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TWO-DIMENSIONAL PHASE UNWRAPPING

THEORY, ALGORITHMS, AND SOFTWARE

Wiley-Interscience A resource like no other-the first comprehensive guide to phase unwrapping Phase unwrapping is a mathematical problem-solving technique increasingly used in synthetic aperture radar (SAR) interferometry, optical interferometry, adaptive optics, and medical imaging. In Two-Dimensional Phase Unwrapping, two internationally recognized experts sort through the multitude of ideas and algorithms cluttering current research, explain clearly how to solve phase unwrapping problems, and provide practicable algorithms that can be applied to problems encountered in diverse disciplines. Complete with case studies and examples as well as hundreds of images and figures illustrating the concepts, this book features: * A thorough introduction to the theory of phase unwrapping * Eight algorithms that constitute the state of the art in phase unwrapping * Detailed description and analysis of each algorithm and its performance in a number of phase unwrapping problems * C language software that provides a complete implementation of each algorithm * Comparative analysis of the algorithms and techniques for evaluating results * A discussion of future trends in phase unwrapping research * Foreword by former NASA scientist Dr. John C. Curlander Two-Dimensional Phase Unwrapping skillfully integrates concepts, algorithms, software, and examples into a powerful benchmark against which new ideas and algorithms for phase unwrapping can be tested. This unique introduction to a dynamic, rapidly evolving field is essential for professionals and graduate students in SAR interferometry, optical interferometry, adaptive optics, and magnetic resonance imaging (MRI).

SINGLE CHANNEL PHASE-AWARE SIGNAL PROCESSING IN SPEECH COMMUNICATION

THEORY AND PRACTICE

John Wiley & Sons An overview on the challenging new topic of phase-aware signal processing Speech communication technology is a key factor in human-machine interaction, digital hearing aids, mobile telephony, and automatic speech/speaker recognition. With the proliferation of these applications, there is a growing requirement for advanced methodologies that can push the limits of the conventional solutions relying on processing the signal magnitude spectrum. Single-Channel Phase-Aware Signal Processing in Speech Communication provides a comprehensive guide to phase signal processing and reviews the history of phase importance in the literature, basic problems in phase processing, fundamentals of phase estimation together with several applications to demonstrate the usefulness of phase processing. Key features: Analysis of recent advances demonstrating the positive impact of phase-based processing in pushing the limits of conventional methods. Offers unique coverage of the historical context, fundamentals of phase processing and provides several examples in speech communication. Provides a detailed review of many references and discusses the existing signal processing techniques required to deal with phase information in different applications involved with speech. The book supplies various examples and MATLAB® implementations delivered within the PhaseLab toolbox. Single-Channel Phase-Aware Signal Processing in Speech Communication is a valuable single-source for students, non-expert DSP engineers, academics and graduate students.

PHASE ESTIMATION IN OPTICAL INTERFEROMETRY

CRC Press Phase Estimation in Optical Interferometry covers the essentials of phase-stepping algorithms used in interferometry and pseudointerferometric techniques. It presents the basic concepts and mathematics needed for understanding the phase estimation methods in use today. The first four chapters focus on phase retrieval from image transforms using a single frame. The next several chapters examine the local environment of a fringe pattern, give a broad picture of the phase estimation approach based on local polynomial phase modeling, cover temporal high-resolution phase evaluation methods, and present methods of phase unwrapping. The final chapter discusses experimental imperfections that are liable to adversely influence the accuracy of phase measurements. Responding to the push for the deployment of novel technologies and fast-evolving techniques, this book provides a framework for understanding various modern phase estimation methods. It also helps readers get a comparative view of the performance and limitations of the approaches.

FOURIER TRANSFORMS

APPROACH TO SCIENTIFIC PRINCIPLES

BoD – Books on Demand This book aims to provide information about Fourier transform to those needing to use infrared spectroscopy, by explaining the fundamental aspects of the Fourier transform, and techniques for analyzing infrared data obtained for a wide number of materials. It summarizes the theory, instrumentation, methodology, techniques and application of FTIR spectroscopy, and improves the performance and quality of FTIR spectrophotometers.

BLIND IMAGE DECONVOLUTION

THEORY AND APPLICATIONS

CRC Press Blind image deconvolution is constantly receiving increasing attention from the academic as well the industrial world due to both its theoretical and practical implications. The field of blind image deconvolution has several applications in different areas such as image restoration, microscopy, medical imaging, biological imaging, remote sensing, astronomy, nondestructive testing, geophysical prospecting, and many others. Blind Image Deconvolution: Theory and Applications surveys the current state of research and practice as presented by the most recognized experts in the field, thus filling a gap in the available literature on blind image deconvolution. Explore the gamut of blind image deconvolution approaches and algorithms that currently exist and follow the current research trends into the future. This comprehensive treatise discusses Bayesian techniques, single- and multi-channel methods, adaptive and multi-frame techniques, and a host of applications to multimedia processing, astronomy, remote sensing imagery, and medical and biological imaging at the whole-body, small-part, and cellular levels. Everything you need to step into this dynamic field is at your fingertips in this unique, self-contained masterwork. For image enhancement and restoration without a priori information, turn to Blind Image Deconvolution: Theory and Applications for the knowledge and techniques you need to tackle real-world problems.

