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**BaRT: A Bayesian reasoning tool for knowledge based systems.** (English) Zbl 0721.68081

Uncertainty in artificial intelligence, 5th Workshop, Ontario/Canada 1989, Mach. Intell. Pattern Recognition 10, 271-282 (1990).

[For the entire collection see [Zbl 0718.68001](#).]

The paper describes BaRT, a Bayesian reasoning tool that makes belief networks and other probabilistic techniques available to knowledge engineers building classificatory problem solvers. The paper discusses how state-of-the-art probabilistic methods fit naturally into a knowledge-based approach to classificatory problem solving, examining the current capabilities of BaRT. As representation tool is used the Conceptual Structures Representation Language (CSRL), designed to facilitate the construction of classificatory problem solvers in a way commensurate with the generic task point of view. Concerning CSRL, it should be noted that: (1) The key unit of representation is the knowledge group - a collection of production rules that map problem data into a discrete scale of qualitative confidence values; (2) Each classificatory hypothesis is associated with its own hierarchy of knowledge groups dedicated to computing its confidence value; (3) Qualitative scales are used to measure confidence levels. The overall BaRT architecture is made up of three major components: the knowledge acquisition system, the network compiler, and the core inference routines. The current version of BaRT supports three knowledge representations: Bayesian networks, influence diagrams, and taxonomic hierachies, and a method for default reasoning and property inheritance, based on a probabilistic semantics, is going to be implemented. The relationship between BaRT system and CSRL is straightforward: BaRT implementation allows arbitrary subclass- superclass hierarchies to be defined, a taxonomic hierarchy being the counterpart to the classification tree used in CSRL. The goal of BaRT project is to bring together several theoretical ideas about plausible inference in a way to be efficient and practical for real applications. BaRT has been used as decision aid for classifying ship images, and as the reasoning component of a system concerned with analysing intelligence reports. Because all of BaRT's capabilities are based on sound probabilistic semantics, it has the added advantage of computing normative and axiomatic inferences.

Reviewer: [N.Curteanu \(Iași\)](#)

**MSC:**

- [68T35](#) Theory of languages and software systems (knowledge-based systems, expert systems, etc.) for artificial intelligence
- [68T30](#) Knowledge representation
- [68T20](#) Problem solving in the context of artificial intelligence (heuristics, search strategies, etc.)

**Keywords:**

[Bayesian reasoning](#); [belief networks](#); [problem solvers](#); [Conceptual Structures Representation Language](#)

**Software:**

[BaRT](#)