



NEXT-GENERATION VIDEO CODING AND STREAMING

BENNY BING

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AND STREAMING**

PREFACE

TV remains the single most important and engaging source of information and entertainment. U.S. teenagers spend more than three times of their spare time watching TV than on social media. The global footprint of TV has been enhanced recently by online video, which includes online TV. U.S. consumers watch more movies online than on DVDs, Blu-ray discs and other physical video formats. This trend is driven by the flexibility of on-the-go mobile entertainment and the widespread adoption of video-capable smartphones and tablets. These personal devices have become ubiquitous with greatly expanded computing power and memory, improved displays, and network connectivity. The accelerated growth of video traffic on the Internet is expected to continue. However, supporting high-quality video delivery presents a significant challenge to Internet service providers due to the higher bandwidth demands compared to data and voice traffic.

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. H.265/HEVC has been developed to meet the demands of emerging UHD video services and pervasive online video streaming. The commercial adoption of H.265/HEVC has started to gain traction since 2014. Invaluable insights into the coding efficiencies of the intracoded and intercoded frames are described in this book, including the impact of different types of video content and powerful feature sets such as the hierarchical block structure and new coding parameters. Adaptive streaming is a key enabling technology that can achieve smooth and reliable video delivery over heterogeneous wireline and wireless networks, as well as multiscreen personal devices. It provides autonomous bandwidth management and maintains quality of service even as link conditions and network congestion vary. This book provides

an in-depth study on the practical performance of the popular adaptive streaming platforms and useful tips for streaming optimization. Innovative techniques related to aggregate adaptive stream bandwidth prediction, duplicate chunk suppression, and server-based adaptive streaming are also discussed.

I wish to thank Wiley's Publisher Dr. Simone Taylor, for her encouragement and patience in overseeing this book project. I also like to acknowledge my industry collaborators and former students who have been generous in sharing many useful comments. The book includes over 220 illustrative figures and over 110 homework problems containing interesting ideas and extensions to key concepts. Powerpoint slides and solutions to the homework problems are available to instructors who adopt the book for a course. Please feel free to send your comments and questions to bennybing@yahoo.com.

BENNY BING

CONTENTS

Preface	xvii
1 Digital Video Delivery	1
1.1 Broadband TV Landscape, 2	
1.1.1 Internet TV Providers, 2	
1.1.2 Netflix, 3	
1.1.3 Hulu, 3	
1.1.4 Amazon, 3	
1.1.5 YouTube, 3	
1.1.6 ESPN3, 4	
1.1.7 HBO, 4	
1.1.8 CBS, 4	
1.1.9 Sony, 4	
1.1.10 Retail Giants, 4	
1.2 Internet TV Delivery Platforms, 5	
1.2.1 Cloud TV, 5	
1.2.2 Content Delivery Network, 6	
1.2.3 Free CDN, 6	
1.2.4 Video Transcoding, 7	

- 1.3 Second Screen Device Adoption, 7
 - 1.3.1 Mobile Video, 8
 - 1.3.2 Mobile Versus Traditional TV, 8
 - 1.3.3 Over-the-Air Digital TV, 8
 - 1.3.4 Non-Real-Time TV Delivery, 9
 - 1.3.5 NRT Use Cases, 9
 - 1.3.6 Cable Wi-Fi Alliance, 9
- 1.4 Screen and Video Resolution, 10
 - 1.4.1 Aspect Ratios, 11
 - 1.4.2 Video Resolution, 11
 - 1.4.3 Visual Quality, 13
 - 1.4.4 Matching Video Content to Screen Size, 13
- 1.5 Stereoscopic 3D TV, 14
 - 1.5.1 Autostereoscopic 3D, 14
 - 1.5.2 Anaglyph 3D, 14
- 1.6 Video Coding Standards, 15
 - 1.6.1 Exploiting Video Content Redundancies, 15
 - 1.6.2 High-Quality Versus High-Resolution Videos, 16
 - 1.6.3 Factors Affecting Coded Video Bit Rates, 16
 - 1.6.4 Factors Affecting Coded Frame Sizes, 17
- 1.7 Video Streaming Protocols, 18
 - 1.7.1 Video Streaming over HTTP, 19
 - 1.7.2 Adaptive Bit Rate Streaming, 19
 - 1.7.3 Benefits and Drawbacks of Adaptive Streaming, 20
 - 1.7.4 HTTP Progressive Download, 20
 - 1.7.5 HTML5, 20
- 1.8 TV Interfaces and Navigation, 21
 - 1.8.1 Streaming Adapters, 21
 - 1.8.2 Streaming Boxes, 21
 - 1.8.3 Media-Activated TV Navigation, 22
 - 1.8.4 Smartphone and Tablet TV Navigation, 22
 - 1.8.5 Digital Living Network Alliance, 22
 - 1.8.6 Discovery and Launch, 23
 - 1.8.7 UltraViolet, 23
 - References, 24
 - Homework Problems, 24

