Lecture Notes in Artificial Intelligence 6883

Subseries of Lecture Notes in Computer Science

Andreas König Andreas Dengel
Knut Hinkelmann Koichi Kise
Robert J. Howlett Lakhmi C. Jain (Eds.)

Knowledge-Based and Intelligent Information and Engineering Systems

15th International Conference, KES 2011
Kaiserslautern, Germany, September 12-14, 2011
Proceedings, Part III

Springer

Volume Editors

Andreas König
University of Kaiserslautern, Germany
E-mail: koenig@eit.uni-kl.de

Andreas Dengel
DFKI and University of Kaiserslautern, Germany
E-mail: andreas.dengel@dfki.de

Knut Hinkelmann
University of Applied Sciences Northwestern Switzerland, Olten, Switzerland
E-mail: knut.hinkelmann@fhnw.ch

Koichi Kise
Osaka Prefecture University, Osaka, Japan
E-mail: kise@cs.osakafu-u.ac.jp

Robert J. Howlett
KES International, Shoreham-by-sea, UK
E-mail: rjhowlett@kesinternational.org

Lakhmi C. Jain
University of South Australia, Adelaide, SA, Australia
E-mail: lakhmi.jain@unisa.edu.au

ISSN 0302-9743 e-ISSN 1611-3349
ISBN 978-3-642-23853-6 e-ISBN 978-3-642-23854-3
DOI 10.1007/978-3-642-23854-3
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2011935629

CR Subject Classification (1998): I.2, H.4, H.3, I.4-5, H.5, C.2, H.2.8

LNCS Sublibrary: SL 7 – Artificial Intelligence

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

The 15^{th} International Conference on Knowledge-Based and Intelligent Information and Engineering Systems was held during September 12–14, 2011 in Kaiserslautern, Germany. The conference was hosted by the University of Kaiserslautern and the German Research Center for Artificial Intelligence (DFKI) GmbH, Germany, and KES International.

KES 2011 provided a scientific forum for the presentation of the results of high-quality international research including recent results of large-scale projects, new exciting techniques, and models, as well as innovative solutions in challenging application fields. The conference attracted contributions from 32 countries and 5 continents: Australia, Canada, China, Colombia, Croatia, Czech Republic, Finland, France, Germany, Greece, Indonesia, Iran, Italy, Japan, Jordan, Korea, Latvia, Malaysia, Mexico, Norway, Poland, Romania, Russia, Spain, Sweden, Switzerland, Taiwan, Thailand, Tunisia, Turkey, UK, and USA.

The conference consisted of 6 keynote talks, 9 general tracks and 25 invited sessions and workshops, on the advance and application of knowledge-based and intelligent systems and related areas. The distinguished keynote speakers were:

Ansgar Bernardi
German Research Center for Artificial Intelligence, Kaiserslautern, Germany
"Growing Together: Opening the Way for Comprehensive Public–Private Knowledge Management"

Knut Manske
Vice President SAP Research, SAP AG, Darmstadt, Germany
"Future Urban Management: Towards Best Managed Cities"

Nikhil R. Pal
Indian Statistical Institute, Calcutta, India
"Selection of Useful Sensors/Features with Controlled Redundancy Using Neural Networks"

Peter Schütt
Leader Software Strategy & Knowledge Management, Executive Engagement Manager, IBM Software Group Germany
"Knowledge Sharing in Enterprise Networks"

Ulrich Reimer
Institute for Information and Process Management University of Applied Sciences St. Gallen, Switzerland
"(Meta-) Modeling of Process-Oriented Information Systems"

Keiji Yamada
General Research Manager, C&C innovation Laboratories, NEC Corporation
Professor, Nara Institute of Science and Technology

"Symbiotic System as a New Social Infrastructure Based on Intelligent Interaction Among the Society, Human Beings, and Information Systems"

Overall 244 oral presentations, complemented by focused lab tours at the organizing institutions, provided excellent opportunities for the presentation of intriguing new research results and vivid discussion on these, paving the way to efficient knowledge transfer and the incubation of new ideas and concepts.

