

Digital Video Processing 2nd Edition Prentice Hall Signal

In addition to its thorough coverage of DSP design and programming techniques, Smith also covers the operation and usage of DSP chips. He uses Analog Devices' popular DSP chip family as design examples. Covers all major DSP topics Full of insider information and shortcuts Basic techniques and algorithms explained without complex numbers

In response to the boom in video processing, and multimedia systems and services, this book provides a comprehensive overview of video image processing. Covers the fundamentals of image and video compression and the emerging world standards for various video and image communication applications, including high-definition TV, multimedia workstations, videoconferencing, videophone, and mobile image communications. For electrical engineers, telecommunications managers, computer scientists, product planners, technical and market consultants, and all those interested in digital video image processing.

Achieve professional quality sound on a limited budget! Harness all new, Hollywood style audio techniques to bring your independent film and video productions to the next level. In *Sound for Digital Video, Second Edition* industry experts Tomlinson Holman and Arthur Baum give you the tools and knowledge to apply recent advances in audio capture, video recording, editing workflow, and mixing to your own film or video with stunning results. This fresh edition is chockfull of techniques, tricks, and workflow secrets that you can apply to your own projects from preproduction through postproduction. New to this edition: A new feature on "true" 24p shooting and editing systems, as well as single vs. double-system recording A strong focus on new media, including mini-DVDs, hard disks, memory cards, and standard and high-definition imagery Discussion of camera selection, manual level control, camera and recorder inputs, location scouting, and preproduction planning Instruction in connectors, real-time transfers, and file-based transfers from DVDs, hard drives, and solid state media. Blu-Ray and HD tape formats for mastering and distribution in addition to file-based, DV, and DVD masters. A revamped companion website, www.focalpress.com/cw/holman, featuring recording and editing exercises, examples and sample tracks Whether you are an amateur filmmaker who wants to create great sound or an advanced professional in need of a reference guide, *Sound for Digital Video, Second Edition* is an essential addition to your digital audio tool belt.

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

Rapidly evolving computer and communications technologies have achieved data transmission rates and data storage capacities high enough for digital video. But video involves much more than just pushing bits! Achieving the best possible image quality, accurate color, and smooth motion requires understanding many aspects of image acquisition, coding, processing, and display that are outside the usual realm of computer graphics. At the same time, video system designers are facing new demands to interface with film and computer system that require techniques outside conventional video engineering. Charles Poynton's 1996 book *A Technical Introduction to Digital Video* became an industry favorite for its succinct, accurate, and accessible treatment of standard definition television (SDTV). In *Digital Video and HDTV*, Poynton augments that book with coverage of high definition television (HDTV) and compression systems. For more information on HDTV Retail markets, go to:

<http://www.insightmedia.info/newsletters.php#hdtv> With the help of hundreds of high quality technical illustrations, this book presents the following topics: * Basic concepts of digitization, sampling, quantization, gamma, and filtering * Principles of color science as applied to image capture and display * Scanning and coding of SDTV and HDTV * Video color coding: luma, chroma (4:2:2 component video, 4fSC composite video) * Analog NTSC and PAL * Studio systems and interfaces * Compression technology, including M-JPEG and MPEG-2 * Broadcast standards and consumer video equipment

Digital Signal Processing 101: Everything You Need to Know to Get Started provides a basic tutorial on digital signal processing (DSP). Beginning with discussions of numerical representation and complex numbers and exponentials, it goes on to explain difficult concepts such as sampling, aliasing, imaginary numbers, and frequency response. It does so using easy-to-understand examples and a minimum of mathematics. In addition, there is an overview of the DSP functions and implementation used in several DSP-intensive fields or applications, from error correction to CDMA mobile communication to airborne radar systems. This book is intended for those who have absolutely no previous experience with DSP, but are comfortable with high-school-level math skills. It is also for those who work in or provide components for industries that are made possible by DSP. Sample industries include wireless mobile phone and infrastructure equipment, broadcast and cable video, DSL modems, satellite communications, medical imaging, audio, radar, sonar, surveillance, and electrical motor control. Dismayed when presented with a mass of equations as an explanation of DSP? This is the book for you! Clear examples and a non-mathematical approach gets you up to speed with DSP Includes an overview of the DSP functions and implementation used in typical DSP-intensive applications, including error correction, CDMA mobile communication, and radar systems

