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A decomposition algorithm for learning Bayesian networks based on scoring function. (English) [Zbl 1263.62046](#)

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Summary: Learning Bayesian network (BN) structures from data is a typical NP-hard problem. But almost existing algorithms have very high complexity when the number of variables is large. In order to solve this problem, we present an algorithm that integrates a decomposition-based approach and a scoring-function-based approach for learning BN structures. First, the proposed algorithm decomposes the supporting graph of BNs into its maximal prime subgraphs. Then it orientates the local edges in each subgraph by the K2-scoring greedy searching. The last step is to combine the directed subgraphs to obtain the final BN structure. The theoretical and experimental results show that our algorithm can efficiently and accurately identify complex network structures from small data sets.

MSC:

[62F15](#) Bayesian inference
[68T05](#) Learning and adaptive systems in artificial intelligence
[05C90](#) Applications of graph theory
[65C60](#) Computational problems in statistics (MSC2010)

Software:

[BNT](#); [RAIcode](#)

Full Text: [DOI](#)

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