

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Alfred Kobsa

University of California, Irvine, CA, USA

Friedemann Mattern

ETH Zurich, Switzerland

John C. Mitchell

Stanford University, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz

University of Bern, Switzerland

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

University of Dortmund, Germany

Madhu Sudan

Microsoft Research, Cambridge, MA, USA

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max-Planck Institute of Computer Science, Saarbruecken, Germany

Emilio Corchado Hujun Yin (Eds.)

Intelligent Data Engineering and Automated Learning - IDEAL 2009

10th International Conference
Burgos, Spain, September 23-26, 2009
Proceedings

Volume Editors

Emilio Corchado

Universidad de Burgos, Escuela Politécnica Superior
Calle Francisco de Vitoria, S/N, Edificio C, 09006 Burgos, Spain
E-mail: escorchado@ubu.es

Hujun Yin

University of Manchester, School of Electrical and Electronic Engineering
Sackville Street Building, Sackville Street, Manchester M60 1QD, UK
E-mail: hujun.yin@manchester.ac.uk

Library of Congress Control Number: 2009934038

CR Subject Classification (1998): H.2.8, I.2, F.4, F.2.2, H.4, H.3

LNCS Sublibrary: SL 3 – Information Systems and Application, incl. Internet/Web and HCI

ISSN 0302-9743

ISBN-10 3-642-04393-3 Springer Berlin Heidelberg New York

ISBN-13 978-3-642-04393-2 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

springer.com

© Springer-Verlag Berlin Heidelberg 2009
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 12756247 06/3180 5 4 3 2 1 0

Preface

The IDEAL conference boast a vibrant and successful history dating back to 1998, and this edition marked the 10th anniversary, an important milestone demonstrating the increasing popularity and high quality of the IDEAL conferences. Burgos, the capital of medieval Spain and a lively city today, was a perfect venue to celebrate such an occasion. The conference has become a unique, established and broad interdisciplinary forum for researchers and practitioners in many fields to interact with each other and with leading academics and industries in the areas of machine learning, information processing, data mining, knowledge management, bio-informatics, neuro-informatics, bio-inspired models, agents and distributed systems, and hybrid systems.

IDEAL 2009 received over 200 submissions. After a rigorous peer-review process, the International Programme Committee accepted 100 high-quality papers to be included in the conference proceedings. In this 10th edition, a special emphasis was given on the organization of workshops and special sessions. Two workshops were organized under the framework of IDEAL 2009: MIR Day 2009 and Nature-Inspired Models for Industrial Applications. Five special sessions were organized by leading researchers in their fields on various topics such as Soft Computing Techniques in Data Mining, Recent Advances on Swarm-Based Computing, Intelligent Computational Techniques in Medical Image Processing, Advances on Ensemble Learning and Information Fusion, and Financial and Business Engineering (Modelling and Applications).

The selection of papers was extremely rigorous in order to maintain the high standard of the conference and we would like to thank our members of the International Programme Committee for their hard work in providing expert and timely evaluations of the submitted manuscripts. Their effort and expertise are vital to the success and quality of the conference and the IDEAL conference would have not taken place without their support and professionalism.

IDEAL 2009 enjoyed outstanding keynote speeches by distinguished guest speakers: Isidro Laso of the European Commission, Xindong Wu of University of Vermont, Bruno Apolloni of the University of Milan, Colin Fyfe of the University of the West of Scotland and Francisco Herrera of the University of Granada.

A big thanks to the local organizing team, especially the Organizing Committee Chairs, Bruno Baruque and Álvaro Herrero, who dedicated their enthusiasm and limitless time to this demanding task and provided lively reception and entertainment for the delegates. Particular thanks also go to our sponsors, Junta de Castilla y León, University of Burgos, Diputación de Burgos, Ayuntamiento de Burgos, GCI, CSA, FAE and FEC, who jointly contributed in an active and constructive manner to the success of this event.

We would also like to thank Alfred Hoffman and Anna Kramer of Springer for their continued support of and collaboration in this conference series.

