

CAMBRIDGE

Information Seeking in Electronic Environments

GARY MARCHIONINI

The author describes how the strategies we use to locate information have begun to change as a result of computers and telecommunications technology. Accessible to students and to the perspicacious citizen who wishes to understand how technology has begun to influence life in the information society.

£30.00 net HB 0 521 44372 5 240 pp. 1995

Cambridge Series on Human-Computer Interaction 9

Information Systems Development and Data Modeling

Conceptual and Philosophical Foundations

R. HIRSCHHEIM, H. K. KLEIN and K. LYYTINEN

Data modelling was hypothesised to be the salvation of an organisation's data problems. This book aims to analyse the problems encountered and to present a comparative philosophical study of the various approaches. The authors explore the epistemology, ontology and rationality of each modelling approach, and describe the underlying assumptions.

£27.95 net HB 0 521 37369 7 303 pp. 1995

The Social and Interactional Dimensions of Human-Computer Interfaces

Edited by PETER J. THOMAS

Considers issues concerning interpersonal dynamics, cultural readings of technology, the organisational contexts of technology, and the 'situated' nature of use and the processes of design. It is an unusual work in that it covers theory, methodology and applications in depth.

£35.00 net HB 0 521 45302 X 320 pp. 1995

Cambridge Series in Human-Computer Interaction 10

Extra-Ordinary Human-Computer Interaction

Interfaces for Users with Disabilities

Edited by A. D. N. EDWARDS

Computer technology has enormous potential for opening doors for people with disabilities. This volume describes the current status of the development of this potential, identifies major obstacles to further progress in this field and articulates ways to accelerate this progress.

£35.00 net HB 0 521 43413 0 400 pp. 1996

Cambridge Series on Human-Computer Interaction 7

People and Computers X

Proceedings of the HCI '95 Conference

Edited by M. A. R. KIRBY, A. J. DIX and J. E. FINLAY

Covers a broad range of HCI related topics, including Visualisation, Computer Supported Communication, Task Analysis, Formal Methods, User Support and Cyberspace. Both research and commercial perspectives are considered.

£37.50 net PB 0 521 56729 7 448 pp. 1995

Cambridge books are available from good bookshops, alternatively phone UK + 44 (0)1223 325970 to order direct using your credit card, or fax UK + 44 (0)1223 315052.



CAMBRIDGE
UNIVERSITY PRESS

The Edinburgh Building, Cambridge CB2 2RU

Robotica

International Journal of Information, Education and Research in Robotics and Artificial Intelligence

Editor: J. Rose, Honorary Director General, World Organisation of Systems and Cybernetics; Visiting Professor, University of Central Lancashire

Robotica provides an international forum for the multidisciplinary subject of robotics and encourages developments in this important field of automation with regard to industry, education and research.

Essential reading for...

- ◆ Academics and students in engineering, AI, social studies and computer science
- ◆ Industrial personnel in the field of advanced manufacturing technology
- ◆ Experts and consultants working in the various fields of automation

Why you should subscribe...

- As well as original papers, Robotica contains reports and surveys, book reviews, conference news, announcements and letters, so you can get a comprehensive view of current developments
- Compared with other periodicals in the field Robotica represents excellent value for money
- Robotica covers both theoretical and practical issues in a wide context
- Papers are of a very high scientific quality and have gone through rigorous refereeing processes

Coverage:

- sensory perception • software • programming languages • vision
- CAD/CAM systems • automation • control devices • mechanical engineering • problem solving • world model representation
- training methods

Recent articles:

A study of neural network control of robot manipulators
Seul Jung and T.C. Hsia

Reexamination of the DCAL controller for rigid link robots
M.S. de Queiroz, D. Dawson and T. Burg

Hybrid force/position control for robot manipulators based on a D-type learning law
Shunmugham R. Pandian and Sadao Kawamura

An approach to time-optimal, smooth and collision-free path planning in a two robot arm environment
Bailin Cao, Gordon I. Dodds and George W. Irwin

Man-adaptive control of teleoperators
Leonid Sluski and Philippe Coiffet

A compliant control method for disassembly of non-elastic parts using realised motion
Yagmur Denizhan

Adaptive hybrid force/position control for the Space Station Alpha robotic operations
S. Kalaycioglu and A. Brown

Comparing two algorithms for automatic planning by robots in stochastic environments
Alan D. Christiansen and Kenneth Y. Goldberg

Subscription information

Volume 14, 1996 published in January, March, May, July, September and November: £178 for institutions; £80 for individuals; airmail £29 per year extra. ISSN 0263-5747

Take a closer look – FREE!

