

1 Changes for Version JM 6.0 to JM 5.0g
2 -----
3 New features
4 * Sequence and Picture Parameter Sets
5 * writes Annex B bytestream and RTP packets
6
7
8 Changes for Version JM 5.0g to JM 5.0f
9 -----
10 New features
11 * Changes for Weighted Prediction (JB)
12
13 Note: This version seems to have severe performance problems
14
15 Changes for Version JM 5.0f to JM 5.0e
16 -----
17 New features
18 * Reducing Pixel Dependencies for Intra-Prediction (JVT-E111) (GrC)
19
20
21 Changes for Version JM 5.0e to JM 5.0d
22 -----
23 New features
24 * alternate scan for aff coding
25
26
27 Changes for Version JM 5.0d to JM 5.0c
28 -----
29 New features
30 * added POC - for implementation details see changes_detail.txt (BH)
31
32 Bug Fixes
33 * reorder chroma intra pred modes aligned to draft (KS)
34
35 Cleanups (no functional change)
36 * cleaner parameter transfer for CABAC stuffing words (FB)
37
38
39 Changes for Version JM 5.0c to JM 5.0b
40 -----
41 New features
42 * CABAC Cleanup and Complexity reduction (FB)
43
44 Bug Fixes
45 * Chroma intra pred fix (AH/KS)
46 * Loop filter Clipping (AH)
47
48 Cleanups (no functional change)
49 * 4x4 intra prediction mode order (KS)
50 * remove old qp range support (simplifies loop filter) (KS)
51 * remove some never called code (KS)

52
53
54 Changes for Version JM 5.0b to JM 5.0a
55 -----
56 New features
57 * CABAC cleanup (GB/DM)
58
59
60 Changes for Version JM 5.0a to JM 5.0
61 -----
62 Removed features
63 * Intra 8x8 sub macroblocks (HS)
64
65 Bug Fixes
66 * Choose right data partition in RDCost_for_4x4IntraBlocks() MW
67
68
69 Changes for Version JM 5.0 to JM 4.4a
70 -----
71 New features
72 * Changed startcode length (KS)
73 * SEI for (SR)
74 a) Unregistered (arbitrary) data
75 b) Registered ITU_T_t35 data
76 c) Random access
77 d) Pan Scan Information
78
79 Removed features
80 * Special Position (KS)
81 * 1/8 pel motion compensation (KS)
82
83 Bug Fixes
84 * Temporal Direct mode fix for bottom field (LW)
85 * fix statistics file
86
87
88 Changes for Version JM 4.4a to JM 4.4
89 -----
90 New features
91 * MB AFF and CABAC (GB/HS)
92 Bug Fixes
93 * fix chroma QP mapping (AH)
94
95
96 Changes for Version JM 4.4 to JM 4.3a
97 -----
98 New features
99 * FMO mode 3# [JVT-D095] (WYK)
100 * FMO modes 4#~6# [JVT-D097] (WYK)
101 * Scene information SEI message [JVT-D099] (WYK)
102 * Redundant slices [JVT-D101] (WYK)

103
104 Note: FMO is broken.
105
106
107 Changes for Version JM 4.3a to JM 4.3
108 -----
109 New features
110 * Spare Pictures [JVT-D100] (DT)
111 * Signaling of Enhanced GOPs [JVT-D098] (DT)
112
113 Bug Fixes
114 * state table fix (BH)
115 * fix chroma intra prediction and MB AFF (DH)
116 * double decoder bitstream buffer size for HD material (KS)
117 * SP chroma calculation fix (MN)
118 * fix long term picture remove from buffer (DC)
119
120 Changes for Version JM 4.3 to JM 4.2a
121 -----
122 New features
123 * Chroma Intra prediction (DH/GB)
124
125 Bug Fixes
126 * Data partitioning (TO)
127 * remove assert from ABT (TH/MW)
128 * fix for constrained intra prediction (TWa)
129
130 Note: MB AFF is broken in this version
131
132
133 Changes for Version JM 4.2a to JM 4.2
134 -----
135 New features
136 * Loop Filter Simplification and Improvement (AJ)
137
138
139 Changes for Version JM 4.2 to JM 4.1c
140 -----
141 New features
142 * Spatial Direct Prediction for MB AFF (AT)
143
144 Bug Fixes
145 * align simplified intra prediction to text (AH)
146 * fix simplified intra prediction for mb aff (AH)
147 * fix spatial direct (YK)
148 * fix temporal direct (YK)
149 * MB AFF fixes (LW, RG)
150
151 Cleanups
152 * clean up decode_one_slice (KS)
153 * removed commented out code (KS)

