A New Feature Reduction Method For Mammogram Mass

This book provides an overview of the current advances in artificial intelligence and neural nets. Artificial intelligence (AI) methods have shown great capabilities in modelling, prediction and recognition tasks supporting human–machine interaction. At the same time, the issue of emotion has gained increasing attention due to its relevance in achieving human-like interaction with machines. The real challenge is taking advantage of the emotional characterization of humans' interactions to make computers interfacing with them emotionally and socially credible. The book assesses how and to what extent current sophisticated computational intelligence tools might support the multidisciplinary research on the characterization of appropriate system reactions to human emotions and expressions in interactive scenarios. Discussing the latest recent research trends, innovative approaches and future challenges in AI from interdisciplinary perspectives, it is a valuable resource for researchers and practitioners in academia and industry.

Though network security has almost always been about encryption and decryption, the field of network security is moving towards securing the network environment rather than just stored or transferred data. Privacy, Intrusion Detection and Response: Technologies for Protecting Networks explores the latest practices and research works in the area of privacy, intrusion detection, and response. Increased interest on intrusion detection together with prevention and response proves that protecting data either in the storage or during transfer is necessary, but not sufficient, for the security of a network. This book discusses the latest trends and developments in network security and privacy, and serves as a vital reference for researchers, academics, and practitioners working in the field of privacy, intrusion detection, and response.

This book explores how developing solutions with heuristic tools offers two major advantages: shortened development time and more robust systems. It begins with an overview of modern heuristic techniques and goes on to cover specific applications of heuristic approaches to power system problems, such as security assessment, optimal power flow, power system scheduling and operational planning, power generation expansion planning, reactive power planning, transmission and distribution planning, network reconfiguration, power system control, and hybrid systems of heuristic methods.

The theme of CUTE is focused on the various aspects of ubiquitous computing for advances in ubiquitous computing and provides an opportunity for academic and industry professionals to discuss the latest issues and progress in the area of ubiquitous computing. Therefore this book will be include the various theories and practical applications in ubiquitous computing

Statistical and Optimization Perspectives Workshop, SLSFS 2005 Bohinj, Slovenia, February 23-25, 2005, Revised Selected Papers

A Machine Learning Perspective

Methods and Applications with R

Dimension Reduction

Emerging Technologies for Information Systems, Computing, and Management

Geometric Structure of High-Dimensional Data and Dimensionality Reduction

Method of Dimensionality Reduction in Contact Mechanics and Friction

Due to advances in sensor, storage, and networking technologies, data is being generated on a daily basis at an ever-increasing pace in a wide range of applications, including cloud computing, mobile Internet, and medical imaging. This large multidimensional data requires more efficient dimensionality reduction schemes than the traditional techniques. Addressing this need, multilinear subspace learning (MSL) reduces the dimensionality of big data directly from its natural multidimensional representation, a tensor. Multilinear Subspace Learning: Dimensionality Reduction of Multidimensional Data gives a comprehensive introduction to both theoretical and practical aspects of MSL for the dimensionality reduction of multidimensional data based on tensors. It covers the fundamentals, algorithms, and applications of MSL. Emphasizing essential concepts and system-level perspectives, the authors provide a foundation for solving many of today's most interesting and challenging problems in big multidimensional data processing. They trace the history of MSL, detail recent advances, and explore future developments and emerging applications. The book follows a unifying MSL framework formulation to systematically derive representative MSL algorithms. It describes various applications of the algorithms, along with their pseudocode. Implementation tips help practitioners in further development, evaluation, and application. The book also provides researchers with useful theoretical information on big multidimensional data in machine learning and pattern recognition. MATLAB® source code, data, and other materials are available at www.comp.hkbu.edu.hk/~haiping/MSL.html

