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Digital Image Processing-Wilhelm Burger 2016-03-25 This revised and expanded new edition of an internationally successful classic presents an accessible introduction to the key methods in digital image processing for both practitioners and teachers. Emphasis is placed on practical application, presenting precise algorithmic descriptions in an unusually high level of detail, while highlighting direct connections between the mathematical foundations and concrete implementation. The text is supported by practical examples and carefully constructed chapter-ending exercises drawn from the authors' years of teaching experience, including easily adaptable Java code and completely worked out examples. Source code, test images and additional instructor materials are also provided at an associated website. Digital Image Processing is the definitive textbook for students, researchers, and professionals in search of critical analysis and modern implementations of the most important algorithms in the field, and is also eminently suitable for self-study.

Digital Image Processing-Uvais Qidwai 2009-10-15 Avoiding heavy mathematics and lengthy programming details, Digital Image Processing: An Algorithmic Approach with MATLAB® presents an easy methodology for learning the fundamentals of image processing. The book applies the algorithms using MATLAB®, without bogging down students with syntactical and debugging issues. One chapter can typically be completed per week, with each chapter divided into three sections. The first section presents theoretical topics in a very simple and basic style with generic language and mathematics. The second section explains the theoretical concepts using flowcharts to streamline the concepts and to form a foundation for students to code in any programming language. The final section supplies MATLAB codes for reproducing the figures presented in the chapter. Programming-based exercises at the end of each chapter facilitate the learning of underlying concepts through practice. This textbook equips undergraduate students in computer engineering and science with an essential understanding of digital image processing. It will also help them comprehend more advanced topics and sophisticated mathematical material in later courses. A color insert is included in the text while various instructor resources are available on the author's website.

DIGITAL IMAGE PROCESSING-Joshi, Madhuri A. 2018-06-01 This introduction to the fundamental concepts and methodologies of image processing is suitable for first-year postgraduate and senior undergraduate students in almost every engineering discipline, and in particular meets the requirement of the prescribed courses in the streams: Electronics and Communication, Computer Science and Engineering, Information Technology, and Computer Applications. The book, now in its second edition, continues to offer a balanced exposition of the basic principles and applications of image processing. It lays considerable emphasis on the algorithmic approach in order to teach students how to write good practical programs for problem solving. Major topics covered in the book include Image fundamentals, Different image transforms, Image enhancement in the spatial and frequency domains, Restoration, Image analysis, Image description, Image compression, Image reconstruction from projections, and Applications of image processing in the areas of biometrics, speaker recognition, satellite imaging, medical imaging, and many more. The style of presentation is comprehensive and application oriented, comprising examples, diagrams, image results, case studies of applications, and review questions—making it easy for students to understand key ideas, their practical relevance and applications. NEW TO THIS EDITION • Object representation, recognition and classification • MATLAB programs for image processing • OpenCV programs for image processing

Principles of Digital Image Processing-Wilhelm Burger 2013-11-18 This textbook is the third of three volumes which provide a modern, algorithmic introduction to digital image processing, designed to be used both by learners desiring a firm foundation on which to build, and practitioners in search of critical analysis and concrete implementations of the most important techniques. This volume builds upon the introductory material presented in the first two volumes with additional key concepts and methods in image processing. Features: practical examples and carefully constructed chapter-ending exercises; real implementations, concise mathematical notation, and precise algorithmic descriptions designed for programmers and practitioners; easily adaptable Java code and completely worked-out examples for easy inclusion in existing applications; uses ImageJ; provides a supplementary website with the complete Java source code, test images, and corrections; additional presentation tools for instructors including a complete set of figures, tables, and mathematical elements.

