Computer-Assisted and Robotic Endoscopy: Third International Workshop, CARE 2016, Held in Conjunction with MICCAI 2016, Athens, Greece, October 17, ... (Lecture Notes in Computer Science, 10170)

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Product Description

This book constitutes the thoroughly refereed post-conference proceedings of the Third International Workshop on Computer Assisted and Robotic Endoscopy, CARE 2016, held in conjunction with MICCAI 2016, in Athens, Greece, in October 2016. The 11 revised full papers were carefully selected out of 13 initial submissions. The papers are organized on topical secttion such as computer vision, graphics, robotics, medical imaging, external tracking systems, medical device controls systems, information processing techniques, endoscopy planning and simulation.
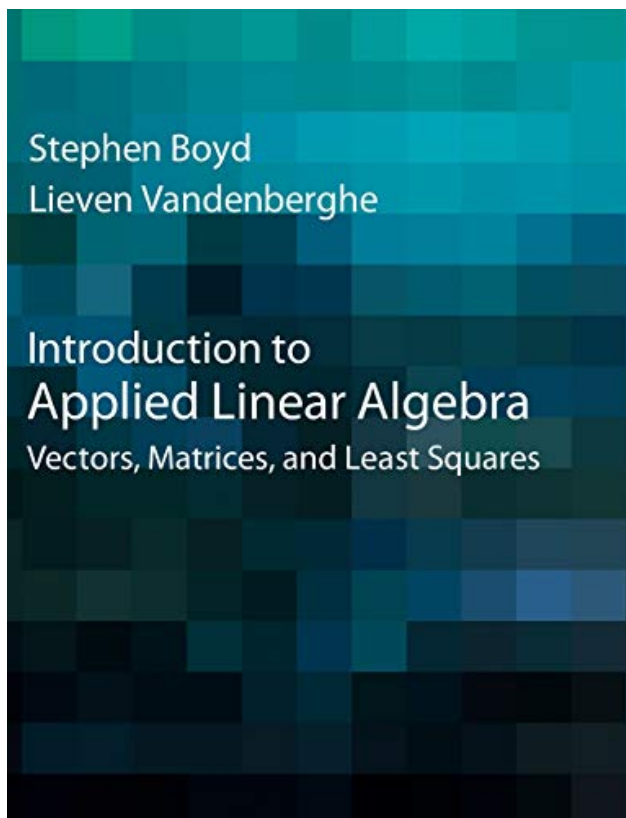
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Product Description

This groundbreaking textbook combines straightforward explanations with a wealth of practical examples to offer an innovative approach to teaching linear algebra. Requiring no prior knowledge of the subject, it covers the aspects of linear algebra - vectors, matrices, and least squares - that are needed for engineering applications, discussing examples across data science, machine learning and artificial intelligence, signal and image processing, tomography, navigation, control, and finance. The numerous practical exercises throughout allow students to test their understanding and translate their knowledge into solving real-world problems, with lecture slides, additional computational exercises in Julia and MATLAB (R), and data sets accompanying the book online. Suitable for both one-semester and one-quarter courses, as well as self-study, this self-contained text provides beginning students with the foundation they need to progress to more advanced study.
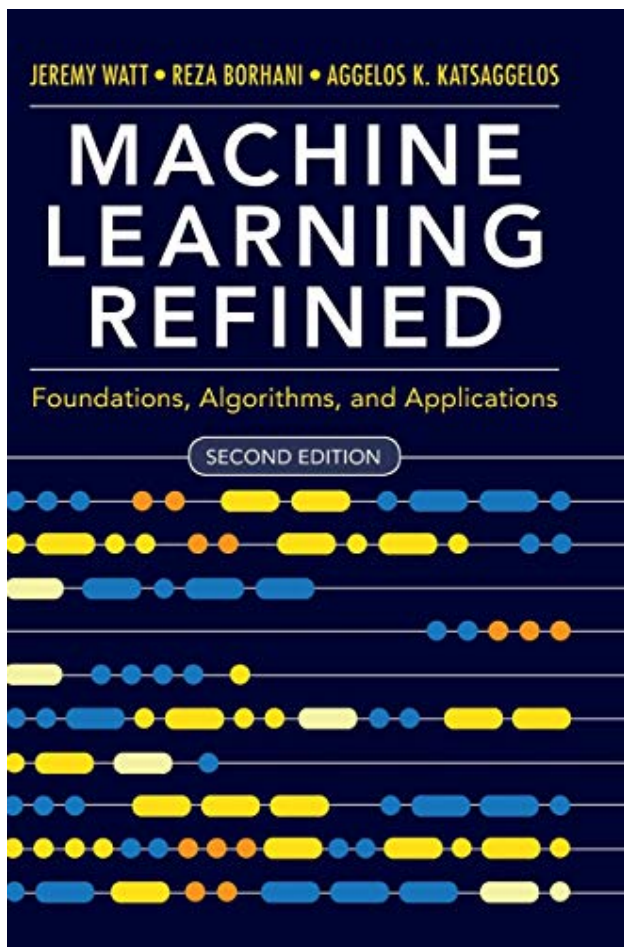
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Product Description

