Vivek Bannore

Iterative-Interpolation Super-Resolution Image Reconstruction

A Computationally Efficient Technique



Springer

Ajith Abraham, Aboul-Ella Hassanien, Patrick Siarry, Andries Engelbrecht

Iterative-Interpolation Super-Resolution Image Reconstruction Vivek Bannore, 2009-04-08 To my wife Mitu Vivek Bannore Preface Preface In many imaging systems under sampling and aliasing occurs frequently leading to degradation of image quality Due to the limited number of sensors available on the digital cameras the quality of images captured is also limited Factors such as optical or atmospheric blur and sensor noise can also contribute further to the d radation of image quality Super Resolution is an image reconstruction technique that enhances a sequence of low resolution images or video frames by increasing the spatial resolution of the images Each of these low resolution images contain only incomplete scene information and are geometrically warped aliased and der sampled Super resolution technique intelligently fuses the incomplete scene information from several consecutive low resolution frames to reconstruct a hi resolution representation of the original scene In the last decade with the advent of new technologies in both civil and mi tary domain more computer vision applications are being developed with a demand for high quality high resolution images In fact the demand for high resolution images is exponentially increasing and the camera manufacturing te nology is unable to cope up due to cost Computer Vision - ECCV 2022 Workshops Leonid Karlinsky, Tomer Michaeli, Ko efficiency and other practical reasons Nishino, 2023-02-14 The 8 volume set comprising the LNCS books 13801 until 13809 constitutes the refereed proceedings of 38 out of the 60 workshops held at the 17th European Conference on Computer Vision ECCV 2022 The conference took place in Tel Aviv Israel during October 23 27 2022 the workshops were held hybrid or online The 367 full papers included in this volume set were carefully reviewed and selected for inclusion in the ECCV 2022 workshop proceedings They were organized in individual parts as follows Part I W01 AI for Space W02 Vision for Art W03 Adversarial Robustness in the Real World W04 Autonomous Vehicle Vision Part II W05 Learning With Limited and Imperfect Data W06 Advances in Image Manipulation Part III W07 Medical Computer Vision W08 Computer Vision for Metaverse W09 Self Supervised Learning What Is Next Part IV W10 Self Supervised Learning for Next Generation Industry LevelAutonomous Driving W11 ISIC Skin Image Analysis W12 Cross Modal Human Robot Interaction W13 Text in Everything W14 BioImage Computing W15 Visual Object Oriented Learning Meets Interaction Discovery Representations and Applications W16 AI for Creative Video Editing and Understanding W17 Visual Inductive Priors for Data Efficient Deep Learning W18 Mobile Intelligent Photography and Imaging Part V W19 People Analysis From Face Body and Fashion to 3D Virtual Avatars W20 Safe Artificial Intelligence for Automated Driving W21 Real World Surveillance Applications and Challenges W22 Affective Behavior Analysis In the Wild Part VI W23 Visual Perception for Navigation in Human Environments The JackRabbot Human Body Pose Dataset and Benchmark W24 Distributed Smart Cameras W25 Causality in Vision W26 In Vehicle Sensing and Monitorization W27 Assistive Computer Vision and Robotics W28 Computational Aspectsof Deep Learning Part VII W29 Computer Vision for Civil