As in the previous years, extended versions of selected papers were considered for publication in follow-up journal publications.

We would like to acknowledge the contribution of the Track Chairs, Invited Sessions Chairs, all members of the Program Committee and external reviewers for coordinating and monitoring the review process. We are grateful to the editorial team of Springer led by Alfred Hofmann. Our sincere gratitude goes to all participants and the authors of the submitted papers.

September 2011

Andreas Dengel
Andreas König
Koichi Kise
Knut Hinkelmann
Robert Howlett
Lakhmi Jain

Organization

KES 2011 was hosted and organized by the Chair's Knowledge-Based Systems, Computer Science department, and Integrated Sensor Systems, Electrical and Computer Engineering department at the University of Kaiserslautern, the German Research Center for Artificial Intelligence (DFKI) GmbH, Germany, and KES International. The conference was held at the University of Kaiserslautern, September 12–14, 2011.

Executive Committee

General Co-chairs

Andreas Dengel	University of Kaiserslautern and DFKI GmbH, Germany
Andreas König	University of Kaiserslautern, Germany
Lakhmi Jain	University of South Australia, Australia

Executive Chair

Robert Howlett	Bournemouth University, UK

Program Co-chairs

Knut Hinkelmann	University of Applied Sciences Northwestern Switzerland, Switzerland
Koichi Kise	Osaka Prefecture University, Japan

Organizing Committee Chair

Stefan Zinsmeister	DFKI GmbH, Germany

Organizing Committee

KES Operations Manager

Peter Cushion	KES International, UK

KES Systems Support

Shaun Lee	KES International, UK

ISE Support Staff

Abhaya Chandra Kammara	University of Kaiserslautern, Germany
Shubhmoy Kumar	University of Kaiserslautern, Germany

Track Chairs

Bruno Apolloni	University of Milan, Italy
Floriana Esposito	University of Bari, Italy
Anne Håkansson	Stockholm University, Sweden
Ron Hartung	Franklyn University, USA
Honghai Liu	University of Portsmouth, UK
Heiko Maus	DFKI GmbH, Germany
Ngoc Thanh Nguyen	Wroclaw University of Technology, Poland
Andreas Nuernberger	University of Magdeburg, Germany
Tuan Pham	University of New South Wales, Australia
Toyohide Watanabe	Nagoya University, Japan

Invited Session Chairs

The Second International Workshop on Natural Language Visualization

Minhua Ma	The Glasgow School of Art, UK
Bob Coyne	Columbia University, USA

Workshop on Seamless Integration of Semantic Technologies in Computer-Supported Office Work (SISTCOW)

Oleg Rostanin	DFKI GmbH, Germany
Simon Scerri	University of Ireland, Galway, Ireland
Benedikt Schmidt	SAP Research, Germany

Innovations in Chance Discovery

Akinori Abe	University of Tokyo, Japan
Yukio Ohsawa	The University of Tokyo, Japan

Computational Intelligence Methods to Benefit Society

Valentina Balas	Aurel Vlaicu University of Arad, Romania
Lakhmi C. Jain	University of South Australia, Australia

Knowledge-Based Interface Systems (I)

Yuji Iwahori	Chubu University, Japan
Naohiro Ishii	Aichi Institute of Technology, Japan

Advances in Theory and Application of Hybrid Intelligent Systems

Lakhmi C. Jain	University of South Australia, Australia
CP Lim	Universiti Sains Malaysia, Malaysia

Recent Trends in Knowledge Engineering, Smart Systems and Their Applications

Cesar Sanin	University of Newcastle, Australia
Carlos Toro	VICOMTech, Spain

Data Mining and Service Science for Innovation

Katsutoshi Yada	Kansai University, Japan

Methods and Techniques of Artificial and Computational Intelligence in Economics, Finance and Decision Making

