Integration of Human Factors in Networked Computing

Editorial

With the advancement of the World Wide Web, networked computing has become an essential determinant on how people access and exchange information. The integration of human factors in networked computing has the intrinsic goal of improving the effectiveness of computer-to-human interaction and, ultimately, of human-to-human communication.

Whilst the Human Computer Interaction community looks predominantly at the application layer and the telecommunications community at the lower end of the ISO OSI stack, little work has been published in bridging the gap between these two communities. Indeed, the human element is often neglected in Quality of Service (QoS) negotiation protocols. Not only does this have a negative and undesirable impact on the user's experience of networked computing, it also discards the potential for more economical resource allocation strategies. With the proliferation of ubiquitous multimedia in predominantly bandwidth-constrained environments, more research is needed towards integrating and mapping perceptual/human factors considerations across the protocol stack and building truly end-to-end communication solutions.

This Special Issue addresses the need to disseminate research dealing with the integration of human factors in networked computing. Eight papers are included in this Special Issue covering three main areas. The first deals with highlighting the importance of taking human factors into account in the design of networked information systems. Human factors covered in the papers of the Special Issue include: cognitive styles, thinking styles as well as affective computing. Accordingly, Ghinea and Chen present a study identifying the qualitative preferences of imagers and verbalizers in distributed multimedia systems, when the underlying QoS varies. Subjective quality was measured using the Quality of Perception (QoP) metric, the only such measure taking into account multimedia's infotainment characteristic. QoS parameters that were considered in their study are presentation frame rate and colour depth, and results show that different cognitive styles display, in certain conditions, different qualitative preferences with respect to these two parameters. User thinking styles are then the focus of Kao et al's paper. Specifically, they investigate how thinking styles impact upon a user's web search strategies. Presented findings suggest that high global style and, respectively, high local style users choose different ways to complete search tasks. Sarrafzadeh et al.'s paper presents research into the integration of emotion into e-learning systems. Their work represents an interesting foray in the world of affective computing, and deals with how efficient e-learning can be achieved by incorporating emotion in *Easy with Eve*, an affective tutoring system for primary school mathematics.

The second theme of the Special Issue addresses entertainment-related networked applications. Ryu and Wong report on a study which investigated the feasibility of a TV-based human-to-human interaction environment, in which audiences could use applications akin to Internet chat and SMS embedded in a TV environment. Results show that such applications have promise and bode well for the future. Game-based networked applications are then the subject of Nam and Shu's paper. Specifically they conducted a study which evaluated the impact on user performance, perception and behaviour, when integrating sensorial modalities in collaborative virtual environments (CVEs). Results highlighted that there is a need to provide multiple sensory information in CVEs in order for the user experience to be enhanced. Another paper addressing the issue of networked game playing is that of Matrai et al. They focus on users with special needs and investigated whether these have specific search routes and navigation methods, with interesting results having a potential impact on the design and positioning of graphical user interface elements in networked games.

The above mentioned papers demonstrate that different types of users display specific preferences when interacting with networked computing applications. There is therefore the need to consider personalisation in such systems, and this represents the last theme of the Special Issue. Germanakos et al introduce a comprehensive user profiling model, incorporating user perceptual preferences, and use this model to filter Web-based raw content. Last but not least, Muntean and Muntean incorporate a Learner Quality of Experience (QoE) Model into AHA!, a well-known personalized education system. A comparison was conducted involving the original AHA and QoEAHA, with results showing that incorporating QoE is significantly beneficial to student learning.

In concluding, we hope that this Special Issue has gone someway towards helping designers build true end-to-end communication architectures, in which integrated adaptation, according to user perceptual needs, cognitive strategies, context, as well as networking -specific requirements, can take place. Only by so doing, will networked computing be able to truly incorporate user needs.

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