

# Lecture Notes in Artificial Intelligence 7466

## Subseries of Lecture Notes in Computer Science

### LNAI Series Editors

Randy Goebel

*University of Alberta, Edmonton, Canada*

Yuzuru Tanaka

*Hokkaido University, Sapporo, Japan*

Wolfgang Wahlster

*DFKI and Saarland University, Saarbrücken, Germany*

### LNAI Founding Series Editor

Joerg Siekmann

*DFKI and Saarland University, Saarbrücken, Germany*

Belén Díaz Agudo Ian Watson (Eds.)

# Case-Based Reasoning Research and Development

20th International Conference, ICCBR 2012  
Lyon, France, September 3-6, 2012  
Proceedings



Springer

## Series Editors

Randy Goebel, University of Alberta, Edmonton, Canada  
Jörg Siekmann, University of Saarland, Saarbrücken, Germany  
Wolfgang Wahlster, DFKI and University of Saarland, Saarbrücken, Germany

## Volume Editors

Belén Díaz Agudo  
Universidad Complutense de Madrid  
Facultad de Informática  
C/ Profesor José García Santesmases, s/n.  
28040 Madrid, Spain  
E-mail: belend@sip.ucm.es

Ian Watson  
University of Auckland  
Department of Computer Science  
1142 Auckland, New Zealand  
E-mail: ian@cs.auckland.ac.nz

ISSN 0302-9743 e-ISSN 1611-3349  
ISBN 978-3-642-32985-2 e-ISBN 978-3-642-32986-9  
DOI 10.1007/978-3-642-32986-9  
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2012944835

CR Subject Classification (1998):  
I.2.1, I.2.3-4, I.2.6, I.2.8, I.1.11, H.3.3-5, H.2.8, H.4, H.5.3, J.1, J.3

LNCS Sublibrary: SL 7 – Artificial Intelligence

© Springer-Verlag Berlin Heidelberg 2012

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.

The use of general descriptive names, registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

*Typesetting:* Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

# Preface

This volume contains the papers presented at ICCBR 2012: the 20th International Conference on Case-Based Reasoning (<http://www.iccbr.org/iccbr12/>) held September 3–6, 2012, in Lyon, France. There were 51 submissions to the conference; each was reviewed by at least three Program Committee members. The committee decided to accept 19 papers for oral presentation at the conference, following a highly selective process. An additional 13 papers were accepted for poster presentation. The program also contained two invited talks, the abstracts of which are included in this volume.

The International Conference on Case-Based Reasoning (ICCBR) is the pre-eminent international meeting on case-based reasoning (CBR). Previous ICCBR conferences have been held in Sesimbra, Portugal (1995), Providence, USA (1997), Seeon Monastery, Germany (1999), Vancouver, Canada (2001), Trondheim, Norway (2003), Chicago, USA (2005), Belfast, UK (2007), Seattle, USA (2009), Alessandria, Italy (2010), and most recently in Greenwich, UK (2011).

The first day of ICCBR 2012 was given over to an Introduction to CBR Development Tools involving an extensive look at the state-of-the-art tools myCBR and jCOLIBRI and products from the company Empolis that use CBR. Running in parallel on the first day was the 4th Annual Doctoral Consortium (DC) that involved presentations from 16 students in association with 19 mentors. A highlight of the DC were talks from guest speakers Agnar Aamodt and Santiago Ontañón.

The second day featured workshops on CBR in the Health Sciences, Process-Oriented CBR, and finally a workshop called TRUE: Traces for Reusing Users' Experiences — Cases, Episodes, and Stories. We would like to thank all the Co-chairs of these workshops for creating such a stimulating program. The workshops were complemented with the popular full-day live Computer Cooking Contest (CCC). We would like to thank all involved with the CCC, the international jury, and the event's sponsors.