With its intuitive yet rigorous approach to machine learning, this text provides students with the fundamental knowledge and practical tools needed to conduct research and build data-driven products. The authors prioritize geometric intuition and algorithmic thinking, and include detail on all the essential mathematical prerequisites, to offer a fresh and accessible way to learn. Practical applications are emphasized, with examples from disciplines including computer vision, natural language processing, economics, neuroscience, recommender systems, physics, and biology. Over 300 color illustrations are included and have been meticulously designed to enable an intuitive grasp of technical concepts, and over 100 in-depth coding exercises (in Python) provide a real understanding of crucial machine learning algorithms. A suite of online resources including sample code, data sets, interactive lecture slides, and a solutions manual are provided online, making this an ideal text both for graduate courses on machine learning and for individual reference and self-study.

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Product Description

This textbook introduces fundamental concepts, major models, and popular applications of pattern recognition for a one-semester undergraduate course. To ensure student understanding, the text focuses on a relatively small number of core concepts with an abundance of illustrations and examples. Concepts are reinforced with hands-on exercises to nurture the student's skill in problem solving. New concepts and algorithms are framed by real-world context and established as part of the big picture introduced in an early chapter. A problem-solving strategy is employed in several chapters to equip students with an approach for new problems in pattern recognition. This text also points out common errors that a new player in pattern recognition may encounter, and fosters the ability for readers to find useful resources and independently solve a new pattern recognition task through various working examples. Students with an undergraduate understanding of mathematical analysis, linear algebra, and probability will be well prepared to master the concepts and mathematical analysis presented here.
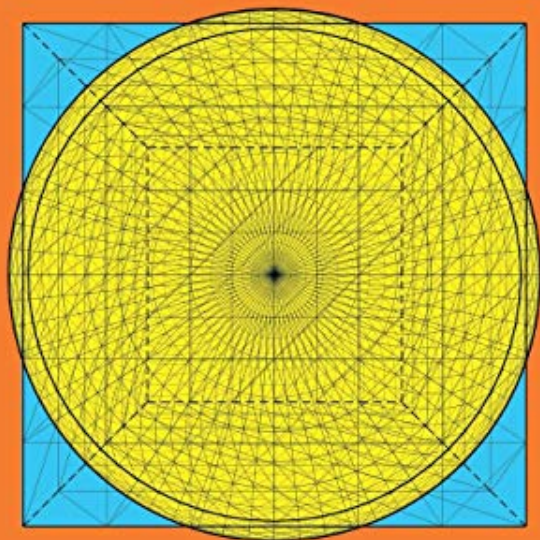
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Product Description

