

Yun Fu *Editor*

Low-Rank and Sparse Modeling for Visual Analysis



Springer

Low Rank And Sparse Modeling For Visual Analysis

Richard Bailey



Low Rank And Sparse Modeling For Visual Analysis:

Low-Rank and Sparse Modeling for Visual Analysis Yun Fu, 2014-10-30 This book provides a view of low rank and sparse computing especially approximation recovery representation scaling coding embedding and learning among unconstrained visual data The book includes chapters covering multiple emerging topics in this new field It links multiple popular research fields in Human Centered Computing Social Media Image Classification Pattern Recognition Computer Vision Big Data and Human Computer Interaction Contains an overview of the low rank and sparse modeling techniques for visual analysis by examining both theoretical analysis and real world applications *Low-Rank Models in Visual Analysis* Zhouchen Lin, Hongyang Zhang, 2017-06-06 Low Rank Models in Visual Analysis Theories Algorithms and Applications presents the state of the art on low rank models and their application to visual analysis It provides insight into the ideas behind the models and their algorithms giving details of their formulation and deduction The main applications included are video denoising background modeling image alignment and rectification motion segmentation image segmentation and image saliency detection Readers will learn which Low rank models are highly useful in practice both linear and nonlinear models how to solve low rank models efficiently and how to apply low rank models to real problems Presents a self contained up to date introduction that covers underlying theory algorithms and the state of the art in current applications Provides a full and clear explanation of the theory behind the models Includes detailed proofs in the appendices Low-Rank Approximation Ivan Markovsky, 2018-08-03 This book is a comprehensive exposition of the theory algorithms and applications of structured low rank approximation Local optimization methods and effective suboptimal convex relaxations for Toeplitz Hankel and Sylvester structured problems are presented A major part of the text is devoted to application of the theory with a range of applications from systems and control theory to psychometrics being described Special knowledge of the application fields is not required The second edition of Low Rank Approximation is a thoroughly edited and extensively rewritten revision It contains new chapters and sections that introduce the topics of variable projection for structured low rank approximation missing data estimation data driven filtering and control stochastic model representation and identification identification of polynomial time invariant systems and blind identification with deterministic input model The book is complemented by a software implementation of the methods presented which makes the theory directly applicable in practice In particular all numerical examples in the book are included in demonstration files and can be reproduced by the reader This gives hands on experience with the theory and methods detailed In addition exercises and MATLAB Octave examples will assist the reader quickly to assimilate the theory on a chapter by chapter basis Each chapter is completed with a new section of exercises to which complete solutions are provided Low Rank Approximation second edition is a broad survey of the Low Rank Approximation theory and applications of its field which will be of direct interest to researchers in system identification control and systems theory numerical linear algebra and optimization The supplementary problems and solutions render it

suitable for use in teaching graduate courses in those subjects as well *Anomaly Detection in Video Surveillance* Xiaochun Wang,2024-08-06 Anomaly detection in video surveillance stands at the core of numerous real world applications that have broad impact and generate significant academic and industrial value The key advantage of writing the book at this point in time is that the vast amount of work done by computer scientists over the last few decades has remained largely untouched by a formal book on the subject although these techniques significantly advance existing methods of image and video analysis and understanding by taking advantage of anomaly detection in the data mining community and visual analysis in the computer vision community The proposed book provides a comprehensive coverage of the advances in video based anomaly detection including topics such as the theories of anomaly detection and machine perception for the functional analysis of abnormal events in general the identification of abnormal behaviour and crowd abnormal behaviour in particular the current understanding of computer vision development and the application of this present understanding towards improving video based anomaly detection in theory and coding with OpenCV The book also provides a perspective on deep learning on human action recognition and behaviour analysis laying the groundwork for future advances in these areas Overall the chapters of this book have been carefully organized with extensive bibliographic notes attached to each chapter One of the goals is to provide the first systematic and comprehensive description of the range of data driven solutions currently being developed up to date for such purposes Another is to serve a dual purpose so that students and practitioners can use it as a textbook while researchers can use it as a reference book A final goal is to provide a comprehensive exposition of the topic of anomaly detection in video media from multiple points of view High-Dimensional and Low-Quality Visual Information Processing

