

Lecture Notes in Artificial Intelligence

2080

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

Hong Kong

London

Milan

Paris

Singapore

Tokyo

David W. Aha Ian Watson (Eds.)

Case-Based Reasoning Research and Development

4th International Conference on Case-Based Reasoning, ICCBR 2001
Vancouver, BC, Canada, July 30 – August 2, 2001
Proceedings



Springer

Series Editors

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

Volume Editors

David W. Aha
Navy Center for Applied Research in Artificial Intelligence
Naval Research Laboratory, Code 5510
4555 Overlook Avenue, SW, Washington, DC 20375, USA
E-mail: aha@aic.nrl.navy.mil

Ian Watson
University of Auckland, Computer Science Department
Private Bag 92019, Auckland 1, New Zealand
E-mail: ian@ai-cbr.org

Cataloging-in-Publication Data applied for

Die Deutsche Bibliothek - CIP-Einheitsaufnahme

Case based reasoning research and development : proceedings / 4th
International Conference on Case Based Reasoning, ICCBR 2001, Vancouver, BC,
Canada, July 30 - August 2, 2001. David W. Aha ; Ian Watson (ed.). - Berlin ;
Heidelberg ; New York ; Barcelona ; Hong Kong ; London ; Milan ; Paris ;
Singapore ; Tokyo : Springer, 2001

(Lecture notes in computer science ; Vol. 2080 : Lecture notes in
artificial intelligence)

ISBN 3-540-42358-3

CR Subject Classification (1998): I.2, J.4, J.1, F.4.1

ISBN 3-540-42358-3 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 New York
a member of BertelsmannSpringer Science+Business Media GmbH

<http://www.springer.de>

© Springer-Verlag Berlin Heidelberg 2001
Printed in Germany

Typesetting: Camera-ready by author, data conversion by PTP-Berlin, Stefan Sossna
Printed on acid-free paper SPIN: 10839273 06/3142 5 4 3 2 1 0

Preface

The 2001 International Conference on Case-Based Reasoning (ICCBR 2001, www.iccbr.org/iccbr01), the fourth in the biennial ICCBR series (1995 in Sesimbra, Portugal; 1997 in Providence, Rhode Island (USA); 1999 in Seeon, Germany), was held during 30 July – 2 August 2001 in Vancouver, Canada. ICCBR is the premier international forum for researchers and practitioners of case-based reasoning (CBR). The objectives of this meeting were to nurture significant, relevant advances made in this field (both in research and application), communicate them among all attendees, inspire future advances, and continue to support the vision that CBR is a valuable process in many research disciplines, both computational and otherwise.

ICCBR 2001 was the first ICCBR meeting held on the Pacific coast, and we used the setting of beautiful Vancouver as an opportunity to enhance participation from the Pacific Rim communities, which contributed 28% of the submissions. During this meeting, we were fortunate to host invited talks by Ralph Bergmann, Ken Forbus, Jaiwei Han, Ramon López de Mántaras, and Manuela Veloso. Their contributions ensured a stimulating meeting; we thank them all.

This conference continues the tradition that ICCBR has established of attracting high-quality research and applications papers from around the world. Among the 81 (24 application + 57 research) submissions, 23 were selected for (9 long and 14 short) oral presentation and an additional 27 for poster presentation. This volume contains the papers for all 50 presentations. Also included are papers from some of the invited speakers and an invited paper by Petra Perner on image interpretation, a topic on which we wish to encourage additional community participation.

ICCBR 2001's first day consisted of the *2001 Innovative Customer-Centered Applications Workshop* (ICCA 2001). This workshop, which was expertly co-chaired by Mehmet Göker (Americas), Hideo Shimazu (Asia & Australia), and Ralph Traphöner (Europe and Africa), focused on reports concerning mature applications and technology innovations of particular industrial interest.

The second day's events included five workshops focusing on the following research interests: Authoring Support Tools, Electronic Commerce, Creative Systems, Process-Oriented Knowledge Management, and Soft Computing. We are grateful to the Workshop Program Co-chairs, Christiane Gresse von Wangenheim and Rosina Weber, for their efforts in coordinating these workshops, along with the individual workshop chairs and participants. Materials from ICCA 2001 and the workshops were published separately and can be obtained from the ICCBR 2001 WWW site.

