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River Publishers Book Catalogue

Series in Signal, Image and Speech
Processing

Versatile Video Coding

Authors:

Humberto Ochoa Dominguez, IIT-UACJ, Mexico

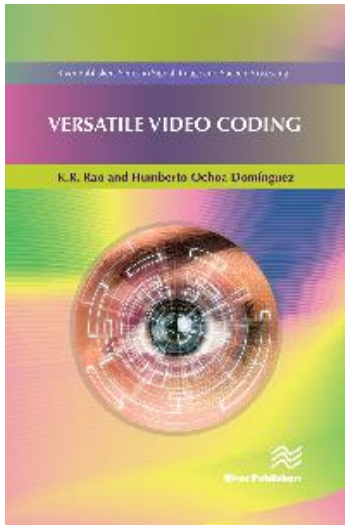
K.R. Rao, University of Texas at Arlington, USA

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Description:

Video is the main driver of bandwidth use, accounting for over 80 per cent of consumer Internet traffic. Video compression is a critical component of many of the available multimedia applications, it is necessary for storage or transmission of digital video over today's band-limited networks. The majority of this video is coded using international standards developed in collaboration with ITU-T Study Group and MPEG.

The MPEG family of video coding standards began on the early 1990s with MPEG-1, developed for video and audio storage on CD-ROMs, with support for progressive video. MPEG-2 was standardized in 1995 for applications of video on DVD, standard and high definition television, with support for interlaced and progressive video. MPEG-4 part 2, also known as MPEG-2 video, was standardized in 1999 for applications of low-bit rate multimedia on mobile platforms and the Internet, with the support of object-based or content based coding by modeling the scene as background and foreground. Since MPEG-1, the main video coding standards were based on the so-called macroblocks. However, research groups continued the work beyond the traditional video coding architectures and found that macroblocks could limit the performance of the compression when using high-resolution video. Therefore, in 2013 the high efficiency video coding (HEVC) also known as H.265, was released, with a structure similar to H.264/AVC but using coding units with more flexible partitions than the traditional macroblocks. HEVC has greater flexibility in prediction modes and transform block sizes, also it has a more sophisticated interpolation and de blocking filters.

In 2006 the VC-1 was released. VC-1 is a video codec implemented by Microsoft and the Microsoft Windows Media Video (VMW) 9 and standardized by the Society of Motion Picture and Television Engineers (SMPTE). In 2017 the Joint Video Experts Team (JVET) released a call for proposals for a new video coding standard initially called Beyond the HEVC, Future Video Coding (FVC) or known as Versatile Video Coding (VVC). VVC is being built on top of HEVC for application on Standard Dynamic Range (SDR), High Dynamic Range (HDR) and 360° Video. The VVC is planned to be finalized by 2020.

This book presents the new VVC, and updates on the HEVC. The book discusses the advances in lossless coding and covers the topic of screen content coding. Technical topics discussed include:

- Beyond the High Efficiency Video Coding
- High Efficiency Video Coding encoder
- Screen content
- Lossless and visually lossless coding algorithms
- Fast coding algorithms
- Visual quality assessment
- Other screen content coding algorithms
- Overview of JPEG Series

Contact River Publishers

Phone: +13-176899634 , +31-(0)-6-46573673
Email: customercare@riverpublishers.com
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The Netherlands Office

Lange Geer 44,
2611 PW Delft
The Netherlands

Denmark Office

Alsbjergvej 10
9260 Gistrup
Denmark

River Publishers Series in Signal, Image and Speech Processing

Recent Advances in Information, Communications and Signal Processing

Editors:

Andy W. H. Khong, Nanyang Technological University, Singapore

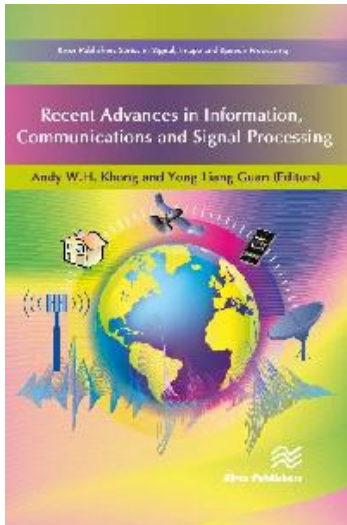
Yong Liang Guan, Nanyang Technological University, Singapore

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Description:

Research in information, communications and signal processing has brought about new services, applications and functions in a large number of fields which include consumer electronics, biomedical devices and defence. These applications play an important role in advancing technologies to enhance human life in general.

Recent Advances in Information, Communications and Signal Processing aims to give students, researchers, and engineers information pertaining to recent advances in these fields. In terms of research in signal processing topics, the two chapters included in this book have a strong emphasis on advances in algorithmic development in the biomedical, and human-computer interfaces domain areas. More specifically, the use of deep learning for placental maturity staging is discussed as well as the use of vibration analysis for localising impacts on surfaces for human-computer applications. In terms of communications signal processing, advances in new wireless communication such as NOMA (non-orthogonal multiple access) and millimetre-wave antenna design for 5G cellular mobile radio, as well as innovations in LDPC (low density parity check code) decoding and networking coding, are featured.