- Please enter my subscription to Robotica, Volume 14, in 1996 @
- 178 for institutions
- £80 for individuals
- Please send by airmail @ £29 per year extra
- Please send me a free sample copy

Name _____

Address _____

Send to: Journals Marketing Department, Cambridge University Press, FREEPOST*, The Edinburgh Building, Cambridge, CB2 1BR, Tel: +44 (0)1223 325806 Fax: +44(0)1223 315052
Email: journals_marketing@cup.cam.ac.uk

(*No postage stamp necessary if posted within UK)

In USA, Canada and Mexico send to: Cambridge University Press, 40 West 20th Street, New York, NY 10011-4211, USA



**CAMBRIDGE
UNIVERSITY PRESS**

NEW JOURNAL FROM CAMBRIDGE

Natural Language Engineering

Natural Language Engineering is a new international journal designed to meet the needs of professionals and researchers working in all areas of computerised language processing, whether from the perspective of theoretical or descriptive linguistics, lexicology, computer science or engineering. Its principal aim is to bridge the gap between traditional computational linguistics research and the implementation of practical applications with potential real world use. As well as publishing research articles on a broad range of topics – from text analysis, machine translation and speech generation and synthesis to integrated systems and multi-modal interfaces – the journal will carry an extensive selection of reviews. It will help to forge the essential link between industry and the academic community.

Volume 2 in 1996: March, June, September and December
£79 for institutions; £39 for individuals; delivery by airmail £15 extra.
ISSN 1351-3249

For further information or a free sample copy contact::
Journals Marketing Department, Cambridge University Press,
FREEPOST*, The Edinburgh Building, Cambridge, CB2 1BR, UK.
Tel: +44 (0)1223 325806
Fax: +44 (0)1223 315052
Email: journals_marketing@cup.cam.ac.uk

*No postage stamp necessary if posted within UK



**CAMBRIDGE
UNIVERSITY PRESS**

52317

Notes for Contributors

Editorial policy

The Knowledge Engineering Review has been established to provide a general source of information and analysis in all areas relevant to research and development in knowledge based systems and applied artificial intelligence. The editors wish to encourage careful preparation of original papers analysing developments in the field. In particular we wish to see tutorial and survey articles, and commentary, criticism and debate. Primary research papers on specialised technical topics are unlikely to be appropriate but research papers on broad topics such as development methodology or general evaluations of tools and techniques, are of interest. Descriptions of specific projects or particular computer systems will be considered if their presentation draws out general issues in the design, implementation or impact of knowledge based systems.

Submission of manuscripts

Contributions for publication should be addressed to Professor John Fox, Editor, The Knowledge Engineering Review, Imperial Cancer Research Fund, PO Box 123, Lincoln's Inn Fields, London WC2A 3PX, UK; or Professor Adele E Howe, North American Editor, Computer Science Department, Colorado State University, Fort Collins, CO 80523, USA; or may be submitted through a member of the Editorial Board (addresses inside front cover). Submission implies that the manuscript has not been published previously, nor currently submitted for publication elsewhere. Upon acceptance of a manuscript, the author will be asked to transfer copyright to the publisher.

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 type-script, leaving the margins clear. Authors are encouraged to provide the final version of the contribution on disk (PC or Mac format, 'Word' or 'Wordperfect') in addition to the paper copies. Contributions should follow the general style of papers in recent issues of The Knowledge Engineering Review. 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 preferred graphics package is Freehand 5 but files from many others can be accepted. Please indicate clearly the file format (e.g. TIFF, EPS, DCS, Freehand etc), computer operating system and graphics software used for originating the artwork files. The typefaces used in electronic artwork supplied should be restricted to the Monotype, Adobe and Bitstream font libraries. Illustrations should be supplied as EPS files and never as Postscript files, or as the native format files from the graphics package used. They should be accompanied by laser proofs with the name and version number of the graphics package used, and also the names of the fonts used.

References. 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) pp 1-34.

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

Unpublished work should normally be referred to in the text parentheses as, for example, 'private communication' or 'unpub. Ph.D. thesis, Univ. London, 1988', and not included in the reference list unless in the press.

Proof Reading:

Typographical or factual errors only may be changed at proof stage. The publisher reserves the right to charge authors for correction of non-typographical errors. No page charge is made.

Offprints:

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.

© Cambridge University Press 1996

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 11 NUMBER 1 MARCH 1996

Contents

An overview of approaches to qualitative model construction CIS SCHUT and BERT BREDEWEG	1
Automatic construction of reactive control systems using symbolic machine learning CLAUDE SAMMUT	27
An introduction to executable temporal logics MICHAEL FISHER	43
Grey Pages	
Computer science research on scientific discovery RAÚL E. VALDÉS-PÉREZ	57
Research in machine scientific discovery and the domain sciences: Invited response to "Computer science research in scientific discovery" VLADIMIR PERICLIEV	67
Roles for intelligence in multimedia: report on the IMMI-1 workshop JOHN LEE	69
Book reviews	73
From the journals	85

CAMBRIDGE
UNIVERSITY PRESS



0269-8889(199603)11:1;1-P