



NEXT-GENERATION VIDEO CODING AND STREAMING

BENNY BING

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Next Generation Video Coding And Streaming

Rosanne Welch, Peg A. Lamphier



Next Generation Video Coding And Streaming:

Next-Generation Video Coding and Streaming Benny Bing, 2015-08-28 Reviews the new High Efficiency Video Coding HEVC standard and advancements in adaptive streaming technologies for use in broadband networks and the Internet This book describes next generation video coding and streaming technologies with a comparative assessment of the strengths and weaknesses Specific emphasis is placed on the H 265 HEVC video coding standard and adaptive bit rate video streaming In addition to evaluating the impact of different types of video content and powerful feature sets on HEVC coding efficiency the text provides an in depth study on the practical performance of popular adaptive streaming platforms and useful tips for streaming optimization Readers will learn of new over the top OTT online TV advancements the direction of the broadband telecommunications industry and the latest developments that will help keep implementation costs down and maximize return on infrastructure investment Reviews the emerging High Efficiency Video Coding HEVC standard and compares its coding performance with the MPEG 4 Advanced Video Coding AVC and MPEG 2 standards Provides invaluable insights into the intra and inter coding efficiencies of HEVC such as the impact of hierarchical block partitioning and new prediction modes Evaluates the performance of the Apple and Microsoft adaptive streaming platforms and presents innovative techniques related to aggregate stream bandwidth prediction duplicate chunk Includes end of chapter homework problems and access to instructor slides *Next Generation Video Coding and Streaming* is written for students researchers and industry professionals working in the field of video communications Benny Bing has worked in academia for over 20 years He has published over 80 research papers and 12 books and has 6 video patents licensed to industry He has served as a technical editor for several IEEE journals and an IEEE Communications Society Distinguished lecturer He also received the National Association of Broadcasters NAB Technology Innovation Award for demonstrations of advanced media technologies

Next-Generation Video Coding and Streaming Benny Bing, 2015-10-01 Reviews the new High Efficiency Video Coding HEVC standard and advancements in adaptive streaming technologies for use in broadband networks and the Internet This book describes next generation video coding and streaming technologies with a comparative assessment of the strengths and weaknesses Specific emphasis is placed on the H 265 HEVC video coding standard and adaptive bit rate video streaming In addition to evaluating the impact of different types of video content and powerful feature sets on HEVC coding efficiency the text provides an in depth study on the practical performance of popular adaptive streaming platforms and useful tips for streaming optimization Readers will learn of new over the top OTT online TV advancements the direction of the broadband telecommunications industry and the latest developments that will help keep implementation costs down and maximize return on infrastructure investment Reviews the emerging High Efficiency Video Coding HEVC standard and compares its coding performance with the MPEG 4 Advanced Video Coding AVC and MPEG 2 standards Provides invaluable insights into the intra and inter coding efficiencies of HEVC such as the impact of hierarchical block partitioning and new prediction

modes Evaluates the performance of the Apple and Microsoft adaptive streaming platforms and presents innovative techniques related to aggregate stream bandwidth prediction duplicate chunk Includes end of chapter homework problems and access to instructor slides Next Generation Video Coding and Streaming is written for students researchers and industry professionals working in the field of video communications Benny Bing has worked in academia for over 20 years He has published over 80 research papers and 12 books and has 6 video patents licensed to industry He has served as a technical editor for several IEEE journals and an IEEE Communications Society Distinguished lecturer He also received the National Association of Broadcasters NAB Technology Innovation Award for demonstrations of advanced media technologies *Next Generation Content Delivery Infrastructures: Emerging Paradigms and Technologies* Fortino, Giancarlo, Palau, Carlos E., 2012-06-30 This book delivers state of the art research on current and future Internet based content delivery networking topics bringing to the forefront novel problems that demand investigation **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 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

