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Related with Image Analysis And Mathematical Morphology:

Image Processing and Mathematical Morphology
Frank Y. Shih 2009-03-23 In the development of digital multimedia, the importance and impact of image processing and mathematical morphology are well documented in areas ranging from automated vision detection and inspection to object recognition, image analysis and pattern recognition. Those working in these ever-evolving fields require a solid grasp of basic fundamentals, theory, and related applications—and few books can provide the unique tools for learning contained in this text. Image Processing and Mathematical Morphology: Fundamentals and Applications is a comprehensive, wide-ranging overview of morphological mechanisms and techniques and their relation to image processing. More than merely a tutorial on vital technical information, the book places this knowledge into a theoretical framework. This helps readers analyze key principles and architectures and then use the author's novel ideas on implementation of advanced algorithms to formulate a practical and detailed plan to develop and foster their own ideas. The book: Presents the history and state-of-the-art techniques related to image morphological processing, with numerous practical examples Gives readers a clear tutorial on complex technology and other tools that rely on their intuition for a clear understanding of the subject Includes an updated bibliography and useful graphs and illustrations Examines several new algorithms in great detail so that readers can adapt them to derive their own solution approaches This invaluable reference helps readers assess and simplify problems and their essential requirements and complexities, giving them all the necessary data and methodology to master current theoretical developments and applications, as well as create new ones.

Image Analysis and Mathematical Morphology
Jean Serra 1984-01

Morphological Image Analysis
Pierre Soille 2013-03-14 The book is self-contained in the sense that it is accessible to engineers, scientists, and practitioners having no prior experience with morphology. In addition, most necessary background notions about digital image processing are covered. The emphasis being put on the techniques useful for solving practical problems rather than the theory underlying mathematical morphology, no special knowledge about set theory and topology is required. Nevertheless, the book goes well beyond an introduction to mathematical morphology. Indeed, starting from the fundamental transformations, more elaborate methods which have proven their practical usefulness are explained. This is achieved through a step by step process pursued until the most recent advances.

Mathematical Morphology and Its Applications to Image Processing
Jean Serra 2012-12-06 Mathematical morphology (MM) is a theory for the analysis of spatial structures. It is called morphology since it aims at analysing the shape and form of objects, and it is mathematical in the sense that the analysis is based on set theory, topology, lattice algebra, random functions, etc. MM is not only a theory, but also a powerful image analysis technique. The purpose of the present book is to provide the image analysis community with a snapshot of current theoretical and applied developments of MM. The book consists of forty-five contributions classified by subject. It demonstrates a wide range of topics suited to the morphological approach.

Mathematical Morphology and its Applications to Image and Signal Processing
Henk J.A.M. Heijmans 1996-05-31 This book contains the proceedings of the International Symposium on Mathematical Morphology and its Applications to Image and Signal Processing IV, held June 3-5, 1998, in Amsterdam, The Netherlands. The purpose of the work is to provide the image analysis community with a sampling of recent developments in theoretical and practical aspects of mathematical morphology and its applications to image and signal processing. Among the areas covered are: digitization and connectivity, skeletonization, multivariate morphology, morphological segmentation, color image processing, filter design, gray-scale morphology, fuzzy morphology, decomposition of morphological operators, random sets and statistical inference, differential morphology and scale-space, morphological algorithms and applications. Audience: This volume will be of interest to research mathematicians and computer scientists whose work involves mathematical morphology, image and signal processing.

Mathematical Morphology in Image Processing
Edward Dougherty 2018-10-03 Presents the statistical analysis of morphological filters and their automatic optical design, the development of morphological features for image signatures, and the design of efficient morphological algorithms. Extends the morphological paradigm to include other branches of science and mathematics. This book is designed to be of interest to optical, electrical and electronics, and electro-optic engineers, including image processing, signal processing, machine vision, and computer vision engineers, applied mathematicians, image analysts and scientists and graduate-level students in image processing and mathematical morphology courses.

