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Data Classification

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Machine Learning Models and Algorithms for Big Data Classification

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Healthcare Data Analytics

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CLARA ZION

DATA CLASSIFICATION

John Wiley & Sons

Trends in Deep Learning Methodologies: Algorithms, Applications, and Systems covers deep learning approaches such as neural networks, deep belief networks, recurrent neural networks, convolutional neural networks, deep auto-encoder, and deep generative networks, which have emerged as powerful computational models. Chapters elaborate on these models which have shown significant success in dealing with massive data for a large number of applications, given their capacity to extract complex hidden features and learn efficient representation in unsupervised settings. Chapters investigate deep learning-based algorithms in a variety of application, including biomedical and health informatics, computer vision, image processing, and more. In recent years, many powerful algorithms have been developed for matching patterns in data and making predictions about future events. The major advantage of deep learning is to process big data analytics for better analysis and self-adaptive algorithms to handle more data. Deep learning methods can deal with multiple levels of representation in which the system learns to abstract higher level representations of raw data. Earlier, it was a common requirement to have a domain expert to develop a specific model for each specific application, however, recent advancements in representation learning algorithms allow researchers across various subject domains to automatically learn the patterns and representation of the given data for the development of specific models. Provides insights into the theory, algorithms, implementation and the application of deep learning techniques Covers a wide range of applications of deep learning across smart healthcare and smart engineering Investigates the development of new models and how they can be exploited to find appropriate solutions

Web Mining CRC Press

Data Mining: A Tutorial-Based Primer, Second Edition provides a comprehensive introduction to data mining with a focus on model building and testing, as well as on interpreting and validating results. The text guides students to understand how data mining can be employed to solve real problems and recognize whether a data mining solution is a feasible alternative for a specific problem. Fundamental data mining strategies, techniques, and evaluation methods are presented and implemented with the help of two well-known software tools. Several new topics have been

added to the second edition including an introduction to Big Data and data analytics, ROC curves, Pareto lift charts, methods for handling large-sized, streaming and imbalanced data, support vector machines, and extended coverage of textual data mining. The second edition contains tutorials for attribute selection, dealing with imbalanced data, outlier analysis, time series analysis, mining textual data, and more. The text provides in-depth coverage of RapidMiner Studio and Weka's Explorer interface. Both software tools are used for stepping students through the tutorials depicting the knowledge discovery process. This allows the reader maximum flexibility for their hands-on data mining experience.

LINEAR CLASSIFICATION ALGORITHMS OF DATA MINING IN LINUX AND ITS APPLICATIONS

CRC Press

This book presents machine learning models and algorithms to address big data classification problems. Existing machine learning techniques like the decision tree (a hierarchical approach), random forest (an ensemble hierarchical approach), and deep learning (a layered approach) are highly suitable for the system that can handle such problems. This book helps readers, especially students and newcomers to the field of big data and machine learning, to gain a quick understanding of the techniques and technologies; therefore, the theory, examples, and programs (Matlab and R) presented in this book have been simplified, hardcoded, repeated, or spaced for improvements. They provide vehicles to test and understand the complicated concepts of various topics in the field. It is expected that the readers adopt these programs to experiment with the examples, and then modify or write their own programs toward advancing their knowledge for solving more complex and challenging problems. The presentation format of this book focuses on simplicity, readability, and dependability so that both undergraduate and graduate students as well as new researchers, developers, and practitioners in this field can easily trust and grasp the concepts, and learn them effectively. It has been written to reduce the mathematical complexity and help the vast majority of readers to understand the topics and get interested in the field. This book consists of four parts, with the total of 14 chapters. The first part mainly focuses on the topics that are needed to help analyze and understand data and big data. The second part covers the topics that can explain the systems required for processing big data. The third part presents the topics required to understand and select machine learning techniques to classify big data. Finally, the fourth part concentrates on the topics that explain the scaling-up machine learning, an important solution for modern big data problems.