User-Centric and Information-Centric Networking and Services M. Bala Krishna, 2019-04-29 User Centric Networks UCN and Information Centric Networks ICN are new communication paradigms to increase the efficiency of content delivery and also content availability In this new concept the network infrastructure actively contributes to content caching and distribution This book presents the basic concepts of UCN and ICN describes the main architecture proposals for these networks and discusses the main challenges to their development The book also looks at the current challenges for this concept including naming routing and caching on the network core elements several aspects of content security user privacy and practical issues in implementing UCN and ICN

Hardware Software Co-Design of a Multimedia SOC Platform Sao-Jie Chen, Guang-Huei Lin, Pao-Ann Hsiung, Yu-Hen Hu, 2009-01-25 Hardware Software Co Design of a Multimedia SOC Platform is one of the first of its kinds to provide a comprehensive overview of the design and implementation of the hardware and software of an SoC platform for multimedia applications Topics covered in this book range from system level design methodology multimedia algorithm implementation a sub word parallel single instruction multiple data SIMD processor design and its virtual platform implementation to the development of an SIMD parallel compiler as well as a real time operating system RTOS Hardware Software Co Design of a Multimedia SOC Platform is written for practitioner engineers and technical managers who want to gain first hand knowledge about the hardware software design process of an SoC platform It offers both tutorial like details to help readers become familiar with a diverse range of subjects and in depth analysis for advanced readers to pursue further

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

Technical Innovation in American History Rosanne Welch, Peg A. Lamphier, 2019-02-22 From the invention of eyeglasses to the Internet this three volume set examines the pivotal effects of inventions on society providing a fascinating history of technology and innovations in the United States from the earliest European colonization to the present *Technical Innovation in American History* surveys the history of technology documenting the chronological and thematic connections between specific inventions technological systems individuals and events that have contributed to the history of science and technology in the United States Covering eras from colonial times to the present day in three chronological volumes the entries include innovations in fields such as architecture civil engineering transportation energy mining and oil industries chemical industries electronics computer and information technology communications television radio and print agriculture and food technology and military technology The A Z entries address key individuals events organizations and legislation related to themes such as industry consumer and medical technology military technology computer technology and space science among others enabling readers to understand how specific inventions technological systems individuals and events influenced the history cultural development and even self identity of the United States and its people The information also spotlights how American culture the U S government and American society have specifically influenced technological development

Cloud Technology: Concepts, Methodologies, Tools, and Applications Management Association, Information Resources, 2014-10-31 As the Web grows and expands into ever more remote parts of the world the availability of resources over the Internet increases exponentially Making use of this widely prevalent tool organizations and individuals can share and store knowledge like never before *Cloud Technology Concepts Methodologies Tools and Applications* investigates the latest research in the ubiquitous Web exploring the use of applications and software that make use of the Internet s anytime anywhere availability By bringing together research and ideas from across the globe this publication will be of use to computer engineers software developers and end users in business education medicine and more

Resource Management of Mobile Cloud Computing Networks and

Environments Mastorakis, George, Mavromoustakis, Constandinos X., Pallis, Evangelos, 2015-03-31 As more and more of our data is stored remotely accessing that data wherever and whenever it is needed is a critical concern More concerning is managing the databanks and storage space necessary to enable cloud systems Resource Management of Mobile Cloud Computing Networks and Environments reports on the latest advances in the development of computationally intensive and cloud based applications Covering a wide range of problems solutions and perspectives this book is a scholarly resource for specialists and end users alike making use of the latest cloud technologies

Engineer of the XXI Century Stanisław Zawisławski, Jacek Rysiński, 2019-04-30 This book gathers the proceedings of Engineer of the XXI Century The VIII Inter University Conference of Students PhD Students and Young Scientists which was held at the University of Bielsko Biala a ATH Poland on the 8th of December 2017 The event highlighted outstanding research on mechatronics in the broadest sense while also promoting cooperation among students and young scientists from around the globe Topic areas covered include mechanics and machine building automation and robotics mechatronics production engineering and management and informatics computer science