Digital Image Processing Algorithms and Applications-Ioannis Pitas 2000-02-22 A unique collection of algorithms and lab experiments for practitioners and researchers of digital image processing technology With the field of digital image processing rapidly expanding, there is a growing need for a book that would go beyond theory and techniques to address the underlying algorithms. Digital Image Processing Algorithms and Applications fills the gap in the field, providing scientists and engineers with a complete library of algorithms for digital image processing, coding, and analysis. Digital image transform algorithms, edge detection algorithms, and image segmentation algorithms are carefully gleaned from the literature for compatibility and a track record of acceptance in the scientific community. The author guides readers through all facets of the technology, supplementing the discussion with detailed lab exercises in EIKONA, his own digital image processing software, as well as useful PDF transparencies. He covers in depth filtering and enhancement, transforms, compression, edge detection, region segmentation, and shape analysis, explaining at every step the relevant theory, algorithm structure, and its use for problem solving in various applications. The availability of the lab exercises and the source code (all algorithms are presented in C-code) over the Internet makes the book an invaluable self-study guide. It also lets interested readers develop digital image processing applications on ordinary desktop computers as well as on Unix machines.

Digital Image Processing-D. Sundararajan 2017-10-12 This book offers readers an essential introduction to the fundamentals of digital image processing. Pursuing a signal processing and algorithmic approach, it makes the fundamentals of digital image processing accessible and easy to learn. It is written in a clear and concise manner with a large number of 4 x 4 and 8 x 8 examples, figures and detailed explanations. Each concept is developed from the basic principles and described in detail with equal emphasis on theory and practice. The book is accompanied by a companion website that provides several MATLAB programs for the implementation of image processing algorithms. The book also offers comprehensive coverage of the following topics: Enhancement, Transform processing, Restoration, Registration, Reconstruction from projections, Morphological image processing, Edge detection, Object representation and classification, Compression, and Color processing.

Digital Image Processing-Bernd Jähne 1997-10-06 This long-established and well-received monograph offers an integral view of image processing - from image acquisition to the extraction of the data of interest - written by a physical scientists for other scientists. Supplements discussion of the general concepts is supplemented with examples from applications on PC-based image processing systems and ready-to-use implementations of important algorithms. Completely revised and extended, the most notable extensions being a detailed discussion on random variables and fields, 3-D imaging techniques and a unified approach to regularized parameter estimation. Complete text of the book is now available on the accompanying CD-ROM. It is hyperlinked so that it can be used in a very flexible way. CD-ROM contains a full set of exercises to all topics covered by this book and a runtime version of the image processing software heurisko. A large collection of images, image sequences, and volumetric images is available for practice exercises

DIGITAL IMAGE PROCESSING-MADHURI A. JOSHI 2006-01-01 This introduction to the fundamental concepts and methodologies of image processing is suitable for first-year postgraduate and senior undergraduate students in almost any engineering discipline, and in particular meets the requirement of the prescribed courses in the following streams: Electronics and Communication. Computer Science and Engineering. Information and Communication Technology. The book offers a balanced exposition of basic principles and applications of image processing. It lays considerable emphasis on the algorithmic approach in order to teach students how to write good practical programs for problem solving

Topological Algorithms for Digital Image Processing-T.Y. Kong 1996-07-17 Basic topological algorithms are the subject of this new book. It presents their underlying theory and discusses their applications. Due to the wide variety of topics treated in the seven chapters, no attempt has been made to standardize the notation and terminology used by the authors. Each chapter, however, is self-contained and can be read independently of the others. Some of the basic terminology and fundamental concepts of digital topology are reviewed in the appendix which also describes important areas of the field. A bibliography of over 360 references is also provided. The notations and terminologies used in this book will serve to introduce readers to the even wider variety that exists in the voluminous literature dealing with topological algorithms.

