Quixelresearch Super Resolution

Super Resolution of Images and Video Super-Resolution Imaging *Super-Resolution Imaging Image Super-Resolution and Applications* **Example-Based Super Resolution Super Resolution of Images and Video Motion-Free Super-Resolution Image Mosaicing and Super-resolution Iterative-Interpolation Super-Resolution Image Reconstruction** *Plasmonics and Super Resolution Imaging* **Super-Resolution Imaging Super-Resolution Microscopy Label-Free Super-Resolution Microscopy Image Super-Resolution and Applications** *Computational Intelligence Methods for Super-Resolution in Image Processing Applications* **Super-Resolution Imaging in Biomedicine Nonlinear Super-Resolution Nano-Optics and Applications** Recent Advances in Fluorescent Probes for Super-Resolution Microscopy **Plasmonics and Super-Resolution Imaging** *Digital Heritage Reconstruction Using Super-resolution and Inpainting* **Standard and Super-Resolution Bioimaging Data Analysis Super-Resolution Imaging in Biomedicine** Motion-Free Super-Resolution **Digital Heritage Reconstruction Using Super-resolution and Inpainting Super Resolution** Signal Processing and Performance Analysis for Imaging Systems Image Mosaicing and Super-resolution Advances in Pattern Recognition ICAPR2003 *Super-Resolution Microscopy Super-Resolution Microscopy Techniques in the Neurosciences* Deep Learning for Image Processing Applications *Single Magnetic Resonance Image Super-resolution Using Generative Adversarial Network Advances in Multimedia Information Processing - PCM 2009* **ECAI 2020 Computer Vision - ECCV 2002 Facial Texture Super-Resolution by Fitting 3D Face Models** Super-Resolution Techniques for Mixed-Resolution Multi-View Images *Artificial Intelligence Applications in Specialty Crops* **Communications, Signal Processing, and Systems** *High-Resolution Microwave Imaging*

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Advances in Multimedia Information Processing - PCM 2009 Jan 30 2020 This book constitutes the proceedings of the 10th Pacific Rim Conference on Multimedia, held in Bangkok, Thailand during December 15-18, 2009. The papers presented in the volume were carefully reviewed and selected from 171 submissions. The topics covered are exploring large-scale videos:automatic content genre classification, repair, enhancement and authentication, human behavior classification and recognition, image and video coding perceptual quality improvement, image annotation, retrieval, and classification, object detection and tracking, networking technologies, audio processing, 3DTV and mulit-view video, image watermarking, multimedia document search and retrieval, intelligent multimedia security and forensics, multimedia content management, image analysis and matching, coding, advanced image processing techniques, multimedia compressioin and optimization, multimedia security rights and management.
Iterative-Interpolation Super-Resolution Image Reconstruction Feb 22 2022 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 efficiency and other practical reasons.
Super-Resolution Imaging Dec 23 2021 Super-Resolution Imaging serves as an essential reference for both academicians and practicing engineers. It can be used both as a text for advanced courses in imaging and as a desk reference for those working in multimedia, electrical engineering, computer science, and mathematics. The first book to cover the new research area of super-resolution imaging, this text includes work on the following groundbreaking topics: Image zooming based on wavelets and generalized interpolation; Super-resolution from sub-pixel shifts; Use of blur as a cue; Use of warping in super-resolution; Resolution enhancement using multiple apertures; Super-resolution from motion data; Super-resolution from compressed video; Limits in super-resolution imaging. Written by the leading experts in the field, Super-Resolution Imaging presents a comprehensive analysis of current technology, along with new research findings and directions for future work.
Facial Texture Super-Resolution by Fitting 3D Face Models Oct 28 2019
Super Resolution of Images and Video May 28 2022 Authors Katsaggelos, Molina, and Mateos present in a systematic way the building blocks of the Bayesian framework, which is also used as a reference in reviewing and comparing Super Resolution (SR) approaches which have appeared in the literature. This work should serve as a reference to the graduate student who would like to work in this area, to the practicing engineer, and scientists applying some of the tools and results to other related problems.The authors present a case that there is a strong