LEARNING APPROACHES IN SIGNAL PROCESSING

CRC Press Coupled with machine learning, the use of signal processing techniques for big data analysis, Internet of things, smart cities, security, and bio-informatics applications has witnessed explosive growth. This has been made possible via fast algorithms on data, speech, image, and video processing with advanced GPU technology. This book presents an up-to-date tutorial and overview on learning technologies such as random forests, sparsity, and low-rank matrix estimation and cutting-edge visual/signal processing techniques, including face recognition, Kalman filtering, and multirate DSP. It discusses the applications that make use of deep learning, convolutional neural networks, random forests, etc. The applications include super-resolution imaging, fringe projection profilometry, human activities detection/capture, gesture recognition, spoken language processing, cooperative networks, bioinformatics, DNA, and healthcare.

ENERGY MINIMIZATION METHODS IN COMPUTER VISION AND PATTERN RECOGNITION

5TH INTERNATIONAL WORKSHOP, EMMCVPR 2005, ST. AUGUSTINE, FL, USA, NOVEMBER 9-11, 2005, PROCEEDINGS

Springer This book constitutes the refereed proceedings of the 5th International Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition, EMMCVPR 2005, held in St. Augustine, FL, USA in November 2005. The 24 revised full papers and 18 poster papers presented were carefully reviewed and selected from 120 submissions. The papers are organized in topical sections on probabilistic and informational approaches, combinatorial approaches, variational approaches, and other approaches and applications.

INTELLIGENT COMPUTING SYSTEMS

4TH INTERNATIONAL SYMPOSIUM, ISICS 2022, SANTIAGO, CHILE, MARCH 23–25, 2022, PROCEEDINGS

Springer Nature This book constitutes the proceedings of the 4th International Symposium on Intelligent Computing Systems, ISICS 2022, held in Santiago, Chile, in March 2022. Due to the COVID-19 pandemic the conference was held online. The 9 full papers along with 2 short papers presented in this volume were carefully reviewed and selected from 30 submissions. They deal with the field of intelligent computing systems focusing on artificial intelligence, computer vision and image processing.

RIVER FLOW 2006, TWO VOLUME SET

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON FLUVIAL HYDRAULICS, LISBON, PORTUGAL, 6-8 SEPTEMBER 2006

CRC Press Rivers are complex entities. In addition to being valuable wildlife habitats, they support human activities by providing water for human usage, renewable energy and convenient transportation. Rivers may also pose threats to riverine communities, in the form of floods and other natural or man-induced hazards. Contemporary societies recognize their responsibility in ensuring the sustainable use of rivers and in preserving river's intrinsic ecological and landscape values. This obligation is often in conflict with riverine economical exploitation and with risk management concerns. As a discipline, Fluvial Hydraulics makes a significant contribution to the development of strategies for sustainable river use by providing new modelling tools and engineering techniques based on advances in phenomenological understanding and in computational modelling. River Flow 2006 comprises the Proceedings of the third edition of the International Conference on Fluvial Hydraulics, organized under the auspices of the Fluvial Hydraulics Section of the International Association of Hydraulic Engineering and Research (IAHR). The book covers issues such as river hydrodynamics, morphodynamics and sediment transport. Other contributions describe interdisciplinary approaches and experiences, particularly regarding interfacial activities involving environmental sciences and information technologies. River Flow 2006 contains the most recent theoretical accomplishments, numerical developments, experimental investigations and field studies in Fluvial Hydraulics. It is an excellent resource for researchers, civil and environmental engineers, and practitioners in river-related disciplines.

ADVANCED OPTICAL INSTRUMENTS AND TECHNIQUES

CRC Press Advanced Optical Instruments and Techniques includes twenty-three chapters providing processes, methods, and procedures of cutting-edge optics engineering design and instrumentation. Topics include biomedical instrumentation and basic and advanced interferometry. Optical metrology is discussed, including point and full-field methods. Active and adaptive optics, holography, radiometry, the human eye, and visible light are covered as well as materials, including photonics, nanophotonics, anisotropic materials, and metamaterials.