The Conference Chair for ICCBR 2001 was Qiang Yang of Simon Fraser University, while the Program Co-chairs were David W. Aha (U.S. Naval Research Laboratory) and Ian Watson (University of Auckland). The chairs would like to thank the program committee and the additional reviewers for their thoughtful and rigorous reviewing during the paper selection process. We also gratefully acknowledge the generous support of ICCBR 2001's sponsors, and Simon Fraser University for providing the venue. Many thanks to Penny Southby and her staff at the Simon Fraser University Conference Services for their tremendous assistance with local arrangements. Finally, thanks to Vincent Chung of the University of Auckland for his assistance with the conference WWW site.

Program Chairs

David W. Aha, Naval Research Laboratory, Washington DC, USA
Ian Watson, University of Auckland, New Zealand

Conference Chair

Qiang Yang, Simon Fraser University, Vancouver, Canada

Industrial Chairs

Mehmet Göker, Kaidara International, Palo Alto, USA
Hideo Shimazu, NEC Corporation, Ikoma, Japan
Ralph Traphöener, Empolis, Kaiserslautern, Germany

Workshop Chairs

Christiane Gresse von Wangenheim, Uni. do Vale do Itajaí, Brazil
Rosina Weber, University of Wyoming, USA

Program Committee

Agnar Aamodt	Norwegian Uni. of Science and Tech.
Robert Aarts	Nokia Telecommunications, Finland
Klaus-Dieter Althoff	Fraunhofer IESE, Germany
Kevin Ashley	University of Pittsburgh, USA
Paolo Avesani	IRST Povo, Italy
Brigitte Bartsch-Spörl	BSR Consulting, Germany
Carlos Bento	University of Coimbra, Portugal
Ralph Bergmann	University of Kaiserslautern, Germany
Enrico Blanzieri	Turin University, Italy
L. Karl Branting	University of Wyoming, USA
Derek Bridge	University College, Cork, Ireland
Michael Brown	SemanticEdge, Berlin, Germany
Robin Burke	California State University, Fullerton, USA
Hans-Dieter Burkhard	Humboldt University Berlin, Germany
Bill Cheetham	General Electric Co. NY, USA
Michael Cox	Wright State University, Dayton, USA
Susan Craw	Robert Gordon University, Aberdeen, Scotland
Pádraig Cunningham	Trinity College, Dublin, Ireland
Walter Daelemans	CNTS, Belgium
Boi Faltings	EPFL Lausanne, Switzerland
Ashok Goel	Georgia Institute of Technology, USA
Andrew Golding	Lycos Inc, USA
C. Gresse von Wangenheim	Uni. do Vale do Itajaí, Brazil

Alec Holt	University of Otago, New Zealand
Igor Jurisica	Ontario Cancer Institute, Canada
Mark Keane	University College Dublin, Ireland
Janet Kolodner	Georgia Institute of Technology, USA
David Leake	Indiana University, USA
Brian Lees	University of Paisley, Scotland
Michel Manago	Kaidara International, Paris, France
Ramon López de Mántaras	IIIA-CSIC, Spain
Cindy Marling	Ohio University, USA
Bruce McLaren	OpenWebs Corp. Pennsylvania, USA
David McSherry	University of Ulster, Northern Ireland
Erica Melis	University of the Saarland, Germany
Alain Mille	Claude Bernard University, France
Héctor Muñoz-Avila	University of Maryland, USA
Petri Myllymaki	University of Helsinki, Finland
Bart Netten	TNO-TPD, The Netherlands
Petra Perner	ICVACS, Germany
Enric Plaza	IIIA-CSIC, Spain
Luigi Portinale	University of Eastern Piedmont, Italy
Lisa S. Purvis	Xerox Corporation, NY, USA
Francesco Ricci	IRST Povo, Italy
Michael M. Richter	University of Kaiserslautern, Germany
Edwina Rissland	University of Massachusetts, USA
Rainer Schmidt	University of Rostock, Germany
Barry Smyth	University College Dublin, Ireland
Einoshin Suzuki	Yokohama National University, Japan
Rosina Weber	University of Wyoming, USA
David C. Wilson	University College Dublin, Ireland

