

Preface

Our motivation for organizing the 1995 AAAI Fall Symposium on *Adaptation of Knowledge for Reuse* derives from our shared concerns regarding case-based reasoning (CBR) research and commercial tools. CBR algorithms differ from similar algorithms studied in related fields (e.g., information retrieval, planning, machine learning, pattern recognition) in that they explicitly *adapt* retrieved solutions to solve new problems. Adaptation is an exciting topic in CBR; several researchers have proposed adaptation algorithms. Yet David Leake's summary of the AAAI-93 Workshop on CBR confirmed what we suspected: while commercial CBR tools can efficiently *retrieve* cases, none include methods for automatically *adapting* them (i.e., users are limited to coding domain-specific adaptation rules). This was further clarified at the more recent CBR Workshops (e.g., at AAAI-94, EWCBR-95, and IJCAI-95), where both researchers and practitioners lamented this absence.

The reason why adaptation algorithms have not yet reached commercial CBR tools is because the CBR community has not yet produced a general theory of adaptation with practical implications (e.g., empirical evidence demonstrating the utility of adaptation across a broad range of problem-solving tasks). Instead, researchers have primarily focussed on domain-specific adaptation strategies. Thus, there is a great need to further the understanding of adaptation methods in CBR research.

One way to fulfill this need is to bring CBR researchers into contact with others who have made progress on this issue. This symposium provided a forum where AI researchers discussed progress on adaptation theories and algorithms from perspectives on analogical problem solving, case-based reasoning, machine learning, multiple agents, knowledge acquisition, knowledge-based systems, model-based reasoning, plan reuse, representation change, software design, theorem proving, and theory revision. Our symposium attracted a large range of expertise among the attendees because, as with CBR, there is much interest in adapting knowledge for reuse throughout the AI community. Thus, while CBR researchers benefited from this symposium, so did attendees focusing on the other perspectives.

Presentations at this symposium defined core issues in knowledge adaptation, characterized approaches for adapting reusable knowledge, and introduced novel approaches from several AI perspectives. Our terrific invited speakers surveyed adaptation methods from specific AI research perspectives: David Leake (CBR) suggested ways to solve open issues, Mark Keane (analogical problem solving) related theories among research areas, and Jeffrey Van Baalen (problem reformulation) addressed issues in representation change. We reserved generous amounts of time for structured open discussion periods, and held two panels. The first involved identifying the unique aspects of the approaches in specific AI areas, focusing on their potential benefits for other problems. A second panel identified core issues in knowledge adaptation proposed in the presentations and predicted their impact on addressing these issues.

Many people helped to organize this symposium. We especially thank our organizing committee members, namely Brian Falkenhainer, Eric Jones, Rao Kambhampati, and David Leake, for their assistance throughout the organizing and reviewing processes. Thanks also to AAAI officials (Lynn Stein & Bonnie Dorr) and staff (Carol Hamilton and several others) for their tremendous support, without which this symposium could not have taken place.

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10-12 November 1995
Cambridge, Massachusetts