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Lange Geer 44,
2611 PW Delft
The Netherlands

Denmark Office

Alsbjergvej 10
9260 Gistrup
Denmark

River Publishers Series in Signal, Image and Speech Processing

High Efficiency Video Coding and Other Emerging Standards

Authors:

K.R. Rao, University of Texas at Arlington, USA

J.J. Hwang, Kunsan National University, South Korea

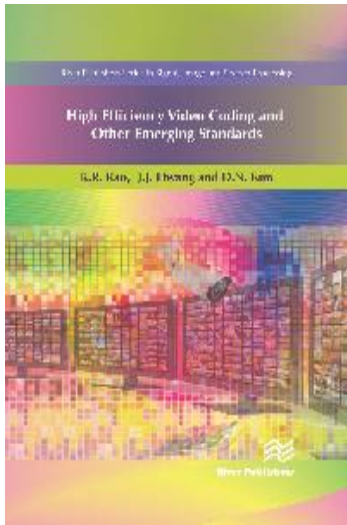
D. N. Kim, Sejong University, South Korea

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Price: € 85.00



Description:

High Efficiency Video Coding and Other Emerging Standards provides an overview of high efficiency video coding (HEVC) and all its extensions and profiles. There are nearly 300 projects and problems included, and about 400 references related to HEVC alone. Next generation video coding (NGVC) beyond HEVC is also described. Other video coding standards such as AVS2, DAALA, THOR, VP9 (Google), DIRAC, VC1, and AV1 are addressed, and image coding standards such as JPEG, JPEG-LS, JPEG2000, JPEG XR, JPEG XS, JPEG XT and JPEG-Pleno are also listed. Understanding of these standards and their implementation is facilitated by overview papers, standards documents, reference software, software manuals, test sequences, source codes, tutorials, keynote speakers, panel discussions, reflector and ftp/web sites – all in the public domain. Access to these categories is also provided.

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2611 PW Delft
The Netherlands

Denmark Office

Alsbjergvej 10
9260 Gistrup
Denmark

River Publishers Series in Signal, Image and Speech Processing

Digital Filter Design and Realization

Authors:

Takao Hinamoto, Hiroshima University, Japan

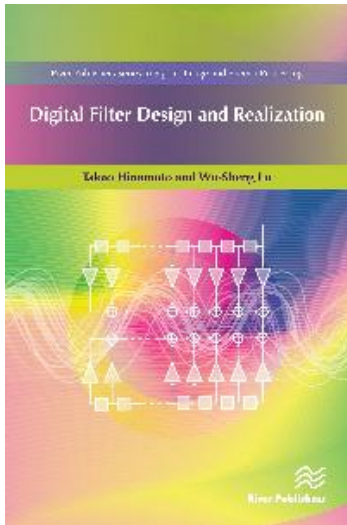
Wu-Sheng Lu, University of Victoria, Canada

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Available From: May 2017

Price: € 85.00



Description:

Analysis, design, and realization of digital filters have experienced major developments since the 1970s, and have now become an integral part of the theory and practice in the field of contemporary digital signal processing.

Digital Filter Design and Realization is written to present an up-to-date and comprehensive account of the analysis, design, and realization of digital filters. It is intended to be used as a text for graduate students as well as a reference book for practitioners in the field. Prerequisites for this book include basic knowledge of calculus, linear algebra, signal analysis, and linear system theory.

Technical topics discussed in the book include:

- Discrete-Time Systems and z-Transformation
- Stability and Coefficient Sensitivity
- State-Space Models
- FIR Digital Filter Design
- Frequency-Domain Digital Filter Design
- Time-Domain Digital Filter Design
- Interpolated and Frequency-Response-Masking FIR Digital Filter Design
- Composite Digital Filter Design
- Finite Word Length Effects
- Coefficient Sensitivity Analysis and Minimization
- Error Spectrum Shaping
- Roundoff Noise Analysis and Minimization
- Generalized Transposed Direct-Form II
- Block-State Realization

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2611 PW Delft
The Netherlands

Denmark Office

Alsbjergvej 10
9260 Gistrup
Denmark

River Publishers Series in Signal, Image and Speech Processing

Digital Signal Processing: A Breadth-First Approach

Authors:

Muhammad Nasir Khan, The University of Lahore, Pakistan

S. K. Hasnain, Swedish College of Engineering, Pakistan

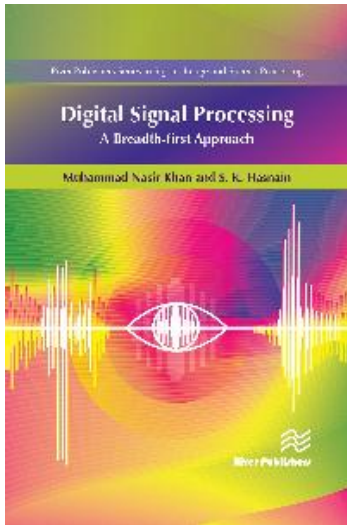
Mohsin Jamil, National University of Sciences and Technology, Pakistan

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Description:

The subject of Digital Signal Processing (DSP) is enormously complex, involving many concepts, probabilities, and signal processing that are woven together in an intricate manner. To cope with this scope and complexity, many DSP texts are often organized around the “numerical examples” of a communication system. With such organization, readers can see through the complexity of DSP, they learn about the distinct concepts and protocols in one part of the communication system while seeing the big picture of how all parts fit together. From a pedagogical perspective, our personal experience has been that such approach indeed works well.

Based on the authors' extensive experience in teaching and research, *Digital Signal Processing: a breadth-first approach* is written with the reader in mind. The book is intended for a course on digital signal processing, for seniors and undergraduate students. The subject has high popularity in the field of electrical and computer engineering, and the authors consider all the needs and tools used in analysis and design of discrete time systems for signal processing.

Key features of the book include:

- The extensive use of MATLAB based examples to illustrate how to solve signal processing problems. The textbook includes a wealth of problems, with solutions
- Worked-out examples have been included to explain new and difficult concepts, which help to expose the reader to real-life signal processing problems
- The inclusion of FIR and IIR filter design further enrich the contents

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2611 PW Delft
The Netherlands

Denmark Office

Alsbjergvej 10
9260 Gistrup
Denmark