In recent years bio-inspired computational theories and tools have developed to assist people in extracting knowledge from high dimensional data. These differ in how they take a more evolutionary approach to learning, as opposed to traditional artificial intelligence (AI) and what could be described as 'creationist' methods. Instead bio-inspired computing takes a bottom-up, decentralized approach that often involves the method of specifying a set of simple rules, a set of simple organisms which adhere to those rules, and of iteratively applying those rules. *Bio-Inspired Computing for Image and Video Processing* covers interesting and challenging new theories in image and video processing. It addresses the growing demand for image and video processing in

diverse application areas, such as secured biomedical imaging, biometrics, remote sensing, texture understanding, pattern recognition, content-based image retrieval, and more. This book is perfect for students following this topic at both undergraduate and postgraduate level. It will also prove indispensable to researchers who have an interest in image processing using bio-inspired computing.

How Video Works has been a bible for professionals in the video world since 1985. It offers easy to understand explanations of the entire world of video. A complete guide from analog video to all the new digital technologies, including HD, compression, and encoding. This book is a must-have for any broadcast or video production department. It is also perfect for the new video technician or non-tech creative professional who is just beginning to discover the digital world. Update your library with the brand new version of an industry standard.

A discussion of a compressed-domain approach for designing and implementing digital video coding systems, which is drastically different from the traditional hybrid approach. It demonstrates how the combination of discrete cosine transform (DCT) coders and motion compensated (MC) units reduces power consumption and hardware complexity.

Any device or system with imaging functionality requires a digital video processing solution as part of its embedded system design. Engineers need a practical guide to technology basics and design fundamentals that enables them to deliver the video component of complex projects. This book introduces core video processing concepts and standards, and delivers practical how-to guidance for engineers embarking on digital video processing designs using FPGAs. It covers the basic topics of video processing in a pictorial, intuitive manner with minimal use of mathematics. Key outcomes and benefits of this book for users include:

understanding the concepts and challenges of modern video systems; architect video systems at a system level; reference design examples to implement your own high definition video processing chain; understand implementation trade-offs in video system designs. Video processing is a must-have skill for engineers working on products and solutions for rapidly growing markets such as video surveillance, video conferencing, medical imaging, military imaging, digital broadcast equipment, displays and countless consumer electronics applications. This book is for engineers who need to develop video systems in their designs but who do not have video processing experience. It introduces the fundamental video processing concepts and skills in enough detail to get the job done, supported by reference designs, step-by-step FPGA- examples, core standards and systems architecture maps. Written by lead engineers at Altera Corp, a top-three global developer of digital video chip (FPGA) technology.

Intelligent Image and Video Compression: Communicating Pictures, Second Edition explains the requirements, analysis, design and application of a modern video coding system. It draws on the authors' extensive academic and professional experience in this field to deliver a text that is algorithmically rigorous yet accessible, relevant to modern standards and practical. It builds on a thorough grounding in mathematical foundations and visual perception to demonstrate how modern image and video compression methods can be designed to meet the rate-quality performance levels demanded by today's applications and users, in the context of prevailing network constraints. An approach that combines algorithmic rigor with practical implementation using numerous

worked examples Explains how video compression methods exploit statistical redundancies, natural correlations, and knowledge of human perception to improve performance Uses contemporary video coding standards (AVC, HEVC and VVC) as a vehicle for explaining block-based compression Provides broad coverage of important topics such as visual quality assessment and video streaming