relationship between the tools and techniques developed for SR and a number of other inverse problems encountered in signal processing (e.g., image restoration, and motion estimation). SR techniques can also be an integral part of an image and video codec and they can drive the development of new coder-decoders (codecs) and standards.
Plasmonics and Super Resolution Imaging Jan 24 2022 Plasmonics is an emerging field mainly developed within the past two decades. Due to its unique capabilities to manipulate light at deep subwavelength scales, plasmonics has been commonly treated as the most important part of nanophotonics. Plasmonic-assisted optical microscopy techniques, especially super-resolution microscopy, have shown tremendous potential and attracted much attention. This book aims to collect cutting-edge studies in various optical imaging technologies with advanced performances that are enabled or enhanced by plasmonics. The basic working principles, development details, and potential future direction and perspectives are discussed. Edited by Zhaowei Liu, a prominent researcher in the field of super-resolution microscopy, this book will be an excellent reference for anyone in the field of nanophotonics, plasmonics, and optical microscopy.
Super-Resolution Microscopy Techniques in the Neurosciences May 04 2020 Super-Resolution Microscopy Techniques in the Neurosciences serves as a comprehensive description of current super-resolution techniques, including the physical principles that allowed for their development, some of the most recent neurobiological applications and selected information for the practical use of these technologies. Written for the Neuromethods series, this detailed work contains contributions from experts in the field and provides key implementation advice to ensure successful results in the lab. Authoritative and cutting-edge, Super-Resolution Microscopy Techniques in the Neurosciences is an ideal guide for researchers aiming to continue increasing the

resolution in the imaging capabilities of neuroscientists and thereby changing the perspective in which cellular biology processes are understood at the nanometer scale.

Image Mosaicing and Super-resolution Mar 26 2022 This book investigates sets of images consisting of many overlapping viewsofa scene, and how the information contained within them may be combined to produce single images of superior quality. The generic name for such techniques is frame fusion. Using frame fusion, it is possible to extend the fieldof view beyond that ofany single image, to reduce noise, to restore high-frequency content, and even to increase spatial resolution and dynamic range. The aim in this book is to develop efficient, robust and automated frame fusion algorithms which may be applied to real image sequences. An essential step required to enable frame fusion is image registration: computing the point-to-point mapping between images in their overlapping region. This sub problem is considered in detail, and a robust and efficient solution is proposed and its accuracy evaluated. Two forms of frame fusion are then considered: image mosaic ing and super-resolution. Image mosaicing is the alignment of multiple images into a large composition which represents part of a 3D scene. Super-resolution is a more sophisticated technique which aims to restore poor-quality video sequences by mod elling and removing the degradations inherent in the imaging process, such as noise, blur and spatial-sampling. A key element in this book is the assumption of a completely uncalibrated cam era. No prior knowledge of the camera parameters, its motion, optics or photometric characteristics is assumed. The power of the methods is illustrated with many real image sequence examples.

Computer Vision - ECCV 2002 Nov 29 2019 Premiering in 1990 in Antibes, France, the European Conference on Computer Vision, ECCV, has been held biennially at venues all around Europe. These conferences have been very successful, making ECCV a major event to the computer vision community. ECCV 2002 was the seventh in the series. The privilege of organizing it was shared by three universities: The IT University of Copenhagen, the University of Copenhagen, and Lund University, with the conference venue in Copenhagen. These universities lie¨ geographically close in the vivid Oresund region, which lies partly in Denmark and partly in Sweden, with the newly built bridge (opened summer 2000) crossing the sound that formerly divided the countries. We are very happy to report that this year's conference attracted more papers than ever before, with around 600 submissions. Still, together with the conference board, we decided to keep the tradition of holding ECCV as a single track conference. Each paper was anonymously refereed by three different reviewers. For the ?nal selection, for the ?rst time for ECCV, a system with area chairs was used. These met with the program chairsinLundfortwodaysinFebruary2002toselect whatbecame45oralpresentations and 181 posters.Also at this meeting the selection was made without knowledge of the authors'identity.