July 2009

Emilio Corchado
Hujun Yin

Ángel Ballesteros	University of Burgos, Spain
Bruno Baruque	University of Burgos, Spain
José Manuel Benítez	University of Granada, Spain
Ester Bernadó	Ramon Llull University, Spain
Mikael Boden	The University of Queensland, Australia
Lourdes Borrajo	University of Vigo, Spain
Juan Botía	University of Murcia, Spain
Vicente Botti	Polytechnic University of Valencia, Spain
Andrés Bustillo	University of Burgos, Spain
André de Carvalho	University of São Paulo, Brazil
Matthew Casey	University of Surrey, UK
Oscar Castillo	Tijuana Institute of Technology, Mexico
Darryl Charles	University of Ulster, UK
Richard Chbeir	Bourgogne University, France
Luonan Chen	Shanghai University, China
Songcan Chen	Nanjing University of Aeronautics and Astronautics, China
Sung-Bae Cho	Yonsei University, Korea
Seungjin Choi	POSTECH, Korea
Andrzej Cichocki	Brain Science Institute, Japan
David A. Clifton	University of Oxford, UK
Juan M. Corchado	University of Salamanca, Spain
Rafael Corchuelo	University of Sevilla, Spain
Leticia Curiel	University of Burgos, Spain
Alfredo Cuzzocrea	University of Calabria, Italy
Ernesto Damiani	University of Milan, Italy
Keshav Dahal	University of Bradford, UK
Sanmay Das	Rensselaer Polytechnic Institute, USA
Ricardo Del Olmo	University of Burgos, Spain
Fernando Díaz	University of Valladolid, Spain
José Dorronsoro	Autónoma de Madrid University, Spain
Gérard Dreyfus	École Supérieure de Physique et de Chimie Industrielles de Paris, France
Dan Dumitrescu	University Babes-Bolyai, Romania
Igor Farkas	Comenius University in Bratislava, Slovakia
Florentino Fernández	University of Vigo, Spain
Jose Alfredo Ferreira	Federal University, Brazil
Francisco Ferrer	University of Seville, Spain
Juan J. Flores	University Michoacana, Mexico
Richard Freeman	Capgemini, UK
Kunihiko Fukushima	Kansai University, Japan
Bogdan Gabrys	Bournemouth University, UK
Marcus Gallagher	The University of Queensland, Australia
Matjaz Gams	Jozef Stefan Institute Ljubljana, Slovenia
Salvador García	University of Jaen, Spain
Mark Girolami	University of Glasgow, UK
Raúl Giráldez	Pablo de Olavide University, Spain

Daniel Glez-Peña	University of Vigo, Spain
Petro Gopych	Universal Power Systems USA-Ukraine LLC, Ukraine
Manuel Graña	University of the Basque Country, Spain
Maciej Grzenda	Warsaw University of Technology, Poland
Jerzy Grzymala-Busse	University of Kansas, USA
Anne Håkansson	Uppsala University, Sweden
Saman Halgamuge	The University of Melbourne, Australia
Aboul Ella Hassanien	Cairo University, Egypt
Ioannis Hatzilygeroudis	University of Patras, Greece
Francisco Herrera	University of Granada, Spain
Álvaro Herrero	University of Burgos, Spain
Michael Herrmann	University of Edinburgh, UK
James Hogan	Queensland University of Technology, Australia
Jaakko Hollmén	Helsinki University of Technology, Finland
Vasant Honavar	Iowa State University, USA
David Hoyle	University of Manchester, UK
Lakhmi Jain	University of South Australia, Australia
María José del Jesús	University of Jaén, Spain
Vicent Julián	University Politécnic de Valencia, Spain
Ata Kaban	University of Birmingham, UK
Juha Karhunen	Helsinki University of Technology, Finland
Miroslav Karny	Academy of Sciences of Czech Republic, Czech Republic
Samuel Kaski	Helsinki University of Technology, Finland
John Keane	University of Manchester, UK
Daniel A. Keim	Universität Konstanz, Germany
Sung-Ho Kim	KAIST, Korea
Frank Klawonn	University of Applied Sciences Braunschweig/Wolfenbuettel, Germany
Mario Köppen	Kyushu Institute of Technology, Japan
Andreas König	University of Kaiserslautern, Germany
Rudolf Kruse	Otto-von-Guericke-Universität Magdeburg, Germany
Lenka Lhotská	Czech Technical University, Czech Republic
Pei Ling Lai	Southern Taiwan University, Taiwan
Paulo Lisboa	Liverpool John Moores University, UK
Honghai Liu	University of Portsmouth, UK
Eva Lorenzo	University of Vigo, Spain
Wenjian Luo	University of Science and Technology of China, China
Frederic Maire	Queensland University of Technology, Australia
Urszula Markowska-Kaczmar	Wroclaw University of Technology, Poland
Roque Marín	University of Murcia, Spain
José F. Martínez	Instituto Nacional de Astrofísica Óptica y Electrónica Mexico
Giancarlo Mauri	University of Milano Bicocca, Italy
David Meehan	University of Teesside, UK
Simon Miles	Kings College London, UK