Digital TV and Wireless Multimedia Communication Xiaokang Yang, Guangtao Zhai, 2017-03-11 This book constitutes the refereed proceedings of the 13th International Forum of Digital TV and Wireless Multimedia Communication IFTC 2016 held in Shanghai China in November 2016 The 38 revised full papers presented were carefully reviewed and selected from 102 submissions The papers are organized in topical sections on image processing audio processing image and video compression telecommunications

Mobile Networks and Cloud Computing Convergence for Progressive Services and Applications Rodrigues, Joel J.P.C., 2013-11-30 Recent technology trends involving the combination of mobile networks and cloud computing have offered new chances for mobile network providers to use specific carrier cloud services These advancements will enhance the utilization of the mobile cloud in industry and corporate settings Mobile Networks and Cloud Computing Convergence for Progressive Services and Applications is a fundamental source for the advancement of knowledge application and practice in the interdisciplinary areas of mobile network and cloud computing By addressing innovative concepts and critical issues this book is essential for researchers practitioners and students interested in the emerging field of vehicular wireless networks

The Media Workflow Puzzle Clyde Smith, Chris Lennon, 2021-03-17 This edited collection brings together a team of top industry experts to provide a comprehensive look at the entire media workflow from start to finish The Media Workflow Puzzle gives readers an in depth overview of the workflow process from production to distribution to archiving Pulling from the expertise of twenty contributing authors and editors the book covers topics including content production postproduction systems media asset management content distribution and archiving and preservation offering the reader an understanding of all the various elements and processes that go into the media workflow ecosystem It concludes with an exploration of the possibilities for the future of media workflows and the new opportunities it may bring Professionals and students alike looking to understand

how to manage media content for its entire lifecycle will find this an invaluable resource

Parametric Packet-based Audiovisual Quality Model for IPTV services Marie-Neige Garcia,2014-06-20 This volume presents a parametric packet based comprehensive model to measure and predict the audiovisual quality of Internet Protocol Television services as it is likely to be perceived by the user The comprehensive model is divided into three sub models referred to as the audio model the video model and the audiovisual model The audio and video models take as input a parametric description of the audiovisual processing path and deliver distinct estimates for both the audio and video quality These distinct estimates are eventually used as input data for the audiovisual model This model provides an overall estimate of the perceived audiovisual quality in total The parametric description can be used as diagnostic information The quality estimates and diagnostic information can be practically applied to enhance network deployment and operations Two applications come to mind in particular Network planning and network service quality monitoring The audio model can be used indifferently for both applications However two variants of the video model have been developed in order to address particular needs of the applications mentioned above The comprehensive model covers effects due to resolution coding and IP packet loss in case of RTP type transport The model applied to quality monitoring is standardized under the ITU T Recommendations P 1201 and P 1201 2

The Newcom++ Vision Book Sergio Benedetto,Marco Luise,Luis M. Correia,2012-04-07 The Book contains the Vision of the researchers of the European Network of Excellence NEWCOM Network of Excellence on Wireless COMMunication on the present and future status of Wireless Communication Networks In its content the community of NEWCOM researchers shaped under the common ground of a mainly academic network of excellence have distilled their scientific wisdom in a number of areas characterized by the common denominator of wireless communications by identifying the medium long term research tendencies problems describing the tools to face them and providing a relatively large number of references for the interested reader The identified areas and the researchers involved in their redaction reflect the intersection of the major topics in wireless communications with those that are deeply investigated in NEWCOM they are preceded by an original description of the main trends in user society needs and the degree of fulfilment that ongoing and future wireless communications standards will more likely help achieving The appendix of the Book contains a list of Millenium Problems seminal problems in the area of wireless communication networks characterized by being crucial and still unsolved The problems have been identified by NEWCOM researchers and filtered by the editors of the Vision Book

Greening Video Distribution Networks Adrian Popescu,2018-01-29 This insightful text presents a guide to video distribution networks VDNs providing illuminating perspectives on reducing power consumption in IP based video networks from an authoritative selection of experts in the field A particular focus is provided on aspects of architectures models Internet protocol television IPTV over the top OTT video content video on demand VoD encoding and decoding mobile terminals wireless multimedia sensor networks WMSNs software defined networking SDN and techno economic issues

