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A Selection of Image Processing Techniques - Yu-Jin Zhang 2021-12-27
A Selection of Image Processing Techniques: From Fundamentals to Research Front focuses on seven commonly used image-processing techniques. These are de-noising, de-blurring, repairing, de-fogging, reconstruction from projection, watermarking, and super-resolution. This book is suitable for readers who do not have a complete foundation in the principles of image technology but need to use image techniques to solve specific tasks in particular applications.

Hence, elementary knowledge for further study is provided, allowing the reader to discover suitable techniques for solving practical problems and to learn the latest developments in a specific domain. This book offers readers a three-step strategy toward problem solving: first, essential principles, then, a detailed explanation, and finally, a discussion of practical and working techniques for specific tasks. Throughout, the author highlights materials pertaining to the newest developments and trends of the technologies.

Iterative Methods for Toeplitz Systems - Michael K. Ng 2004

Toeplitz and Toeplitz-related systems arise in a variety of applications in mathematics and engineering, especially in signal and image processing. This book deals primarily with iterative methods for solving Toeplitz and Toeplitz-related linear systems, discussing both the algorithms and their convergence theories. A basic knowledge of real analysis, elementary numerical analysis and linear algebra is assumed. The first part of the book (chapters one and two) gives a brief review of some terms and results in linear algebra and the conjugate gradient method, which are important topics for handling the mathematics later on in the book. The second part of the book (chapters three to seven) presents the theory of using iterative methods for solving Toeplitz and Toeplitz-related systems. The third part of the book (chapters eight to twelve) presents recent results from applying the use of iterative methods in different fields of applications, such as partial differential equations, signal and image processing, integral equations and queuing networks. These chapters provide research and application-oriented readers with a thorough understanding of using iterative methods, enabling them not only to apply these methods to the problems discussed but also to derive and analyze new methods for other types of problems and applications.

Intelligent Data Security Solutions for e-

Health Applications - Amit Kumar Singh 2020-09-02

E-health applications such as tele-medicine, tele-radiology, tele-ophthalmology, and tele-diagnosis are very promising and have immense potential to improve global healthcare. They can improve access, equity, and quality through the connection of healthcare facilities and healthcare professionals, diminishing geographical and physical barriers. One critical issue, however, is related to the security of data transmission and access to the technologies of medical information. Currently, medical-related identity theft costs billions of dollars each year and altered medical information can put a person's health at risk through misdiagnosis, delayed treatment or incorrect prescriptions. Yet, the use of hand-held devices for storing, accessing, and transmitting medical information is outpacing the privacy and security protections on those devices. Researchers are starting to develop some imperceptible marks to ensure the tamper-proofing, cost effective, and guaranteed originality of the medical records. However, the robustness, security and efficient image archiving and retrieval of medical data information against these cyberattacks is a challenging area for researchers in the field of e-health applications. Intelligent Data Security Solutions for e-Health Applications focuses on cutting-edge academic and industry-related research in this field, with particular emphasis on interdisciplinary approaches and novel techniques to provide security solutions for smart applications. The book provides an overview of cutting-edge security techniques and ideas to help graduate students, researchers, as well as IT professionals who want to understand the opportunities and challenges of using emerging techniques and algorithms for designing and developing more secure systems and methods for e-health applications. Investigates new security and privacy requirements related to eHealth technologies

and large sets of applications Reviews how the abundance of digital information on system behavior is now being captured, processed, and used to improve and strengthen security and privacy Provides an overview of innovative security techniques which are being developed to ensure the guaranteed authenticity of transmitted, shared or stored data/information

Artificial Intelligence Techniques - Alan Bundy 2012-12-06

The purpose of "Artificial Intelligence Techniques: A Comprehensive Cata logue" is to promote interaction between members of the AI community. It does this by announcing the existence of AI techniques, and acting as a pointer into the literature. Thus the AI community has access to a common, extensional definition of the field, which promotes a common terminology, discourages the reinvention of wheels, and acts as a clearing house for ideas and algorithms. I am grateful to the impressive group of AI experts who have contributed the many descriptions of AI techniques which go to make up this Catalogue. They have managed to distill a very wide knowledge of AI into a very compact form. The Catalogue is a reference work providing a quick guide to the AI tech niques available for different tasks. Intentionally, it only provides a brief de scription of each technique, with no extended discussion of its historical origin or how it has been used in particular AI programs.

Level Set Methods and Fast Marching Methods - J. A. Sethian 1999-06-13

This new edition is an introduction to level set methods and fast marching methods.

