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Cover photos: Dr. Stephen Marshall, Author, *Logic-based Nonlinear Image Processing* (TT72); and Prof. Jan P. Allebach, Editor, *Journal of Electronic Imaging*. 
Local Approximation Techniques in Signal and Image Processing
by Vladimir Katkovnik, Karen Egiazarian, Jaakko Astola

This book deals with a wide class of novel and efficient adaptive signal processing techniques developed to restore signals from noisy and degraded observations. These signals include those acquired from still or video cameras, electron microscopes, radar, x rays, or ultrasound devices, and are used for various purposes, including entertainment, medical, business, industrial, military, civil, security, and scientific applications.

Logic-based Nonlinear Image Processing
by Stephen Marshall

This text provides insight into the design of optimal image processing operators for implementation directly into digital hardware. Starting with simple restoration examples and using the minimum of statistics, the book provides a design strategy for a wide range of image processing applications. The text is aimed principally at electronics engineers and computer scientists, but will also be of interest to anyone working with digital images.

Computational Color Technology
by Henry R. Kang

Henry Kang provides the fundamental color principles and mathematical tools to prepare the reader for a new era of color reproduction, and for subsequent applications in multispectral imaging, medical imaging, remote sensing, and machine vision. This book is intended to bridge the gap between color science and computational color technology, putting color adaptation, color constancy, color transforms, color display, and color rendition in the domain of vector-matrix representations and theories.

Computational Color Technology deals with color digital images on the spectral level using vector-matrix representations so that the reader can learn to process digital color images via linear algebra and matrix theory.
Progressive Image Transmission: The Role of Rationality, Cooperation, and Justice
by Jose A. García, Rosa Rodriguez-Sánchez, Joaquín Fdez-Valdivia

The authors present a sound, practical approach to information prioritization in progressive image transmission. The method, suitable for a variety of imaging applications from consumer products to the defense, publishing, science, and law enforcement industries, first states some general principles that the solution must obey and then derives the solution that satisfies exactly those principles. The text is intended for graduate students as well as engineers and research scientists in the field of image coding.

Hands-on Morphological Image Processing
by Edward R. Dougherty, Roberto A. Lotufo

Morphological image processing, now a standard part of the imaging scientist’s toolbox, can be applied to a wide range of industrial applications. Concentrating on applications, this book shows how to analyze a problem and then develop successful algorithms based on the analysis. The book is hands-on in a very real sense: readers can download a demonstration toolbox of techniques and images from the web so they can process the images according to examples in the text.

Optical Information Processing: A Tribute to Adolf Lohmann
Editor: H. John Caulfield

Adolf Lohmann’s significant contributions to the field of optics are recognized by key people whose own works have been based on or influenced by his ground-breaking discoveries and inventions. Chapters describe the history, research, and latest trends in optical information processing.
In 1671, Isaac Newton demonstrated color dispersion by positioning a triangular prism in a narrow beam of sunlight and projecting bands of differently colored lights onto a white surface. The spectrum had been discovered. Since that historic experiment, color has been the subject of intensive study. This text provides a number of concepts, definitions, and tools useful to students who wish to develop a basic understanding of colorimetry and color vision. Those who have experience in the field will find a compendium of data and other information previously unavailable in a single publication.

The Art and Science of Holography: A Tribute to Emmett Leith and Yuri Denisyuk

Editor: H. John Caulfield

This volume celebrates both the triumphs and the consummate details of one of the most creative fields in optics: the art and science that is modern holography. Through anecdotal narratives and rigorous mathematical analyses, this book reveals the elegance of the field pioneered by physicists Yuri Denisyuk and Emmett Leith. Many highly regarded holographers worldwide have contributed chapters to this work. It explores all of the modern holographic advances and ponders the role holography will play in future technology.

