

Lecture Notes in Artificial Intelligence 3131

Edited by J. G. Carbonell and J. Siekmann

Subseries of Lecture Notes in Computer Science

Vicenç Torra Yasuo Narukawa (Eds.)

Modeling Decisions for Artificial Intelligence

First International Conference, MDAI 2004
Barcelona, Catalonia, Spain, August 2-4, 2004
Proceedings



Springer

Series Editors

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

Volume Editors

Vicenç Torra
Institut d'Investigació en Intel·ligència Artificial
Consejo Superior de Investigaciones Científicas
Campus U.A.B., 08193 Bellaterra, Catalonia, Spain
E-mail: vtorra@iia.csic.es

Yasuo Narukawa
Toho Gakuen
3-1-10, Naka, Kunitachi, Tokyo 186-0004, Japan
E-mail: narukawa@d4.dion.ne.jp

Library of Congress Control Number: 2004109711

CR Subject Classification (1998): I.2, F.4.1, F.1, H.2.8, I.6

ISSN 0302-9743

ISBN 3-540-22555-2 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 is a part of Springer Science+Business Media

springeronline.com

© Springer-Verlag Berlin Heidelberg 2004
Printed in Germany

Typesetting: Camera-ready by author, data conversion by DA-TeX Gerd Blumenstein
Printed on acid-free paper SPIN: 11304432 06/3142 5 4 3 2 1 0

Preface

This volume contains the papers selected for presentation at the 1st Conference on Modeling Decisions for Artificial Intelligence (MDAI 2004), held in Barcelona, Catalonia, August 2–4, 2004.

The aim of this conference was to provide a forum for researchers to discuss models for information fusion (aggregation operators) and decision, to examine computational methods and criteria for model selection and determination, and to stimulate their application in new contexts.

Fifty-three papers were submitted to the conference, from 19 different countries. Each submitted paper was reviewed by at least two experts on the basis of technical soundness, originality, significance and clarity. Based on the review reports, 26 papers were accepted for publication in this volume. Additionally, this volume contains the plenary talks given at the conference.

We would like to express our gratitude to the members of the program committee as well as to all reviewers for their work. We thank Alfred Hofmann, from Springer-Verlag, who supported the publication of these proceedings in the LNAI series.

The conference was supported by the Catalan Association for Artificial Intelligence (ACIA), the European Society for Fuzzy Logic and Technology (EUSFLAT), the Japan Society for Fuzzy Theory and Intelligent Informatics (SOFT), the IEEE Spanish Chapter, the Spanish Council for Scientific Research (CSIC) and the Generalitat de Catalunya (AGAUR 2002XT 00111).

May 2004

Vicenç Torra
Yasuo Narukawa

MDAI 2004

Program Chair

Vicenç Torra, IIIA-CSIC, Catalonia, Spain
Yasuo Narukawa, Toho Gakuen, Japan

Program Committee

T. Calvo (Spain)
J. Domingo (Spain)
M. Grabisch (France)
F. Herrera (Spain)
E. Herrera-Viedma (Spain)
K. Hirota (Japan)
H. Imai (Japan)
J. Kacprzyk (Poland)
J.-L. Marichal (Luxembourg)
R. Mesiar (Slovakia)
S. Miyamoto (Japan)
T. Murofushi (Japan)
G. Pasi (Italy)
C. Sierra (Spain)
R.R. Yager (USA)

Organization Chair

V. Torra

Organization Committee

E. Martí, A. Valls

Additional Referees

K. Fujimoto, F. Sebé, A. Martinez Ballesté, F. Esteva, G. Escalada-Imaz,
J. Castro, J. Dujmovic, J. Ozawa, A. Valls, S. Yoshida, Y. Yoshida,
I. Kojadinovic, M. Hagiwara

Supporting Institutions

Catalan Association for Artificial Intelligence (ACIA)

European Society for Fuzzy Logic and Technology (EUSFLAT)

Japan Society for Fuzzy Theory and Intelligent Informatics (SOFT)

IEEE Spanish Chapter

Spanish Council for Scientific Research (CSIC)

Catalan Agency for Research (AGAUR 2002XT 00111)

Table of Contents

Invited Talks

Introduction to RoboCup Research in Japan <i>Yoichiro Maeda</i>	1
Fuzzy Integrals <i>Radko Mesiar and Andrea Mesiarová</i>	7
Fuzzy Qualitative Models to Evaluate the Quality on the Web <i>Enrique Herrera-Viedma</i>	15
Multisets and Fuzzy Multisets as a Framework of Information Systems <i>Sadaaki Miyamoto</i>	27

