Journal of Universal Computer Science, vol. 14, no. 16 (2008), 2597-2598
submitted: 9/7/07, accepted: 15/10/07, appeared: 28/8/08 © J.UCS

Human-Computer Interaction Research and Development Challenges

J.UCS Special Issue

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In March 2007 the IFIP Technical Committee 13 on Human-Computer Interaction organized a workshop held in Salamanca (Spain) to discuss a number of research and development challenges in the field of Human-Computer Interaction. Several papers were presented and discussed, providing an overview of some fields of activity. The aim of this workshop was not, of course, to provide a complete and exhaustive review of all possible future HCI research and development. On the contrary, experts were invited to look forward in their specific knowledge area starting from their past experience and their current activity. This special issue is composed of a selection of some of the papers presented there, which have been enhanced with the results of discussions and peer-reviewed in order to provide a good insight into the results of the workshop. Let us introduce each of them.

In some geographical areas, HCI can acquire special characteristics due to factors such as language or culture. The paper, entitled "The State of HCI in Ibero-American Countries", by Toni Granollers, César A. Collazos and María Paula González, surveys the state of the art in Human-Computer Interaction in Ibero-American countries (namely Latin-American Countries plus Portugal and Spain), characterized by the predominant use of the Spanish and Portuguese languages. This study includes industry, research and teaching activities, and the existing organizations. They claim the need to improve the visibility of this specific HCI community, enhancing the self-awareness of their members as well as their individual motivation and future interchanges.

In his paper "Cognitive Ergonomics in Interface Design – Discussion of a Moving Science", Gerrit C. van der Veer analyzes the Cognitive Ergonomics approach to the systematic design of user interfaces. This paper provides a complete insight of the past, present and future of Cognitive Ergonomics, mentioning and illustrating the concept of activity-centred design and a number of techniques that support this paradigm. To complete the picture, José J. Cañas was invited to debate the role of "Cognitive Ergonomics in Interface Development Evaluation". He introduces the "Mutual Dependency Principle", which determines the dependence on the optimal interface functions and the limitations on the interface introduced by changes in

human cognitive functions. He presents several projects where the Mutual Dependency Principle has been used.

The influence of demographic, social, cultural, and contextual factors on the design is noticeably instanced by Judy van Biljon and Paula Kotzé in their paper "Cultural Factors in a Mobile Phone Adoption and Usage Model", showing the influence of these issues on the understanding of mobile phone usage. Drawing on concepts and models from sociology, computer-supported cooperative work, human-computer interaction and marketing, they propose a model that includes culture as one of the key factors that influence the acceptance of mobile devices.

Mobile and ubiquitous interaction have a broad range of possible applications to be explored. Maximiliano Paredes, Ana I. Molina, Miguel A. Redondo and Manuel Ortega discuss the collaborative design of ubiquitous applications. In their paper entitled "Designing Collaborative User Interfaces for Ubiquitous Applications Using CIAM: The AULA Case Study", they discuss the use of a specific methodology called Collaborative Interactive Applications Methodology. The results show the importance of including all aspects related to context modelling and the synchronization of contents.

The promulgation of accessibility laws and the proposal of standards and guidelines have made Web accessibility very topical subject. In "Supporting the Development of Accessible Web Applications" Myriam Arrue, Markel Vigo and Julio Abascal survey the best known methodologies for web applications development as well as the existing supporting tools and techniques. They argue that the lack of a holistic development framework to be used throughout the whole development process must be ameliorated by comprehensive frameworks that support the different phases.

In the paper entitled "Intelligent Decision Support in Medicine: back to Bayes", Gitte Lindgaard, Catherine Pyper, Monique Frize, Robin Walker, Craig Boutilier, Bowen Hui, Sheila Narasimhan, Janette Folkens, Bill Winogron, Peter Egan and Colin Jones tackle diagnostic decision support in clinical systems by means of Bayesian models. They demonstrate that that Bayes' Theorem can be successfully applied to support expert decisions in dynamically changing situations requiring the progressive adaptation of the system. They support their arguments with applications for diagnostic support for human decision makers and e-health mental intervention systems.

To continue with Artificial Intelligence based methods used for decision making or for recommendation in interactive systems: Ana-Belén Gil and Francisco José García-Peñalvo discuss the application of these techniques to e-Learning in their paper "Learner Course Recommendation in e-Learning Based on Swarm Intelligence". Starting from an analysis of the recommendation process in distributed information systems, on the grounds of self-organization and cooperative emergence in complex systems, they propose recommendation by emergence through a Multi-Agent System architecture.

We hope that these reflections are useful for people interested in gaining an insight into some of the hottest topics in the current Human computer Interaction field.

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