Example-Based Super Resolution Jun 28 2022 Example-Based Super Resolution provides a thorough introduction and overview of example-based super resolution, covering the most successful algorithmic approaches and theories behind them with implementation insights. It also describes current challenges and explores future trends. Readers of this book will be able to understand the latest natural image patch statistical models and the performance limits of example-based super resolution algorithms, select the best state-of-the-art algorithmic alternative and tune it for specific use cases, and quickly put into practice implementations of the latest and most successful example-based super-resolution methods. Provides detailed coverage of techniques and implementation details that have been successfully introduced in diverse and demanding real-world applications Covers a wide variety of machine learning approaches, ranging from cross-scale self-similarity concepts and sparse coding, to the latest advances in deep learning Presents a statistical interpretation of the subspace of natural image patches that transcends super resolution and makes it a valuable source for any researcher on image processing or low-level vision

Super-Resolution Microscopy Nov 21 2021 This unique book on super-resolution microscopy techniques presents comparative, in-depth analyses of the strengths and weaknesses of the individual approaches. It was written for non-experts who need to understand the principles of super-resolution or who wish to use recently commercialized instruments as well as for professionals who plan to realize novel microscopic devices. Explaining the practical requirements in terms of hardware, software and sample preparation, the book offers a wealth of hands-on tips and practical tricks to get a setup running, provides invaluable help and support for successful data acquisition and specific advice in the context of data analysis and visualization. Furthermore, it addresses a wide array of transdisciplinary fields of applications. The author begins by outlining the joint efforts that have led to achieving super-resolution microscopy combining advances in single-molecule photo-physics, fluorophore design and fluorescent labeling, instrument design and software development. The following chapters depict and compare current main standard techniques such as structured illumination microscopy, single-molecule localization, stimulated emission depletion microscopy and multi-scale imaging including light-sheet and expansion microscopy. For each individual approach the experimental setups are introduced, the imaging protocols are provided and the various applications illustrated. The book concludes with a discussion of future challenges addressing issues of routine applications and further commercialization of the available methods. Guiding users in how to make choices for the design of their own experiments from scratch to promising application, this one-stop resource is intended for researchers in the applied sciences, from chemistry to biology and medicine to physics and engineering.

Image Mosaicing and Super-resolution Aug 07 2020 The Distinguished Dissertation Series is published on behalf of the Conference of Professors and Heads of Computing and the British Computer Society, who annually select the best British PhD dissertations in computer science for publication. The dissertations are

selected on behalf of the CPHC by a panel of eight academics. Each dissertation chosen makes a noteworthy contribution to the subject and reaches a high standard of exposition, placing all results clearly in the context of computer science as a whole. In this way computer scientists with significantly different interests are able to grasp the essentials - or even find a means of entry - to an unfamiliar research topic. This book investigates how information contained in multiple, overlapping images of a scene may be combined to produce images of superior quality. This offers possibilities such as noise reduction, extended field of view, blur removal, increased spatial resolution and improved dynamic range. Potential applications cover fields as diverse as forensic video restoration, remote sensing, video compression and digital video editing. The book covers two aspects that have attracted particular attention in recent years: image mosaicing, whereby multiple images are aligned to produce a large composite; and super-resolution, which permits restoration at an increased resolution of poor quality video sequences by modelling and removing imaging degradations including noise, blur and spacial-sampling. It contains a comprehensive coverage and analysis of existing techniques, and describes in detail novel, powerful and automatic algorithms (based on a robust, statistical framework) for applying mosaicing and super-resolution. The algorithms may be implemented directly from the descriptions given here. A particular feature of the techniques is that it is not necessary to know the camera parameters (such as position and focal length) in order to apply them. Throughout the book, examples are given on real image sequences, covering a variety of applications including: the separation of latent marks in forensic images; the automatic creation of 360 panoramic mosaics; and super-resolution restoration of various scenes, text, and faces in lw-quality video.