This book provides an introduction to the mathematical and algorithmic foundations of data science, including machine learning, high-dimensional geometry, and analysis of large networks. Topics include the counterintuitive nature of data in high dimensions, important linear algebraic techniques such as singular value decomposition, the theory of random walks and Markov chains, the fundamentals of and important algorithms for machine learning, algorithms and analysis for clustering, probabilistic models for large networks, representation learning including topic modelling and non-negative matrix factorization, wavelets and compressed sensing. Important probabilistic techniques are developed including the law of large numbers, tail inequalities, analysis of random projections, generalization guarantees in machine learning, and moment methods for analysis of phase transitions in large random graphs. Additionally, important structural and complexity measures are discussed such as matrix norms and VC-dimension. This book is suitable for both undergraduate and graduate courses in the design and analysis of algorithms for data.
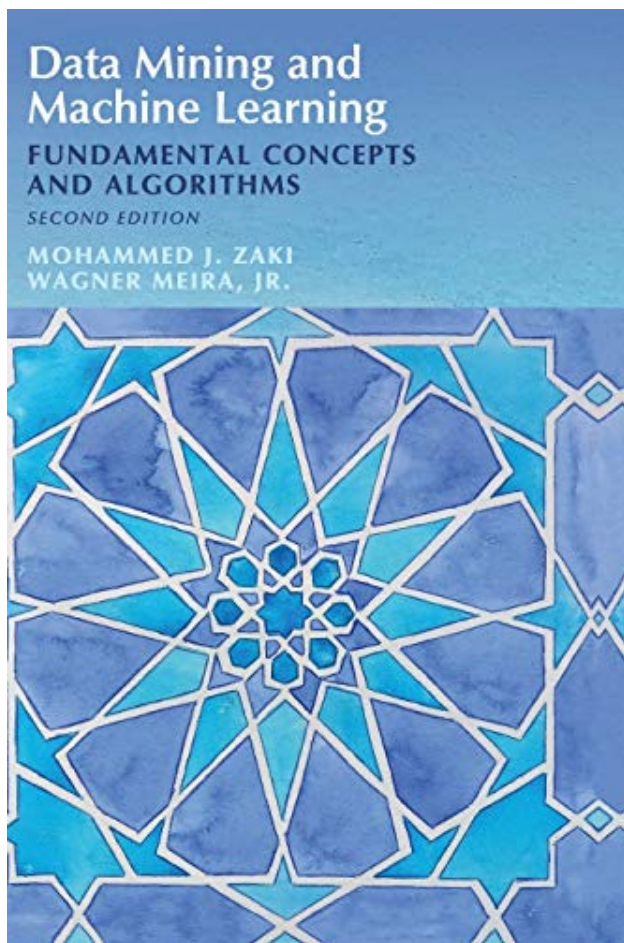
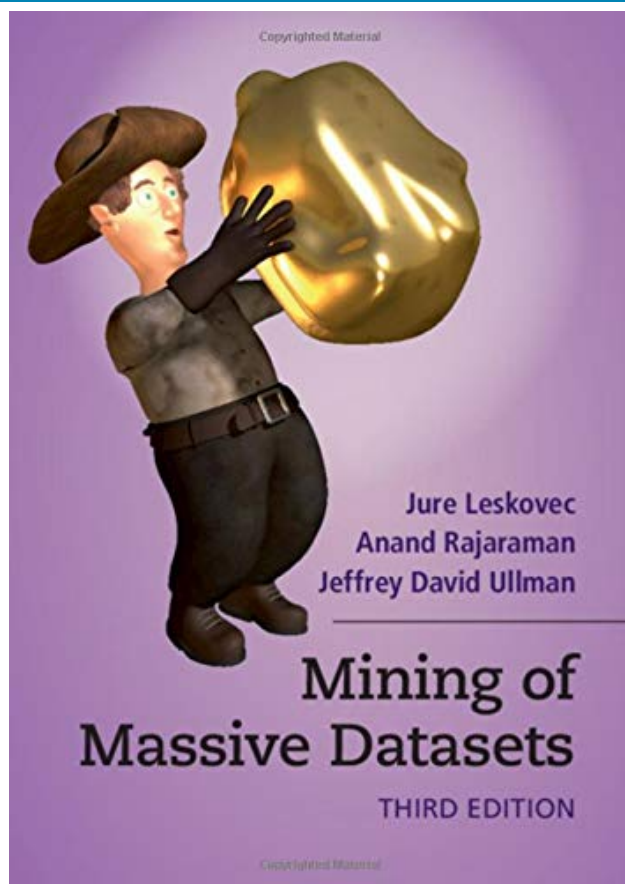# Data Mining and Machine Learning: Fundamental Concepts and Algorithms

