

EXPERTSYS-96

ARTIFICIAL INTELLIGENCE APPLICATIONS

Subject Editors:

**J. Zarka, E. Mercier-Laurent
D. L. Crabtree, M. Narasipuram**

INTERNATIONAL SCIENTIFIC COMMITTEE

D. Boulanger, Université de Lyon 3 (F)
P. Chopra, University of Tennessee (USA)
C. Clevenson, E.I. Dupont (USA)
J.W. Guan, University of Ulster (U.K.)
S. Hashemi, University of Houston (USA)
A. Jovanovic, MPA Stuttgart (Germany)
M. Krisper, Ljubljana University, (Bosnia)
J.P. Marciano, Univ. de Aix-Marseille (F)
T. Martelli, Univ. Paris 5, LIMSI-CNRS (F)
J. Musgrove, Bechtel Corporation (USA)
H.S. Nwana, University of Keele (U.K)

G. Quirchmayr, Vienna Univ. (Austria)
U. Schmitt, FOGRA, (Germany)
R.V. Schuwer, Eindhoven Univ.
of Tech. (Netherlands)
M. Sebag, CNRS-LMS Palaiseau (France)
B. Singer, Paris University (F)
P. Smith, University of Sunderland (U.K.)
S. Steadman, Univ. of Wyoming (USA)
J., Surma, Univ. of Economics (Poland)
C. Vassiliadis, Ohio University (USA)



i.i.t.t.
International

UNIVERSITÄTSBIBLIOTHEK
HANNOVER
TECHNISCHE
INFORMATIONSBIBLIOTHEK

Postal Address: F-93460 Gournay s/M, France

Offices: 39 Promenade des Patis, F-77420 Champs s/M, France

Tel: 331-64683600, Fax: 331-64685480

E-mail: 101545.3645@compuserve.com

http://ourworld.compuserve.com/homepages/IITT_INT

Technology Transfer Series
Series Editor: A. Niku-Lari

Copyright © 1996 - IITT-International
ISBN 2-90766933-8

CONTENTS

CHAPTER 1: FUNDAMENTAL ASPECTS	1
An Evolution Program for Optimisation of Discrete Problems. K.C. Chan, S.S. Leong, and Sulung, The University of New South Wales, AUSTRALIA	3
GOPT-Resolution and Its Applications. Faye F. Liu, The University of South Australia, and Douglas H. Moore, La Trobe University , AUSTRALIA	9
Problem Solving Using Classification of the Domain Problems. Nathalie Guin, LAFORIA, FRANCE	15
Abstraction Mechanisms to Modelize Human Strategy in the Game of Go. Patrick Ricaud, LAFORIA, FRANCE	21
Automated Generation of Interesting Conjectures. Christophe Turle, LAFORIA-IBP, FRANCE	27
Artificial Intelligence Support for Conceptual Design. B. Lees, D.G. Jenkins, University of Paisley, UK	33
A GA-based approach to solve simultaneous linear equations. J.L. Fernández-Villacanas, S. Amin, M. Gell, B.T. Laboratories, U.K.	39
A Formal Model for Computing Argumentation Strategies. A. de Korvin (a) , G. Quirchmayre (b), S. Hashemi (b), R. Robbins (b), (a) University of Houston - Downtown, U.S.A., (b) Unviersity of Wien, AUSTRIA	47
CHAPTER 2: NEURAL NETWORK, GENETIC ALGORITHMS	55
A Comparison of Neural Network Based and Regression Based Models for the Prediction of EEG indices. Aashish Gulati, Derya A. Jacobs, Murat N. Silan, Old Dominion University, Alan T. Pope, NASA Langley Research Center, USA	57
Neural Networks and Statistical Models: A Case of the Relation of Human Performance Factors to the Outcomes of Military Combat. Wm. Oliver Hedgepeth, U.S.Army, Pentagon, Derya A. Jacobs, Laurence D. Richards, Old Dominion University, USA	63

