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Case-factor diagrams for structured probabilistic modeling. (English) Zbl 1161.68784
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Summary: We introduce a probabilistic formalism handling both Markov random fields of bounded tree width and probabilistic context-free grammars. Our models are based on Case-Factor Diagrams (CFDs) which are similar to binary decision diagrams but are more concise for circuits of bounded tree width. A probabilistic model consists of a CFD defining a feasible set of Boolean assignments and a weight (or cost) for each individual Boolean variable. We give versions of the inside-outside algorithm and the Viterbi algorithm for these models.

MSC:

- 68T20 Problem solving in the context of artificial intelligence (heuristics, search strategies, etc.) Cited in 4 Documents
- 60C05 Combinatorial probability
- 68Q42 Grammars and rewriting systems

Keywords:

Boolean decision diagrams; Markov random fields; probabilistic context free grammars; hidden Markov models; conditional random fields; probabilistic relational models; structured labeling; graphical models; Bayesian networks; zero supression; recursive conditioning; and/or graphs

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