Modern Algorithms for Image Processing-Vladimir Kovalevsky 2018-12-10 Utilize modern methods for digital image processing and take advantage of the many time-saving templates provided for all of the projects in this book. Modern Algorithms for Image Processing approaches the topic of image processing through teaching by example. Throughout the book, you will create projects that resolve typical problems that you might encounter in the world of digital image processing. Some projects teach you methods for addressing the quality of images, such as reducing random errors or noise and suppressing pulse noise (salt and pepper), a method valuable for improving the quality of historical images. Other methods detail how to correct inhomogeneous illumination, not by means of subtracting the mean illumination, but through division, a far more efficient method. Additional projects cover contrasting, and a process for edge detection, more efficient than Canny's, for detecting edges in color images directly, without converting them into black and white images. What You'll Learn Apply innovative methods for suppressing pulse noise, enhancing contrast, and edge detection Know the pros and cons of enlisting a particular method Use new approaches for image compression and recognizing circles in photos Utilize a valuable method for straightening photos of paintings taken at an oblique angle, a critical concept to understand when using flash at a right angle Understand the problem statement of polygonal approximation of boundaries or edges and its solution Use a new method for detecting bicycles in traffic Access complete source code examples in C# for all of the projects Who This Book Is For C# developers who work with digital image processing or are interested in informatics. The reader should have programming experience and access to an integrated development environment (IDE), ideally .NET. This book does not prove or disprove theorems, but suggests methods for learning valuable concepts that will enable you to customize your own image processing projects.

Computer Imaging-Scott E Umbaugh 2005-01-27 Computer Imaging: Digital Image Analysis and Processing brings together analysis and processing in a unified framework, providing a valuable foundation for understanding both computer vision and image processing applications. Taking an engineering approach, the text integrates theory with a conceptual and application-oriented style, allowing you to immediately understand how each topic fits into the overall structure of practical application development. Divided into five major parts, the book begins by introducing the concepts and definitions necessary to understand computer imaging. The second part describes image analysis and provides the tools, concepts, and models required to analyze digital images and develop computer vision applications. Part III discusses application areas for the processing of images, emphasizing human visual perception. Part IV delivers the information required to apply a CVIPtools environment to algorithm development. The text concludes with appendices that provide supplemental imaging information and assist with the programming exercises found in each chapter. The author presents topics as needed for understanding each practical imaging model being studied. This motivates the reader to master the topics and also makes the book useful as a reference. The CVIPtools software integrated throughout the book, now in a new Windows version, provides practical examples and encourages you to conduct additional exploration via tutorials and programming exercises provided with each chapter.

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 application 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 algorithms. 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 four major sections, this book provides the concepts and models required to analyze digital images and develop computer vision 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.

Fundamentals of Three-dimensional Digital Image Processing-Junichiro Toriwaki 2009-05-04 This book is a detailed description of the basics of three-dimensional digital image processing. A 3D digital image (abbreviated as "3D image" below) is a digitalized representation of a 3D object or an entire 3D space, stored in a computer as a 3D array. Whereas normal digital image processing is concerned with screens that are a collection of square shapes called "pixels" and their corresponding density levels, the "image plane" in three dimensions is represented by a division into cubical graphical elements (called "voxels") that represent corresponding density levels. Inthecontextofimageprocessing,in manycases3Dimageprocessingwill refer to the input of multiple 2D images and performing processing in order to understand the 3D space (or "scene") that they depict. This is a result of research into how to use input from image sensors such as television cameras as a basis for learning about a 3D scene, thereby replicating the sense of vision for humans or intelligent robots, and this has been the central problem in image processing research since the 1970s. However, a completely di?erent type of image with its own new problems, the 3D digital image discussed in this book, rapidly took prominence in the 1980s, particularly in the ?eld of medical imaging. These were recordings of human bodies obtained through computed (or "computerized") tomography (CT),imagesthatarecordednotonlytheexternal,visiblesurfaceofthesubject but also, to some degree of resolution, its internal structure. This was a type of image that no one had experienced before.

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 Holography and Digital Image Processing-Leonid Yaroslavsky 2013-03-14 Digital holography and digital image processing are twins born by computer era. They share origin, theoretical base, methods and algorithms. The present book describes these common fundamentals principles, methods and algorithms including image and hologram digitization, data compression, digital transforms and efficient computational algorithms, statistical and Monte-Carlo methods, image restoration and enhancement, image reconstruction in tomography and digital holography, discrete signal resampling and image geometrical transformations, accurate measurements and reliable target localization in images, recording and reconstruction of computer generated holograms, adaptive and nonlinear filters for sensor signal perfecting and image restoration and enhancement. The book combines theory, heavily illustrated practical methods and efficient computational algorithms and is written for senior-level undergraduate and graduate students, researchers and engineers in optics, photonics, opto-electronics and electronic engineering.