COMPUTATIONAL OPTICAL PHASE IMAGING

Springer Nature

IMAGE ANALYSIS

16TH SCANDINAVIAN CONFERENCE, SCIA 2009, OSLO, NORWAY, JUNE 15-18, PROCEEDINGS

Springer Science & Business Media This volume contains the papers presented at the Scandinavian Conference on Image Analysis, SCIA 2009, which was held at the Radisson SAS Scandinavian Hotel, Oslo, Norway, June 15–18. SCIA 2009 was the 16th in the biennial series of conferences, which has been organized in turn by the Scandinavian countries

Sweden, Finland, D- mark and Norway since 1980. The event itself has always attracted participants and author contributions from outside the Scandinavian countries, making it an international conference. Theconferenceincludedafulldayoftutorialsand?vekeynotetalksprovided by world-renowned experts. The program covered high-quality scienti?c cont-butions within image analysis, human and action analysis, pattern and object recognition,colorimagingandquality,medicalandbiomedicalapplications,face andheadanalysis,computer vision,andmultispectralcoloranalysis. The papers werecarefully selected based on at least two reviews. Among 154 submissions 79 wereaccepted,leadingtoanacceptancerateof51%. SinceSCIAwasarrangedas a single-track event, 30 papers were presented in the oral sessions and 49 papers were presented in the poster sessions. A separate session on multispectral color science was organized in cooperation with the 11th Symposium of Multispectral Color Science (MCS 2009). Since 2009 was proclaimed the "International Year of Astronomy" by the United Nations General Assembly, the conference also contained a session on the topic "Imageand PatternAnalysis in Astronomyand Astrophysics. " SCIA has a reputation of having a friendly environment, in addition to hi- quality scienti?c contributions. We focused on maintaining this reputation, by designing a technical and social program that we hope the participants found interesting and inspiring for new research ideas and network extensions. We thank the authors for submitting their valuable work to SCIA.

COMPUTER VISION IN MEDICAL IMAGING

World Scientific The major progress in computer vision allows us to make extensive use of medical imaging data to provide us better diagnosis, treatment and predication of diseases. Computer vision can exploit texture, shape, contour and prior knowledge along with contextual information from image sequence and provide 3D and 4D information that helps with better human understanding. Many powerful tools have been available through image segmentation, machine learning, pattern classification, tracking, reconstruction to bring much needed quantitative information not easily available by trained human specialists. The aim of the book is for both medical imaging professionals to acquire and interpret the data, and computer vision professionals to provide enhanced medical information by using computer vision techniques. The final objective is to benefit the patients without adding to the already high medical costs. Contents:An Introduction to Computer Vision in Medical Imaging (Chi Hau Chen)Theory and Methodologies:Distribution Matching Approaches to Medical Image Segmentation (Ismail Ben Ayed)Digital Pathology in Medical Imaging (Bikash Sabata, Chukka Srinivas, Pascal Bamford and Gerardo Fernandez)Adaptive Shape Prior Modeling via Online Dictionary Learning (Shaoting Zhang, Yiqiang Zhan, Yan Zhou and Dimitris Metaxas)Feature-Centric Lesion Detection and Retrieval in Thoracic Images (Yang Song, Weidong Cai, Stefan Eberl, Michael J Fulham and David Dagan Feng)A Novel Paradigm for Quantitation from MR Phase (Joseph Dagher)A Multi-Resolution Active Contour Framework for Ultrasound Image Segmentation (Weiming Wang, Jing Qin, Pheng-Ann Heng, Yim-Pan Chui, Liang Li and Bing Nan Li)2D, 3D Reconstructions/Imaging Algorithms, Systems & Sensor Fusion:Model-Based Image Reconstruction in Optoacoustic Tomography (Amir Rosenthal, Daniel Razansky and Vasilis Ntziachristos)The Fusion of Three-Dimensional Quantitative Coronary Angiography and Intracoronary Imaging for Coronary Interventions (Shengxian Tu, Niels R Holm, Johannes P Janssen and Johan H C Reiber)Three-Dimensional Reconstruction Methods in Near-Field Coded Aperture for SPECT Imaging System (Stephen Baoming Hong)Ultrasound Volume Reconstruction based on Direct Frame Interpolation (Sergei Koptenko, Rachel Remlinger, Martin Lachaine, Tony Falco and Ulrich Scheipers)Deconvolution Technique for Enhancing and Classifying the Retinal Images (Uvais A Qidwai and Umair A Qidwai)Medical Ultrasound Digital Signal Processing in the GPU Computing Era (Marcin Lewandowski)Developing Medical Image Processing Algorithms for GPU Assisted Parallel Computation (Mathias Broxvall and Marios Daotis)Specific Image Processing and Computer Vision Methods for Different Imaging Modalities Including IVUS, MRI, etc.:Computer Vision in Interventional Cardiology (Kendall R Waters)Pattern Classification of Brain Diffusion MRI: Application to Schizophrenia Diagnosis (Ali Tabesh, Matthew J Hoptman, Debra D'Angelo and Babak A Ardekani)On Compressed Sensing Reconstruction for Magnetic Resonance Imaging (Benjamin Paul Berman, Sagar Mandava and Ali Bilgin)On Hierarchical Statistical Shape Models with Application to Brain MRI (Juan J Cerrolaza, Arantxa Villanueva and Rafael Cabeza)Advanced PDE-based Methods for Automatic Quantification of Cardiac Function and Scar from Magnetic Resonance Imaging (Durco Turco and Cristiana Corsi)Automated IVUS Segmentation Using Deformable Template Model with Feature Tracking (Prakash Manandhar and Chi Hau Chen) Readership: Researchers, professionals and academics in machine perception/computer vision, pattern recognition/image analysis, nuclear medicine, bioengineering & cardiology. Keywords:Medical Imaging;Computer Vision;Image Segmentation;Machine Learning;3D InformationKey Features:Uses computer vision techniques for medical imaging dataCovers image processing and segmentation algorithms in intravascular ultrasound, PETscan data, MRI dataEmphaisises 3D information extraction from medical imaging data

