

# The knowledge engineering review

VOLUME 25 NUMBER 4 DECEMBER 2010

---

## Contents

- On rough sets, their recent extensions and applications  
N. MAC PARTHALÁIN and Q. SHEN 365
- Role-based software agent interaction models: a survey  
GIACOMO CABRI, LETIZIA LEONARDI, LUCA FERRARI and  
FRANCO ZAMBONELLI 397
- Discretization as the enabling technique for the Naïve Bayes and semi-Naïve  
Bayes-based classification  
MARCIN J. MIZIANTY, LUKASZ A. KURGAN and MAREK R. OGIELA 421

---

Cambridge Journals Online  
For further information about this journal  
please go to the journal web site at:  
[journals.cambridge.org/ker](http://journals.cambridge.org/ker)

**CAMBRIDGE**  
UNIVERSITY PRESS

# The knowledge engineering review

## 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 submitted as PDF files in an email attachment to either Professor Simon Parsons, Department of Computer and Information Science, Brooklyn College, City University of New York (parsons@sci.brooklyn.cuny.edu) or to Dr Peter McBurney, Department of Computer Science, University of Liverpool, UK (mcburney@liverpool.ac.uk). 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 electronic form. Authors are encouraged to provide the final version of the contribution in LaTeX, TeX, or Word format.

Authors using LaTeX should ideally use the KER LaTeX style file which can be obtained using anonymous FTP from the internet address <ftp://ftp.cambridge.org/pub/texarchive/journals/latex/ker-cls>. In case of difficulties obtaining these files, there is a help-line available via e-mail; please contact [texline@cup.cam.ac.uk](mailto:texline@cup.cam.ac.uk). Tables and figures should be embedded in the article in the usual way, with figures in .eps form, which should be also supplied as separate files.

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.

If you are not using the ker.cls file, then please adopt the following layout rules. 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 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:

No paper offprints are provided, but the corresponding author will be sent the pdf of the published article. Print offprints may be purchased at extra cost at proof stage.

© Cambridge University Press 2010

(Revised 11 June 2010)

ISSN 0269-8889

CAMBRIDGE UNIVERSITY PRESS

Published by the Press Syndicate of the University of Cambridge  
The Edinburgh Building, Shaftesbury Road, Cambridge CB2 8RU, UK  
32 Avenue of the Americas, New York, NY 10013-2473, USA  
10 Stamford Road, Oakleigh, Melbourne 3166, Australia

Printed in the United Kingdom by Henry Ling Limited, at the Dorset Press, Dorchester, DT1 1HD

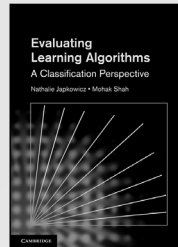
# Great New Books from Cambridge!

## Evaluating Learning Algorithms A Classification Perspective

NATHALIE JAPKOWICZ  
and MOHAK SHAH

This book offers a solid basis for conducting performance evaluations of learning algorithms in practical settings with an emphasis on classification algorithms. The authors describe several techniques designed to deal with performance measures and methods, error estimation or re-sampling techniques, statistical significance testing, data set selection, and evaluation benchmark design.

\$90.00: Hb: 978-0-521-19600-0: 432 pp.



*New in Paperback!*

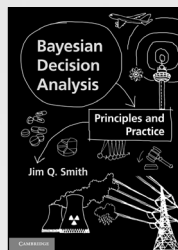
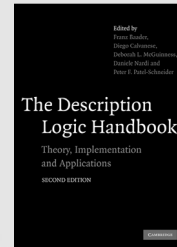
## The Description Logic Handbook

Theory, Implementation and Applications

*Edited by* FRANZ BAADER,  
DIEGO CALVANESE,  
DEBORAH L. MCGUINNESS,  
DANIELE NARDI,  
and PETER F. PATEL-SCHNEIDER

\$59.00: Pb: 978-0-521-15011-8: 624 pp.