Digital Heritage Reconstruction Using Super-resolution and Inpainting Mar 14 2021 Heritage sites across the world have witnessed a number of natural calamities, sabotage and damage from visitors, resulting in their present ruined condition. Many sites are now restricted to reduce the risk of further damage. Yet these masterpieces are significant cultural icons and critical markers of past civilizations that future generations need to see. A digitally reconstructed heritage site could diminish further harm by using immersive navigation or walkthrough systems for virtual environments. An exciting key element for the viewer is observing fine details of the historic work and viewing monuments in their undamaged form. This book presents image super-resolution methods and techniques for automatically detecting and inpainting damaged regions in heritage monuments, in order to provide an enhanced visual experience. The book presents techniques to obtain higher resolution photographs of the digitally reconstructed monuments, and the resulting images can serve as input to immersive walkthrough systems. It begins with the discussion of two novel techniques for image super-resolution and an approach for inpainting a user-supplied region in the given image, followed by a technique to simultaneously perform super-resolution and

inpainting of given missing regions. It then introduces a method for automatically detecting and repairing the damage to dominant facial regions in statues, followed by a few approaches for automatic crack repair in images of heritage scenes. This book is a giant step toward ensuring that the iconic sites of our past are always available, and will never be truly lost.

Standard and Super-Resolution Bioimaging Data Analysis Feb 10 2021 A comprehensive guide to the art and science of bioimaging data acquisition, processing and analysis Standard and Super-Resolution Bioimaging Data Analysis gets newcomers to bioimage data analysis quickly up to speed on the mathematics, statistics, computing hardware and acquisition technologies required to correctly process and document data. The past quarter century has seen remarkable progress in the field of light microscopy for biomedical science, with new imaging technologies coming on the market at an almost annual basis. Most of the data generated by these systems is image-based, and there is a significant increase in the content and throughput of these imaging systems. This, in turn, has resulted in a shift in the literature on biomedical research from descriptive to highly-quantitative. Standard and Super-Resolution Bioimaging Data Analysis satisfies the demand among students and research scientists for introductory guides to the tools for parsing and processing image data. Extremely well illustrated and including numerous examples, it clearly and accessibly explains what image data is and how to process and document it, as well as the current resources and standards in the field. A comprehensive guide to the tools for parsing and processing image data and the resources and industry standards for the biological and biomedical sciences Takes a practical approach to image analysis to assist scientists in ensuring scientific data are robust and reliable Covers fundamental principles in such a way as to give beginners a sound scientific base upon which to build Ideally suited for advanced students having only limited knowledge of the mathematics, statistics and computing required for image data analysis An entry-level text written for students and practitioners in the bioscience community, Standard and Super-Resolution Bioimaging Data Analysis de-mythologises the vast array of image analysis modalities which have come online over the past decade while schooling beginners in bioimaging principles, mathematics, technologies and standards.

Label-Free Super-Resolution Microscopy Oct 21 2021 This book presents the advances in super-resolution microscopy in physics and biomedical optics for nanoscale imaging. In the last decade, super-resolved fluorescence imaging has opened new horizons in improving the resolution of optical microscopes far beyond the classical diffraction limit, leading to the Nobel Prize in Chemistry in 2014. This book represents the first comprehensive review of a different type of super-resolved microscopy, which does not rely on using fluorescent markers. Such label-free super-resolution microscopy enables potentially even broader applications in life sciences and nanoscale imaging, but is much more challenging and it is based on different physical concepts and

approaches. A unique feature of this book is that it combines insights into mechanisms of label-free super-resolution with a vast range of applications from fast imaging of living cells to inorganic nanostructures. This book can be used by researchers in biological and medical physics. Due to its logically organizational structure, it can be also used as a teaching tool in graduate and upper-division undergraduate-level courses devoted to super-resolved microscopy, nanoscale imaging, microscopy instrumentation, and biomedical imaging.
Advances in Pattern Recognition ICAPR2003 Jul 06 2020