Algorithms for Image Processing and Computer Vision-J. R. Parker 2010-11-29 A cookbook of algorithms for common image processing applications Thanks to advances in computer hardware and software, algorithms have been developed that support sophisticated image processing without requiring an extensive background in mathematics. This bestselling book has been fully updated with the newest of these, including 2D vision methods in content-based searches and the use of graphics cards as image processing computational aids. It's an ideal reference for software engineers and developers, advanced programmers, graphics programmers, scientists, and other specialists who require highly specialized image processing. Algorithms now exist for a wide variety of sophisticated image processing applications required by software engineers and developers, advanced programmers, graphics programmers, scientists, and related specialists This bestselling book has been completely updated to include the latest algorithms, including 2D vision methods in content-based searches, details on modern classifier methods, and graphics cards used as image processing computational aids Saves hours of mathematical calculating by using distributed processing and GPU programming, and gives non-mathematicians the shortcuts needed to program relatively sophisticated applications. Algorithms for Image Processing and Computer Vision, 2nd Edition provides the tools to speed development of image processing applications.

Algorithms for Image Processing and Computer Vision-J. R. Parker 1997 A cookbook of the hottest new algorithms and cutting-edge techniques in image processing and computer vision This amazing book/CD package puts the power of all the hottest new image processing techniques and algorithms in your hands. Based on J. R. Parker's exhaustive survey of Internet newsgroups worldwide, Algorithms for Image Processing and Computer Vision answers the most frequently asked questions with practical solutions. Parker uses dozens of real-life examples taken from fields such as robotics, space exploration, forensic analysis, cartography, and medical diagnostics, to clearly describe the latest techniques for morphing, advanced edge detection, wavelets, texture classification, image restoration, symbol recognition, and genetic algorithms, to name just a few. And, best of all, he implements each method covered in C and provides all the source code on the CD. For the first time, you're rescued from the hours of mind-numbing mathematical calculations it would ordinarily take to program these state-of-the-art image processing capabilities into software. At last, nonmathematicians get all the shortcuts they need for sophisticated image recognition and processing applications. On the CD-ROM you'll find: * Complete code for examples in the book * A gallery of images illustrating the results of advanced techniques * A free GNU compiler that lets you run source code on any platform * A system for restoring damaged or blurred images * A genetic algorithms package

Digital Image Processing Techniques-Michael P. Ekstrom 2012-12-02 Digital Image Processing Techniques is a state-of-the-art review of digital image processing techniques, with emphasis on the processing approaches and their associated algorithms. A canonical set of image processing problems that represent the class of functions typically required in most image processing applications is presented. Each chapter broadly addresses the problem being considered; the best techniques for this particular problem and how they work; their strengths and limitations; and how the techniques are actually implemented as well as their computational aspects. Comprised of eight chapters, this volume begins with a discussion on processing techniques associated with the following tasks: image enhancement, restoration, detection and estimation, reconstruction, and analysis, along with image data compression and image spectral estimation. The second section describes härdware and software systems for digital image processing. Aspects of commercially available systems that combine both processing and display functions are considered, as are future prospects for their technological and architectural evolution. The specifics of system design trade-offs are explicitly presented in detail. This book will be of interest to students, practitioners, and researchers in various disciplines including digital signal processing, computer science, statistical communications theory, control systems, and applied physics.

Digital Image Processing-Rafael C. Gonzalez 2011-11-21 This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. For courses in Image Processing and Computer Vision. Completely self-contained—and heavily illustrated—this introduction to basic concepts and methodologies for digital image processing is written at a level that truly is suitable for seniors and first-year graduate students in almost any technical discipline. The leading textbook in its field for more than twenty years, it continues its cutting-edge focus on contemporary developments in all mainstream areas of image processing—e.g., image fundamentals, image enhancement in the spatial and frequency domains, restoration, color image processing, wavelets, image compression, morphology, segmentation, image description, and the fundamentals of object recognition. It focuses on material that is fundamental and has a broad scope of application.

