Studies in Computational Intelligence, Volume 166

Editor-in-Chief
Prof. Janusz Kacprzyk
Systems Research Institute
Polish Academy of Sciences
ul. Newelska 6
01-447 Warsaw
Poland
E-mail: kacprzyk@ibspan.waw.pl

Further volumes of this series can be found on our homepage: springer.com

Vol. 144. Andreas Fink and Franz Rothlauf (Eds.)
Advances in Computational Intelligence in Transport, Logistics, and Supply Chain Management, 2008
ISBN 978-3-540-69024-5

Vol. 145. Mikhail Ju. Moshkov, Marcin Piliszczuk and Beata Zielosko
Partial Covers, Reducts and Decision Rules in Rough Sets, 2008
ISBN 978-3-540-69027-6

Vol. 146. Fatos Xhafa and Ajith Abraham (Eds.)
Metaheuristics for Scheduling in Distributed Computing Environments, 2008
ISBN 978-3-540-69260-7

Vol. 147. Oliver Kramer
Self-Adaptive Heuristics for Evolutionary Computation, 2008
ISBN 978-3-540-69280-5

Vol. 148. Philipp Limbourg
Dependability Modelling under Uncertainty, 2008
ISBN 978-3-540-69286-7

Vol. 149. Roger Lee (Ed.)
Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing, 2008
ISBN 978-3-540-70559-8

Vol. 150. Roger Lee (Ed.)
Software Engineering Research, Management and Applications, 2008
ISBN 978-3-540-70774-5

Vol. 151. Tomasz G. Smolinski, Mariofanna G. Milanova and Aboul-Ella Hassanien (Eds.)
Computational Intelligence in Biomedicine and Bioinformatics, 2008
ISBN 978-3-540-70776-9

Vol. 152. Jarosław Stepaniuk
Rough – Granular Computing in Knowledge Discovery and Data Mining, 2008
ISBN 978-3-540-70800-1

Vol. 153. Carlos Cotta and Jano van Hemert (Eds.)
Recent Advances in Evolutionary Computation for Combinatorial Optimization, 2008
ISBN 978-3-540-70806-3

Vol. 154. Oscar Castillo, Patricia Melin, Janusz Kacprzyk and Witold Pedrycz (Eds.)
Soft Computing for Hybrid Intelligent Systems, 2008
ISBN 978-3-540-70811-7

Vol. 155. Hamid R. Tizhoosh and M. Ventresca (Eds.)
Oppositional Concepts in Computational Intelligence, 2008
ISBN 978-3-540-70826-1

Vol. 156. Dawn E. Holmes and Lakhmi C. Jain (Eds.)
Innovations in Bayesian Networks, 2008
ISBN 978-3-540-85065-6

Vol. 157. Ying-ping Chen and Meng-Hiot Lim (Eds.)
Linkage in Evolutionary Computation, 2008
ISBN 978-3-540-85067-0

Vol. 158. Marina Gavrilova (Ed.)
Generalized Voronoi Diagram: A Geometry-Based Approach to Computational Intelligence, 2009
ISBN 978-3-540-85125-7

Vol. 159. Dimitri Plemenos and Georgios Miaoulis (Eds.)
Artificial Intelligence Techniques for Computer Graphics, 2009
ISBN 978-3-540-85127-1

Vol. 160. P. Rajasekaran and Vasantha Kalyani David
Pattern Recognition using Neural and Functional Networks, 2009
ISBN 978-3-540-85129-5

Vol. 161. Francisco Baptista Pereira and Jorge Tavares (Eds.)
Bio-inspired Algorithms for the Vehicle Routing Problem, 2009
ISBN 978-3-540-85151-6

Vol. 162. Costin Badica, Giuseppe Mangioni, Vincenza Carchiolo and Dumitru Dan Burdescu (Eds.)
Intelligent Distributed Computing, Systems and Applications, 2008
ISBN 978-3-540-85256-8

Vol. 163. Pawel Delimata, Mikhail Ju. Moshkov, Andrzej Skowron and Zbigniew Suraj
Inhibitory Rules in Data Analysis, 2009
ISBN 978-3-540-85637-5

Vol. 164. Nadia Nedjah, Luiza de Macedo Mourelle, Janusz Kacprzyk, Felipe M.G. França and Alberto Ferreira de Souza (Eds.)
Intelligent Text Categorization and Clustering, 2009
ISBN 978-3-540-85643-6

Vol. 165. Djamel A. Zighed, Shusaku Tsumoto, Zbigniew W. Ras and Hakim Hacid (Eds.)
Mining Complex Data, 2009
ISBN 978-3-540-88066-0

Vol. 166. Constantinos Koutsojannis and Spiros Sirmakessis (Eds.)
Tools and Applications with Artificial Intelligence, 2009
ISBN 978-3-540-88068-4

Constantinos Koutsojannis
Spiros Sirmakessis
(Eds.)

