

Lecture Notes in Artificial Intelligence

1515

Subseries of Lecture Notes in Computer Science

Edited by J. G. Carbonell and J. Siekmann

Lecture Notes in Computer Science

Edited by G. Goos, J. Hartmanis and J. van Leeuwen

Springer

Berlin

Heidelberg

New York

Barcelona

Hong Kong

London

Milan

Paris

Singapore

Tokyo

Flávio Moreira de Oliveira (Ed.)

Advances in Artificial Intelligence

14th Brazilian Symposium
on Artificial Intelligence, SBIA'98
Porto Alegre, Brazil, November 4-6, 1998
Proceedings



Springer

Series Editors

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

Volume Editor

Flávio Moreira de Oliveira
Instituto de Informática - PUCRS
Av. Ipiranga 6681, prédio 30, bloc 4
90619-900 Porto Alegre - RS, Brazil
E-mail: flavio@kriti.inf.pucrs.br

Cataloging-in-Publication Data applied for

Die Deutsche Bibliothek - CIP-Einheitsaufnahme

Advances in artificial intelligence : proceedings / 14th Brazilian Symposium on Artificial Intelligence, SBIA'98, Porto Alegre, Brazil, November 4 - 6, 1998. Flávio Moreira de Oliveira (ed.). - Berlin ; Heidelberg ; New York ; Barcelona ; Budapest ; Hong Kong ; London ; Milan ; Paris ; Singapore ; Tokyo : Springer, 1998
(Lecture notes in computer science ; Vol. 1515 : Lecture notes in artificial intelligence)
ISBN 3-540-65190-X

CR Subject Classification (1998): I.2

ISSN 0302-9743

ISBN 3-540-65190-X 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-Verlag. Violations are liable for prosecution under the German Copyright Law.

© Springer-Verlag Berlin Heidelberg 1998
Printed in Germany

Typesetting: Camera-ready by author

SPIN: 10692710 06/3142 - 5 4 3 2 1 0 Printed on acid-free paper

Preface

The Brazilian Symposium on Artificial Intelligence (SBIA) has been organized by the Interest Group on Artificial Intelligence of the Brazilian Computer Society (SBC) since 1984. In order to promote research in Artificial Intelligence and scientific interaction among Brazilian AI researchers and practitioners, and with their counterparts worldwide, it is being organized as an international forum since 1993. The SBIA proceedings have been published by Springer-Verlag as a part of the Lecture Notes in Artificial Intelligence (LNAI) series since 1995.

The XIVth SBIA, held in 1998 at the PUCRS Campus in Porto Alegre, has maintained the international tradition and standards previously established: 61 papers were submitted and reviewed by an international program committee, from this number, 26 papers were accepted and are included in this volume.

Of course, organizing an event such as SBIA demands a lot of group effort. We would like to thank and congratulate all the program committee members, and the many reviewers, for their work in reviewing and commenting on the submitted papers. We would also like to thank the Pontifical Catholic University of Rio Grande do Sul, host of the XIV SBIA, and the institutions which sponsored it - CNPq, CAPES, BANRISUL, among others. Last but not least, we want to thank all the kind people of the Local Organizing Committee, whose work made the event possible.

Porto Alegre, November 1998

Flávio Moreira de Oliveira

Program Committee Members

*Flávio M. de Oliveira (Instituto de Informática - PUCRS, Brazil) ***
Antonio Carlos da Rocha Costa (Univ. Católica de Pelotas, Brazil)
Luis Otávio Alvares (Instituto de Informática - UFRGS, Brazil)
Dibio Borges (Univ. Federal de Goiania, Brazil)
Celso Kaestner (CEFET - PR, Brazil)
Tarcisio Pequeno (LIA - Univ. Federal do Ceará, Brazil)
Edson de Carvalho Filho (DI - UFPE, Brazil)
Ariadne Carvalho (Unicamp - Brazil)
Maria Carolina Monard (USP - São Carlos, Brazil)
Guilherme Bittencourt (LCMI - Univ. Federal de S. Catarina, Brazil)
Sandra Sandri (Inst. Nacional de Pesquisas Espaciais, Brazil)
Wagner Silva (UnB, Brazil)
Edilson Fereda (Univ. Federal da Paraíba, Brazil)
Helder Coelho (Univ. de Lisboa, Portugal)
Yves Demazeau (Lab. Leibniz/IMAG - Grenoble, France)
Barbara Hayes-Roth (Stanford Univ. - USA)
Stefan Wrobel (GMD, Germany)
Manuela Veloso (Carnegie Mellon - EUA)
John Self (Leeds Univ. - UK)
Peter Ross (Edinburgh Univ. - UK)

Local Organizing Committee

Ana L.V. Leal, Gabriela Conceição, Iára Claudio, João L.T. da Silva, Lúcia M.M. Giraffa, Michael C. Mora, all the people at IIPUCRS, Ricardo Annes, Ricardo M. Bastos, Thais C. Webber, The PET Group.