2 Video Coding Fundamentals

29

- 2.1 Sampling Formats of Raw Videos, 29
 - 2.1.1 Color Subsampling, 30
 - 2.1.2 YUV Versus RGB Color Space, 31
 - 2.1.3 Bit Rate and Storage Requirements, 31
- 2.2 Impact of Video Compression, 32
 - 2.2.1 Rate-Distortion Optimization, 32

- 2.2.2 Partitions in a Video Frame, 33
- 2.2.3 Video Coding Standards, 34
- 2.2.4 Profiles and Levels, 34
- 2.3 General Video Codec Operations, 34
 - 2.3.1 Transform Coding, 35
 - 2.3.2 Quantization, 35
 - 2.3.3 Deblocking Filter, 37
- 2.4 Transform Coding, 38
 - 2.4.1 Orthonormal Transforms, 38
 - 2.4.2 Discrete Cosine Transform, 40
 - 2.4.3 Discrete Sine Transform, 44
 - 2.4.4 Asymmetric DST, 44
 - 2.4.5 Comparison of KLT, ADST, and DCT, 44
 - 2.4.6 Hybrid Transforms, 46
 - 2.4.7 Wavelet Transform, 46
 - 2.4.8 Impact of Transform Size, 46
 - 2.4.9 Impact of Parallel Coding, 47
- 2.5 Entropy Coding, 47
 - 2.5.1 Variable Length Codes, 47
 - 2.5.2 Golomb Codes, 48
 - 2.5.3 Arithmetic Coding Overview, 48
 - 2.5.4 Nonadaptive Arithmetic Coding, 49
 - 2.5.5 Steps in Nonadaptive Arithmetic Coding, 49
 - 2.5.6 Context-Based Adaptive Arithmetic Coding, 50
 - 2.5.7 Code Synchronization, 50
- 2.6 MPEG (H.26x) Standards, 51
 - 2.6.1 MPEG Frames, 51
 - 2.6.2 I Frames, 51
 - 2.6.3 P Frames, 52
 - 2.6.4 B Frames, 52
 - 2.6.5 Intracoded P and B Frames, 52
- 2.7 Group of Pictures, 53
 - 2.7.1 GOP Length, 53
 - 2.7.2 Closed GOP, 53
 - 2.7.3 Error Resiliency in a Closed GOP, 54
 - 2.7.4 Decoding Sequence, 55
 - 2.7.5 Open GOP, 55
 - 2.7.6 Variable GOP Length, 56
 - 2.7.7 Random Access of MPEG Frames, 56
- 2.8 Motion Estimation and Compensation, 57
 - 2.8.1 Motion Estimation, 57
 - 2.8.2 Motion Search in P Frames, 58
 - 2.8.3 Motion Search in B Frames, 58
 - 2.8.4 Fractional (Subsample) Motion Search, 59
 - 2.8.5 Motion Compensation, 60