José Manuel Molina	University Carlos III of Madrid, Spain
Carla Möller-Levet	University of Manchester, UK
Fabio Musso	University of Burgos, Spain
Anil Nerode	Cornell University, USA
Maria do Carmo Nicoletti	Universidade Federal de São Carlos, Brazil
Luis Miguel Nieto	University of Valladolid, Spain
Yusuke Nojima	Osaka Prefecture University, Japan
Chung-Ming Ou	Kainan University, Taiwan
Joaquín Pacheco	University of Burgos, Spain
Vasile Palade	University of Oxford, UK
Stephan Pareigis	Hamburg University of Applied Sciences, Germany
Jongan Park	Chosun University, Korea
Juan Pavón	University Complutense of Madrid, Spain
Carlos Pereira	University of Coimbra, Portugal
Gloria Phillips-Wren	Loyola College, USA
Jorge Posada	VICOMTech, Spain
John Qiang	University of Essex, UK
Victor Rayward-Smith	University of East Anglia, UK
Perfecto Reguera	University of Leon, Spain
Bernardete Ribeiro	University of Coimbra, Portugal
José Riquelme	University of Seville, Spain
Ramón Rizo	University of Alicante, Spain
Fabrice Rossi	National Institute of Research on Computer Science and Automatic, France
Roberto Ruiz	Pablo de Olavide University, Spain
Wei-Chiang Samuelson	
Hong	Oriental Institute of Technology, Taiwan
Yanira Santana De Paz	University of Salamanca, Spain
José Santos	University of A Coruña, Spain
Javier Sedano	University of Burgos, Spain
Hyoseop Shin	Konkuk University Seoul, Korea
Michael Small	Hong Kong Polytechnic University, Hong Kong
Ponnuthurai N. Suganthan	Nanyang Technological University, Singapore
Ying Tan	Peking University, China
Ke Tang	University of Science and Technology of China, China
Dante I. Tapia	University of Salamanca, Spain
Peter Tino	University of Birmingham, UK
Alicia Troncoso	Pablo de Olavide University, Spain
Eiji Uchino	Yamaguchi University, Japan
Marc Van Hulle	K. U. Leuven, Belgium
Alfredo Vellido	University Politècnica de Catalunya, Spain
José R. Villar	University of Oviedo, Spain
Lipo Wang	Nanyang Technological University, Singapore
Tzai-Der Wang	Cheng Shiu University, Taiwan
Dong-Qing Wei	Shanghai Jiaotong University, China
Stefan Wermter	University of Sunderland, UK
Michał Woźniak	Wrocław University of Technology, Poland

Wu Ying	Northwestern University, USA
Ronald R. Yager	Iona College, USA
Ron Yang	University of Exeter, UK
Du Zhang	California State University, USA
Huiyu Zhou	Brunel University, UK
Rodolfo Zunino	University of Genoa, Italy

Organizing Committee

Bruno Baroque	University of Burgos, Spain, Chair
Álvaro Herrero	University of Burgos, Spain, Chair
Ángel Arroyo	University of Burgos, Spain
Pedro Burgos	University of Burgos, Spain
Andrés Bustillo	University of Burgos, Spain
Jacinto Canales	CPIICyL, Spain
Juan Manuel Corchado	University of Salamanca, Spain
Leticia Curiel	University of Burgos, Spain
Carlos López	University of Burgos, Spain
Miguel Ángel Manzanedo	University of Burgos, Spain
Raúl Marticorena	University of Burgos, Spain
David Martín	University of Burgos, Spain
Juan Vicente Martín	University of Burgos, Spain
Juan Carlos Pérez	University of Burgos, Spain
Raquel Redondo	University of Burgos, Spain
Jose Manuel Sáiz	University of Burgos, Spain
Lourdes Sáiz	University of Burgos, Spain
Pedro Santos	University of Burgos, Spain
Javier Sedano	University of Burgos, Spain
Belén Vaquerizo	University of Burgos, Spain

Programme Committees of Special Sessions

Soft Computing Techniques in Data Mining

Francisco Herrera	University of Granada, Spain, Chair
Jesús Alcalá	University of Granada, Spain, Chair
Albert Orriols Puig	Ramon Llull University, Spain
Alberto Fernández Hilario	University of Granada, Spain
Bogdan Trawiński	University of Wroclaw, Poland
Daniel Sánchez	University of Granada, Spain
Julian Luengo Martín	University of Granada, Spain
Luciano Sánchez Ramos	University of Oviedo, Spain
Rafael Alcalá Fernández	University of Granada, Spain
Sebastián Ventura Soto	University of Cordoba, Spain
Susana Nascimento	New University of Lisbon, Portugal

