Vitamio Codec

Iain E. Richardson

<u>Video Codec Design</u> Iain E. Richardson,2002-05-22 Codec-Algorithmen werden zur Kodierung und Dekodierung (oder Komprimierung und Dekomprimierung) von Daten wie Videofilmen benutzt, ohne daß die visuelle Qualität des dekodierten Bildes beeinträchtigt wird. Bekannt sind zum Beispiel Codecs zur Konvertierung von analoger Videosignale in komprimierte Videodateien wie MPEG. Dieses Lehrbuch vermittelt Ihnen einen Überblick über einschlägige Standards und Technologien, der Schwerpunkt liegt auf Fragen des Designs. Einleuchtende qualitative und quantitative Vergleiche von Systemalternativen werden anhand von Fallstudien vorgenommen.

Versatile Video Coding Humberto Ochoa Dominguez,K.R. Rao,2022-09-01 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 begun 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 and 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 CodingHigh Efficiency Video Coding encoderScreen contentLossless and visually lossless coding algorithmsFast coding algorithmsVisual quality assessmentOther screen content coding algorithmsOverview of JPEG Series

<u>The H.264 Advanced Video Compression Standard</u> Iain E. Richardson,2011-08-24 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

Video Codec Design ,2002 Video compression coding is the enabling technology behind a new wave of communication applications. From streaming internet video to broadcast digital television and digital cinema, the video codec is a key building block for a host of new multimedia applications and services. Video Codec Design sets out to de-mystify the subject of video coding and present a practical, design-based approach to this emerging field. Featuring: Guidance on the practical design and implementation of video coding technology. Explanation of the major video coding standards, including MPEG-2, MPEG-4, H.263 and H.26L. Detailed coverage of key video coding techniques and core algorithms. Examination of critical design issues including transmission, Quality of Service and processing platforms. A wealth of illustrations and practical examples, including quantitative comparisons of design alternatives. Video Codec Design provides communications engineers, system designers, researchers and technical managers with an essential handbook to image and video compression technology.; The clear presentation and emphasis on real-life examples make this book an excellent teaching tool for computer science and electronic engineering instructors.

Standard Codecs Mohammed Ghanbari,2003 This book discusses the growth of digital television technology and the revolution in image and video compression (such as JPEG2000, broadcast TV, video phone), highlighting the need for standardisation in processing static and moving images and their exchange between computer systems.

Video Compression Handbook Andy Beach,Aaron Owen,2018-06-27 Video compression is not a new process; however, it is forever evolving. New standards, codecs, and ways of getting the job done are continually being created. Newcomers to video compression and seasoned veterans alike need to know how to harness the tools and use them for specific workflows for broadcast, the Web, Blu-rays, set-top boxes, digital cinema, and mobile devices. Here to guide you through the multitude of formats and confusing array of specifications, Andy Beach and Aaron Owen use a practical, straightforward approach to explaining video compression. After covering the fundamentals of audio and video compression, they explore the current applications for encoding, discuss the common workflows associated with each, and then look at the most common delivery platforms. The book includes examples from the authors' projects as well as recipes that offer a way to define some of the best practices of video compression today. This invaluable resource gives you: proven techniques for delivering video online, or via disc or other devices. clear, straightforward explanations that cut through the jargon. step-by-step instructions for using a wide variety of encoding tools. workflow tips for performing either stand-alone or batch compressions. insight and advice from top compression professionals sprinkled throughout.

H.264 and MPEG-4 Video Compression Iain E. Richardson,2004-02-06 Following on from the successful MPEG-2 standard, MPEG-4 Visual is enabling a new wave of multimedia applications from Internet video streaming to mobile video conferencing. The new H.264 'Advanced Video Coding' standard promises impressive compression performance and is gaining support from developers and manufacturers. The first book to cover H.264 in technical detail, this unique resource takes an application-based approach to the two standards and the coding concepts that underpin them. Presents a practical, step-by-step, guide to the MPEG-4 Visual and H.264 standards for video compression. Introduces the basic concepts of digital video and covers essential background material required for an understanding of both standards. Provides side-by-side performance comparisons of MPEG-4 Visual and H.264 and advice on how to approach and interpret them to ensure conformance. Examines the way that the standards have been shaped and developed, discussing the composition and procedures of the VCEG and MPEG standardisation groups. Focussing on compression tools and profiles for practical multimedia applications, this book 'decodes' the standards, enabling developers, researchers, engineers and students to rapidly get to grips with both H.264 and

MPEG-4 Visual. Dr Iain Richardson leads the Image Communication Technology research group at the Robert Gordon University in Scotland and is the author of over 40 research papers and two previous books on video compression technology.