Marina Resta	DIEM sezione di Matematica Finanziaria, Italy

Human-Oriented Learning Technology and Learning Support Environment

Toyohide Watanabe	Nagoya University, Japan
Tomoko Kojiri	Nagoya University, Japan

Human Activity Support in Knowledge Society

Toyohide Watanabe	Nagoya University, Japan
Takeshi Ushiama	Kyushu University, Japan

Design of Social Intelligence and Creativity Environment

Toyohide Watanabe	Nagoya University, Japan
Naoto Mukai	Tokyo University of Science, Japan

Knowledge Engineering Applications in Process Systems and Plant Operations

Kazuhiro Takeda	Shizuoka University, Japan
Takashi Hamaguchi	Nagoya Institute of Technology, Japan
Tetsuo Fuchino	Tokyo Institute of Technology, Japan

Knowledge - Based Interface Systems (II)

Yoshinori Adachi	Chubu University, Japan
Nobuhiro Inuzuka	Nagoya Institute of Technology, Japan

Emergent Intelligent Technologies in Multimedia Information Processing (IMIP)

Giovanna Castellano	University of Bari, Italy
Maria Alessandra Torsello	University of Bari, Italy

Time Series Prediction Based on Fuzzy and Neural Networks

Minvydas Ragulskis	Kaunas University of Technology, Lithuania

Management Technologies from the Perspective of Kansei Engineering and Emotion

Junzo Watada	Waseda University, Japan
Hisao Shiizuka	Kogakuin University, Japan
Taki Kanda	Bunri University of Hospitality, Japan

Knowledge-Based Systems for e-Business

Kazuhiko Tsuda	University of Tsukuba, Japan
Nubuo Suzuki	KDDI Corporation, Japan

Reasoning Based Intelligent Systems (RIS)

Kazumi Nakamatsu	University of Hyogo, Japan
Jair Minoro Abe	University of Sao Paulo, Brazil

Skill Acquisition and Ubiquitous Human–Computer Interaction

Hirokazu Taki	Wakayama University, Japan
Masato Soga	Wakayama University, Japan

International Session on Sustainable Information Systems

Anne Håkansson	KTH, Sweden
Jason J. Jung	Yeungnam University , Korea
Costin Badica	University of Craiova, Romania

Intelligent Network and Service

Jun Munemori	Wakayama University, Japan
Takaya Yuizono	Japan Advanced Institute Science and Technology, Japan

Advances in Theory and Application of Multi-Agent Systems

Bala M. Balachandran	University of Canberra, Australia
Dharmendra Sharma	University of Canberra, Australia

Advanced Design Techniques for Adaptive Hardware and Systems

Sorin Hintea	Technical University of Cluj-Napoca, Romania
Hernando Fernández-Canque	Glasgow Caledonian University, UK
Gabriel Oltean	Technical University of Cluj-Napoca, Romania

Advanced Knowledge-Based Systems

Alfredo Cuzzocrea	ICAR-CNR, University of Calabria, Italy

Computational Intelligence for Fault Diagnosis and Prognosis

Beatrice Lazzerini	University of Pisa, Italy
Marco Cococcioni	University of Pisa, Italy
Sara Lioba Volpi	University of Pisa, Italy

Multiple Classifiers and Hybrid Learning Paradigms

Edmondo Trentin	University of Siena, Italy
Friedhelm Schwenker	University of Ulm, Germany

Soft Computing Techniques and Their Intelligent Utilizations

Norio Baba	Osaka Kyoiku University, Japan
Kunihiro Yamada	Tokai University, Japan

Document Analysis and Knowledge Science

Seiichi Uchida	Kyushu University, Japan
Marcus Liwicki	DFKI GmbH, Germany
Koichi Kise	Osaka Prefecture University, Japan

Model-Based Computing for Innovative Engineering

Klaus Schneider	University of Kaiserslautern, Germany
Norbert Wehn	University of Kaiserslautern, Germany

