



ELSEVIER

Information Processing and Management 40 (2004) 379–381

**INFORMATION
PROCESSING
&
MANAGEMENT**

www.elsevier.com/locate/infoproman

Book review

Socially Intelligent Agents: Creating Relationships with Computers and Robots. By Kerstin Dautenhahn (Ed.), Kluwer Academic Publishers, 2002, \$39 ISBN 1-4020-7057-8

The field of socially intelligent agents (SIA) is a fast growing and increasingly important area that comprises highly active research activities and strongly interdisciplinary approaches. It is characterized by agent systems that show human style social intelligence. SIA systems are different from multi-agent systems, which are often only loosely related to human social intelligence or use very different models from the animal world.

This book is intended to be the first definitive collection of current work in the rapidly growing field of SIA, providing useful and timely references for computer scientists, roboticists, web programmers and designers, computer users, cognitive scientists and other researchers who are interested in studying interactions between humans and computers.

This book comprising 32 chapters is divided into two parts. The first part addresses the theory, concepts and technology of SIA. The second part addresses current and potential applications of SIA.

The first part of the book has 12 chapters covering three major themes, namely relationships between agents and humans, agents and emotions/personality, and communities of social agents. The authors explored issues such as the relationship between a computer agent and a human user, how to design and implement agents that engage in interacting with users, how to manage such agents. The authors did not pay their attention to investigate automatic or semi-automatic agents technology, but rather emphasized on understanding a system in terms of human intentionality, emotion and cognition. And they proposed a multi-facetted view of how users employ an intentional stance in understanding SIA on the basis of folk-theory that inspires view this field from the perspective of anthropology, ethnology, social psychology, culture and communication for user-centered SIA research. In some sense, SIA research adopts a kind of black-box design of meaningful, consistent and coherent social intelligence to the users. The authors of this book suggested that emotion is the key in human social activity. Several models and applications mentioned that agents use knowledge-based approach to recognize and identify a user's emotion focusing on traits "anxiety", "aggressiveness", and "obsessiveness". Therefore, it can be said that it is a challenge to mimic the reasoning process and appropriate response of human beings in a real-time environment for the researchers in this area. The author advocated the use of a 'minimal' set of expressive features that allow humans to recognize and analyze meaningful basic expressions. But the readers might doubt on the basic features whether this approach grasps all emotion elicitation. The authors enumerated a couple of examples how to build an agent that recognizes emotions in speech, which make the application easier to understand. As a result, the readers formulated a concrete profile in their mind about the infrastructure. Since this research stays in its

initial phase, the authors did report software such as machine learning software used to create reliable recognizers. However, they failed to recommend the promising algorithms to solve particular real-world problems. The authors analyzed the social behavior of a set of interacting agents in a 3D spatial environment. They suggested that agents and humans act voluntarily and automatically, meanwhile they behavior under constraint over each other by mutual perception. The innovative aspect of this book is that they suggest put the human into the developmental loop of the agent so that humans are not merely as designers. Agents need to construct themselves as humans using social reflection via language use. The author articulated a model of the construction of a self by agent in interaction with users. In this way agents would play roles as humans. The authors encouraged designing social interface agents using nonverbal social cues in social relationships that not only add value to human–human interaction, but also to the potentially useful applications for everyone’s work in this area. Also the authors described several user interface systems such as ABAIS in detail.

The second part of the book consists of 20 chapters covering the themes of interactive therapeutic agent systems, socially intelligent robots and interactive education and training, social agents in games and entertainment, and social agents in e-commerce. Social robots are designed to offer practical applications for social agent technology. In addition, they also constitute powerful tools to investigate cognitive mechanisms underlying social intelligence. The authors described several robotic platforms that embed some of the cognitive mechanisms required to develop social intelligence and achieve socially competent interactions with humans. Cognitive research on SIA has achieved a lot recently and will continue to serve as one of the key factors affecting future social agent research. However, the authors did not include advanced studies on interactions among socially intelligent robots themselves, which involve higher level of psychological activities in humans being placed in social context. Compared with traditional training methods such as field studies, virtual training environments can provide very cost-efficient training scenarios that can be experimentally manipulated and closely monitor a human’s learning process. Similarly, SIA in children’s (or adult’s) education can provide enjoyable and even entertaining learning environments, where recipients learn constructively and cooperatively. The authors described ‘socially situated planning’ for deliberate planning agents that reside in virtual training environments, and several applications of SIA in the context of computer-based learning environments for children. Obviously, the range of potential application areas is broad, and the most promising is scenarios that would otherwise (in real life) be highly dangerous, cost-intensive, or demanding on equipment. This book should address more such areas to motivate or guide researchers to develop future applications on this topic. The authors also discussed important mainstream applications of the technology of SIA, in educational games, in interactive drama, and in interactive art. Most people, even those with little background knowledge of SIA, can easily understand those applications. The authors did well in adding this section and enlarged the scope of readers a lot. It is not surprising to find a section of this book dealing with commerce, since the exchange of value is one of the principle social mechanisms that humans use. The confluence of using societies of agents to model the complexities of social exchange and the challenge to perform that exchange reinforces the importance of social agents with respect to future commerce. It is really wise for this book to select e-commerce as one typical application of SIA. However, as Internet spreads widely, global e-commerce is becoming an open market for emerging applications of social agents. This book should have considered applications of SIA in a much wider context of e-commerce.

Overall, this book, written by leading SIA researchers, presents a coherent and structured presentation of state-of-art in SIA area such as social robotics, embodied conversational agents, affective computing, anthropomorphism, narrative and story-telling, social aspects in multi-agent systems, new technologies for education and therapy, etc. One of the advantages of this book is that it provides readers with references to other literature that serve well and lead readers to further detailed information. Also this book includes in-depth discussion for particular research projects that act as a superb tool for readers to think with. The readers do not need to possess any specialist knowledge but still could have general ideas about the state-of-art technology in this field. Meanwhile, based on the broad research topics presented in this book, it provides the readers with a comprehensive look at current research activities in this area. However, since this book is a collection of multiple papers, consequently, even though it is coherently structured, the readers might not perceive the connection between topics easily. And if there were introduced several applications of SIA at the beginning of the book, that might trigger readers' more interest and urge them to read through the remainders.

In sum, this book is a pleasure to read. We would like to study more about current research conducted on SIA and focus on future applications of it, which are believed of the greatest importance.

Yin Yang
Rui Wang
*School of IST, 001 Thomas Building
Penn State University
University Park, PA 16802, USA
E-mail address: yuy107@psu.edu*