Data Mining with R Springer

Machine Learning Algorithms is for current and ambitious machine learning specialists looking to implement solutions to real-world machine learning problems. It talks entirely about the various applications of machine and deep learning techniques, with each chapter dealing with a novel approach

of machine learning architecture for a specific application, and then compares the results with previous algorithms. The book discusses many methods based in different fields, including statistics, pattern recognition, neural networks, artificial intelligence, sentiment analysis, control, and data mining, in order to present a unified treatment of machine learning problems and solutions. All learning algorithms are explained so that the user can easily move from the equations in the book to a computer program.

[The Top Ten Algorithms in Data Mining](#) CRC Press

Data Mining with R: Learning with Case Studies, Second Edition uses practical examples to illustrate the power of R and data mining. Providing an extensive update to the best-selling first edition, this new edition is divided into two parts. The first part will feature introductory material, including a new chapter that provides an introduction to data mining, to complement the already existing introduction to R. The second part includes case studies, and the new edition strongly revises the R code of the case studies making it more up-to-date with recent packages that have emerged in R. The book does not assume any prior knowledge about R. Readers who are new to R and data mining should be able to follow the case studies, and they are designed to be self-contained so the reader can start anywhere in the document. The book is accompanied by a set of freely available R source files that can be obtained at the book's web site. These files include all the code used in the case studies, and they facilitate the "do-it-yourself" approach followed in the book. Designed for users of data analysis tools, as well as researchers and developers, the book should be useful for anyone interested in entering the "world" of R and data mining. About the Author Luís Torgo is an associate professor in the Department of Computer Science at the University of Porto in Portugal. He teaches Data Mining in R in the NYU Stern School of Business' MS in Business Analytics program. An active researcher in machine learning and data mining for more than 20 years, Dr. Torgo is also a researcher in the Laboratory of Artificial Intelligence and Data Analysis (LIAAD) of INESC Porto LA.

Trends in Deep Learning Methodologies Walter de Gruyter GmbH & Co KG

This book introduces basic machine learning concepts and applications for a broad audience that includes students, faculty, and industry practitioners. We begin by describing how machine learning provides capabilities to computers and embedded systems to learn from data. A typical machine learning algorithm involves training, and generally the performance of a machine learning model improves with more training data. Deep learning is a sub-area of machine learning that involves extensive use of layers of artificial neural networks typically trained on massive amounts of data. Machine and deep learning methods are often used in contemporary data science tasks to address the growing data sets and detect, cluster, and classify data patterns. Although machine learning commercial interest has grown relatively recently, the roots of machine learning go back to decades ago. We note that nearly all organizations, including industry, government, defense, and health, are using machine learning to address a variety of needs and applications. The machine learning paradigms presented can be broadly divided into the following three categories: supervised learning, unsupervised learning, and semi-supervised learning. Supervised learning algorithms focus on learning a mapping function, and they are trained with supervision on labeled data. Supervised learning is further sub-divided into classification and regression algorithms. Unsupervised learning typically does not have access to ground truth, and often the goal is to learn or uncover the hidden pattern in the data. Through semi-supervised learning, one can effectively utilize a large volume of unlabeled data and a limited amount of labeled data to improve machine learning model performances. Deep learning and neural networks are also covered in this book. Deep neural networks have attracted a lot of interest during the last ten years due to the availability of graphics processing units (GPU) computational power, big data, and new software platforms. They have strong capabilities in terms of learning complex mapping functions for different types of data. We organize the book as follows. The book starts by introducing concepts in supervised, unsupervised, and semi-supervised learning. Several algorithms and their inner workings are presented within these three categories. We then continue with a brief introduction to artificial neural network algorithms and their properties. In addition, we cover an array of applications and provide extensive bibliography. The book ends with a summary of the key machine learning concepts.