Mathematical Morphology in Image Processing
Edward Dougherty 1992-09-25 Presents the statistical analysis of morphological filters and their automatic optical design, the development of morphological features for image signatures, and the design of efficient morphological algorithms. Extends the morphological paradigm to include other branches of science and mathematics. This book is designed to be of interest to optical, electrical and electronics, and electro-optic engineers, including image processing, signal processing, machine vision, and computer vision engineers, applied mathematicians, image analysts and scientists and graduate-level students in image processing and mathematical morphology courses.

Mathematical Morphology
Laurent Najman 2013-01-24 Mathematical Morphology allows for the analysis and processing of geometrical structures using techniques based on the fields of set theory, lattice theory, topology, and random functions. It is the basis of morphological image processing, and finds applications in fields including digital image processing (DSP), as well as areas for graphs, surface meshes, solids, and other spatial structures. This book presents an up-to-date treatment of mathematical morphology, based on the three pillars that made it an important field of theoretical work and practical application: a solid theoretical foundation, a large body of applications and an efficient implementation. The book is divided into five parts and includes 20 chapters. The five parts are structured as follows: Part I sets out the fundamental aspects of the discipline, starting with a general introduction, followed by two more theory-focused chapters, one addressing its mathematical structure and
including an updated formalism, which is the result of several decades of work. Part II extends this formalism to some non-deterministic aspects of the theory, in particular detailing links with other disciplines such as stereology, geostatistics and fuzzy logic. Part III addresses the theory of morphological filtering and segmentation, featuring modern connected approaches, from both theoretical and practical aspects. Part IV features practical aspects of mathematical morphology, in particular how to deal with color and multivariate data, links to discrete geometry and topology, and some algorithmic aspects; without which applications would be impossible. Part V showcases all the previously noted fields of work through a sample of interesting, representative and varied applications.


Mathematical morphology is a powerful methodology for the processing and analysis of geometric structure in signals and images. This book contains the proceedings of the fifth International Symposium on Mathematical Morphology and its Applications to Image and Signal Processing, held June 26-28, 2000, at Xerox PARC, Palo Alto, California. It provides a broad sampling of the most recent theoretical and practical developments of mathematical morphology and its applications to image and signal processing. Areas covered include: decomposition of structuring functions and morphological operators, morphological discretization, filtering, connectivity and connected operators, morphological shape analysis and interpolation, texture analysis, morphological segmentation, morphological multiscale techniques and scale-spaces, and morphological algorithms and applications. Audience: The subject matter of this volume will be of interest to electrical engineers, computer scientists, and mathematicians whose research work is focused on the theoretical and practical aspects of nonlinear signal and image processing. It will also be of interest to those working in computer vision, applied mathematics, and computer graphics.

Mathematical Morphology and Its Applications to Image and Signal Processing Petroso Maragos 2012-12-06

Mathematical morphology (MM) is a powerful methodology for the quantitative analysis of geometrical structures. It consists of a broad and coherent collection of theoretical concepts, nonlinear signal operators, and algorithms signal aiming at extracting, from images or other geometrical objects, information related to their shape properties. Its mathematical origins stem from the theory of set models and from the study of the morphological shape analysis and interpretation, then provided with new mathematical tools and algorithms. MM was initiated in the late 1960s by G. Matheron and J. Serra at the Fontainebleau School of Mines in France. Originally it was applied to analyzing images from geological or biological specimens. However, its rich theoretical framework, algorithmic efficiency, easy implementability on special hardware, and suitability for many shape-oriented problems have propelled its widespread diffusion and adoption by many academic and industry groups in many countries as one of the most prominent image analysis methodologies. The purpose of Mathematical Morphology and its Applications to Image and Signal Processing is to provide the image analysis community with a sampling from the current developments in the theoretical (deterministic and stochastic) and computational aspects of MM and its applications to image and signal processing. The book consists of the papers presented at the ISMM’96 grouped into the following themes: Theory Connectivity Filtering Nonlinear System Related to Morphology Algorithms/Architectures Granulometries, Texture Segmentation Image Sequence Analysis Learning Document Analysis Applications

