S. Kasif, S. Salzberg, D. Waltz, J. Rachlin and D. Aha, A probabilistic framework for memory-based reasoning

In this paper, we propose a probabilistic framework for Memory-Based Reasoning (MBR). The framework allows us to clarify the technical merits and limitations of several recently published MBR methods and to design new variants. The proposed computational framework consists of three components: a specification language to define an adaptive notion of relevant context for a query; mechanisms for retrieving this context; and local learning procedures that are used to induce the desired action from this context. We primarily focus on actions in the form of a classification. Based on the framework we derive several analytical and empirical results that shed light on MBR algorithms. We introduce the notion of an MBR transform, and discuss its utility for learning algorithms. We also provide several perspectives on memory-based reasoning from a multi-disciplinary point of view.

T. Schmidt and P.P. Shenoy, Some improvements to the Shenoy–Shafer and Hugin architectures for computing marginals (Research Note)

The main aim of this paper is to describe two modifications to the Shenoy–Shafer architecture with the goal of making it computationally more efficient in computing marginals of the joint valuation. We also describe a modification to the Hugin architecture. Finally, we briefly compare the traditional and modified architectures by solving a couple of small Bayesian networks, and conclude with a statement of further research.

A.Y. Levy and M.-C. Rousset, CARIN: a representation language combining Horn rules and description logics

We describe CARIN, a novel family of representation languages, that combine the expressive power of Horn rules and of description logics. We address the issue of providing sound and complete inference procedures for such languages. We identify existential entailment as a core problem in reasoning in CARIN, and describe an existential entailment algorithm for the \(\mathcal{ALCN}^\mathcal{R}\) description logic. As a result, we obtain a sound and complete algorithm for reasoning in non recursive \(\text{CARIN-}\mathcal{ALCN}^\mathcal{R}\) knowledge bases, and an algorithm for rule subsumption over \(\mathcal{ALCN}^\mathcal{R}\). We show that in general, the reasoning problem for recursive \(\text{CARIN-}\mathcal{ALCN}^\mathcal{R}\) knowledge bases is
undecidable, and identify the constructors of $\mathcal{ALCNR}$ causing the undecidability. We show two ways in which CARIN-$\mathcal{ALCNR}$ knowledge bases can be restricted while obtaining sound and complete reasoning.