- 2.8.6 Computational Complexity, 61
- 2.8.7 Motion Search Algorithms, 63
- 2.8.8 Accelerating Motion Search, 65
- 2.8.9 Impact of Video Resolution, 66
- 2.9 Non-MPEG Video Coding, 66
 - 2.9.1 Motion JPEG, 66
 - 2.9.2 Dirac, 67
 - 2.9.3 WebM Project, 67
- 2.10 Constant and Variable Bit-Rate Videos, 67
 - 2.10.1 CBR Encoding, 68
 - 2.10.2 VBR Encoding, 68
 - 2.10.3 Assessing Bit Rate Variability, 69
 - 2.10.4 Scene Change Detection, 70
 - 2.10.5 Adaptive Scene Change Detection, 71
 - 2.10.6 I Frame Size Prediction, 72
- 2.11 Advanced Audio Coding, 72
 - 2.11.1 Low and High Bit Rate AAC, 74
 - 2.11.2 High-Efficiency and Low-Complexity AAC, 74
 - 2.11.3 MPEG Surround, 74
- 2.12 Video Containers, 74
 - 2.12.1 MPEG-4, 75
 - 2.12.2 MP4 Access Units, 75
 - 2.12.3 Binary Format for Scenes, 75
 - 2.12.4 MP4 Overheads, 76
 - 2.12.5 MPEG-2 TS, 76
 - 2.12.6 MPEG-2 TS Structure, 76
 - 2.12.7 MPEG-2 TS Audio and Video PESs, 77
 - 2.12.8 MPEG-2 TS IP/Ethernet Encapsulation, 77
- 2.13 CLOSED CAPTIONS, 77
 - References, 78
 - Homework Problems, 78

3 H.264/AVC Standard

83

- 3.1 Overview of H.264, 83
 - 3.1.1 Fundamental H.264 Benefits, 84
 - 3.1.2 H.264 Applications, 84
- 3.2 H.264 Syntax and Semantics, 84
 - 3.2.1 Profiles and Levels, 85
 - 3.2.2 Baseline, Extended, Main Profiles, 85
 - 3.2.3 High Profiles, 85
- 3.3 H.264 Encoder, 89
 - 3.3.1 H.264 Slice Types, 89
 - 3.3.2 H.264 Intraprediction, 90
 - 3.3.3 Intraprediction for 4×4 Blocks, 91

- 3.3.4 Intraprediction for 16×16 Macroblocks, 92
- 3.3.5 Intra Pulse Code Modulation Mode, 93
- 3.3.6 H.264 Interprediction, 93
- 3.4 Rate Distortion Optimization, 94
 - 3.4.1 RDO under VBR, 95
 - 3.4.2 RDO under CBR, 95
 - 3.4.3 In-Loop Deblocking Filter, 96
- 3.5 Video Coding and Network Abstraction Layers, 96
 - 3.5.1 Video Coding Layer, 96
 - 3.5.2 Network Abstraction Layer, 97
 - 3.5.3 Hypothetical Reference Decoder, 97
 - 3.5.4 Supplemental Enhancement Information, 98
- 3.6 Error Resilience, 98
 - 3.6.1 Slice Coding, 98
 - 3.6.2 Data Partitioning, 99
 - 3.6.3 Slice Groups, 100
 - 3.6.4 Redundant Slices, 101
 - 3.6.5 Flexible Macroblock Ordering, 101
 - 3.6.6 FMO Types, 102
 - 3.6.7 FMO Overhead, 103
 - 3.6.8 Arbitrary Slice Ordering, 103
- 3.7 Transform Coding, 104
 - 3.7.1 Transform Types, 104
 - 3.7.2 Hadamard Transforms, 105
 - 3.7.3 Transform Implementation, 106
- 3.8 Entropy Coding, 106
 - 3.8.1 Context-Adaptive Binary Arithmetic Coding, 106
 - 3.8.2 CABAC Performance, 107
 - 3.8.3 Context-Adaptive Variable-Length Coding, 107
- 3.9 Motion Vector Search, 108
 - 3.9.1 Motion Search Options, 108
- 3.10 Multiple Reference Slices, 109
 - 3.10.1 Motivations for Using More Reference Slices, 109
 - 3.10.2 Switching Reference Slices, 109
- 3.11 Scalable Video Coding, 109
 - 3.11.1 Temporal Scalability, 110
 - 3.11.2 Spatial Scalability, 110
 - 3.11.3 Video Quality Scalability, 110
 - 3.11.4 Disadvantages of SVC, 110
- References, 111
- Homework Problems, 111