Mathematical Morphology in Geomorphology and GISci Behara Seshadri Daya Sagar 2016-04-19

Mathematical Morphology in Geomorphology and GISci presents a multitude of mathematical morphological approaches for processing and analyzing digital images in quantitative geomorphology and geographic information science (GISc). Covering many interdisciplinary applications, the book explains how to use mathematical morphology not only to perform

Hands-on Morphological Image Processing Edward R. Dougherty 2003

Morphological Image Processing, a standard part of the imaging scientist’s toolbox, can be applied to a wide range of industrial applications. Concentrating on applications, this text shows how to analyse the problems and then develop successful algorithms to solve them.

Shape in Picture Ying-Lie O 2013-04-17

The fields of image analysis, computer vision, and artificial intelligence all make use of descriptions of shape in grey-level images. Most existing algorithms for the automatic recognition and classification of particular shapes have been developed for specific purposes, with the result that these methods are often restricted in their application. The use of advanced and theoretically well-founded mathematical methods should lead to the construction of robust shape descriptors having more general application. Shape description can be regarded as a meeting point of vision research, mathematics, computing science, and the application fields of image analysis, computer vision, and artificial intelligence. The NATO Advanced Research Workshop “Shape in Picture” was organized with the aim to provide all participants with an overview of relevant developments in these different disciplines; second, it should stimulate researchers to exchange original results and ideas across the boundaries of these disciplines. This book comprises a widely drawn selection of papers presented at the workshop, and many contributions have been revised to reflect further progress in the field. The focus of this collection is on mathematical approaches to the construction of shape descriptions from grey-level images. The book is divided into five parts, each devoted to a different discipline. Each part contains papers that have tutorial sections; these are intended to assist the reader in becoming acquainted with the variety of approaches to the problem.

Random Sets and Integral Geometry Georges Matheron 1974

Handbook of Computer Vision Algorithms in Image Algebra Joseph N. Wilson 2000-09-21

Image algebra is a comprehensive, unifying theory of image transformations, image analysis, and image understanding. In 1996, the bestselling first edition of the Handbook of Computer Vision Algorithms in Image Algebra introduced engineers, scientists, and students to this powerful tool, its basic concepts, and its use in the concise representation of computer vision algorithms and architectures. Updated to reflect recent advances, the second edition continues to provide an outstanding introduction to image algebra. It describes more than 80 fundamental computer vision techniques and introduces the portable ia++ library, which supports image algebra programming in the C++ language. Revisions to the first edition include a new chapter on geometric manipulation and spatial transformation, several additional algorithms, and the addition of exercises to each chapter. The authors—both instrumental in the groundbreaking development of image algebra—introduce each technique with a brief discussion that provides context and motivation, then provide a detailed algorithmic treatment of the new and expanded topics. In addition to furnishing the simple yet powerful utility of image algebra, the Handbook of Computer Vision Algorithms in Image Algebra supplies the core of knowledge all computer vision practitioners need. It offers a more practical, less esoteric presentation than those found in research publications that will soon earn it a prime location on your reference shelf.

Colorimetry and Image Processing Carlos Travieso-Gonzalez 2018-01-24 Nowadays, the technological advances allow developing many applications in different fields. In the book Colorimetry and Image Processing, two important fields are presented: colorimetry and image processing. Colorimetry is observed by a visual interactive programming learning system, an approach based on color analysis of Habanero chili peppers. Another approach based on scene image segmentation centered on mathematical morphology, other systems based on the simulations of the dichromatic color appearance, and, finally, an approach based on the color reconstruction in order to enhance its using super-resolution methods. On the other hand, image processing is shown by pansharpening algorithms for hyperspectral images, an approach based on the analysis of the low-resolution satellite images and ground-based sky camera for estimating the cloud motion, a hybrid super-resolution framework that combines desirable features of TV and BM3D models, a study of the real-time video analysis used for anthropometric measurements on agricultural tools and machines, and finally, an approach based on the threshold optimization iterative algorithm using the ground truth data and assessing the accuracy of a range of threshold values through the corresponding Kappa coefficient of concordance.

