

Journal of Automated Reasoning

Editor-in-Chief:

L. Wos, *Mathematics and Computer Science Division,
Argonne National Laboratory, USA*

The *Journal of Automated Reasoning* is an interdisciplinary journal that maintains a balance between theory, implementation and application. The spectrum of material published ranges from the presentation of a new inference rule with proofs of its logical properties to a detailed account of a computer program designed to solve some problem from industry. The main fields covered are automated theorem proving, logic programming, expert systems, program synthesis and validation, artificial intelligence, computational logic, robotics, and various industrial applications. The papers share the common feature of focusing on some aspect of automated reasoning, a field whose objective is the design and implementation of a computer program that serves as an assistant in solving problems and in answering questions that require reasoning.

The *Journal of Automated Reasoning* provides a forum and a means for exchanging information for those interested purely in theory, those interested primarily in implementation, and those interested in specific research and industrial applications.

Journal of Automated Reasoning is surveyed by *The ACM Guide to Computing Literature*, *INSPEC Information Services*, *Robotix Reporter*, *CAD/CAM Abstracts*, *The Turing Institute Abstracts in Artificial Intelligence*, *Engineering Information*, *Knowledge Engineering Review*, *Mathematical Reviews*, *Computer & Information Systems Abstracts Journal*.

Subscription Information

ISSN 0168-7433

1993, Volumes 10-11 (6 issues)

Subscription rate: Dfl. 566.00/US\$354.00

incl. postage and handling

Private rate: Dfl. 288.00/US\$144.00 *incl. postage and handling*

Special rate for AAR members available upon request.

P.O. Box 322, 3300 AH Dordrecht, The Netherlands
P.O. Box 358, Accord Station, Hingham, MA 02018-0358, U.S.A.

Journal Highlight

**KLUWER
ACADEMIC
PUBLISHERS**



Annals of Mathematics and Artificial Intelligence

Editor-in-Chief: Martin Charles Golumbic, IBM Israel Scientific Center, Technion City, Haifa, Israel and Department of Mathematics and Computer Science, Bar-Ilan University, Ramat Gan, Israel, E-Mail: golumbic@israe.arn.bitnet, Fax: 972-4-320894.

Available Volumes:

- 6, IV: Golumbic and Hoffman (Eds): Artificial Intelligence and Mathematics II, 95 pages, 1992, Personal price \$ 32,-/Institutional price \$ 57,-
6, I-III: Franco et al (Eds): Logic and Combinatorics, 294 pages, 1992, Personal price \$ 96,-/Institutional price \$ 171,-
5, II-IV: Golumbic and Hoffman (Eds): Artificial Intelligence and Mathematics I, 283 pages, 1992, Personal price \$ 96,-/Institutional price \$ 171,-
5, I: Liepins (Ed.): Genetic Algorithms in Artificial Intelligence, 88 pages, 1992, Personal price \$ 32,-/Institutional price \$ 57,-
4, III-IV: Golumbic (Ed.), Foundations of Artificial Intelligence, 152 pages, 1991, Personal price \$ 64,- / Institutional price \$ 114,-
4, I-II: Lassez et al. (Eds), Theory and Applications of Artificial Intelligence, 209 pages, 1991, Personal price \$ 64,- / Institutional price \$ 114,-
3, II-IV: Nacqvi et al. (Eds), Deductive Databases, 307 pages, 1991, Personal price \$ 96,-/Institutional price \$ 171,-
3, I: Sharir (Ed.), Algorithmic Motion Planning in Robotics, 154 pages, 1991, Personal price \$ 32,- / Institutional price \$ 57,-
2: Hand (Ed.), Artificial Intelligence and Statistics II, 400 pages, 1990, Personal price \$ 128,- / Institutional price \$ 228,-
1: Golumbic et al. (Eds), Horn Logic, Search and Satisfiability, 372 pages, 1990, Personal price \$ 128,- / Institutional price \$ 228,-

Forthcoming Volumes in 1993:

- 7, I-III: Thalheim et al. (Eds): Mathematical Fundamentals of Database and Knowledge Base Systems
7, IV: Golumbic and Koppel (Eds): Foundations of Artificial Intelligence II
8, I-II: Zadrozny (Ed.): Mathematics of Language
8, III-IV: Kirchner/Lassez

Issues in Progress:

- Goldberg et al. (Eds): Genetic Algorithms in Artificial Intelligence II
Meijer and Wieringa (Eds): Deontic Logic in Computer Science
Csirik and Bunke (Eds): Formal Methods in Shape Analysis
Grigorieff and Nivat (Eds): Mathematics and Computer Science
Wang et al. (Eds): Algebraic Approaches to Automated Geometric Reasoning
Miola and Lichtenberger (Eds): Extension of Computer Algebra Systems by Theorem Proving
Loveland et al. (Eds): Disjunctive Logic Programming
Calmet and Campbell (Eds): Symbolic Mathematics and Artificial Intelligence
Hoffman et al. (Eds): Artificial Intelligence and Mathematics III

Subscription Volumes 7 & 8, 1993, Personal price \$ 128,- per volume / Institutional price \$ 228,- per volume. All prices are including postage.

