

Lecture Notes in Artificial Intelligence 4626

Edited by J. G. Carbonell and J. Siekmann

Subseries of Lecture Notes in Computer Science

Rosina O. Weber Michael M. Richter (Eds.)

Case-Based Reasoning Research and Development

7th International Conference
on Case-Based Reasoning, ICCBR 2007
Belfast, Northern Ireland, UK, August 13-16, 2007
Proceedings



Springer

Series Editors

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

Volume Editors

Rosina O. Weber
The iSchool at Drexel
College of Information Science & Technology
3141 Chestnut Street, Philadelphia, PA 19104, USA
E-mail: rweber@ischool.drexel.edu

Michael M. Richter
TU Kaiserslautern
Department of Computer Science
P.O. Box 3049, 67618 Kaiserslautern, Germany
E-mail: richter@informatik.uni-kl.de

Library of Congress Control Number: 2007932197

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

LNCS Sublibrary: SL 7 – Artificial Intelligence

ISSN 0302-9743
ISBN-10 3-540-74138-0 Springer Berlin Heidelberg New York
ISBN-13 978-3-540-74138-1 Springer 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. Violations are liable to prosecution under the German Copyright Law.

Springer is a part of Springer Science+Business Media
springer.com

© Springer-Verlag Berlin Heidelberg 2007
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 12105106 06/3180 5 4 3 2 1 0

Preface

The International Conference on Case-Based Reasoning (ICCBR) is the pre-eminent international meeting on case-based reasoning (CBR). ICCBR 2007 (<http://www.iccbr.org/iccbr07/>) was the seventh in this series, presenting the most significant contributions in the field of CBR. The conference took place in Belfast, Northern Ireland, UK, during August 13-16, 2007. ICCBR and its sister conferences ECCBR (European Conference on Case-Based Reasoning) alternate every year. ICCBR 2007 followed a series of six successful international conferences previously held in Sesimbra, Portugal (1995); Providence, Rhode Island, USA (1997); Seeon, Germany (1999); Vancouver, Canada (2001); Trondheim, Norway (2003); and Chicago, Illinois, USA (2005). The European Conferences on Case-Based Reasoning (ECCBR) were held as European workshops in Kaiserslautern, Germany (1993); Chantilly, France (1994); Lausanne, Switzerland (1996); Dublin, Ireland (1998); and Trento, Italy (2000); and as European conferences in Aberdeen, UK (2002); Madrid, Spain (2004); and Lykia World, Turkey (2006).

Days one, two, and four comprised presentations and posters on theoretical and applied CBR research. In order to emphasize the importance of applications, the traditional industry day was converted into an Industry Program held on the second day, in the middle of the conference. Day three was devoted to five workshops: Case-Based Reasoning and Context-Awareness; Case-Based Reasoning in the Health Sciences; Textual Case-Based Reasoning: Beyond Retrieval; Uncertainty and Fuzziness in Case-Based Reasoning; and Knowledge Discovery and Similarity.

There were four distinguished invited speakers. Two speakers from the CBR community, David W. Aha (Naval Research Laboratory, USA) spoke about perceptions of CBR, while Eva Armengol (IIIA-CSIC, Spain) talked about usages of generalization in CBR. Hans-Dieter Burkhard (Humboldt University, Germany) described the use of cases in robotic soccer, and Larry Kershberg (George Mason University, USA) presented the role of XML databases in CBR. Thanks to their commitment and ideas.

The presentations and posters covered a wide range of topics, including adaptation, planning, learning, similarity, maintenance, textual CBR, and recommender systems. This volume includes 15 papers from oral presentations and 18 from posters. These were chosen from a total of 64 submissions originating from 25 different countries. In addition, the volume contains three papers from invited speakers. The accepted papers were chosen based on a thorough and highly selective review process. Each paper was reviewed and discussed by four reviewers and revised according to their comments.

There were many people who participated in making ICCBR possible. First of all, David W. Patterson (University of Ulster, Northern Ireland, UK) –the Conference Chair who had the initiative to propose ICCBR 2007. The organization team was very diverse, having David C. Wilson (University of North Carolina, USA) and Deepak Khemani (IIT Madras, India) as coordinators of the Workshop Program. Thomas Roth-Berghofer (DFKI, Germany) chaired a Steering Committee for the Industry Program that included Kareem S. Aggour (General Electric CRD, USA), Bill

Cheetham (General Electric CRD, USA), Mehmet H. Göker (PricewaterhouseCoopers, USA), and Kalyan Moy Gupta (Knexus Research Corp., USA).

