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Bayesian MAP model selection of chain event graphs. (English) Zbl 1216.62039
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Summary: Chain event graphs are graphical models that while retaining most of the structural advantages of Bayesian networks for model interrogation, propagation and learning, more naturally encode asymmetric state spaces and the order in which events happen than Bayesian networks do. In addition, the class of models that can be represented by chain event graphs for a finite set of discrete variables is a strict superset of the class that can be described by Bayesian networks. In this paper we demonstrate how with complete sampling, conjugate closed form model selection based on product Dirichlet priors is possible, and prove that suitable homogeneity assumptions characterise the product Dirichlet prior on this class of models. We demonstrate our techniques using two educational examples.

MSC:

- 62F15 Bayesian inference
- 68T35 Theory of languages and software systems (knowledge-based systems, expert systems, etc.) for artificial intelligence
- 05C90 Applications of graph theory
- 62-07 Data analysis (statistics) (MSC2010)

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