Multimedia hardware still cannot accommodate the demand for large amounts of visual data. Without the generation of high-quality video bitstreams, limited hardware capabilities will continue to stifle the advancement of multimedia technologies. Thorough grounding in coding is needed so that applications such as MPEG-4 and JPEG 2000 may come to fruition. Image and Video Compression for Multimedia Engineering provides a solid, comprehensive understanding of the fundamentals and algorithms that lead to the creation of new methods for generating high quality video bit streams. The authors present a number of relevant advances along with international standards. New to the Second Edition · A chapter describing the recently developed video coding standard, MPEG-Part 10 Advances Video Coding also known as H.264 · Fundamental concepts and algorithms of JPEG2000 · Color systems of digital video · Up-to-date video coding standards and profiles Visual data, image, and video coding will continue to enable the creation of advanced hardware, suitable to the demands of new applications. Covering both image and video compression, this book yields a unique, self-contained reference for practitioners to build a basis for future study, research, and development.

Digital image sequences (including digital video) are increasingly common and important components in technical applications ranging from medical imaging and multimedia communications to autonomous vehicle navigation. The immense popularity of DVD video and the introduction of digital television make digital video ubiquitous in the consumer domain. Digital Image Sequence Processing, Compression, and Analysis provides an overview of the current state of the field, as analyzed by leading researchers. An invaluable resource for planning and conducting research in this area, the book conveys a unified view of potential directions for further industrial development. It offers an in-depth treatment of the latest perspectives on processing, compression, and analysis of digital image sequences. Research involving digital image sequences remains extremely active. The advent of economical sequence acquisition, storage, and display devices, together with the availability of computing power, opens new areas of opportunity. This volume delivers the background necessary to understand the strengths and weaknesses of current techniques and the directions that consumer and technical applications may take over the coming decade.

Now available in a three-volume set, this updated and expanded edition of the bestselling The Digital Signal Processing Handbook continues to provide the engineering community with authoritative coverage of the fundamental and specialized aspects of information-bearing signals in digital form. Encompassing essential background material, technical details, standards, and software, the second edition reflects cutting-edge information on signal processing algorithms and protocols related to speech, audio, multimedia, and video processing technology associated with standards ranging from WiMax to MP3 audio, low-power/high-performance DSPs, color image processing, and chips on video. Drawing on the experience of leading engineers, researchers,

and scholars, the three-volume set contains 29 new chapters that address multimedia and Internet technologies, tomography, radar systems, architecture, standards, and future applications in speech, acoustics, video, radar, and telecommunications. This volume, Video, Speech, and Audio Signal Processing and Associated Standards, provides thorough coverage of the basic foundations of speech, audio, image, and video processing and associated applications to broadcast, storage, search and retrieval, and communications.

A best-seller in its print version, this comprehensive CD-ROM reference contains unique, fully searchable coverage of all major topics in digital signal processing (DSP), establishing an invaluable, time-saving resource for the engineering community. Its unique and broad scope includes contributions from all DSP specialties, including: telecommunications, computer engineering, acoustics, seismic data analysis, DSP software and hardware, image and video processing, remote sensing, multimedia applications, medical technology, radar and sonar applications

As multimedia applications have become part of contemporary daily life, numerous paradigm-shifting technologies in multimedia processing have emerged over the last decade. Substantially updated with 21 new chapters, Multimedia Image and Video Processing, Second Edition explores the most recent advances in multimedia research and applications. This edition presents a comprehensive treatment of multimedia information mining, security, systems, coding, search, hardware, and communications as well as multimodal information fusion and interaction. Clearly divided into seven parts, the book begins with a section on standards, fundamental methods, design issues, and typical architectures. It then focuses on the coding of video and multimedia content before covering multimedia search, retrieval, and management. After examining multimedia security, the book describes multimedia communications and networking and explains the architecture design and implementation for multimedia image and video processing. It concludes with a section on multimedia systems and applications. Written by some of the most prominent experts in the field, this updated edition provides readers with the latest research in multimedia processing and equips them with advanced techniques for the design of multimedia systems.

The rapid rate at which the field of digital picture processing has grown in the past five years had necessitated extensive revisions and the introduction of topics not found in the original edition.