List of Reviewers

Alexandre Ribeiro
Ana Teresa de Castro Martins
Antonio Carlos da Rocha Costa
Ariadne Carvalho
Arnaldo Moura
Barbara Hayes-Roth
Bertilo F. Becker
Celso Kaestner
Dibio Borges
Doris Ferraz de Aragon
Edilson Ferneda
Edson de Carvalho Filho
Eloi F. Fritsch
Flávio M. de Oliveira
Flavio Soares Correa da Silva
Germano C. Vasconcelos
Guilherme Bittencourt
Hans-Jorg Schneebeli
Helder Coelho
Jacques Wainer
João Balsa
John Self
Lúcia M.M. Giraffa
Luis Antunes
Luis Moniz

Luis Moniz
Luis Otávio Alvares
Manuela Veloso
Mara Abel
Marcelino Pequeno
Maria Carolina Monard
Maria das Gracias Volpe Nunes
Mathias Kirsten
Michael C. Mora
Patrick Doyle
Paulo J. L. Adeodato
Peter Ross
Raul S. Wazlawick
Riverson Rios
Rosa M. viccari
Sandra Sandri
Solange Oliveira Rezende
Stefan Wrobel
Tarcisio Pequeno
Teresa B. Ludermir
Thomas F. Gordon
Vera L.S. de Lima
Wagner Silva
Wilson R. de Oliveira Jr.
Yves Demazeau

Contents

Multi-agent Systems

On Personal and Role Mental Attitudes: A Preliminary Dependence-Based Analysis	1
<i>J.S. Sichman, R. Conte</i>	
An Autonomous Agent Architecture and the Locomotion Problem.....	11
<i>C.C. de Sá, G. Bittencourt, N. Omar</i>	
Building Object-Agents from a Software Meta-Architecture	21
<i>A. Amandi, A. Price</i>	
Agent's Programming from a Mental States Framework	31
<i>M. Corrêa, H. Coelho</i>	

Intelligent Tutoring Systems

The Component Based Model of the Control Knowledge in an Intelligent Tutoring Shell	40
<i>L. Jerinic, V. Devedzic, D. Radovic</i>	
Modeling the MCOE Tutor Using a Computational Model	50
<i>L.M.M. Giraffa, M. da C. Móra, R.M. Viccari</i>	
From a Tridimensional View of Domain Knowledge to Multi-agent Tutoring System	61
<i>E. de Barros Costa, A. Perkusich, E. Ferneda</i>	

Natural Language

A Transfer Dictionary for Words and Bigrams	73
<i>J. Kinoshita</i>	
Integrating Morphological, Syntactical and Semantical Aspects Through Multi-agent Cooperation.....	83
<i>J.L.T. da Silva, P.R.C. Abrahão, V.L.S. de Lima</i>	
A Massively Parallel Architecture for Natural Language Parsing - Some Results	93
<i>R.S. Wazlawick, J.G. Pereira Lopes</i>	

Machine Learning and Neural Networks

Planning and Learning: Put the User in the Loop.....	101
<i>J.L. Ferreira, E.J. Costa</i>	
Redundant Covering with Global Evaluation in the RC1 Inductive Learner.....	111
<i>A. de Andrade Lopes, P. Brazdil</i>	
Towards Integrating Hierarchical Censored Production Rule (HCPR) Based Systems and Neural Networks.....	121
<i>K.K. Bharadwaj, J.D.S. da Silva</i>	
Goal-Directed Reinforcement Learning Using Variable Learning Rate.....	133
<i>A.P. de S. Braga, A.F.R. Araújo</i>	

Logic Programming

On the Relations between Acceptable Programs and Stratifiable Classes.....	141
<i>F. Protti, G. Zaverucha</i>	
An Adaptation of Dynamic Slicing Techniques for Logic Programming.....	151
<i>W.W. Vasconcelos, M.A.T. Aragão</i>	
Argumentative and Cooperative Multi-agent System for Extended Logic Programming.....	161
<i>I. de Almeida Móra, J.J. Alferes</i>	

Knowledge Representation

Modeling Credulity and Skepticism through Plausibility Measures.....	171
<i>B. Borges Garcia, G.Pereira Lopes, P. Quaresma</i>	
Fuzzy Temporal Categorical and Intensity Information in Diagnosis.....	181
<i>J. Wainer, S. Sandri</i>	
Experiments on a Memory Structure Supporting Creative Design.....	191
<i>P. Gomes, C. Bento</i>	
Real Time Variable Precision Logic Systems.....	201
<i>N.M. Hewahi</i>	
Strong Conditional Logic.....	209
<i>C. Nalon, J. Wainer</i>	
Computing Aesthetics.....	219
<i>P. Machado, A. Cardoso</i>	

AI Applications

Manipulator Robots Using Partial-Order Planning..... 229
J.H.M. Nogueira, S.C.P. Gomes

Darwinci: Creating Bridges to Creativity 239
F.C. Pereira, P. Machado, A. Cardoso

Scheduling to Reduce Uncertainty in Syntactical Music Structures..... 249
M. Ferrand, A. Cardoso

Author Index 259