Two-Dimensional Digital Filters - Wu-Sheng Lu 2020-08-12

Presents basic theories, techniques, and procedures used to analyze, design, and implement two-dimensional filters; and surveys a number of applications in image and seismic data processing that demonstrate their use in real-world signal processing. For graduate

students in electrical and computer e

Robotic Vision - Peter Corke 2021-10-15

This textbook offers a tutorial introduction to robotics and Computer Vision which is light and easy to absorb. The practice of robotic vision involves the application of computational algorithms to data. Over the fairly recent history of the fields of robotics and computer vision a very large body of algorithms has been developed. However this body of knowledge is something of a barrier for anybody entering the field, or even looking to see if they want to enter the field — What is the right algorithm for a particular problem?, and importantly: How can I try it out without spending days coding and debugging it from the original research papers? The author has maintained two open-source MATLAB Toolboxes for more than 10 years: one for robotics and one for vision. The key strength of the Toolboxes provide a set of tools that allow the user to work with real problems, not trivial examples. For the student the book makes the algorithms accessible, the Toolbox code can be read to gain understanding, and the examples illustrate how it can be used —instant gratification in just a couple of lines of MATLAB code. The code can also be the starting point for new work, for researchers or students, by writing programs based on Toolbox functions, or modifying the Toolbox code itself. The purpose of this book is to expand on the tutorial material provided with the toolboxes, add many more examples, and to weave this into a narrative that covers robotics and computer vision separately and together. The author shows how complex problems can be decomposed and solved using just a few simple lines of code, and hopefully to inspire up and coming researchers. The topics covered are guided by the real problems observed over many years as a practitioner of both robotics and computer vision. It is written in a light but informative style, it is easy to read and absorb, and includes a lot of Matlab examples and figures. The book is a real walk

through the fundamentals light and color, camera modelling, image processing, feature extraction and multi-view geometry, and bring it all together in a visual servo system. “An authoritative book, reaching across fields, thoughtfully conceived and brilliantly accomplished Oussama Khatib, Stanford

Biometric Systems - Zahid Riaz 2011-10-21

Biometric authentication has been widely used for access control and security systems over the past few years. The purpose of this book is to provide the readers with life cycle of different biometric authentication systems from their design and development to qualification and final application. The major systems discussed in this book include fingerprint identification, face recognition, iris segmentation and classification, signature verification and other miscellaneous systems which describe management policies of biometrics, reliability measures, pressure based typing and signature verification, bio-chemical systems and behavioral characteristics. In summary, this book provides the students and the researchers with different approaches to develop biometric authentication systems and at the same time includes state-of-the-art approaches in their design and development. The approaches have been thoroughly tested on standard databases and in real world applications.

Computerized Control Systems in the Food Industry - Mittal 2018-02-19

Covers the fundamentals and the latest advances in computerized automation and process control, control algorithms, and specific applications essential food manufacturing processes and unit operations. This text highlights the use of efficient process control to convert from batch to continuous operation and enhance plant sanitation. It compares both established and innovative control schemes.

Signal Treatment and Signal Analysis in NMR - D.N. Rutledge 1996-06-10

Signal analysis and signal treatment are integral

parts of all types of Nuclear Magnetic Resonance. In the last ten years, much has been achieved in the development of dimensional spectra. At the same time new NMR techniques such as NMR Imaging and multidimensional spectroscopy have appeared, requiring entirely new methods of signal analysis. Up until now, most NMR texts and reference books limited their presentation of signal processing to a short introduction to the principles of the Fourier Transform, signal convolution, apodisation and noise reduction. To understand the mathematics of the newer signal processing techniques, it was necessary to go back to the primary references in NMR, chemometrics and mathematics journals. The objective of this book is to fill this void by presenting, in a single volume, both the theory and applications of most of these new techniques to Time-Domain, Frequency-Domain and Space-Domain NMR signals. Details are provided on many of the algorithms used and a companion CD-ROM is also included which contains some of the computer programs, either as source code or in executable form. Although it is aimed primarily at NMR users in the medical, industrial and academic fields, it should also interest chemometricians and programmers working with other techniques.

Proceedings of the American Society for Composites 2014-Twenty-ninth Technical Conference on Composite Materials - Hyonny Kim 2014-09-17

New and not previously published U.S. and international research on composite and nanocomposite materialsFocus on health monitoring/diagnosis, multifunctionality, self-healing, crashworthiness, integrated computational materials engineering (ICME), and moreApplications to aircraft, armor, bridges, ships, and civil structures This fully searchable CD-ROM contains 270 original research papers on all phases of composite materials, presented by specialists from universities, NASA and