Regular Papers

Stock Price Forecasting: Statistical, Classical and Fuzzy Neural Network Approach <i>Dušan Marček</i>	41
Wavelet Time Shift Properties Integration with Support Vector Machines <i>Jaime Gómez, Ignacio Melgar, and Juan Seijas</i>	49
A Study on Weighting Training Patterns for Fuzzy Rule-Based Classification Systems <i>Tomoharu Nakashima, Hisao Ishibuchi, and Andrzej Bargiela</i>	60
A Machine Learning Approach for Modeling Algorithm Performance Predictors <i>Joaquín Pérez O., Rodolfo A. Pazos R., Juan Frausto S., Laura Cruz R., Héctor Fraire H., Elizabeth Santiago D., and Norma E. García A.</i>	70
A Novel Network Traffic Analysis Method Based on Fuzzy Association Rules <i>Xinyu Yang, Wenjing Yang, Ming Zeng, and Yi Shi</i>	81
Quantum Computing Based Machine Learning Method and Its Application in Radar Emitter Signal Recognition <i>Gexiang Zhang, Laizhao Hu, and Weidong Jin</i>	92
Modeling the Distributed Control of the Lower Urinary Tract Using a Multiagent System <i>Daniel Ruiz Fernández, Juan Manuel García Chamizo, Francisco Maciá Pérez, and Antonio Soriano Payá</i>	104

Mining Diagnostic Taxonomy Using Interval-Based Similarity from Clinical Databases <i>Shusaku Tsumoto</i>	115
Combining Multiple Classifiers Using Dempster's Rule of Combination for Text Categorization <i>Yazın Bi, David Bell, Hui Wang, Gongde Guo, and Kieran Greer</i>	127
An Empirical Analysis of Assessment Errors for Weights and Andness in LSP Criteria <i>Jozo J. Dujmović and Wen Yuan Fang</i>	139
Reliability of LSP Criteria <i>Jozo J. Dujmović and Wen Yuan Fang</i>	151
Unsupervised Aggregation by the Choquet Integral Based on Entropy Functionals: Application to the Evaluation of Students <i>Ivan Kojadinovic</i>	163
Preservation of Distinguished Fuzzy Measure Classes by Distortion <i>Ľubica Valášková and Peter Struk</i>	175
Decision Modelling Using the Choquet Integral <i>Yasuo Narukawa and Toshiaki Murofushi</i>	183
Measurements of Consensus in Multi-granular Linguistic Group Decision-Making <i>Enrique Herrera-Viedma, Francisco Mata, Luis Martínez, Francisco Chiclana, and Luis G. Pérez</i>	194
On Detecting Interactions in Hayashi's Second Method of Quantification <i>Hideyuki Imai, Daigo Izawa, Kiyotaka Yoshida, and Yoshiharu Sato</i>	205
A Generalization of Symbolic Data Analysis Allowing the Processing of Fuzzy Granules <i>Vasile Georgescu</i>	215
A Learning Procedure to Estimate Missing Values in Fuzzy Preference Relations Based on Additive Consistency <i>Sergio Alonso, Francisco Chiclana, Francisco Herrera, and Enrique Herrera-Viedma</i>	227
Decision Making in a Dynamic System Based on Aggregated Fuzzy Preferences <i>Yuji Yoshida</i>	239

Object Positioning Based on Partial Preferences <i>Josep M. Mateo-Sanz, Josep Domingo-Ferrer, and Vicenç Torra</i>	252
A Comparative Study of Clustering Methods for Long Time-Series Medical Databases <i>Shusaku Tsumoto and Shoji Hirano</i>	260
Fuzzy Multiset Model and Methods of Nonlinear Document Clustering for Information Retrieval <i>Sadaaki Miyamoto and Kiyotaka Mizutani</i>	273
A Feature Weighting Approach to Building Classification Models by Interactive Clustering <i>Liping Jing, Joshua Huang, Michael K. Ng, and Hongqiang Rong</i>	284
A Framework for Representation and Manipulation of Vague Knowledge <i>Van Nam Huynh and Yoshiteru Nakamori</i>	295
Comparing Transitive Closure with a New T-transitivization Method <i>Luis Garmendia and Adela Salvador</i>	306
On the Interpretation of Some Fuzzy Integrals <i>Vicenç Torra and Yasuo Narukawa</i>	316
Author Index	327