Tools and Applications with Artificial Intelligence

Springer

Prof. Spiros Sirmakessis
Research Academic Computer Technology
Institute "D. Maritsas" Building N.
Kazantzaki str.
Patras University Campus
26500 Patras
Greece

Prof. Constantinos Koutsojannis
Computer Engineering and Informatics Department
University of Patras
26500 Patras
Greece

ISBN 978-3-540-88068-4 e-ISBN 978-3-540-88069-1

DOI 10.1007/978-3-540-88069-1

Studies in Computational Intelligence ISSN 1860949X

Library of Congress Control Number: 2008935499

Typeset & *Cover Design:* Scientific Publishing Services Pvt. Ltd., Chennai, India.

Printed in acid-free paper

9 8 7 6 5 4 3 2 1

springer.com

Preface

In recent years, the use of Artificial Intelligence (AI) techniques has been greatly increased. The term “intelligence” seems to be a “must” in a large number of European and International project calls. AI Techniques have been used in almost any domain. Application-oriented systems usually incorporate some kind of “intelligence” by using techniques stemming from intelligent search, knowledge representation, machine learning, knowledge discovery, intelligent agents, computational intelligence etc. The Workshop on "Applications with Artificial Intelligence" seeks for quality papers on computer applications that incorporate some kind of AI technique. The objective of the workshop was to bring together scientists, engineers and practitioners, who work on designing or developing applications that use intelligent techniques or work on intelligent techniques and apply them to application domains (like medicine, biology, education etc), to present and discuss their research works and exchange ideas. Results of project-based works were very welcome.

Topics of interest for the workshop as far as application domains were concerned included (but not limited to) the following:

- Biology
- Computer Networks
- Computer Security
- E-commerce
- Education
- Engineering
- Finance
- Health Care & Medicine
- Logistics
- Multimedia
- Psychology
- Power Systems
- Sociology
- Web Applications

Topics of interest as far as intelligent techniques were concerned included (but are not limited to) the following:

- Evolutionary Algorithms
- Fuzzy Logic
- Hybrid Techniques

- Heuristic Search
- Intelligent Agents
- Knowledge-Based Systems
- Knowledge Representation
- Knowledge Discovery
- Machine Learning
- Neural Networks
- Planning
- Semantic Web Techniques

We would like to express our appreciation to all authors of submitted papers, to the members of the program committee and all the people that have worked for this event.

This workshop could not have been held without the outstanding efforts of Marios Katsis Finally, recognition and acknowledgement is due to all members of the Internet and Multimedia Research Unit at Research Academic Computer Technology Institute and the eBusiness Lab staff.

Constantinos Koutsojannis
Spiros Sirmakessis

Organization

Program Committee

Constantinos Koutsojannis (Co-chair)	Department of Physiotherapy, Technological Educational Institution of Patras, Greece
Spiros Sirmakessis (Co-chair)	Department of Applied Informatics in Administration and Economy, Technological Educational Institution of Messolongi, Greece
Spiros Likothanasis	Computer Engineering and Informatics Department, University of Patras, Greece
Maria Rigkou	Computer Engineering and Informatics Department, University of Patras, Greece
Martin Rajman	Global Computing Center, Ecole Polytechnique Federale de Lausanne, Switzerland
Michalis Xenos	Hellenic Open University, Greece
Thrasyvoulos Tsiatsos	Department of Informatics, Aristotle University of Thessaloniki, Greece
Georgios Miaoulis	Department of Informatics, TEI of Athens Greece
Nikiktas Karanikolas	Department of Informatics, TEI of Athens Greece
Dimitri Plemenos	XLIM laboratory, University of Limoges, France
Pierre-François Bonnefoi	XLIM laboratory, University of Limoges, France
Grigorios Beligiannis	Department of Business Administration in Food and Agricultural Enterprises, University of Ioannina, Greece
Vassilios Tampakas	Department of Accounting, TEI of Patras, Greece

Contents