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<<模式识别>>

图书基本信息

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前言

This book is the outgrowth of our teaching advanced undergraduate and graduatecourses over the past 20 years.These courses have been taught to differentaudiences, including students in electrical and electronics engineering, computerengineering, computer science, and informatics, as well as to an interdisciplinaryaudience of a graduate course on automation. This experience led us to makethe book as self-contained as possible and to address students with different back-grounds. As prerequisitive knowledge, the reader requires only basic calculus,elementary linear algebra, and some probability theory basics. A number of mathe-matical tools, such as probability and statistics as well as constrained optimization,needed by various chapters, are treated in fourAppendices. The book is designed toserve as a text for advanced undergraduate and graduate students, and it can be usedfor either a one- or a two-semester course. Furthermore,it is intended to be used as aself-study and reference book for research and for the practicing scientist/engineer.This latter audience was also our second incentive for writing this book, due to theinvolvement of our group in a number of projects related to pattern recognition.

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内容概要

本书是享誉世界的名著，内容既全面又相对独立，既有基础知识的介绍，又有本领域研究现状的介绍，还有对未来发展的展望，是本领域最全面的参考书，被世界众多高校选用为教材。
本书可作为高等院校计算机。
电子、通信。
自动化等专业研究生和高年级本科生的教材，也可作为计算机信息处理、自动控制等相关领域的工程技术人员的参考用书。
本书主要特点　　提供了大型数据集和高维数据的聚类算法以及网络挖掘和生物信息学应用的最新资料。
涵盖了基于图像分析、光学字符识别，信道均衡，语音识别和音频分类的多种应用。
呈现了解决分类和稳健回归问题的内核方法取得的最新成果。
介绍了带有Boosting方法的分类器组合技术。
提供更多处理过的实例和图例，加深读者对各种方法的了解。
增加了关于热点话题的新的章节，包括非线性维数约减、非负矩阵分解、实用性反馈。
稳健回归、半监督学习，谱聚类和聚类组合技术。

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章节摘录

插图：Chapter 14 deals with clustering algorithms based on cost function optimization,using tools from differential calculus. Hard clustering and fuzzy and possibilisticschemes axe considered, based on various types of cluster representatives, includingpoint representatives, hyperplane representatives, and shell-shaped representatives.In a first course, most of these algorithms are bypassed, and emphasis is given tothe isodata algorithm.Chapter 15 features a high degree of modularity. It deals with clustering algo-rithms based on different ideas,which cannot be grouped under a single philosophy.Spectral clustering, competitive learning, branch and bound, simulated annealing,and genetic algorithms are some of the schemes treated in this chapter. These arebypassed in a first course.Chapter 16 deals with the clustering validity stage of a clustering procedure. Itcontains rather advanced concepts and is omitted in a first course. Emphasis is givento the definitions of internal, external, and relative criteria and the random hypothe-ses used in each case. Indices, adopted in the framework of external and internalcriteria, are presented, and examples are provided showing the use of these indices.Syntactic pattern recognftfon methods are not treated in this book. Syntacticpattern recognition methods differ in philosophy from the methods discussed inthis book and, in general, are applicable to different types of problems. In syntacticpattern recognition, the structure of the patterns is of paramount importance, andpattern recognition is performed on the basis of a set of pattern primitives, a setof rules in the form of a grammar, and a recognizer called automaton. Thus, wewere faced with a dilemma: either to increase the size of the book substantially, orto provide a short overview（which, however, exists in a number of other books）,or to omit it. The last option seemed to be the most sensible choice.

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