Computational Genomics with R provides a starting point for beginners in genomic data analysis and also guides more advanced practitioners to sophisticated data analysis techniques in genomics. The book covers topics from R programming, to machine learning and statistics, to the latest genomic data analysis techniques. The text provides accessible information and explanations, always with the genomics context in the background. This also contains practical and well-documented examples in R so readers can analyze their data by simply reusing the code presented. As the field of computational genomics is interdisciplinary, it requires different starting points for people with different backgrounds. For example, a biologist might skip sections on basic genome biology and start with R programming, whereas a computer scientist might want to start with genome biology. After reading: You will have the basics of R and be able to dive right into specialized uses of R for computational genomics such as using Bioconductor packages. You will be familiar with statistics, supervised and unsupervised learning techniques that are important in data modeling, and exploratory analysis of high-dimensional data. You will understand genomic intervals and operations on them that are used for tasks such as aligned read counting and genomic feature annotation. You will know the basics of processing and quality checking high-throughput sequencing data. You will be able to do sequence analysis, such as calculating GC content for parts of a genome or finding transcription factor binding sites. You will know about visualization techniques used in genomics, such as heatmaps, meta-gene plots, and genomic track visualization. You will be familiar with analysis of different high-throughput sequencing data sets, such as RNA-seq, ChIP-seq, and BS-seq. You will know basic techniques for integrating and interpreting multi-omics data. Altuna Akalin is a group leader and head of the Bioinformatics and Omics Data Science Platform at the Berlin Institute of Medical Systems Biology, Max Delbrück Center, Berlin. He has been developing computational methods for analyzing and integrating large-scale genomics data sets since 2002. He has published an extensive body of work in this area. The framework for this book grew out of the yearly computational genomics courses he has been organizing and teaching since 2015.

Data creation and storage methods have changed over the past few decades with the use of new technologies, and gathering data on a huge number of features (dimensions) is now very common among diverse scientific and engineering fields. Prior to classification or regression, dimensionality reduction is necessary to eliminate irrelevant features and to deal with data with high dimensions. A number of numerical methods have already been proposed to reduce the dimension of data, for example,Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), and Supervised Principal Component Analysis (SPCA).In this dissertation, we will introduce a novel way of reducing dimensionality and classifying data simultaneously through a supervised approach that reduces dimension while classifying data. The objective of our model is to determine the projection matrix utilized in the dimensionality reduction procedure, as well as to determine the hyperplane of the classifier used for data classification. Since the supervised model is learning both the representation of the low-dimensional data and the classification simultaneously, our supervised model has the advantage of high accuracy as well as effective representation. Additionally, our model is capable of performing multi-class classification, i.e., it is capable of classifying data with more than two categories. Due to our model's ability to use nonlinear mappings, we can also apply it to data sets with nonlinear and complex structures. Simulating the model and comparing it with the state-of-the-art dimensionality reduction and classification techniques demonstrate the model's effectiveness and efficiency.

This book describes for the first time a simulation method for the fast calculation of contact properties and friction between rough surfaces in a complete form. In contrast to existing simulation methods, the method of dimensionality reduction (MDR) is based on the exact mapping of various types of three-dimensional contact problems onto contacts of one-dimensional foundations. Within the confines of MDR, not only are three dimensional systems reduced to one-dimensional, but also the resulting degrees of freedom are independent from another. Therefore, MDR results in an enormous reduction of the development time for the numerical implementation of contact problems as well as the direct computation time and can ultimately assume a similar role in tribology as FEM has in structure mechanics or CFD methods, in hydrodynamics. Furthermore, it substantially simplifies analytical calculation and presents a sort of " pocket book edition" of the entirety contact mechanics. Measurements of the rheology of bodies in contact as well as their surface topography and adhesive properties are the inputs of the calculations. In particular, it is possible to capture the entire dynamics of a system – beginning with the macroscopic, dynamic contact calculation all the way down to the influence of roughness – in a single numerical simulation model. Accordingly, MDR allows for the unification of the methods of solving contact problems on different scales. The goals of this book are on the one hand, to prove the applicability and reliability of the method and on the other hand, to explain its extremely simple application to those interested.

Reviews, Refinements and New Ideas in Face Recognition

A Novel Hybrid Dimensionality Reduction Method Using Support Vector Machines and Independent Component Analysis

Multilinear Subspace Learning

Texture Analysis for Magnetic Resonance Imaging

Computational Methods of Feature Selection

Machine Learning Refined

Sufficient Dimension Reduction

"Geometric Structure of High-Dimensional Data and Dimensionality Reduction" adopts data geometry as a framework to address various methods of dimensionality reduction. In addition to the introduction to well-known linear methods, the book moreover stresses the recently developed nonlinear methods and introduces the applications of dimensionality reduction in many areas, such as face recognition, image segmentation, data classification, data visualization, and hyperspectral imagery data analysis. Numerous tables and graphs are included to illustrate the ideas, effects, and shortcomings of the methods. MATLAB code of all dimensionality reduction algorithms is provided to aid the readers with the implementations on computers. The book will be useful for mathematicians, statisticians, computer scientists, and data analysts. It is also a valuable handbook for other practitioners who have a basic background in mathematics, statistics and/or computer algorithms, like internet search engine designers, physicists, geologists, electronic engineers, and economists. Jianzhong Wang is a Professor of Mathematics at Sam Houston State University, U.S.A.

