

Principles Of Data Mining Adaptive Computation And Machine Learning Series

Advances in Data Mining Knowledge Discovery and Applications
Data Mining: Concepts and Techniques
Optimal Adaptive Control and Differential Games by Reinforcement Learning Principles
The Adaptive Web
Data Mining, Southeast Asia Edition
Knowledge Discovery in Databases: PKDD 2007
Introduction to Data Mining and its Applications
Adaptive Stream Mining
The Elements of Statistical Learning
Educational Data Mining
Metalearning
Next Generation of Data Mining
Principles and Theory for Data Mining and Machine Learning
Swarm Intelligence
Principles of Data Mining
Advanced Data Mining and Applications
Multidimensional Particle Swarm Optimization for Machine Learning and Pattern Recognition
Recommender Systems Handbook
Principles of Data Mining
Principles of Data Integration
Matrix Methods in Data Mining and Pattern Recognition, Second Edition
The Minimum Description Length Principle
Learning Classifier Systems in Data Mining
Social and Political Implications of Data Mining: Knowledge Management in E-Government
Principles of Data Mining and Knowledge Discovery
Statistical Modelling and Machine Learning Principles for Bioinformatics
Techniques, Tools, and Applications
Adaptive Business Intelligence
Evolutionary Learning Algorithms for Neural Adaptive Control
Simultaneous Statistical

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Inference Principles of Data Mining and Knowledge Discovery Automating the Design of Data Mining Algorithms Principles of Data Mining and Knowledge Discovery Principles of Data Mining and Knowledge Discovery Transparent Data Mining for Big and Small Data Data Mining Probabilistic Graphical Models The Top Ten Algorithms in Data Mining Principles of Data Mining Handbook of Statistical Analysis and Data Mining Applications Clustering and Information Retrieval

Advances in Data Mining Knowledge Discovery and Applications

How do you approach answering queries when your data is stored in multiple databases that were designed independently by different people? This is first comprehensive book on data integration and is written by three of the most respected experts in the field. This book provides an extensive introduction to the theory and concepts underlying today's data integration techniques, with detailed, instruction for their application using concrete examples throughout to explain the concepts. Data integration is the problem of answering queries that span multiple data sources (e.g., databases, web pages). Data integration problems surface in multiple contexts, including enterprise information integration, query processing on the Web, coordination between government agencies and collaboration between scientists. In some cases, data integration is the key bottleneck to making progress in a field. The authors

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provide a working knowledge of data integration concepts and techniques, giving you the tools you need to develop a complete and concise package of algorithms and applications. Offers a range of data integration solutions enabling you to focus on what is most relevant to the problem at hand Enables you to build your own algorithms and implement your own data integration applications

Data Mining: Concepts and Techniques

During the past decade there has been an explosion in computation and information technology. With it have come vast amounts of data in a variety of fields such as medicine, biology, finance, and marketing. The challenge of understanding these data has led to the development of new tools in the field of statistics, and spawned new areas such as data mining, machine learning, and bioinformatics. Many of these tools have common underpinnings but are often expressed with different terminology. This book describes the important ideas in these areas in a common conceptual framework. While the approach is statistical, the emphasis is on concepts rather than mathematics. Many examples are given, with a liberal use of color graphics. It should be a valuable resource for statisticians and anyone interested in data mining in science or industry. The book's coverage is broad, from supervised learning (prediction) to unsupervised learning. The many topics include neural networks, support vector machines, classification trees and boosting---the first comprehensive treatment of this topic in any book. This major new edition features

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many topics not covered in the original, including graphical models, random forests, ensemble methods, least angle regression & path algorithms for the lasso, non-negative matrix factorization, and spectral clustering. There is also a chapter on methods for “wide” data (p bigger than n), including multiple testing and false discovery rates. Trevor Hastie, Robert Tibshirani, and Jerome Friedman are professors of statistics at Stanford University. They are prominent researchers in this area: Hastie and Tibshirani developed generalized additive models and wrote a popular book of that title. Hastie co-developed much of the statistical modeling software and environment in R/S-PLUS and invented principal curves and surfaces. Tibshirani proposed the lasso and is co-author of the very successful *An Introduction to the Bootstrap*. Friedman is the co-inventor of many data-mining tools including CART, MARS, projection pursuit and gradient boosting.