and Infrastructure Engineering W30 AI Enabled Medical Image Analysis Digital Pathology and Radiology COVID19 W31 Compositional and Multimodal Perception Part VIII W32 Uncertainty Quantification for Computer Vision W33 Recovering 6D Object Pose W34 Drawings and Abstract Imagery Representation and Analysis W35 Sign Language Understanding W36 A Challenge for Out of Distribution Generalization in Computer Vision W37 Vision With Biased or Scarce Data W38 Visual Object Tracking Challenge Foundations of Computational Intelligence Volume 3 Ajith Abraham, Aboul-Ella Hassanien, Patrick Siarry, Andries Engelbrecht, 2009-04-27 Global optimization is a branch of applied mathematics and numerical analysis that deals with the task of finding the absolutely best set of admissible conditions to satisfy certain criteria objective function s formulated in mathematical terms Global optimization includes nonlinear stochastic and combinatorial programming multiobjective programming control games geometry approximation algorithms for parallel architectures and so on Due to its wide usage and applications it has gained the attention of researchers and practitioners from a plethora of scientific domains Typical practical examples of global optimization applications include Traveling salesman problem and electrical circuit design minimize the path length safety engineering building and mechanical structures mathematical problems Kepler conjecture Protein structure prediction minimize the energy function etc Global Optimization algorithms may be categorized into several types Deterministic example branch and bound methods Stochastic optimization example simulated annealing Heuristics and meta heuristics example evolutionary algorithms etc Recently there has been a growing interest in combining global and local search strategies to solve more complicated optimization problems This edited volume comprises 17 chapters including several overview Chapters which provides an up to date and state of the art research covering the theory and algorithms of global optimization Besides research articles and expository papers on theory and algorithms of global optimization papers on numerical experiments and on real world applications were also encouraged The book is divided into 2 main parts Foundations of Computational Intelligence Ajith Abraham, Aboul-Ella Hassanien, André Ponce de Leon F. de Carvalho, 2009-04-21 Foundations of Computational Intelligence Volume 4 Bio Inspired Data Mining Theoretical Foundations and Applications Recent advances in the computing and electronics technology particularly in sensor devices databases and distributed systems are leading to an exponential growth in the amount of data stored in databases It has been estimated that this amount doubles every 20 years For some applications this increase is even steeper Databases storing DNA sequence for example are doubling their size every 10 months This growth is occurring in several applications areas besides bioinformatics like financial transactions government data environmental mo toring satellite and medical images security data and web As large organizations recognize the high value of data stored in their databases and the importance of their data collection to support decision making there is a clear demand for phisticated Data Mining tools Data mining tools play a key role in the extraction of useful knowledge from databases They can be used either to confirm a parti lar hypothesis or to automatically find patterns In the second case which is lated to this book the goal may

be either to describe the main patterns present in dataset what is known as descriptive Data Mining or to find patterns able to p dict behaviour of specific attributes or features known as predictive Data Mining While the first goal is associated with tasks like clustering summarization and association the second is found in classification and regression problems

Foundations of Computational Intelligence Volume 2 Aboul-Ella Hassanien, Ajith Abraham, Francisco Herrera, 2009-05-27 Foundations of Computational Intelligence Volume 2 Approximation Reasoning Theoretical Foundations and Applications Human reasoning usually is very approximate and involves various types of certainties Approximate reasoning is the computational modelling of any part of the process used by humans to reason about natural phenomena or to solve real world problems The scope of this book includes fuzzy sets Dempster Shafer theory multi valued logic probability random sets and rough set near set and hybrid intelligent systems Besides research articles and expository papers on t ory and algorithms of approximation reasoning papers on numerical experiments and real world applications were also encouraged This Volume comprises of 12 chapters including an overview chapter providing an up to date and state of the research on the applications of Computational Intelligence techniques for proximation reasoning The Volume is divided into 2 parts Part I Approximate Reasoning Theoretical Foundations Part II Approximate Reasoning Success Stories and Real World Applications Part I on Approximate Reasoning Theoretical Foundations contains four ch ters that describe several approaches of fuzzy and Para consistent annotated logic approximation reasoning In Chapter 1 Fuzzy Sets Near Sets and Rough Sets for Your Computational Intelligence Toolbox by Peters considers how a user might utilize fuzzy sets near sets and rough sets taken separately or taken together in hybridizations as part of a computational intelligence toolbox In multi criteria decision making it is necessary to aggregate combine utility values corresponding to several criteria parameters

Foundations of Computational Intelligence Volume 5 Ajith Abraham, Aboul-Ella Hassanien, Vaclav Snášel, 2009-07-11 Foundations of Computational Intelligence Volume 5 Function Approximation and Classification Approximation theory is that area of analysis which is concerned with the ability to approximate functions by simpler and more easily calculated functions. It is an area which like many other fields of analysis has its primary roots in the mat matics. The need for function approximation and classification arises in many branches of applied mathematics computer science and data mining in particular. This edited volume comprises of 14 chapters including several overview. Cheters which provides an up to date and state of the art research covering the theory and algorithms of function approximation and classification Besides research ar cless and expository papers on theory and algorithms of function approximation and classification papers on numerical experiments and real world applications were also encouraged. The Volume is divided into 2 parts Part I Function. Approximation and Classification Success Stories and Real World Applications Part I on Function Approximation and Classification Integral Some Issues on