Super-Resolution Imaging in Biomedicine Jan 12 2021 This book encompasses the full breadth of the super-resolution imaging field, representing modern techniques that exceed the traditional diffraction limit, thereby opening up new applications in biomedicine. It shows readers how to use the new tools to increase resolution in sub-nanometer-scale images of living cells and tissue, which leads to new information about molecules, pathways and dynamics. The book highlights the advantages and disadvantages of the techniques, and gives state-of-the-art examples of applications using microscopes currently available on the market. It covers key techniques such as stimulated emission depletion (STED), structured illumination microscopy (SSIM), photoactivated localization microscopy (PALM), and stochastic optical reconstruction microscopy (STORM). It will be a useful reference for biomedical researchers who want to work with super-resolution imaging, learn the proper technique for their application, and simultaneously obtain a solid footing in other techniques.
Deep Learning for Image Processing Applications Apr 02 2020 Deep learning and image processing are two areas of great interest to academics and industry professionals alike. The areas of application of these two disciplines range widely, encompassing fields such as medicine, robotics, and security and surveillance. The aim of this book, 'Deep Learning for Image Processing Applications', is to offer concepts from these two areas in the same platform, and the book brings together the shared ideas of professionals from academia and research about problems and solutions relating to the multifaceted aspects of the two disciplines. The first chapter provides an introduction to deep learning, and serves as the basis for much of what follows in the subsequent chapters, which cover subjects including: the application of deep neural networks for image classification; hand gesture recognition in robotics; deep learning techniques for image retrieval; disease detection using deep learning techniques; and the comparative analysis of deep data and big data. The book will be of interest to all those whose work involves the use of deep learning and image processing techniques.

Digital Heritage Reconstruction Using Super-resolution and Inpainting Nov 09 2020 Heritage sites across the world have witnessed a number of natural calamities, sabotage and damage from visitors, resulting in their present ruined condition. Many sites are now restricted to reduce the risk of further damage. Yet these masterpieces are significant cultural icons and critical markers of past civilizations that future generations need to

see. A digitally reconstructed heritage site could diminish further harm by using immersive navigation or walkthrough systems for virtual environments. An exciting key element for the viewer is observing fine details of the historic work and viewing monuments in their undamaged form. This book presents image super-resolution methods and techniques for automatically detecting and inpainting damaged regions in heritage monuments, in order to provide an enhanced visual experience. The book presents techniques to obtain higher resolution photographs of the digitally reconstructed monuments, and the resulting images can serve as input to immersive walkthrough systems. It begins with the discussion of two novel techniques for image super-resolution and an approach for inpainting a user-supplied region in the given image, followed by a technique to simultaneously perform super-resolution and inpainting of given missing regions. It then introduces a method for automatically detecting and repairing the damage to dominant facial regions in statues, followed by a few approaches for automatic crack repair in images of heritage scenes. This book is a giant step toward ensuring that the iconic sites of our past are always available, and will never be truly lost.
Super-Resolution Imaging Aug 31 2022 With the exponential increase in computing power and broad proliferation of digital cameras, super-resolution imaging is poised to become the next "killer app." The growing interest in this technology has manifested itself in an explosion of literature on the subject. Super-Resolution Imaging consolidates key recent research contributions from eminent scholars and practitioners in this area and serves as a starting point for exploration into the state of the art in the field. It describes the latest in both theoretical and practical aspects of direct relevance to academia and industry, providing a base of understanding for future progress. Features downloadable tools to supplement material found in the book Recent advances in camera sensor technology have led to an increasingly larger number of pixels being crammed into ever-smaller spaces. This has resulted in an overall decline in the visual quality of recorded content, necessitating improvement of images through the use of post-processing. Providing a snapshot of the cutting edge in super-resolution imaging, this book focuses on methods and techniques to improve images and video beyond the capabilities of the sensors that acquired them. It covers: History and future directions of super-resolution imaging Locally adaptive processing methods versus globally optimal methods Modern techniques for motion estimation How to integrate robustness Bayesian statistical approaches Learning-based methods Applications in remote sensing and medicine Practical implementations and commercial products based on super-resolution The book concludes by concentrating on multidisciplinary applications of super-resolution for a variety of fields. It covers a wide range of super-resolution imaging implementation techniques, including variational, feature-based, multi-channel, learning-based, locally adaptive, and nonparametric methods. This versatile book can be used as the basis for short courses for

engineers and scientists, or as part of graduate-level courses in image processing.