4 H.265/HEVC Standard

115

- 4.1 H.265 Overview, 115

- 4.1.1 Fundamental H.265 Benefits, 116
 - 4.1.2 H.265 Applications, 118
 - 4.1.3 Video Input, 118
- 4.2 H.265 Syntax and Semantics, 118
 - 4.2.1 Parameter Set Structure, 119
 - 4.2.2 NAL Unit Syntax Structure, 119
 - 4.2.3 Reference Frame Sets and Lists, 119
 - 4.2.4 H.265 GOP Structure, 120
 - 4.2.5 Support for Open GOPs and Random Access, 121
 - 4.2.6 Video Coding Layer, 122
 - 4.2.7 Temporal Sublayers, 122
 - 4.2.8 Error Resilience, 123
 - 4.2.9 RTP Support, 124
- 4.3 Profiles, Levels, and Tiers, 124
 - 4.3.1 Profiles, 124
 - 4.3.2 Levels, 125
 - 4.3.3 Range Extensions, 126
- 4.4 Quadtrees, 126
 - 4.4.1 Variable Block Size Quadtree Partitioning, 127
 - 4.4.2 Coding Tree Units, 128
 - 4.4.3 Splitting of Coding Blocks, 129
 - 4.4.4 Frame Boundary Matching, 130
 - 4.4.5 Prediction Blocks and Units, 130
 - 4.4.6 Transform Blocks and Units, 132
 - 4.4.7 Determining the Quadtree Depth, 132
 - 4.4.8 Coding Unit Identification, 133
- 4.5 Slices, 133
 - 4.5.1 Tiles, 134
 - 4.5.2 Dependent Slice Segments, 135
 - 4.5.3 Wavefront Parallel Processing, 136
 - 4.5.4 Practical Considerations for Parallel Processing, 137
- 4.6 Intraprediction, 137
 - 4.6.1 Prediction Block Partitioning, 138
 - 4.6.2 Intra-Angular Prediction, 138
 - 4.6.3 Intra-DC and Intra-Planar Prediction, 140
 - 4.6.4 Adaptive Smoothing of Reference Samples, 140
 - 4.6.5 Filtering of Prediction Block Boundary Samples, 141
 - 4.6.6 Reference Sample Substitution, 141
 - 4.6.7 Mode Coding, 142
- 4.7 Interprediction, 143
 - 4.7.1 Fractional Sample Interpolation, 143
 - 4.7.2 Motion Vector Prediction, 145
 - 4.7.3 Merge Mode, 146
 - 4.7.4 Skip Mode, 147

- 4.7.5 Advanced MV Prediction, 148
- 4.7.6 Restrictions on Motion Data, 148
- 4.7.7 Practical Considerations, 149
- 4.8 Transform, Scaling, and Quantization, 149
 - 4.8.1 Alternative 4×4 Transform, 150
 - 4.8.2 Scaling, 151
 - 4.8.3 Quantization, 151
- 4.9 Entropy Encoding, 151
 - 4.9.1 H.265 Binarization Formats, 152
 - 4.9.2 Context Modeling, 152
 - 4.9.3 CABAC Throughput Issues, 154
 - 4.9.4 CABAC Encoding, 154
 - 4.9.5 CABAC Decoding, 155
 - 4.9.6 Coefficient Scanning, 155
 - 4.9.7 Coefficient Coding, 156
- 4.10 In-Loop Filters, 156
 - 4.10.1 In-Loop Deblocking Filter, 157
 - 4.10.2 Sample-Adaptive Offset Filter, 158
- 4.11 Special H.265 Coding Modes, 161
 - References, 162
 - Homework Problems, 162

5 Assessing and Enhancing Video Quality

165

- 5.1 Introduction, 165
 - 5.1.1 Subjective Metrics, 166
 - 5.1.2 Limitations of Subjective Metrics, 166
 - 5.1.3 Objective Metrics, 166
 - 5.1.4 Types of Objective Metrics, 167
 - 5.1.5 References for Objective Metrics, 167
 - 5.1.6 Network Impact, 168
- 5.2 Distortion Measure, 169
 - 5.2.1 Sum of Absolute Differences, 169
 - 5.2.2 Sum of Absolute Transformed Differences, 169
- 5.3 Peak Signal to Noise Ratio, 170
 - 5.3.1 Combined PSNR, 170
 - 5.3.2 Impact of Video Resolution and QP on PSNR, 172
 - 5.3.3 Limitations of PSNR, 173
- 5.4 Structural Similarity Index, 173
- 5.5 Observable Versus Perceptual Visual Artifacts, 175
 - 5.5.1 Limited Information Provided by PSNR, 176
 - 5.5.2 Observable Artifacts and Link Quality, 176
 - 5.5.3 Combined Spatial and Temporal Video Quality Assessment, 176

