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Case-based reasoning commentaries: introduction

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We are delighted to present this special issue of *The Knowledge Engineering Review*, as it marks a significant accomplishment of the case-based reasoning (CBR) community. Its 19 commentaries, written by 41 authors, represent a compendium on the state-of-the-art in CBR. These evolved from a 2003 workshop that was held at Waiheke Island and Queenstown, New Zealand and chaired by Alec Holt and Ian Watson. The workshop's delegates identified the primary topics of CBR research and application, selected representative influential publications for each topic, and were encouraged to co-author commentaries on each topic with other CBR experts who were unable to attend. These collaborations produced the articles you now see. While several reviews exist on CBR (e.g. Marir & Watson, 1994; López de Mántaras & Plaza, 1997; Lenz *et al*., 1998), few have been published recently or have similar historical and subject breadth.

CBR is a process in which specific experiences are retrieved, reused, revised, and retained for use in problem solving and/or interpreting the state of the world. CBR has been described, alternately, as a cognitive theory of human problem solving, a paradigm for conducting Artificial Intelligence research, and as a knowledge engineering methodology for deploying practical systems. The commentaries are organized into five groups that account for the various aspects of CBR. We begin with an introduction, in which Richter & Aamodt describe foundations that underlie case-based reasoning, Bergmann *et al*. describe representations used in CBR processes, and López de Mántaras *et al*. summarize the cognitive science influences of CBR and its four primary subprocesses (i.e. case retrieval, reuse, revision, and retention). Second, five articles describe CBR techniques, focusing on integrations with other problem-solving methods (Marling *et al*.), incremental query elicitation (conversational CBR) (Aha *et al*.), reasoning with text documents (textual CBR) (Weber *et al*.), distributed approaches (Plaza & McGinty), and soft computing (Cheetham *et al*.). Third, three articles focus on principal task areas, namely design (Goel & Craw), diagnosis (Goker *et al*.), and planning (Cox *et al*.). Fourth, six articles describe the application of CBR to key topic areas: medicine (Holt *et al*.), the law (Rissland *et al*.), education (Kolodner *et al*.), knowledge management (Althoff & Weber), image processing (Perner *et al*.), and recommender systems (Bridge *et al*). Finally, two articles review influential commercial applications of CBR (Cheetham & Watson) and emerging application areas (López de Mántaras *et al*.).

The articles presented here can be used by students to review the field, by CBR researchers to refer others to key contributions, by experts in other academic areas who want to quickly identify accomplishments in CBR, and by practitioners. We hope these interest you in this unique, broad, and exciting field, and invite you to join us in its continuing development.

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