Data-driven discovery is revolutionizing the modeling, prediction, and control of complex systems. This textbook brings together machine learning, engineering mathematics, and mathematical physics to integrate modeling and control of dynamical systems with modern methods in data science. It highlights many of the recent advances in scientific computing that enable data-driven methods to be applied to a diverse range of complex systems, such as turbulence, the brain, climate, epidemiology, finance, robotics, and autonomy. Aimed at advanced undergraduate and beginning graduate students in the engineering and physical sciences, the text presents a range of topics and methods from introductory to state of the art.

The field of Intelligent Systems and Applications has expanded enormously during the last two decades. Theoretical and practical results in this area are growing rapidly due to many successful applications and new theories derived from many diverse problems. This book is dedicated to the Intelligent Systems and Applications in many different aspects. In particular, this book is to provide highlights of the current research in Intelligent Systems and Applications. It consists of research papers in the following specific topics: l Graph Theory and Algorithms l Interconnection Networks and Combinatorial Algorithms l Artificial Intelligence and Fuzzy Systems l Database, Data Mining, and Information Retrieval l Information Literacy, e-Learning, and Social Media l Computer Networks and Web Service/Technologies l Wireless Sensor Networks l Wireless Network Protocols l Wireless Data Processing This book provides a reference to theoretical problems as well as practical solutions and applications for the state-of-the-art results in Intelligent Systems and Applications on the aforementioned topics. In particular, both the academic community (graduate students, post-doctors and faculties) in Electrical Engineering, Computer Science, and Applied Mathematics; and the industrial community (engineers, engineering managers, programmers, research lab staffs and managers, security managers) will find this book interesting.

The last few years have seen a great increase in the amount of data available to scientists, yet many of the techniques used to analyse this data cannot cope with such large datasets. Therefore, strategies need to be employed as a pre-processing step to reduce the number of objects or measurements whilst retaining important information. Spectral dimensionality reduction is one such tool for the data processing pipeline. Numerous algorithms and improvements have been proposed for the purpose of performing spectral dimensionality reduction, yet there is still no gold standard technique. This book provides a survey and reference aimed at advanced undergraduate and postgraduate students as well as researchers, scientists, and engineers in a wide range of disciplines. Dimensionality reduction has proven useful in a wide range of problem domains and so this book will be applicable to anyone with a solid grounding in statistics and computer science seeking to apply spectral dimensionality to their work.

Object Detection by Stereo Vision Images

Exploring New Forms of Random Projections for Prediction and Dimensionality Reduction in Big-data Regimes

Subspace, Latent Structure and Feature Selection

A Novel Supervised Dimensionality Reduction Method

Machine Learning, Dynamical Systems, and Control

5th International Conference, ADMA 2009, Chengdu, China, August 17-19, 2009, Proceedings

Computational Intelligence and Healthcare Informatics

As a baby one of our earliest stimuli is that of human faces. We rapidly learn to identify, characterize and eventually distinguish those who are near and dear to us. We accept face recognition later as an everyday ability. We realize the complexity of the underlying problem only when we attempt to duplicate this skill in a computer vision system. This book is arranged around a number of clustered themes covering different aspects of face recognition. The first section on Statistical Face Models and Classifiers presents reviews and refinements of some well-known statistical models. The next section presents two articles exploring the use of Infrared imaging techniques and is followed by few articles devoted to refinements of classical methods. New approaches to improve the robustness of face analysis techniques are followed by two articles dealing with real-time challenges in video sequences. A final article explores human perceptual issues of face recognition.