Image Processing and Pattern Recognition Frank Y. Shih 2010-07-16

A comprehensive guide to the essential principles of image processing and pattern recognition and applications in the areas of image processing and pattern recognition are growing at an unprecedented rate. Containing the latest state-of-the-art developments in the field, Image Processing and Pattern Recognition presents clear explanations of the
fundamentals as well as the most recent applications. It explains the essential principles so readers will not only be able to easily implement the algorithms and techniques, but also lead themselves to discover new problems and applications. Unlike other books on the subject, this volume presents numerous fundamental and advanced image processing algorithms and pattern recognition techniques to illustrate the framework. Scores of graphs and examples, technical assistance, and practical tools illustrate the basic principles and help simplify the problems, allowing students as well as professionals to easily grasp even complicated theories. It also features unique coverage of the most interesting developments and updated techniques, such as image watermarking, digital steganography, document processing and classification, solar image processing and event classification, 3-D Euclidean distance transformation, shortest path planning, soft morphology, recursive morphology, regulated morphology, and sweep morphology. Additional topics include enhancement and segmentation techniques, active learning, feature extraction, neural networks, and fuzzy logic. Featuring supplemental materials for instructors and students, Image Processing and Pattern Recognition is designed for undergraduate seniors and graduate students, engineering and scientific researchers, and professionals who work in signal processing, image processing, pattern recognition, information security, document processing, multimedia systems, and solar physics.

**Mathematical Morphology and Its Applications to Signal and Image Processing**
Jin All Benediktsson 2015-05-15 This book contains the thoroughly refereed proceedings of the 12th International Symposium on Mathematical Morphology, ISMM 2015 held in Reykjavik, Iceland, in May 2015. The 62 revised full papers were carefully reviewed and selected from 72 submissions. The papers are organized in topical sections on evaluations and applications; hierarchies; color, multivalued and orientation fields; optimization, differential calculus and probabilities; topology and discrete geometry; and algorithms and implementation.

**Mathematical Morphology: 40 Years On**
Christian Ronse 2006-03-30 Mathematical Morphology is a specialty in Image Processing and Analysis, which considers images as geometrical objects, to be analyzed through their interactions with other geometrical objects. It relies on several branches of mathematics, such as discrete geometry, topology, lattice theory, partial differential equations, integral geometry and geometrical probability. It has produced fast and efficient algorithms for computer analysis of images, and has found applications in bio-medical imaging, materials science, geoscience, remote sensing, quality control, document processing and data analysis. This book contains the 43 papers presented at the 7th International Symposium on Mathematical Morphology, held in Paris on April 18-20, 2005. It gives a lively state of the art of current research topics in this field. It also marks a milestone, the 40 years of uninterrupted development of this ever-expanding domain.

**Image Processing and Acquisition using Python**
Ravishankar Chitayala 2014-02-19 Image Processing and Acquisition using Python provides readers with a sound foundation in both image acquisition and image processing—one of the first books to integrate these topics together. By improving readers’ knowledge of image acquisition techniques and corresponding image processing, the book will help them perform experiments more effectively and fast. It introduces Python as well as image and measurement techniques. A refresh for more experienced readers, the first part of the book presents an introduction to Python, Python modules, reading and writing images using Python, and an introduction to images. The second part discusses the basics of image processing, including pre/post processing using filters, segmentation, morphological operations, and measurements. The last part describes image acquisition using various modalities, such as x-ray, CT, MRI, light microscopy, and electron microscopy. These modalities encompass most of the common image acquisition methods currently used by researchers in academia and industry.