Digital Image Processing and Analysis-Scott E Umbaugh 2017-11-30 Digital image processing and analysis is a field that continues to experience rapid growth, with applications in many facets of our lives. Areas such as medicine, agriculture, manufacturing, transportation, communication systems, and space exploration are just a few of the application areas. This book takes an engineering approach to image processing and analysis, including more examples and images throughout the text than the previous edition. It provides more material for illustrating the concepts, along with new PowerPoint slides. The application development has been expanded and updated, and the related chapter provides step-by-step tutorial examples for this type of development. The new edition also includes supplementary exercises, as well as MATLAB-based exercises, to aid both the reader and student in development of their skills.

Digital Image Processing using SCILAB-Rohit M. Thanki 2018-05-07 This book provides basic theories and implementations using SCILAB open-source software for digital images. The book simplifies image processing theories and well as implementation of image processing algorithms, making it accessible to those with basic knowledge of image processing. This book includes many SCILAB programs at the end of each theory, which help in understanding concepts. The book includes more than sixty SCILAB programs of the image processing theory. In the appendix, readers will find a deeper glimpse into the research areas in the image processing.

3-D Image Processing Algorithms-Nikolaidis, Nikos Nikolaidis 2000-11-06 Thorough, up-to-date, comprehensive coverage of 3-D image processing This authoritative guide presents and explains numerous 3-D image processing, analysis, and visualization techniques, including volume filtering, interpolation, 3-D discrete Fourier transform, evaluation of topological and geometrical features, region segmentation and edge detection, skeletonization and registration, and visualization. Necessary theoretical background is provided for each topic, along with a number of algorithms, selected on the basis of their acceptance by the scientific community. The presentation of each technique includes a commented implementation, either in C code or in C-like pseudocode. Though presented in an almost ready-to-run form, the C code is simplified to expose the structure of the processing algorithms, rather than their programming details. This combination of theoretical treatment and C code implementation allows readers to gain insight into these techniques. Important features of 3-D Image Processing Algorithms include: * A demo version of EIKONA 3D image processing software * Lab exercises based on EIKONA 3D * Accompanying transparencies summarizing the most important topics. The material can be downloaded from an ftp site Based on the authors' long experience in research and teaching of 2-D/3-D image processing, 3-D Image Processing Algorithms is an indispensable resource for electrical, computer, and biomedical engineers, as well as computer graphics professionals and programmers.

Fundamentals of Digital Image Processing-Anil K. Jain 1989

Algorithms for Graphics and Image Processing-T. Pavlidis 2012-12-06 The technological developments of the last ten years have made com puter graphics and image processing by computer popular. Pictorial pat tern recognition has also shown significant progress. Clearly, there exist overlapping interests among the three areas of research. Graphic displays are of concern to anyone involved in image processing or pic torial pattern recognition and many problems in graphics require methodologies from image processing for their solutions. The data structures used in all three areas are similar. It seems that there is a common body of knowledge underlying all three areas, pictorial informa tion processing by computer. The novelty of these fields makes it difficult to design a course or to write a book covering their basic concepts. Some of the treatises on graphics focus on the hardware and methods of current interest while treatises on image processing often emphasize applications and classical signal processing. The fast evolution of technology causes such material to lose its relevance. For example, the development of optical fibers has reduced the importance of bandwidth compression.

Variational Methods in Image Processing-Luminita A. Vese 2015-11-18 Variational Methods in Image Processing presents the principles, techniques, and applications of variational image processing. The text focuses on variational models, their corresponding Euler-Lagrange equations, and numerical implementations for image processing. It balances traditional computational models with more modern techniques that solve t

Binary Digital Image Processing-Stéphane Marchand-Maillet 2000 Foreword. Acknowledgements. Notation. Preface. Digital topology. Discrete geometry. Algorithmic graph theory. Acquisition and storage. Distance transformations. Binary digital image characteristics. Image thinning. Some applications. References. Index.

