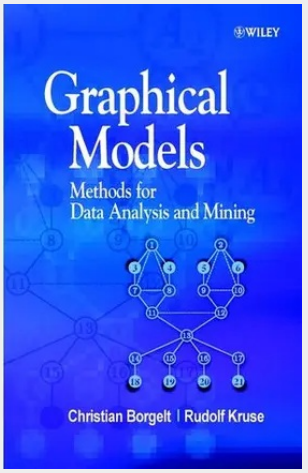
Borgelt / Kruse

Graphical Models: Methods for Data Analysis and Mining



The concept of modelling using graph theory has its origin in several scientific areas, notably statistics, physics, genetics, and engineering. The use of graphical models in applied statistics has increased considerably over recent years and the theory has been greatly developed and extended. This book provides a self-contained introduction to the learning of graphical models from data, and is the first to include detailed coverage of possibilistic networks - a relatively new reasoning tool that allows the user to infer results from problems with imprecise data. One major advantage of graphical modelling is that specialised techniques that have been developed in one field can be transferred into others easily. The methods described here are applied in a number of industries, including a recent quality testing programme at a major car manufacturer. * Provides a self-contained introduction to learning relational, probabilistic and possibilistic networks from data * Each concept is carefully explained and illustrated by examples * Contains all necessary background, including modeling under uncertainty, decomposition of distributions, and graphical representation of decompositions * Features applications of learning graphical models from data, and problems for further research * Includes a comprehensive bibliography An essential reference for graduate students of graphical modelling, applied statistics, computer science and engineering, as well as researchers and practitioners who use graphical models in their work.

Relationale, probabilistische und possibilistische Netzwerke: Methoden zur graphischen Datenanalyse stehen im Mittelpunkt dieses Bandes. Jedes der Konzepte wird sorgfältig und exakt erklärt und anschließend durch viele Beispiele veranschaulicht. Zu dem breiten Spektrum an Hintergrundinformationen, das hier geboten wird, gehören Angaben zur Ableitung von Ergebnissen aus ungenauen Daten, zur Zerlegung von Verteilungen und zur graphischen Darstellung dieser Zerlegungen. Ein Ausblick auf noch ungelöste Probleme gibt Anregungen für eigene Forschungstätigkeit. Mit einer umfangreichen Bibliographie!

The use of graphical models in applied statistics has increased considerably over recent years and the theory has been greatly developed and extended. This book provides a self-contained introduction to the learning of graphical models from data, and includes detailed coverage of possibilistic networks - a tool that allows the user to infer results from problems with imprecise data. One of the most important applications of graphical modelling today is data mining - the data-driven discovery and modelling of hidden patterns in large data sets. The techniques described have a wide range of industrial applications, and a quality testing programme at a major car manufacturer is included as a real-life example. * Provides a self-contained introduction to learning relational, probabilistic and possibilistic networks from data. * Each concept is carefully explained and illustrated by examples. * Contains all necessary background material, including modelling under uncertainty, decomposition of distributions, and graphical representation of decompositions. * Features applications of learning graphical models from data, and problems for further research. * Includes a comprehensive bibliography. Graphical Models: Methods for Data Analysis and Mining will be invaluable to researchers and practitioners who use graphical models in their work. Graduate students of applied statistics, computer science and engineering will find this book provides an excellent introduction to the subject.

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