Yue Deng,2014-09-04 This thesis primarily focuses on how to carry out intelligent sensing and understand the high dimensional and low quality visual information After exploring the inherent structures of the visual data it proposes a number of computational models covering an extensive range of mathematical topics including compressive sensing graph theory probabilistic learning and information theory These computational models are also applied to address a number of real world problems including biometric recognition stereo signal reconstruction natural scene parsing and SAR image processing

Vision Models for High Dynamic Range and Wide Colour Gamut Imaging Marcelo Bertalmío,2019-11-06 To enhance the overall viewing experience for cinema TV games AR VR the media industry is continuously striving to improve image quality Currently the emphasis is on High Dynamic Range HDR and Wide Colour Gamut WCG technologies which yield images with greater contrast and more vivid colours The uptake of these technologies however has been hampered by the significant challenge of understanding the science behind visual perception Vision Models for High Dynamic Range and Wide Colour Gamut Imaging provides university researchers and graduate students in computer science computer engineering vision science as well as industry R D engineers an insight into the science and methods for HDR and WCG It presents the underlying principles and latest practical methods in a detailed and accessible way highlighting how the use of vision models

is a key element of all state of the art methods for these emerging technologies Presents the underlying vision science principles and models that are essential to the emerging technologies of HDR and WCG Explores state of the art techniques for tone and gamut mapping Discusses open challenges and future directions of HDR and WCG research **Spectral Geometry of Shapes** Jing Hua,Zichun Zhong,Jiaxi Hu,2019-10-26 Spectral Geometry of Shapes presents unique shape analysis approaches based on shape spectrum in differential geometry It provides insights on how to develop geometry based methods for 3D shape analysis The book is an ideal learning resource for graduate students and researchers in computer science computer engineering and applied mathematics who have an interest in 3D shape analysis shape motion analysis image analysis medical image analysis computer vision and computer graphics Due to the rapid advancement of 3D acquisition technologies there has been a big increase in 3D shape data that requires a variety of shape analysis methods hence the need for this comprehensive resource Intelligent Data Engineering and Analytics Vikrant Bhateja,Xin-She Yang,Jerry Chun-Wei Lin,Ranjita Das,2023-02-23 The book presents the proceedings of the 10th International Conference on Frontiers of Intelligent Computing Theory and Applications FICTA 2022 held at NIT Mizoram Aizawl Mizoram India during 18 19 June 2022 Researchers scientists engineers and practitioners exchange new ideas and experiences in the domain of intelligent computing theories with prospective applications in various engineering disciplines in the book These proceedings are divided into two volumes It covers broad areas of information and decision sciences with papers exploring both the theoretical and practical aspects of data intensive computing data mining evolutionary computation knowledge management and networks sensor networks signal processing wireless networks protocols and architectures This volume is a valuable resource for postgraduate students in various engineering disciplines **Intelligence Science and Big Data Engineering. Visual Data Engineering** Zhen Cui,Jinshan Pan,Shanshan Zhang,Liang Xiao,Jian Yang,2019-11-28 The two volumes LNCS 11935 and 11936 constitute the proceedings of the 9th International Conference on Intelligence Science and Big Data Engineering IScIDE 2019 held in Nanjing China in October 2019 The 84 full papers presented were carefully reviewed and selected from 252 submissions The papers are organized in two parts visual data engineering and big data and machine learning They cover a large range of topics including information theoretic and Bayesian approaches probabilistic graphical models big data analysis neural networks and neuro informatics bioinformatics computational biology and brain computer interfaces as well as advances in fundamental pattern recognition techniques relevant to image processing computer vision and machine learning *ECAI 2020* Giuseppe De Giacomo,Bistra Dilkina,Michela Milano,Senén Barro,Alberto Bugarín,Jérôme Lang,2020-09-15 This book presents the proceedings of the 24th European Conference on Artificial Intelligence ECAI 2020 held in Santiago de Compostela Spain from 29 August to 8 September 2020 The conference was postponed from June and much of it conducted online due to the COVID 19 restrictions The conference is one of the principal occasions for researchers and practitioners of AI to meet and discuss the latest trends and challenges in all fields of

