beginning to see the development of markerless motion capture that can be used in day-light in real-world settings [2].

Secondly, artists are exploiting new sensor technologies to explore new ways of human-computer interaction that could have lessons for everyday interaction [3][4].

Thirdly, there have been more projects in bio-cybernetics [5] which attempt to capture patterns of physiological behaviour and derive make connections between the user's physiological state and their context of interaction.

And, fourthly, we are becoming more sophisticated in our thinking of interaction frameworks for richer interaction styles [6][7].

In addition, movement scientists are developing better understandings of the range and limitations of human movement. However, until now, that knowledge has not been applied to movement intended for digital interaction and control.

Perspective

We are using the term *Whole Body Interaction* to return to a user-centred approach. So we are avoiding terms, such as, mobile interaction or ubiquitous interaction that focus on where the technology is as opposed to where the person is and what they are physically doing

in a particular space. We also wish to go beyond just physical considerations to considerations of the *integration* of physiological and cognitive states and factors as they integrate with physical movement and position. For this to happen we need movement scientists, cognitive scientists, interaction developers and potential end users to collaborate to develop a common framework of understanding.

Our workshop is about posing questions about the capabilities for whole body interaction over the next 5 to 10 years, and seeing how the developing threads, above, come together to support rich whole body interaction.

The kinds of issues that we will explore include

- What would be the criteria for a useful and successful framework for addressing the research questions of Whole Body Interaction?
- What are some of the basic lessons that can be learned from previous attempts to framework the topic?
- Can we come up with a set of concepts and a terminology to support interdisciplinary design, analysis and evaluation?
- The mappings of the bodies' movement to the system's interpretation of that movement; were movements required physically possible. Does the system only expect normal movements – what of abnormal, exaggerated or other out of range movements?

- What is the users' understanding and comprehension of the mappings and metaphor of their movement to system reaction? Could the user and system mutually adapt or would users be forced to adapt their body movements?
- What is the scope of whole body interaction and body as a data source for
 - Physical Presence/Cartesian Space – posture, movement, location, orientation
 - Physiological – Heart rate, breathe volume and rate, skin resistance as both data and control
 - Human senses – taste, smell, kinesthetic, vision, speech/sound, balance and the possibilities for synaesthesia between two or more senses.

The workshop will explore these and related topics to come to a common understanding and proposals for future research directions.

Citations

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