**Image Processing and Analysis with Graphs**
Olivier Lezoray 2017-07-12 Covering the theoretical aspects of image processing and analysis through the use of graphs in the representation and analysis of objects, Image Processing and Analysis with Graphs: Theory and Practice also demonstrates how these concepts are indispensable for the design of cutting-edge solutions for real-world applications. Explores new applications in computational photography, image and video processing, computer graphics, recognition, medical and biomedical imaging With the explosive growth in image production, in everything from digital photographs to medical scans, there has been a drastic increase in the number of applications based on digital images. This book explores how images—which are suitable to represent any discrete data by modeling neighborhood relationships—have emerged as the perfect unified tool to represent, analyze and synthesize images. It also explains why graphs are ideal for defining graph-theoretical algorithms that enable the processing of functions, making it possible to draw on the rich literature of combinatorial optimization to produce highly efficient solutions. Some key subjects covered in the book include: Definition of graph-theoretical algorithms that enable denoising and image enhancement Energy minimization and modeling of pixel-labeling problems with graph cuts and Markov Random Fields Image processing with graphs: targeted segmentation, partial differential equations, mathematical morphology, and wavelets Analysis of the similarity between objects with graph matching Adaptation and use of graph-theoretical algorithms for specific imaging applications in computational photography, computer vision, and medical and biomedical imaging Use of graphs has become very influential in computer science and has led to many applications in denoising, enhancement, restoration, and object extraction. Accounting for the wide variety of problems being solved with graphs in image processing and computer vision, this book is a contributed volume of chapters written by renowned experts who address specific aspects of the graph-theoretical algorithms. The book is written as an up-to-date overview provides application examples that illustrate practical application of theoretical algorithms. Useful as a support for graduate courses in image processing and computer vision, it is also perfect as a reference for practicing engineers working on development and implementation of image processing and analysis algorithms.

**An Introduction to Morphological Image Processing**

**Image Processing and Data Analysis**
Jean-Luc Starck 1998-05-21 Powerful techniques have been developed in recent years for the analysis of digital data, especially the manipulation of images. This book provides an in-depth introduction to a range of these innovative, avant-garde data-processing techniques. It develops the reader’s understanding of each technique and then shows with practical examples how they can be applied to improve the skills of graduate students and researchers in astronomy, electrical engineering, physics, geophysics and medical imaging. It is intended to be an introduction to the complementary blend of theory and practical application. Throughout, it is copiously illustrated with real-world examples from astronomy, electrical engineering, remote sensing and medicine. It also shows how many, more traditional, methods can be enhanced by incorporating the new wavelet and multiscale methods into the processing. For graduate students and researchers already experienced in image processing and data analysis, this book provides an indispensable guide to a wide range of exciting and original data-analysis techniques.

**Introduction to Image Processing and Analysis**
Job C. Russ 2007-10-31 Image processing comprises a broad variety of methods that operate on images to produce another image. A unique textbook, Introduction to Image Processing and Analysis establishes the programming involved in image processing and analysis by utilizing skills in C compiler and both Windows and MacOs programming environments. The provided mathematical background illustrates the workings of algorithms and emphasizes the practical reasons for using certain methods, their effects on images, and their appropriate applications. The text concentrates on image processing and measurement and details the implementation of many of the most widely used and most important image processing and analysis algorithms. Homework problems are included in every chapter with solutions available for download from the CRC Press website. The chapters work together to combine image processing with image analysis. The book is an explanation of the difference between image and an expansion of the frequency space. Chapters 1 and 2 deal with the algorithms used in processing steps that are usually accomplished by a combination of measurement and processing operations, as described in chapters 3 and 4. The authors present each concept using a mixture of three mutually supportive tools: a description of the procedure with example images, the relevant mathematical equations behind each concept, and the simple source code (in C), which illustrates basic operations. In particular, the source code provides a starting point to develop further modifications. Written by John Russ, author of esteemed Image Processing Handbook now in its fifth edition, this book demonstrates functions to improve an image's of features and detail visibility, improve images for printing or transmission, and facilitate subsequent analysis.
Machine Vision Handbook: Bruce G. Batchelor 2012-02-14 The automation of visual inspection is becoming more and more important in modern industry as a consistent, reliable means of judging the quality of raw materials and manufactured goods. The Machine Vision Handbook equips the reader with the practical details required to engineer integrated mechanical-optical-electronic-software systems. Machine vision is first set in the context of basic information on light, natural vision, colour sensing and optics. The physical apparatus required for mechanized image capture - lenses, cameras, scanners and light sources - are discussed followed by detailed treatment of various image-processing methods including an introduction to the QT image processing system. QT is unique to this book, and provides an example of a practical machine vision system along with extensive libraries of useful commands, functions and images which can be implemented by the reader. The main text of the book is completed by studies of a wide variety of applications of machine vision in inspecting and handling different types of object.