Recent Advances on Swarm-Based Computing

Zhihua Cui	Taiyuan University of Science and Technology, China, Chair
Jianchao Zeng	Taiyuan University of Science and Technology, China, Chair
Jing Jie	SOHU, China
Panigrahi B.K.	Indian Institute of Technology Delhi, India
Parsopoulos Konstantinos	University of Patras, Greece

MIR Day 2009 – Burgos

Ajith Abraham	Norwegian University of Science and Technology, Norway, Chair
Francisco Herrera	University of Granada, Spain, Chair
Juan Corchado	University of Salamanca, Spain, Chair
Santi Caballé	Open University of Catalonia, Spain, Chair
Emilio Corchado	University of Burgos, Spain, Chair
Fatos Xhafa	Techical University of Catalonia, Spain, Chair
Thanasis Daradoumis	Open University of Catalonia, Spain, Chair
Bruno Baruque	University of Burgos, Spain
Emilio Corchado	University of Burgos, Spain
Fatos Xhafa	Techical University of Catalonia, Spain
Leticia Curiel	University of Burgos, Spain
Álvaro Herrero	University of Burgos, Spain
Raquel Redondo	University of Burgos, Spain
Santi Caballé	Open University of Catalonia, Spain
Thanasis Daradoumis	Open University of Catalonia, Spain

Nature-Inspired Models for Industrial Applications

Dominik Slezak	Infobright Inc., Canada, Chair
Ajith Abraham	Machine Intelligence Research Labs, MIR Labs, Chair
Emilio Corchado	University of Burgos, Spain, Chair
Bruno Baruque	University of Burgos, Spain
Andrés Bustillo	University of Burgos, Spain
Pedro M ^a Caballero	CARTIF, Spain
Juan Corchado	University of Salamanca, Spain
Petros Daras	Centre for Research and Technology Hellas, Greece
Álvaro Herrero	University of Burgos, Spain
Félix Sánchez	Promatic System, Spain
Gregorio Sáinz Palmero	CARTIF, Spain
Javier Sedano	University of Burgos, Spain
José R. Villar	University of Oviedo, Spain

Intelligent Computational Techniques in Medical Image Processing

Manuel Graña	University of the Basque Country, Spain, Chair
Alex Manhaes	University of the Basque Country, Spain, Chair
Alexandre Manhaes Savio	University of the Basque Country, Spain
Bogdan Raducanu	Autonomous University of Barcelona, Spain
Íñigo Barandiaran	VICOMTECH, Spain
Iván Macia	VICOMTECH, Spain
Javier de Lope	Polytechnic University of Madrid, Spain
Javier Ramírez	University of Granada, Spain
Josu Maiora	University of the Basque Country, Spain
Josune Gallego	University of the Basque Country, Spain
Juan Manuel Górriz	University of Granada, Spain
Maite García-Sebastián	University of the Basque Country, Spain
Miriam López	University of Granada, Spain

Advances on Ensemble Learning and Information Fusion

Emilio Corchado	University of Burgos, Spain, Chair
Bruno Baruque	University of Burgos, Spain, Chair
Michał Woźniak	University of Wrocław, Poland, Chair
Arkadiusz Grzybowski	University of Wrocław, Poland
Konrad Jackowski	University of Wrocław, Poland

Financial and Business Engineering (Modeling and Applications)

Dragan Simić	Novi Sad Fair, Serbia, Chair
Ilija Tanackov	University of Novi Sad, Serbia
Krzysztof Walkowiak	University of Wrocław, Poland
Milenko Pertic	University of Novi Sad, Serbia
Nebojsa Vukov	Novi Sad Fair, Serbia
Silvio Bortoleto	University Positivo, Brazil