Immunity-Based Systems

Yoshiteru Ishida	Toyohashi University of Technology, Japan
Andreas König	University of Kaisers-lautern, Germany

Program Committee

Akinori Abe	University of Tokyo, Japan
Jair Minoro Abe	University of Sao Paulo, Brazil
Canicious Abeynayake	DSTO, Australia
Yoshinori Adachi	Chubu University, Japan

Benjamin Adrian	German Research Center for Artificial Intelligence (DFKI), Germany
Plamen Angelov	Lancaster University, UK
Ahmad Taher Azar	Modern Science and Arts University (MSA), Egypt
Norio Baba	Osaka Kyoiku University, Japan
Costin Badica	University of Craiova , Romania
Bala Balachandran	University of Canberra, Australia
Valentina Balas	Aurel Vlaicu University of Arad, Romania
Vivek Bannore	University of South Australia, Australia
Adrian S. Barb	Penn State University, USA
Ansgar Bernardi	German Research Center for Artificial Intelligence (DFKI), Germany
Monica Bianchini	University of Siena, Italy
Isabelle Bichindaritz	University of Washington, USA
Veselka Boeva	Technical University of Sofia, Bulgaria
Christopher Buckingham	Aston University, UK
Giovanna Castellano	University of Bari, Italy
Barbara Catania	Università degli Studi di Genova, Italy
Michele Ceccarelli	University of Sannio, Italy
Javaan Chahl	DSTO, Australia
Stephan Chalup	The University of Newcastle, Australia
Chien-Fu Cheng	Tamkang University, Taiwan
Kai Cheng	Brunel University, UK
Benny Cheung	Honk Kong Polytechnic University, Hong Kong
Marco Cococcioni	University of Pisa, Italy
Bob Coyne	Columbia University, USA
Paolo Crippa	Università Politecnica delle Marche, Italy
Mary (Missy) Cummings	Massachusetts Institute of Technology, USA
Alfredo Cuzzocrea	ICAR-CNR & University of Calabria , Italy
Ernesto Damiani	Università degli Studi di Milano, Italy
Stamatia Dasiopoulou	Informatics and Telematics Institute, Greece
Martine De Cock	University of Washington Tacoma, USA
Philippe De Wilde	Heriot-Watt University, UK
Argyris Dentsoras	University of Patras, Greece
Liya Ding	Macau University of Science and Technology, Hong Kong
Richard J. Duro	Universidade da Coruña, Spain
Schahram Dustdar	Vienna University of Technology, Austria
Isao Echizen	National Institute of Informatics, Japan
Tapio Elomaa	Tampere University of Technology, Finland
Hernando Fernandez-Canque	Glasgow Caledonian University, UK
Ana Fernandez-Vilas	University of Vigo, Spain
Arthur Filippidis	DSTO, Australia
Tetsuo Fuchino	Tokyo Institute of Technology, Japan