Extensions of Information and Dynamic Information System and a Probabilistic Approach to the Evaluation and Combination of Preferences Chapter 1 Feature Selection for Partial Least Square Based Dimension Red tion by Li and Zeng investigate a systematic feature reduction framework by combing dimension reduction with feature selection To evaluate the proposed framework authors used four typical data sets Foundations of Computational Intelligence Aboul-Ella Hassanien, Ajith Abraham, Athanasios V. Vasilakos, Witold Pedrycz, 2009-05-02 Foundations of Computational Intelligence Volume 1 Learning and Approximation Theoretical Foundations and Applications Learning methods and approximation algorithms are fundamental tools that deal with computationally hard problems and problems in which the input is gradually disclosed over time Both kinds of problems have a large number of applications arising from a variety of fields such as algorithmic game theory approximation classes coloring and partitioning competitive analysis computational finance cuts and connectivity inapproximability results mechanism design network design packing and covering paradigms for design and analysis of approxition and online algorithms randomization techniques real world applications scheduling problems and so on The past years have witnessed a large number of interesting applications using various techniques of Computational Intelligence such as rough sets connectionist learning fuzzy logic evolutionary computing artificial immune systems swarm intelligence reinforcement learning intelligent multimedia processing etc In spite of numerous successful applications of C putational Intelligence in business and industry it is sometimes difficult to explain the performance of these techniques and algorithms from a theoretical perspective Therefore we encouraged authors to present original ideas dealing with the inc poration of different mechanisms of Computational Intelligent dealing with Lea ing and Approximation algorithms and underlying processes This edited volume comprises 15 chapters including an overview chapter which provides an up to date and state of the art research on the application of Computational Intelligence for learning and approximation Hybrid Self-Organizing Modeling Systems Godfrey C Onwubolu, 2009-06-15 The Group Method of Data Handling GMDH is a typical inductive modeling method that is built on principles of self organization for modeling complex systems This book clearly presents hybrids of some computational intelligence techniques and GMDH approach **Evolutionary Image Analysis and Signal Processing** Stefano Cagnoni, 2009-06-22 The publication of this book on evolutionary Image Analysis and Signal P cessing IASP has two main goals The rst occasional one is to celebrate the 10th edition of EvoIASP the workshop which has been the only event speci cally dedicated to this topic since 1999 The second more important one is to give an overview of the opportunities o ered by Evolutionary C putation EC techniques to computer vision pattern recognition and image and signal processing It is not possible to celebrate EvoIASP properly without rst ackno edging EvoNET the EU funded network of excellence which has made it possible for Europe to build a strong European research community on EC Thanks to the success of the rst pioneering event organized by EvoNET held in 1998 in Paris it was possible to realize that not only was EC a f tile ground for basic research but also there were several application elds to which EC techniques could o er a valuable

contribution That was how the idea of creating a single event Evo Workshops out of a collection of workshops dedicated to applications of EC was born Amongst the possible application elds for EC IASP was selected almost accidentally due to the occasional presence within EvoNET of less than a handful of researchers who were interested in it I would lie if I stated that the event was a great success since its very start but it was successful enough to survive healthily for a couple of years before reaching its present size relevance and popularity Visual Complexity and Intelligent Computer Graphics Techniques Enhancements Dimitri Plemenos, Georgios Miaoulis, 2009-05-06 In this book three main notions will be used in the editors search of improvements in various areas of computer graphics Artificial Intelligence Viewpoint Complexity and Human Intelligence Several Artificial Intelligence techniques are used in presented intelligent scene modelers mainly declarative ones Among them the mostly used techniques are Expert systems Constraint Satisfaction Problem resolution and Machine learning The notion of viewpoint complexity that is complexity of a scene seen from a given viewpoint will be used in improvement proposals for a lot of computer graphics problems like scene understanding virtual world exploration image based modeling and rendering ray tracing and radiosity Very often viewpoint complexity is used in conjunction with Artificial Intelligence techniques like Heuristic search and Problem resolution The notions of artificial Intelligence and Viewpoint Complexity may help to automatically resolve a big number of computer graphics problems However there are special situations where is required to find a particular solution for each situation In such a case human intelligence has to replace or to be combined with artificial intelligence Such cases and proposed solutions are also presented in this book Soft Computing Based Modeling in Intelligent Systems Valentina Emilia Balas, János Fodor, Annamária R. Várkonyi-Kóczy, 2009-03-23 The book Soft Computing Based Modeling in Intelligent Systems contains the tended works originally presented at the IEEE International Workshop SOFA 2005 and additional papers SOFA an acronym for SOFt computing and Applications is an international wo shop intended to advance the theory and applications of intelligent systems and soft computing Lotfi Zadeh the inventor of fuzzy logic has suggested the term Soft Computing He created the Berkelev Initiative of Soft Computing BISC to connect researchers working in these new areas of AI Professor Zadeh participated actively in our wo shop Soft Computing techniques are tolerant to imprecision uncertainty and partial truth Due to the large variety and complexity of the domain the constituting methods of Soft Computing are not competing for a comprehensive ultimate solution Instead they are complementing each other for dedicated solutions adapted to each specific pr lem Hundreds of concrete applications are already available in many domains Model based approaches offer a very challenging way to integrate a priori knowledge into procedures Due to their flexibility robustness and easy interpretability the soft c puting applications will continue to have an exceptional role in our technologies. The applications of Soft Computing techniques in emerging research areas show its mat ity and usefulness The IEEE International Workshop SOFA 2005 held Szeged Hungary and Arad Romania in 2005 has led to the publication of these two edited volumes This volume contains Soft