Topics and features reviews the fundamentals of video over IP distribution systems and the trade offs between network service performance and energy efficiency in VDNs describes the characterization of the main elements in a video distribution chain and techniques to decrease energy consumption in software based VoD encoding introduces an approach to reduce power consumption in mobile terminals during video playback and in data center networks using the SDN paradigm discusses the strengths and limitations of different methods for measuring the energy consumption of mobile devices proposes optimization methods to improve the energy efficiency of WMSNs and a routing algorithm that reduces energy consumption while maintaining the bandwidth presents an economic analysis of the savings yielded by approaches to minimize energy consumption of IPTV and OTT video content services The broad coverage and practical insights offered in this timely volume will be of great value to all researchers practitioners and students involved with computer and telecommunication systems

Mobile Computing: Concepts, Methodologies, Tools, and Applications Taniar, David, 2008-11-30 This multiple volume publication advances the emergent field of mobile computing offering research on approaches observations and models pertaining to mobile devices and wireless communications from over 400 leading researchers Provided by publisher

Cloud VR Huaping Xiong, Dawei Li, Kun Huang, Mu Xu, Yin Huang, Lingling Xu, Jianfei Lai, Shengjun Qian, 2020-11-11 Based on the technical accumulation and practice of Huawei iLab in the Cloud VR field this book systematically describes the advantages of Cloud VR technologies technical requirements on clouds networks and terminals as well as solution implementation Cloud VR experience evaluation baselines and methods and current business practices Cloud VR introduces cloud computing and cloud rendering to VR services With fast and stable networks cloud based display output and audio output are coded compressed and transmitted to user terminals implementing cloud based VR service content and content rendering Cloud VR has stringent requirements on bandwidth and latency making it a proficient application for 5G and gigabit home broadband networks in the era of dual G As the first advocate of Cloud VR Huawei iLab developed the first prototype of the Cloud VR technical solution initiated the industry s first Cloud VR industry cooperation plan VR OpenLab with partners and incubated the world s first Cloud VR commercial project with China Mobile Fujian Cloud VR Technology and Application is the first official publication of Huawei iLab s research and practice achievements It systematically and thoroughly introduces the Cloud VR concept solution architecture key technologies and business practices and is of great value in academic and social applications This book is easy to understand practical and suitable for VR vendors VR technology enthusiasts carriers network vendors cloud service providers universities and other enterprises and scientific research institutes

Enabling 5G Communication Systems to Support Vertical Industries

Muhammad Ali Imran, Yusuf Abdulrahman Sambo, Qammer H. Abbasi, 2019-07-31 How 5G technology can support the demands of multiple vertical industries Recent advances in technology have created new vertical industries that are highly dependent on the availability and reliability of data between multiple locations The 5G system unlike previous generations

will be entirely data driven addressing latency resilience connection density coverage area and other vertical industry criteria Enabling 5G Communication Systems to Support Vertical Industries demonstrates how 5G communication systems can meet the needs unique to vertical industries for efficient cost effective delivery of service Covering both theory and practice this book explores solutions to problems in specific industrial sectors including smart transportation smart agriculture smart grid environmental monitoring and disaster management The 5G communication system will have to provide customized solutions to accommodate each vertical industry s specific requirements Whether an industry practitioner designing the next generation of wireless communications or a researcher needing to identify open issues and classify their research this timely book Covers the much discussed topics of supporting multiple vertical industries and new ICT challenges Addresses emerging issues and real world problems surrounding 5G technology in wireless communication and networking Explores a comprehensive array of essential topics such as connected health smart transport smart manufacturing and more Presents important topics in a clear concise style suitable for new learners and professionals alike Includes contributions from experts and industry leaders system diagrams charts tables and examples Enabling 5G Communication Systems to Support Vertical Industries is a valuable resource telecom engineers industry professionals researchers professors doctorate and postgraduate students requiring up to date information on supporting vertical industries with 5G technology systems

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