Optimal Adaptive Control and Differential Games by Reinforcement Learning Principles

This book constitutes the refereed proceedings of the 5th International Conference on Advanced Data Mining and Applications, ADMA 2009, held in Beijing, China, in August 2009. The 34 revised full papers and 47 revised short papers presented together with the abstract of 4 keynote lectures were carefully reviewed and selected from 322 submissions from 27 countries. The papers focus on advancements in data mining and peculiarities and challenges of real world

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applications using data mining and feature original research results in data mining, spanning applications, algorithms, software and systems, and different applied disciplines with potential in data mining.

The Adaptive Web

Data mining is a very active research area with many successful real-world applications. It consists of a set of concepts and methods used to extract interesting or useful knowledge (or patterns) from real-world datasets, providing valuable support for decision making in industry, business, government, and science. Although there are already many types of data mining algorithms available in the literature, it is still difficult for users to choose the best possible data mining algorithm for their particular data mining problem. In addition, data mining algorithms have been manually designed; therefore they incorporate human biases and preferences. This book proposes a new approach to the design of data mining algorithms. -stead of relying on the slow and ad hoc process of manual algorithm design, this book proposes systematically automating the design of data mining algorithms with an evolutionary computation approach. More precisely, we propose a genetic programming system (a type of evolutionary computation method that evolves computer programs) to automate the design of rule induction algorithms, a type of classification method that discovers a set of classification rules from data. We focus on genetic programming in this book because it is the

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paradigmatic type of machine learning method for automating the generation of programs and because it has the advantage of performing a global search in the space of candidate solutions (data mining algorithms in our case), but in principle other types of search methods for this task could be investigated in the future.

Data Mining, Southeast Asia Edition

This book explains the principal techniques of data mining: for classification, generation of association rules and clustering. It is written for readers without a strong background in mathematics or statistics and focuses on detailed examples and explanations of the algorithms given. This will benefit readers of all levels, from those who use data mining via commercial packages, right through to academic researchers. The book aims to help the general reader develop the necessary understanding to use commercial data mining packages, and to enable advanced readers to understand or contribute to future technical advances. Includes exercises and glossary.

Knowledge Discovery in Databases: PKDD 2007

Identifying some of the most influential algorithms that are widely used in the data mining community, The Top Ten Algorithms in Data Mining provides a description of each algorithm, discusses its impact, and reviews current and future research. Thoroughly evaluated by independent reviewers, each chapter

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focuses on a particular algorithm and is written by either the original authors of the algorithm or world-class researchers who have extensively studied the respective algorithm. The book concentrates on the following important algorithms: C4.5, k-Means, SVM, Apriori, EM, PageRank, AdaBoost, kNN, Naive Bayes, and CART. Examples illustrate how each algorithm works and highlight its overall performance in a real-world application. The text covers key topics—including classification, clustering, statistical learning, association analysis, and link mining—in data mining research and development as well as in data mining, machine learning, and artificial intelligence courses. By naming the leading algorithms in this field, this book encourages the use of data mining techniques in a broader realm of real-world applications. It should inspire more data mining researchers to further explore the impact and novel research issues of these algorithms.

Introduction to Data Mining and its Applications

This book constitutes the refereed proceedings of the First European Symposium on Principles of Data Mining and Knowledge Discovery, PKDD '97, held in Trondheim, Norway, in June 1997. The volume presents a total of 38 revised full papers together with abstracts of one invited talk and four tutorials. Among the topics covered are data and knowledge representation, statistical and probabilistic methods, logic-based approaches, man-machine interaction aspects, AI contributions, high performance

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computing support, machine learning, automated scientific discovery, quality assessment, and applications.