Table of Contents

Learning and Information Processing

Taking Advantage of Class-Specific Feature Selection	1
<i>Bárbara B. Pineda-Bautista, Jesús Ariel Carrasco-Ochoa, and José Fco. Martínez-Trinidad</i>	
Local Approximations	9
<i>Jerzy W. Grzymala-Busse and Wojciech Rzasa</i>	
SCIS: Combining Instance Selection Methods to Increase Their Effectiveness over a Wide Range of Domains	17
<i>Yoel Caises, Antonio González, Enrique Leyva, and Raúl Pérez</i>	
Supervised Feature Extraction Using Hilbert-Schmidt Norms	25
<i>P. Daniušis and P. Vaitkus</i>	
A Novel Estimation of the Regularization Parameter for ϵ -SVM	34
<i>E.G. Ortiz-García, J. Gascón-Moreno, S. Salcedo-Sanz, A.M. Pérez-Bellido, J.A. Portilla-Figueras, and L. Carro-Calvo</i>	
Nearest Neighbor Classification by Relearning	42
<i>Naohiro Ishii, Yuta Hoki, Yuki Okada, and Yongguang Bao</i>	
Integrating Rough Set and Genetic Algorithm for Negative Rule Extraction	50
<i>Junyu Liu, Yubao Liu, and Yan Long</i>	
Development of a Conceptual Model for a Knowledge-Based System for the Design of Closed-Loop PID Controllers	58
<i>Jose Luis Calvo-Rolle, Héctor Alaiz-Moretón, Javier Alfonso-Cendón, Ángel Alonso-Álvarez, and Ramón Ferreiro-García</i>	
Lazy Classification Using an Optimized Instance-Based Learner	66
<i>Rui Pedro Barbosa and Orlando Belo</i>	
Adaptive Fuzzy Logic Controller and Its Application in MEMS Mirror Actuation Feedback Control	74
<i>Weiwei Shan, Xiqun Zhu, and Yuan Ma</i>	
Detecting Computer Intrusions with Bayesian Networks	82
<i>Wojciech Tylman</i>	

Phase Load Balancing in the Secondary Distribution Network Using a Fuzzy Logic and a Combinatorial Optimization Based on the Newton Raphson	92
<i>Willy Siti, Adisa Jimoh, and Dan Nicolae</i>	
Imperfect Pattern Recognition Using the Fuzzy Measure Theory	101
<i>Anas Dahabiah, John Puentes, and Basel Solaiman</i>	
K-Means Clustering Seeds Initialization Based on Centrality, Sparsity, and Isotropy	109
<i>Pilsung Kang and Sungzoon Cho</i>	
Recurrence-Based Synchronization of Single Trials for EEG-Data Analysis	118
<i>Matthias Ihrke, Hecke Schrobsdorff, and J. Michael Herrmann</i>	
FeedRank: A Semantic-Based Management System of Web Feeds	126
<i>Hooran MahmoudiNasab and Sherif Sakr</i>	
An Autonomous Learning Algorithm of Resource Allocating Network ...	134
<i>Toshihisa Tabuchi, Seiichi Ozawa, and Asim Roy</i>	
Real-Time Nose Detection and Tracking Based on AdaBoost and Optical Flow Algorithms	142
<i>D. González-Ortega, F.J. Díaz-Pernas, M. Martínez-Zarzuela, M. Antón-Rodríguez, J.F. Díez-Higuera, and D. Boto-Giralda</i>	
Hand Localization and Fingers Features Extraction: Application to Digit Recognition in Sign Language	151
<i>A. Ben Jmaa, W. Mahdi, Y. Ben Jemaa, and A. Ben Hamadou</i>	
Interaction Detection in Aerodynamic Design Data	160
<i>Lars Graening, Markus Olhofer, and Bernhard Sendhoff</i>	
Semi-supervised Outcome Prediction for a Type of Human Brain Tumour Using Partially Labeled MRS Information	168
<i>Raúl Cruz-Barbosa and Alfredo Vellido</i>	
Optimizing Data Transformations for Classification Tasks	176
<i>José M. Valls and Ricardo Aler</i>	
The Minimum Redundancy – Maximum Relevance Approach to Building Sparse Support Vector Machines	184
<i>Xiaoxing Yang, Ke Tang, and Xin Yao</i>	
Discriminant Regression Analysis to Find Homogeneous Structures	191
<i>Esteban Garcia-Cuesta, Ines M. Galvan, and Antonio J. de Castro</i>	
Learning from a Smarter Teacher	200
<i>Leonor Becerra-Bonache and Adrian Horia Dediu</i>	