AI and to demonstrate innovative applications and uses of advanced AI technology The book also includes the proceedings of the 10th Conference on Prestigious Applications of Artificial Intelligence PAIS 2020 held at the same time A record number of more than 1 700 submissions was received for ECAI 2020 of which 1 443 were reviewed Of these 361 full papers and 36 highlight papers were accepted an acceptance rate of 25% for full papers and 45% for highlight papers The book is divided into three sections ECAI full papers ECAI highlight papers and PAIS papers The topics of these papers cover all aspects of AI including Agent based and Multi agent Systems Computational Intelligence Constraints and Satisfiability Games and Virtual Environments Heuristic Search Human Aspects in AI Information Retrieval and Filtering Knowledge Representation and Reasoning Machine Learning Multidisciplinary Topics and Applications Natural Language Processing Planning and Scheduling Robotics Safe Explainable and Trustworthy AI Semantic Technologies Uncertainty in AI and Vision The book will be of interest to all those whose work involves the use of AI technology

Advances in Visual Computing George Bebis, Richard Boyle, Bahram Parvin, Darko Koracin, Fatih Porikli, Sandra Skaff, Alireza Entezari, Jianyuan Min, Daisuke Iwai, Amela Sadagic, Carlos Scheidegger, Tobias Isenberg, 2016-12-09 The two volume set LNCS 10072 and LNCS 10073 constitutes the refereed proceedings of the 12th International Symposium on Visual Computing ISVC 2016 held in Las Vegas NV USA in December 2016 The 102 revised full papers and 34 poster papers presented in this book were carefully reviewed and selected from 220 submissions The papers are organized in topical sections Part I LNCS 10072 comprises computational bioimaging computer graphics motion and tracking segmentation pattern recognition visualization 3D mapping modeling and surface reconstruction advancing autonomy for aerial robotics medical imaging virtual reality computer vision as a service visual perception and robotic systems and biometrics Part II LNCS 9475 applications visual surveillance computer graphics and virtual reality

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

Intelligent Multidimensional Data and Image Processing De, Sourav, Bhattacharyya, Siddhartha, Dutta, Paramartha, 2018-06-08 As the most natural and convenient means of conveying or transmitting information images play a vital role in our daily lives Image processing is now of paramount importance in the computer vision research community and proper processing of two dimensional 2D real life images plays a key role in many real life applications as well as commercial developments *Intelligent Multidimensional Data and Image Processing* is a vital research publication that contains an in depth exploration of image processing techniques used in various applications including how to handle noise removal object segmentation object extraction and the determination of the nearest object classification and its associated confidence level Featuring coverage on a broad range of topics such as object detection machine vision and image conversion this book provides critical research for scientists computer engineers

professionals researchers and academicians seeking current research on solutions for new challenges in 2D and 3D image processing

MultiMedia Modeling Qi Tian,Nicu Sebe,Guo-Jun Qi,Benoit Huet,Richang Hong,Xueliang Liu,2015-12-31 The two volume set LNCS 9516 and 9517 constitutes the thoroughly refereed proceedings of the 22nd International Conference on Multimedia Modeling MMM 2016 held in Miami FL USA in January 2016 The 32 revised full papers and 52 poster papers were carefully reviewed and selected from 117 submissions In addition 20 papers were accepted for five special sessions out of 38 submissions as well as 7 demonstrations from 11 submissions and 9 video showcase papers The papers are organized in topical sections on video content analysis social media analysis object recognition and system multimedia retrieval and ranking multimedia representation machine learning in multimedia and interaction and mobile The special sessions are good practices in multimedia modeling semantics discovery from multimedia big data perception aesthetics and emotion in multimedia quality modeling multimodal learning and computing for human activity understanding and perspectives on multimedia analytics div