Now available in a three-volume set, this updated and expanded edition of the bestselling Digital Signal Processing Handbook continues to provide the engineering community with authoritative coverage of the fundamental and specialized aspects of information-bearing signals in digital form. Encompassing essential background material, technical details, standards, and software, The Digital Signal Processing Handbook, Second Edition reflects cutting-edge information on signal processing algorithms and protocols related to speech, audio, multimedia, and video processing technology associated with standards ranging from WiMax to MP3 audio, low-power/high-performance DSPs, color image processing, and chips on video. The three-volume set draws on the experience of leading engineers, researchers, and scholars and includes 29 new chapters that address multimedia and Internet technologies, tomography, radar systems, architecture, standards, and future applications in speech, acoustics, video,

radar, and telecommunications. Each volume in the set is also available individually ... Emphasizing theoretical concepts, Digital Signal Processing Fundamentals (Catalog no. 46063) provides comprehensive coverage of the basic foundations of DSP. Coverage includes: Signals and Systems, Signal Representation and Quantization, Fourier Transforms, Digital Filtering, Statistical Signal Processing, Adaptive Filtering, Inverse Problems and Signal Reconstruction, and Time–Frequency and Multirate Signal Processing. Wireless, Networking, Radar, Sensor Array Processing, and Nonlinear Signal Processing (Catalog no. 46047) thoroughly covers the foundations of signal processing related to wireless, radar, space–time coding, and mobile communications together with associated applications to networking, storage, and communications. Video, Speech, and Audio Signal Processing and Associated Standards, (Catalog no. 4608X) details the basic foundations of speech, audio, image, and video processing and associated applications to broadcast, storage, search and retrieval, and communications.

This book offers a comprehensive introduction to advanced methods for image and video analysis and processing. It covers deraining, dehazing, inpainting, fusion, watermarking and stitching. It describes techniques for face and lip recognition, facial expression recognition, lip reading in videos, moving object tracking, dynamic scene classification, among others. The book combines the latest machine learning methods with computer vision applications, covering topics such as event recognition based on deep learning, dynamic scene classification based on topic model, person re-identification based on metric learning and behavior analysis. It also offers a systematic introduction to image evaluation criteria showing how to use them in different experimental contexts. The book offers an example-based practical guide to researchers, professionals and graduate students dealing with advanced problems in image analysis and computer vision.

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 exploring 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.

This fully revised and expanded edition gives readers the necessary understanding of image and video processing concepts to contribute to this hot technology's future advances. Important new topics include introductory random processes, image enhancement and analysis, and the new MPEG scalable video coding standard.

The subject of digital image processing has migrated from a graduate to a junior or senior level course as students become more proficient in mathematical background earlier in their college education. With that in mind, Introduction to Digital Image Processing is simpler in terms of mathematical derivations and eliminates derivations of advanced s

The Handbook of Image and Video Processing contains a comprehensive and highly accessible presentation of all essential mathematics, techniques, and algorithms for every type of image and video processing used by scientists and engineers. The timely volume will provide both the novice and the seasoned practitioner with the necessary information and skills to be able to develop algorithms and applications for multimedia, digital imaging, digital video, telecommunications, and World Wide Web industries. Handbook of Image and Video Processing will also serve as a textbook for courses such as digital image processing, digital image analysis, digital video, video communications, multimedia, and biomedical image processing in the departments of electrical and computer engineering and computer science. * No other resource contains the same breadth of up-to-date coverage * Contains over 100 example algorithm illustrations * Contains a series of extremely accessible tutorial chapters * Indispensable for researchers in telecommunications, internet applications, multimedia, and nearly every branch of science

This second edition focuses on audio, image and video data, the three main types of input that machines deal with when interacting with the real world. A set of appendices provides the reader with self-contained introductions to the mathematical background necessary to read the book. Divided into three main parts, From Perception to Computation introduces methodologies aimed at representing the data in forms suitable for computer processing, especially when it comes to audio and images. Whilst the second part, Machine Learning includes an extensive overview of statistical techniques aimed at addressing three main problems, namely classification (automatically assigning a data sample to one of the classes belonging to a predefined set), clustering (automatically grouping data samples according to the similarity of their properties) and sequence analysis (automatically mapping a sequence of observations into a sequence of human-understandable symbols). The third part Applications shows how the abstract problems defined in the second part underlie technologies capable to perform complex tasks such as the recognition of hand gestures or the transcription of handwritten data. Machine Learning for Audio, Image and Video Analysis is suitable for students to acquire a solid background in machine learning as well as for practitioners to deepen their knowledge of the state-of-the-art. All application chapters are based on publicly available data and free software packages, thus allowing readers to replicate the experiments.