The Fourth International Conference on Advanced Data Mining and Applications (ADMA 2008) will be held in Chengdu, China, followed by the last three successful ADMA conferences (2005 in Wu Han, 2006 in Xi'an, and 2007 Harbin). Our major goal of ADMA is to bring together the experts on data mining in the world, and to provide a leading international forum for the dissemination of original research results in data mining, including applications, algorithms, software and systems, and different disciplines with potential applications of data mining. This goal has been partially achieved in a very short time despite the young age of the conference, thanks to the rigorous review process insisted upon, the outstanding list of internationally renowned keynote speakers and the excellent program each year. ADMA is ranked higher than, or very similar to, other data mining conferences (such as PAKDD, PKDD, and SDM) in early 2008 by an independent source: cs-conference-ranking. org. This year we had the pleasure and honor to host illustrious keynote speakers are Prof. Qiang Yang and Prof. Jiming Liu. Prof. Yang is a tenured Professor and postgraduate studies coordinator at Computer Science and Engineering Department of Hong Kong University of Science and Technology. He is also a member of AAAI, ACM, a senior member of the IEEE, and he is also an as- ciate editor for the IEEE TKDE and IEEE Intelligent Systems, KAIS and WI Journals.

Sufficient dimension reduction is a rapidly developing research field that has wide applications in regression diagnostics, data visualization, machine learning, genomics, image processing, pattern recognition, and medicine, because they are fields that produce large datasets with a large number of variables. Sufficient Dimension Reduction: Methods and Applications with R introduces the basic theories and the main methodologies, provides practical and easy-to-use algorithms and computer codes to implement these methodologies, and surveys the recent advances at the frontiers of this field. Features Provides comprehensive coverage of this emerging research field. Synthesizes a wide variety of dimension reduction methods under a few unifying principles such as projection in Hilbert spaces, kernel mapping, and von Mises expansion. Reflects most recent advances such as nonlinear sufficient dimension reduction, dimension folding for tensorial data, as well as sufficient dimension reduction for functional data. Includes a set of computer codes written in R that are easily implemented by the readers. Uses real data sets available online to illustrate the usage and power of the described methods. Sufficient dimension reduction has undergone momentous development in recent years, partly due to the increased demands for techniques to process high-dimensional data, a hallmark of our age of Big Data. This book will serve as the perfect entry into the field for the beginning researchers or a handy reference for the advanced ones. The author Bing Li obtained his Ph.D. from the University of Chicago. He is currently a Professor of Statistics at the Pennsylvania State University. His research interests cover sufficient dimension reduction, statistical graphical models, functional data analysis, machine learning, estimating equations and quasilikelihood, and robust statistics. He is a fellow of the Institute of Mathematical Statistics and the American Statistical Association. He is an Associate Editor for The Annals of Statistics and the Journal of the American Statistical Association.

Now in its second edition, this book focuses on practical algorithms for mining data from even the largest datasets.

Volume II No. 4 2018

Ubiquitous Information Technologies and Applications

Data Mining with SPSS Modeler

Advances in Intelligent Systems and Applications - Volume 1

Progresses in Artificial Intelligence and Neural Systems

Dimensionality Reduction of Multidimensional Data

Open Problems in Spectral Dimensionality Reduction

The primary aim of this volume is to provide researchers and engineers from both academia and industry with up-to-date coverage of recent advances in the fields of robotic welding, intelligent systems and automation. It gathers selected papers from the 2018 International Conference on Robotic Welding, Intelligence and Automation (RWIA Guangzhou, China. The contributions reveal how intelligentized welding manufacturing (IWM) is becoming an inescapable trend, just as intelligentized robotic welding is becoming a key technology. The volume is divided into four main parts: Intelligent Techniques for Robotic Welding, Sensing in Arc Welding Processing, Modeling and Intelligent and Intelligent Control and Its Applications in Engineering.

Proceedings of the Sixth International Conference on Intelligent System and Knowledge Engineering presents selected papers from the conference ISKE 2011, held December 15-17 in Shanghai, China. This proceedings doesn't only examine original research and approaches in the broad areas of intelligent systems and knowledge engineering, practices in intelligent computing paradigms. The book introduces the current scientific and technical advances in the fields of artificial intelligence, machine learning, pattern recognition, data mining, information retrieval, knowledge-based systems, knowledge representation and reasoning, multi-agent systems, natural-language processing, methodologies are presented, including cloud computing, service computing and pervasive computing with traditional intelligent methods. The proceedings will be beneficial for both researchers and practitioners who want to utilize intelligent methods in their specific research fields. Dr. Yinglin Wang is a professor at the Department of Com

Jiao Tong University, China; Dr. Tianrui Li is a professor at the School of Information Science and Technology, Southwest Jiaotong University, China.

