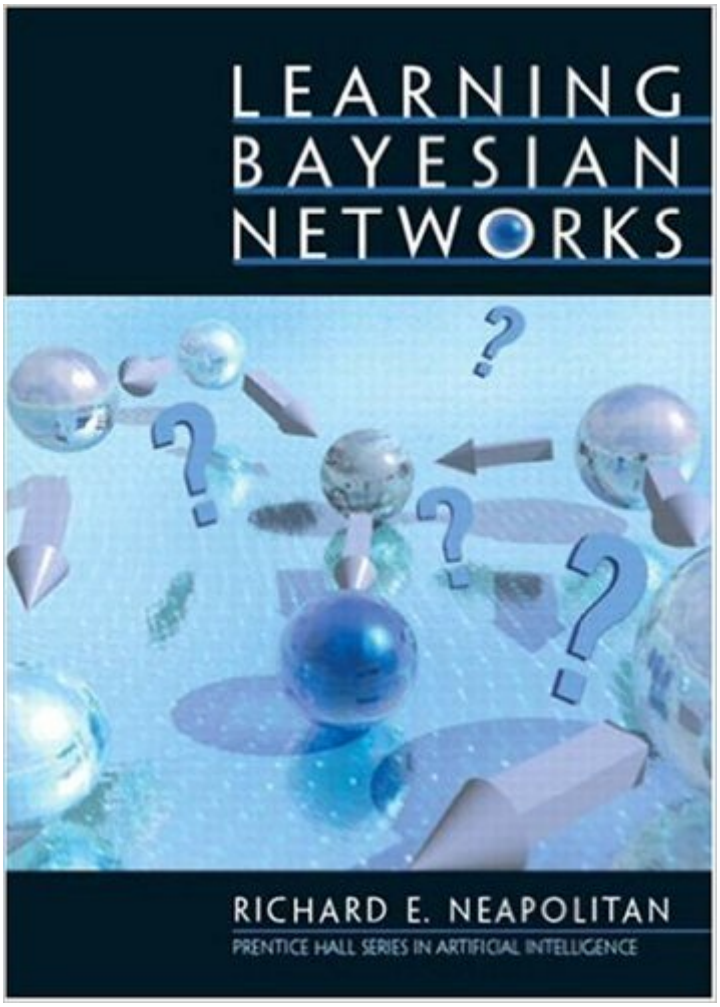
Learning Bayesian Networks



Synopsis

In this first edition book, methods are discussed for doing inference in Bayesian networks and inference diagrams. Hundreds of examples and problems allow readers to grasp the information. Some of the topics discussed include Pearl's message passing algorithm, Parameter Learning: 2 Alternatives, Parameter Learning r Alternatives, Bayesian Structure Learning, and Constraint-Based Learning. For expert systems developers and decision theorists.

Book Information

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Customer Reviews

In just a decade, Bayesian networks have went from being a mere academic curiosity to a highly useful field with myriads of applications. Indeed, the applications of Bayesian networks are wide-ranging and include disparate fields such as network engineering, bioinformatics, medical diagnostics, and intelligent troubleshooting. This book gives a fine overview of the subject, and after reading it one will have an in-depth understanding of both the underlying foundations and the algorithms involved in using Bayesian networks. The reader will have to look elsewhere for applications of Bayesian networks, since they are only discussed briefly in the book. Due to space constraints, only the first four chapters will be reviewed here.The author defines a Bayesian network as a graphical structure for representing the probabilistic relationship among a large number of variables and for performing probabilistic inference with these variables. Before the advent of Bayesian networks, probabilistic inference depended on the use of Bayes' theorem, which entailed that the problems examined be relatively simple, due to the exponential space and time complexity

that can arise in the application of this theorem.After a short review of probability theory in chapter 1, a discussion of the "philosophical" foundations of probability, and a discussion of the difficulties inherent in representing large instances and in performing inference over a large number of variables, the author introduces Bayesian networks as directed acyclic graphs satisfying the Markov condition. A brief discussion of NasoNet, which is a large-scale Bayesian network used in the diagnosis and prognosis of nasopharyngeal cancer, is given.