ENVIRONMENTAL INFORMATION SYSTEMS: CONCEPTS, METHODOLOGIES, TOOLS, AND APPLICATIONS

CONCEPTS, METHODOLOGIES, TOOLS, AND APPLICATIONS

IGI Global Environmental information and systems play a major role in environmental decision making. As such, it is vital to understand the impact that they have on different aspects of sustainable environmental management, as well as to understand the opportunism they might present for further improvement. Environmental Information Systems:

Concepts, Methodologies, Tools, and Applications is an innovative reference source containing the latest research on the use of information systems to track and organize environmental data for use in an overall environmental management system. Highlighting a range of topics such as environmental analysis, remote sensing, and geographic information science, this multi-volume book is designed for engineers, data scientists, practitioners, academicians, and researchers interested in all aspects of environmental information systems.

COHERENT LIGHT MICROSCOPY

IMAGING AND QUANTITATIVE PHASE ANALYSIS

Springer Science & Business Media This book deals with the latest achievements in the field of optical coherent microscopy. While many other books exist on microscopy and imaging, this book provides a unique resource dedicated solely to this subject. Similarly, many books describe applications of holography, interferometry and speckle to metrology but do not focus on their use for microscopy. The coherent light microscopy reference provided here does not focus on the experimental mechanics of such techniques but instead is meant to provide a users manual to illustrate the strengths and capabilities of developing techniques. The areas of application of this technique are in biomedicine, medicine, life sciences, nanotechnology and materials sciences.

ADVANCES IN GEOSPATIAL DATA SCIENCE

SELECTED PAPERS FROM THE INTERNATIONAL CONFERENCE ON GEOSPATIAL INFORMATION SCIENCES 2021

Springer Nature

ENERGY MINIMIZATION METHODS IN COMPUTER VISION AND PATTERN RECOGNITION

THIRD INTERNATIONAL WORKSHOP, EMMCVPR 2001, SOPHIA ANTIPOLIS FRANCE, SEPTEMBER 3-5, 2001. PROCEEDINGS

Springer This volume consists of the 42 papers presented at the International Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition (EMMCVPR2001),whichwasheldatINRIA(InstitutNationaldeRechercheen Informatique et en Automatique) in Sophia Antipolis, France, from September 3 through September 5, 2001. This workshop is the third of a series, which was started with EMMCVPR'97, held in Venice in May 1997, and continued with EMMCVR'99, which took place in York, in July 1999. Minimization problems and optimization methods permeate computer vision (CV), pattern recognition (PR), and many other ?elds of machine intelligence. The aim of the EMMCVPR workshops is to bring together people with research interests in this interdisciplinary topic. Although the subject is traditionally well represented at major international conferences on CV and PR, the EMMCVPR workshops provide a forum where researchers can report their recent work and engage in more informal discussions. We received 70 submissions from 23 countries, which were reviewed by the members of the program committee. Based on the reviews, 24 papers were - cepted for oral presentation and 18 for poster presentation. In this volume, no distinction is made between papers that were presented orally or as posters. The book is organized into ?ve sections, whose topics coincide with the ?ve s-sionsoftheworkshop:"ProbabilisticModelsandEstimation","ImageModelling and Synthesis", "Clustering, Grouping, and Segmentation", "Optimization and Graphs", and "Shapes, Curves, Surfaces, and Templates".

EMERGING COMMUNICATION TECHNOLOGIES FOR E-HEALTH AND MEDICINE

IGI Global According to the World Health Organisation (WHO), e-health is the combined use of electronic communication and information technology in the health sector and, moreover, it enables a safer, higher quality, more equitable, and sustainable health system. Emerging Communication Technologies for E-Health and Medicine is a fundamental source for the advancement of knowledge, application, and practice in the interdisciplinary areas of healthcare, e-health, m-health, u-health, sensors, biomedical engineering, and telemedicine. Due to its grounding in research and theory evidence, this book is designed for use in graduate courses in health management, medicine, nursing, health professionals, and medical informatics. The book can help to e-health contents, applications, and interesting experiences. It is an important way to communicate e-health concepts.