Additional Reviewers

Connor Hayes	Pietro Torasso
Markus Nick	Ivo Vollrath
Sascha Schmitt	Gabriele Zenobi
Armin Stahl	

Conference Support

ICCBR 2001 was supported by the American Association for Artificial Intelligence (AAAI), AI-CBR, ChangingWorlds, eGain, Empolis, the European Coordinating Committee for Artificial Intelligence (ECAI), Kaidara International, the INRECA Center, the Haley Enterprise, the Machine Learning Network, the Naval Research Laboratory, Simon Fraser University, Stottler Henke Associates Inc. and the University of Auckland.

Table of Contents

Invited Papers

Highlights of the European INRECA Projects	1
<i>Ralph Bergmann</i>	
The Synthesis of Expressive Music: A Challenging CBR Application	16
<i>Ramon López de Mántaras and Josep Lluís Arcos</i>	
Why Case-Based Reasoning Is Attractive for Image Interpretation	27
<i>Petra Perner</i>	

Research Papers

Similarity Assessment for Relational CBR	44
<i>Eva Armengol and Enric Plaza</i>	
Acquiring Customer Preferences from Return-Set Selections	59
<i>L. Karl Branting</i>	
The Role of Information Extraction for Textual CBR	74
<i>Stefanie Brüninghaus and Kevin D. Ashley</i>	
Case-Based Reasoning in Course Timetabling: An Attribute Graph Approach	90
<i>Edmund K. Burke, Bart MacCarthy, Sanja Petrovic, and Rong Qu</i>	
Ranking Algorithms for Costly Similarity Measures	105
<i>Robin Burke</i>	
A Fuzzy-Rough Approach for Case Base Maintenance	118
<i>Guoqing Cao, Simon Shiu, and Xizhao Wang</i>	
Learning and Applying Case-Based Adaptation Knowledge	131
<i>Susan Crow, Jacek Jarmulak, and Ray Rowe</i>	
Case Representation Issues for Case-Based Reasoning from Ensemble Research	146
<i>Pádraig Cunningham and Gabriele Zenobi</i>	
A Declarative Similarity Framework for Knowledge Intensive CBR	158
<i>Belén Díaz-Agudo and Pedro A. González-Calero</i>	
Classification Based Retrieval Using Formal Concept Analysis	173
<i>Belén Díaz-Agudo and Pedro A. González-Calero</i>	
Conversational Case-Based Planning for Agent Team Coordination	189
<i>Joseph A. Giampapa and Katia Sycara</i>	

A Hybrid Approach for the Management of FAQ Documents in Latin Languages	204
<i>Christiane Gresse von Wangenheim, Andre Bortolon, and Aldo von Wangenheim</i>	
Taxonomic Conversational Case-Based Reasoning	219
<i>Kalyan Moy Gupta</i>	
A Case-Based Reasoning View of Automated Collaborative Filtering.....	234
<i>Conor Hayes, Pádraig Cunningham, and Barry Smyth</i>	
A Case-Based Approach to Tailoring Software Processes	249
<i>Scott Henninger and Kurt Baumgarten</i>	
The Conflict Graph for Maintaining Case-Based Reasoning Systems	263
<i>Ioannis Iglezakis</i>	
Issues on the Effective Use of CBR Technology for Software Project Prediction	276
<i>Gada Kadoda, Michelle Cartwright, and Martin Shepperd</i>	
Incremental Case-Based Plan Recognition Using State Indices	291
<i>Boris Kerkez and Michael T. Cox</i>	
A Similarity-Based Approach to Attribute Selection in User-Adaptive Sales Dialogs	306
<i>Andreas Kohlmaier, Sascha Schmitt, and Ralph Bergmann</i>	
When Two Case Bases Are Better than One: Exploiting Multiple Case Bases	321
<i>David B. Leake and Raja Sooriamurthi</i>	
COBRA: A CBR-Based Approach for Predicting Users Actions in a Web Site	336
<i>Maria Malek and Rushed Kanawati</i>	
Similarity vs. Diversity	347
<i>Barry Smyth and Paul McClave</i>	
Collaborative Case-Based Reasoning: Applications in Personalised Route Planning	362
<i>Lorraine Mc Ginty and Barry Smyth</i>	
Helping a CBR Program Know What It Knows	377
<i>Bruce M. McLaren and Kevin D. Ashley</i>	
Precision and Recall in Interactive Case-Based Reasoning.....	392
<i>David McSherry</i>	
Meta-case-Based Reasoning: Using Functional Models to Adapt Case-Based Agents	407
<i>J. William Murdock and Ashok K. Goel</i>	
Exploiting Interchangeabilities for Case Adaptation	422
<i>Nicoleta Neagu and Boi Faltings</i>	