Days three and four comprised presentations and posters on technical and applied CBR papers, as well as invited talks from two distinguished scholars: Yolanda Gil, of the University of Southern California, USA, and Klaus-Dieter Althoff, of the University of Hildesheim, Germany. Yolanda Gil argued that integrating case-based reasoning techniques with scientific workflow research would result in improved approaches to workflow sharing, retrieval, and adaptation. Klaus-Dieter Althoff analyzed the relationships between CBR and expert systems using different perspectives, including problem solving, learning, competence development, and knowledge types. The presentations and posters covered a wide range of CBR topics of interest to both practitioners and researchers, including foundational issues covering case representation, similarity, retrieval, and adaptation; conversational CBR recommender systems; multi-agent collaborative systems;

data mining; time series analysis; Web applications; knowledge management; legal reasoning; healthcare systems and planning and scheduling systems.

Many people participated in making ICCBR 2012 a great success. In particular Amélie Cordier and Marie Lefevre of the University Claude Bernard, France, who served as Conference Co-chairs, with Belén Díaz-Agudo, Complutense de Madrid, Spain, and Ian Watson, University of Auckland, New Zealand, as Program Co-chairs. We would especially like to thank Luc Lamontagne, University of Laval, Canada, and Juan A. Recio García, Universidad Complutense de Madrid, for serving as Workshop Coordinators, and Mehmet Göker of Salesforce and William Cheetham of General Electric for chairing the Introduction to CBR Development Tools meeting on the first day. We wish to thank David Aha and Thomas Roth-Berghofer for organizing the valuable Doctoral Consortium and Michel Manago for chairing the Computer Cooking Contest.

We thank the Program Committee and all our additional reviewers for their thoughtful and timely participation in the paper selection process. We acknowledge the time and effort put in by the members of the Local Organizing Committee at the Lyon 1 University including: Faty Berkai, Pierre-Antoine Champin, Béatrice Fuchs, Brigitte Guyader, Marie Lefevre, Alain Mille, Sylvie Oudot, and Raafat Zarka, plus all our student volunteers.

We are very grateful for the generous support of the ICCBR 2012 sponsors: the AIJ for student bursaries in support of the doctoral consortium, and Lyon 1 University, the Computer Science Department of Lyon 1 University, and CNRS for supporting the conference in general. Finally, we appreciate the support provided by EasyChair in the management of this conference and we thank Springer for its continuing support in publishing the proceedings of ICCBR.

Finally, we would like to dedicate the proceedings of this conference to the memory of Alan Mathison Turing (1912–1954), the father of computer science and of artificial intelligence.

September 2012

Belén Díaz-Agudo  
Ian Watson

# Organization

## Program Chairs

Belén Díaz-Agudo  
Ian Watson

Universidad Complutense de Madrid, Spain  
University of Auckland, New Zealand

## Conference Chairs

Amélie Cordier  
Marie Lefevre

University Claude Bernard Lyon 1, France  
University Claude Bernard Lyon 1, France

## Industry Day Chairs

William Cheetham  
Mehmet Göker

General Electric, USA  
SalesForce, USA

## Workshop Coordinators

Luc Lamontagne  
Juan Recio-Garcia

Laval University, Canada  
Universidad Complutense de Madrid, Spain

## Doctoral Consortium Chairs

David Aha  
Thomas Roth-Berghofer

Naval Research Laboratory, USA  
University of West London, UK

## Cooking Competition Chair

Michel Manago

Kiolis, France

## Program Committee

Agnar Aamodt

Norwegian University of Science and  
Technology, Norway

David Aha  
Josep Lluís Arcos

Naval Research Laboratory, USA  
IIIA - CSIC, Artificial Intelligence Research  
Institute, Spain

Kevin Ashley  
Ralph Bergmann  
Isabelle Bichindaritz  
Derek Bridge

University of Pittsburgh, USA  
University of Trier, Germany  
University of Washington, Tacoma, USA  
University College Cork, Ireland