Due to the increasing demand for high dimensional data analysis from various applications such as electrocardiogram signal analysis and gene expression analysis for cancer detection, dimensionality reduction becomes a viable process to extracts essential information from data such that the high-dimensional data can be represented in a dimensionality to both improve classification accuracy and reduce computational complexity. Conventional dimensionality reduction methods can be categorized into stand-alone and hybrid approaches. The stand-alone method utilizes a single criterion from either supervised or unsupervised perspective. On the other hand, the hybrid metho a variety of stand-alone dimensionality reduction methods, the hybrid approach is promising as it takes advantage of both the supervised criterion for better classification accuracy and the unsupervised criterion for better data representation, simultaneously. However, several issues always exist that challenge the efficiency of the hybrid a subspace that seamlessly integrates both criteria in a single hybrid framework, (2) the robustness of the performance regarding noisy data, and (3) nonlinear data representation capability. This dissertation presents a new hybrid dimensionality reduction method to seek projection through optimization of both structural risk (supervised (SVM) and data independence (unsupervised criterion) from Independent Component Analysis (ICA). The projection from SVM directly contributes to classification performance improvement in a supervised perspective whereas maximum independence among features by ICA construct projection indirectly achieving classification accuracy im representation in an unsupervised perspective. For linear dimensionality reduction model, I introduce orthogonality to interrelate both projections from SVM and ICA while redundancy removal process eliminates a part of the projection vectors from SVM, leading to more effective dimensionality reduction. The orthogonality-based linear hyb extended to uncorrelatedness-based algorithm with nonlinear data representation capability. In the proposed approach, SVM and ICA are integrated into a single framework by the uncorrelated subspace based on kernel implementation. Experimental results show that the proposed approaches give higher classification performance with be dimensions than conventional methods for high-dimensional datasets.

This proceedings presents recent practical applications of Computational Biology and Bioinformatics. It contains the proceedings of the 9th International Conference on Practical Applications of Computational Biology & Bioinformatics held at University of Salamanca, Spain, at June 3rd-5th, 2015. The International Conference on Practical A Bioinformatics (PACBB) is an annual international meeting dedicated to emerging and challenging applied research in Bioinformatics and Computational Biology. Biological and biomedical research are increasingly driven by experimental techniques that challenge our ability to analyse, process and extract meaningful knowledge from the under capabilities of next generation sequencing technologies, together with novel and ever evolving distinct types of omics data technologies, have put an increasingly complex set of challenges for the growing fields of Bioinformatics and Computational Biology. The analysis of the datasets produced and their integration call for new algorithms Statistics, Data Mining, Machine Learning, Optimization, Computer Science and Artificial Intelligence. Clearly, Biology is more and more a science of information requiring tools from the computational sciences.

Feature Engineering and Selection

First International Conference on Logic, Information, Control and Computation, ICLICC 2011, Gandhigram, India, February 25-27, 2011, Proceedings

Applications of Artificial Intelligence and Machine Learning

Data Analytics in Bioinformatics

Integrating PCA with SVM

Technologies for Protecting Networks

Data Cleaning, Feature Selection, and Data Transforms in Python

The process of developing predictive models includes many stages. Most resources focus on the modeling algorithms but neglect other critical aspects of the modeling process. This book describes techniques for finding the best representations of predictors for modeling and for nding the best subset of predictors for improving model performance. A variety of example data sets are used to illustrate the techniques along with R programs for reproducing the results.

OBJECT DETECTION BY STEREO VISION IMAGES Since both theoretical and practical aspects of the developments in this field of research are explored, including recent state-of-the-art technologies and research opportunities in the area of object detection, this book will act as a good reference for practitioners, students, and researchers. Current state-of-the-art technologies have opened up new opportunities in research in the areas of object detection and recognition of digital images and videos, robotics, neural networks, machine learning, stereo vision matching algorithms, soft computing, customer prediction, social media analysis, recommendation systems, and stereo vision. This book has been designed to provide directions for those interested in researching and developing intelligent applications to detect an object and estimate depth. In addition to focusing on the performance of the system using high-performance computing techniques, a technical overview of certain tools, languages, libraries, frameworks, and APIs for developing applications is also given. More specifically, detection using stereo vision images/video from its developmental stage up till today, its possible applications, and general research problems relating to it are covered. Also presented are techniques and algorithms that satisfy the peculiar needs of stereo vision images along with emerging research opportunities through analysis of modern techniques being applied to intelligent systems. Audience Researchers in information technology looking at robotics, deep learning, machine learning, big data analytics, neural networks, pattern & data mining, and image and object recognition. Industrial sectors include automotive electronics, security and surveillance systems, and online retailers.