This comprehensive and state-of-the art approach to video processing gives engineers and students a comprehensive introduction and includes full coverage of key applications: wireless video, video networks, video indexing and retrieval and use of video in speech processing. Containing all the essential methods in video processing alongside the latest standards, it is a complete resource for the professional engineer, researcher and graduate student. Numerous conceptual and numerical examples All the latest standards are thoroughly covered: MPEG-1, MPEG-2, MPEG-4, H.264 and AVC Coverage of the latest techniques in video security "Like its sister volume "The Essential Guide to Image Processing," Professor Bovik's Essential Guide to Video Processing provides a timely and comprehensive survey, with

contributions from leading researchers in the area. Highly recommended for everyone with an interest in this fascinating and fast-moving field." —Prof. Bernd Girod, Stanford University, USA * Edited by a leading person in the field who created the IEEE International Conference on Image Processing, with contributions from experts in their fields. * Numerous conceptual and numerical examples *All the latest standards are thoroughly covered: MPEG-1, MPEG-2, MPEG-4, H.264 and AVC. * Coverage of the latest techniques in video security

Master the basics from first principles: the physics of sound, principles of hearing etc, then progress onward to fundamental digital principles, conversion, compression and coding and then onto transmission, digital audio workstations, DAT and optical disks. Get up to speed with how digital audio is used within DVD, Digital Audio Broadcasting, networked audio and MPEG transport streams. All of the key technologies are here: compression, DAT, DAB, DVD, SACD, oversampling, noise shaping and error correction theories are treated in a simple yet accurate form. Thoroughly researched, totally up-to-date and technically accurate this is the only book you need on the subject.

Over the years, thousands of engineering students and professionals relied on Digital Video Processing as the definitive, in-depth guide to digital image and video processing technology. Now, Dr. A. Murat Tekalp has completely revamped the first edition to reflect today's technologies, techniques, algorithms, and trends. Digital Video Processing, Second Edition, reflects important advances in image processing, computer vision, and video compression, including new applications such as digital cinema, ultra-high-resolution video, and 3D video. This edition offers rigorous, comprehensive, balanced, and quantitative coverage of image filtering, motion estimation, tracking, segmentation, video filtering, and compression. Now organized and presented as a true tutorial, it contains updated problem sets and new MATLAB projects in every chapter. Coverage includes Multi-dimensional signals/systems: transforms, sampling, and lattice conversion Digital images and video: human vision, analog/digital video, and video quality Image filtering: gradient estimation, edge detection, scaling, multi-resolution representations, enhancement, de-noising, and restoration Motion estimation: image formation; motion models; differential, matching, optimization, and transform-domain methods; and 3D motion and shape estimation Video segmentation: color and motion segmentation, change detection, shot boundary detection, video matting, video tracking, and performance evaluation Multi-frame filtering: motion-compensated filtering, multi-frame standards conversion, multi-frame noise filtering, restoration, and super-resolution Image compression: lossless compression, JPEG, wavelets, and JPEG2000 Video compression: early standards, ITU-T H.264/MPEG-4 AVC, HEVC, Scalable Video Compression, and stereo/multi-view approaches

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. It includes numerous examples and exercises to give students hands-on practice with the material.