Computing methods and applications in modeling optimisation and prediction **Genetic Algorithms for Applied CAD** Problems Viktor M. Kureichik, Sergey P. Malioukov, Vladimir V. Kureichik, Alexander S. Malioukov, 2009-07-21 New perspective technologies of genetic search and evolution simulation represent the kernel of this book The authors wanted to show how these technologies are used for practical problems solution. This monograph is devoted to specialists of CAD intellectual information technologies in science biology economics sociology and others It may be used by post graduate students and students of specialties connected to the systems theory and system analysis methods information science optimization methods operations investigation and solution making **Biologically-Inspired Optimisation Methods** Andrew Lewis, Sanaz Mostaghim, Marcus Randall, 2009-05-25 This book covers the latest theories applications and techniques in Biologically Inspired Optimisation Methods Many chapters derive from studies presented at workshops and international conferences on e Science Grid Computing and Evolutionary computation Opportunities and Challenges for Next-Generation Applied Intelligence Been-Chian Chien, Tzung-Pei Hong, 2009-05-12 The term Artificial Intelligence has been used since 1956 and has become a very popular research field Generally it is the study of the computations that enable a system to perceive reason and act In the early days it was expected to achieve the same intelligent behavior as a human but found impossible at last Its goal was thus revised to design and use of intelligent methods to make systems more efficient at solving problems The term Applied Intelligence was thus created to represent its practicality It emphasizes applications of applied intelligent systems to solve real life problems in all areas including engineering science industry automation robotics business finance medicine bio medicine bio informatics cyberspace and man machine interactions To endow the intelligent behavior of a system many useful and interesting techniques have been developed Some of them are even borrowed from the na ral observation and biological phenomenon Neural networks and evolutionary computation are two examples of them Besides some other heuristic approaches like data mining adaptive control intelligent manufacturing autonomous agents bio informatics reasoning computer vision decision support systems expert s tems fuzzy logic robots intelligent interfaces internet technology planning and scheduling are also commonly used in applied intelligence Challenges and Opportunities of Connected K-Covered Wireless Sensor Networks Habib M. Ammari, 2009-08-10 Wireless sensor networks have received significant attention because of their important role and many conveniences in our lives Indeed the recent and fast advances in inexpensive sensor technology and wireless communications has made the design and development of large scale wireless sensor networks cost effective and appealing to a wide range of mission critical situations including civilian natural industrial and military applications such as health and environmental monitoring seism monitoring industrial process automation and battlefields surveillance respectively A wireless sensor network consists of a large number of tiny low powered devices called sensors which are randomly or deterministically deployed in a field of interest while collaborating and coordinating for the successful accomplishment of their mission These sensors suffer from very scarce resources and

