Lecture Notes in Artificial Intelligence 3490

Edited by J. G. Carbonell and J. Siekmann

Subseries of Lecture Notes in Computer Science

Leonard Bolc Zbigniew Michalewicz
Toyoaki Nishida (Eds.)

Intelligent Media Technology for Communicative Intelligence

Second International Workshop, IMTCI 2004
Warsaw, Poland, September 13-14, 2004
Revised Selected Papers

Springer

Series Editors

Jaime G. Carbonell, Carnegie Mellon University, Pittsburgh, PA, USA
Jörg Siekmann, University of Saarland, Saarbrücken, Germany

Volume Editors

Leonard Bolc
Polish-Japanese Institute of Information Technology
Koszykowa 86, 02-008 Warsaw, Poland
and
Polish Academy of Science, Institute of Computer Science
Ordona 21, 01-237 Warsaw, Poland
E-mail: Leonard.Bolc@ipipan.waw.pl

Zbigniew Michalewicz
Polish-Japanese Institute of Information Technology
Koszykowa 86, 02-008 Warsaw, Poland
and
University of Adelaide, School of Computer Science
South Australia 5005, Australia
E-mail: zbyszek@cs.adelaide.edu.au

Toyoaki Nishida
Kyoto University, Graduate School of Informatics
Department of Intelligence Science and Technology
Yoshida-Honmachi, Sakyo-ku, Kyoto 606-8501, Japan
E-mail: nishida@i.kyoto-u.ac.jp

Library of Congress Control Number: 2005933039

CR Subject Classification (1998): I.2, H.5.2-3, H.3, H.4

ISSN 0302-9743
ISBN-10 3-540-29035-4 Springer Berlin Heidelberg New York
ISBN-13 978-3-540-29035-3 Springer Berlin Heidelberg New York

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 11558637 06/3142 5 4 3 2 1 0

Preface

The 2nd Workshop on Intelligent Media Technology for Communicative Intelligence commemorating the 10th anniversary of the Polish-Japanese Institute of Information Technology in Warsaw aimed to explore the current research topics in the field of intelligent media technologies for communicative intelligence.

Communicative intelligence represents a new challenge towards building a super-intelligence on the ubiquitous global network by accumulating a huge amount of human and knowledge resources. The term "communicative intelligence" reflects the view that communication is at the very core of intelligence and its creation. Communication permits novel ideas to emerge from intimate interactions by multiple agents, ranging from collaboration to competition. The recent advance of information and communication technologies has established an information infrastructure that allows humans and artifacts to communicate with each other beyond space and time. It enables us to advance a step further to realize a communicative intelligence with many fruitful applications.

Intelligent media technologies attempt to capture and augment people's communicative activities by embedding computers into the environment to enhance interactions in an unobtrusive manner. The introduction of embodied conversational agents that might mediate conversations among people in a social context is the next step in the process. The scope of intelligent media technologies includes design and development of intelligent supports for content production, distribution, and utilization, since rich content is crucial for communication in many applications. The promising applications of intelligence media technologies include e-learning, knowledge management systems, e-democracy, and other communication-intensive subject domains.

The first workshop was held in Tokyo, Japan in August 2002, as PRICAI 2002 (7th Pacific Rim International Conference on Artificial Intelligence) WS-5: International Workshop on Intelligent Media Technology for Communicative Reality. As indicated by the title, the role of reality was emphasized at that time. We considered that communication plays the central role not only in interpreting existing objects but also in attributing information to physical objects. The physical substances in the real world make sense to us only if they are associated with a meaning in the conceptual world. Typical examples are historical objects displayed in a museum. They make sense only if their historical facts and stories are well presented to the visitor. The sense of reality comes from the way in which physical and information features of those objects interact with each other.

The first workshop consisted of three invited talks and nine presentations. The invited talks covered key dimensions of the communicative reality, including computer-mediated interaction in the real world, situated conversations, and conversational agents. The presentations addressed additional topics such as video-based interactive media, a personalized navigation system, immersive distance learning, shared understanding by ontology building, analysis of facial expression for estimating the conversation mood,

embodied communication of information and atmosphere by a team of robots, conversational contents for knowledgeable conversational agents, meaning acquisition from communications, and cognitive linguistic modelling of understanding irony.

The scope of this workshop covered much wider areas than the previous one. The topics involved media technologies from areas of artificial intelligence, Web intelligence, human-computer interaction, and other intelligent and cognitive technologies that may lead to the development of individual or collective intelligence.

This volume consists of two keynote papers, six plenary papers, and 38 regular papers. The topics include the following:

1. Perceptual technologies for capturing semantic information
2. Smart environments that support communicative activities
3. Embodied conversational agents that create and mediate knowledge in a social context
4. Sociable agents that cohabit with people in the real world
5. Intelligent content production and management for communicating intellectual assets
6. Automatic media annotation generation
7. Intelligent grids built as overlays on grid technologies
8. Measurement and evaluation of communicative intelligence
9. E-learning and multimedia technologies in education
10. Applications of communicative intelligence

We hope this workshop contributed to further advancing the state of the art in intelligent media technologies.

Finally, we would like to thank the members of the Program and Organizing Committees for their hard work in making this workshop happen.