private corporations such as Boeing. The document is divided into the following sections: Aviation Safety and Aircraft Structures; Armor and Protection; Multifunctional Composites; Effects of Defects; Out of Autoclave Processing; Sustainable Processing; Design and Manufacturing; Stability and Postbuckling; Crashworthiness; Impact and Dynamic Response; Natural, Biobased and Green; Integrated Computational Materials Engineering (ICME); Structural Optimization; Uncertainty Quantification; NDE and SHM Monitoring; Progressive Damage Modeling; Molecular Modeling; Marine Composites; Simulation Tools; Interlaminar Properties; Civil Structures; Textiles. The CD-ROM displays figures and illustrations in articles in full color along with a title screen and main menu screen. Each user can link to all papers from the Table of Contents and Author Index and also link to papers and front matter by using the global bookmarks which allow navigation of the entire CD-ROM from every article. Search features on the CD-ROM can be by full text including all key words, article title, author name, and session title. The CD-ROM has Autorun feature for Windows 2000 or higher products and can also be used with Macintosh computers. The CD includes the program for Adobe Acrobat Reader with Search 11.0. One year of technical support is included with your purchase of this product.

Global Trends in Intelligent Computing Research and Development - Tripathy, B.K. 2013-12-31

As the amount of accumulated data across a variety of fields becomes harder to maintain, it is essential for a new generation of computational theories and tools to assist humans in extracting knowledge from this rapidly growing digital data. Global Trends in Intelligent Computing Research and Development brings together recent advances and in depth knowledge in the fields of knowledge representation and computational intelligence. Highlighting the theoretical advances and their applications to

real life problems, this book is an essential tool for researchers, lecturers, professors, students, and developers who have seek insight into knowledge representation and real life applications.

Numerical Simulations and Case Studies Using Visual C++.Net - Shaharuddin Salleh 2005-06-17

Master the numerical simulation process required to design, testand support mobile and parallel computing systems. An accompanyingftp site contains all the Visual C++ based programs discussed inthe text to help readers create their own programs. With its focuson problems and solutions, this is an excellent text forupper-level undergraduate and graduate students, and a must-havereference for researchers and professionals in the field ofsimulations. More information about Visual C++ based programs can be found at:ftp: //ftp.wiley.com/public/sci_tech_med/numerical_simulations/

Digital Image Processing and Analysis - Scott E Umbaugh 2010-11-19

Whether for computer evaluation of otherworldly terrain or the latest high definition 3D blockbuster, digital image processing involves the acquisition, analysis, and processing of visual information by computer and requires a unique skill set that has yet to be defined a single text. Until now. Taking an applications-oriented, engineering approach, Digital Image Processing and Analysis provides the tools for developing and advancing computer and human vision applications and brings image processing and analysis together into a unified framework. Providing information and background in a logical, as-needed fashion, the author presents topics as they become necessary for understanding the practical imaging model under study. He offers a conceptual presentation of the material for a solid understanding of complex topics and discusses the theory and foundations of digital image processing and the

algorithm development needed to advance the field. With liberal use of color through-out and more materials on the processing of color images than the previous edition, this book provides supplementary exercises, a new chapter on applications, and two major new tools that allow for batch processing, the analysis of imaging algorithms, and the overall research and development of imaging applications. It includes two new software tools, the Computer Vision and Image Processing Algorithm Test and Analysis Tool (CVIP-ATAT) and the CVIP Feature Extraction and Pattern Classification Tool (CVIP-FEPC). Divided into five major sections, this book provides the concepts and models required to analyze digital images and develop computer vision and human consumption applications as well as all the necessary information to use the CVIPtools environment for algorithm development, making it an ideal reference tool for this fast growing field.

Introduction to Video and Image Processing - Thomas B. Moeslund 2012-01-23

This textbook presents the fundamental concepts and methods for understanding and working with images and video in an unique, easy-to-read style which ensures the material is accessible to a wide audience. Exploring more than just the basics of image processing, the text provides a specific focus on the practical design and implementation of real systems for processing video data. Features: includes more than 100 exercises, as well as C-code snippets of the key algorithms; covers topics on image acquisition, color images, point processing, neighborhood processing, morphology, BLOB analysis, segmentation in video, tracking, geometric transformation, and visual effects; requires only a minimal understanding of mathematics; presents two chapters dedicated to applications; provides a guide to defining suitable values for parameters in video and image processing systems, and to conversion between the RGB color representation and the HIS, HSV and

YUV/YCbCr color representations.