High Efficiency Video Coding (HEVC) Vivienne Sze,Madhukar Budagavi,Gary J. Sullivan,2014-08-23 This book provides developers, engineers, researchers and students with detailed knowledge about the High Efficiency Video Coding (HEVC) standard. HEVC is the successor to the widely successful H.264/AVC video compression standard, and it provides around twice as much compression as H.264/AVC for the same level of quality. The applications for HEVC will not only cover the space of the well-known current uses and capabilities of digital video – they will also include the deployment of new services and the delivery of enhanced video quality, such as ultra-high-definition television (UHDTV) and video with higher dynamic range, wider range of representable color, and greater representation precision than what is typically found today. HEVC is the next major generation of video coding design – a flexible, reliable and robust solution that will support the next decade of video applications and ease the burden of video on world-wide network traffic. This book provides a detailed explanation of the various parts of the standard, insight into how it was developed, and in-depth discussion of algorithms and architectures for its implementation.

Hybrid Video Compression Standard Dhaval R. Bhojani,Vedvyas J. Dwivedi,Rohit M. Thanki,2019-09-18 The book presents compression techniques for digital video stream, describing their design using various image transforms, such as discrete cosine transform (DCT), discrete wavelet transform (DWT), and singular value decomposition (SVD). It first discusses the basic requirements and applications of video compression techniques. The book then addresses video compression using DCT as well as the hybrid compression technique, designed and implemented using DCT, DWT and SVD, demonstrating the simulation results for both. Lastly, it proposes future research directions in the field.

Video coding standards K.R. Rao,Do Nyeon Kim,Jae Jeong Hwang,2013-10-07 The requirements for multimedia (especially video and audio) communications increase rapidly in the last two decades in broad areas such as television, entertainment, interactive services, telecommunications, conference, medicine, security, business, traffic, defense and banking. Video and audio coding standards play most important roles in multimedia communications. In order to meet these requirements, series of video and audio coding standards have been developed such as MPEG-2, MPEG-4, MPEG-21 for audio and video by ISO/IEC, H.26x for video and G.72x for audio by ITU-T, Video Coder 1 (VC-1) for video by the Society of Motion Picture and Television Engineers (SMPTE) and RealVideo (RV) 9 for video by Real Networks. AVS China is the abbreviation for Audio Video Coding Standard of China. This new standard includes four main technical areas, which are systems, video, audio and digital copyright management (DRM), and some supporting documents such as consistency verification. The second part of the standard known as AVS1-P2 (Video – Jizhun) was approved as the national standard of China in 2006, and several final drafts of the standard have been completed, including AVS1-P1 (System – Broadcast), AVS1-P2 (Video – Zengqiang), AVS1-P3 (Audio – Double track), AVS1-P3 (Audio – 5.1), AVS1-P7 (Mobile Video), AVS-S-P2 (Video) and AVS-S-P3 (Audio). AVS China provides a technical solution for many applications such as digital broadcasting (SDTV and HDTV), high-density storage media, Internet streaming media, and will be used in the domestic IPTV, satellite and possibly the cable TV market. Comparing with other coding standards such as H.264 AVC, the advantages of AVS video standard include similar performance, lower complexity, lower implementation cost and licensing fees. This standard has attracted great deal of attention from industries related to television, multimedia communications and even chip manufacturing from around the world. Also many well known companies have joined the AVS Group to be Full Members or Observing Members. The 163 members of AVS Group include Texas Instruments (TI) Co., Agilent Technologies Co. Ltd., Envivio Inc., NDS, Philips Research East Asia, Aisino Corporation, LG, Alcatel Shanghai Bell Co. Ltd., Nokia (China) Investment (NCIC) Co. Ltd., Sony (China) Ltd., and Toshiba (China) Co. Ltd. as well as some high level universities in China. Thus there is a pressing need from the instructors, students, and engineers for a book dealing with the topic of AVS China and its performance comparisons with similar standards such as H.264, VC-1 and RV-9.

Complexity-Aware High Efficiency Video Coding Guilherme Corrêa,Pedro Assunção,Luciano Agostini,Luis A. da Silva Cruz,2015-12-29 This book discusses computational complexity of High Efficiency Video Coding (HEVC) encoders with coverage extending from the analysis of HEVC compression efficiency and computational complexity to the reduction and scaling of its encoding complexity. After an introduction to the topic and a review of the state-of-the-art research in the field, the authors provide a detailed analysis of the HEVC encoding tools compression efficiency and computational complexity. Readers will benefit from a set of algorithms for scaling the computational complexity of HEVC encoders, all of which take advantage from the flexibility of the frame partitioning structures allowed by the standard. The authors also provide a set of early termination methods based on data mining and machine learning techniques, which are able to reduce the computational complexity required to find the best frame partitioning structures. The applicability of the proposed methods is finally exemplified with an encoding time control system that employs the best complexity reduction and scaling methods presented throughout the book. The methods presented in this book are especially useful in power-constrained, portable multimedia devices to reduce energy consumption and to extend battery life. They can also be applied to portable and non-portable multimedia devices operating in real time with limited computational resources.

