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[Computational Intelligence Methods for Super-Resolution in Image Processing Applications](#) Sep 21 2021 This book explores the application of deep learning techniques within a particularly difficult computational type of computer vision (CV) problem \square 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.

[Deep Learning for Image Processing Applications](#) Sep 09 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.

[Super-Resolution-Algorithmen für eine leistungsfähige Videosignalverarbeitung](#) Dec 13 2020 [Iterative-Interpolation Super-Resolution Image Reconstruction](#) Oct 23 2021 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 degradation 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 under-sampled. Super-resolution technique intelligently fuses the incomplete scene information from several consecutive low-resolution frames to reconstruct a high-resolution representation of the original scene. In the last decade, with the advent of new technologies in both civil and military 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 technology is unable to cope up due to cost efficiency and other practical reasons.

[Super-Resolution Imaging](#) Jun 30 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.

Computer Vision - ECCV 2002 Dec 01 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 final selection, for the first time for ECCV, a system with area chairs was used. These met with the program chairs in Lund for two days in February 2002 to select what became 45 oral presentations and 181 posters. Also at this meeting the selection was made without knowledge of the authors' identity.

Super Resolution of Images and Video Nov 04 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.

Super-Resolution Imaging in Biomedicine Dec 25 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.

Recent Advances in Fluorescent Probes for Super-Resolution Microscopy Aug 21 2021

Super-Resolution Microscopy Apr 28 2022 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.

Super-Resolution Imaging in Biomedicine Jan 02 2020 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.

Label-Free Super-Resolution Microscopy May 30 2022 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.

Super-Resolution Imaging Aug 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.

Digital Heritage Reconstruction Using Super-resolution and Inpainting Nov 23 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.

Example-Based Super Resolution Mar 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

Computer Vision - ECCV 2020 Workshops Jul 28 2019 The 6-volume set, comprising the LNCS books 12535 until 12540, constitutes the refereed proceedings of 28 out of the 45 workshops held at the 16th European Conference on Computer Vision, ECCV 2020. The conference was planned to take place in Glasgow, UK, during August 23-28, 2020, but changed to a virtual format due to the COVID-19 pandemic. The 249 full papers, 18 short papers, and 21 further contributions included in the workshop proceedings were carefully reviewed and selected from a total of 467 submissions. The papers deal with diverse computer vision topics. Part III includes the Advances in Image Manipulation Workshop and Challenges.

Signal Processing and Performance Analysis for Imaging Systems Feb 12 2021 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.

Artificial Intelligence Applications in Specialty Crops Jun 06 2020

Image Mosaicing and Super-resolution Jan 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.

Biometric Recognition Aug 09 2020 This book constitutes the refereed proceedings of the 7th Chinese Conference on Biometric Recognition, CCBR 2012, held in Guangzhou, China, in December 2012. The 46 revised full papers were carefully reviewed and selected from 80 submissions. The papers address the problems in face, iris, hand biometrics, speaker, handwriting, gait, soft biometrics, security and other related topics, and contribute new ideas to research and development of reliable and practical solutions for biometric authentication.

Standard and Super-Resolution Bioimaging Data Analysis Jun 18 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.

High-Resolution Microwave Imaging Apr 16 2021 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.

Knowledge-Based Intelligent Information and Engineering Systems Feb 01 2020 This book is part of a three-volume set that constitutes the refereed proceedings of the 11th International Conference on Knowledge-Based Intelligent Information and Engineering Systems, KES 2007. Coverage in this first volume includes artificial neural networks and connectionists systems, fuzzy and neuro-fuzzy systems, evolutionary computation, machine learning and classical AI, agent systems, and information engineering and applications in ubiquitous computing environments.

Computer Analysis of Images and Patterns Apr 04 2020 The two volume set LNCS 6854/6855 constitutes the refereed proceedings of the International Conference on Computer Analysis of Images and Patterns, CAIP 2011, which took place in Seville, Spain, August 29-31, 2011. The 138 papers presented together with 2 invited talks were carefully reviewed and selected from 286 submissions. The papers are organized in topical section on: motion analysis, image and shape models, segmentation and grouping, shape recovery, kernel methods, medical imaging, structural pattern recognition, Biometrics, image and video processing,

calibration; and tracking and stereo vision.

Proceedings of ELM-2015 Volume 2 May 06 2020 This book contains some selected papers from the International Conference on Extreme Learning Machine 2015, which was held in Hangzhou, China, December 15-17, 2015. This conference brought together researchers and engineers to share and exchange R&D experience on both theoretical studies and practical applications of the Extreme Learning Machine (ELM) technique and brain learning. This book covers theories, algorithms and applications of ELM. It gives readers a glance of the most recent advances of ELM.

Advances in Multimedia Information Processing - PCM 2009 Jul 08 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 multi-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 compression and optimization, multimedia security rights and management.

Advances in Multimedia Modeling Oct 30 2019 The two-volume set LNCS 7732 and 7733 constitutes the thoroughly refereed proceedings of the 19th International Conference on Multimedia Modeling, MMM 2012, held in Huangshan, China, in January 2013. The 30 revised regular papers, 46 special session papers, 20 poster session papers, and 15 demo session papers, and 6 video browser showdown were carefully reviewed and selected from numerous submissions. The two volumes contain papers presented in the topical sections on multimedia annotation I and II, interactive and mobile multimedia, classification, recognition and tracking I and II, ranking in search, multimedia representation, multimedia systems, poster papers, special session papers, demo session papers, and video browser showdown.

Plasmonics and Super-Resolution Imaging Jul 20 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.

Super-Resolution Imaging Sep 02 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.

Motion-Free Super-Resolution Oct 03 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 May 18 2021 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.

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Image Super-Resolution and Applications Feb 24 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

Plasmonics and Super Resolution Imaging Jun 26 2019 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.

Machine Learning Algorithms for Signal and Image Processing Sep 29 2019 Enables readers to understand the fundamental concepts of machine and deep learning techniques with interactive, real-life applications within signal and image processing Machine Learning Algorithms for Signal and Image Processing aids the reader in designing and developing real-world applications using advances in machine learning to aid and enhance speech signal processing, image processing, computer vision, biomedical signal processing, adaptive filtering, and text processing. It includes signal processing techniques applied for pre-processing, feature extraction, source separation, or data decompositions to achieve machine learning tasks. Written by well-qualified authors and contributed to by a team of experts within the field, the work covers a wide range of important topics, such as: Speech recognition, image reconstruction, object classification and detection, and text processing Healthcare monitoring, biomedical systems, and green energy How various machine and deep learning techniques can improve accuracy, precision rate recall rate, and processing time Real applications and examples, including smart sign language recognition, fake news detection in social media, structural damage prediction, and epileptic seizure detection Professionals within the field of signal and image processing seeking to adapt their work further will find immense value in this easy-to-understand yet extremely comprehensive reference work. It is also a worthy resource for students and researchers in related fields who are looking to thoroughly understand the historical and recent developments that have been made in the field.

Communications, Signal Processing, and Systems Aug 28 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.

Advances in Pattern Recognition ICAPR2003 Jan 14 2021

ECAI 2020 Mar 04 2020 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.

Iterative-Interpolation Super-Resolution Image Reconstruction Oct 11 2020 To my wife, Mitu - Vivek Bannore 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 degradation 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 under-sampled. Super-resolution technique intelligently fuses the incomplete scene information from several consecutive low-resolution frames to reconstruct a high-resolution representation of the original scene. In the last decade, with the advent of new technologies in both civil and military 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 technology is unable to cope up due to cost efficiency and other practical reasons.

Image Super-Resolution and Applications Mar 16 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 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.