Nature-Inspired Algorithms and Applications Springer

This compendium is a completely revised version of an earlier book, *Data Mining in Time Series Databases*, by the same editors. It provides a unique collection of new articles written by leading experts that account for the latest developments in the field of time series and data stream mining. The emerging topics covered by the book include weightless neural modeling for mining data streams, using ensemble classifiers for imbalanced and evolving data streams, document stream mining with active learning, and many more. In particular, it addresses the domain of streaming data, which has recently become one of the emerging topics in Data Science, Big Data, and related areas. Existing titles do not provide sufficient information on this topic. Contents: Streaming Data Mining with Massive Online Analytics (MOA) (Albert Bifet, Jesse Read, Geoff Holmes and Bernhard Pfahringer)Weightless Neural Modeling for Mining Data Streams (Douglas O Cardoso, João Gama and Felipe França)Ensemble Classifiers for Imbalanced and Evolving Data Streams (Dariusz Brzezinski and Jerzy Stefanowski)Consensus Learning for Sequence Data (Andreas Nienkötter and Xiaoyi Jiang)Clustering-Based Classification of Document Streams with Active Learning (Mark Last, Maxim Stolar and Menahem Friedman)Supporting the Mining of Big Data by Means of Domain Knowledge During the Pre-mining Phases (Rémon Cornelisse and Sunil Choenni)Data Analytics: Industrial Perspective & Solutions for Streaming Data (Mohsin Munir, Sebastian Baumbach, Ying Gu, Andreas Dengel and Sheraz Ahmed) Readership: Researchers, academics, professionals and graduate students in artificial intelligence, machine learning, databases, and information science. Keywords: Time Series;Data Streams;Big Data;Internet of Things;Concept Drift;Sequence Mining;Episode Mining;Incremental Learning;Active LearningReview:0

A Study of Recent Classification Algorithms and a Novel Approach for Biosignal Data Classification John Wiley & Sons

NATURE-INSPIRED ALGORITHMS AND APPLICATIONS The book's unified approach of balancing algorithm introduction, theoretical background and practical implementation, complements extensive literature with well-chosen case studies to illustrate how these algorithms work. Inspired by the world around them, researchers are gathering information that can be developed for use in areas where certain practical applications of nature-inspired computation and machine learning can be applied. This book is designed to enhance the reader's understanding of this process by portraying certain practical applications of nature-inspired algorithms (NIAs) specifically designed to solve complex real-world problems in data analytics and pattern recognition by means of domain-specific solutions. Since various NIAs and their multidisciplinary applications in the mechanical engineering

and electrical engineering sectors; and in machine learning, image processing, data mining, and wireless networks are dealt with in detail in this book, it can act as a handy reference guide. Among the subjects of the 12 chapters are: A novel method based on TRIZ to map real-world problems to nature problems Applications of cuckoo search algorithm for optimization problems Performance analysis of nature-inspired algorithms in breast cancer diagnosis Nature-inspired computation in data mining Hybrid bat-genetic algorithm-based novel optimal wavelet filter for compression of image data Efficiency of finding best solutions through ant colony optimization techniques Applications of hybridized algorithms and novel algorithms in the field of machine learning. Audience: Researchers and graduate students in mechanical engineering, electrical engineering, machine learning, image processing, data mining, and wireless networks will find this book very useful.

[High Performance Computing and Real Time Software for High Dimensional Data Classification](#) GRIN Verlag

A Fruitful Field for Researching Data Mining Methodology and for Solving Real-Life Problems Contrast Data Mining: Concepts, Algorithms, and Applications collects recent results from this specialized area of data mining that have previously been scattered in the literature, making them more accessible to researchers and developers in data mining and other fields. The book not only presents concepts and techniques for contrast data mining, but also explores the use of contrast mining to solve challenging problems in various scientific, medical, and business domains. Learn from Real Case Studies of Contrast Mining Applications In this volume, researchers from around the world specializing in architecture engineering, bioinformatics, computer science, medicine, and systems engineering focus on the mining and use of contrast patterns. They demonstrate many useful and powerful capabilities of a variety of contrast mining techniques and algorithms, including tree-based structures, zero-suppressed binary decision diagrams, data cube representations, and clustering algorithms. They also examine how contrast mining is used in leukemia characterization, discriminative gene transfer and microarray analysis, computational toxicology, spatial and image data classification, voting analysis, heart disease prediction, crime analysis, understanding customer behavior, genetic algorithms, and network security.