Monitoring Continuous Phenomena - Peter Lorkowski 2021-06-25

Monitoring continuous phenomena by stationary and mobile sensors has become a common due to the improvement in hardware and communication infrastructure and decrease in it's cost. Sensor data is now available in near real time via web interfaces and in machine-readable form, facilitated by paradigms like the Internet of Things (IoT). There are still some obstacles in the usability of the data since the positions (in space and time) of observation and the positions of interest usually do not coincide. Interpolation is the technique to fill such gaps and there are manifold methods to perform it. To actually operate a monitoring system, there are problems like unambiguous identification of interpolation method and associated parameters, appropriate interface to store observations and retrieve interpolated data, continuous update of the interpolation model for real time monitoring, compression and progressive retrieval of observational data and critical states definition and notification by using aggregation of values. This book proposes a general system architecture that addresses these problems. It is not confined to details about particular interpolation methods but rather takes a holistic view on the problem of monitoring. State-of-the-art technologies like geostatistics, sensor web enablement and field data types are introduced and applied in order to provide a viable toolset for the problem domain. The focus is on the overall organization of the monitoring and the architectural design of the software system and the associated simulation framework that is used to systematically evaluate different monitoring approaches. The whole cycle of a monitoring entailing observation, interpolation, discretization, storage, retrieval and notification is covered. Concrete solutions for several common problems in this context are provided.

Information Technology in Medical Diagnostics

II - Waldemar Wójcik 2019-02-13

For many centuries, mankind has tried to learn about his health. Initially, during the pre-technological period, he could only rely on his senses. Then there were simple tools to help the senses. The breakthrough turned out to be the discovery of X-rays, which gave insight into the human body. Contemporary medical diagnostics are increasingly supported by information technology, which for example offers a very thorough analysis of the tissue image or the pathology differentiation. It also offers possibilities for very early preventive diagnosis. Under the influence of information technology, 'traditional' diagnostic techniques and new ones are changing. More and more often the same methods can be used for both medical and technical diagnostics. In addition, methodologies are developed that are inspired by the functioning of living organisms. Information Technology in Medical Diagnostics II is the second volume in a series showing the latest advances in information technologies directly or indirectly applied to medical diagnostics. Unlike the previous book, this volume does not contain closed chapters, but rather extended versions of presentations made during two conferences: XLVIII International Scientific and Practical Conference 'Application of Lasers in Medicine and Biology' (Kharkov, Ukraine) and the International Scientific Internet conference 'Computer graphics and image processing' (Vinnitsa, Ukriane), both held in May 2018. Information Technology in Medical Diagnostics II links technological issues to medical and biological issues, and will be valuable to academics and professionals interested in medical diagnostics and IT.

Bubbles in Food 2 - Grant Campbell 2016-06-11

Bubbles give novelty and distinctiveness to many food and drink products including the most important and interesting ones such as bread, beer, ice cream, whipped cream, soufflés and

champagne. Understanding the creation and control of bubbles in food products is key to the success of the domestic chef or the industrial food manufacturer. This new volume presents the proceedings of the conference Bubbles in Food 2: Novelty, Health and Luxury. This book is fully updated and expanded from the original Bubbles in Food book published in 1999. This new title brings together up-to-date information on the latest developments in this fast moving area. Bubbles in Food 2 includes novel experimental techniques for measuring and quantifying the aerated structure of foods (e.g. ultrasonics, MRI imaging, X-ray tomography, microscopy, rheology, image analysis), and novel analytical approaches for interpreting aerated food properties and behavior. These techniques and approaches provide stimulus for new product development or for enhancing the understanding of the manufacture of existing products, leading to enhanced quality and greater product differentiation. Bubbles in Food 2: Novelty, Health and Luxury aims to enhance the appreciation of aerated foods and to provide stimulation and cross fertilisation of ideas for the exploitation of bubbles as a novel and versatile food ingredient.

Handbook of Image Quality - Brian Keelan 2002-03-21

With 300 figures, tables, and equations, this book presents a unified approach to image quality research and modeling. The author discusses the results of different, calibrated psychometric experiments can be rigorously integrated to construct predictive software using Monte Carlo simulations and provides numerous examples of viable field applications for product design and verification of modeling predictions. He covers perceptual measurements for the assessment of individual quality attributes and overall quality, explores variation in scene susceptibility, observer sensitivity, and preference, and includes methods of analysis for testing and refining metrics based on

psychometric data.

Soft Computing Methods for Practical Environment Solutions: Techniques and Studies - Gestal Pose, Marcos 2010-05-31

"This publication presents a series of practical applications of different Soft Computing techniques to real-world problems, showing the enormous potential of these techniques in solving problems"--Provided by publisher.