capabilities such as bandwidth storage CPU battery power or energy sensing and communication to name a few with energy being the most critical one The major challenge in the design process of this type of network is mainly due to the limited capabilities of the sensors and particularly their energy which makes them unreliable This book aims to develop a reader s thorough understanding of the opportunities and challenges of k covered wireless sensor networks where each point in a deployment field is covered or sensed by at least k sensors Following Ren Descartes most elegant methodology of dividing each difficulty into as many parts as might be possible and necessary to best solve it Discours de la Method 1637 this book presents a variety of theoretical studies based on percolation theory and computational geometry as well as protocols that lead to the design of a unified framework where connected k coverage sensor scheduling and data routing and dissemination are jointly considered Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed **Computing** Roger Lee, Naohiro Ishii, 2009-04-30 The purpose of the 10th ACIS International Conference on Software Engineering Artificial Intelligence Networking and Parallel Distributed Computing SNPD rd 2009 held in Daegu Korea on May 27 29 2009 the 3 International Workshop st on e Activity IWEA 2009 and the 1 International Workshop on Enterprise Architecture Challenges and Responses WEACR 2009 is to aim at bringing together researchers and scientist businessmen and entrepreneurs teachers and students to discuss the numerous fields of computer science and to share ideas and information in a meaningful way Our conference officers selected the best 24 papers from those papers accepted for presentation at the conference in order to publish them in this volume The papers were chosen based on review scores submitted by members of the program committee and underwent further rounds of rigorous review In chapter 1 Igor Crk and Chris Gniady propose a network aware energy m agement mechanism that provides a low cost solution that can significantly reduce energy consumption in the entire system while maintaining responsiveness of local interactive workloads Their dynamic mechanisms reduce the decision delay before the disk is spun up reduce the number of erroneous spin ups in local wo stations decrease the network bandwidth and reduce the energy consumption of individual drives In chapter 2 Yoshihito Saito and Tokuro Matsuo describe a task allocation mechanism and its performance concerning with software developing They run simulations and discuss the results in terms of effective strategies of task allocation Constraint-Handling in Evolutionary Optimization Efrén Mezura-Montes, 2009-05-03 This book is the result of a special session on constraint handling techniques used in evolutionary algorithms within the Congress on Evolutionary Computation CEC in 2007 It presents recent research in constraint handling in evolutionary optimization **Computer and Information Science 2009** Roger Lee, Gongzu Hu, Huaikou Miao, 2009-04-28 This volume includes the best papers of the IEEE ACIS International Conference on Computer and Information Science ICIS 2009 held on June 2009 in Shanghai China Transfer in Reinforcement Learning Domains Matthew Taylor, 2009-06-05 In reinforcement learning RL problems learning agents sequentially execute actions with the goal of maximizing a reward signal The RL framework has gained popularity with the

development of algorithms capable of mastering increasingly complex problems but learning difficult tasks is often slow or infeasible when RL agents begin with no prior knowledge The key insight behind transfer learning is that generalization may occur not only within tasks but also across tasks While transfer has been studied in the psychological literature for many years the RL community has only recently begun to investigate the benefits of transferring knowledge This book provides an introduction to the RL transfer problem and discusses methods which demonstrate the promise of this exciting area of research The key contributions of this book are Definition of the transfer problem in RL domains Background on RL sufficient to allow a wide audience to understand discussed transfer concepts Taxonomy for transfer methods in RL Survey of existing approaches In depth presentation of selected transfer methods Discussion of key open questions By way of the research presented in this book the author has established himself as the pre eminent worldwide expert on transfer learning in sequential decision making tasks A particular strength of the research is its very thorough and methodical empirical evaluation which Matthew presents motivates and analyzes clearly in prose throughout the book Whether this is your initial introduction to the concept of transfer learning or whether you are a practitioner in the field looking for nuanced details I trust that you will find this book to be an enjoyable and enlightening read Peter Stone Associate Professor of Computer Science New Advances in Intelligent Decision Technologies Gloria Phillips-Wren, 2009-04-28 IDT Intelligent Decision Technologies seeks an interchange of research on intelligent systems and intelligent technologies which enhance or improve decision making in industry government and academia The focus is interdisciplinary in nature and includes research on all aspects of intelligent decision technologies from fundamental development to the applied system It constitutes a great honor and pleasure for us to publish the works and new research results of scholars from the First KES International Symposium on Intelligent Decision Technologies KES IDT 09 hosted and organized by University of Hyogo in conjunction with KES International Himeji Japan April 2009 The symposium was concerned with theory design development implementation testing and evaluation of intelligent decision systems Its topics included intelligent agents fuzzy logic multi agent systems artificial neural networks genetic algorithms expert systems intelligent decision making support systems information retrieval systems geographic information systems and knowledge management systems. These technologies have the potential to support decision making in many areas of management international business finance accounting marketing healthcare military applications production networks traffic management crisis response and human interfaces

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