



## Editorial

Recent work on Intelligent Agents has initiated a strong paradigm change in Human-Computer Interaction: “direct manipulation” was challenged by “delegation”. This paradigm change has given rise to several metaphors for human/computer interaction, in particular the metaphors of a “personal assistant”, an “intelligent companion”, a “receptionist”, etc. To perform tasks on behalf of the user, an agent has to be familiar with his or her habits and preferences and adapt its behavior accordingly.

Building embodied life-like characters animated with a set of rich behaviors is another research area that has grown significantly in the last few years. The impact of these characters is strengthened by the fact that people tend to anthropomorphize computers, as well as by the richer communication styles that such characters can convey.

The agent metaphor poses a major challenge to research on user modeling since it drastically changes the way humans perceive and interact with computers. The current issue provides a collection of work in which user modeling is used as a means of improving Human-Agent interaction.

Mukherjee and colleagues propose a novel adaptation of agent-based voting theory to user modeling to derive robust recommendations. The authors argue that such an approach offers great promises when modeling conflicting preferences of a single user. The work has been implemented and evaluated within a movie recommender system. In this system, an interactive agent learns a user model by analysing feedback about its recommended movies from the user.

Eliassi-Rad and Shavlik present an approach to the creation of software agents which are able to retrieve and extract information from the web. The authors argue for a hybrid solution that combines a user’s ability to provide direct instructions with a system’s ability to accept and automatically create training examples. Instructions which the user provides in a specific language are compiled into neural networks, which are then modified by user-provided or system-provided examples.

While the first two papers focus on the efficiency of software agents, the paper by Cassell and Bickmore as well as the contribution by Thom aim at the realization of interface agents that are believable. In the context of their work, believability refers to the extent to which an agent makes the user believe that he or she is interacting with a sentient being that has its own desires, beliefs and personality, rather than a computer system. The novel contribution of these papers is the fact that they augment current work on user modeling by a social dimension.

The paper by Cassell and Bickmore examines how to model the social relationship between a user and an embodied conversational agent, and how to influence this relationship by means of the agent’s dialogue behaviors. The authors present a framework of social interaction which has been employed to implement a real estate agent that

communicates with the user by means of gestures, facial movements and speech. An empirical evaluation of the system revealed that users with different personalities indeed respond differently to social language.

The interpersonal relationship between a user and a computer-based agent is also an important aspect of Thom's work. Her article describes a personalized music companion that is able to customize its improvisations to a user's musical style and personality. Thom argues that a believable music companion needs to convey the impression that it listens to the user's music and immediately responds to it. Due to the nature of the domain, it is hard to specify concrete adaptation rules. Guided models for engineering behaviors seem less appropriate. Thom addresses this problem by presenting an unsupervised machine learning approach. Although the current music companion cannot yet interact with a performer live, simulated solo exchanges between the agent and transcribed solos of jazz musicians have provided encouraging results.

Finally, the paper by Vassileva and colleagues represents an interesting shift from centralized to distributed agent-based user modelling. While traditional approaches rely on a single user model, Vassileva and colleagues present a framework that exploits a large number of distributed agents to maintain information from heterogeneous sources about a group of users. The framework has been employed within the I-Help system, a collaborative environment for peer help.

The current collection of papers has been carefully selected from more than 20 papers that have been submitted for this Special Issue. We would like to thank the reviewers for the time and effort they put into the reviewing process. Special thanks goes to Alfred Kobsa for his patience and support.

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Elisabeth André and Ana Paiva

### **Biographies**

**Elisabeth André** is a Professor of Computer Science at the University of Augsburg, Germany, where she is building up a new lab for Multimedia Concepts and its Applications. Prior to that, she worked as a principal researcher at DFKI GmbH. She has been leading various academic and industrial projects on intelligent user interfaces, including the WIP system which was honoured by a European IT Prize in 1995. Her research interests include intelligent multimedia interfaces, hypermedia authoring, conversational embodied agents and the integration of vision and natural language. She is Chair of the ACL Special Interest Group on Multimedia Language Processing (SIGMEDIA). Furthermore, she is on the editorial boards of Artificial Intelligence Communications (AICOM), Cognitive Processing (International Quarterly of Cognitive Science), Universal Access to the Information Society (UAIS), and Computational Linguistics. Elisabeth André is also the Area Editor for Intelligent User Interfaces of the Electronic Transactions of Artificial Intelligence (ETAI).

**Ana Paiva** is a research group leader at INESC-ID and a Professor at Instituto Superior Técnico, Technical University of Lisbon. She works in the areas of Intelligent Agents, User Modelling and Artificial Intelligence applied to Education. After completing her Ph.D. at the University of Lancaster, she has worked at GMD-Fraunhofer, Germany, and in France (CNRS-COAST team at the ENS of Lyon). In 1996 she returned to Portugal where she created a group on intelligent agents and synthetic characters. Her research is focused on the affective elements in the interactions between users and computers. She served as a member of numerous international conferences and workshops, and (co)authored over 50 publications. She co-ordinated the participation of INESC within several European projects, such as the IDEALS (funded under the Telematics program), NIMIS (an I3-ESE project), DiViLab and Safira (IST- 5th Framework).