

RICHARD E. NEAPOLITAN

PROBABILISTIC METHODS FOR BIOINFORMATICS

with an Introduction
to Bayesian Networks

No other book provides as thorough a working knowledge of probabilistic reasoning as applied to biological information.

The Bayesian network is one of the most important architectures for representing and reasoning with multivariate probability distributions. When used in conjunction with specialized informatics, possibilities of real-world applications are achieved. *Probabilistic Methods for Bioinformatics* explains the application of probability and statistics, in particular Bayesian networks, to genetics. This book provides background material on probability, statistics, and genetics, and then moves on to discuss Bayesian networks and applications to bioinformatics.

Rather than getting bogged down in proofs and algorithms, probabilistic methods used for biological information and Bayesian networks are explained in an accessible way using applications and case studies. The many useful applications of Bayesian networks that have been developed in the past 10 years are discussed, forming a review of all the significant work in the field that will arguably become the most prevalent method in biological data analysis.

Features

- Covers the unique probabilistic reasoning methods applied to bioinformatics data—methods that are likely to become the standard analysis tools for bioinformatics
- Shares insights about when and why probabilistic methods can and cannot be used effectively
- Completely reviews Bayesian networks and probabilistic methods with a practical approach using an abundance of images and real-world examples

Richard E. Neapolitan is professor and Chair of Computer Science at Northeastern Illinois University. He has previously written four books including the seminal 1990 work on Bayesian networks, *Probabilistic Reasoning in Expert Systems*. More recently, he wrote *Learning Bayesian Networks; Foundations of Algorithms*, which has been translated to three languages and is one of the most widely recognized algorithms books worldwide; and the 2007 book, *Probabilistic Methods for Financial and Marketing Informatics* (Morgan Kaufmann Publishers).



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