Digital Image Processing Using MATLAB - Rafael C. Gonzalez 2004

Solutions to problems in the field of digital image processing generally require extensive experimental work involving software simulation and testing with large sets of sample images. Although algorithm development typically is based on theoretical underpinnings, the actual implementation of these algorithms almost always requires parameter estimation and, frequently, algorithm revision and comparison of candidate solutions. Thus, selection of a flexible, comprehensive, and well-documented software development environment is a key factor that has important implications in the cost, development time, and portability of image processing solutions. In spite of its importance, surprisingly little has been written on this aspect of the field in the form of textbook material dealing with both theoretical principles and software implementation of digital image processing concepts. This book was written for just this purpose. Its main objective is to provide a foundation for implementing image processing algorithms using modern software tools. A complementary objective was to prepare a book that is self-contained and easily readable by individuals with a basic background in digital image processing, mathematical analysis, and computer programming, all at a level typical of that found in a junior/senior curriculum in a technical discipline. Rudimentary knowledge of MATLAB also is desirable. To achieve these objectives, we felt that two key ingredients were needed. The first was to select image processing

material that is representative of material covered in a formal course of instruction in this field. The second was to select software tools that are well supported and documented, and which have a wide range of applications in the "real" world. To meet the first objective, most of the theoretical concepts in the following chapters were selected fromDigital Image Processingby Gonzalez and Woods, which has been the choice introductory textbook used by educators all over the world for over two decades. The software tools selected are from the MATLAB Image Processing Toolbox (IPT), which similarly occupies a position of eminence in both education and industrial applications. A basic strategy followed in the preparation of the book was to provide a seamless integration of well-established theoretical concepts and their implementation using state-of-the-art software tools. The book is organized along the same lines asDigital Image Processing.In this way, the reader has easy access to a more detailed treatment of all the image processing concepts discussed here, as well as an up-to-date set of references for further reading. Following this approach made it possible to present theoretical material in a succinct manner and thus we were able to maintain a focus on the software implementation aspects of image processing problem solutions. Because it works in the MATLAB computing environment, the Image Processing Toolbox offers some significant advantages, not only f in the breadth of its computational tools, but also because it is supported under most operating systems in use today. A unique feature of this book is its emphasis on showing how to develop new code to enhance existing MATLAB and IPT functionality This is an important feature in an area such as image processing, which, as noted earlier, is characterized by the need for extensive algorithm development and experimental work. After an introduction to the fundamentals of MATLAB functions and

programming, the book proceeds to address the mainstream areas of image processing. The major areas covered include intensity transformations, linear and nonlinear spatial filtering, filtering in the frequency domain, image restoration and registration, color image processing, wavelets, image data compression, morphological image processing, image segmentation, region and boundary representation and description, and object recognition. This material is complemented by numerous illustrations of how to solve image processing problems using MATLAB and IPT functions. In cases where a function did not exist, a new function was written and documented as part of the instructional focus of the book. Over 60 new functions are included in the following chapters. These functions increase the scope of IPT by approximately 35 percent and also serve the important purpose of further illustrating how to implement new image processing software solutions. The material is presented in textbook format, not as a software manual. Although the book is self-contained, we have established a companion Web site (see Section 1.5) designed to provide support in a number of areas. For students following a formal course of study or individuals embarked on a program of self study, the site contains tutorials and reviews on background material, as well as projects and image databases, including all images in the book. For instructors, the site contains classroom presentation materials that include PowerPoint slides of all the images and graphics used in the book. Individuals already familiar with image processing and IPT fundamentals will find the site a useful place for up-to-date references, new implementation techniques, and a host of other support material not easily found elsewhere. All purchasers of the book are eligible to download executable files of all the new functions developed in the text. As is true of most writing efforts of this nature, progress continues after work on the manuscript

stops. For this reason, we devoted significant effort to the selection of material that we believe is fundamental, and whose value is likely to remain applicable in a rapidly evolving body of knowledge. We trust that readers of the book will benefit from this effort and thus find the material timely and useful in their work.

Multimedia Transcoding in Mobile and Wireless Networks - Ahmad, Ashraf M.A. 2008-07-31

"This book is designed to provide readers with relevant theoretical frameworks and latest technical and institutional solutions for transcoding multimedia in mobile and wireless networks"--Provided by publisher.

Applied Medical Image Processing, Second Edition - Wolfgang Birkfellner 2014-03-06

A widely used, classroom-tested text, Applied Medical Image Processing: A Basic Course delivers an ideal introduction to image processing in medicine, emphasizing the clinical relevance and special requirements of the field. Avoiding excessive mathematical formalisms, the book presents key principles by implementing algorithms from scratch and using simple MATLAB®/Octave scripts with image data and illustrations on an accompanying CD-ROM or companion website. Organized as a complete textbook, it provides an overview of the physics of medical image processing and discusses image formats and data storage, intensity transforms, filtering of images and applications of the Fourier transform, three-dimensional spatial transforms, volume rendering, image registration, and tomographic reconstruction. This Second Edition of the bestseller: Contains two brand-new chapters on clinical applications and image-guided therapy Devotes more attention to the subject of color space Includes additional examples from radiology, internal medicine, surgery, and radiation therapy Incorporates freely available programs in the public domain (e.g., GIMP, 3DSlicer, and ImageJ) when applicable Beneficial to students

of medical physics, biomedical engineering, computer science, applied mathematics, and related fields, as well as medical physicists, radiographers, radiologists, and other professionals, Applied Medical Image Processing: A Basic Course, Second Edition is fully updated and expanded to ensure a perfect blend of theory and practice.