Digital Video Coding for Next Generation Multimedia Shreyanka Subbarayappa,K. R. Rao,Humberto Ochoa Domínguez,2021-07-31 This book is devoted to the theory and design of different algorithms used in the video codecs to obtain efficient implementation and reconstruction of codec outputs. It also addresses the most recent codecs being developed, i.e., VVC and EVC along with the reference codecs, i.e., H.264 and HEVC.

Real-Time Video Compression Raymond Westwater,Borko Furht,2007-08-28 Real-Time Video Compression: Techniques and Algorithms introduces the XYZ video compression technique, which operates in three dimensions, eliminating the overhead of motion estimation. First, video compression standards, MPEG and H.261/H.263, are described. They both use asymmetric compression algorithms, based on motion estimation. Their encoders are much more complex than decoders. The XYZ technique uses a symmetric algorithm, based on the Three-Dimensional Discrete Cosine Transform (3D-DCT). 3D-DCT was originally suggested for compression about twenty years ago; however, at that time the computational complexity of the algorithm was too high, it required large buffer memory, and was not as effective as motion estimation. We have resurrected the 3D-DCT-based video compression algorithm by developing several enhancements to the original algorithm. These enhancements make the algorithm feasible for real-time video compression in applications such as video-on-demand, interactive multimedia, and videoconferencing. The demonstrated results, presented in this book, suggest that the XYZ video compression technique is not only a fast algorithm, but also provides superior compression ratios and high quality of the video compared to existing standard techniques, such as MPEG and H.261/H.263. The elegance of the XYZ technique is in its simplicity, which leads to inexpensive VLSI implementation of any XYZ codec. Real-Time Video Compression: Techniques and Algorithms can be used as a text for graduate students and researchers working in the area of real-time video compression. In addition, the book serves as an essential reference for professionals in the field.

Signal Recovery Techniques for Image and Video Compression and Transmission Aggelos Katsaggelos,Nick Galatsanos,2013-03-09 Signal Recovery Techniques for Image and Video Compression and Transmission establishes a bridge between the fields of signal recovery and image and video compression. Traditionally these fields have developed separately because the problems they examined were regarded as very different, and the techniques used appear unrelated. Recently, though, there is growing consent among the research community that the two fields are quite closely related. Indeed, in both fields the objective is to reconstruct the best possible signal from

limited information. The field of signal recovery, which is relatively mature, has long been associated with a wealth of powerful mathematical techniques such as Bayesian estimation and the theory of projects onto convex sets (to name just two). This book illustrates for the first time in a complete volume how these techniques can be brought to bear on the very important problems of image and video compression and transmission. Signal Recovery Techniques for Image and Video Compression and Transmission, which is written by leading practitioners in both fields, is one of the first references that addresses this approach and serves as an excellent information source for both researchers and practicing engineers.

Codec 127 Success Secrets – 127 Most Asked Questions on Codec – What You Need to Know Andrew Holcomb,2014-09-28 Look at codec now. There has never been a codec Guide like this. It contains 127 answers, much more than you can imagine; comprehensive answers and extensive details and references, with insights that have never before been offered in print. Get the information you need--fast! This all-embracing guide offers a thorough view of key knowledge and detailed insight. This Guide introduces what you want to know about codec. A quick look inside of some of the subjects covered: Comparison of video codecs – Subjective video quality, Video decoder – Google (On2) codecs, Opus (audio codec) – Quality comparison and low latency performance, Jpeg – JPEG codec example, Video decoder – H.265/MPEG-H HEVC codecs, FFmpeg – Legal status of codecs, VideoLAN – Codecs, Codecademy – History, Samsung Galaxy Player – Codec support, Codecision procedure – Treaty revisions, CinemaNow – Codecs and DRMs, Linphone – Video codecs, YouTube – Quality and codecs, Video codecs – Text compression formats, HTML5 Audio – Supported audio codecs, Silk (codec) – History, Comparison of video codecs – Speed comparison, Opus (audio codec) – Hardware, List of open source codecs – Video codecs, DTS Coherent Acoustics – DTS audio codec, Ogg – Ogg codecs, Opus (audio codec) – Sample rates, VC-1 – Microsoft codec implementations, Codecision procedure – Simplified revision procedure, Opus (audio codec) – Features, DivX – DivX Plus Codec Pack, Video codecs – Lossless compression, Global System for Mobile Communications – Voice codecs, DTS (sound system) – DTS audio codec, Video codecs – Voice, Codecision procedure – Ordinary legislative procedure, Comparison of video codecs – Profiles support, Comparison of video codecs – Introduction to comparison, Blu-ray Disc – Codecs, CODEC – Compression quality, and much more...