Super-Resolution Imaging Oct 01 2022 Super-Resolution Imaging serves as an essential reference for both academicians and practicing engineers. It can be used both as a text for advanced courses in imaging and as a desk reference for those working in multimedia, electrical engineering, computer science, and mathematics. The first book to cover the new research area of super-resolution imaging, this text includes work on the following groundbreaking topics: Image zooming based on wavelets and generalized interpolation; Super-resolution from sub-pixel shifts; Use of blur as a cue; Use of warping in super-resolution; Resolution enhancement using multiple apertures; Super-resolution from motion data; Super-resolution from compressed video; Limits in super-resolution imaging. Written by the leading experts in the field, Super-Resolution Imaging presents a comprehensive analysis of current technology, along with new research findings and directions for future work.

Super Resolution Oct 09 2020 Although imaging sensors are the dominant technologies for both user and industry applications, they still have several physical limitations, such as noise and limited spatial resolution. These limitations can be overcome, based on device electronics and physics technology. However, a promising solution is a signal processing approach that has been one of the most active research areas, and it is called Super Resolution (SR). This work proposes SR algorithm that uses an affine block-based with the Maximum Likelihood. A number of experiments were performed with the proposed system to obtain reconstructed High Resolution (HR) images of different resolutions from the same set of Low Resolution (LR) images. Also, a number of experiments were performed to evaluate its behavior as a function of the number of available LR images. The algorithm improves the accuracy of translational registration and accurately recovers HR image even in the case where just very a few input images are provided. This work should be especially useful to professionals in Image Processing, Signal Processing, and Electronics fields, or anyone else who may be considering utilizing Resolution Enhancement.

Signal Processing and Performance Analysis for Imaging Systems Sep 07 2020 This book presents today's most powerful signal processing techniques together with methods for assessing imaging system performance when each of these techniques is applied. This multi-use book helps you make the most of sensor hardware through software enhancement, and evaluate system and algorithm performance. You also learn how to make the best hardware/software decisions in developing the next-generation of image acquisition and analysis systems.

Image Super-Resolution and Applications Sep 19 2021 This book is devoted to the issue of image super-resolution-obtaining high-resolution images from single or multiple low-resolution images. Although there are numerous algorithms available for image interpolation and super-resolution, there's been a need for a book that establishes a common thread between the two processes. Filling this need, Image

Recent Advances in Fluorescent Probes for Super-Resolution Microscopy May 16 2021 **Plasmonics and Super-Resolution Imaging** Apr 14 2021 Plasmonics is an emerging field mainly developed within the past two decades. Due to its unique capabilities to manipulate light at deep subwavelength scales, plasmonics has been commonly treated as the most important part of nanophotonics. Plasmonic-assisted optical microscopy techniques, especially super-resolution microscopy, have shown tremendous potential and attracted much attention. This book aims to collect cutting-edge studies in various optical imaging technologies with advanced performances that are enabled or enhanced by plasmonics. The basic working principles, development details, and potential future direction and perspectives are discussed. Edited by Zhaowei Liu, a prominent researcher in the field of super-resolution microscopy, this book will be an excellent reference for anyone in the field of nanophotonics, plasmonics, and optical microscopy.

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Communications, Signal Processing, and Systems Jul 26 2019 This book brings together papers from the 2018 International Conference on Communications, Signal Processing, and Systems, which was held in Dalian, China on July 14–16, 2018. Presenting the latest developments and discussing the interactions

and links between these multidisciplinary fields, the book spans topics ranging from communications, signal processing and systems. It is aimed at undergraduate and graduate electrical engineering, computer science and mathematics students, researchers and engineers from academia and industry as well as government employees.