Disruptive Developments in Biomedical Applications - Swati V. Shinde 2022-12-22

This book covers advancements and future challenges in biomedical application development using disruptive technologies like artificial intelligence (AI), the Internet of Things (IoT), and signal processing. The book is divided into four main sections, namely, medical image processing using AI; IoT and biomedical devices; biomedical signal processing; and electronic health records, including advances in biomedical systems. It includes different case studies of biomedical applications using different AI algorithms related to diabetes, skin cancer, breast cancer, cervical cancer, and osteoarthritis. Features: Covers different technologies like AI, IoT, and signal processing in the context of biomedical applications. Reviews medical image analysis, disease detection, and prediction. Comprehends the advantage of recent technologies for medical record keeping through electronic health records (EHRs). Presents state-of-the-art research in the field of biomedical engineering using various physiological signals. Explores different bio sensors used in healthcare applications using IOT. This book is aimed at graduate students and researchers in AI, medical imaging, biomedical engineering, and IoT.

Fundamentals of Digital Image Processing - Chris Solomon 2011-07-05

This is an introductory to intermediate level text on the science of image processing, which employs the Matlab programming language to illustrate some of the elementary, key concepts

in modern image processing and pattern recognition. The approach taken is essentially practical and the book offers a framework within which the concepts can be understood by a series of well chosen examples, exercises and computer experiments, drawing on specific examples from within science, medicine and engineering. Clearly divided into eleven distinct chapters, the book begins with a fast-start introduction to image processing to enhance the accessibility of later topics. Subsequent chapters offer increasingly advanced discussion of topics involving more challenging concepts, with the final chapter looking at the application of automated image classification (with Matlab examples) . Matlab is frequently used in the book as a tool for demonstrations, conducting experiments and for solving problems, as it is both ideally suited to this role and is widely available. Prior experience of Matlab is not required and those without access to Matlab can still benefit from the independent presentation of topics and numerous examples. Features a companion website www.wiley.com/go/solomon/fundamentals containing a Matlab fast-start primer, further exercises, examples, instructor resources and accessibility to all files corresponding to the examples and exercises within the book itself. Includes numerous examples, graded exercises and computer experiments to support both students and instructors alike.

Digital Image Processing - Rafael C. Gonzalez 2002

"Digital Image Processing" has been the leading textbook in its field for more than 20 years. As was the case with the 1977 and 1987 editions by Gonzalez and Wintz, and the 1992 edition by Gonzalez and Woods, the present edition was prepared with students and instructors in mind. 771e material is timely, highly readable, and illustrated with numerous examples of practical significance. All mainstream areas of image processing are covered, including a totally

revised introduction and discussion of image fundamentals, image enhancement in the spatial and frequency domains, restoration, color image processing, wavelets, image compression, morphology, segmentation, and image description. Coverage concludes with a discussion of the fundamentals of object recognition. Although the book is completely self-contained, a Companion Website (see inside front cover) provides additional support in the form of review material, answers to selected problems, laboratory project suggestions. and a score of other features. A supplementary instructor's manual is available to instructors who have adopted the book for classroom use. "New Features" New chapters on wavelets, image morphology, and color image processing. More than 500 new images and over 200 new line drawings and tables. A revision and update of all chapters, including topics such as segmentation by watersheds. Numerous new examples with processed images of higher resolution. A reorganization that allows the reader to get to the material on actualimage processing much sooner than before. Updated image compression standards and a new section on compression using wavelets. A more intuitive development of traditional topics such as image transforms and image restoration. Updated bibliography.

Advances in Image and Video Segmentation - Zhang, Yu-Jin 2006-05-31

"This book attempts to bring together a selection of the latest results of state-of-the art research in image and video segmentation, one of the most critical tasks of image and video analysis that has the objective of extracting information (represented by data) from an image or a sequence of images (video)"--Provided by publisher.

Rising Threats in Expert Applications and Solutions - Vijay Singh Rathore 2020-10-01

This book presents high-quality, peer-reviewed papers from the FICR International Conference

on Rising Threats in Expert Applications and Solutions 2020, held at IIS University Jaipur, Rajasthan, India, on January 17–19, 2020. Featuring innovative ideas from researchers, academics, industry professionals and students, the book covers a variety of topics, including expert applications and artificial intelligence/machine learning; advanced web technologies, like IoT, big data, and cloud computing in expert applications; information and cybersecurity threats and solutions; multimedia applications in forensics, security and intelligence; advances in app development; management practices for expert applications; and social and ethical aspects of expert applications in applied sciences.