5.6	Error Concealment, 177	
5.6.1	Error Resilience, 177	
5.6.2	Impact on Visual Artifacts, 178	
5.6.3	Types of Error Concealment, 179	
5.6.4	Comparison of EC Methods, 179	
5.6.5	Increasing Frame Rate Using EC, 179	
5.6.6	Actions Performed After EC, 180	
5.7	Color Science, 180	
5.7.1	Color Reception, 180	
5.7.2	Color Reproduction, 180	
	References, 181	
	Homework Problems, 181	
6	Coding Performance of H.262, H.264, and H.265	183
6.1	Coding Parameters, 184	
6.1.1	Coding Block Size, 184	
6.1.2	Transform Block Size, 187	
6.1.3	TMVP, SAO, AMP, 188	
6.2	Comparison of H.265 And H.264, 189	
6.2.1	Absolute Coding Efficiency, 189	
6.2.2	Relative Coding Gain, 190	
6.2.3	Videos with Different Levels of Motion, 191	
6.3	Frame Coding Comparison, 192	
6.3.1	I Frame Coding Efficiency, Quality, and Time, 193	
6.3.2	P Frame Coding Efficiency, Quality, and Time, 195	
6.3.3	B Frame Coding Efficiency, Quality, and Time, 197	
6.3.4	Overall Frame Coding Efficiency, Quality, and Time, 199	
6.4	Impact of Coding Block Size on Frame Coding Efficiency, 201	
6.4.1	Impact of Transform Block Size on Frame Coding Efficiency, 201	
6.4.2	Impact of Coding Block Size on Frame Encoding Time, 203	
6.4.3	Impact of Transform Block Size on Frame Encoding Time, 203	
6.4.4	Impact of CU Size on Encoding Time, 203	
6.4.5	Decoding Time, 205	
6.5	Summary of Coding Performance, 205	
6.6	Error Resiliency Comparison of H.264 and H.265, 205	
6.6.1	H.264 Error Resiliency, 208	
6.6.2	H.265 Error Resiliency, 212	
6.7	H.264/H.265 Versus H.262, 214	
6.7.1	Performance Comparison, 214	
6.7.2	H.262 Frame Coding Efficiency, 215	
6.7.3	Impact of GOP Size, 218	
	References, 219	
	Homework Problems, 219	

7	3D Video Coding	221
7.1	Introduction, 221	
7.1.1	3D Video Transmission and Coding, 222	
7.1.2	View Multiplexing, 222	
7.1.3	View Expansion and Display, 223	
7.1.4	View Packing Methods, 223	
7.2	Multiview Coding, 224	
7.2.1	MVC Bitstream, 224	
7.2.2	2D to 3D Conversion, 225	
7.2.3	H.264 Multiview Coding Extension, 225	
7.2.4	MVC Inter-view Prediction, 225	
7.2.5	MVC Inter-view Reordering, 227	
7.2.6	MVC Profiles, 227	
7.2.7	Comparing MVC with 2D H.264 Video Coding, 227	
7.3	Correlation Between Left and Right Views in S3D VIDEOS, 228	
7.4	View Expansion Via Sample Interpolation, 230	
7.4.1	Impact of Sample Interpolation, 230	
7.4.2	Inter-view Versus Intraview Sample Interpolation, 233	
7.4.3	Interframe Versus Intraview Sample Interpolation, 235	
7.4.4	Impact of Quantization on Interpolated S3D Videos, 235	
7.5	Anaglyph 3D Generation, 235	
7.5.1	H.264 Coding Efficiency for Anaglyph Videos, 238	
7.5.2	Delta Analysis, 239	
7.5.3	Disparity Vector Generation, 242	
	References, 243	
	Homework Problems, 244	
8	Video Distribution and Streaming	245
8.1	Adaptive Video Streaming, 246	
8.1.1	Playlists and Bandwidth Estimation, 247	
8.1.2	Quality (Bitstream) Switching, 247	
8.2	Video Quality and Chunk Efficiency, 248	
8.2.1	Video Quality for Different VBR Chunk Durations, 248	
8.2.2	VBR Chunk Bit Rate Versus Chunk Duration, 250	
8.2.3	VBR Chunk Efficiency Versus Chunk Duration, 250	
8.2.4	Capped VBR Chunk Efficiency Versus Chunk Duration, 252	
8.2.5	CBR Chunk Efficiency Versus Chunk Duration, 253	
8.2.6	Instantaneous and Average Rates for Different Chunk Durations, 254	
8.3	Apple HLS, 257	
8.3.1	Overview of HLS Operation, 257	
8.3.2	GOP Structure, 258	
8.3.3	Super and Dynamic Playlists, 259	