Adaptive Stream Mining

Clustering is an important technique for discovering relatively dense sub-regions or sub-spaces of a multi-dimension data distribution. Clustering has been used in information retrieval for many different purposes, such as query expansion, document grouping, document indexing, and visualization of search results. In this book, we address issues of clustering algorithms, evaluation methodologies, applications, and architectures for information retrieval. The first two chapters discuss clustering algorithms. The chapter from Baeza-Yates et al. describes a clustering method for a general metric space which is a common model of data relevant to information retrieval. The chapter by Guha, Rastogi, and Shim presents a survey as well as detailed discussion of two clustering algorithms: CURE and ROCK for numeric data and categorical data respectively. Evaluation methodologies are addressed in the next two chapters. Ertöz et al. demonstrate the use of text retrieval benchmarks, such as TRECS, to evaluate clustering algorithms. He et al. provide objective measures of clustering quality in their chapter. Applications of clustering methods to information retrieval is addressed in the next four chapters. Chu et al. and Noel et al. explore feature selection using word stems, phrases, and link associations for document clustering and indexing.

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Wen et al. and Sung et al. discuss applications of clustering to user queries and data cleansing. Finally, we consider the problem of designing architectures for information retrieval. Crichton, Hughes, and Kelly elaborate on the development of a scientific data system architecture for information retrieval.

The Elements of Statistical Learning

This book explores the concepts of data mining and data warehousing, a promising and flourishing frontier in database systems, and presents a broad, yet in-depth overview of the field of data mining. Data mining is a multidisciplinary field, drawing work from areas including database technology, artificial intelligence, machine learning, neural networks, statistics, pattern recognition, knowledge based systems, knowledge acquisition, information retrieval, high performance computing and data visualization.

Educational Data Mining

This thoroughly revised second edition provides an updated treatment of numerical linear algebra techniques for solving problems in data mining and pattern recognition. Adopting an application-oriented approach, the author introduces matrix theory and decompositions, describes how modern matrix methods can be applied in real life scenarios, and provides a set of tools that students can modify for a particular application. Building on material from the first edition, the author discusses basic graph concepts and their matrix counterparts. He introduces

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the graph Laplacian and properties of its eigenvectors needed in spectral partitioning and describes spectral graph partitioning applied to social networks and text classification. Examples are included to help readers visualize the results. This new edition also presents matrix-based methods that underlie many of the algorithms used for big data. The book provides a solid foundation to further explore related topics and presents applications such as classification of handwritten digits, text mining, text summarization, PageRank computations related to the Google search engine, and facial recognition. Exercises and computer assignments are available on a Web page that supplements the book. This book is primarily for undergraduate students who have previously taken an introductory scientific computing/numerical analysis course and graduate students in data mining and pattern recognition areas who need an introduction to linear algebra techniques.

Metalearning

This state-of-the-art survey provides a systematic overview of the ideas and techniques of the adaptive Web and serves as a central source of information for researchers, practitioners, and students. The volume constitutes a comprehensive and carefully planned collection of chapters that map out the most important areas of the adaptive Web, each solicited from the experts and leaders in the field.

Next Generation of Data Mining

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Extensive treatment of the most up-to-date topics
Provides the theory and concepts behind popular and emerging methods
Range of topics drawn from Statistics, Computer Science, and Electrical Engineering

Principles and Theory for Data Mining and Machine Learning

Drawn from the US National Science Foundation's Symposium on Next Generation of Data Mining and Cyber-Enabled Discovery for Innovation (NGDM 07), Next Generation of Data Mining explores emerging technologies and applications in data mining as well as potential challenges faced by the field. Gathering perspectives from top experts across different disciplines, the book debates upcoming challenges and outlines computational methods. The contributors look at how ecology, astronomy, social science, medicine, finance, and more can benefit from the next generation of data mining techniques. They examine the algorithms, middleware, infrastructure, and privacy policies associated with ubiquitous, distributed, and high performance data mining. They also discuss the impact of new technologies, such as the semantic web, on data mining and provide recommendations for privacy-preserving mechanisms. The dramatic increase in the availability of massive, complex data from various sources is creating computing, storage, communication, and human-computer interaction challenges for data mining. Providing a framework to better understand these fundamental issues, this volume surveys

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promising approaches to data mining problems that span an array of disciplines.