Remote Sensing - John R. Schott 2007-05-25

Remote Sensing deals with the fundamental ideas underlying the rapidly growing field of remote sensing. John Schott explores energy-matter interaction, radiation propagation, data dissemination, and described the tools and procedures required to extract information from remotely sensed data using the image chain approach. Organizations and individuals often focus on one aspect of the remote sensing process before considering it as a whole, thus investigating unjustified effort, time, and expense to get minimal improvement. Unlike other books on the subject, Remote Sensing treats the process as a continuous flow. Schott examines the limitations obstructing the flow of information to the user, employing numerous applications of remote sensing to earth observation disciplines. For this second edition, in addition to a thorough update, there are major changes and additions, such as a much more complete treatment of spectroscopic imaging, which has matured dramatically in the last ten years, and a more rigorous treatment of image processing with an emphasis on spectral image processing algorithms. Remote Sensing is an ideal first text in remote sensing for advanced undergraduate and graduate students in the

physical or engineering sciences, and will also serve as a valuable reference for practitioners.

Remote Sensing Digital Image Analysis - John A. Richards 2021

Remote Sensing Digital Image Analysis provides a comprehensive treatment of the methods used for the processing and interpretation of remotely sensed image data. Over the past decade there have been continuing and significant developments in the algorithms used for the analysis of remote sensing imagery, even though many of the fundamentals have substantially remained the same. As with its predecessors this new edition again presents material that has retained value but also includes newer techniques, covered from the perspective of operational remote sensing. The book is designed as a teaching text for the senior undergraduate and postgraduate student, and as a fundamental treatment for those engaged in research using digital image analysis in remote sensing. The presentation level is for the mathematical non-specialist. Since the very great number of operational users of remote sensing come from the earth sciences communities, the text is pitched at a level commensurate with their background. The chapters progress logically through means for the acquisition of remote sensing images, techniques by which they can be corrected, and methods for their interpretation. The prime focus is on applications of the methods, so that worked examples are included and a set of problems conclude each chapter.

Pattern Recognition and Signal Processing in Archaeometry: Mathematical and Computational Solutions for Archaeology - Papaodysseus, Constantin 2011-10-31

Computer science—especially pattern recognition, signal processing and mathematical algorithms—can offer important information about archaeological finds, information that is otherwise undetectable by the human senses and traditional archaeological approaches.

Pattern Recognition and Signal Processing in Archaeometry: Mathematical and Computational Solutions for Archaeology offers state of the art research in computational pattern recognition and digital archaeometry. Computer science researchers in pattern recognition and machine intelligence will find innovative research methodologies combined to create novel and efficient computational systems, offering robust, exact, and reliable performance and results. Archaeologists, conservators, and historians will discover reliable automated methods for quickly reconstructing archaeological materials and benefit from the application of non-destructive, automated processing of archaeological finds.

Robotics, Vision and Control - Peter Corke 2017-05-20

Robotic vision, the combination of robotics and computer vision, involves the application of computer algorithms to data acquired from sensors. The research community has developed a large body of such algorithms but for a newcomer to the field this can be quite daunting. For over 20 years the author has maintained two open-source MATLAB® Toolboxes, one for robotics and one for vision. They provide implementations of many important algorithms and allow users to work with real problems, not just trivial examples. This book makes the fundamental algorithms of robotics, vision and control accessible to all. It weaves together theory, algorithms and examples in a narrative that covers robotics and computer vision separately and together. Using the latest versions of the Toolboxes the author shows how complex problems can be decomposed and solved using just a few simple lines of code. The topics covered are guided by real problems observed by the author over many years as a practitioner of both robotics and computer vision. It is written in an accessible but informative style, easy to read and absorb, and includes over 1000 MATLAB and Simulink® examples and over 400 figures. The book is a

real walk through the fundamentals of mobile robots, arm robots. then camera models, image processing, feature extraction and multi-view geometry and finally bringing it all together with an extensive discussion of visual servo systems. This second edition is completely revised, updated and extended with coverage of Lie groups, matrix exponentials and twists; inertial navigation; differential drive robots; lattice planners; pose-graph SLAM and map making; restructured material on arm-robot kinematics and dynamics; series-elastic actuators and operational-space control; Lab color spaces; light field cameras; structured light, bundle adjustment and visual odometry; and photometric visual servoing. “An authoritative book, reaching across fields, thoughtfully conceived and brilliantly accomplished!” OUSSAMA KHATIB, Stanford

Biometric Solutions - David D. Zhang 2002-08-31

Biometric Solutions for Authentication in an E-World provides a collection of sixteen chapters containing tutorial articles and new material in a unified manner. This includes the basic concepts, theories, and characteristic features of integrating/formulating different facets of biometric solutions for authentication, with recent developments and significant applications in an E-world. This book provides the reader with a basic concept of biometrics, an in-depth discussion exploring biometric technologies in various applications in an E-world. It also includes a detailed description of typical biometric-based security systems and up-to-date coverage of how these issues are developed. Experts from all over the world demonstrate the various ways this integration can be made to efficiently design methodologies, algorithms, architectures, and implementations for biometric-based applications in an E-world.