Junbin Charles Gao	Sturt University, Australia
Petia Georgieva	University of Aveiro, Portugal
Daniela Godoy	UNICEN University, Argentina
Bernard Grabot	LGP-ENIT, France
Manuel Graña Romay	Universidad del Pais Vasco, Spain
Christos Grecos	University of West Scotland, UK
Anne Hakånsson	KTH, Sweden
Takashi Hamaguchi	Nagoya Institute of Technology, Japan
Alex Hariz	University of South Australia, Australia
Mohamed Hassan	Cairo University, Egypt
Richard Hill	University of Derby, UK
Sorin Hintea	Technical University of Cluj-Napoca, Romania
Dawn Holmes	University of California, USA
Katsuhiro Honda	Osaka Prefecture University, Japan
Tzung-Pei Hong	National University of Kaohsiung, Taiwan
Eyke Hullermeier	Philipps-Universität Marburg, Germany
Nikhil Ichalkaranje	University of Mumbai, India
Nobuhiro Inuzuka	Nagoya Institute of Technology, Japan
Naohiro Ishii	Aichi Institute of Technology, Japan
Takayuki Ito	Massachusetts Institute of Technology, USA
Yuji Iwahori	Chubu University, Japan
Norbert Jastroch	MET Communications GmbH, Germany
Richard Jensen	Aberystwyth University, UK
Andrew Jones	Cardiff University, UK
Jason J. Jung	Yeungnam University, Korea
Taki Kanda	Bunri University of Hospitality, Japan
Anastasia Kastania	Athens University of Economics and Business, Greece
Hideki Katagiri	Hiroshima University, Japan
Koichi Kise	Osaka Prefecture University, Japan
In-Young Ko	KAIST, Korea
Vassilis S. Kodogiannis	University of Westminster, UK
Tomoko Kojiri	Nagoya University, Japan
Amit Konar	Jadavpur University, India
Ivan Koychev	University of Sofia, Bulgaria
Halina Kwasnicka	Wroclaw University of Technology, Poland
C.K. Kwong	The Hong Kong Polytechnic University, Hong Kong
Beatrice Lazzerini	University of Pisa, Italy
Dah-Jye Lee	Brigham Young University, USA
CP Lim	Universiti Sains Malaysia, Malaysia
Tsung-Chih Lin	Feng-Chia University, Taiwan
James Liu	The Hong Kong Polytechnic University, Hong Kong
Lei Liu	Beijing University of Technology, China

Marcus Liwicki	German Research Center for Artificial Intelligence (DFKI), Germany
Ignac Lovrek	University of Zagreb, Croatia
Jie Lu	University of Technology, Sydney, Australia
Minhua Eunice Ma	University of Derby, UK
Ilias Maglogiannis	University of Central Greece, Greece
Nadia Magnenat-Thalmann	University of Geneva, Switzerland
Dario Malchiodi	Università degli Studi di Milano, Italy
Milko T. Marinov	University of Ruse, Bulgaria
Mia Markey	The University of Texas at Austin, USA
Maja Matijasevic	University of Zagreb, Croatia
Rashid Mehmood	School of Engineering, Swansea, UK
Stefania Montani	Università del Piemonte Orientale, Italy
Ramón Moreno Jimenez	Universidad del Pais Vasco, Spain
Naoto Mukai	Tokyo University of Science, Japan
Christine Mumford	Cardiff University, UK
Jun Munemori	Wakayama University, Japan
Hirofumi Nagashino	The University of Tokushima, Japan
Kazumi Nakamatsu	University of Hyogo, Japan
Zorica Nedic	University of South Australia, Australia
Ngoc Thanh Nguyen	Wroclaw University of Technology, Poland
Vesa A. Niskanen	University of Helsinki, Finland
Lidia Ogiela	AGH & University of Science and Technology, Poland
Yukio Ohsawa	The University of Tokyo, Japan
Gabriel Oltean	Technical University of Cluj-Napoca, Romania
Vasile Palade	Oxford University, UK
Gabriella Pasi	Università degli Studi di Milano Bicocca, Italy
Kunal Patel	Ingenuity Systems, USA
Jose Pazos-Arias	University of Vigo, Spain
Carlos Pedrinaci	The Open University, UK
Alfredo Petrosino	Università di Napoli Parthenope, Italy
Dilip Pratihar	Indian Institute of Technology, India
Goran D. Putnik	University of Minho, Portugal
Minvydas Ragulskis	Kaunas University of Technology, Lithuania
Elisabeth Rakus-Andersson	Blekinge Institute of Technology, Sweden
Nancy Reed	University of Hawaii , USA
Paolo Remagnino	Kingston University, UK
Marina Resta	DIEM sezione di Matematica Finanziaria, Italy
Oleg Rostanin	German Research Center for Artificial Intelligence (DFKI), Germany
Asit Saha	Central State University, USA
Ziad Salem	Aleppo University, Syria
Cesar Sanin	University of Newcastle, Australia
Carlo Sansone	Università di Napoli Federico II, Italy