Swarm Intelligence

Swarm Intelligence: Principles, Advances, and Applications delivers in-depth coverage of bat, artificial fish swarm, firefly, cuckoo search, flower pollination, artificial bee colony, wolf search, and gray wolf optimization algorithms. The book begins with a brief introduction to mathematical optimization, addressing basic concepts related to swarm intelligence, such as randomness, random walks, and chaos theory. The text then: Describes the various swarm intelligence optimization methods, standardizing the variants, hybridizations, and algorithms whenever possible Discusses variants that focus more on binary, discrete, constrained, adaptive, and chaotic versions of the swarm optimizers Depicts real-world applications of the individual optimizers, emphasizing variable selection and fitness function design Details the similarities, differences, weaknesses, and strengths of each swarm optimization method Draws parallels between the operators and searching manners of the different algorithms Swarm Intelligence: Principles, Advances, and Applications presents a comprehensive treatment of modern swarm intelligence optimization methods, complete with illustrative examples and an extendable MATLAB® package for feature selection in wrapper mode applied on different data sets with benchmarking using different evaluation criteria. The book provides beginners with a solid foundation of

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swarm intelligence fundamentals, and offers experts valuable insight into new directions and hybridizations.

Principles of Data Mining

Just over thirty years after Holland first presented the outline for Learning Classifier System paradigm, the ability of LCS to solve complex real-world problems is becoming clear. In particular, their capability for rule induction in data mining has sparked renewed interest in LCS. This book brings together work by a number of individuals who are demonstrating their good performance in a variety of domains. The first contribution is arranged as follows: Firstly, the main forms of LCS are described in some detail. A number of historical uses of LCS in data mining are then reviewed before an overview of the rest of the volume is presented. The rest of this book describes recent research on the use of LCS in the main areas of machine learning data mining: classification, clustering, time-series and numerical prediction, feature selection, ensembles, and knowledge discovery.

Advanced Data Mining and Applications

This book discusses topics related to bioinformatics, statistics, and machine learning, presenting the latest research in various areas of bioinformatics. It also highlights the role of computing and machine learning in knowledge extraction from biological data, and how this knowledge can be applied in fields such as drug

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design, health supplements, gene therapy, proteomics and agriculture.

Multidimensional Particle Swarm Optimization for Machine Learning and Pattern Recognition

"This book focuses on the data mining and knowledge management implications that lie within online government"--Provided by publisher.

Recommender Systems Handbook

Advances in Data Mining Knowledge Discovery and Applications aims to help data miners, researchers, scholars, and PhD students who wish to apply data mining techniques. The primary contribution of this book is highlighting frontier fields and implementations of the knowledge discovery and data mining. It seems to be same things are repeated again. But in general, same approach and techniques may help us in different fields and expertise areas. This book presents knowledge discovery and data mining applications in two different sections. As known that, data mining covers areas of statistics, machine learning, data management and databases, pattern recognition, artificial intelligence, and other areas. In this book, most of the areas are covered with different data mining applications. The eighteen chapters have been classified in two parts: Knowledge Discovery and Data Mining Applications.

Principles of Data Mining

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This introduction to the MDL Principle provides a reference accessible to graduate students and researchers in statistics, pattern classification, machine learning, and data mining, to philosophers interested in the foundations of statistics, and to researchers in other applied sciences that involve model selection.