Micro-Doppler Characteristics of Radar Targets: Qun Zhang 2016-10-31 Micro-Doppler Characteristics of Radar Targets is a monograph on radar target’s micro-Doppler effect theory and micro-Doppler feature extraction techniques. The micro-Doppler effect is presented from two aspects, including micro-Doppler effect analysis and micro-Doppler feature extraction, with micro-Doppler effects induced by different micro-motional targets in different radar systems analyzed and several methods of micro-Doppler feature extraction and three-dimensional micro-motion feature reconstruction presented. The main contents of this book include micro-Doppler effect in narrowband radar, micro-Doppler effect in wideband radar, micro-Doppler effect in bistatic radar, micro-Doppler feature analysis and extraction, and three-dimensional micro-motion feature reconstruction, etc. This book can be used as a reference for scientific and technical personnel engaged in radar signal processing and automatic target recognition, etc. It is especially suitable for beginners who are interested in research on micro-Doppler effect in radar. Presents new views on micro-Doppler effects, analyzing and discussing micro-Doppler effect in wideband radar rather than focusing on narrowband Provides several new methods for micro-Doppler feature extraction which are very helpful and practical for readers Includes practical cases that align with main MATLAB codes in each chapter, with detailed program annotations

Mathematical Morphology and Its Applications to Signal and Image Processing: Jesús Angulo 2017-05-17 This book contains the refereed proceedings of the 13th International Symposium on Mathematical Morphology, ISMM 2017 held in Fontainebleau, France, in May 2017. The 36 revised full papers presented together with 4 short papers were carefully reviewed and selected from 53 submissions. The papers are organized in topical sections on algebraic theory, max-plus and max-min mathematics; discrete geometry and discrete topology; watershed and graph-based segmentation; trees and hierarchies; topological and graph-based clustering, classification and filtering; connected operators and attribute filters; PDE-based morphology; scale-space representations and nonlinear decompositions; computational morphology; object detection; and biomedical, material science and physical applications.

Practical Image and Video Processing Using MATLAB: Oge Marques 2011-08-04 UP-TO-DATE, TECHNICALLY ACCURATE COVERAGE OF ESSENTIAL TOPICS IN IMAGE AND VIDEO PROCESSING This is the first book to combine image and video processing with a practical MATLAB®-oriented approach in order to demonstrate the most important image and video techniques and algorithms. Utilizing minimal math, the contents are presented in a clear, objective manner, emphasizing and encouraging experimentation. The book has been organized into two parts. Part I: Image Processing begins with an overview of the field, then introduces the fundamental concepts, notation, and terminology associated with image representation and basic image processing operations. Next, it discusses MATLAB® and its Image Processing Toolbox with the start of a series of chapters with hands-on activities and step-by-step tutorials. These chapters cover image acquisition and digitization; arithmetic, logic, and geometric operations; point-based, histogram-based, and neighborhood-based image enhancement techniques; the Fourier Transform and relevant frequency-domain image filtering techniques; image restoration; mathematical morphology; edge detection techniques; image segmentation; image compression and coding; and feature extraction and representation. Part II: Video Processing presents the main concepts and terminology associated with analog video signals and systems, as well as digital video formats and standards. It then describes the technically involved problem of standards conversion, discusses motion estimation and compensation techniques, shows how video sequences can be filtered, and concludes with an example of a solution to object detection and tracking in video sequences using MATLAB®. Extra features of this book include: More than 30 MATLAB® tutorials, which consist of step-by-step guides to processing image and video processing techniques using MATLAB® Chapters supported by figures, examples, illustrative problems, and exercises Useful websites and an extensive list of bibliographical references This accessible text is ideal for upper-level undergraduate and graduate students in digital image and video processing courses, as well as for engineers, researchers, software developers, practitioners, and anyone who wishes to learn about these increasingly popular topics on their own.

