

Smart Innovation, Systems and Technologies

Volume 148

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Gordan Jezic · Yun-Heh Jessica Chen-Burger ·
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Editors

Agents and Multi-agent Systems: Technologies and Applications 2019

13th KES International Conference,
KES-AMSTA-2019 St. Julians, Malta,
June 2019 Proceedings

 Springer

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Multi-agent Systems in Transportation Systems

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Agent-Based Modelling and Simulation

Assoc. Prof. Roman Šperka, Silesian University in Opava, Czech Republic

Business Process Management

Assoc. Prof. Roman Šperka, Silesian University in Opava, Czech Republic

Agents and Multi-agents Systems applied to Well-Being and Health

Dr. Maria del Rosario Baltazar Flores

Dr. Arnulfo Alanis Garza

Business Informatics

Prof. Hiroshi Takahashi, Keio University, Japan

Prof. Setsuya Kurahashi, University of Tsukuba, Japan

Prof. Takao Terano, Tokyo Institute of Technology, Japan

Preface

This volume contains the proceedings of the 13th KES Conference on Agent and Multi-agent Systems—Technologies and Applications (KES-AMSTA 2019) which will be held in St. Julian's, Malta, between 17 and 19 June 2019. The conference was organized by KES International, its focus group on agent and multi-agent systems and University of Zagreb, Faculty of Electrical Engineering and Computing. The KES-AMSTA conference is a subseries of the KES conference series.

Following the success of previous KES Conferences on Agent and Multi-agent Systems—Technologies and Applications, held in Gold Coast, Vilamoura, Puerto de la Cruz, Sorrento, Chania, Hue, Dubrovnik, Manchester, Gdynia, Uppsala, Incheon and Wrocław, the conference featured the usual keynote talks, oral presentations and invited sessions closely aligned to its established themes.

KES-AMSTA is an international scientific conference for discussing and publishing innovative research in the field of agent and multi-agent systems and technologies applicable in the digital and knowledge economy. The aim of the conference is to provide an internationally respected forum for both the research and industrial communities on their latest work on innovative technologies and applications that is potentially disruptive to industries. Current topics of research in the field include technologies in the area of decision-making, big data analysis, Internet of things (IoT), business informatics, artificial intelligence, social systems, health, transportation systems and smart environments, etc. Special attention is paid on the feature topics: agent communication and architectures, modelling and simulation agents, agent negotiation and optimization, business informatics, intelligent agents and multi-agent systems.

The conference attracted a substantial number of researchers and practitioners from all over the world who submitted their papers for main track covering the methodologies of agent and multi-agent systems applicable in the smart environments and knowledge economy, and four invited sessions on specific topics within the field. Submissions came from 15 countries. Each paper was peer-reviewed by at least two members of the International Programme Committee and International

Reviewer Board. Thirty-one papers were selected for oral presentation and publication in the volume of the KES-AMSTA 2019 proceedings.

The Programme Committee defined the following main tracks: agent communication and architectures, and multi-agent systems. In addition to the main tracks of the conference, there were the following invited sessions: agents and MAS applied to well-being and health, business informatics, MAS in transportation systems and agent-based modelling and simulation.

Accepted and presented papers highlight new trends and challenges in agent and multi-agent research. We hope that these results will be of value to the research community working in the fields of artificial intelligence, collective computational intelligence, health, robotics, smart systems and, in particular, agent and multi-agent systems, technologies, tools and applications.

The Chairs' special thanks go to the following special session organizers: Dra. Maria del Rosario Baltazar Flores, Instituto Tecnológico de Leon, Mexico; Prof. Arnulfo Alanis Garza, Instituto Tecnológico de Tijuana, Mexico; Prof. Hiroshi Takahashi, Keio University, Japan; Prof. Setsuya Kurahashi, University of Tsukuba, Tokyo, Japan; Prof. Takao Terano, Tokyo Institute of Technology, Japan; and Dr. Mahdi Zargayouna, IFSTTAR, France, for their excellent work.

Thanks are due to the Programme Co-Chairs, all Programme and Reviewer Committee members and all the additional reviewers for their valuable efforts in the review process, which helped us to guarantee the highest quality of selected papers for the conference.

We cordially thank all authors for their valuable contributions and all of the other participants in this conference. The conference would not be possible without their support.

Zagreb, Croatia
 Edinburgh, UK
 Zagreb, Croatia
 Karviná, Czech Republic
 Poole, UK
 Canberra, Australia
 April 2019

Gordan Jezic
 Yun-Heh Jessica Chen-Burger
 Mario Kusek
 Roman Šperka
 Robert J. Howlett
 Lakhmi C. Jain

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About the Editors

Gordan Jezic is a Professor at the University of Zagreb, Croatia. His research interest includes telecommunication networks and services focusing particularly on parallel and distributed systems, Machine-to-Machine (M2M) and Internet of Things (IoT) systems, communication networks and protocols, mobile software agents and multi-agent systems. He actively participates in numerous international conferences as a paper author, speaker, member of organizing and program committees or reviewer. He co-authored over 100 scientific and professional papers, book chapters and articles in journals and conference proceedings.

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Roman Šperka is an Associate Professor and Head of Department of Business Economics and Management at Silesian University in Opava, School of Business Administration in Karvina, Czech Republic. He holds Ph.D. title in “Business economics and management” and Dr. title in “Applied informatics” since

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Dr. Robert J. Howlett is the Executive Chair of KES International, a non-profit organization that facilitates knowledge transfer and the dissemination of research results in areas including Intelligent Systems, Sustainability, and Knowledge Transfer. He is a Visiting Professor at Bournemouth University in the UK. His technical expertise is in the use of intelligent systems to solve industrial problems. He has been successful in applying artificial intelligence, machine learning and related technologies to sustainability and renewable energy systems; condition monitoring, diagnostic tools and systems; and automotive electronics and engine management systems. His current research work is focussed on the use of smart microgrids to achieve reduced energy costs and lower carbon emissions in areas such as housing and protected horticulture.

Lakhmi C. Jain, B.E. (Hons), M.E., Ph.D. Fellow (IE Australia) is with the University of Technology Sydney, Australia, University of Canberra, Australia, Liverpool Hope University, United Kingdom and KES International, United Kingdom. Professor Jain co-founded the KES International for providing a professional community the opportunities for publications, knowledge exchange, cooperation and teaming. Involving around 5,000 researchers drawn from universities and companies worldwide, KES facilitates international cooperation and generate synergy in teaching and research. KES regularly provides networking opportunities for professional community through one of the largest conferences of its kind in the area of KES.