Principles of Data Integration

A general framework for constructing and using probabilistic models of complex systems that would enable a computer to use available information for making decisions. Most tasks require a person or an automated system to reason—to reach conclusions based on available information. The framework of probabilistic graphical models, presented in this book, provides a general approach for this task. The approach is model-based, allowing interpretable models to be constructed and then manipulated by reasoning algorithms. These models can also be learned automatically from data, allowing the approach to be used in cases where manually constructing a model is difficult or even impossible. Because uncertainty is an inescapable aspect of most real-world applications, the book focuses on probabilistic models, which make the uncertainty explicit and provide models that are more faithful to reality. Probabilistic Graphical Models discusses a variety of models, spanning Bayesian networks, undirected Markov networks, discrete and continuous models, and extensions to deal with dynamical systems and relational data. For each class of models,

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the text describes the three fundamental cornerstones: representation, inference, and learning, presenting both basic concepts and advanced techniques. Finally, the book considers the use of the proposed framework for causal reasoning and decision making under uncertainty. The main text in each chapter provides the detailed technical development of the key ideas. Most chapters also include boxes with additional material: skill boxes, which describe techniques; case study boxes, which discuss empirical cases related to the approach described in the text, including applications in computer vision, robotics, natural language understanding, and computational biology; and concept boxes, which present significant concepts drawn from the material in the chapter. Instructors (and readers) can group chapters in various combinations, from core topics to more technically advanced material, to suit their particular needs.

Matrix Methods in Data Mining and Pattern Recognition, Second Edition

This second edition of a well-received text, with 20 new chapters, presents a coherent and unified repository of recommender systems' major concepts, theories, methodologies, trends, and challenges. A variety of real-world applications and detailed case studies are included. In addition to wholesale revision of the existing chapters, this edition includes new topics including: decision making and recommender systems, reciprocal recommender systems, recommender systems in social networks, mobile

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recommender systems, explanations for recommender systems, music recommender systems, cross-domain recommendations, privacy in recommender systems, and semantic-based recommender systems. This multi-disciplinary handbook involves world-wide experts from diverse fields such as artificial intelligence, human-computer interaction, information retrieval, data mining, mathematics, statistics, adaptive user interfaces, decision support systems, psychology, marketing, and consumer behavior. Theoreticians and practitioners from these fields will find this reference to be an invaluable source of ideas, methods and techniques for developing more efficient, cost-effective and accurate recommender systems.

The Minimum Description Length Principle

Our ability to generate and collect data has been increasing rapidly. Not only are all of our business, scientific, and government transactions now computerized, but the widespread use of digital cameras, publication tools, and bar codes also generate data. On the collection side, scanned text and image platforms, satellite remote sensing systems, and the World Wide Web have flooded us with a tremendous amount of data. This explosive growth has generated an even more urgent need for new techniques and automated tools that can help us transform this data into useful information and knowledge. Like the first edition, voted the most popular data mining book by KD Nuggets readers, this

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book explores concepts and techniques for the discovery of patterns hidden in large data sets, focusing on issues relating to their feasibility, usefulness, effectiveness, and scalability. However, since the publication of the first edition, great progress has been made in the development of new data mining methods, systems, and applications. This new edition substantially enhances the first edition, and new chapters have been added to address recent developments on mining complex types of data—including stream data, sequence data, graph structured data, social network data, and multi-relational data. A comprehensive, practical look at the concepts and techniques you need to know to get the most out of real business data Updates that incorporate input from readers, changes in the field, and more material on statistics and machine learning Dozens of algorithms and implementation examples, all in easily understood pseudo-code and suitable for use in real-world, large-scale data mining projects Complete classroom support for instructors at www.mkp.com/datamining2e companion site

Learning Classifier Systems in Data Mining

This book is a significant contribution to the subject of mining time-changing data streams and addresses the design of learning algorithms for this purpose. It introduces new contributions on several different aspects of the problem, identifying research opportunities and increasing the scope for applications. It also includes an in-depth study of

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stream mining and a theoretical analysis of proposed methods and algorithms. The first section is concerned with the use of an adaptive sliding window algorithm (ADWIN). Since this has rigorous performance guarantees, using it in place of counters or accumulators, it offers the possibility of extending such guarantees to learning and mining algorithms not initially designed for drifting data. Testing with several methods, including Naive Bayes, clustering, decision trees and ensemble methods, is discussed as well. The second part of the book describes a formal study of connected acyclic graphs, or 'trees', from the point of view of closure-based mining, presenting efficient algorithms for subtree testing and for mining ordered and unordered frequent closed trees. Lastly, a general methodology to identify closed patterns in a data stream is outlined. This is applied to develop an incremental method, a sliding-window based method, and a method that mines closed trees adaptively from data streams. These are used to introduce classification methods for tree data streams."