STORM - A Novel Information Fusion and Cluster Interpretation Technique	208
<i>Jan Fejereisl and Uwe Aickelin</i>	
Discriminant Independent Component Analysis	219
<i>Chandra Shekhar Dhir and Soo Young Lee</i>	
Information Preserving Empirical Mode Decomposition for Filtering Field Potentials	226
<i>Zareen Mehboob and Hujun Yin</i>	
Data Mining and Information Management	
A Heuristic Partial-Correlation-Based Algorithm for Causal Relationship Discovery on Continuous Data	234
<i>Zhenxing Wang and Laiwan Chan</i>	
Clustering with XCS and Agglomerative Rule Merging	242
<i>Liangdong Shi, Yinghuan Shi, and Yang Gao</i>	
Extended Cascaded Star Schema and ECOLAP Operations for Spatial Data Warehouse	251
<i>Marcin Gorawski</i>	
Block Clustering for Web Pages Categorization	260
<i>Malika Charrad, Yves Lechevallier, Mohamed ben Ahmed, and Gilbert Saporta</i>	
Framework for Decisional Business Modeling and Requirements Modeling in Data Mining Projects	268
<i>José Gallardo, Gloria Giacaman, Claudio Meneses, and Óscar Marbán</i>	
An AI Tool for the Petroleum Industry Based on Image Analysis and Hierarchical Clustering	276
<i>Denis Ferraretti, Giacomo Gamberoni, Evelina Lamma, Raffaele Di Cuia, and Chiara Turolla</i>	
Quantitative Association Rules Applied to Climatological Time Series Forecasting	284
<i>M. Martínez-Ballesteros, F. Martínez-Álvarez, A. Troncoso, and J.C. Riquelme</i>	
Duplicate Candidate Elimination and Fast Support Calculation for Frequent Subgraph Mining	292
<i>Andrés Gago-Alonso, Jesús Ariel Carrasco-Ochoa, José Eladio Medina-Pagola, and José Fco. Martínez-Trinidad</i>	

Knowledge Extraction with Non-Negative Matrix Factorization for Text Classification	300
<i>Catarina Silva and Bernardete Ribeiro</i>	
Spherical Harmonics and Distance Transform for Image Representation and Retrieval	309
<i>Atul Sajjanhar, Guojun Lu, Dengsheng Zhang, Jingyu Hou, and Yi-Ping Phoebe Chen</i>	
Fourier Transform Based Spatial Outlier Mining	317
<i>Faraz Rasheed, Peter Peng, Reda Alhajj, and Jon Rokne</i>	
Fuzzy Multi-Criteria Decision Making in Stereovision Matching for Fish-Eye Lenses in Forest Analysis	325
<i>P.J. Herrera, G. Pajares, M. Guijarro, J.J. Ruz, and J.M. De la Cruz</i>	
Fuzzy Query Model for XML Documents	333
<i>Jeany Seto, Shane Clement, David Duong, Keivan Kianmehr, and Reda Alhajj</i>	
Similarity-Binning Averaging: A Generalisation of Binning Calibration	341
<i>Antonio Bella, Cèsar Ferri, José Hernández-Orallo, and María José Ramírez-Quintana</i>	
Compressed Disjunction-Free Pattern Representation versus Essential Pattern Representation	350
<i>Marzena Kryszkiewicz</i>	
Neuro-Informatics, Bio-Informatics and Bio-Inspired Models	
Combining Multiple Evolved Analog Circuits for Robust Evolvable Hardware	359
<i>Kyung-Joong Kim and Sung-Bae Cho</i>	
Web Feed Clustering and Tagging Aggregator Using Topological Tree-Based Self-Organizing Maps	368
<i>Richard T. Freeman</i>	
A Hybrid Grouping Genetic Algorithm for the Multiple-Type Access Node Location Problem	376
<i>O. Alonso-Garrido, S. Salcedo-Sanz, L.E. Agustín-Blas, E.G. Ortiz-García, A.M. Pérez-Bellido, and J.A. Portilla-Figueras</i>	
A Comparative Study of Stellar Spectra Analysis with Neural Networks in Transformed Domains	384
<i>Diego Ordóñez, Carlos Dafonte, Minia Manteiga, and Bernardino Arcay</i>	