Motion-Free Super-Resolution Apr 26 2022 Motion-Free Super-Resolution is a compilation of very recent work on various methods of generating super-resolution (SR) images from a set of low-resolution images. The current literature on this topic deals primarily with the use of motion cues for the purpose of generating SR images. These cues have, it is shown, their advantages and disadvantages. In contrast, this book shows that cues other than motion can also be used for the same purpose, and addresses both the merits and demerits of these new techniques. Motion-Free Super-Resolution supersedes much of the lead author's previous edited volume, "Super-Resolution Imaging," and includes an up-to-date account of the latest research efforts in this fast-moving field. This sequel also features a style of presentation closer to that of a textbook, with an emphasis on teaching and explanation rather than scholarly presentation.

Super Resolution of Images and Video Nov 02 2022 This book focuses on the super resolution of images and video. The authors' use of the term super resolution (SR) is used to describe the process of obtaining a high resolution (HR) image, or a sequence of HR images, from a set of low resolution (LR) observations. This process has also been referred to in the literature as resolution enhancement (RE). SR has been applied primarily to spatial and temporal RE, but also to hyperspectral image enhancement. This book concentrates on motion based spatial RE, although the authors also describe motion free and hyperspectral image SR problems. Also examined is the very recent research area of SR for compression, which consists of the intentional downsampling, during pre-processing, of a video sequence to be compressed and the application of SR techniques, during post-processing, on the compressed sequence. It is clear that there is a strong interplay between the tools and techniques developed for SR and a number of other inverse problems encountered in signal processing (e.g., image restoration, motion estimation). SR techniques are being applied to a variety of fields, such as obtaining improved still images from video sequences (video printing), high definition television, high performance color Liquid Crystal Display (LCD) screens, improvement of the quality of color images taken by one CCD, video surveillance, remote sensing, and medical imaging. The authors believe that the SR/RE area has matured enough to develop a body of knowledge that can now start to provide useful and practical solutions to challenging real problems and that SR techniques can be an integral part of an image and video codec and can drive the development of new coder-decoders (codecs) and standards.

Image Super-Resolution and Applications Jul 30 2022 This book is devoted to the issue of image super-resolution—obtaining high-resolution images from single or multiple low-resolution

images. Although there are numerous algorithms available for image interpolation and super-resolution, there's been a need for a book that establishes a common thread between the two processes. Filling this need, Image Super-Resolution and Applications presents image interpolation as a building block in the super-resolution reconstruction process. Instead of approaching image interpolation as either a polynomial-based problem or an inverse problem, this book breaks the mold and compares and contrasts the two approaches. It presents two directions for image super-resolution: super-resolution with a priori information and blind super-resolution reconstruction of images. It also devotes chapters to the two complementary steps used to obtain high-resolution images: image registration and image fusion. Details techniques for color image interpolation and interpolation for pattern recognition Analyzes image interpolation as an inverse problem Presents image registration methodologies Considers image fusion and its application in image super resolution Includes simulation experiments along with the required MATLAB® code Supplying complete coverage of image-super resolution and its applications, the book illustrates applications for image interpolation and super-resolution in medical and satellite image processing. It uses MATLAB® programs to present various techniques, including polynomial image interpolation and adaptive polynomial image interpolation. MATLAB codes for most of the simulation experiments supplied in the book are included in the appendix.

Artificial Intelligence Applications in Specialty Crops Aug 26 2019

Motion-Free Super-Resolution Dec 11 2020 Motion-Free Super-Resolution is a compilation of very recent work on various methods of generating super-resolution (SR) images from a set of low-resolution images. The current literature on this topic deals primarily with the use of motion cues for the purpose of generating SR images. These cues have, it is shown, their advantages and disadvantages. In contrast, this book shows that cues other than motion can also be used for the same purpose, and addresses both the merits and demerits of these new techniques. Motion-Free Super-Resolution supersedes much of the lead author's previous edited volume, "Super-Resolution Imaging," and includes an up-to-date account of the latest research efforts in this fast-moving field. This sequel also features a style of presentation closer to that of a textbook, with an emphasis on teaching and explanation rather than scholarly presentation.