Optics and Photonics 2006: A Tribute to Holography Pioneers Emmett Leith and Yuri Denisyuk

This CDS includes papers from the special conference OEI300 “Tribute to Emmett Leith” at Optics and Photonics 2006, along with photographs and a collection of Emmett Leith’s SPIE papers.
Adaptive Image Processing: A Computational Intelligence Perspective
by Stuart W. Perry, Hau-San Wong, Ling Guan

Application of computational intelligence techniques—often called soft computing—to the problem of adaptive image processing is the focus of this text. Imaging professionals and others with a background in mathematical science, computer software, and related fields will find this book a readable, useful resource. It also is suitable as a textbook in graduate-level or professional course in image processing.

Computational Image Quality
by Ruud Janssen

Images are a powerful, efficient means for communicating information. This book looks at metrics and methods for predicting image quality based on human visual and cognitive information-processing capabilities.

Smart Imaging Systems
Editor: Bahram Javidi

This book presents recent advances in image sensing and processing systems, image recognition, 3D imaging and processing, ultrafast optical networks for image communication, and multidimensional information security systems. Eleven chapters by international experts provide practical and theoretical insights. Useful for students, researchers, and technology users in IT, image processing, and optics.
Evolutionary Computation: Principles and Practice for Signal Processing

by David B. Fogel

Evolutionary computation is one of the fastest growing areas of computer science, partly because of its broad applicability to engineering problems. The methods can be applied to problems as diverse as supply-chain optimization, routing and planning, task assignment, pharmaceutical design, interactive gaming, and many others within the signal processing domain. The book is an outgrowth of successful SPIE short courses taught by the author. The examples span a range of applications and should be useful to a variety of readers with different backgrounds and expertise.

Fractal and Wavelet Image Compression Techniques

by Stephen Welstead

Interest in image compression for internet and other multimedia applications has spurred research into compression techniques that will increase storage capabilities and transmission speed. This tutorial provides a practical guide to fractal and wavelet approaches—two techniques with exciting potential. It is intended for scientists, engineers, researchers, and students. It provides both introductory information and implementation details.

Analysis of Sampled Imaging Systems

by Richard H. Vollmerhausen, Ronald G. Driggers

Advances in solid state detector arrays, flat panel displays, and digital image processing have prompted an increasing variety of sampled imaging products and possibilities. These technology developments provide new opportunities and problems for the design engineer and system analyst—this tutorial's intended reader.
Contrast Sensitivity of the Human Eye and Its Effects on Image Quality
by Peter G. J. Barten

This book examines contrast sensitivity of the human visual system—concerning the eye’s ability to distinguish objects from each other or from the background—and its effects on the image-forming process. The text provides equations for determining various aspects of contrast sensitivity, in addition to models (mathematical expressions) that can be easily adapted for practical applications.

Nonlinear Filters for Image Processing
Editors: Edward R. Dougherty, Jaakko T. Astola

Part of the SPIE/IEEE Series on Imaging Science & Engineering. This text covers key mathematical principles and algorithms for nonlinear filters used in image processing. Readers will gain an in-depth understanding of the underlying mathematical and filter design methodologies needed to construct and use nonlinear filters in a variety of applications. The presentation is rigorous, yet accessible to engineers with a solid background in mathematics.

Digital Color Halftoning
by Henry R. Kang

Part of the SPIE/IEEE Series on Imaging Science and Engineering. This comprehensive look at digital halftoning, a key technology in printing and display industries, is aimed at technical professionals and students. It is especially useful for those designing halftone screens and screenless processes for research and development. It is also suitable as a textbook in printing and graphic arts (graduate/undergraduate).
Electronic Imaging Technology

*Editor: Edward R. Dougherty*

**PM60**
Jan. 1999
448 pages
Softcover
ISBN: 9780819430373
SPIE Member $56
List Price $70

This book provides an overview of electronic imaging systems, technology, and practical applications. Written by industry experts, its 11 chapters explore a variety of systems and applications, ranging from video compression and handwritten word recognition to color science and hardware architectures. The text is intended for readers interested in applied, industrial electronic imaging.