Application of A.I. Techniques in Shell Design. R. V. Koteswara Rao, G. Yesuratnam, Jawaharlal Nehru Technological University, INDIA	69
Solving the Triangulation Problem in Real Time with an Imbedded Neural Network. Louis Sanzogni, Richard F. Bonner, Griffith University, AUSTRALIA and John A. Vaccaro, The Open University , U.K.	75
Two Numerical Learning Systems. M. Terrien, Ecole Polytechnique, FRANCE	81
An Intelligent Adaptive System for Improving the Behaviour of Simple Genetic Algorithms. Chen-Fang Tsai, C.G.D. Bowerman, J.I. Tait, University of Sunderland , UK	89
The Power of Mutation. Pierre A.I. Wijkman, Stockholm University and Royal Institute of Technology, SWEDEN	95
A Hybrid Expert System for a Network Application Problem Diagnosis. Nittida Nuransri, Tharam S. Dillon, Samar Singh, La Trobe University, AUSTRALIA	99
CHAPTER 3: REASONING	107
Two Industrial Applications Developed on a Common Knowledge Based System. Andrew Kispal, Botond Virginas, Max Bramer, University of Porthmouth, U.K.	109
A Routine Design Model Based on Extensive Design Space Search. Argiris J.Dentsoras, University of Patras, GREECE	115
A Knowledge-Based Approach for the Generation of Assembly Strategies. C.J. Tsaprounis, A.J. Dentsoras, N.A. Aspragathos, University of Patras, GREECE	121
Induction in an Expert System Shell for Dynamic Domains. Silvia Gomez, David Lorenzo, Ramon P. Otero, University of Corunna, SPAIN	127
Algorithm of Rules Extraction from Learning Data. Vladimir I. Gorodetski, Oleg Karsaev, St. Petersburg Institute for Informatics and Automation, RUSSIA.....	133

Integration of Human Knowledge, Fuzzy set and Bayesian Networks for the Stock Market Timing Forecast. Jaques Janssen, Gabriel Ruelas, Université Libre de Bruxelles, BELGIUM	139
Spatial Reasoning with Uncertainty in Generalized Evidential Theory. ShengLi Shi, D.A. Bell, University of Ulster, UK	145
CHAPTER 4: TRANSPORTATION	151
Computer Aided Ergonomic Design: Use of Artificial Intelligence Techniques. Aline Alauzet, INRETS/LESCO, FRANCE	153
Computation of the normalized effective volume of car trunks. A constraint Programming Approach. Hubert Terrier, Arnaud Leforestier, Denis Bèja, GIST, Gilbert Nicolas, Renault, FRANCE	159
An Expert System with Deep Knowledge for Urban Traffic Control Based on a Parallel Architecture. L.A. Garcia, F. Toledo, Universitat Jaume I , S. Moreno, E. Bonet, Universitat de Valencia , SPAIN.....	167
Qualitative Modelling for Building Sensor Independent Knowledge Bases in Control Applications. S. Moreno, F. Toledo, E. Bonet, G. Martin, Universitat Jaume I & Universitat de Valencia, SPAIN	173
CHAPTER 5: KNOWLEDGE ACCESS	179
The Comparative Part of the Corpus Legis Project: Using SGML for Intelligent Information Retrieval of Legal Documents. Georg Haider, Gerald Quirchmayr, Verena Sebald, University of Wien, AUSTRIA, Cecilia Magnusson Sjöberg, Stockholm University, SWEDEN.....	181
Text Filtering with the INFOrmer Interface Agent. H. Sorensen, A. O’Riordan, C. O’Riordan, University College Cork, IRELAND	187
A Deontic-logic based Intelligent Agent Framework for Electronic Clipping Services on Information Highways. M. Mohan Narasipuram, City University of Hong Kong, HONG KONG	193

Rule-Based Knowledge Representation Using a Database. Paul Skarek, CERN SWITZERLAND and Laszlo Zsolt Varga, KFKI-MSZKI, HUNGARY	199
CHAPTER 6: ENGINEERING APPLICATIONS	207
Opimal Design of Structures with direct Links to CAD Systems. J. Zarka, P. Navidi, Ecole Polytechnique, FRANCE	209
Control Agents: Implementing on Industrials Networks. Raouf Benamara, Carlos Moreno, EVRY University, FRANCE	219
Quick Customer Response by Expert Systems: A case Study. Kwai-Sang Chin, T.C. Du, City University of Hong Kong, HONG KONG	229
Planning Activities in a Health-Care Structure: An Intelligent-Agent Architecture. Fernando Ferri, Patrizia Grifoni, ISRDS - CNR, ITALY	235
A Three-Levels Plex Grammars - Based Approach for Manufacturing Feature Recognition. E. Ostrosi, A. Coulibaly, B Mutel, P. Lutz, ENSAIS - LRPS, FRANCE	241
Non Destructive Testing and Artificial Intelligence. M. Terrien, Ecole Polytechnique, FRANCE	247
A Case-Based Reasoning System for Pilot Production Using FMEA Data. Tzu-Fu Chiu, Oxford University College, TAIWAN, and Jackie Archibald, Colin Hardy, University of Sunderland, UK	255
CHAPTER 7: PLANNING, SCHEDULING, LEARNING	261
Machine Learning Applied to the Control of Complex systems. Dominique Luzeau, ETCA, FRANCE	263
Least-Commitment Strategy for Ordering Subgoals in Partial-Order Planning. In Cheol Kim, Kyonggi University, KOREA	273
A Genetic Approach to the Generic Crew Scheduling Problem. Norihiro Ono, Takuya Tsugawa, Tokushima University, JAPAN	279