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Product Description

The fundamental algorithms in data mining and machine learning form the basis of data science, utilizing automated methods to analyze patterns and models for all kinds of data in applications ranging from scientific discovery to business analytics. This textbook for senior undergraduate and graduate courses provides a comprehensive, in-depth overview of data mining, machine learning and statistics, offering solid guidance for students, researchers, and practitioners. The book lays the foundations of data analysis, pattern mining, clustering, classification and regression, with a focus on the algorithms and the underlying algebraic, geometric, and probabilistic concepts. New to this second edition is an entire part devoted to regression methods, including neural networks and deep learning.
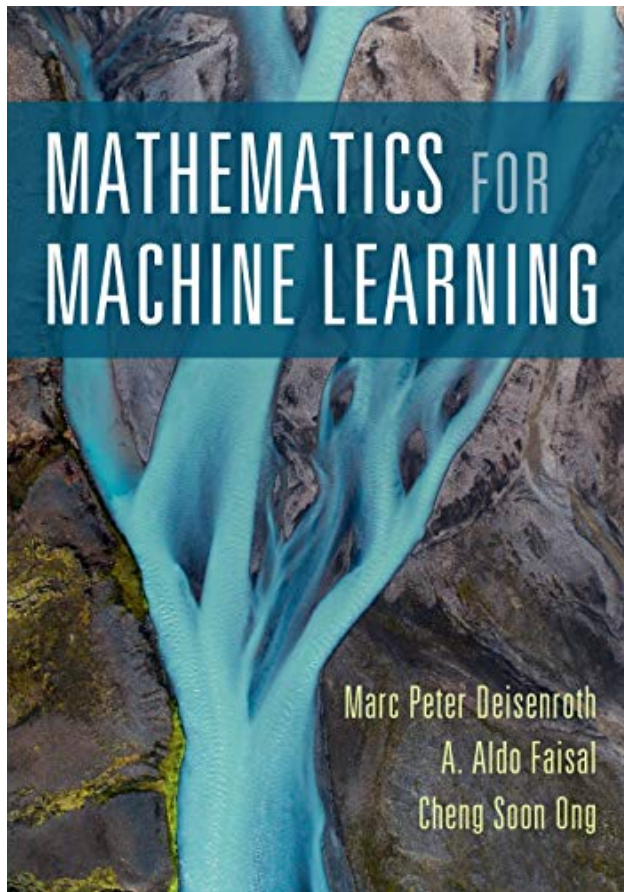
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Product Description

Written by leading authorities in database and Web technologies, this book is essential reading for students and practitioners alike. The popularity of the Web and Internet commerce provides many extremely large datasets from which information can be gleaned by data mining. This book focuses on practical algorithms that have been used to solve key problems in data mining and can be applied successfully to even the largest datasets. It begins with a discussion of the MapReduce framework, an important tool for parallelizing algorithms automatically. The authors explain the tricks of locality-sensitive hashing and stream-processing algorithms for mining data that arrives too fast for exhaustive processing. Other chapters cover the PageRank idea and related tricks for organizing the Web, the problems of finding frequent itemsets, and clustering. This third edition includes new and extended coverage on decision trees, deep learning, and mining social-network graphs.