2nd  
Edition



## Bayesian Decision Analysis

Principles and Practice

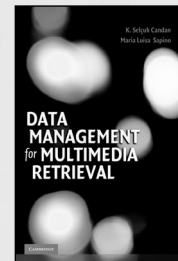
JIM Q. SMITH

### Contents:

Preface; Part I. Foundations of Decision Modeling: 1. Introduction; 2. Explanations of processes and trees; 3. Utilities and rewards; 4. Subjective probability and its elicitation; 5. Bayesian inference for decision

analysis; Part II. Multi-Dimensional Decision Modeling: 6. Multiattribute utility theory; 7. Bayesian networks; 8. Graphs, decisions and causality; 9. Multidimensional learning; 10. Conclusions; Bibliography.

\$65.00: Hb: 978-0-521-76454-4: 348 pp.



## Data Management for Multimedia Retrieval

K. SELÇUK CANDAN  
and MARIA LUISA SAPINO

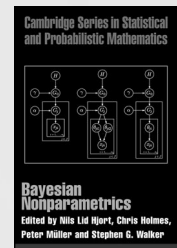
\$85.00: Hb: 978-0-521-88739-7: 500 pp.

## Bayesian Nonparametrics

*Edited by* NILS LID HJORT,  
CHRIS HOLMES, PETER MÜLLER,  
and STEPHEN G. WALKER

*Cambridge Series in Statistical and Probabilistic Mathematics*

\$59.00: Hb: 978-0-521-51346-3: 308 pp.



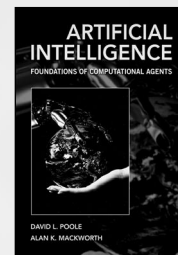
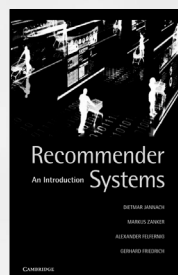
## Recommender Systems

An Introduction

DIETMAR JANNACH,  
MARKUS ZANKER,  
ALEXANDER FELFERNIG,  
and GERHARD FRIEDRICH

This book offers an overview of approaches to developing state-of-the-art recommender systems that automate a variety of choice-making strategies with the goal of providing affordable, personal, and high-quality recommendations. The authors present algorithmic approaches for generating personalized buying proposals, as well as more interactive and knowledge-based approaches. They discuss how to measure the effectiveness of recommender systems and illustrate the methods with practical case studies.

\$65.00: Hb: 978-0-521-49336-9: 360 pp.



## Artificial Intelligence

Foundations of Computational Agents

DAVID L. POOLE  
and ALAN K. MACKWORTH

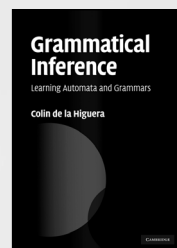
\$90.00: Hb: 978-0-521-51900-7: 688 pp.

## Grammatical Inference

Learning Automata and Grammars

COLIN DE LA HIGUERA

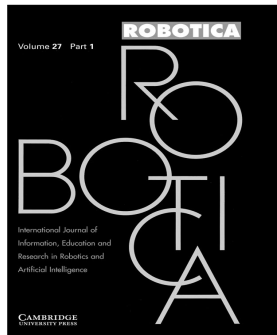
\$85.00: Hb: 978-0-521-76316-5: 432 pp.



*Prices subject to change.*

CAMBRIDGE

JOURNALS



# Robotica

An official journal of the International Federation of Robotics

## **Robotica**

is available online at:

<http://journals.cambridge.org/rob>

## **To subscribe contact Customer Services**

### **in Cambridge:**

Phone +44 (0)1223 326070

Fax +44 (0)1223 325150

Email [journals@cambridge.org](mailto:journals@cambridge.org)

### **in New York:**

Phone +1 (845) 353 7500

Fax +1 (845) 353 4141

Email

[subscriptions\\_newyork@cambridge.org](mailto:subscriptions_newyork@cambridge.org)

## **Editor-in-Chief**

G. S. Chirikjian, Johns Hopkins University, USA

*Robotica* is a forum for the multidisciplinary subject of robotics and encourages developments, applications and research in this important field of automation with regard to industry, health, education and economic and social aspects. Coverage includes activities in hostile environments, applications in the service and manufacturing industries, biological robots, on-line robots and various other areas.

**Pricing information is available at:**  
**<http://journals.cambridge.org/rob>**

## **Free email alerts**

Keep up-to-date with new material – sign up at  
<http://journals.cambridge.org/alerts>

**For free online content visit:**  
<http://journals.cambridge.org/rob>



**CAMBRIDGE**  
UNIVERSITY PRESS