Acquisition of Optimal Communication by Episode-Sharing Artificial Organisms. Norihiro Ono, Minoru Morinaga, Tokushima University, JAPAN	285
Multiagent Reinforcement Learning in a Continuous Environment. Norihiro Ono, Yoshihiro Fukuta, Tokushima University, JAPAN	291
Learning to Coordinate: a Reinforcement Learning Approach. Norihiro Ono, Kenji Fukumoto, Tokushima University, JAPAN	297
CHAPTER 8: DIAGNOSTICS	303
A Knowledge Acquisition Tool for Developing Diagnosis Systems. Young S. Choi, Suk I. Yoo, Seoul National University, KOREA	305
Development and Analysis of an Expert System Generation Tool for Differential Diagnosis Based on a Psychological Attention Model. Angel Garcia-Crespo, Paloma Domingo Garcia, Universitat Carlos III de Madrid, SPAIN	311
A SB-TREE Parallel Algorithm for Evidence Combination Using the Dempster's Rule. Horace H.S. IP, Hong-Ying Tang, City University of Hong Kong, HONG KONG	317
Development of a Knowledge-Based System for Waste Water Pipeline Failure Risk Assessment. Derya A. Jacobs, Old Dominion University, Adam M. Ngaliga, Norfolk Southern Railways Corp., USA	323
Diagnosis and Reasoning Reifying. Michel Masson, LAFORIA - IBP, FRANCE	329
SEDA: Expert System Generation Tool for the Accomplishment of Corrective Maintenance Tasks in an Industrial Environment. Angel Garcia-Crespo, Miryam Lancha Rojas, Almudena Sierra Alonso, Paloma Domingo Garcia, Universitat Carlos III de Madrid, SPAIN	335
CHAPTER 9: EDUCATION	341
Geographic Information System to be used in Municipal Environment Planning: a Lawful Instrument to be used on Soil Regulation. Beatriz Nozari Ribeiro de Carvalho, Edis Mafra Lapolli, Ricardo Miranda Barcia, University of Modena, ITALY	343

Application of Expert System Techniques as a Predictor of the At-Risk Student Entering Mechanical Engineering Technology. Donald L. Crabtree, Purdue University, USA	349
A Blackboard Model Approach for Solving Ill-Defined Problems Through Problem Structuring. Mukesh Rohatgi, Old Dominion University , USA	355
SYGEP, a Problem Generator for Various Domains. Georges Pecego, Université de Paris VI, LAFORIA-IBP, FRANCE	361
CHAPTER 10: NATURAL LANGUAGE	367
The Formalisation of Specifications from Specification written in Natural Language. Alain-Jérôme Fougères, Centre National D'Etudes Des TELECOM and Philippe Trigano, UTC, FRANCE	369
Usage of Verb Information in a Natural Language Based Information Retrieval System. HoWook Jang, ETRI, KOREA	375
CHAPTER 11: MEDICAL APPLICATIONS, ENVIRONMENT	381
Neural Networks in Medical Expert Systems. John Kocur Jr. , E-Systems Greenville, Sang C. Suh, Texas A&M University, USA	383
Efficient Concurrent Execution of Medtool Expert Systems. Manuel Cabarcos, Pedro Cabalar, Vigo University, Mario Otero-Diaz, Ramon P. Otero, Coruna University, SPAIN	389
Intelligent Colour Blindness Testing: The Farnsworth-Munsell 100 HUE. M.J. McAlister, V. Martino, University of Sunderland, UK	395
Intelligent Expert Database System for Differential Diagnosis of Ear Diseases. Sang C. Suh, S.I. Saffer, Paul S. Sundar Singh, Texas A&M University, USA	401
The Operation of a Storm Drainage Network: An Expert System to Evaluate the Sensitivity of the Urban Fabric to Network Failure. A. Karnib, J. Al-Hajjar, Université d'Artois, D. Boissier, Université Blaise Pascal, FRANCE	407

CHAPTER 12: KNOWLEDGE MANAGEMENT 413

Sharing Domain Knowledge and Reusing Problem Solving Methods.

