



Data Mining and Analysis: Fundamental Concepts and Algorithms

By Mohammed J. Zaki, Wagner Meira Jr



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The fundamental algorithms in data mining and analysis form the basis for the emerging field of data science, which includes automated methods to analyze patterns and models for all kinds of data, with applications ranging from scientific discovery to business intelligence and analytics. This textbook for senior undergraduate and graduate data mining courses provides a broad yet indepth overview of data mining, integrating related concepts from machine learning and statistics. The main parts of the book include exploratory data analysis, pattern mining, clustering, and classification. The book lays the basic foundations of these tasks, and also covers cutting-edge topics such as kernel methods, high-dimensional data analysis, and complex graphs and networks. With its comprehensive coverage, algorithmic perspective, and wealth of examples, this book offers solid guidance in data mining for students, researchers, and practitioners alike. Key features: • Covers both core methods and cutting-edge research • Algorithmic approach with open-source implementations • Minimal prerequisites: all key mathematical concepts are presented, as is the intuition behind the formulas • Short, self-contained chapters with class-tested examples and exercises allow for flexibility in designing a course and for easy reference • Supplementary website with lecture slides, videos, project ideas, and more



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Editorial Review

Review

"This book by Mohammed Zaki and Wagner Meira Jr is a great option for teaching a course in data mining or data science. It covers both fundamental and advanced data mining topics, explains the mathematical foundations and the algorithms of data science, includes exercises for each chapter, and provides data, slides and other supplementary material on the companion website."

Gregory Piatetsky-Shapiro, Founder, ACM SIGKDD, the leading professional organization for Knowledge Discovery and Data Mining

"World-class experts, providing an encyclopedic coverage of all datamining topics, from basic statistics to fundamental methods (clustering, classification, frequent itemsets), to advanced methods (SVD, SVM, kernels, spectral graph theory). For each concept, the book thoughtfully balances the intuition, the arithmetic examples, as well the rigorous math details. It can serve both as a textbook, as well as a reference book." Professor Christos Faloutsos, Carnegie Mellon University and winner of the ACM SIGKDD Innovation Award

About the Author

Mohammed J. Zaki is a Professor of Computer Science at Rensselaer Polytechnic Institute. He received his PhD in computer science from the University of Rochester in 1998. His research interests focus on developing novel data mining techniques, especially for applications in bioinformatics and social networks. He has published over 225 papers and book chapters on data mining and bioinformatics, and is the founding co-chair for the BIOKDD series of workshops. He is currently Area Editor for Statistical Analysis and Data Mining, and an Associate Editor for Data Mining and Knowledge Discovery, ACM Transactions on Knowledge Discovery from Data, and Social Network Analysis and Mining. He was the program co-chair for SDM'08, SIGKDD'09, PAKDD'10, BIBM'11, CIKM'12, and ICDM'12. He is currently serving on the Board of Directors for ACM SIGKDD. He received the National Science Foundation CAREER Award in 2001 and the Department of Energy Early Career Principal Investigator Award in 2002. He received an HP Innovation Research Award in 2010, 2011, and 2012, and a Google Faculty Research Award in 2011. He is a senior member of the IEEE, and an ACM Distinguished Scientist. His research is supported in part by NSF, NIH, DOE, Google, HP, and Nvidia.

Wagner Meira, Jr is a Professor of Computer Science at the Universidade Federal de Minas Gerais, Brazil.

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