Digital Image Processing - Rafael C. Gonzalez 2018

Introduce your students to image processing

with the industry's most prized text For 40 years, Image Processing has been the foundational text for the study of digital image processing. The book is suited for students at the college senior and first-year graduate level with prior background in mathematical analysis, vectors, matrices, probability, statistics, linear systems, and computer programming. As in all earlier editions, the focus of this edition of the book is on fundamentals. The 4th Edition, which celebrates the book's 40th anniversary, is based on an extensive survey of faculty, students, and independent readers in 150 institutions from 30 countries. Their feedback led to expanded or new coverage of topics such as deep learning and deep neural networks, including convolutional neural nets, the scale-invariant feature transform (SIFT), maximally-stable extremal regions (MSERs), graph cuts, k-means clustering and superpixels, active contours (snakes and level sets), and exact histogram matching. Major improvements were made in reorganizing the material on image transforms into a more cohesive presentation, and in the discussion of spatial kernels and spatial filtering. Major revisions and additions were made to examples and homework exercises throughout the book. For the first time, we added MATLAB projects at the end of every chapter, and compiled support packages for you and your teacher containing, solutions, image databases, and sample code. The support materials for this title can be found at www.ImageProcessingPlace.com

Fractal Patterns in Nonlinear Dynamics and Applications - Santo Banerjee 2020-03-27

Most books on fractals focus on deterministic fractals as the impact of incorporating randomness and time is almost absent. Further, most review fractals without explaining what scaling and self-similarity means. This book introduces the idea of scaling, self-similarity, scale-invariance and their role in the dimensional analysis. For the first time, fractals

emphasizing mostly on stochastic fractal, and multifractals which evolves with time instead of scale-free self-similarity, are discussed. Moreover, it looks at power laws and dynamic scaling laws in some detail and provides an overview of modern statistical tools for calculating fractal dimension and multifractal spectrum.

Adaptive Audio and Video Processing for Electronic Chalkboard Lectures - Gerald Friedland 2006

This doctoral dissertation in computer science describes how traditional chalk and talk lectures can be transmitted over the web while maximizing the quality and minimizing the amount of extra effort. The book presents a comprehensive discussion on many technological and humand-centered issues using the example of the software system "E-Chalk" that was co-developed by the author. As a by-product, the work includes a detailed description of the so-called "Simple Interactive Object Extration (SIOX)" algorithm that has recently been integrated in several open-source image manipulation programs such as GIMP, Inkscape, and Blender.

FAIR - Jan Modersitzki 2009-11-26

Whenever images taken at different times, from different viewpoints, and/or by different sensors need to be compared, merged, or integrated, image registration is required. Registration, also known as alignment, fusion, or warping, is the process of transforming data into a common reference frame. This book provides an overview of state-of-the-art registration techniques from theory to practice, plus numerous exercises designed to enhance readers' understanding of the principles and mechanisms of the described techniques. It also provides, via a supplementary Web page, free access to FAIR.m, a package that is based on the MATLAB software environment, which enables readers to experiment with the proposed algorithms and explore the presented examples in more depth.

Books in Print - 1994

Image Restoration - Aymeric Histace 2012-04-04

This book represents a sample of recent contributions of researchers all around the world in the field of image restoration. The book consists of 15 chapters organized in three main sections (Theory, Applications, Interdisciplinarity). Topics cover some different aspects of the theory of image restoration, but this book is also an occasion to highlight some new topics of research related to the emergence of some original imaging devices. From this arise some real challenging problems related to image reconstruction/restoration that open the way to some new fundamental scientific questions closely related with the world we interact with.

Imaging Spectroscopy for Scene Analysis - Antonio Robles-Kelly 2012-10-30

This book presents a detailed analysis of spectral imaging, describing how it can be used for the purposes of material identification, object recognition and scene understanding. The opportunities and challenges of combining spatial and spectral information are explored in depth, as are a wide range of applications. Features: discusses spectral image acquisition by hyperspectral cameras, and the process of spectral image formation; examines models of surface reflectance, the recovery of photometric invariants, and the estimation of the illuminant power spectrum from spectral imagery; describes spectrum representations for the interpolation of reflectance and radiance values, and the classification of spectra; reviews the use of imaging spectroscopy for material identification; explores the recovery of reflection geometry from image reflectance; investigates spectro-polarimetric imagery, and the recovery of object shape and material properties using polarimetric images captured from a single view.