COOPERATION IN CLASSIFICATION AND DATA ANALYSIS

Springer

Generating a satisfactory classification image from remote sensing data is not a straightforward task. Many factors contribute to this difficulty including the characteristics of a study area, availability of suitable remote sensing data, ancillary and ground reference data, proper use of variables and classification algorithms, and the analyst's e

CONTRAST DATA MINING

CRC Press

Data ClassificationCRC Press

Machine Learning Models and Algorithms for Big Data Classification CRC Press

An intuitive approach to machine learning covering key concepts, real-world applications, and practical Python coding exercises.

Data Clustering Data Classification

This book provides a detailed and up-to-date overview on classification and data mining methods. The first part is focused on supervised classification algorithms and their applications, including recent research on the combination of classifiers. The second part deals with unsupervised data mining and knowledge discovery, with special attention to text mining. Discovering the underlying structure on a data set has been a key research topic associated to unsupervised techniques with multiple applications and challenges, from web-content mining to the inference of cancer subtypes in genomic microarray data. Among those, the book focuses on a new application for dialog systems which can be thereby made adaptable and portable to different domains. Clustering evaluation metrics and new approaches, such as the ensembles of clustering algorithms, are also described.

MACHINE AND DEEP LEARNING ALGORITHMS AND APPLICATIONS

Wiley-ISTE

This book presents a wealth of deep-learning algorithms and demonstrates their design process. It also highlights the need for a prudent alignment with the essential characteristics of the nature of learning encountered in the practical problems being tackled. Intended for readers interested in acquiring practical knowledge of analysis, design, and deployment of deep learning solutions to real-world problems, it covers a wide range of the paradigm's algorithms and their applications in diverse areas including imaging, seismic tomography, smart grids, surveillance and security, and health care, among others. Featuring systematic and comprehensive discussions on the development processes, their evaluation, and relevance, the book offers insights into fundamental design strategies for algorithms of deep learning.

[Intelligent Decision Support Systems](#) Academic Press

Data Science and Analytics with Python is designed for practitioners in data science and data analytics in both academic and business environments.

The aim is to present the reader with the main concepts used in data science using tools developed in Python, such as SciKit-learn, Pandas, Numpy, and others. The use of Python is of particular interest, given its recent popularity in the data science community. The book can be used by seasoned programmers and newcomers alike. The book is organized in a way that individual chapters are sufficiently independent from each other so that the reader is comfortable using the contents as a reference. The book discusses what data science and analytics are, from the point of view of the process and results obtained. Important features of Python are also covered, including a Python primer. The basic elements of machine learning, pattern recognition, and artificial intelligence that underpin the algorithms and implementations used in the rest of the book also appear in the first part of the book. Regression analysis using Python, clustering techniques, and classification algorithms are covered in the second part of the book. Hierarchical clustering, decision trees, and ensemble techniques are also explored, along with dimensionality reduction techniques and recommendation systems. The support vector machine algorithm and the Kernel trick are discussed in the last part of the book. About the Author Dr. Jesús Rogel-Salazar is a Lead Data scientist with experience in the field working for companies such as AKQA, IBM Data Science Studio, Dow Jones and

others. He is a visiting researcher at the Department of Physics at Imperial College London, UK and a member of the School of Physics, Astronomy and Mathematics at the University of Hertfordshire, UK. He obtained his doctorate in physics at Imperial College London for work on quantum atom optics and ultra-cold matter. He has held a position as senior lecturer in mathematics as well as a consultant in the financial industry since 2006. He is the author of the book *Essential Matlab and Octave*, also published by CRC Press. His interests include mathematical modelling, data science, and optimization in a wide range of applications including optics, quantum mechanics, data journalism, and finance.

