Learning Rule-based Local Structure in Probability Models

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Abstract

Bayesian Knowledge Bases (BKB) are a rule-based probabilistic model that extend the well-known Bayes Networks (BN), by naturally allowing for context-specific independence and for cycles in the directed graph. The rules induce a local structure that in many cases results in a compact representation, regardless of whether cycles are needed in the model. Acquisition of these rules by learning from a set of samples is of interest, but appears to be a hard problem, even for limited cases and where the global structure is known. We present a algorithm based on simulated annealing that learns the local structure, and empirical results that show that it is capable of recovering intricate local structure - even for cases where decision trees do not behave well.