Whether for computer evaluation of otherworldly terrain or the latest high definition 3D blockbuster, digital image processing involves the acquisition, analysis, and processing of visual information by computer and requires a unique skill set that has yet to be defined a single text. Until now. Taking an applications-oriented, engineering approach, Digital Image Processing and Analysis provides the tools for developing and advancing computer and human vision applications and brings image processing and analysis together into a unified framework. Providing information and background in a logical, as-needed fashion, the author presents topics as they become necessary for understanding the practical imaging model under study. He offers a conceptual presentation of the material for a solid understanding of complex topics and discusses the theory and foundations of digital image processing and the algorithm development needed to advance the field. With liberal use of color through-out and more materials on the processing of color images than the previous edition, this book provides supplementary exercises, a new chapter on applications, and two major new tools that allow for batch processing, the analysis of imaging algorithms, and the overall research and development of imaging applications. It includes two new software tools, the Computer Vision and Image Processing Algorithm Test and Analysis Tool (CVIP-ATAT) and the CVIP Feature Extraction and Pattern Classification Tool (CVIP-FEPC). Divided into five major sections, this book provides the concepts and models required to analyze digital images and develop computer vision and human consumption applications as well as all the necessary information to use the CVIPtools environment for algorithm development, making it an ideal reference tool for this fast growing field.

The latest edition provides a comprehensive foundation for image and video compression. It covers HEVC/H.265 and future video coding activities, in addition to Internet Video Coding. The book features updated chapters and content, along with several new chapters and sections. It adheres to the current international standards, including the JPEG standard.

A complete introduction to the basic and intermediate concepts of image processing from the leading people in the field Up-to-date content, including statistical modeling of natural, anisotropic diffusion, image quality and the latest developments in JPEG 2000 This comprehensive and state-of-the art approach to image processing gives engineers and students a thorough introduction, and includes full coverage of key applications: image watermarking, fingerprint recognition, face recognition and iris recognition and medical imaging. "This book combines basic image processing techniques with some of the most advanced procedures. Introductory chapters dedicated to general principles are presented alongside detailed application-orientated ones. As a result it is suitably adapted for different classes of readers, ranging from Master to PhD students and beyond." – Prof. Jean-Philippe Thiran, EPFL, Lausanne, Switzerland "AI Bovik's compendium proceeds systematically from fundamentals to today's research frontiers. Professor Bovik, himself a highly respected leader in the field, has invited an all-star team of contributors. Students, researchers, and practitioners of image processing alike should benefit from the Essential Guide." – Prof. Bernd Girod, Stanford University, USA "This book is informative, easy to read with plenty of examples, and allows great flexibility in tailoring a course on image processing or analysis." – Prof. Pamela Cosman, University of California, San Diego, USA A complete and modern introduction to the basic and intermediate concepts of image processing – edited and written by the leading people in the field An essential reference for all types of engineers working on image processing applications Up-to-date content, including statistical modelling of natural, anisotropic diffusion, image quality and the latest developments in JPEG 2000

Meant for students and practicing engineers, this book provides a clear, comprehensive and up-to-date introduction to Digital Image Processing in a pragmatic style. An illustrative approach, practical examples and MATLAB applications given in the book help in bringing the theory to life.

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This book presents collective works published in the recent Special Issue (SI) entitled " Digital Signal, Image and Video Processing for Emerging Multimedia Technology". These works address the emerging technology in signal processing and its new aspects, as well as the related applications. Recent developments in image/video-based deep learning technology have enabled new services in the field of multimedia and recognition technology. The applications vary and range from digital signal processing to image, video and multimedia signal processing, also including object classification, learning mechanism design and data security. Recent advances in numerical, theoretical and experimental methodologies are presented within the scope of the current book, along with the finding of new learning methods and new methodological developments and their limitations. This book brings together a collection of inter-/multidisciplinary works applied to many classification and data security applications in a coherent manner.