HIERARCHICAL FEATURE SELECTION FOR KNOWLEDGE DISCOVERY

CRC Press

Intelligent prediction and decision support systems are based on signal processing, computer vision (CV), machine learning (ML), software engineering (SE), knowledge based systems (KBS), data mining, artificial intelligence (AI) and include several systems developed from the study of expert systems (ES), genetic algorithms (GA), artificial neural networks (ANN) and fuzzy-logic systems. The use of automatic decision support systems in design and manufacturing industry, healthcare and commercial software development systems has the following benefits: Cost savings in companies, due to employment of expert system technology. Fast decision making, completion of projects in time and development of new products. Improvement in decision making capability and quality. Usage of Knowledge database and Preservation of expertise of individuals. Eases complex decision problems. Ex: Diagnosis in Healthcare To address the issues and challenges related to development, implementation and application of automatic and intelligent prediction and decision support systems in domains such as manufacturing, healthcare and software product design, development and optimization, this book aims to collect and publish wide ranges of quality articles such as original research contributions, methodological reviews, survey papers, case studies and/or reports covering intelligent systems, expert prediction systems, evaluation models, decision support systems and Computer Aided Diagnosis (CAD).

DATA SCIENCE AND ANALYTICS WITH PYTHON

Springer Nature

This book is a collection of high-quality research work on cutting-edge technologies and the most-happening areas of computational intelligence and data engineering. It includes selected papers from the International Conference on Computational Intelligence and Data Engineering (ICCID 2020). It covers various topics, including collective intelligence, intelligent transportation systems, fuzzy systems, Bayesian network, ant colony optimization, data privacy and security, data mining, data warehousing, big data analytics, cloud computing, natural language processing, swarm intelligence and speech processing.

Semi-Supervised and Unervised Machine Learning

CRC Press

This book covers the state-of-art image classification methods for discrimination of earth objects from remote sensing satellite data with an emphasis on fuzzy machine learning and deep learning algorithms. Both types of algorithms are described in such details that these can be implemented directly for thematic mapping of multiple-class or specific-class landcover from multispectral optical remote sensing data. These algorithms along with multi-date, multi-sensor remote sensing are capable to monitor specific stage (for e.g., phenology of growing crop) of a particular class also included.

With these capabilities fuzzy machine learning algorithms have strong applications in areas like crop insurance, forest fire mapping, stubble burning, post disaster damage mapping etc. It also provides details about the temporal indices database using proposed Class Based Sensor Independent (CBSI) approach supported by practical examples. As well, this book addresses other related algorithms based on distance, kernel based as well as spatial information through Markov Random Field (MRF)/Local convolution methods to handle mixed pixels, non-linearity and noisy pixels. Further, this book covers about techniques for quantitative assessment of soft classified fraction outputs from soft classification and supported by in-house developed tool called sub-pixel multi-spectral image classifier (SMIC). It is aimed at graduate, postgraduate, research scholars and working professionals of different branches such as Geoinformation sciences, Geography, Electrical, Electronics and Computer Sciences etc., working in the fields of earth observation and satellite image processing. Learning algorithms discussed in this book may also be useful in other related fields, for example, in medical imaging. Overall, this book aims to: exclusive focus on using large range of fuzzy classification algorithms for remote sensing images; discuss ANN, CNN, RNN, and hybrid learning classifiers application on remote sensing images; describe sub-pixel multi-spectral image classifier tool (SMIC) to support discussed fuzzy and learning algorithms; explain how to assess soft classified outputs as fraction images using fuzzy error matrix (FERM) and its advance versions with FERM tool, Entropy, Correlation Coefficient, Root Mean Square Error and Receiver Operating Characteristic (ROC) methods and; combines explanation of the algorithms with case studies and practical applications.

Industry 4.0, AI, and Data Science

SIAM

This book seeks to promote the exploitation of data science in healthcare systems. The focus is on advancing the automated analytical methods used to extract new knowledge from data for healthcare applications. To do so, the book draws on several interrelated disciplines, including machine learning, big data analytics, statistics, pattern recognition, computer vision, and Semantic Web technologies, and focuses on their direct application to healthcare. Building on three tutorial-like chapters on data science in healthcare, the following eleven chapters highlight success stories on the application of data science in healthcare, where data science and artificial intelligence technologies have proven to be very promising. This book is primarily intended for data scientists involved in the healthcare or medical sector. By reading this book, they will gain essential insights into the modern data science technologies needed to advance innovation for both healthcare businesses and patients. A basic grasp of data science is recommended in order to fully benefit from this book.

Data Clustering

Springer Nature

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 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.

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