The story of this work is dimensionality reduction. Dimensionality reduction is a method that takes as input a point-set P of n points in R^d where d is typically large and attempts to find a lower-dimensional representation of that dataset, in order to ease the burden of processing for down-stream algorithms. In today's landscape of machine learning, researchers and practitioners work with datasets that either have a very large number of samples, and or include high-dimensional samples. Therefore, dimensionality reduction is applied as a pre-processing technique primarily to overcome the curse of dimensionality. Generally, dimensionality reduction improves time and storage space required for processing the point-set, removes multi-collinearity and redundancies in the dataset where different features may depend on one another, and may enable simple visualizations of the dataset in 2-D and 3-D making the relationships in the data easy for humans to comprehend. Dimensionality reduction methods come in many shapes and sizes. Methods such as Principal Component Analysis (PCA), Multi-dimensional Scaling, IsoMaps, and Locally Linear Embeddings are amongst the most commonly used method of this family of algorithms. However, the choice of dimensionality reduction method proves critical in many applications as there is no one-size-fits-all solution, and special care must be considered for different datasets and tasks. Furthermore, the aforementioned popular methods are data-dependent, and commonly rely on computing either the Kernel / Gram matrix or the covariance matrix of the dataset. These matrices scale with increasing number of samples and increasing number of data dimensions, respectively, and are consequently poor choices in today's landscape of big-data applications. Therefore, it is pertinent to develop new dimensionality reduction methods that can be efficiently applied to large and high-dimensional datasets, by either reducing the dependency on the data, or side-stepping it altogether. Furthermore, such new dimensionality reduction methods should be able to perform on par with, or better than, traditional methods such as PCA. To achieve this goal, we turn to a simple and powerful method called random projections. Random projections are a simple, efficient, and data-independent method for stably embedding a point-set P of n points in R^d to R^k where d is typically large and k is on the order of log n. Random projections have a long history of use in dimensionality reduction literature with great success. In this work, we are inspired to build on the ideas of random projection theory, and extend the framework and build a powerful new setup of random projections for large high-dimensional datasets, with comparable performance to state-of-the-art data-dependent and nonlinear methods. Furthermore, we study the use of random projections in domains other than dimensionality reduction, including prediction, and show the competitive performance of such methods for processing small dataset regimes.

Now in its second edition, this textbook introduces readers to the IBM SPSS Modeler and guides them through data mining processes and relevant statistical methods. Focusing on step-by-step tutorials and well-documented examples that help demystify complex mathematical algorithms and computer programs, it also features a variety of exercises and solutions, as well as an accompanying website with data sets and SPSS Modeler streams. While intended for students, the simplicity of the Modeler makes the book useful for anyone wishing to learn about basic and more advanced data mining, and put this knowledge into practice. This revised and updated second edition includes a new chapter on imbalanced data and resampling techniques as well as an extensive case study on the cross-industry standard process for data mining.

Transactions on Intelligent Welding Manufacturing

Proceedings of the International Computer Symposium ICS 2012 Held at Hualien, Taiwan, December 12-14, 2012

Mining of Massive Datasets

9th International Conference on Practical Applications of Computational Biology and Bioinformatics

Data-Driven Science and Engineering

Control, Computation and Information Systems

A Guided Tour

Machine learning techniques are increasingly being used to address problems in computational biology and bioinformatics. Novel machine learning computational techniques to analyze high throughput data in the form of sequences, gene and protein expressions, pathways, and images are becoming vital for understanding diseases and future drug discovery. Machine learning techniques such as Markov models, support vector machines, neural networks, and graphical models have been successful in analyzing life science data because of their capabilities in handling randomness and uncertainty of data noise and in generalization. Machine Learning in Bioinformatics compiles recent approaches in machine learning methods and their applications in addressing contemporary problems in bioinformatics approximating classification and prediction of disease, feature selection, dimensionality reduction, gene selection and classification of microarray data and many more.