POLAR REMOTE SENSING

VOLUME II: ICE SHEETS

Springer Science & Business Media Polar Remote Sensing is a two-volume work providing a comprehensive, multidisciplinary discussion of the applications of satellite sensing. Volume 2 focuses on the ice sheets, icebergs, and interactions between ice sheets and the atmosphere and ocean. It contains information about the applications of satellite remote sensing in all relevant polar related disciplines, including glaciology, meteorology, climate and radiation balance and oceanogaraphy. It also provides a brief review of the state-of-the-art of each discipline, including current issues and questions. Various passive and active remote sensor types are discussed, and the book then concentrates on specific geophysical applications. Its interdisciplinary approach means that major advances and publications are highlighted. Polar Remote Sensing: Ice Sheets summarizes fundamental principles of detectors, imaging and geophysical product retrieval includes a chapter on the important new field of satellite synthetic-aperture radar interferometry is a "one stop shop" for polar remote sensing information contains significant new information on the Earth's polar regions describes sophisticated groundbased remote sensing applications with specific reference to their use in polar regions.

ULTRASONIC AND ADVANCED METHODS FOR NONDESTRUCTIVE TESTING AND MATERIAL CHARACTERIZATION

INFORMATION PROCESSING IN MEDICAL IMAGING

23RD INTERNATIONAL CONFERENCE, IPMI 2013, ASILOMAR, CA, USA, JUNE 28--JULY 3, 2013, PROCEEDINGS

Springer This book constitutes the proceedings of the 23rd International Conference on Information Processing in Medical Imaging, IPMI 2013, held in Asilomar in June/July 2013. The 26 full papers and 38 poster papers presented in this volume were carefully reviewed and selected from 199 submissions. The papers are organized in topical sections on connectivity, groupwise registration, neuro segmentation, statistical analysis, dynamic imaging, cortical surface registration, diffusion MRI, functional imaging, torso image analysis, and tract analysis.

INTRODUCTION TO MODERN DIGITAL HOLOGRAPHY

WITH MATLAB

Cambridge University Press Get up to speed with digital holography with this concise and straightforward introduction to modern techniques and conventions. Building up from the basic principles of optics, this book describes key techniques in digital holography, such as phase-shifting holography, low-coherence holography, diffraction tomographic holography and optical scanning holography, discussing their practical applications, and accompanied by all the theory necessary to understand the underlying principles at work. A further chapter covers advanced techniques for producing computer-generated holograms. Extensive Matlab code is integrated with the text throughout and available for download online, illustrating both theoretical results and practical considerations such as aliasing, zero padding and sampling. Accompanied by end-of-chapter problems and an online solutions manual for instructors, this is an indispensable resource for students, researchers and engineers in the fields of optical image processing and digital holography.

DIGITAL OPTICAL MEASUREMENT TECHNIQUES AND APPLICATIONS

Artech House This new resource explains the principles and applications of today's digital optical measurement techniques. From start to finish, each chapter provides a concise introduction to the concepts and principles of digital optical metrology, followed by a detailed presentation of their applications. The development of all these topics, including their numerous methods, principles, and applications, has been illustrated using a large number of easy-to-understand figures. This book aims to not only help the reader identify the appropriate techniques in function of the measurement requirements, but also assess modern digital measurement systems.

MAGNETIC RESONANCE ELASTOGRAPHY

PHYSICAL BACKGROUND AND MEDICAL APPLICATIONS

John Wiley & Sons Magnetic resonance elastography (MRE) is a medical imaging technique that combines magnetic resonance imaging (MRI) with mechanical vibrations to generate maps of viscoelastic properties of biological tissue. It serves as a non-invasive tool to detect and quantify mechanical changes in tissue structure, which can be symptoms or causes of various diseases. Clinical and research applications of MRE include staging of liver fibrosis, assessment of tumor stiffness and investigation of neurodegenerative diseases. The first part of this book is dedicated to the physical and technological principles underlying MRE, with an introduction to MRI physics, viscoelasticity theory and classical waves, as well as vibration generation, image acquisition and viscoelastic parameter reconstruction. The second part of the book focuses on clinical applications of MRE to various organs. Each section starts with a discussion of the specific properties of the organ, followed by an extensive overview of clinical and preclinical studies that have been performed, tabulating reference values from published literature. The book is completed by a chapter discussing technical aspects of elastography methods based on ultrasound.

SYNTHETIC APERTURE RADAR PROCESSING

CRC Press Synthetic Aperture Radar Processing simply and methodically presents principles and techniques of Synthetic Aperture Radar (SAR) image generation by analyzing its system transfer function. The text considers the full array of operation modes from strip to scan, emphasizes processing techniques, enabling the design of operational SAR codes. A simple example then follows. This book will be invaluable to all SAR scientists and engineers working in the field. It may be used as the basis for a course on SAR image generation or as a reference book on remote sensing. It contains a wide spectrum of information presented with clarity and rigor.