Please request a free specimen copy !

How to order: Please send your order either to your usual agent or directly to our Basel Head Office as mentioned below. In the United States of America please address your order to: J.C. Baltzer AG, Science Publishers, P.O. Box 8577, Red Bank, NJ 07701-8577.



J.C. Baltzer AG, Science Publishers
Wettsteinplatz 10, CH-4058 Basel, Switzerland
tel: + 41-61-6918925; fax: +41-61-6924262,
E-mail: na.baltzer@na-net.ornl.gov

The knowledge engineering review

Notes for Contributors

Contributions for publication should be addressed to Dr John Fox, Editor, The Knowledge Engineering Review, Biomedical Computing Unit, PO Box 123, Lincoln's Inn Fields, London WC2A 3PX, England, Dr Peter Jackson, North American Editor, Department of Electrical and Computer Engineering, Clarkson University, Potsdam, NY 13699-5720, USA; or may be submitted through a member of the Editorial Advisory Board (address inside front cover). Submission implies that the manuscript has not been published previously nor currently submitted for publication elsewhere.

All contributions, whether articles, correspondence or reviews, must be sent in triplicate and typed on one side of the paper, with wide margins and double-line spacing throughout. Any minor corrections should be made neatly in the typescript, leaving the margins clear. The author is invited to nominate up to five possible referees, who will not necessarily be used.

Articles must be accompanied by a brief, informative rather than indicative, abstract. Headings should be set out clearly but not underlined. Primary headings should be in lower case, at margin, with arabic numeral; subheadings should be numbered 2.a., 2.b., etc., and tertiary headings, 2.a.1., 2.a.2. No cross-references should be given by page number, but 'above' and 'below' should be used with the section specified, e.g. Section 2.a.2. The SI system of units should be used. The author should mark in the margin of the manuscript where figures and tables may be inserted. References to points in larger works should, where possible, quote the page reference, e.g. Ager, 1981, p. 102.

Tables should be typed with double-line spacing on sheets separate from the running text. Each table must have a caption that will make the data in the table intelligible without reference to the text.

Illustrations should be drafted for reproduction as full page (148 mm) width. Originals should normally be drawn at twice final area and must be sent in a flat package; larger drawings may delay publication. Lettering should be of a size so that when reduced the smallest lower-case letters will not be less than about 1 mm. Avoid gross disparities in lettering size on a drawing. Duplicates of illustrations should be sent, and may be prints or, preferably, photocopies reduced to final size. Illustrations in the text, both line drawings and photographs for halftone reproductions, will be referred to as figures (Fig. 2, 2a, etc.). Folding plates will not be accepted. Figures composed of photographs should be glossy prints presented at publication scale. Figure captions must be typed with double-line spacing on sheets separate from the running text.

The accuracy of references is the responsibility of authors. References must be double-spaced and spelt out in full, e.g.

Gale, W A, ed 1986. *Artificial Intelligence and statistics*, Reading, Massachusetts: Addison-Wesley

Pearl, J 1984. *Heuristics. Intelligent search strategies for problem solving*, Reading, Massachusetts: Addison-Wesley

Tie-Cheng Wang and Bledsoe, W W, 1987. "Hierarchical deduction" *Journal of Automated Reasoning* 3 (1) pp1-34.

Pau, L F, 1986. "Survey of expert systems for fault detection, test generation and maintenance" *Expert Systems*, 3 (2) pp 100-111.

Twenty Five offprints of each paper will be provided free of charge. Additional offprints may be purchased according to a set scale of charges if ordered when the proofs are returned.

ISSN 0269-8889

CAMBRIDGE UNIVERSITY PRESS

Published by the Press Syndicate of the University of Cambridge
The Pitt Building, Trumpington Street, Cambridge CB2 1RP
40 West 20th Street, New York, NY 10011-4211, USA
10 Stamford Road, Oakleigh, Melbourne 3166, Australia

Typeset by Paston Press Ltd, Loddon

Printed in Great Britain by Henry Ling Ltd, Dorchester

The knowledge engineering review

VOLUME 8 NUMBER 1 MARCH 1993

Contents

There's no theory better than that of a practical tool MARK A. MUSEN	1
Knowledge acquisition tools with explicit problem-solving models WILLIAM BIRMINGHAM and GEORG KLINKER	5
Conceptual models for automatic generation of knowledge-acquisition tools HENRIK ERIKSSON and MARK A. MUSEN	27
Knowledge acquisition tools based on personal construct psychology BRIAN R. GAINES and MILDRED L. G. SHAW	49
From the journals	87

CAMBRIDGE
UNIVERSITY PRESS



0269-8889(199303)8:1;1-D