William Cheetham	General Electric, USA
Amélie Cordier	University Claude Bernard Lyon 1, France
Susan Craw	The Robert Gordon University, UK
Sarah Jane Delany	Dublin Institute of Technology, Ireland
Klaus Dieter-Althoff	DFKI / University of Hildesheim, Germany
Belén Díaz-Agudo	Universidad Complutense de Madrid, Spain
Peter Funk	Mälardalen University, Sweden
Pedro González Calero	Complutense University of Madrid, Spain
Mehmet Göker	SalesForce, USA
Deepak Khemani	Indian Institute of Technology - Madras, India
Luc Lamontagne	Laval University, Canada
David Leake	Indiana University, USA
Jean Lieber	Loria, France
Ramon Lopez De Mantaras	IIIA - CSI, Artificial Intelligence Research Institute, Spain
Cindy Marling	Ohio University, USA
Lorraine Mcginty	University College Dublin, Ireland
David Mcsherry	University of Ulster, UK
Mirjam Minor	University of Trier, Germany
Stefania Montani	Università del Piemonte Orientale, Italy
Hector Munoz-Avila	Lehigh University, USA
Santiago Ontañón	Drexel University, USA
Petra Perner	Institute of Computer Vision and Applied Computer Sciences, Germany
Miltos Petridis	University of Brighton, UK
Enric Plaza	IIIA - CSI, Artificial Intelligence Research Institute, Spain
Luigi Portinale	Università del Piemonte Orientale, Italy
Ashwin Ram	Georgia Tech, USA
Juan Recio-Garcia	Universidad Complutense de Madrid, Spain
Thomas Roth-Berghofer	University of West London, UK
Barry Smyth	University College Dublin, Ireland
Armin Stahl	German Research Center for Artificial Intelligence (DFKI), Germany
Ian Watson	University of Auckland, New Zealand
Rosina Weber	Drexel iSchool, USA
David Wilson	University of North Carolina at Charlotte, USA
Nirmalie Wiratunga	The Robert Gordon University, UK
Qiang Yang	Hong Kong University of Science and Technology, SAR China

# Table of Contents

Case-Based Reasoning and Expert Systems . . . . .	1
<i>Klaus-Dieter Althoff</i>	
Reproducibility and Efficiency of Scientific Data Analysis: Scientific Workflows and Case-Based Reasoning . . . . .	2
<i>Yolanda Gil</i>	
A Computer Aided System for Post-operative Pain Treatment Combining Knowledge Discovery and Case-Based Reasoning . . . . .	3
<i>Mobyen Uddin Ahmed and Peter Funk</i>	
Developing Case-Based Reasoning Applications Using myCBR 3 . . . . .	17
<i>Kerstin Bach and Klaus-Dieter Althoff</i>	
Diverse Plan Generation by Plan Adaptation and by First-Principles Planning: A Comparative Study . . . . .	32
<i>Alexandra Coman and Héctor Muñoz-Avila</i>	
Case-Based Appraisal of Internet Domains . . . . .	47
<i>Sebastian Dieterle and Ralph Bergmann</i>	
Harnessing the Experience Web to Support User-Generated Product Reviews . . . . .	62
<i>Ruihai Dong, Markus Schaal, Michael P. O'Mahony, Kevin McCarthy, and Barry Smyth</i>	
Adapting Spatial and Temporal Cases . . . . .	77
<i>Valmi Dufour-Lussier, Florence Le Ber, Jean Lieber, and Laura Martin</i>	
eCo: Managing a Library of Reusable Behaviours . . . . .	92
<i>Gonzalo Flórez-Puga, Guillermo Jiménez-Díaz, and Pedro A. González-Calero</i>	
Toward Measuring the Similarity of Complex Event Sequences in Real-Time . . . . .	107
<i>Odd Erik Gundersen</i>	
Case-Based Project Scheduling . . . . .	122
<i>Mario Gómez and Enric Plaza</i>	