Cascade-Connected ANN Structures for Indoor WLAN Positioning	392
<i>Miloš Borenović, Aleksandar Nešković, and Djuradj Budimir</i>	
The Spatial Pheromone Signal for Ant Colony Optimisation	400
<i>Ilija Tanackov, Dragan Simić, Jelena Mihaljev-Martinov, Gordan Stojić, and Siniša Sremac</i>	
Intrusion Detection in Sensor Networks Using Clustering and Immune Systems	408
<i>Zorana Banković, José M. Moya, Álvaro Araujo, and Juan-Mariano de Goyeneche</i>	
Novel Architecture for RNA Secondary Structure Prediction	416
<i>Mario A. García-Martínez, Rubén Posada-Gómez, and Giner Alor-Hernández</i>	
Nonlinear Dimensionality Reduction for Face Recognition	424
<i>Weilin Huang and Hujun Yin</i>	
A Framework for Pattern-Based Global Models	433
<i>Arnaud Giacometti, Eynollah Khanjari Miyaneh, Patrick Marcel, and Arnaud Soulet</i>	
A New Segmentation Approach in Structured Self-Organizing Maps for Image Retrieval	441
<i>Raquel E. Patiño-Escarcina and J. Alfredo Ferreira Costa</i>	
GPU Implementation of the Multiple Back-Propagation Algorithm	449
<i>Noel Lopes and Bernardete Ribeiro</i>	
LDA Pre-processing for Classification: Class-Dependent Single Objective GA and Multi-objective GA Approaches	457
<i>Modjtaba Khalidji, Hossein Moeinzadeh, Ahmad Akbari, and Bijan Raahemi</i>	
Neural Network with Classification Based on Multiple Association Rule for Classifying Mammographic Data	465
<i>Benaki Lairenjam and Siri Krishan Wasan</i>	
A Fuzzy Approach for Studying Combinatorial Regulatory Actions of Transcription Factors in Yeast	477
<i>F. Javier Lopez, Carlos Cano, Fernando Garcia, and Armando Blanco</i>	
Agents and Hybrid Systems	
The Winning Advantage: Using Opponent Models in Robot Soccer	485
<i>José Antonio Iglesias, Juan Antonio Fernández, Ignacio Ramon Villena, Agapito Ledezma, and Araceli Sanchis</i>	

Talking Agents Design on the ICARO Framework 494
José M. Fernández de Alba and Juan Pavón

A Rule-Based Multi-agent System for Local Traffic Management 502
*Isabel Martí, Vicente R. Tomás, Luis A. García, and
 Juan J. Martínez*

Requirements Engineering in the Development of Multi-Agent Systems:
 A Systematic Review 510
David Blanes, Emilio Insfran, and Silvia Abrahão

Resources Oriented Search: A Strategy to Transfer Knowledge in the
 TRIZ-CBR Synergy 518
*Guillermo Cortes Robles, Giner Alor Hernández,
 Alberto Aguilar Lasserre, Ulises Juárez Martínez,
 Ruben Posada Gomez, Juan Miguel Gomez, and
 Alejandro Rodríguez González*

Agent Negotiation Protocols in Time-Bounded Service Composition 527
Martí Navarro, Elena del Val, Miguel Rebollo, and Vicente Julián

Writer Identification Using a Hybrid Method Combining Gabor
 Wavelet and Mesh Fractal Dimension 535
Jianjun Zhang, Zhenyu He, Yiu-ming Cheung, and Xinge You

Soft Computing Techniques in Data Mining

Segmentation of Upwelling Regions in Sea Surface Temperature Images
 via Unsupervised Fuzzy Clustering 543
Susana Nascimento and Pedro Franco

Exploration of Bagging Ensembles Comprising Genetic Fuzzy Models
 to Assist with Real Estate Appraisals 554
*Tadeusz Lasota, Zbigniew Telec, Bogdan Trawiński, and
 Krzysztof Trawiński*

Implementation and Integration of Algorithms into the KEEL
 Data-Mining Software Tool 562
*Alberto Fernández, Julián Luengo, Joaquín Derrac,
 Jesús Alcalá-Fdez, and Francisco Herrera*

A Niching Algorithm to Learn Discriminant Functions with Multi-Label
 Patterns 570
J.L. Ávila, E.L. Gibaja, A. Zafra, and S. Ventura

Fuzzy Quantification-Based Linguistic Summaries in Data Cubes with
 Hierarchical Fuzzy Partition of Time Dimension 578
Rita Castillo-Ortega, Nicolás Marín, and Daniel Sánchez

A Soft Discretization Technique for Fuzzy Decision Trees Using Resampling	586
<i>Taimur Qureshi and D.A. Zighed</i>	
Evolving Fuzzy Systems Based on the eTS Learning Algorithm for the Valuation of Residential Premises	594
<i>Tadeusz Lasota, Zbigniew Telec, Bogdan Trawiński, and Krzysztof Trawiński</i>	
GFS-Based Analysis of Vague Databases in High Performance Athletics	602
<i>Ana Palacios, Inés Couso, and Luciano Sánchez</i>	
Recent Advances on Swarm-Based Computing	
The Vector Model of Artificial Physics Optimization Algorithm for Global Optimization Problems	610
<i>Liping Xie, Jianchao Zeng, and Zhuohua Cui</i>	
Electricity Consumption Simulation Based on Multi-agent System	618
<i>Minjie Xu, Zhaoguang Hu, Baoguo Shan, and Xiandong Tan</i>	
Using Preferences to Solve Student–Class Allocation Problem	626
<i>Juan I. Cano, Luis Sánchez, David Camacho, Estrella Pulido, and Eloy Anguiano</i>	
Nearest Neighbor Interaction PSO Based on Small-World Model	633
<i>Zhihua Cui, Yongfang Chu, and Xingjuan Cai</i>	
Intelligent Computational Techniques in Medical Image Processing	
Classification Results of Artificial Neural Networks for Alzheimer’s Disease Detection	641
<i>Alexandre Savio, Maite García-Sebastián, Carmen Hernández, Manuel Graña, and Jorge Villanúa</i>	
An Automatic Segmentation and Reconstruction of Mandibular Structures from CT-Data	649
<i>Iñigo Barandiaran, Iván Macía, Eva Berckmann, Diana Wald, Michael Pierre Dupillier, Céline Paloc, and Manuel Graña</i>	
Stent Graft Change Detection After Endovascular Abdominal Aortic Aneurysm Repair	656
<i>Josu Maiora, Guillermo García, Arantxa Tapia, Iván Macía, Jon Haitz Legarreta, Céline Paloc, Manuel Graña, and Mariano de Blas</i>	