Computational Intelligence Methods for Super-Resolution in Image Processing Applications Aug 19 2021 This book explores the application of deep learning techniques within a particularly difficult computational type of computer vision (CV) problem − super-resolution (SR). The authors present and discuss ways to apply computational intelligence (CI) methods to SR. The volume also explores the possibility of using different kinds of CV techniques to develop and enhance

the tools/processes related to SR. The application areas covered include biomedical engineering, healthcare applications, medicine, histology, and material science. The book will be a valuable reference for anyone concerned with multiple multimodal images, especially professionals working in remote sensing, nanotechnology and immunology at research institutes, healthcare facilities, biotechnology institutions, agribusiness services, veterinary facilities, and universities.

Super-Resolution Imaging in Biomedicine Jul 18 2021 This book encompasses the full breadth of the super-resolution imaging field, representing modern techniques that exceed the traditional diffraction limit, thereby opening up new applications in biomedicine. It shows readers how to use the new tools to increase resolution in sub-nanometer-scale images of living cells and tissue, which leads to new information about molecules, pathways and dynamics. The book highlights the advantages and disadvantages of the techniques, and gives state-of-the-art examples of applications using microscopes currently available on the market. It covers key techniques such as stimulated emission depletion (STED), structured illumination microscopy (SSIM), photoactivated localization microscopy (PALM), and stochastic optical reconstruction microscopy (STORM). It will be a useful reference for biomedical researchers who want to work with super-resolution imaging, learn the proper technique for their application, and simultaneously obtain a solid footing in other techniques.

Super-Resolution Techniques for Mixed-Resolution Multi-View Images Sep 27 2019

Nonlinear Super-Resolution Nano-Optics and Applications Jun 16 2021 This book covers many advances in the subjects of nano-optics and nano photonics. The author describes the principle and technical schematics of common methods for breaking through the optical diffraction limit and focuses on realizing optical super-resolution with nonlinear effects of thin film materials. The applications of nonlinear optical super-resolution effects in nano-data storage, nanolithography, and nano-imaging are also presented. This book is useful to graduate students majoring in optics and nano science and also serves as a reference book for academic researchers, engineers, technical professionals in the fields of super-resolution optics and laser techniques, nano-optics and nano photonics, nano-data storage, nano imaging, micro/nanofabrication and nanolithography and nonlinear optics.

High-Resolution Microwave Imaging Jun 24 2019 This book comprehensively describes high-resolution microwave imaging and super-resolution information processing technologies and discusses new theories, methods and achievements in the high-resolution microwave imaging fields. Its chapters, which include abundant research results and examples, systematically summarize the authors' main research findings in recent years. The book is intended for researchers, engineers and postgraduates in the fields of electronics systems, signal information processing and data

analysis, microwave remote sensing and microwave imaging radar, as well as space technology, especially in the microwave remote sensing and airborne or space-borne microwave imaging radar fields.

ECAI 2020 Dec 31 2019 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.

Single Magnetic Resonance Image Super-resolution Using Generative Adversarial Network Mar 02 2020 Super-Resolution is the process of converting given low-resolution images into corresponding high-resolution ones. The resolution enhancement process applied to medical images can potentially improve diagnostic accuracy for a variety of conditions and reduce imaging scan time. Recent improvements in computational tools have made deep learning methods popular for various image processing techniques including resolution enhancement. In this thesis, we consider the image super-resolution problem of the brain and cardiac MRI datasets. To increase the spatial resolution of these medical images, we have adapted a Generative Adversarial Network (GAN) model where the generator has a DenseNet type structure and the discriminator is based on the U-Net model. We have used a combination of loss functions to ensure the generated images are consistent with ground truth. To train and validate the model, we have used four different datasets consisting of brain and cardiac MRI. Promising qualitative and quantitative results are provided.