Fuzzy Logic: R. Lowen 2012-12-06 Fuzzy Logic: State of the Art covers a wide range of both theory and applications of fuzzy sets, ranging from mathematical basics, through artificial intelligence, computer management and systems science to engineering applications. Fuzzy Logic will be of interest to researchers working in fuzzy set theory and its applications.

A Beginner's Guide to Image Preprocessing Techniques: Jyotismita Chaki 2018-10-25 For optimal computer vision outcomes, attention to image pre-processing is required so that one can improve image features by eliminating unwanted falsification. This book emphasizes various image pre-processing methods which are necessary for early extraction of features from the image. Effective use of image pre-processing can offer advantages and resolve complications that finally results in improved detection of local and global features. Different approaches for image enrichments and improvements are conferred in this book that will affect the feature analysis depending on how the procedures are employed. Key Features Describes the methods used to prepare images for further analysis which includes noise removal, enhancement, segmentation, local, and global features, and object detection. Includes data and deep learning Covers geometric pixel brightness, filtering, mathematical morphology transformation, and segmentation pre-processing techniques Illustrates a combination of basic and advanced pre-processing techniques essential to computer vision pipeline Details complications to resolve using image pre-processing.

Morphology of Condensed Matter: Klaus R. Mecke 2008-01-11 The morphology of spatially stuctured materials is a rapidly growing field of research at the interface of statistical physics, applied mathematics and materials science. A wide spectrum of applications encompasses the flow through porous and composite materials as well as microemulsions and foams. Written as a set of lectures and tutorial reviews leading up to the forefront of research, this book will be both a compendium for the experienced researcher as well as a high level introductory text for postgraduate students and nonspecialist researchers working in related areas.

Mapping and Spatial Analysis of Socio-economic and Environmental Indicators for Sustainable Development: Noamen Rebai 2019-08-01 This book presents most recent research studies on mapping and spatial analysis of socio-economic and environmental indicators used by various national and international contributors to regional development projects. It gathers the best contributions to the 1st International Conference on Mapping and Spatial Analysis of Socio-economic and Environmental Indicators for the Local and Regional Sustainable Development. The conference was held in southern Tunisia, Tataouine in March 2015. The research studies focused on generating and analyzing indicators in various domains of Agriculture, Energy, Industry, Tourism, Transport, Urban Planning, Exploitation of Natural Resources, Infrastructure, Health, Environment, Education, Information and Communication Technologies, Social Affairs and Employability, and Culture and Sport. Socio-economic and environmental indicators are important in regional development plans and strategies as they allow to observe and analyze changes in the economic growth and to measure their impact on the environment and on social networks/daily life of citizens. On the basis of well-defined geomatic approaches, and particularly, through sophisticated digital mapping and spatio-temporal analyses, authors focused on retrieving indicators to evaluate the exploitation rate of natural resources, intensity of the energy consumption in various economic sector, net migratory flows, quality checking of the air in urban areas, adaptation to climate change, and vulnerability of the coastal domain and risk of marine submersion due to sea-level rise. The book is of interest not only to investors and contributors to regional development projects, but also to all relevant policy makers.
Fuzzy Information and Engineering - Bingyuan Cao 2009-10-14 This book is the proceedings of the Third International Conference on Fuzzy Information and Engineering (ICFIE 2009) held in the famous mountain city Chongqing in Southwestern China, from September 26-29, 2009. Only high-quality papers are included. The ICFIE 2009, built on the success of previous conferences, the ICFIE 2007 (Guangzhou, China), is a major symposium for scientists, engineers and practitioners in the world to present their updated results, ideas, developments and applications in all areas of fuzzy information and engineering. It aims to strengthen relations between industry research laboratories and universities, and to create a primary symposium for world scientists in fuzzy fields as follows: Fuzzy Information; Fuzzy Sets and Systems; Soft Computing; Fuzzy Engineering; Fuzzy Operation Research and Management; Artificial Intelligence; Fuzzy Mathematics and Systems in Applications, etc.

