

SPARSITY MEASURES AND THEIR SIGNAL PROCESSING APPLICATIONS FOR MACHINE CONDITION MONITORING



Dong Wang
Bingchang Hou



Sparsity And Its Applications

**P. N. Agrawal, R. N. Mohapatra, Uday
Singh, H. M. Srivastava**



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Sparsity and Its Applications David J. Evans, 1985-01-10 Good No Highlights No Markup all pages are intact Slight Shelfwear may have the corners slightly dented may have slight color changes slightly damaged spine **Sparsity A.** Brameller, Ronald Norman Allan, Y. M. Hamam, 1976 *Sparse Coding And Its Applications In Computer Vision* Zhaowen Wang, Jianchao Yang, Haichao Zhang, Zhangyang Wang, Thomas S Huang, Ding Liu, Yingzhen Yang, 2015-10-28 This book provides a broader introduction to the theories and applications of sparse coding techniques in computer vision research It introduces sparse coding in the context of representation learning illustrates the fundamental concepts and summarizes the most active research directions A variety of applications of sparse coding are discussed ranging from low level image processing tasks such as super resolution and de blurring to high level semantic understanding tasks such as image recognition clustering and fusion The book is suitable to be used as an introductory overview to this field with its theoretical part being both easy and precious enough for quick understanding It is also of great value to experienced researchers as it offers new perspective to the underlying mechanism of sparse coding and points out potential future directions for different applications *Sparsity Measures and their Signal Processing Applications for Machine Condition Monitoring* Dong Wang, Bingchang Hou, 2025-02-01 Sparsity Measures and their Signal Processing Applications for Machine Condition Monitoring presents newly designed sparsity measures and their advanced signal processing technologies for machine condition monitoring and fault diagnosis This book systematically covers new sparsity measures including a quasiarithmetic mean ratio framework for fault signatures quantification a generalized Gini index as well as classic sparsity measures based on signal processing technologies and a cycle embedded sparsity measure based on new impulsive mode decomposition technology This book additionally includes a sparsity measure data driven framework based optimized weights spectrum theory and its relevant advanced signal processing technologies Provides the background roadmaps and detailed discussion of newly designed sparsity measures and their advanced signal processing technologies for machine condition monitoring and fault diagnosis Covers new theories advanced technologies and the latest contributions in the field of machine condition monitoring and fault diagnosis Particularly focuses on newly advanced sparsity measures for fault signature quantification classic and advanced sparsity measures based signal processing technologies and sparsity measures using data driven framework based signal processing technologies Provides experimental and real world practical validation cases including newly advanced sparsity measures and their advanced signal processing technologies **Nonlinear Principal Component Analysis and Its Applications** Yuichi Mori, Masahiro Kuroda, Naomichi Makino, 2016-12-09 This book expounds the principle and related applications of nonlinear principal component analysis PCA which is useful method to analyze mixed measurement levels data In the part dealing with the principle after a brief introduction of ordinary PCA a PCA for categorical data nominal and ordinal is introduced as nonlinear PCA in which an optimal scaling technique is used to quantify

the categorical variables The alternating least squares ALS is the main algorithm in the method Multiple correspondence analysis MCA a special case of nonlinear PCA is also introduced All formulations in these methods are integrated in the same manner as matrix operations Because any measurement levels data can be treated consistently as numerical data and ALS is a very powerful tool for estimations the methods can be utilized in a variety of fields such as biometrics econometrics psychometrics and sociology In the applications part of the book four applications are introduced variable selection for mixed measurement levels data sparse MCA joint dimension reduction and clustering methods for categorical data and acceleration of ALS computation The variable selection methods in PCA that originally were developed for numerical data can be applied to any types of measurement levels by using nonlinear PCA Sparseness and joint dimension reduction and clustering for nonlinear data the results of recent studies are extensions obtained by the same matrix operations in nonlinear PCA Finally an acceleration algorithm is proposed to reduce the problem of computational cost in the ALS iteration in nonlinear multivariate methods This book thus presents the usefulness of nonlinear PCA which can be applied to different measurement levels data in diverse fields As well it covers the latest topics including the extension of the traditional statistical method newly proposed nonlinear methods and computational efficiency in the methods

Computational Electromagnetics and Its Applications Thomas G. Campbell, Roy A. Nicolaidis, Manuel D. Salas, 2012-12-06 This volume contains the proceedings of the first ICASE LaRC Work shop on Computational Electromagnetics and Its Applications conducted by the Institute for Computer Applications in Science and Engineering and NASA Langley Research Center We had several goals in mind when we decided jointly with the Electromagnetics Research Branch to organize this workshop on Computational Electromagnetics CEM Among our goals were a desire to obtain an overview of the current state of CEM covering both algorithms and applications and their effect on NASA's activities in this area In addition we wanted to provide an attractive setting for computational scientists with expertise in other fields especially computational fluid dynamics CFD to observe the algorithms and tools of CEM at work Our expectation was that scientists from both fields would discover mutually beneficial inter connections and relationships Another goal was to learn of progress in solution algorithms for electromagnetic optimization and design problems such problems make extensive use of field solvers and computational efficiency is at a premium To achieve these goals we assembled the renowned group of speakers from academia and industry whose talks are contained in this volume The papers are printed in the same order in which the talks were presented at the meeting The first paper is an overview of work currently being performed in the Electromagnetic Research Branch at the Langley Research Center

Compressed Sensing and Its Applications Holger Boche, Giuseppe Caire, Robert Calderbank, Gitta Kutyniok, Rudolf Mathar, Philipp Petersen, 2019-08-13 The chapters in this volume highlight the state of the art of compressed sensing and are based on talks given at the third international MATHEON conference on the same topic held from December 4-8 2017 at the Technical University in Berlin In addition to methods in compressed sensing chapters

provide insights into cutting edge applications of deep learning in data science highlighting the overlapping ideas and methods that connect the fields of compressed sensing and deep learning Specific topics covered include Quantized compressed sensing Classification Machine learning Oracle inequalities Non convex optimization Image reconstruction Statistical learning theory This volume will be a valuable resource for graduate students and researchers in the areas of mathematics computer science and engineering as well as other applied scientists exploring potential applications of compressed sensing

Sparse Modeling Irina Rish, Genady Grabarnik, 2014-12-01 Sparse models are particularly useful in scientific applications such as biomarker discovery in genetic or neuroimaging data where the interpretability of a predictive model is essential Sparsity can also dramatically improve the cost efficiency of signal processing Sparse Modeling Theory Algorithms and Applications provides an introduction to

Mathematical Analysis and its Applications P. N. Agrawal, R. N. Mohapatra, Uday Singh, H. M. Srivastava, 2015-08-22 This book discusses recent developments in and the latest research on mathematics statistics and their applications All contributing authors are eminent academics scientists researchers and scholars in their respective fields hailing from around the world The book presents roughly 60 unpublished high quality and peer reviewed research papers that cover a broad range of areas including approximation theory harmonic analysis operator theory fixed point theory functional differential equations dynamical and control systems complex analysis special functions function spaces summability theory Fourier and wavelet analysis and numerical analysis all of which are topics of great interest to the research community while further papers highlight important applications of mathematical analysis in science engineering and related areas This conference aims at bringing together experts and young researchers in mathematics from all over the world to discuss the latest advances in mathematical analysis and at promoting the exchange of ideas in various applications of mathematics in engineering physics and biology This conference encourages international collaboration and provides young researchers an opportunity to learn about the current state of the research in their respective fields

Computational Methods for General Sparse Matrices Zahari Zlatev, 2013-04-17

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