Microscope Image Processing-Qiang Wu 2010-07-27 Digital image processing, an integral part of microscopy, is increasingly important to the fields of medicine and scientific research. This book provides a unique one-stop reference on the theory, technique, and applications of this technology. Written by leading experts in the field, this book presents a unique practical perspective of state-of-the-art microscope image processing and the development of specialized algorithms. It contains in-depth analysis of methods coupled with the results of specific real-world experiments. Microscope Image Processing covers image digitization and display, object measurement and classification, autofocusing, and structured illumination. Key Features: Detailed descriptions of many leading-edge methods and algorithms In-depth analysis of the method and experimental results, taken from real-life examples Emphasis on computational and algorithmic aspects of microscope image processing Advanced material on geometric, morphological, and wavelet image processing, fluorescence, three-dimensional and time-lapse microscopy, microscope image enhancement, MultiSpectral imaging, and image data management This book is of interest to all scientists, engineers, clinicians, post-graduate fellows, and graduate students working in the fields of biology, medicine, chemistry, pharmacology, and other related fields. Anyone who uses microscopes in their work and needs to understand the methodologies and capabilities of the latest digital image processing techniques will find this book invaluable. Presents a unique practical perspective of state-of-the-art microscope image processing and the development of specialized algorithms Each chapter includes in-depth analysis of methods coupled with the results of specific real-world experiments Co-edited by Kenneth R. Castleman, world-renowned pioneer in digital image processing and author of two seminal textbooks on the subject

Data Analysis in Astronomy-V. di Gesù 2012-12-06 The international Workshop on "Data Analysis in Astronomy" was intended to give a presentation of experiences that have been acqui red in data analysis and image processing, developments and appli cations that are steadily growing up in Astronomy. The quality and the quantity of ground and satellite observations require more so phisticated data analysis methods and better computational tools. The Workshop has reviewed the present state of the art, explored new methods and discussed a wide range of applications. The topics which have been selected have covered the main fields of interest for data analysis in Astronomy. The Workshop has been focused on the methods used and their significant applications. Results which gave a major contribution to the physical interpre tation of the data have been stressed in the presentations. Atten tion has been devoted to the description of operational system for data analysis in astronomy. The success of the meeting has been the results of the coordinated effort of several people from the organizers to those who presen ted a contribution and/or took part in the discussion. We wish to thank the members of the Workshop scientific committee Prof. M. Ca paccioli, Prof. G. De Biase, Prof. G. Sedmak, Prof. A. Zichichi and of the local organizing committee Dr. R. Buccheri and Dr. M.C. Macca rone together with Miss P. Savalli and Dr. A. Gabriele of the E. Majo rana Center for their support and the unvaluable part in arranging the Workshop.

Digital Image Processing for Medical Applications-Geoff Dougherty 2009-04-09 Hands-on text for a first course aimed at end-users, focusing on concepts, practical issues and problem solving.

Image Processing for Cinema-Marcelo Bertalmío 2014-02-04 Image Processing for Cinema presents a detailed overview of image processing techniques that are used in practice in digital cinema. The book shows how image processing has become ubiquitous in movie-making, from shooting to exhibition. It covers all the ways in which image processing algorithms are used to enhance, restore, adapt, and convert moving images. These techniques and algorithms make the images look as good as possible while exploiting the capabilities of cameras, projectors, and displays. The author focuses on the ideas behind the methods, rather than proofs and derivations. The first part of the text presents fundamentals on optics and color. The second part explains how cameras work and details the image processing algorithms that are applied in-camera. With an emphasis on state-of-the-art methods that are actually used in practice, the last part describes image processing algorithms that are applied offline to solve a variety of problems. The book is designed for advanced undergraduate and graduate students in applied mathematics, image processing, computer science, and related fields. It is also suitable for academic researchers and professionals in the movie industry.