Machine Learning for Cyber Security Yuan Xu,Hongyang Yan,Huang Teng,Jun Cai,Jin Li,2023-01-12 The three volume proceedings set LNCS 13655 13656 and 13657 constitutes the refereed proceedings of the 4th International Conference on Machine Learning for Cyber Security ML4CS 2022 which taking place during December 2 4 2022 held in Guangzhou China The 100 full papers and 46 short papers were included in these proceedings were carefully reviewed and selected from 367 submissions

Information Fusion Jinxing Li,Bob Zhang,David Zhang,2022-05-04 In the big data era increasing information can be extracted from the same source object or scene For instance a person can be verified based on their fingerprint palm print or iris information and a given image can be represented by various types of features including its texture color shape etc These multiple types of data extracted from a single object are called multi view multi modal or multi feature data Many works have demonstrated that the utilization of all available information at multiple abstraction levels measurements features decisions helps to obtain more complex reliable and accurate information and to maximize performance in a range of applications This book provides an overview of information fusion technologies state of the art techniques and their applications It covers a variety of essential information fusion methods based on different techniques including sparse collaborative representation kernel strategy Bayesian models metric learning weight classifier methods and deep learning The typical applications of these proposed fusion approaches are also presented including image classification domain adaptation disease detection image restoration etc This book will benefit all researchers professionals and graduate students in the fields of computer vision pattern recognition biometrics applications etc Furthermore it offers a valuable resource for interdisciplinary research

Neuroscience-driven Visual Representation Teng Li,Fudong Nian, Caifeng Shan,Jianfei Liu ,Qieshi Zhang,2024-08-14 Visual representation learning enables computers or systems to simulate the function of retinas optic nerves and visual cortex in the human brain and derive meaningful information from digital images videos and other visual inputs To learn the effective presentation of visual

data is essential for many computer vision and artificial intelligence applications ranging from energy and utilities to manufacturing and automotive Current popular deep learning based visual representation learning methods do not fully consider the nature of the biological visual nervous system and are lack in interpretability To solve visual representation well the integration of psychological or neuroscientific approaches is required to enhance the cognition of visual data

Remote Sensing for Target Object Detection and Identification Gemine Vivone, Paolo Addesso, Amanda Ziemann, 2020-03-06 Target object detection and identification are among the primary uses for a remote sensing system This is crucial in several fields including environmental and urban monitoring hazard and disaster management and defense and military In recent years these analyses have used the tremendous amount of data acquired by sensors mounted on satellite airborne and unmanned aerial vehicle UAV platforms This book promotes papers exploiting different remote sensing data for target object detection and identification such as synthetic aperture radar SAR imaging and multispectral and hyperspectral imaging Several cutting edge contributions which provide examples of how to select of a technology or another depending on the specific application will be detailed

The Recent Advances in Transdisciplinary Data Science Henry Han, Erich Baker, 2023-01-28 This book constitutes the refereed proceedings of the First Southwest Data Science Conference on The Recent Advances in Transdisciplinary Data Science SDSC 2022 held in Waco TX USA during March 25 26 2022 The 14 full papers and 2 short papers included in this book were carefully reviewed and selected from 72 submissions They were organized in topical sections as follows Business and social data science Health and biological data science Applied data science artificial intelligence and data engineering

Understanding-Oriented Multimedia Content Analysis Zechao Li, 2017-05-26 This book offers a systematic introduction to an understanding oriented approach to multimedia content analysis It integrates the visual understanding and learning models into a unified framework within which the visual understanding guides the model learning while the learned models improve the visual understanding More specifically it discusses multimedia content representations and analysis including feature selection feature extraction image tagging user oriented tag recommendation and understanding oriented multimedia applications The book was nominated by the University of Chinese Academy of Sciences and China Computer Federation as an outstanding PhD thesis By providing the fundamental technologies and state of the art methods it is a valuable resource for graduate students and researchers working in the field computer vision and machine learning

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