Knowledge Aided Design

A Volume in the Knowledge Based Systems Series.

Edited By Marc Green

Computer Studies Programme, Trent University, Canada

While computers have made a dramatic impact on most realms of business and industry, engineering has been a notable exception. The current technology, computer aided drafting (CAD) is useful only long after engineers have made their fundamental design decisions. The next generation of tools should provide knowledge aided design (KAD), where computers supply the knowledge necessary to help engineers in the earlier stages of design when they make the more basic, and expensive, decisions.

Knowledge Aided Design examines the role of knowledge in computer aided design, specifically addressing the application of AI techniques in the engineering domain. The book will be of particular interest to those in research and development concerned with artificial intelligence, knowledge based systems and engineering design.

FEATURES

- Covers the theoretical aspect of design as a human problem solving activity
- Explains tools and techniques which are applicable to creating systems for knowledge based design systems
 Describes specific systems and the experiences of their builders

CONTENTS

•Introduction • Conceptions and Misconceptions of Knowledge Aided Design • Design Problem solving: A task analysis • Towards a domain-independent synthesis system • Compiling redesign plans and diagnosis rules from a structure/behaviour device model • Engineering Design Cycle: A case study and implications for CAE • Design Fusion: An Architecture for Concurrent Design • Knowlege-based design rationale capture: automating engineering trade studies • Knowledge Acquisition for knowledge-based design systems • Experiences with modelling memory and simple learning in routine design problem solving systems • Eliminating research in design via learning

ISBN:0-12-298250-9 c. 320pages £32.95 (tentative)

O R D E R F O R Available from your bookseller or from:

ACADEMIC PRESS Marketing Department, 24-28 Oval Road London NW1 7DX, UK

Tel: (44) 071-267 4466

Please send me

..... copy/copies of Knowledge Aided Design 0-12-298250-9 £32.95 (tentative)

For customers outside the UK: Please add £2.00 for the first book and £1.00 for each additional title.

Please note: Payment must be in sterling, Bank Draft, International Money Order or UNESCO coupons. A cademic Press London also accepts payments to National Giro Account No. 5043158

CB/A04921

O I enclose a cheque/P.O. for

(made payable to Harcourt Brace Jovanovich Ltd)
O I wish to pay to credit card. Amount
Diners Club/ Barclaycard (VISA)/ American Express/
MasterCard (delete as appropriate)

No.

(MasterCard users should add the numbers above their name)

Expiry Date

Name (CAPITALS)

Address

Post Code

Signature

(Your signature is essential, especially when paying by credit card)

Al Workbench Book and two disks BABYLON

An Open and Portable Development Environment for Expert Systems

A Volume in the Knowledge Based Systems Series.

Edited By

T. Christaller, F. di Primio, U. Schnepf & A. Voss

GMD, Artificial Intelligence Research Division, Sankt Augustin, Germany

Features:

- Presents BABYLON, an expert system shell from Europe's premier KBS centre.
- Full source-code is provided in Lisp or as a stand-alone version for the Macintosh.
- Book and disk for the price of a textbook.

Specifications:

To read and install the disks you will need:

- Apple Macintosh with a high density disk drive (1.44 MB)
- Min. 4 MB RAM of working memory
- Min. 5 MB free disk space on hard disk

Contents:

- Introduction The User View: The BABYLON Idea BABYLON for the Knowledge Engineer • Component Description and Diagnosis
 - The System View: BABYLON for the System Programmer •
 - How to implement BABYLON on Other Computers
 Compiling Knowledge Bases
 Data Base Access for BABYLON on the IBM PC
 - BABYLON Applications and Future Trends: Present Applications Future trends •

ISBN:0.12.174235.0 • 480pp • Casebound and two disks, £34.95 (tentative) • May 1992

O R D E R F O R

Available from your bookseller or from:

ACADEMIC PRESS Marketing Department, 24-28 Oval Road London NW1 7DX, UK

Tel: (44) 071-267 4466

Please send me copy/copies of *The AI Workbench*, *BABYLON* 0.12.174235.0 Casebound and two disks £34.95 (tentative)

For customers outside the UK: Please add £2.00 for the first book and £1.00 for each additional title.