Digital Image Processing of Remotely Sensed Data-R.M. Hord 1982-01-01 Digital Image Processing of Remotely Sensed Data presents a practical approach to digital image processing of remotely sensed data, with emphasis on application examples and algorithms. It explains where to get the data and what is available and what preprocessing is needed to prepare the imagery for processing. Research topics are described to indicate the limitations of computer methods. This book is comprised of seven chapters and begins with a summary of basic concepts used in remote sensing and digital imagery, followed by a discussion on sources of remotely sensed data. Two essential hardware ingredients in a digital image processing system, a computer and a display device, are then considered, along with the algorithms used in digital image processing. Examples of how digital image processing algorithms have been applied to real imagery for specific objectives are given, including the Kentucky water impoundment experiment and the land-use mapping initiative in Washington, D.C. The next section is devoted to research topics such as digital image shape detection; edge detection and regionalized terrain classification from satellite photography; and digital image enhancement for maximum interpretability using linear programming. This monograph will be of value to professional regional planners, natural resource managers, and others in fields ranging from hydrology and forestry to agronomy and geology.

Digital Image Processing-Bernd Jähne 2013-03-09 From the reviews of the first edition: "I recommend this book to anyone seriously engaged in image processing. It will clearly stretch the horizon of some readers and be a good reference for others. This is not just another image processing book; it is a book worth owning and a book worth reading several times ..." #J. Electronic Imaging# This practical guidebook uses the concepts and mathematics familiar to students of the natural sciences to provide them with a working knowledge of modern techniques of digital image processing. It takes readers from basic concepts to current research topics and demonstrates how digital image processing can be used for data gathering in research. Detailed examples of applications on PC-based systems and ready-to-use algorithms enhance the text, as do nearly 200 illustrations (16 in color). The book also includes the most exciting recent advances such as reconstruction of 3-D objects from projections and the analysis of stereo images and image sequences.

Binary Digital Image Processing-Stéphane Marchand-Maillet 1999-12-01 Binary Digital Image Processing is aimed at faculty, postgraduate students and industry specialists. It is both a text reference and a textbook that reviews and analyses the research output in this field of binary image processing. It is aimed at both advanced researchers as well as educating the novice to this area. The theoretical part of this book includes the basic principles required for binary digital image analysis. The practical part which will take an algorithmic approach addresses problems which find applications beyond binary digital line image processing. The book first outlines the theoretical framework underpinning the study of digital image processing with particular reference to those needed for line image processing. The theoretical tools in the first part of the book set the stage for the second and third parts, where low-level binary image processing is addressed and then intermediate level processing of binary line images is studied. The book concludes with some practical applications of this work by reviewing some industrial and software applications (engineering drawing storage and primitive extraction, fingerprint compression). Outlines the theoretical framework underpinning the study of digital image processing with particular reference to binary line image processing Addresses low-level binary image processing, reviewing a number of essential characteristics of binary digital images and providing solution procedures and algorithms Includes detailed reviews of topics in binary digital image processing with up-to-date research references in relation to each of the problems under study Includes some practical applications Covers a range of topics, organised by theoretical field rather than being driven by problem definitions

Digital Image Processing-Bernd Jähne 2003-04-12 Intended as a practical guide, the book takes the reader from basic concepts to up-to-date research topics in digital image processing. Only little special knowledge in computer sciences is required since many principles and mathematical tools widely used in natural sciences are also explained in digital image processing thus the reader with a general background in natural science gets an easy access to the material presented. The book discusses the following topics: image acquisition and digitization; linear and nonlinear filter operations; edge detection; local orientation and texture; fast algorithms and multigrid data structures; morphological operations to detect the shape of objects; segmentation and classification. Further chapters deal with the reconstruction of three-dimensional objects from projections and the analysis of stereo images and image sequences with differential, correlation, and filter algorithms. Many examples from different areas show how the reader can use image processing as an experimental tool for image data acquisition and evaluation in his or her research areas.

