

Yun Fu Editor

Low-Rank and Sparse Modeling for Visual Analysis

 Springer

Low Rank And Sparse Modeling For Visual Analysis

Marcelo Bertalmío



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

Handbook of Robust Low-Rank and Sparse Matrix Decomposition Thierry Bouwmans, Necdet Serhat Aybat, El-hadi Zahzah, 2016-09-20 Handbook of Robust Low Rank and Sparse Matrix Decomposition Applications in Image and Video Processing shows you how robust subspace learning and tracking by decomposition into low rank and sparse matrices provide a suitable framework for computer vision applications Incorporating both existing and new ideas the book conveniently gives you one stop access to a number of different decompositions algorithms implementations and benchmarking techniques Divided into five parts the book begins with an overall introduction to robust principal component analysis PCA via decomposition into low rank and sparse matrices The second part addresses robust matrix factorization completion problems while the third part focuses on robust online subspace estimation learning and tracking Covering applications in image and video processing the fourth part discusses image analysis image denoising motion saliency detection video coding key frame extraction and hyperspectral video processing The final part presents resources and applications in background foreground separation for video surveillance With contributions from leading teams around the world this handbook provides a complete overview of the concepts theories algorithms and applications related to robust low rank and sparse matrix decompositions It is designed for researchers developers and graduate students in computer vision image and video processing real time architecture machine

learning and data mining **Advances in Visual Computing** George Bebis, Richard Boyle, Bahram Parvin, Darko Koracin, Fowlkes Charless, Wang Sen, Choi Min-Hyung, Stephan Mantler, Jurgen Schulze, Daniel Acevedo, Klaus Mueller, Michael Papka, 2012-08-22 The two volume set LNCS 7431 and 7432 constitutes the refereed proceedings of the 8th International Symposium on Visual Computing ISVC 2012 held in Rethymnon Crete Greece in July 2012 The 68 revised full papers and 35 poster papers presented together with 45 special track papers were carefully reviewed and selected from more than 200 submissions The papers are organized in topical sections Part I LNCS 7431 comprises computational bioimaging computer graphics calibration and 3D vision object recognition illumination modeling and segmentation visualization 3D mapping modeling and surface reconstruction motion and tracking optimization for vision graphics and medical imaging HCI and recognition Part II LNCS 7432 comprises topics such as unconstrained biometrics advances and trends intelligent environments algorithms and applications applications virtual reality face processing and recognition

Magnetic Resonance Image Reconstruction Mehmet Akcakaya, Mariya Ivanova Doneva, Claudia Prieto, 2022-11-04 Magnetic Resonance Image Reconstruction Theory Methods and Applications presents the fundamental concepts of MR image reconstruction including its formulation as an inverse problem as well as the most common models and optimization methods for reconstructing MR images The book discusses approaches for specific applications such as non Cartesian imaging under sampled reconstruction motion correction dynamic imaging and quantitative MRI This unique resource is suitable for physicists engineers technologists and clinicians with an interest in medical image reconstruction and MRI Explains the underlying principles of MRI reconstruction along with the latest research Gives example codes for some of the methods presented Includes updates on the latest developments including compressed sensing tensor based reconstruction and machine learning based reconstruction **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 **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 Neural Information Processing Derong Liu, Shengli Xie, Yuanqing Li, Dongbin Zhao, El-Sayed M. El-Alfy, 2017-11-07 The six volume set LNCS 10634 LNCS 10635 LNCS 10636 LNCS 10637 LNCS 10638 and LNCS 10639 constitutes the proceedings of the 24rd International Conference on Neural Information Processing ICONIP 2017 held in Guangzhou China in November 2017 The 563 full papers presented were carefully reviewed and selected from 856 submissions The 6 volumes are organized in topical sections on Machine Learning Reinforcement Learning Big Data Analysis Deep Learning Brain Computer Interface Computational Finance Computer Vision Neurodynamics Sensory Perception and Decision Making Computational Intelligence Neural Data Analysis Biomedical Engineering Emotion and Bayesian Networks Data Mining Time Series Analysis Social Networks Bioinformatics Information Security and Social Cognition Robotics and Control Pattern Recognition Neuromorphic Hardware and Speech Processing

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 **Pattern Recognition** Shutao Li, Chenglin Liu, Yaonan Wang, 2014-11-05 The two volume set CCIS 483 and CCIS 484 constitutes the refereed proceedings of the 6th Chinese Conference on Pattern Recognition CCPR 2014 held in Changsha China in November 2014 The 112 revised full papers presented in two volumes were carefully reviewed and selected from 225 submissions The papers are organized in topical sections on fundamentals of pattern recognition feature extraction and classification computer vision image processing and analysis video processing and analysis biometric and action recognition biomedical image analysis document and speech analysis pattern recognition applications *Computer Vision -- ACCV 2014* Daniel Cremers, Ian Reid, Hideo Saito, Ming-Hsuan Yang, 2015-04-15 The five volume set LNCS 9003 9007 constitutes the thoroughly refereed post conference proceedings of the 12th Asian Conference on Computer Vision ACCV 2014 held in Singapore Singapore in November 2014 The total of 227 contributions presented in these volumes was carefully reviewed and selected from 814 submissions The papers are organized in topical sections on recognition 3D vision low level vision and features segmentation face and gesture

tracking stereo physics video and events and poster sessions 1 3 **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

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 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, Jiayi 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

Advanced Data Mining and Applications Guojun Gan,Bohan Li,Xue Li,Shuliang Wang,2018-12-28 This book constitutes the refereed proceedings of the 14th International Conference on Advanced Data Mining and Applications ADMA 2018 held in Nanjing China in November 2018 The 23 full and 22 short papers presented in this volume were carefully reviewed and selected from 104 submissions The papers were organized in topical sections named Data Mining Foundations Big Data Text and Multimedia Mining Miscellaneous Topics

Machine Learning Techniques on Gene Function Prediction Volume II Quan Zou,Arun Kumar Sangaiah,Dariusz Mrozek,2023-04-11

Computer Vision in Sports Thomas B. Moeslund,Graham Thomas,Adrian Hilton,2015-01-19 The first book of its kind devoted to this topic this comprehensive text reference presents state of the art research and reviews current challenges in the application of computer vision to problems in sports Opening with a detailed introduction to the use of computer vision across the entire life cycle of a sports event the text then progresses to examine cutting edge techniques for tracking the ball obtaining the whereabouts and pose of the players and identifying the sport being played from video footage The work concludes by investigating a selection of systems for the automatic analysis and classification of sports play The insights provided by this pioneering collection will be of great interest to researchers and practitioners involved in computer vision sports analysis and media production

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