Social and Political Implications of Data Mining: Knowledge Management in E-Government

This book explains and explores the principal techniques of Data Mining, the automatic extraction of implicit and potentially useful information from data, which is increasingly used in commercial, scientific and other application areas. It focuses on classification, association rule mining and clustering. Each topic is clearly explained, with a focus on

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algorithms not mathematical formalism, and is illustrated by detailed worked examples. The book is written for readers without a strong background in mathematics or statistics and any formulae used are explained in detail. It can be used as a textbook to support courses at undergraduate or postgraduate levels in a wide range of subjects including Computer Science, Business Studies, Marketing, Artificial Intelligence, Bioinformatics and Forensic Science. As an aid to self study, this book aims to help general readers develop the necessary understanding of what is inside the 'black box' so they can use commercial data mining packages discriminately, as well as enabling advanced readers or academic researchers to understand or contribute to future technical advances in the field. Each chapter has practical exercises to enable readers to check their progress. A full glossary of technical terms used is included. This expanded third edition includes detailed descriptions of algorithms for classifying streaming data, both stationary data, where the underlying model is fixed, and data that is time-dependent, where the underlying model changes from time to time - a phenomenon known as concept drift.

Principles of Data Mining and Knowledge Discovery

Handbook of Statistical Analysis and Data Mining Applications, Second Edition, is a comprehensive professional reference book that guides business analysts, scientists, engineers and researchers, both academic and industrial, through all stages of data

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analysis, model building and implementation. The handbook helps users discern technical and business problems, understand the strengths and weaknesses of modern data mining algorithms and employ the right statistical methods for practical application. This book is an ideal reference for users who want to address massive and complex datasets with novel statistical approaches and be able to objectively evaluate analyses and solutions. It has clear, intuitive explanations of the principles and tools for solving problems using modern analytic techniques and discusses their application to real problems in ways accessible and beneficial to practitioners across several areas—from science and engineering, to medicine, academia and commerce. Includes input by practitioners for practitioners Includes tutorials in numerous fields of study that provide step-by-step instruction on how to use supplied tools to build models Contains practical advice from successful real-world implementations Brings together, in a single resource, all the information a beginner needs to understand the tools and issues in data mining to build successful data mining solutions Features clear, intuitive explanations of novel analytical tools and techniques, and their practical applications

Statistical Modelling and Machine Learning Principles for Bioinformatics Techniques, Tools, and Applications

This book gives an exposition of recently developed approximate dynamic programming (ADP) techniques for decision and control in human engineered

systems.

Adaptive Business Intelligence

Evolutionary Learning Algorithms for Neural Adaptive Control

Data Mining: Concepts and Techniques provides the concepts and techniques in processing gathered data or information, which will be used in various applications. Specifically, it explains data mining and the tools used in discovering knowledge from the collected data. This book is referred as the knowledge discovery from data (KDD). It focuses on the feasibility, usefulness, effectiveness, and scalability of techniques of large data sets. After describing data mining, this edition explains the methods of knowing, preprocessing, processing, and warehousing data. It then presents information about data warehouses, online analytical processing (OLAP), and data cube technology. Then, the methods involved in mining frequent patterns, associations, and correlations for large data sets are described. The book details the methods for data classification and introduces the concepts and methods for data clustering. The remaining chapters discuss the outlier detection and the trends, applications, and research frontiers in data mining. This book is intended for Computer Science students, application developers, business professionals, and researchers who seek information on data mining. Presents dozens of algorithms and implementation examples, all in pseudo-code and