Providing a unique approach to machine learning, this text contains fresh and intuitive, yet rigorous, descriptions of all fundamental concepts necessary to conduct research, build products, tinker, and play. By prioritizing geometric intuition, algorithmic thinking, and practical real world applications in disciplines including computer vision, natural language processing, economics, neuroscience, recommender systems, physics, and biology, this text provides readers with both a lucid understanding of foundational material as well as the practical tools needed to solve real-world problems. With in-depth Python and MATLAB/OCTAVE-based computational exercises and a complete treatment of cutting edge numerical optimization techniques, this is an essential resource for students and an ideal reference for researchers and practitioners working in machine learning, computer science, electrical engineering, signal processing, and numerical optimization.

Dimension reduction is the mapping of data to a lower dimensional space such that uninformative variance in the data is discarded, or such that a subspace in which the data lives is detected. Dimension reduction has a long history as a method for data visualization, and for extracting key low dimensional features (for example, the two-dimensional orientation of an object, from its high dimensional image representation). In some cases the desired low dimensional features depend on the task at hand. Apart from teaching us about the data, dimension reduction can lead us to better models for inference. Dimension Reduction: A Guided Tour covers many well-known, and some less well-known, methods for dimension reduction for which the inferred variables are continuous. It describes the mathematics and key ideas underlying the methods, and provides some links to the literature for those interested in pursuing a topic further.

The book will provide: 1) In depth explanation of rough set theory along with examples of the concepts. 2) Detailed discussion on idea of feature selection. 3) Details of various representative and state of the art feature selection techniques along with algorithmic explanations. 4) Critical review of state of the art rough set based feature selection methods covering strength and weaknesses of each. 5) In depth investigation of various application areas using rough set based feature selection. 6) Complete Library of Rough Set APIs along with complexity analysis and detailed manual of using APIs 7) Program files of various representative Feature Selection algorithms along with explanation of each. The book will be a complete and self-sufficient source both for primary and secondary audience. Starting from basic concepts to state-of-the art implementation, it will be a constant source of help both for practitioners and researchers. Book will provide in-depth explanation of concepts supplemented with working examples to help in practical implementation. As far as practical implementation is concerned, the researcher/practitioner can fully concentrate on his/her own work without any concern towards implementation of basic RST functionality. Providing complexity analysis along with full working programs will further simplify analysis and comparison of algorithms.

Data Preparation for Machine Learning

Advanced Data Mining and Applications

Knowledge Engineering and Management

Proceedings of the Sixth International Conference on Intelligent Systems and Knowledge Engineering, Shanghai, China, Dec 2011 (ISKE 2011)

Theory and Applications to Power Systems

Nonlinear Dimensionality Reduction

Privacy, Intrusion Detection and Response: Technologies for Protecting Networks

AI techniques are being successfully used in the fields of health to increase the efficacy of therapies and avoid the risks of false diagnosis, therapeutic decision-making, and outcome prediction in many clinical cases, thanks to the rapid advancement of technology. The acquisition, analysis, and application of a vast amount of information required to solve complex problems is a challenge for modern health therapies. The 21 chapters in this integrate several aspects of computational intelligence like machine learning and deep learning from diversified perspectives. The purpose of the book is to endow to different communities with their innovative advances in theory, analytical approaches, numerical simulation, statistical analysis, modeling, advanced deployment, case studies, analytical results, computational structuring and significance progress in healthcare applications.

Due to increasing demands for dimensionality reduction, research on feature selection has deeply and widely expanded into many fields, including computational statistics, pattern recognition, machine learning, data mining, and knowledge discovery. Highlighting current research issues, Computational Methods of Feature Selection introduces the basic concepts and principles, state-of-the-art algorithms, and novel applications of this tool. The book begins by exploring unsupervised, randomized, and causal feature selection. It then reports on some recent results of empowering feature selection, including active feature selection, decision-border estimate, the use of ensembles with independent probes, and incremental feature selection. This is followed by discussions of weighting and local methods, such as the ReliefF family, k-means clustering, local feature relevance, and a new interpretation of Relief. The book subsequently covers text classification, a new feature selection score, and both constraint-guided and aggressive feature selection. The final section examines applications of feature selection in bioinformatics, including feature construction as well as redundancy-, ensemble-, and penalty-based feature selection. Through a clear, concise, and coherent presentation of topics, this volume systematically covers the key concepts, underlying principles, and inventive applications of feature selection, illustrating how this powerful tool can efficiently harness massive, high-dimensional data and turn it into valuable, reliable information.

