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CNN-based Single Image Super-resolution Network and Biomedical Image Applications Academic Press

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.

Computer Vision – ECCV 2020 Workshops Springer

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.

Advances in Computer Graphics Springer

The four-volume set LNCS 6492-6495 constitutes the thoroughly refereed post-proceedings of the 10th Asian Conference on Computer Vision, ACCV 2009, held in Queenstown, New Zealand in November 2010. All together the four volumes present 206 revised papers selected from a total of 739 Submissions. All current issues in computer vision are addressed ranging from algorithms that attempt to automatically understand the content of images, optical methods coupled with computational techniques that enhance and improve images, and capturing and analyzing the world's geometry while preparing the higher level image and shape understanding. Novel gemometry techniques, statistical learning methods, and modern algebraic procedures are dealt with as well.

Seven Ways to Improve Example-based Single Image Super Resolution Springer Science & Business Media

Single molecule tools have begun to revolutionize the molecular sciences, from biophysics to chemistry to cell biology. They hold the promise to be able to directly observe previously unseen molecular heterogeneities, quantitatively dissect complex reaction kinetics, ultimately miniaturize enzyme assays, image components of spatially distributed samples, probe the mechanical properties of single molecules in their native environment, and "just look at the thing" as anticipated by the visionary Richard Feynman already half a century ago. Single Molecule Tools, Part B: Super-Resolution, Particle Tracking, Multiparameter, and Force Based Methods captures a snapshot of this vibrant, rapidly expanding field, presenting articles from pioneers in the field intended to guide both the newcomer and the expert through the intricacies of getting single molecule tools. Includes time-tested core methods and new innovations applicable to any researcher employing single molecule tools Methods included are useful to both established researchers and newcomers to the field Relevant background and reference information given for procedures can be used as a guide to developing protocols in a number of disciplines

Motion-Free Super-Resolution John Wiley & Sons

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.

Single Frame Super-resolution Image System Springer Nature

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.

Computational Intelligence Methods for Super-Resolution in Image Processing Applications Springer

Pattern RecognitionSpringer

ECAI 2020 Springer Nature

This book constitutes the refereed proceedings of the 30th Symposium of the German Association for Pattern Recognition, DAGM 2008, held in Munich, Germany, in June 2008. The 53 revised full papers were carefully reviewed and selected from 136 submissions. The papers are organized in topical sections on learning and classification, tracking, medical image processing and segmentation, audio, speech and handwriting recognition, multiview geometry and 3D-reconstruction, motion and matching, and image analysis.

Image Mosaicing and Super-resolution Frontiers Media SA

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.

Recent Advances in Fluorescent Probes for Super-Resolution Microscopy IOS Press

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 in Biomedicine Pattern Recognition

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.

Smart and Sustainable Intelligent Systems Springer

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 of Sentinel-2 Images a Single Network for All-bands Upsampling CRC Press

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.

Iterative-Interpolation Super-Resolution Image Reconstruction Springer Nature

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.

Super-resolution Optical Microscopic Study of Single Vesicles in Astrocytes Springer Nature

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.

Label-Free Super-Resolution Microscopy John Wiley & Sons

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.

The 10th International Conference on Computer Engineering and Networks Springer Nature

The sixteen-volume set comprising the LNCS volumes 11205-11220 constitutes the refereed proceedings of the 15th European Conference on Computer Vision, ECCV 2018, held in Munich, Germany, in September 2018.The 776 revised papers presented were carefully reviewed and selected from 2439 submissions. The papers are organized in topical sections on learning for vision; computational photography; human analysis; human sensing; stereo and reconstruction; optimization; matching and recognition; video attention; and poster sessions.

2020 IEEE CVF Conference on Computer Vision and Pattern Recognition (CVPR) Springer Science & Business Media

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.

Super Resolution of Images and Video Springer

This book contains a collection of the papers accepted by the CENet2020 – the 10th International Conference on Computer Engineering and Networks held on October 16-18, 2020 in Xi’an, China. The topics focus but are not limited to Internet of Things and Smart Systems, Artificial Intelligence and Applications,

Communication System Detection, Analysis and Application, and Medical Engineering and Information Systems. Each part can be used as an excellent reference by industry practitioners, university faculties, research fellows and undergraduates as well as graduate students who need to build a knowledge base of the most current advances and state-of-practice in the topics covered by this conference proceedings. This will enable them to produce, maintain, and manage systems with high levels of trustworthiness and complexity.

John Wiley & Sons

Introduces the detailed basis and recent development of single molecule/particle nanocatalysis based on single molecule techniques This unique book introduces and summarizes the recent development of single molecule/particle nanocatalysis to provide both comprehensive coverage of fundamentals for different methods now in widespread use and the extensive applications in different catalytic systems. Chapters are mainly based on different detection methods, including single molecule fluorescence microscopy, surface plasmon resonance spectroscopy, X-ray microscopy, and surface enhanced Raman spectroscopy. The book also includes numerous basic principles of different methods and application examples and features illustrations that help clarify presentations. Single Particle Nanocatalysis: Fundamentals and Applications starts with the history and development of single molecule techniques for nanocatalysis. It then shows readers how single molecule fluorescence microscopy (SMFM) reveals catalytic kinetics and dynamics of individual nanocatalysts. Next, it examines traditional SMFM-based single molecule nanocatalysis without super-resolution (SR) imaging, before moving on to the topic of SMFM-based SR imaging in single molecule nanocatalysis. Following chapters cover scanning electrochemical microscopy for single particle nanocatalysis; surface plasmon resonance spectroscopy for single particle nanocatalysis/reactions; X-ray-based microscopy of single-particle nanocatalysis; and surface-enhanced Raman spectroscopy for single particle nanocatalysis. The book finishes by introducing some less-practiced techniques for single particle nanocatalysis/electrochemistry. -Presents a systematical and complete introduction to the subject of single particle nanocatalysis?covering all of its fundamentals and applications -Helps readers fully understand the basis, role, and recent development of single molecule nanocatalysis -Teaches researchers how to gain new knowledge to successfully conduct their own studies within this rapidly increasing new area of research Single Particle Nanocatalysis: Fundamentals and Applications is an excellent reference book for experts in this area as well as for general researchers who want to learn how to study nanocatalysis at single molecule/particle level.