Spatial Information Theory - Stephan Winter 2007-08-26 This book constitutes the refereed proceedings of the 8th International Conference on Spatial Information Theory, COSIT 2007, held in Melbourne, Australia in September 2007. The 27 revised full papers were carefully reviewed from 102 submissions, and they are organized in topical sections on cultural studies, semantics, similarity, mapping and representation, perception and cognition, reasoning and algorithms, navigation and landmarks, as well as uncertainty and imperfection.

Mathematical Methods for Signal and Image Analysis and Representation - Luc Florack 2012-01-12 Mathematical Methods for Signal and Image Analysis and Representation presents the mathematical methodology for generic image analysis tasks. In the context of this book an image may be any m-dimensional empirical signal living on an n-dimensional smooth manifold (typically, but not necessarily, a subset of spacetime). The existing literature on image methodology is rather scattered and often limited to either a deterministic or a statistical point of view. In contrast, this book brings together these seemingly different points of view in order to stress their conceptual relations and formal analogies. Furthermore, it does not focus on specific applications, although some are detailed for the sake of illustration, but on the methodological frameworks on which such applications are built, making it an ideal companion for those seeking a rigorous methodological basis for specific algorithms as well as for those interested in the fundamental methodology per se. Covering many topics at the forefront of current research, including anisotropic diffusion filtering of tensor fields, this book will be of particular interest to graduate and postgraduate students and researchers in the fields of computer vision, medical imaging and visual perception.

Fuzzy Techniques in Image Processing - Etienne E. Kerre 2013-03-19 Since time immemorial, vision in general and images in particular have played an important and essential role in human life. Nowadays, the field of image processing also has numerous scientific, commercial, industrial and military applications. All these applications result from the interaction between fundamental scientific research on the one hand, and the development of new and high-standard technology on the other. Regarding the scientific component, quite recently the scientific community became familiar with “fuzzy techniques” in image processing, which make use of the framework of fuzzy sets and related theories. The theory of fuzzy sets was initiated in 1965 by Zadeh, and is one of the most developed models to treat imprecision and uncertainty. Instead of the classical approach that an object belongs or does not belong to a set, the concept of a fuzzy set allows a gradual transition from membership to nonmembership, providing partial degrees of membership. Fuzzy techniques are often complementary to existing techniques and can contribute to the development of better and more robust methods, as has already been illustrated in numerous scientific branches. With this volume, we want to demonstrate that the introduction and application of fuzzy techniques can also be very successful in the area of image processing. This book contains high-quality contributions of over 30 field experts, covering a wide range of both theoretical and practical applications of fuzzy techniques in image processing.

Entropy in Image Analysis - Amelia Carolina Sparavigna 2019-06-24 Image analysis is a fundamental task for extracting information from images acquired across a range of different devices. Since reliable quantitative results are requested, image analysis requires highly sophisticated numerical and analytical methods—particularly for applications in medicine, security, and remote sensing, where the results of the processing may consist of vitally important data. The contributions to this book provide a good overview of the most important demands and solutions concerning this research area. In particular, the reader will find image analysis applied for feature extraction, encryption and decryption of data, color segmentation, and in the support of new technologies. In all the contributions, entropy plays a pivotal role.

Progress in Pattern Recognition, Image Analysis, Computer Vision, and Applications - Ruben Vera-Rodriguez 2019-03-02 This book constitutes the refereed post-conference proceedings of the 23rd Iberoamerican Congress on Pattern Recognition, CIARP 2018, held in Madrid, Spain, in November 2018. The 112 papers presented were carefully reviewed and selected from 187 submissions. The program was comprised of 6 oral sessions on the following topics: machine learning, computer vision, classification, biometrics and medical applications, and brain signals, and also on: text and character analysis, human interaction, and sentiment analysis.

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.