- 8.3.4 Media Control, 260
- 8.4 HLS Over 4G and 802.11, 261
 - 8.4.1 Startup Delay, 261
 - 8.4.2 Switching Quality Levels, 263
 - 8.4.3 One-Level Versus Unfragmented HLS, 265
 - 8.4.4 Multi-Level HLS, 266
 - 8.4.5 Duplicate Video Chunks with Audio, 268
 - 8.4.6 Duplicate Video Chunks, 269
 - 8.4.7 Duplicate Audio Chunks, 271
 - 8.4.8 Duplicate Chunk Suppression, 272
 - 8.4.9 Server-Based Chunk Suppression, 272
 - 8.4.10 Custom App Chunk Suppression, 274
- 8.5 Impact of Varying Chunk Duration, 274
 - 8.5.1 Impact of Varying Quality Levels, 276
 - 8.5.2 Summary of HLS Performance, 277
- 8.6 Microsoft Silverlight Smooth Streaming, 280
 - 8.6.1 Overview of MSS Operation, 280
 - 8.6.2 MSS Streaming over 802.11n and 802.16, 281
 - 8.6.3 802.16 MSS Streaming, 283
 - 8.6.4 802.11n MSS Streaming, 284
 - 8.6.5 Comparison of HLS and MSS Streaming, 287
- 8.7 Traffic Rate Shaping, 287
 - 8.7.1 Impact of Shaping and Scene Complexity on Quality Switching, 288
 - 8.7.2 Impact of Shaping on Quality Switch Delay, 290
 - 8.7.3 Impact of Shaping on Playback Duration, 291
 - 8.7.4 Impact of Shaping on Start of Playback, 291
 - 8.7.5 Impact of Shaping and Scene Complexity on Duplicate Chunks, 292
 - 8.7.6 Impact of Unshaped Traffic on Quality Switching, 293
- 8.8 Adobe HTTP Dynamic Streaming, 294
- 8.9 MPEG-DASH (ISO/IEC 23009), 294
 - 8.9.1 DASH Process, 296
 - 8.9.2 DASH Media Formats, 296
 - 8.9.3 DASH for HTML5, 297
 - 8.9.4 DASH Industry Forum, 297
- 8.10 Aggregate Adaptive Stream Bandwidth Prediction, 297
 - 8.10.1 Permanence Time, 298
 - 8.10.2 Prediction Model Implementation, 298
- 8.11 Limitations of Client-Based Adaptive Streaming, 298
 - 8.11.1 Limitations of Fixed-Size Chunks, 300
 - 8.11.2 Server-Based Adaptive Streaming, 301
 - 8.11.3 Linear Broadcast Systems, 302
 - 8.11.4 Adaptive Streaming and Scalable Video Coding, 302
- 8.12 Tips for Efficient Adaptive Streaming, 302

8.12.1 Quality Levels and Chunk Duration, 302

8.12.2 Encoder Efficiency, 303

8.12.3 Bit Rates of Quality Levels, 303

8.12.4 Server Bandwidth Shaping, 303

8.12.5 Server Bandwidth Estimation, 304

8.12.6 Analyzing Network Congestion, 304

References, 305

Homework Problems, 305

Glossary 311

Index 317