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suitable for use in real-world, large-scale data mining projects Addresses advanced topics such as mining object-relational databases, spatial databases, multimedia databases, time-series databases, text databases, the World Wide Web, and applications in several fields Provides a comprehensive, practical look at the concepts and techniques you need to get the most out of your data

Simultaneous Statistical Inference

This book constitutes the refereed proceedings of the 4th European Conference on Principles and Practice of Knowledge Discovery in Databases, PKDD 2000, held in Lyon, France in September 2000. The 86 revised papers included in the book correspond to the 29 oral presentations and 57 posters presented at the conference. They were carefully reviewed and selected from 147 submissions. The book offers topical sections on new directions, rules and trees, databases and reward-based learning, classification, association rules and exceptions, instance-based discovery, clustering, and time series analysis.

Principles of Data Mining and Knowledge Discovery

Measurement and Data. Visualizing and Exploring Data. Data Analysis and Uncertainty. A Systematic Overview of Data Mining Algorithms. Models and Patterns. Score Functions for Data Mining Algorithms. Search and Optimization Methods. Descriptive Modeling. Predictive Modeling for Classification.

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Predictive Modeling for Regression. Data Organization and Databases. Finding Patterns and Rules. Retrieval by Content.

Automating the Design of Data Mining Algorithms

Metalearning is the study of principled methods that exploit metaknowledge to obtain efficient models and solutions by adapting machine learning and data mining processes. While the variety of machine learning and data mining techniques now available can, in principle, provide good model solutions, a methodology is still needed to guide the search for the most appropriate model in an efficient way. Metalearning provides one such methodology that allows systems to become more effective through experience. This book discusses several approaches to obtaining knowledge concerning the performance of machine learning and data mining algorithms. It shows how this knowledge can be reused to select, combine, compose and adapt both algorithms and models to yield faster, more effective solutions to data mining problems. It can thus help developers improve their algorithms and also develop learning systems that can improve themselves. The book will be of interest to researchers and graduate students in the areas of machine learning, data mining and artificial intelligence.

Principles of Data Mining and Knowledge Discovery

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This book constitutes the refereed proceedings of the 11th European Conference on Principles and Practice of Knowledge Discovery in Databases, PKDD 2007, held in Warsaw, Poland, co-located with ECML 2007, the 18th European Conference on Machine Learning. The 28 revised full papers and 35 revised short papers present original results on leading-edge subjects of knowledge discovery from conventional and complex data and address all current issues in the area.

Principles of Data Mining and Knowledge Discovery

Adaptive business intelligence systems combine prediction and optimization techniques to assist decision makers in complex, rapidly changing environments. These systems address fundamental questions: What is likely to happen in the future? What is the best course of action? Adaptive Business Intelligence explores elements of data mining, predictive modeling, forecasting, optimization, and adaptability. The book explains the application of numerous prediction and optimization techniques, and shows how these concepts can be used to develop adaptive systems. Coverage includes linear regression, time-series forecasting, decision trees and tables, artificial neural networks, genetic programming, fuzzy systems, genetic algorithms, simulated annealing, tabu search, ant systems, and agent-based modeling.

Transparent Data Mining for Big and

Small Data

Evolutionary Learning Algorithms for Neural Adaptive Control is an advanced textbook, which investigates how neural networks and genetic algorithms can be applied to difficult adaptive control problems which conventional results are either unable to solve, or for which they can not provide satisfactory results. It focuses on the principles involved, rather than on the modelling of the applications themselves, and therefore provides the reader with a good introduction to the fundamental issues involved.