Mirjam Minor (University of Trier, Germany) coordinated the contacts with CBR researchers who have published work outside ICCBR and ECCBR conferences. We invited those researchers because we wanted to bring to the ICCBR audience a complete view of recent advances in CBR.

This diverse team together with the authors, the Program Committee, and additional reviewers are the stars of the CBR community in 2007. They made the conference happen and we want to thank them for their brilliant performances that are recorded in this volume.

We would also like to acknowledge the thoughtfulness of David W. Aha, whose constant leadership and concern for the community are crucial to the success of ICCBR and ECCBR conferences.

We gratefully acknowledge the generous support of the sponsors of ICCBR 2007 and their, partly long-time, sponsorship of ICCBR and ECCBR.

Additional help was given by doctoral students from the iSchool at Drexel University. Thanks to Caleb Fowler for serving as webmaster and to Sidath Gunawardena and Jay Johnson for their help with this volume. In support of local arrangements, thanks to the Local Arrangements Committee from the University of Ulster: Patricia Kearney, Niall Rooney, Mykola Galushka, and Juan Carlos Augusto.

The submission and reviewing process was supported with the use of Conf Master.net - The Conference Management System. We would like to express our gratitude to Thomas Preuss. Finally, we thank Springer for its continuing support in publishing this series of conference proceedings.

June 2007

Rosina O. Weber
Michael M. Richter

Organization

Program Chairs

Rosina O. Weber, Drexel University, USA

Michael M. Richter, Technical University of Kaiserslautern, Germany

Conference Chair

David W. Patterson, University of Ulster, Northern Ireland, UK

Workshop Chairs

David C. Wilson, University of North Carolina, USA

Deepak Khemani, IIT Madras, India

Industry Program Committee

Thomas Roth-Berghofer, DFKI, Germany (Chair)

