

Guest Editorial

Special Issue on Case Based Reasoning

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Abstract. Case-based reasoning (CBR) addresses new problems by remembering and adapting solutions previously used to solve similar problems. Pulled by the increasing number of applications and pushed by a growing interest in memory intensive techniques, research on case-based reasoning appears to be gaining momentum. This special issue on Case Based Reasoning gathers together extended versions of selected papers of the successful ICCBR International Conference on Case Based Reasoning, held in November 2016 in Atlanta, USA. ICCBR is the premier, annual meeting of the CBR community and the leading international conference on this topic. The conference series steadily expands the frontiers of CBR as a scientific field. Each conference addresses on the progress of the field and its connections with related areas and application domains. We have selected the best papers of ICCBR 2016 and invited their authors to submit extended and improved versions of their contributions.

1. Introduction

After a rigorous revision process we have finally selected 8 papers for publication. The focus of this special issue is on theoretical research, applied research and deployed application papers on all aspects of Case-Based Reasoning.

Research on foundations CBR reasoning aims at improving the basic processes of a CBR system: retrieve from memory cases relevant to solving a query problem; adapting the solution as needed to fit the new situation; revise and retain the resulting experience and maintain the whole case base.

The paper “Learning and applying adaptation rules for categorical features: An ensemble approach” by Vahid Jalali, David Leake and Najmeh Forouzan-dehmehr, deals with a classic challenge for CBR: acquiring knowledge for case adaptation. To provide CBR systems with adaptation knowledge, machine learning methods have been developed for automatically generating adaptation rules.

Research on CBR over the years has led to a large number of applications in a variety of domains. Recommender systems (RS) have been a successful application area of CBR techniques. The paper enti-

tled “Investigating Users’ Eye Movement Behavior in Critiquing-based Recommender Systems” by Li Chen and Feng Wang, propose a method to acquire users’ critiquing feedback in critiquing-based recommender systems. Based on a collection of real users’ eye-gaze data authors identify the correlation between eye movements and user’s critiquing feedback.

The paper “Similarity metrics from social network analysis for content recommender systems” by Guillermo Jimenez-Diaz, Pedro Pablo Gómez Martín, Marco Antonio Gómez Martín and Antonio Sánchez Ruiz-Granados, describes a complex similarity metric based on social network analysis techniques and apply it to measure similarity between programming problems that can be then used for recommendation in an online judge used in programming contests.

The paper “On argument bundles in the Web of experiences” by Xavier Ferrer Aran and Enric Plaza, proposes a novel approach to creating a vocabulary to characterize a set of products by analyzing the usage of the aspects over a set of reviews in the web. This approach takes advantage of people experience to find those features with a clear positive and negative polarity to create the bundles of arguments.

The paper entitled “Retrieving and reusing qualitative cases: An application in the humanoid-robot soccer” by Thiago Pedro Donadon Homem, Danilo Hernani Perico, Paulo Eduardo Santos, Ramon Lopez de

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Mantaras and Reinaldo Augusto Da Costa Bianchi, proposes novel retrieval and reuse techniques based on qualitative Spatial Reasoning theory and evaluate them in an interesting domain: simulation and real humanoid robots soccer players.

In order for us to trust artificial intelligence systems, they need to be able to explain their decisions. The paper “Let me explain: Adaptation of explanations extracted from incident reports” by Gleb Sizov, Pinar Ozturk and Erwin Marsi, investigates a CBR approach for generating explanations where a new event is explained by combining and modifying explanations of multiple previous events. The domain of application is incident analysis where the goal is to identify causes of transportation incidents.

Also related with explanations and in the robot behavior domain, the paper “Incorporating transparency

during trust-guided behavior adaptation” by Michael Floyd and David Aha, highlights the importance of maintaining adequate trust when robots perform tasks. They use CBR to include a transparency layer in the reasoning process that allows the robot to provide simple, concise, and understandable explanations for its behavior.

The paper entitled “A generalized case competence model for casebase maintenance” by Ditty Mathew and Sutanu Chakraborti, describes a competence guided casebase maintenance algorithm that retains a case in the casebase if it is useful to solve many problems and ensures that the casebase is highly competent.

We expect that this special issue will provide the readers with a comprehensive overview of the most recent developments in CBR research.