Ensemble Case-Based Reasoning: Collaboration Policies for Multiagent Cooperative CBR	437
<i>Enric Plaza and Santiago Ontañón</i>	
MAMA: A Maintenance Manual for Case-Based Reasoning Systems	452
<i>Thomas Roth-Berghofer and Thomas Reinartz</i>	
Rough Sets Reduction Techniques for Case-Based Reasoning	467
<i>Maria Salamó and Elisabet Golobardes</i>	
Sequential Instance-Based Learning for Planning in the Context of an Imperfect Information Game	483
<i>Jenngang Shih</i>	
Learning Feature Weights from Case Order Feedback.....	502
<i>Armin Stahl</i>	
Adaptation by Applying Behavior Routines and Motion Strategies in Autonomous Navigation.....	517
<i>Haris Supic and Slobodan Ribaric</i>	
An Accurate Adaptation-Guided Similarity Metric for Case-Based Planning	531
<i>Flavio Tonidandel and Márcio Rillo</i>	
Releasing Memory Space through a Case-Deletion Policy with a Lower Bound for Residual Competence	546
<i>Flavio Tonidandel and Márcio Rillo</i>	
Using Description Logics for Designing the Case Base in a Hybrid Approach for Diagnosis Integrating Model and Case-Based Reasoning.....	561
<i>Yacine Zeghib, François De Beuvron, and Martina Kullmann</i>	

Application Papers

Deployed Applications

T-Air: A Case-Based Reasoning System for Designing Chemical Absorption Plants	576
<i>Josep Lluís Arcos</i>	
Benefits of Case-Based Reasoning in Color Matching.....	589
<i>William Cheetham</i>	
CBR for Dimensional Management in a Manufacturing Plant.....	597
<i>Alexander P. Morgan, John A. Cafeo, Diane I. Gibbons, Ronald M. Lesperance, Gülcin H. Sengir, and Andrea M. Simon</i>	
Real-Time Creation of Frequently Asked Questions	611
<i>Hideo Shimazu and Dai Kusui</i>	

Managing Diagnostic Knowledge in Text Cases.....	622
<i>Anil Varma</i>	

Emerging Applications

CBR Adaptation for Chemical Formulation.....	634
<i>Stefania Bandini and Sara Manzoni</i>	

A Case-Based Reasoning Approach for Due-Date Assignment in a Wafer Fabrication Factory	648
<i>Pei-Chann Chang, Jih-Chang Hsieh, and T. Warren Liao</i>	

DubLet: An Online CBR System for Rental Property Recommendation.....	660
<i>Gareth Hurley and David C. Wilson</i>	

Improved Performance Support through an Integrated Task-Based Video Case Library.....	675
<i>Christopher L. Johnson, Larry Birnbaum, Ray Bareiss, and Tom Hinrichs</i>	

Transforming Electronic Mail Folders into Case Bases	690
<i>Dai Kusui and Hideo Shimazu</i>	

Case-Based Reasoning in the Care of Alzheimer's Disease Patients.....	702
<i>Cindy Marling and Peter Whitehouse</i>	

Prototype of an Intelligent Failure Analysis System	716
<i>Claude Mount and T. Warren Liao</i>	

Applying CBR and Object Database Techniques in Chemical Process Design	731
<i>Timo Seuranen, Elina Pajula, and Markku Hurme</i>	

Mining High-Quality Cases for Hypertext Prediction and Prefetching	744
<i>Qiang Yang, Ian Tian-Yi Li, and Henry Haining Zhang</i>	

Author Index.....	757
--------------------------	------------