Please note: Payment must be in sterling, Bank Draft, International Money Order or UNESCO coupons. Academic Press London also accepts payments to National Giro Account No. 5043158

Tenciose a cheque/P.O. for
(made payable to Harcourt Brace Jovanovich Ltd)
O I wish to pay to credit card. Amount
Diners Club/ Barclaycard (VISA)/ American Express MasterCard (delete as appropriate)
No (MasterCard users should add the numbers above their name)
Expiry Date
Name (CAPITALS)
Address
Post Code
Signature
(Your signature is essential, especially when paying by credit card)

CB/A0492H

(AI EDAM): Artificial Intelligence for Engineering Design, Analysis and Manufacturing is a journal intended for engineers and designers who see artificial intelligence technologies as powerful tools for handling difficult engineering problems and for research workers in artificial intelligence and computer science who are interested in applications of artificial intelligence and in the theoretical issues that arise from such applications. The Editor is particularly seeking articles that develop new and interesting applications based on the most up-to-date research in chemical, civil, industrial and mechanical (i.e. non-VLSI) engineering. Specifically,

the Journal is interested in the use of artificial intelligence in planning, design, finite element analysis, simulation, spatial reasoning and graphics, process planning, optimization and manufacturing. Areas of special interest include: expert (knowledge-based) systems, including knowledge acquisition and representation, control, and system architectures; spatial reasoning and the integration of graphics and solid modelers; artificial intelligence languages and machines, including exploratory programming environments and expert system shells.

INSTRUCTIONS FOR AUTHORS

Submission of manuscripts

Three (3) copies of articles, in English, should be submitted to the Editor. Research briefs and books for review should be submitted to the appropriate section editor.

Typescripts

Paper should be typed in double spacing throughout, including tables, footnotes, references and legends to tables and figures. One side of the paper, only, should be used and there should be a margin of at least 2.5 cm all round. The position of tables and figures should be clearly indicated, in sequence, in the text. Tables, footnotes and legends to figures should be typed separately. Where it is essential for clear cross-referencing, particularly in mathematicallyorientated material, paragraphs and subparagraphs may be numbered, and the decimal system should be used, i.e. 1.1.1., 1.1.2., etc. A short running title of not more than 40 characters (including spaces) should be indicated if the full title is longer than this. The name of the laboratory where the work has been carried out should be indicated on the title page and the full postal address for the despatch of proofs and offprints should be included on a separate page. Photocopies of typescripts will not be accepted for publication. For refereeing purposes only, good photocopies may be submitted. Upon acceptance of the manuscript the top copy and the original illustrations should be submitted for publication.

Abstract

An abstract will be printed at the head of all papers: this should not exceed 300 words, and should be intelligible to the general reader without reference to the main text. Abbreviations should be avoided.

Author biographies

Brief author biographies will be printed at the end of each paper: they should not exceed 100 words for each author.

Conventions

References should be listed alphabetically by first author at the end of the paper. All authors' names should be given, followed by the year of publication, the full title of the journal, volume, issue number, and inclusive page numbers. For books, the full title should be given, followed by the volume number (if any), page numbers, place of publication and publisher. Citations in the text should read: Brown and Smith (1973). Where there are more than two authors the citation should read: Brown et al. (1973). The convention Brown (1973a), Brown (1973b) should be used where more than one paper by the author(s) has appeared in the same year. Authors are responsible for checking the accuracy of all references and that all references cited in the text also appear in the list of references at the end of the paper. Examples of the style to be used are:

Reyling, G. Jr 1974. Performance and control of multiple multiprocessor systems. *Computer Design* 13, 81–86.

Enslow, P.H. 1974. *Multiprocessors and Parallel Processing*. New York: John Wiley.

Abbreviations

Customary abbreviations will be accepted and the authors are recommended to employ Système Internationale (metric) units. Special and unusual symbols should be clearly identified, especially if handwritten.

Preparation of illustrations

Artwork, preferably no larger than $30 \, \mathrm{cm} \times 22 \, \mathrm{cm}$, may be submitted in any medium providing that the image is very sharp. When submitting illustrations it should be borne in mind that the page area is $222 \, \mathrm{mm} \times 177 \, \mathrm{mm}$ and that computer output and program listings cannot be reduced by more than 20% before the clarity of the image is affected. Authors are requested to use the reverse side of the printout paper and to ensure that conditions, generally, are such as to assist maximum clarity in reproduction. Photographs will be accepted only if the information cannot be presented easily in any other form. Explanation and keys should, as far as possible, be placed in the legends.

Copyright/offprints

Authors submitting a manuscript do so on the understanding that if it is accepted for publication, exclusive copyright in the paper shall be assigned to the Publisher. In consideration for assignment of copyright, the Publisher will supply 50 offprints of each paper. Further offprints may be ordered at extra cost; the copyright assignment form and offprint order form will be sent with the proofs. The Publisher will not put any limitation on the personal freedom of the author to use material contained in the paper in other works which may be published elsewhere.

Contents

Esterline, A. and Kota, S. A general paradigm for routine design—theory and implementation	73
Soo, VW. and Wang, TC. Integration of qualitative and quantitative reasoning in iterative parametric	
mechanical design	95
Chou, YC. A theoretical framework for automatic layout of machining fixtures	111
Books	123

Indexed and abstracted in Computer Journal



0890-0604(199208)6:2:1-4

This journal is printed on acid-free paper Filmset and printed in Northern Ireland by The Universities Press (Belfast) Ltd.