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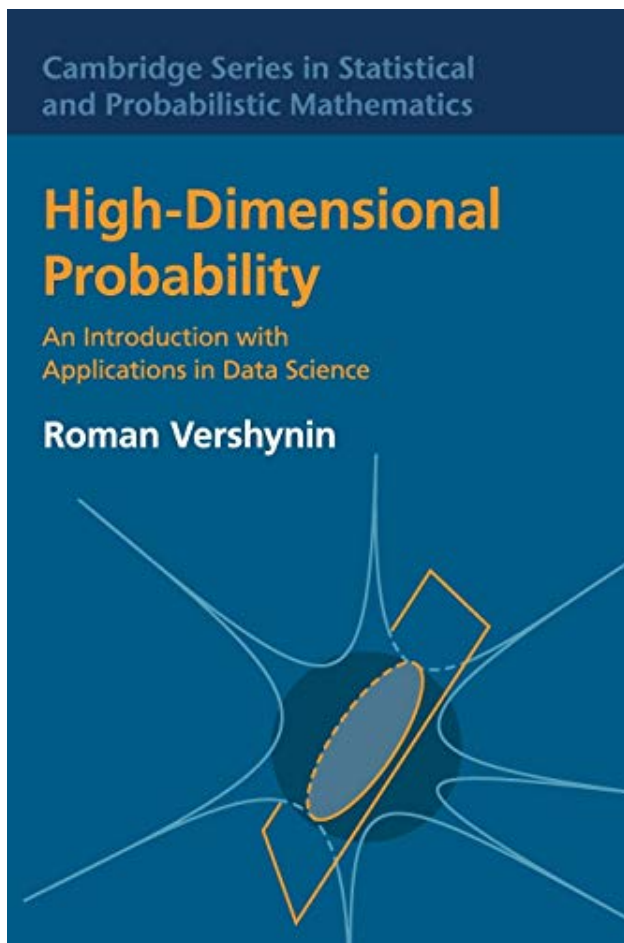
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Product Description

The fundamental mathematical tools needed to understand machine learning include linear algebra, analytic geometry, matrix decompositions, vector calculus, optimization, probability and statistics. These topics are traditionally taught in disparate courses, making it hard for data science or computer science students, or professionals, to efficiently learn the mathematics. This self-contained textbook bridges the gap between mathematical and machine learning texts, introducing the mathematical concepts with a minimum of prerequisites. It uses these concepts to derive four central machine learning methods: linear regression, principal component analysis, Gaussian mixture models and support vector machines. For students and others with a mathematical background, these derivations provide a starting point to machine learning texts. For those learning the mathematics for the first time, the methods help build intuition and practical experience with applying mathematical concepts. Every chapter includes worked examples and exercises to test understanding. Programming tutorials are offered on the book's web site.

High-Dimensional Probability: An Introduction with Applications in Data Science (Cambridge Series in Statistical and Probabilistic Mathematics, Series Number 47)
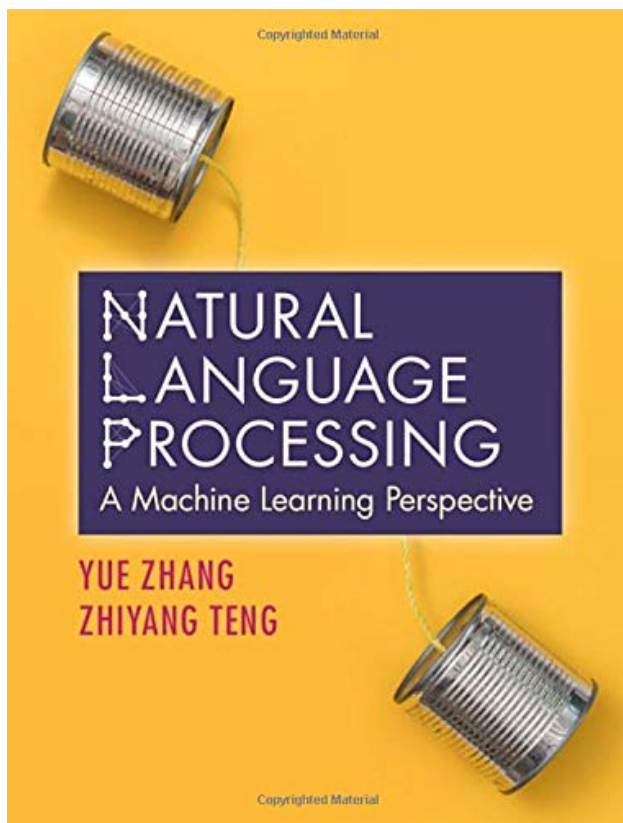
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Product Description