Segmentation of Abdominal Aortic Aneurysms in CT Images Using a Radial Model Approach 664
Iván Macía, Jon Haitz Legarreta, Céline Paloc, Manuel Graña, Josu Maiora, Guillermo García, and Mariano de Blas

Advances on Ensemble Learning and Information Fusion

Interval-Valued Fuzzy Observations in Bayes Classifier 672
Robert Burduk

Random Relevant and Non-redundant Feature Subspaces for Co-training 679
Yusuf Yaslan and Zehra Cataltepe

Modification of Nested Hyperrectangle Exemplar as a Proposition of Information Fusion Method 687
Michał Woźniak

Financial and Business Engineering (Modeling and Applications)

Modelling Evaluation of Railway Reform Level Using Fuzzy Logic 695
Gordan Stojić, Ilija Tanackov, Slavko Vesković, Sanjin Milinković, and Dragan Simić

A Comparison of Market Structures with Near-Zero-Intelligence Traders 703
Xinyang Li and Andreas Krause

Evaluating the Performance of Adapting Trading Strategies with Different Memory Lengths 711
Andreas Krause

MIR Day 2009 - Burgos

Improving the Language Active Learning with Multiagent Systems 719
Cristian Pinzón, Vivian López, Javier Bajo, and Juan M. Corchado

A Multi-agent System to Learn from Oceanic Satellite Image Data 727
Rosa Cano, Angélica González, Juan F. de Paz, and Sara Rodríguez

A Proposal for an Optimal Mutation Probability in an Evolutionary Model Based on Turing Machines 735
Fabio Musso and Giovanni Feverati

Segmentation and Classification of Time-Series: Real Case Studies	743
<i>J.M. Molina, J. Garcia, A.C. Bicharra Garcia, R. Melo, and L. Correia</i>	
A Compendium of Heuristic Methods for Scheduling in Computational Grids	751
<i>Fatos Xhafa and Ajith Abraham</i>	
Modeling of Network Computing Systems for Decision Tree Induction Tasks	759
<i>Krzysztof Walkowiak and Michał Woźniak</i>	
Atmospheric Pollution Analysis by Unsupervised Learning	767
<i>Angel Arroyo, Emilio Corchado, and Veronica Tricio</i>	
Improving Energy Efficiency in Buildings Using Machine Intelligence . . .	773
<i>Javier Sedano, José Ramón Villar, Leticia Curiel, Enrique de la Cal, and Emilio Corchado</i>	
Analysis, Design and Implementation of a Multiagent System, to Extract Defining Contexts Based on a Linguistic Corpus in the Neurological Disease Domain	783
<i>Luis F. Castillo, María Mercedes Suarez, Carmenza Ríos, and Manuel G. Bedia</i>	
Nature Inspired Models for Industrial Applications	
Applying Scatter Search to the Location Areas Problem	791
<i>Sónia M. Almeida-Luz, Miguel A. Vega-Rodríguez, Juan A. Gómez-Pulido, and Juan M. Sánchez-Pérez</i>	
Parameter Analysis for Differential Evolution with Pareto Tournaments in a Multiobjective Frequency Assignment Problem	799
<i>Marisa da Silva Maximiano, Miguel A. Vega-Rodríguez, Juan A. Gómez-Pulido, and Juan M. Sánchez-Pérez</i>	
SOM-Based Selection of Monitored Consumers for Demand Prediction	807
<i>Maciej Grzenda</i>	
Multiagent Systems for Power System Topology Verification	815
<i>Kazimierz Wilkosz, Zofia Kruczkiewicz, and Tomasz Rojek</i>	
Author Index	823