Mika Sato-Ilic	University of Tsukuba, Japan
Simon Scerri	University of Ireland Galway, Ireland
Benedikt Schmidt	SAP Research, Germany
Klaus Schneider	University of Kaiserslautern, Germany
Steven Schockaert	Ghent University, Belgium
Friedhelm Schwenker	University of Ulm, Germany
Udo Seiffert	Fraunhofer Institute IFF Magdeburg, Germany
Dharmendra Sharma	University of Canberra, Australia
Hisao Shiizuka	Kogakuin University, Japan
Christos Sioutis	DSTO, Australia
Masato Soga	Wakayama University, Japan
Margarita Sordo	Harvard University, USA
Anthony Soroka	Cardiff University, UK
Myra Spiliopoulou	Otto-von-Guericke-Universität, Germany
Dipti Srinivasan	National University of Singapore, Singapore
Jadranka Sunde	DSTO, Australia
Nobuo Suzuki	KDDI Corporation , Japan
Edward Szczerbicki	The University of Newcastle, Australia
Kazuhiro Takeda	Shizuoka University, Japan
Hirokazu Taki	Wakayama University, Japan
Tatiana Tambouratzis	University of Piraeus, Greece
Pavel Tichy	Rockwell Automation Research Centre, Czech Republic
Peter Tino	The University of Birmingham, UK
Carlos Toro	VICOMTech, Spain
Maria Torsello	University of Bari, Italy
Edmondo Trentin	University of Siena, Italy
George A. Tsihrintzis	University of Piraeus, Greece
Kazuhiko Tsuda	University of Tsukuba, Japan
Jeffrey Tweedale	University of South Australia, Australia
Seiichi Uchida	Kyushu University, Japan
Eiji Uchino	Yamaguchi University, Japan
Taketoshi Ushiama	Kyushu University, Japan
Sunil Vadera	University of Salford, UK
Annamaria Varkonyi Koczy	Obuda University, Hungary
István Vassányi	University of Pannonia, Hungary
Alfredo Vellido	Universitat Politècnica de Catalunya, Spain
Juan D. Velásquez	University of Chile, Chile
Maria Virvou	University of Piraeus, Greece
Sara Volpi	University of Pisa, Italy
Junzo Watada	Waseda University, Japan
Toyohide Watanabe	Nagoya University, Japan
Rosina Weber	The iSchool at Drexel, USA
Norbert Wehn	University of Kaiserslautern, Germany
Richard J. White	Cardiff University, UK

M. Howard Williams	Heriot-Watt University, UK
Katsutoshi Yada	Kansai University, Japan
Kunihiro Yamada	Tokai University, Japan
Zijiang Yang	York University, Canada
Hiroyuki Yoshida	Harvard Medical School, USA
Jane You	The Hong Kong Polytechnic University, Hong Kong
Takaya Yuizono	JAIST, Japan
Cecilia Zanni-Merk	LGeCo - INSA de Strasbourg, France

Sponsoring Institutions

Center for Computational and Mathematical Modeling $(CM)^2$, University of Kaiserslautern, Germany

German Research Center for Artificial Intelligence (DFKI) GmbH, Kaiserslautern, Germany

Institute of Integrated Sensor Systems, University of Kaiserslautern, Germany

Table of Contents – Part III

Skill Acquisition and Ubiquitous Human Computer Interaction

Intelligent Network and Service

Management Technologies from the Perspective of Kansei Engineering and Emotion

Data Mining and Service Science for Innovation

Knowledge-Based Systems for E-Business

Knowledge Engineering Applications in Process Systems and Plant Operations

Advanced Design Techniques for Adaptive Hardware and Systems

Human-Oriented Learning Technology and Learning Support Environment

Design of Social Intelligence and Creativity Environment