H.264 Advanced Video Coding or MPEG-4 Part 10 is fundamental to a growing range of markets such as high definition broadcasting, internet video sharing, mobile video and digital surveillance. This book reflects the growing importance and implementation of H.264 video technology. Offering a detailed overview of the system, it explains the syntax, tools and features of H.264 and equips readers with practical advice on how to get the most out of the standard. Packed with clear examples and illustrations to explain H.264 technology in an accessible and practical way. Covers basic video coding concepts, video formats and visual quality. Explains how to measure and optimise the performance of H.264 and how to balance bitrate, computation and video quality. Analyses recent work on scalable and multi-view versions of H.264, case studies of H.264 codecs and new technological developments such as the popular High Profile extensions. An invaluable companion for developers, broadcasters, system integrators, academics and students who want to master this burgeoning state-of-the-art technology. "[This book] unravels the mysteries behind the latest H.264 standard and delves deeper into each of the operations in the codec. The reader can implement (simulate, design, evaluate, optimize) the codec with all profiles and levels. The book ends with extensions and directions (such as SVC and MVC) for further research." Professor K. R. Rao, The University of Texas at Arlington, co-inventor of the Discrete Cosine Transform

55% new material in the latest edition of this "must-have for students and practitioners of image & video processing! This Handbook is intended to serve as the basic reference point on image and video processing, in the field, in the research laboratory, and in the classroom. Each chapter has been written by carefully selected, distinguished experts specializing in that topic and carefully reviewed by the Editor, Al Bovik, ensuring that the greatest depth of understanding be communicated to the reader. Coverage includes introductory, intermediate and advanced topics and as such, this book serves equally well as classroom textbook as reference resource. • Provides practicing engineers and students with a highly accessible resource for learning and using image/video processing theory and algorithms • Includes a new chapter on image processing education, which should prove invaluable for those developing or modifying their curricula • Covers the various image and video processing standards that exist and are emerging, driving today's explosive industry • Offers an understanding of what images are, how they are modeled, and gives an introduction to how they are perceived • Introduces the necessary, practical background to allow engineering students to acquire and process their own digital image or video data • Culminates with a diverse set of applications chapters, covered in sufficient depth to serve as extensible models to the reader's own potential applications About the Editor... Al Bovik is the Cullen Trust for Higher Education Endowed Professor at The University of Texas at Austin, where he is the Director of the Laboratory for Image and Video Engineering (LIVE). He has published over 400 technical articles in the general area of image and video processing and holds two U.S.

patents. Dr. Bovik was Distinguished Lecturer of the IEEE Signal Processing Society (2000), received the IEEE Signal Processing Society Meritorious Service Award (1998), the IEEE Third Millennium Medal (2000), and twice was a two-time Honorable Mention winner of the international Pattern Recognition Society Award. He is a Fellow of the IEEE, was Editor-in-Chief, of the IEEE Transactions on Image Processing (1996-2002), has served on and continues to serve on many other professional boards and panels, and was the Founding General Chairman of the IEEE International Conference on Image Processing which was held in Austin, Texas in 1994. * No other resource for image and video processing contains the same breadth of up-to-date coverage * Each chapter written by one or several of the top experts working in that area * Includes all essential mathematics, techniques, and algorithms for every type of image and video processing used by electrical engineers, computer scientists, internet developers, bioengineers, and scientists in various, image-intensive disciplines

A complete, professional 'bible' on all aspects of audio and video compression using MPEG technology, including the MPEG-4 standard and, in this second edition, H-264. The clarity of explanation and depth of technical detail combine to make this book an essential and definitive reference work. THE MPEG HANDBOOK is both a theoretical and practical treatment of the subject. Fundamental knowledge is provided alongside practical guidance on how to avoid pitfalls and poor quality. The often-neglected issues of reconstructing the signal timebase at the decoder and of synchronizing the signals in a multiplex are treated fully here. Previously titled MPEG-2, the book is frequently revised to cover the latest applications of the technology.

A self-contained approach to DSP techniques and applications in radar imaging The processing of radar images, in general, consists of three major fields: Digital Signal Processing (DSP); antenna and radar operation; and algorithms used to process the radar images. This book brings together material from these different areas to allow readers to gain a thorough understanding of how radar images are processed. The book is divided into three main parts and covers: * DSP principles and signal characteristics in both analog and digital domains, advanced signal sampling, and interpolation techniques * Antenna theory (Maxwell equation, radiation field from dipole, and linear phased array), radar fundamentals, radar modulation, and target-detection techniques (continuous wave, pulsed Linear Frequency Modulation, and stepped Frequency Modulation) * Properties of radar images, algorithms used for radar image processing, simulation examples, and results of satellite image files processed by Range-Doppler and Stolt interpolation algorithms The book fully utilizes the computing and graphical capability of MATLAB[®] to display the signals at various processing stages in 3D and/or cross-sectional views. Additionally, the text is complemented with flowcharts and system block diagrams to aid in readers' comprehension. Digital Signal Processing Techniques and Applications in Radar Image Processing serves as an ideal textbook for graduate students and practicing engineers who wish to gain firsthand experience in applying DSP principles and technologies to radar imaging.