Many of the papers in this proceedings volume were presented at the PASCAL Workshop entitled Subspace, Latent Structure and Feature Selection Techniques: Statistical and Optimization Perspectives which took place in Bohinj, Slovenia during February, 23- 25 2005.

Data preparation involves transforming raw data in to a form that can be modeled using machine learning algorithms. Cut through the equations, Greek letters, and confusion, and discover the specialized data preparation techniques that you need to know to get the most out of your data on your next project. Using clear explanations, standard Python libraries, and step-by-step tutorial lessons, you will discover how to confidently and effectively prepare your data for predictive modeling with machine learning.

Theory, Exercises and Solutions

Foundations, Algorithms, and Applications

Multi-Label Dimensionality Reduction

4th International Conference, ADMA 2008, Chengdu, China, October 8-10, 2008, Proceedings

Case Studies on Organization and Retrieval

Select Proceedings of ICAAAIML 2021

Modern Heuristic Optimization Techniques

Similar to other data mining and machine learning tasks, multi-label learning suffers from dimensionality. An effective way to mitigate this problem is through dimensionality reduction, which extracts a small number of features by removing irrelevant, redundant, and noisy information. The data mining and machine learning literature currently lacks a unified treatment of multi-label dimensionality reduction that incorporates both algorithmic developments and applications. Addressing this shortfall, Multi-Label Dimensionality Reduction covers the methodological developments, theoretical properties, computational aspects, and applications of many multi-label dimensionality reduction algorithms. It explores numerous research questions, including: How to fully exploit label correlations for effective dimensionality reduction How to scale dimensionality reduction algorithms to large-scale problems How to effectively combine dimensionality reduction with classification How to derive sparse dimensionality reduction algorithms to enhance model interpretability How to perform multi-label dimensionality reduction effectively in practical applications The authors emphasize their extensive work on dimensionality reduction for multi-label learning. Using a case study of Drosophila gene expression pattern image annotation, they demonstrate how to apply multi-label dimensionality reduction algorithms to solve real-world problems. A supplementary website provides a MATLAB® package for implementing popular dimensionality reduction algorithms.

This book constitutes the refereed proceedings of the International Conference on Logic, Information, Control and Computation, ICLICC 2011, held in Gandhigram, India, in February 2011. The 52 revised full papers presented were carefully reviewed and selected from 278 submissions. The papers are organized in topical sections on control theory and its real time

applications, computational mathematics and its application to various fields, and information sciences focusing on image processing and neural networks.

Processing multimedia content has emerged as a key area for the application of machine learning techniques, where the objectives are to provide insight into the domain from which the data is drawn, and to organize that data and improve the performance of the processes manipulating it. Arising from the EU MUSCLE network, this multidisciplinary book provides a comprehensive coverage of the most important machine learning techniques used and their application in this domain.

This book aims to examine innovation in the fields of information technology, software engineering, industrial engineering, management engineering. Topics covered in this publication include; Information System Security, Privacy, Quality Assurance, High-Performance Computing and Information System Management and Integration. The book presents papers from The Second International Conference for Emerging Technologies Information Systems, Computing, and Management (ICM2012) which was held on December 1 to 2, 2012 in Hangzhou, China.

Understanding and Using Rough Set Based Feature Selection: Concepts, Techniques and Applications

Computational Genomics with R

A Practical Approach for Predictive Models

CUTE 2013

Machine Learning Techniques for Multimedia

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 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.

This book describes established and advanced methods for reducing the dimensionality of numerical databases. Each description starts from intuitive ideas, develops the necessary mathematical details, and ends by outlining the algorithmic implementation. The text provides a lucid summary of facts and concepts relating to well-known methods as well as recent developments in nonlinear dimensionality reduction. Methods are all described from a unifying point of view, which helps to highlight their respective strengths and shortcomings. The presentation will appeal to statisticians, computer scientists and data analysts, and other practitioners having a basic background in statistics or computational learning.

The book presents a collection of peer-reviewed articles from the International Conference on Advances and Applications of Artificial Intelligence and Machine Learning—ICAAAIML 2021. The book covers research in the areas of artificial intelligence, machine learning, and deep learning applications in health care, agriculture, business, and security. This book contains research papers from academicians, researchers as well as students. There are also papers on core concepts of computer networks, intelligent system design and deployment, real-time systems, wireless sensor networks, sensors and sensor nodes, software engineering, and image processing. This book is a valuable resource for students, academics, and practitioners in the industry working on AI applications.