Random Processes for Image and Signal Processing

*by Edward R. Dougherty*

**PM44**
Oct. 1998
616 pages
Hardcover
ISBN: 9780819425133
On Sale!
SPIE Member $22
List Price $36

Part of the SPIE/IEEE Series on Imaging Science and Engineering. This book provides a framework for understanding the ensemble of temporal, spatial, and higher-dimensional processes in science and engineering that vary randomly in observations. Suitable as a text for undergraduate and graduate students with a strong background in probability and as a graduate text in image processing courses.

Fundamentals of Machine Vision

*by Harley R. Myler*

**TT33**
Oct. 1998
149 pages
Softcover
ISBN: 9780819430496
SPIE Member $35
List Price $44

Machine vision has come of age as an established, respected field of research and application with a strong theoretical foundation. The term “machine vision” has various definitions, depending on one’s field, such as computer vision, image understanding, scene analysis, or robotics. In this Tutorial Text, machine vision specifically refers to the study and implementation of systems that allow machines to recognize objects from acquired image data and perform useful tasks from that recognition. This book is intended to help readers understand and construct machine vision systems that perform useful tasks, based on the current state of the art.
Sampling, Aliasing, and Data Fidelity for Electronic Imaging Systems, Communications, and Data Acquisition

by Gerald C. Holst

This book is for anyone involved in digital processing. The math is straightforward and the text is aimed at practicing engineers. It describes how to represent digital signals on back-of-the-envelope drawings and will help the system analyst understand the implications of sampling theory. For the software specialist, it provides the link between digital and analog data.

Journal of Electronic Imaging

Editor: Jan P. Allebach, Purdue University

The Journal of Electronic Imaging covers the full spectrum of technologies normally considered in the design, engineering, and applications of electronic imaging systems.

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SPIE Newsroom reporters are experts from Academia and Industry covering news from your technical field. The Newsroom features first-person articles and interviews with international leaders in their technologies, like Tuan Vo-Dinh, Director of the Fitzpatrick Institute for Photonics Duke University, and Naomi Halas, Head of Halas Nanophotonics Group, Rice University.
Breast cancer is the most common type of cancer found in women worldwide; approximately 10% of women are confronted with breast cancer in their lives. Breast cancer can be most efficiently treated if detected at an early stage. This book focuses primarily on the application of computer vision for early lesion identification in mammograms and breast-imaging volumes through computer-aided diagnostics (CAD). Color illustrations are included in the text, and an accompanying CD-ROM contains other full-color images.

Computed Tomography: Principles, Design, Artifacts, and Recent Advances
by Jiang Hsieh

X-ray computed tomography (CT) has experienced tremendous growth in recent years, in terms of both basic technology and new clinical applications. This book provides an overview of the evolution of CT, the mathematical and physical aspects of the technology, and the fundamentals of image reconstruction using algorithms. It examines image display from traditional methods through the most recent advancements, and it discusses key performance indices, theories behind the measurement methodologies, and different measurement phantoms in image quality. General descriptions and different categories of artifacts, their causes, and their corrections are considered at length.
Handbook of Medical Imaging

Volume 1. Physics and Psychophysics
Edited by Richard L. Van Metter, Jacob Beutel, Harold L. Kundel

Volume 1 examines x-ray imaging physics and reviews linear systems theory and its application to signal and noise propagation. The first half addresses the physics of important imaging modalities now in use: ultrasound, CT, MRI, and the recently emerging flat panel x-ray detectors and their application to mammography. The second half describes the relationship between image quality metrics and visual perception of the diagnostic information carried by medical images.

Volume 2. Medical Image Processing and Analysis
Edited by J. Michael Fitzpatrick, Milan Sonka

Volume 2 addresses the methods in use or in development for enhancing the visual perception of digital medical images obtained by a wide variety of imaging modalities and for image analysis as an aid to detection and diagnosis.

Volume 3. Display and PACS
Edited by Yongmin Kim, Steven C. Horii

This volume describes concurrent engineering developments that affect or are expected to influence future development of digital diagnostic imaging. It also covers current developments in Picture Archiving and Communications System (PACS) technology, with particular emphasis on integration of emerging imaging technologies into the hospital environment.
### More books from electronic and medical imaging

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