Multimedia processing demands efficient programming in order to optimize functionality. Data, image, audio, and video processing, some or all of which are present in all electronic devices today, are complex programming environments. Optimized algorithms (step-by-step directions) are difficult to create but can make all the difference when developing a new application. This book discusses the most current algorithms available that will maximize your programming keeping in mind the memory and real-time constraints of the architecture with which you are working. A wide range of algorithms is covered detailing basic and

advanced multimedia implementations, along with, cryptography, compression, and data error correction. The general implementation concepts can be integrated into many architectures that you find yourself working with on a specific project. Analog Devices' BlackFin technology is used for examples throughout the book. Discusses how to decrease algorithm development times to streamline your programming Covers all the latest algorithms needed for constrained systems Includes case studies on WiMAX, GPS, and portable media players

A fully updated second edition of the excellent Digital Audio Signal Processing Well established in the consumer electronics industry, Digital Audio Signal Processing (DASP) techniques are used in audio CD, computer music and multi-media components. In addition, the applications afforded by this versatile technology now range from real-time signal processing to room simulation. Digital Audio Signal Processing, Second Edition covers the latest signal processing algorithms for audio processing. Every chapter has been completely revised with an easy to understand introduction into the basics and exercises have been included for self testing. Additional Matlab files and Java Applets have been provided on an accompanying website, which support the book by easy to access application examples. Key features include: A thoroughly updated and revised second edition of the popular Digital Audio Signal Processing, a comprehensive coverage of the topic as whole Provides basic principles and fundamentals for Quantization, Filters, Dynamic Range Control, Room Simulation, Sampling Rate Conversion, and Audio Coding Includes detailed accounts of studio technology, digital transmission systems, storage media and audio components for home entertainment Contains precise algorithm description and applications Provides a full account of the techniques of DASP showing their theoretical foundations and practical solutions Includes updated computer-based exercises, an accompanying website, and features Web-based Interactive JAVA-Applets for audio processing This essential guide to digital audio signal processing will serve as an invaluable reference to audio engineering professionals, R&D engineers, researchers in consumer electronics industries and academia, and Hardware and Software developers in IT companies. Advanced students studying multi-media courses will also find this guide of interest.

Digital Signal Processing, Second Edition enables electrical engineers and technicians in the fields of biomedical, computer, and electronics engineering to master the essential fundamentals of DSP principles and practice. Many instructive worked examples are used to illustrate the material, and the use of mathematics is minimized for easier grasp of concepts. As such, this title is also useful to undergraduates in electrical engineering, and as a reference for science students and practicing engineers. The book goes beyond DSP theory, to show implementation of algorithms in hardware and software. Additional topics covered include adaptive filtering with noise reduction and echo cancellations, speech compression, signal sampling, digital filter realizations, filter design, multimedia applications, over-sampling, etc. More advanced topics are also covered, such as adaptive filters, speech compression such as PCM, u-law, ADPCM, and multi-rate DSP and over-sampling ADC. New to this edition: MATLAB projects dealing with practical applications added throughout the book New chapter (chapter 13) covering sub-band coding and wavelet transforms, methods that have become popular in the DSP field New applications included in many chapters, including

applications of DFT to seismic signals, electrocardiography data, and vibration signals All real-time C programs revised for the TMS320C6713 DSK Covers DSP principles with emphasis on communications and control applications Chapter objectives, worked examples, and end-of-chapter exercises aid the reader in grasping key concepts and solving related problems Website with MATLAB programs for simulation and C programs for real-time DSP

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