Kuo Ming Chao (a), Marin Guenov (b), Bill Hills (b), Peter Smith (a),
Ian Buxton (b), Chen-Fang Tsai (c),

(a) University of Sunderland,

(b) University of Newcastle Upon Tyne, UK,

(c) Tamsui Oxford University College, TAIWAN 415

A Process-centered Advisability Analysis to Capitalizing Company Knowledge.

Michel Grundstein, Framatome, FRANCE 421

Knowledge Management: Some Industrial Examples.

E. Mercier-Laurent, EML Conseil, FRANCE 427

CHAPTER 13: MODELLING 433

Semantic Conflict Solving: From Theory to Systems.

Laurent Chaudron, CERT-ONERA, FRANCE 435

An Expert System for The Development of New Telecommunications Services. Armin

P. G. Eberlein, Fred Halsall, University of Wales, UK 441

Analysis of the Impact of Business Change on Software Systems.

Bill Karakostas, UMIST, UK 447

Limits of Knowledge Base Validation.

Mieczyslaw Lech Owoc, Malgorzata Ochmanska,

Academy of Economics Wroclaw, POLAND 453

Development of Image Processing applications within a Cooperative Knowledge-Based Workbench.

Christine Porquet, Règis Clouard, Valérie Fichet,

Marinette Revenu, GREYC- ISMRA, FRANCE 459

Evolutionary Identification of Rheological Models.

M. Sebag, M. Schoenauer, H. Maitournam,

Ecole Polytechnique, FRANCE 465

CHAPTER 14: MULTI AGENTS 471

A Multi-Agent Approach for a Pressurized Water Reactor (P.W.R.) Control System.

Mathilde Aimar, Gilles Arnaud, Patrick Lardjane,

Michel Dumas, CEA & CRIL Ingénierie, FRANCE 473

Negotiation Protocols in an Information System Cooperation. D. Boulanger, G. Dubois, C. Wintergerst, Université de Lyon III, FRANCE	479
A Multi-Agent System to Study the Economic-Agents Evolution. Z. Guessoum, LAFORIA-IBP, R. Durant, Groupe HEC, FRANCE	485
Towards a Multi-Agents System for Help to the Resolution of Problem and a Dynamic Organisation Elaboration. B.G. Tsobgni Dongmo, Université d'Aix Marseille, FRANCE	491
A Constraint Based Framework for Multi-Agent Coordination. Huaqing Wang, Lejian Liao, City University of Hong Kong, HONG KONG	497
CHAPTER 15: SOFTWARE ENGINEERING	503
A Method of Applying Software Metrics in Knowledge Engineering. Edmundo Tovar, Madrid Universidad Politecnica, SPAIN.	505
Automatic Generation of Software Test Data Using Genetic Algorithms and Relaxation Techniques. Alison L. Watkins, Suzanne Farrar, University of Plymouth, UK	511
Fault Diagnosis and Network Entities in a Next Generation Network Management System. Tony White, Niall Ross, Nortel Technology Ltd, UK	517
A Knowledge Based Group Decision Support System for Confrontation. Hai Zhuge, Jian Ma, City University of Hong Kong, HONG KONG	523
Towards Bug Free Software Engineering for Telecommunications. P. Bellot, J-P Cottin, A. Demaille, J. Leneutre, E. Zarpas, ENST, FRANCE	529
Software Safety: An Integrated and Knowledge-Based Approach For Early Product Lifecycle Phases. Stefan Scheer, European Commission, Joint Research Centre, ITALY	535
TERAS: The Travel Reimbursement Advisory . A. de Korvin, S. Hashemi, R. Robbins, M. Paravic, University of Houston - Downtown, U.S.A	541
AUTHOR INDEX.....	547