NEURAL INFORMATION PROCESSING

27TH INTERNATIONAL CONFERENCE, ICONIP 2020, BANGKOK, THAILAND, NOVEMBER 18–22, 2020, PROCEEDINGS, PART IV

Springer Nature The two-volume set CCIS 1332 and 1333 constitutes thoroughly refereed contributions presented at the 27th International Conference on Neural Information Processing, ICONIP 2020, held in Bangkok, Thailand, in November 2020.* For ICONIP 2020 a total of 378 papers was carefully reviewed and selected for publication out of 618 submissions. The 191 papers included in this volume set were organized in topical sections as follows: data mining; healthcare analytics-improving healthcare outcomes using big data analytics; human activity recognition; image processing and computer vision; natural language processing; recommender systems; the 13th international workshop on artificial intelligence and cybersecurity; computational intelligence; machine learning; neural network models; robotics and control; and time series analysis. * The conference was held virtually due to the COVID-19 pandemic.

BIOMEDICAL OPTICAL PHASE MICROSCOPY AND NANOSCOPY

Academic Press Written by leading optical phase microscopy experts, this book is a comprehensive reference to phase microscopy and nanoscopy techniques for biomedical applications, including differential interference contrast (DIC) microscopy, phase contrast microscopy, digital holographic microscopy, optical coherence tomography, tomographic phase microscopy, spectral-domain phase detection, and nanoparticle usage for phase nanoscopy The Editors show biomedical and optical engineers how to use phase microscopy for visualizing unstained specimens, and support the theoretical coverage with applied content and examples on designing systems and interpreting results in bio- and nanoscience applications. Provides a comprehensive overview of the principles and techniques of optical phase microscopy and nanoscopy with biomedical applications. Tips/advice on building systems and working with advanced imaging biomedical techniques, including interpretation of phase images, and techniques for quantitative analysis based on phase microscopy. Interdisciplinary approach that combines optical engineering, nanotechnology, biology and medical aspects of this topic. Each chapter includes practical implementations and worked examples.

ADVANCES IN GEOSCIENCE AND REMOTE SENSING

BoD – Books on Demand Remote sensing is the acquisition of information of an object or phenomenon, by the use of either recording or real-time sensing device(s), that is not in physical or intimate contact with the object (such as by way of aircraft, spacecraft, satellite, buoy, or ship). In practice, remote sensing is the stand-off collection through the use of a variety of devices for gathering information on a given object or area. Human existence is dependent on our ability to understand, utilize, manage and maintain the environment we live in - Geoscience is the science that seeks to achieve these goals. This book is a collection of contributions from world-class scientists, engineers and educators engaged in the

fields of geoscience and remote sensing.

WAVE PROPAGATION, SCATTERING AND EMISSION IN COMPLEX MEDIA

World Scientific This book contains review papers presented at the International Workshop on Wave Propagation, Scattering and Emission on Theory, Experiment, Simulation and Inversion (WPSE). The papers are of high quality, covering broad areas: a new mechanism of interaction of electromagnetic waves with complex media, remote sensing information, computational electromagnetics, etc. This book summarizes the most significant progress in wave propagation, encompassing theory, experiment, simulation, and inversion. It will also serve as a good reference for scientists in future research.List of Foreign Invited Speakers: Henry Bertoni (Brooklyn Polytechnic University), Lawrence Carin (Duke U), Al Chang (NASA, Goddard), Margaret Cheney (Rensselaer Polytech Institute), Weng Chew (U of Illinois at Urbana Champaign), Shane Cloude (AEL Consultants, UK), Adrian Fung (U of Texas at Arlington), Al Gasiewski (Environmental Tech Lab, NOAA), Martti Hallikainen (Helsinki U of Technology), Akira Ishimaru (U of Washington), Magdy Iskander (U of Hawaii), J A Kong (MIT), Roger Lang (George Washington U), Alex Maradudin (U of California at Irvine), Eric Michielssen (U of Illinois at Urbana Champaign), Eni Njoku (Caltech, Jet Propulsion Lab), Carey Rappaport (Northeastern U), Marc Saillard (Institut Fresnel), Kamal Sarabandi (U of Michigan), David R Smith (U of California at San Diego), Mitsuo Tateiba (Kyushu University), George Uslenghi (U of Illinois at Chicago), and Werner Wiesbeck (Karlsruhe U).

HANDBOOK OF RESEARCH ON GEOGRAPHIC INFORMATION SYSTEMS APPLICATIONS AND ADVANCEMENTS

IGI Global The proper management of geographic data can provide assistance to a number of different sectors within society. As such, it is imperative to continue advancing research for spatial data analysis. The Handbook of Research on Geographic Information Systems Applications and Advancements presents a thorough overview of the latest developments in effective management techniques for collecting, processing, analyzing, and utilizing geographical data and information. Highlighting theoretical frameworks and relevant applications, this book is an ideal reference source for researchers, academics, professionals, and students actively involved in the field of geographic information systems.