A Computational Introduction to Digital Image Processing-Alasdair McAndrew 2015-10-28 Highly Regarded, Accessible Approach to Image Processing Using Open-Source and Commercial Software A Computational Introduction to Digital Image Processing, Second Edition explores the nature and use of digital images and shows how they can be obtained, stored, and displayed. Taking a strictly elementary perspective, the book only covers topics that involve simple mathematics yet offer a very broad and deep introduction to the discipline. New to the Second Edition This second edition provides users with three different computing options. Along with MATLAB®, this edition now includes GNU Octave and Python. Users can choose the best software to fit their needs or migrate from one system to another. Programs are written as modular as possible, allowing for greater flexibility, code reuse, and conciseness. This edition also contains new images, redrawn diagrams, and new discussions of edge-preserving blurring filters, ISODATA thresholding, Radon transform, corner detection, retinex algorithm, LZW compression, and other topics. Principles, Practices, and Programming Based on the author's successful image processing courses, this bestseller is suitable for classroom use or self-study. In a straightforward way, the text illustrates how to implement imaging techniques in MATLAB, GNU Octave, and Python. Programs are as modular as possible, allowing readers to construct numerous examples and exercises to give

students hands-on practice with the material.

Image Processing Technologies-Kiyoharu Aizawa 2004-03-01 Showcasing the most influential developments, experiments, and architectures impacting the digital, surveillance, automotive, industrial, and medical sciences, this text/reference tracks the evolution and advancement of CVIP technologies - examining methods and algorithms for image analysis, optimization, segmentation, and restoration.

Practical Handbook on Image Processing for Scientific and Technical Applications-Bernd Jahne 2004-03-15 Image processing is fast becoming a valuable tool for analyzing multidimensional data in all areas of natural science. Since the publication of the best-selling first edition of this handbook, the field of image processing has matured in many of its aspects from ad hoc, empirical approaches to a sound science based on established mathematical and p

The Pocket Handbook of Image Processing Algorithms in C-Harley R. Myler 1993 This handy desktop reference gathers together into one easy-to-use volume the most popular image processing algorithms. Designed to be used at the computer terminal, it features an illustrated, annotated dictionary format -- with clear, concise definitions, examples, and C program code. Covers algorithms for adaptive filters, coding and compression, color image processing, histogram operations, image fundamentals, mensuration, morphological filters, nonlinear filters, segmentation, spatial filters, spatial frequency filters, storage formats, and transforms. Includes graphic oriented techniques such as warping, morphing, zooming, and dithering. Provides algorithms for image noise generation. MARKETS: For users and developers of image processing systems and programs.

Digital Image Processing-Bernd Jähne 2013-06-29 This long-established and well-received monograph offers an integral view of image processing - from image acquisition to the extraction of the data of interest – written by a physical scientists for other scientists. Supplements discussion of the general concepts is supplemented with examples from applications on PC-based image processing systems and ready-to-use implementations of important algorithms. Completely revised and extended, the most notable extensions being a detailed discussion on random variables and fields, 3-D imaging techniques and a unified approach to regularized parameter estimation. Complete text of the book is now available on the accompanying CD-ROM. It is hyperlinked so that it can be used in a very flexible way. CD-ROM contains a full set of exercises to all topics covered by this book and a runtime version of the image processing software heurisko. A large collection of images, image sequences, and volumetric images is available for practice exercises

Techniques for Image Processing and Classifications in Remote Sensing-Robert A. Schowengerdt 2012-12-02 Techniques for Image Processing and Classifications in Remote Sensing provides an introduction to the fundamentals of computer image processing and classification (commonly called ""pattern recognition"" in other applications). The book begins with a discussion of digital scanners and imagery, and two key mathematical concepts for image processing and classification—spatial filtering and statistical pattern recognition. This is followed by separate chapters on image processing and classification techniques that are widely used in the remote sensing community. The emphasis throughout is on techniques that assist in the analysis of images, not particular applications of these techniques. The book also has four appendixes, featuring a bibliography; an introduction to computer binary data representation and image data formats; a discussion of interactive image processing; and a selection of exam questions from the Image Processing Laboratory course at the University of Arizona. This book is intended for use as either a primary source in an introductory image processing course or as a supplementary text in an intermediate-level remote sensing course. The academic level addressed is upper-division undergraduate or beginning graduate, and familiarity with calculus and basic vector and matrix concepts is assumed.

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