March 2005

Leonard Bolc
Zbigniew Michalewicz
Toyoaki Nishida

Organization

Conference Chairs

Toyoaki Nishida (Kyoto University, Japan)
Jerzy Paweł Nowacki (PJIIT, Poland)

Program Committee

Leonard Bolc (PJIIT, and IPI PAN, Poland)
Witold Kosiński (PJIIT, Poland)
Sadao Kurohashi (University of Tokyo, Japan)
Krzysztof Marasek (PJIIT, Poland)
Zbigniew Michalewicz (PJIIT, Poland, and University of Adelaide, Australia)
Michihiko Minoh (Kyoto University, Japan)
Lech Polkowski (PJIIT, Poland)
Zbigniew Raś (PJIIT, Poland, and University of North Carolina at Charlotte, USA)
Franciszek Seredyński (PJIIT, and IPI PAN, Poland)
Kazimierz Subieta (PJIIT, and IPI PAN, Poland)
Yasuyuki Sumi (Kyoto University, Japan)
Rin-ichiro Taniguchi (Kyushu University, Japan)
Wolfgang Wahlster (German Research Center for AI, Germany)

Organizing Committee

Tomasz Rutkowski
Paweł Wiemann

Preface

The 2nd Workshop on Intelligent Media Technology for Communicative Intelligence commemorating the 10th anniversary of the Polish-Japanese Institute of Information Technology in Warsaw aimed to explore the current research topics in the field of intelligent media technologies for communicative intelligence.

Communicative intelligence represents a new challenge towards building a super-intelligence on the ubiquitous global network by accumulating a huge amount of human and knowledge resources. The term "communicative intelligence" reflects the view that communication is at the very core of intelligence and its creation. Communication permits novel ideas to emerge from intimate interactions by multiple agents, ranging from collaboration to competition. The recent advance of information and communication technologies has established an information infrastructure that allows humans and artifacts to communicate with each other beyond space and time. It enables us to advance a step further to realize a communicative intelligence with many fruitful applications.

Intelligent media technologies attempt to capture and augment people's communicative activities by embedding computers into the environment to enhance interactions in an unobtrusive manner. The introduction of embodied conversational agents that might mediate conversations among people in a social context is the next step in the process. The scope of intelligent media technologies includes design and development of intelligent supports for content production, distribution, and utilization, since rich content is crucial for communication in many applications. The promising applications of intelligence media technologies include e-learning, knowledge management systems, e-democracy, and other communication-intensive subject domains.

The first workshop was held in Tokyo, Japan in August 2002, as PRICAI 2002 (7th Pacific Rim International Conference on Artificial Intelligence) WS-5: International Workshop on Intelligent Media Technology for Communicative Reality. As indicated by the title, the role of reality was emphasized at that time. We considered that communication plays the central role not only in interpreting existing objects but also in attributing information to physical objects. The physical substances in the real world make sense to us only if they are associated with a meaning in the conceptual world. Typical examples are historical objects displayed in a museum. They make sense only if their historical facts and stories are well presented to the visitor. The sense of reality comes from the way in which physical and information features of those objects interact with each other.

The first workshop consisted of three invited talks and nine presentations. The invited talks covered key dimensions of the communicative reality, including computer-mediated interaction in the real world, situated conversations, and conversational agents. The presentations addressed additional topics such as video-based interactive media, a personalized navigation system, immersive distance learning, shared understanding by ontology building, analysis of facial expression for estimating the conversation mood,

embodied communication of information and atmosphere by a team of robots, conversational contents for knowledgeable conversational agents, meaning acquisition from communications, and cognitive linguistic modelling of understanding irony.

The scope of this workshop covered much wider areas than the previous one. The topics involved media technologies from areas of artificial intelligence, Web intelligence, human-computer interaction, and other intelligent and cognitive technologies that may lead to the development of individual or collective intelligence.

This volume consists of two keynote papers, six plenary papers, and 38 regular papers. The topics include the following:

1. Perceptual technologies for capturing semantic information
2. Smart environments that support communicative activities
3. Embodied conversational agents that create and mediate knowledge in a social context
4. Sociable agents that cohabit with people in the real world
5. Intelligent content production and management for communicating intellectual assets
6. Automatic media annotation generation
7. Intelligent grids built as overlays on grid technologies
8. Measurement and evaluation of communicative intelligence
9. E-learning and multimedia technologies in education
10. Applications of communicative intelligence

We hope this workshop contributed to further advancing the state of the art in intelligent media technologies.

Finally, we would like to thank the members of the Program and Organizing Committees for their hard work in making this workshop happen.

March 2005

Leonard Bolc
Zbigniew Michalewicz
Toyoaki Nishida

Organization

Conference Chairs

Toyoaki Nishida (Kyoto University, Japan)
Jerzy Paweł Nowacki (PJIIT, Poland)

Program Committee

Leonard Bolc (PJIIT, and IPI PAN, Poland)
Witold Kosinski (PJIIT, Poland)
Sadao Kurohashi (University of Tokyo, Japan)
Krzysztof Marasek (PJIIT, Poland)
Zbigniew Michalewicz (PJIIT, Poland, and University of Adelaide, Australia)
Michihiko Minoh (Kyoto University, Japan)
Lech Polkowski (PJIIT, Poland)
Zbigniew Ras (PJIIT, Poland, and University of North Carolina at Charlotte, USA)
Franciszek Seredynski (PJIIT, Poland)
Kazimierz Subieta (PJIIT, and IPI PAN, Poland)
Yasuyuki Sumi (Kyoto University, Japan)
Rin-ichiro Taniguchi (Kyushu University, Japan)
Wolfgang Wahlster (German Research Center for AI, Germany)

Organizing Committee

Tomasz Rutkowski
Paweł Wiemann

Table of Contents