EARTHQUAKES

TECTONICS, HAZARD AND RISK MITIGATION

BoD – Books on Demand This book is devoted to diverse aspects of earthquake researches, especially to new achievements in seismicity that involves geosciences, assessment, and mitigation. Chapters contain advanced materials of detailed engineering investigations, which can help more clearly appreciate, predict, and manage different earthquake processes. Different research themes for diverse areas in the world are developed here, highlighting new methods of studies that lead to new results and models, which could be helpful for the earthquake risk. The presented and developed themes mainly concern wave's characterization and decomposition, recent seismic activity, assessment-mitigation, and engineering techniques. The book provides the state of the art on recent progress in earthquake engineering and management. The obtained results show a scientific progress that has an international scope and, consequently, should open perspectives to other still unresolved interesting aspects.

ADVANCES IN VISUALIZATION AND OPTIMIZATION TECHNIQUES FOR MULTIDISCIPLINARY RESEARCH

TRENDS IN MODELLING AND SIMULATIONS FOR ENGINEERING APPLICATIONS

Springer Nature This volume presents several multidisciplinary approaches to the visual representation of data acquired from experiments. As an expansion of these approaches, it is also possible to include data examination generated by mathematical-physical modeling. Imaging Systems encompass any subject related to digital images, from fundamental requirements for a correct image acquisition to computational algorithms that make it possible to obtain relevant information for image analysis. In this context, the book presents selected contributions of a special session at the Conference on Advanced Computational Engineering and Experimenting (ACE-X) 2016.

ACADEMIC PRESS LIBRARY IN SIGNAL PROCESSING

COMMUNICATIONS AND RADAR SIGNAL PROCESSING

Academic Press This second volume, edited and authored by world leading experts, gives a review of the principles, methods and techniques of important and emerging research

topics and technologies in communications and radar engineering. With this reference source you will: Quickly grasp a new area of research Understand the underlying principles of a topic and its application Ascertain how a topic relates to other areas and learn of the research issues yet to be resolved Quick tutorial reviews of important and emerging topics of research in array and statistical signal processing Presents core principles and shows their application Reference content on core principles, technologies, algorithms and applications Comprehensive references to journal articles and other literature on which to build further, more specific and detailed knowledge Edited by leading people in the field who, through their reputation, have been able to commission experts to write on a particular topic

ACTIVE LIGHTING AND ITS APPLICATION FOR COMPUTER VISION

40 YEARS OF HISTORY OF ACTIVE LIGHTING TECHNIQUES

Springer Nature This book describes active illumination techniques in computer vision. We can classify computer vision techniques into two classes: passive and active techniques. Passive techniques observe the scene statically and analyse it as is. Active techniques give the scene some actions and try to facilitate the analysis. In particular, active illumination techniques project specific light, for which the characteristics are known beforehand, to a target scene to enable stable and accurate analysis of the scene. Traditional passive techniques have a fundamental limitation. The external world surrounding us is three-dimensional; the image projected on a retina or an imaging device is two-dimensional. That is, reduction of one dimension has occurred. Active illumination techniques compensate for the dimensional reduction by actively controlling the illumination. The demand for reliable vision sensors is rapidly increasing in many application areas, such as robotics and medical image analysis. This book explains this new endeavour to explore the augmentation of reduced dimensions in computer vision. This book consists of three parts: basic concepts, techniques, and applications. The first part explains the basic concepts for understanding active illumination techniques. In particular, the basic concepts of optics are explained so that researchers and engineers outside the field can understand the later chapters. The second part explains currently available active illumination techniques, covering many techniques developed by the authors. The final part shows how such active illumination techniques can be applied to various domains, describing the issue to be overcome by active illumination techniques and the advantages of using these techniques. This book is primarily aimed at 4th year undergraduate and 1st year graduate students, and will also help engineers from fields beyond computer vision to use active illumination techniques. Additionally, the book is suitable as course material for technical seminars.

HANDBOOK OF OPTICAL DIMENSIONAL METROLOGY

Taylor & Francis Due to their speed, data density, and versatility, optical metrology tools play important roles in today's high-speed industrial manufacturing applications. Handbook of Optical Dimensional Metrology provides useful background information and practical examples to help readers understand and effectively use state-of-the-art optical metrology methods. The book first builds a foundation for evaluating optical measurement methods. It explores the many terms of optical metrology and compares it to other forms of metrology, such as mechanical gaging, highlighting the limitations and errors associated with each mode of measurement at a general level. This comparison is particularly helpful to current industry users who operate the most widely applied mechanical tools. The book then focuses on each application area of measurement, working down from large area to medium-sized to submicron measurements. It describes the measurement of large objects on the scale of buildings, the measurement of durable manufactured goods such as aircraft engines and appliances, and the measurement of fine features on the micron and nanometer scales. In each area, the book covers fast, coarse measures as well as the finest measurements possible. Best practices and practical examples for each technology aid readers in effectively using the methods. Requiring no prior expertise in optical dimensional metrology, this handbook helps engineers and quality specialists understand the capabilities and limitations of optical metrology methods. It also shows them how to successfully apply optical metrology to a vast array of current engineering and scientific problems.