VLSI Design for Video Coding Youn-Long Steve Lin,Chao-Yang Kao,Hung-Chih Kuo,Jian-Wen Chen,2009-12-29 High definition video requires substantial compression in order to be transmitted or stored economically. Advances in video coding standards from MPEG-1, MPEG-2, MPEG-4 to H.264/AVC have provided ever increasing coding efficiency, at the expense of great computational complexity which can only be delivered through massively parallel processing. This book will present VLSI architectural design and chip implementation for high definition H.264/AVC video encoding, using a state-of-the-art video application, with complete VLSI prototype, via FPGA/ASIC. It will serve as an invaluable reference for anyone interested in VLSI design and high-level (EDA) synthesis for video.

Basic Prediction Techniques in Modern Video Coding Standards Byung-Gyu Kim,Kalyan Goswami,2016-06-28 This book discusses in detail the basic algorithms of video compression that are widely used in modern video codec. The authors dissect complicated specifications and present material in a way that gets readers quickly up to speed by describing video compression algorithms succinctly, without going to the mathematical details and technical specifications. For accelerated learning, hybrid codec structure, inter- and intra- prediction techniques in MPEG-4, H.264/AVC, and HEVC are discussed together. In addition, the latest research in the fast encoder design for the HEVC and H.264/AVC is also included.

Video Encoding by the Numbers Jan Lee Ozer,2016-12-28 Video Encoding by the Numbers helps readers optimize the quality and efficiency of their streaming video by objectively detailing the impact of critical configuration options with industry-standard quality metrics like PSNR and SSIMplus. This takes the guesswork out of most encoding decisions and allows readers to achieve the optimal quality/data rate tradeoff. In addition, readers learn how to use tools like the Moscow University Video Quality Measurement tool, SSIMWave Quality of Experience Monitor, and FFmpeg to perform similar quality tests on their own videos. Because all videos encode differently, the tests detailed in the book involve eight different videos, including movie footage, animations, talking head footage, a music video, and Powerpoint and Camtasia-based videos. Readers first learn how to determine the ideal data rate for their videos at different resolutions. Then the book covers configuration options like bitrate control (CBR, VBR) that impacts quality and deliverability, and I-Frame, B-Frame, and reference frame decisions that impact quality and encoding time. The next three chapters focus on codec-specific configurations like Profile and preset for H.264 and HEVC, and the various configuration options available for Google's VP9. Next the book details how to choose an adaptive bitrate (ABR) technology, how to create an encoding ladder, and the most efficient ways to encode and package video into different ABR formats. Working off the groundbreaking work by Netflix and YouTube, the final chapter teaches the reader how a use per-title encoding with their own videos to create the ideal encoding ladder for each video in their library. Each chapter concludes with a section detailing how to configure the options discussed with FFmpeg, a preferred tool for high-volume video producers, including packaging into HLS and DASH formats (the latter with MP4Box). Overall readers learn how to optimally configure their encoding ladders and how to produce their videos with FFmpeg.

Decode to Encode Avinash Ramachandran,2018-11-23 Video coding is complex. YouTube and Netflix use it to deliver great video even at extremely low data rates. Have you ever wondered how they optimize video for low bandwidths? Do technical terms like 'rate distortion optimization', 'predictive coding' or 'adaptive quantization' overwhelm you? Decode To Encode is the only book that answers the hows and whys of elements in AVC (H.264), HEVC (H.265) and VP9. It provides video engineers and students all the compression fundamentals they need to solve problems, conduct research and serve their customers better. Coming from an experienced video codec engineer and product enthusiast, the book is written in a clear language with numerous examples.You will learn about: – digital video fundamentals and the evolution of codecs;– spatial and temporal aspects leveraged to achieve compression in block-based video architecture;– intra and inter coding, GOPs, block partitioning, prediction, transforms, quantization, CABAC, in-loop filtering, rate-distortion optimization and rate control;– bitrate modes, performance metrics and comparisons;– emerging topics like per-title encoding, AV1, 360 Video and VR, and encoding with ML.Why be left behind in today's evolving video landscape? Get the tools you need to understand technical specifications and design video algorithms. Learn the concepts in this book and become a compression expert today. Exude confidence as you walk into your next meeting or start a conversation about video compression

Video Coding Mohammed Ghanbari,1999 This study offers an introduction to video coding algorithms for readers in electronic engineering, media, broadcasting and transmission. The text works up from basic principles to the advanced video compression systems now being developed, including MPEG 1,2,4 and 7, JPEG, H.261 and H.263.

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