Kareem S. Aggour, General Electric CRD, USA

Bill Cheetham, General Electric CRD, USA

Mehmet H. Göker, PricewaterhouseCoopers, USA

Kalyan Moy Gupta, Knexus Research Corp., USA

Program Committee

Agnar Aamodt, Norwegian University of Science and Technology, Norway

Kareem S. Aggour, General Electric CRD, USA

David W. Aha, Naval Research Laboratory, USA

Klaus-Dieter Althoff, University of Hildesheim, Germany

Josep Lluís Arcos, IIIA-CSIC, Spain

Eva Armengol, IIIA-CSIC, Spain

Kevin Ashley, University of Pittsburgh, USA

Paolo Avesani, The Centre for Scientific and Technological Research, Italy

Ralph Bergmann, University of Trier, Germany

Enrico Blanzieri, University of Trento, Italy

L. Karl Branting, MITRE, USA

Derek Bridge, University College Cork, Ireland

Stefanie Brünighaus, University of Pittsburgh, USA

Robin Burke, DePaul University, USA

Hans-Dieter Burkhard, Humboldt University, Germany
 Amílcar Cardoso, Universidade de Coimbra, Portugal
 Bill Cheetham, General Electric CRD, USA
 Michael Cox, BBN Technologies, USA
 Susan Craw, Robert Gordon University, Scotland, UK
 Pádraig Cunningham, University College Dublin, Ireland
 Belén Díaz-Agudo, Complutense University of Madrid, Spain
 Peter Funk, Mälardalen University, Sweden
 Ashok Goel, Georgia Institute of Technology, USA
 Mehmet H. Göker, PricewaterhouseCoopers, USA
 Pedro A. González Calero, Complutense University of Madrid, Spain
 Kalyan Moy Gupta, Knexus Research Corp., USA
 Alec Holt, University of Otago, New Zealand
 Eyke Hüllermeier, University of Magdeburg, Germany
 Larry Hunter, University of Colorado, USA
 Larry Kerschberg, George Mason University, USA
 Deepak Khemani, IIT Madras, India
 Janet Kolodner, Georgia Institute of Technology, USA
 Luc Lamontagne, Université Laval, Canada
 David Leake, Indiana University, USA
 Ramon López de Mántaras, IIIA-CSIC, Spain
 Michel Manago, Independent Consultant
 Cindy Marling, Ohio University, USA
 Lorraine McGinty, University College Dublin, Ireland
 David McSherry, University of Ulster, Northern Ireland, UK
 Mirjam Minor, University of Trier, Germany
 Héctor Muñoz-Avila, Lehigh University, USA
 Sankar Pal, Indian Statistical Institute, India
 David Patterson, University of Ulster, Northern Ireland, UK
 Petra Perner, ICVACS, Germany
 Enric Plaza, IIIA-CSIC, Spain
 Luigi Portinale, Università del Piemonte Orientale "A. Avogadro", Italy
 Bhanu Prasad, Florida A&M University, USA
 Lisa S. Purvis, Xerox Corporation, USA
 Francesco Ricci, University of Bozen-Bolzano, Italy
 Michael M. Richter, Technical University of Kaiserslautern, Germany
 Edwina Rissland, University of Massachusetts, USA
 Thomas Roth-Berghofer, DFKI, Germany
 A.K. Sadiq, Satyam Computer Services Ltd., India
 M. Sasikumar, C-DAC Mumbai, India
 Simon Shiu, Hong Kong Polytechnic University, Hong Kong
 Barry Smyth, University College Dublin, Ireland
 Raja Sooriamurthi, Indiana University, USA
 Armin Stahl, DFKI, Germany
 Flavio Tonidandel, UniFEI, Brazil
 Ian Watson, University of Auckland, New Zealand
 Rosina O. Weber, Drexel University, USA

David C. Wilson, University of North Carolina, USA
Nirmalie Wiratunga, The Robert Gordon University, Scotland, UK
Ronald R. Yager, Iona College, USA
Qiang Yang, University of Hong Kong, China

Additional Reviewers

Jörg Denzinger
Susan Fox
Andrew Golding
Stewart Massie
Lisa Cummins
Miltos Petridis
Stefania Montani
Conor Hayes
Alexandre Hanft
Régis Newo
Qhang Nhat Nguyen
Steve Bogaerts
Frode Sormo

Sponsoring Institutions

ICCBR 2007 was supported by these organizations: DFKI (<http://www.dfki.de/web>), Drexel iSchool (<http://www.ischool.drexel.edu/>), empolis (<http://www.empolis.com/>), University of Ulster (<http://www.ulster.ac.uk/>), and Zerosolution Inc. (<http://www.zerosolution.com/>).

Table of Contents

Invited Papers

Cases in Robotic Soccer	1
<i>Hans-Dieter Burkhard and Ralf Berger</i>	
A Case-Based Framework for Collaborative Semantic Search in Knowledge Sifter	16
<i>Larry Kerschberg, Hanjo Jeong, Yong Uk Song, and Wooju Kim</i>	
Usages of Generalization in Case-Based Reasoning	31
<i>Eva Armengol</i>	

Research Papers

Team Playing Behavior in Robot Soccer: A Case-Based Reasoning Approach	46
<i>Raquel Ros, Ramon López de Màntaras, Josep Lluís Arcos, and Manuela Veloso</i>	
Acquiring Word Similarities with Higher Order Association Mining	61
<i>Sutanu Chakraborti, Nirmalie Wiratunga, Robert Lothian, and Stuart Watt</i>	
Label Ranking in Case-Based Reasoning	77
<i>Klaus Brinker and Eyke Hüllermeier</i>	
When Similar Problems Don't Have Similar Solutions	92
<i>Stewart Massie, Susan Craw, and Nirmalie Wiratunga</i>	
Mixed-Initiative Relaxation of Constraints in Critiquing Dialogues	107
<i>David McSherry and David W. Aha</i>	
A Methodology for Analyzing Case Retrieval from a Clustered Case Memory	122
<i>Albert Fornells, Elisabet Golobardes, Josep Maria Martorell, Josep Maria Garrell, Núria Macià, and Ester Bernadó</i>	
Using Cases Utility for Heuristic Planning Improvement	137
<i>Tomás de la Rosa, Angel García Olaya, and Daniel Borrajo</i>	
Case-Based Reasoning Adaptation for High Dimensional Solution Space	149
<i>Ying Zhang, Panos Louvieris, and Maria Petrou</i>	

