

Lecture Notes in Artificial Intelligence

1489

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

Budapest

Hong Kong

London

Milan

Paris

Singapore

Tokyo

Jürgen Dix Luís Fariñas del Cerro
Ulrich Furbach (Eds.)

Logics in Artificial Intelligence

European Workshop, JELIA '98
Dagstuhl, Germany, October 12-15, 1998
Proceedings



Springer

Series Editors

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

Volume Editors

Jürgen Dix

Department of Computer Science, University of Maryland
College Park, Maryland 20742, USA
E-mail: dix@cs.umd.edu

Luís Fariñas del Cerro

I.R.I.T. Université Paul Sabatier
118 route de Narbonne, F-31062 Toulouse Cedex, France
E-mail: farinas@irit.fr

Ulrich Furbach

Fachbereich 4: Informatik, Universität Koblenz
Rheinau 1, D-56075 Koblenz, Germany
E-mail: uli@informatik.uni-koblenz.de

Cataloging-in-Publication Data applied for

Die Deutsche Bibliothek - CIP-Einheitsaufnahme

Logics in artificial intelligence : European workshop ; proceedings /
JELIA '98, Dagstuhl, Germany, October 12 - 15, 1998 / Jürgen Dix
... (ed.). - Berlin ; Heidelberg ; New York ; Barcelona ; Budapest ;
Hong Kong ; London ; Milan ; Paris ; Santa Clara ; Singapore ;
Tokyo : Springer, 1998
(Lecture notes in computer science ; Vol. 1489 : Lecture notes in
artificial intelligence)
ISBN 3-540-65141-1

CR Subject Classification (1991): I.2, D.1.6, F.4.1

ISBN 3-540-65141-1 Springer-Verlag 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 10638847 06/3142 - 5 4 3 2 1 0

Printed on acid-free paper

Preface

This volume contains the papers selected for presentation at the conference and two abstracts from invited speakers. The programme committee selected these 25 papers from 12 countries out of 65 submissions from 17 countries.

The first JELIA meeting was in Roscoff, France, ten years ago. Afterwards, it took place in the Netherlands, Germany, United Kingdom, Portugal, and now again in Germany. The proceedings of the last four meetings appeared in the Springer-Verlag LNCS series, and a selected series of papers of the English and the Portuguese meeting appeared as special issues in the *Journal of Applied Non-Classical Logics* and in the *Journal of Automated Reasoning*, respectively.

The aim of JELIA was and still is to provide a forum for the exchange of ideas and results in the domain of foundations of AI, focusing on rigorous descriptions of some aspects of intelligence. These descriptions are promoted by applications, and produced by logical tools and methods. The papers contained in this volume cover the following topics:

1. *Logic programming*
2. *Epistemic logics*
3. *Theorem proving*
4. *Non-monotonic reasoning*
5. *Non-standard logics*
6. *Knowledge representation*
7. *Higher order logics*

We would like to warmly thank the authors, the invited speakers, the members of the program committee, and the additional reviewers listed below. They all have made these proceedings possible and ensured their quality.

August 1998

Jürgen Dix, Koblenz
Luís Fariñas del Cerro, Toulouse
Ulrich Furbach, Koblenz

Conference Organization

Conference Chair

Jürgen Dix University of Koblenz, Germany

Program Chairs

Luís Fariñas del Cerro University of Toulouse, France
 Ulrich Furbach University of Koblenz, Germany

Program Committee

Bruno Buchberger	RISC, Linz, Austria
Ricardo Caferra	LIFIA, Grenoble, France
Robert Demolombe	University of Toulouse, France
Patrice Enjalbert	University of Caen, France
Pascal van Hentenryck	University of Amsterdam, Netherlands
Michael Kohlhase	University of Saarbrücken, Germany
Vladimir Lifschitz	University of Texas, U.S.A.
Kym MacNish	University of Western Australia, Australia
Daniele Mundici	University of Milan, Italy
Ilkka Niemelä	Helsinki University of Technology, Finland
David Pearce	University of Saarbrücken, Germany
Luís Moniz Pereira	Universidade Nova de Lisboa, Portugal
Teodor Przymusiński	University of California at Riverside, U.S.A.
Andrzej Szalas	Warszaw University, Poland
Mary-Anne Williams	University of Newcastle, Australia
Stefan Wrobel	University of Magdeburg, Germany

Organizing Committee (University of Koblenz, Germany)

Chandrabose Aravindan
 Peter Baumgartner
 Michael Kühn
 Frieder Stolzenburg
 Bernd Thomas

Sponsors

ESPRIT Compulog Network of Excellence
 University of Koblenz
 Research Committee 1.2 Inference Systems of the *German Society of Computer Science*

Invited Speakers

Erik Sandewall Linköping University, Sweden
 Bart Selman Cornell University, U.S.A.
 Paul Tarau Université de Moncton, Canada