Data Mining

This book is devoted to the Educational Data Mining arena. It highlights works that show relevant proposals, developments, and achievements that shape trends and inspire future research. After a rigorous revision process sixteen manuscripts were accepted and organized into four parts as follows:

- Profile: The first part embraces three chapters oriented to: 1) describe the nature of educational data mining (EDM); 2) describe how to pre-process raw data to facilitate data mining (DM); 3) explain how EDM supports government policies to enhance education.
- Student modeling: The second part contains five chapters concerned with: 4) explore the factors having an impact on the student's academic success; 5) detect student's personality and behaviors in an educational game; 6) predict students performance to adjust content and strategies; 7) identify students who will most benefit from tutor

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support; 8) hypothesize the student answer correctness based on eye metrics and mouse click. · Assessment: The third part has four chapters related to: 9) analyze the coherence of student research proposals; 10) automatically generate tests based on competences; 11) recognize students activities and visualize these activities for being presented to teachers; 12) find the most dependent test items in students response data. · Trends: The fourth part encompasses four chapters about how to: 13) mine text for assessing students productions and supporting teachers; 14) scan student comments by statistical and text mining techniques; 15) sketch a social network analysis (SNA) to discover student behavior profiles and depict models about their collaboration; 16) evaluate the structure of interactions between the students in social networks. This volume will be a source of interest to researchers, practitioners, professors, and postgraduate students aimed at updating their knowledge and find targets for future work in the field of educational data mining.

Probabilistic Graphical Models

For many engineering problems we require optimization processes with dynamic adaptation as we aim to establish the dimension of the search space where the optimum solution resides and develop robust techniques to avoid the local optima usually associated with multimodal problems. This book explores multidimensional particle swarm optimization, a technique developed by the authors

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that addresses these requirements in a well-defined algorithmic approach. After an introduction to the key optimization techniques, the authors introduce their unified framework and demonstrate its advantages in challenging application domains, focusing on the state of the art of multidimensional extensions such as global convergence in particle swarm optimization, dynamic data clustering, evolutionary neural networks, biomedical applications and personalized ECG classification, content-based image classification and retrieval, and evolutionary feature synthesis. The content is characterized by strong practical considerations, and the book is supported with fully documented source code for all applications presented, as well as many sample datasets. The book will be of benefit to researchers and practitioners working in the areas of machine intelligence, signal processing, pattern recognition, and data mining, or using principles from these areas in their application domains. It may also be used as a reference text for graduate courses on swarm optimization, data clustering and classification, content-based multimedia search, and biomedical signal processing applications.

The Top Ten Algorithms in Data Mining

Data mining is an area of research where appropriate methodological research and technical means are experienced to produce useful knowledge from different types of data. Data mining techniques use a broad family of computationally intensive methods that include decision trees, neural networks, rule

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induction, machine learning and graphic visualisation. This book discusses the principles, applications and emerging challenges of data mining.

Principles of Data Mining

Simultaneous Statistical Inference, which was published originally in 1966 by McGraw-Hill Book Company, went out of print in 1973. Since then, it has been available from University Microfilms International in xerox form. With this new edition Springer-Verlag has republished the original edition along with my review article on multiple comparisons from the December 1977 issue of the Journal of the American Statistical Association. This review article covered developments in the field from 1966 through 1976. A few minor typographical errors in the original edition have been corrected in this new edition. A new table of critical points for the studentized maximum modulus is included in this second edition as an addendum. The original edition included the table by K. C. S. Pillai and K. V. Ramachandran, which was meager but the best available at the time. This edition contains the table published in Biometrika in 1971 by G. I. Hahn and R. W. Hendrickson, which is far more comprehensive and therefore more useful. The typing was ably handled by Wanda Edminster for the review article and Karola Decleve for the changes for the second edition. My wife, Barbara, again cheerfully assisted in the proofreading. Fred Leone kindly granted permission from the American Statistical Association to reproduce my review article. Also, Gerald Hahn, Richard Hendrickson, and, for

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Biometrika, David Cox graciously granted permission to reproduce the new table of the studentized maximum modulus. The work in preparing the review article was partially supported by NIH Grant ROI GM21215.

Handbook of Statistical Analysis and Data Mining Applications

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Clustering and Information Retrieval

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