Case-Based Planning and Execution for Real-Time Strategy Games	164
<i>Santiago Ontañón, Kinshuk Mishra, Neha Sugandh, and Ashwin Ram</i>	
Case Authoring: From Textual Reports to Knowledge-Rich Cases	179
<i>Stella Asimwe, Susan Craw, Bruce Taylor, and Nirmalie Wiratunga</i>	
Case Provenance: The Value of Remembering Case Sources	194
<i>David Leake and Matthew Whitehead</i>	
Mining Large-Scale Knowledge Sources for Case Adaptation Knowledge	209
<i>David Leake and Jay Powell</i>	
Representation and Structure-Based Similarity Assessment for Agile Workflows	224
<i>Mirjam Minor, Alexander Tartakovski, and Ralph Bergmann</i>	
Application of the Revision Theory to Adaptation in Case-Based Reasoning: The Conservative Adaptation	239
<i>Jean Lieber</i>	
Methodological Assistance for Integrating Data Quality Evaluations into Case-Based Reasoning Systems	254
<i>Annett Bierer</i>	
Case-Based Anomaly Detection	269
<i>Alessandro Micarelli and Giuseppe Sansonetti</i>	
Case-Based Reasoning in Robot Indoor Navigation	284
<i>Alessandro Micarelli, Stefano Panzieri, and Giuseppe Sansonetti</i>	
Case-Based Group Recommendation: Compromising for Success	299
<i>Kevin McCarthy, Lorraine McGinty, and Barry Smyth</i>	
Catching the Drift: Using Feature-Free Case-Based Reasoning for Spam Filtering	314
<i>Sarah Jane Delany and Derek Bridge</i>	
Enhancing Case-Based, Collaborative Web Search	329
<i>Oisín Boydell and Barry Smyth</i>	
An Analysis of Case-Based Value Function Approximation by Approximating State Transition Graphs	344
<i>Thomas Gabel and Martin Riedmiller</i>	
From Anomaly Reports to Cases	359
<i>Stewart Massie, Nirmalie Wiratunga, Susan Craw, Alessandro Donati, and Emmanuel Vicari</i>	

Assessing Classification Accuracy in the Revision Stage of a CBR Spam Filtering System	374
<i>José Ramón Méndez, Carlos González, Daniel Glez-Peña, Florentino Fdez-Riverola, Fernando Díaz, and Juan Manuel Corchado</i>	

Application Papers

Intelligent Guidance and Suggestions Using Case-Based Planning	389
<i>Javier Bajo, Juan Manuel Corchado, and Sara Rodríguez</i>	
Case-Based Reasoning for Invoice Analysis and Recognition	404
<i>Hatem Hamza, Yolande Belaïd, and Abdel Belaïd</i>	
Watershed Segmentation Via Case-Based Reasoning	419
<i>Maria Frucci, Petra Perner, and Gabriella Sanniti di Baja</i>	
A Case-Based Song Scheduler for Group Customised Radio	433
<i>Claudio Baccigalupo and Enric Plaza</i>	
Helping Software Engineers Reusing UML Class Diagrams	449
<i>Paulo Gomes, Pedro Gandola, and Joel Cordeiro</i>	
Failure Analysis for Domain Knowledge Acquisition in a Knowledge-Intensive CBR System	463
<i>Amélie Cordier, Béatrice Fuchs, Jean Lieber, and Alain Mille</i>	
Classify and Diagnose Individual Stress Using Calibration and Fuzzy Case-Based Reasoning	478
<i>Shahina Begum, Mobyen Uddin Ahmed, Peter Funk, Ning Xiong, and Bo von Schéele</i>	
Prototypical Cases for Knowledge Maintenance in Biomedical CBR	492
<i>Isabelle Bichindaritz</i>	
Case-Based Support for Library Reference Services	507
<i>Yen Bui</i>	
Knowledge Extraction and Summarization for an Application of Textual Case-Based Interpretation	517
<i>Eni Mustafaraj, Martin Hoof, and Bernd Freisleben</i>	
Author Index	533