Adapting Numerical Representations of Lung Contours Using Case-Based Reasoning and Artificial Neural Networks . . . . .	137
<i>Julien Henriet, Pierre-Emmanuel Leni, Rémy Laurent, Ana Roxin, Brigitte Chebel-Morello, Michel Salomon, Jad Farah, David Broggio, Didier Franck, and Libor Makovicka</i>	
Adaptation in a CBR-Based Solver Portfolio for the Satisfiability Problem . . . . .	152
<i>Barry Hurley and Barry O’Sullivan</i>	
A Local Rule-Based Attribute Weighting Scheme for a Case-Based Reasoning System for Radiotherapy Treatment Planning . . . . .	167
<i>Rupa Jagannathan and Sanja Petrovic</i>	
Learning and Reusing Goal-Specific Policies for Goal-Driven Autonomy . . . . .	182
<i>Ulit Jaidee, Héctor Muñoz-Avila, and David W. Aha</i>	
Custom Accessibility-Based CCBR Question Selection by Ongoing User Classification . . . . .	196
<i>Vahid Jalali and David Leake</i>	
Feature Weighting and Confidence Based Prediction for Case Based Reasoning Systems . . . . .	211
<i>Debarun Kar, Sutanu Chakraborti, and Balaraman Ravindran</i>	
A Case-Based Approach to Mutual Adaptation of Taxonomic Ontologies . . . . .	226
<i>Sergio Manzano, Santiago Ontañón, and Enric Plaza</i>	
A Lazy Learning Approach to Explaining Case-Based Reasoning Solutions . . . . .	241
<i>David McSherry</i>	
Confidence in Workflow Adaptation . . . . .	255
<i>Mirjam Minor, Mohd. Siblee Islam, and Pol Schumacher</i>	
Retrieval and Clustering for Business Process Monitoring: Results and Improvements . . . . .	269
<i>Stefania Montani and Giorgio Leonardi</i>	
A Case-Based Approach to Cross Domain Sentiment Classification . . . . .	284
<i>Bruno Ohana, Sarah Jane Delany, and Brendan Tierney</i>	
GENA: A Case-Based Approach to the Generation of Audio-Visual Narratives . . . . .	297
<i>Santiago Ontañón, Josep Lluís Arcos, Josep Puyol-Gruart, Eusebio Carasusán, Daniel Giribet, David de la Cruz, Ismel Brito, and Carlos Lopez del Toro</i>	

On Knowledge Transfer in Case-Based Inference . . . . .	312
<i>Santiago Ontañón and Enric Plaza</i>	
Case-Based Aggregation of Preferences for Group Recommenders . . . . .	327
<i>Lara Quijano-Sánchez, Derek Bridge, Belén Díaz-Agudo, and Juan A. Recio-García</i>	
A Case-Based Solution to the Cold-Start Problem in Group Recommenders . . . . .	342
<i>Lara Quijano-Sánchez, Derek Bridge, Belén Díaz-Agudo, and Juan A. Recio-García</i>	
Opponent Type Adaptation for Case-Based Strategies in Adversarial Games . . . . .	357
<i>Jonathan Rubin and Ian Watson</i>	
Exploiting Extended Search Sessions for Recommending Search Experiences in the Social Web . . . . .	369
<i>Zurina Saaya, Markus Schaal, Maurice Coyle, Peter Briggs, and Barry Smyth</i>	
Event Extraction for Reasoning with Text . . . . .	384
<i>Sadiq Sani, Nirmalie Wiratunga, Stewart Massie, and Robert Lothian</i>	
Explanation-Aware Design of Mobile myCBR-Based Applications . . . . .	399
<i>Christian Severin Sauer, Alexander Hundt, and Thomas Roth-Berghofer</i>	
A Competitive Measure to Assess the Similarity between Two Time Series . . . . .	414
<i>Joan Serrà and Josep Lluís Arcos</i>	
Case-Based Reasoning Applied to Textile Industry Processes . . . . .	428
<i>Beatriz Sevilla Villanueva and Miquel Sánchez-Marrè</i>	
Natural Language Generation through Case-Based Text Modification . . .	443
<i>Josép Valls and Santiago Ontañón</i>	
Case-Based Reasoning for Turbine Trip Diagnostics . . . . .	458
<i>Aisha Yousuf and William Cheetham</i>	
<b>Author Index . . . . .</b>	<b>469</b>