Additional Referees

J.J. Alferes	T. Horvath
P. Balbiani	U. Hustadt
P. Baumgartner	T. Janhunen
B. Beckert	I. Jarras
S. Benferhat	J. Karczmarszuk
P. Besnard	S. Kraus
C. Bettini	J. Lang
F. Boniol	D. Lehmann
T. Boy de la Tour	R. Li
G. Brewka	V. Marek
A. Burt	M. Marin
M. Castilho	M. May
F. Clerin	N. McCain
S. Costantini	M. Milano
J.C. Cunha	Y. Moinard
C.V. Damasio	N. Peltier
S. Demri	M. Protzen
M. Dierkes	S. Ratschan
V. Dugat	H. Rolletschek
C. Dupre	D. Sadek
T. Eiter	T. Schaub
J. Engelfriet	K. Schlechta
M.C. Ferreira	R. Schmidt
S. Fevre	D. Seipel
B. Fronhöfer	B. Selman
O. Gasquet	P. Simons
M. Gelfond	F. Stolzenburg
T. Gordon	T. Stratulat
G. Gottlob	V.S. Subrahmanian
P. Gribomont	F. Toni
J. Halpern	H. Turner
H. Herre	Y.S. Usenko
A. Herzig	A. Zanardo
S. Hölldobler	G. Zanon
H. Hong	

Previous Workshops

1988 Roscoff	France
1990 Amsterdam	Netherlands
1992 Berlin	Germany
1994 York	United Kingdom
1996 Evora	Portugal

Table of Contents

Logic Programming

The Well-Founded Semantics <i>Is</i> the Principle of Inductive Definition.....	1
<i>Marc Denecker</i>	
Combining Introspection and Communication with Rationality and Reactivity in Agents.....	17
<i>Pierangelo Dell’Acqua, Fariba Sadri, Francesca Toni</i>	
Disjunctive Logic Program = Horn Program + Control Program.....	33
<i>Wenjin Lu, Ulrich Furbach</i>	
Semantics of Partial-Order Programs	47
<i>Mauricio Osorio</i>	

Epistemic Logics

Persistence and Minimality in Epistemic Logic.....	62
<i>Wiebe van der Hoek, Jan Jaspars, Elias Thijssen</i>	
Prohairetic Deontic Logic (PDL)	77
<i>Leendert W.N. van der Torre, Yao-Hua Tan</i>	
Phased Labeled Logics of Conditional Goals	92
<i>Leendert W.N. van der Torre</i>	

Theorem Proving

Analysis of Distributed-Search Contraction-Based Strategies	107
<i>Maria Paola Bonacina</i>	
A Deduction Method Complete for Refutation and Finite Satisfiability.....	122
<i>François Bry, Sunna Torge</i>	
Requirement-Based Cooperative Theorem Proving.....	139
<i>Dirk Fuchs</i>	
⋈-Resolution: An Inference Rule for Regular Multiple-Valued Logics	154
<i>Sonia M. Leach, James J. Lu, Neil V. Murray, Erik Rosenthal</i>	
A Matrix Characterization for <i>MELL</i>	169
<i>Heiko Mantel, Christoph Kreitz</i>	
A Resolution Calculus for Dynamic Semantics	184
<i>Christof Monz, Maarten de Rijke</i>	
Algorithms on Atomic Representations of Herbrand Models.....	199
<i>Reinhard Pichler</i>	

Non-monotonic Reasoning

On the Intertranslatability of Autoepistemic, Default and Priority Logics, and Parallel Circumscription	216
<i>Tomi Janhunen</i>	
An Approach to Query-Answering in Reiter's Default Logic and the Underlying Existence of Extensions Problem.....	233
<i>Thomas Linke, Torsten Schaub</i>	
Towards State Update Axioms: Reifying Successor State Axioms.....	248
<i>Michael Thielscher</i>	

Non-standard Logics

A Mechanised Proof System for Relation Algebra Using Display Logic	264
<i>Jeremy E. Dawson, Rajeev Goré</i>	
Relative Similarity Logics are Decidable: Reduction to FO^2 with Equality..	279
<i>Stéphane Demri, Beata Konikowska</i>	
A Conditional Logic for Belief Revision	294
<i>Laura Giordano, Valentina Gliozzi, Nicola Olivetti</i>	
Implicates and Reduction Techniques for Temporal Logics	309
<i>Inman P. de Guzmán, Manuel Ojeda-Aciego, Agustín Valverde</i>	
A Logic for Anytime Deduction and Anytime Compilation	324
<i>Frédéric Koriche</i>	

Knowledge Representation

On Knowledge, Strings, and Paradoxes	342
<i>Manfred Kerber</i>	
Propositional Lower Bounds: Generalization and Algorithms.....	355
<i>Marco Cadoli, Luigi Palopoli, Francesco Scarcello</i>	

Higher Order Logics

Higher Order Generalization.....	368
<i>Jianguo Lu, Masateru Harao, Masami Hagiya</i>	

Invited Talks

The Logical Characterization of Goal-Directed Behavior in the Presence of Exogenous Events	382
<i>Erik Sandewall</i>	
Towards Inference and Computation Mobility: The Jinni Experiment	385
<i>Paul Tarau</i>	

Author Index	391
---------------------------	-----