HANDBOOK OF OPTICAL METROLOGY

PRINCIPLES AND APPLICATIONS, SECOND EDITION

CRC Press Handbook of Optical Metrology: Principles and Applications begins by discussing key principles and techniques before exploring practical applications of optical metrology. Designed to provide beginners with an introduction to optical metrology without sacrificing academic rigor, this comprehensive text: Covers fundamentals of light sources, lenses, prisms, and mirrors, as well as optoelectronic sensors, optical devices, and optomechanical elements Addresses interferometry, holography, and speckle methods and applications Explains Moiré metrology and the optical heterodyne measurement method Delves into the specifics of diffraction, scattering, polarization, and near-field optics

Considers applications for measuring length and size, displacement, straightness and parallelism, flatness, and three-dimensional shapes This new Second Edition is fully revised to reflect the latest developments. It also includes four new chapters—nearly 100 pages—on optical coherence tomography for industrial applications, interference microscopy for surface structure analysis, noncontact dimensional and profile metrology by video measurement, and optical metrology in manufacturing technology.

INTERFEROGRAM ANALYSIS FOR OPTICAL TESTING

CRC Press In this day of digitalization, you can work within the technology of optics without having to fully understand the science behind it. However, for those who wish to master the science, rather than merely be its servant, it's essential to learn the nuances, such as those involved with studying fringe patterns produced by optical testing interferometers. When Interferogram Analysis for Optical Testing originally came to print, it filled the need for an authoritative reference on this aspect of fringe analysis. That it was also exceptionally current and highly accessible made its arrival even more relevant. Of course, any book on something as cutting edge as interferogram analysis, no matter how insightful, isn't going to stay relevant forever. The second edition of Interferogram Analysis for Optical Testing is designed to meet the needs of all those involved or wanting to become involved in this area of advanced optical engineering. For those new to the science, it provides the necessary fundamentals, including basic computational methods for studying fringe patterns. For those with deeper experience, it fills in the gaps and adds the information necessary to complete and update one's education. Written by the most experienced researchers in optical testing, this text discusses classical and innovative fringe analysis, principles of Fourier theory, digital image filtering, phase detection algorithms, and aspheric wavelength testing. It also explains how to assess wavefront deformation by calculating slope and local average curvature.

INTRODUCTION TO REMOTE SENSING, SECOND EDITION

CRC Press Addressing the need for updated information in remote sensing, Introduction to Remote Sensing, Second Edition provides a full and authoritative introduction for scientists who need to know the scope, potential, and limitations in the field. The authors discuss the physical principles of common remote sensing systems and examine the processing, interpretation, and applications of data. This new edition features updated and expanded material, including greater coverage of applications from across earth, environmental, atmospheric, and oceanographic sciences. Illustrated with remotely sensed color images from satellites and aircraft, it also outlines data acquisition and analysis. New to this edition: · Details of satellite systems launched since the first edition · Sections on airborne lidar for land surveys and airborne gamma ray spectroscopy · A section on interferometric synthetic aperture radar · Expanded discussions of filtering of images · Updates to a number of recent applications, particularly some that make use of global datasets Suitable for students and professionals with some background in the physical sciences, this book comprehensively surveys the basic principles behind remote sensing physics, techniques, and technology.

ADVANCES IN MEASUREMENT SYSTEMS

BoD – Books on Demand This book is a collection of 24 chapters concerning the developments within the Measurement Systems field of study.The collection includes scholarly contributions by various authors and edited by a group of experts pertinent to Measurement Systems. Each contribution comes as a separate chapter complete in itself but directly related to the book's topics and objectives. The target audience comprises scholars and specialists in the field.

HANDBOOK OF LASER TECHNOLOGY AND APPLICATIONS

LASER APPLICATIONS: MEDICAL, METROLOGY AND COMMUNICATION (VOLUME FOUR)

CRC Press This comprehensive handbook gives a fully updated guide to lasers and laser technologies, including the complete range of their technical applications. This forth volume covers laser applications in the medical, metrology and communications fields. Key Features: • Offers a complete update of the original, bestselling work, including many brand-new chapters. • Deepens the introduction to fundamentals, from laser design and fabrication to host matrices for solid-state lasers, energy level diagrams, hosting materials, dopant energy levels, and lasers based on nonlinear effects. • Covers new laser types, including quantum cascade lasers, silicon-based lasers, titanium sapphire lasers, terahertz lasers, bismuth-doped fiber lasers, and diode-pumped alkali lasers. • Discusses the latest applications, e.g., lasers in microscopy, high-speed imaging, attosecond metrology, 3D printing, optical atomic clocks, time-resolved spectroscopy, polarization and profile measurements, pulse measurements, and laser-induced fluorescence detection. • Adds new sections on laser materials processing, laser spectroscopy, lasers in imaging, lasers in environmental sciences, and lasers in communications. This handbook is the ideal companion for

scientists, engineers, and students working with lasers, including those in optics, electrical engineering, physics, chemistry, biomedicine, and other relevant areas.