High-dimensional probability offers insight into the behavior of random vectors, random matrices, random subspaces, and objects used to quantify uncertainty in high dimensions. Drawing on ideas from probability, analysis, and geometry, it lends itself to applications in mathematics, statistics, theoretical computer science, signal processing, optimization, and more. It is the first to integrate theory, key tools, and modern applications of high-dimensional probability. Concentration inequalities form the core, and it covers both classical results such as Hoeffding's and Chernoff's inequalities and modern developments such as the matrix Bernstein's inequality. It then introduces the powerful methods based on stochastic processes, including such tools as Slepian's, Sudakov's, and Dudley's inequalities, as well as generic chaining and bounds based on VC dimension. A broad range of illustrations is embedded throughout, including classical and modern results for covariance estimation, clustering, networks, semidefinite programming, coding, dimension reduction, matrix completion, machine learning, compressed sensing, and sparse regression.

# Natural Language Processing: A Machine Learning Perspective

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Product Description

With a machine learning approach and less focus on linguistic details, this gentle introduction to natural language processing develops fundamental mathematical and deep learning models for NLP under a unified framework. NLP problems are systematically organised by their machine learning nature, including classification, sequence labelling, and sequence-to-sequence problems. Topics covered include statistical machine learning and deep learning models, text classification and structured prediction models, generative and discriminative models, supervised and unsupervised learning with latent variables, neural networks, and transition-based methods. Rich connections are drawn between concepts throughout the book, equipping students with the tools needed to establish a deep understanding of NLP solutions, adapt existing models, and confidently develop innovative models of their own. Featuring a host of examples, intuition, and end of chapter exercises, plus sample code available as an online resource, this textbook is an invaluable tool for the upper undergraduate and graduate student.
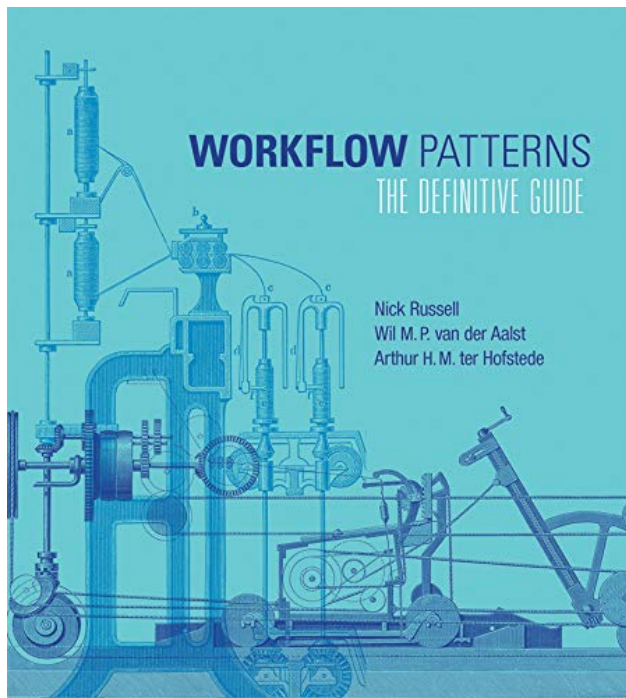
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