154
155
156 Changes for Version JM 4.1c to JM 4.1b
157 -----
158 New features
159 * Implicit bi-predictive weighting (YK)
160
161 Bug Fixes
162 * MAX_QP define (AJ)
163
164
165 Changes for Version JM 4.1b to JM 4.1a
166 -----
167 New features
168 * Simplification of Intra Prediction (AH)
169
170 Cleanups
171 * also always enable EncapsulatedNALPayload at the decoder (KS)
172 * reference frame check AFF fix (AT)
173
174
175 Changes for Version JM 4.1a to JM 4.1
176 -----
177 New features
178 * Spatial Direct Prediction (AT)
179 Note: Spatial Direct Currently disabled for MB-AFF
180
181 Bug Fixes
182 * SP chroma bug fixed (XS)
183 Removed SP Switch flag from SI encoding (AT)
184 Corrected readSyntaxElement_fixed (AT)
185 * close reconstruction file only if opened (LWi)
186 * MB AFF fixes (AT)
187
188 Cleanups
189 * remove double scan routines (KS)
190 * always enable EncapsulatedNALPayload (KS)
191
192
193 Changes for Version JM 4.1 to JM 4.0d
194 -----
195 New features
196 * macroblock adaptive frame/field (LW)
197
198
199 Changes for Version JM 4.0d to JM 4.0c
200 -----
201 Bug Fixes
202 * CAVLC/AFF memory allocation (KL)
203 * Solaris compiler problem (MW)
204 * CAVLC and ABT updates

205
 206
 207 Changes for Version JM 4.0c to JM 4.0b
 208 -----
 209 New features
 210 * New Macroblock modes for SP-frames [JVT-B055] (RK)
 211 Note: some problems related to decoding of SI-frames
 212 are reported and have to be fixed
 213
 214
 215
 216 Changes for Version JM 4.0b to JM 4.0a
 217 -----
 218 New features
 219 * CAVLC [JVT-C028, D034, D036] (KL, JA)
 220 * Low Complexity Diagonal Mode for Intra Prediction [JVT-D059] (GrC)
 221
 222 Bug Fixes
 223 * Bitstream in MSB first order for CABAC (DM, GB)
 224
 225
 226 Changes for Version JM 4.0a to JM 3.9a
 227 -----
 228 New features
 229 * Improved CABAC [JVT-C060] (HS, GB))
 230 * Fast Arithmetic Coding for CABAC [JVT-C061] (DM, GB)
 231 * CABAC cleanup [JVT-D019] (GB, DM)
 232 * CABAC and ABT [JVT-D021] (HS, DM, GH))
 233 * New end-of-slice signaling for CABAC [JVT-D020] (HS)
 234
 235
 236 Changes for Version JM 3.9a to JM 3.9
 237 -----
 238
 239 Bug Fixes
 240 * fix ABT and VLC (MW)
 241 * fix slice mode 2 (KS)
 242
 243
 244 Changes for Version JM 3.9 to JM 3.8
 245 -----
 246
 247 Bug Fixes
 248 * fix bitstream NAL encapsulation for slice modes 1,2 and interlace (KS)
 249 * merge interlace buffer changes (KP/KS)
 250 * fix encoder/decoder mismatch for SP-frames (MW)
 251 * remove unnecessary calculations (AT)
 252 * fix SP compiling warning (FW)
 253 * disable 8x8 intra blocks in data partitioning mode (TO)
 254
 255 Cleanups

256 * remove dead code and variables (KS)
 257 * free all previously allocated memory (KS)
 258
 259 Note:
 260 * FMO is currently broken
 261
 262 Changes for Version JM 3.8 to JM 3.7
 263 -----
 264
 265 New features
 266 * Adaptive Block-size Transforms (MW)
 267
 268 Changes for Version JM 3.7 to JM 3.6
 269 -----
 270
 271 New features
 272 * Loop filter complexity reduction [JVT-C094] (AJ)
 273
 274
 275 Changes for Version JM 3.6 to JM 3.5
 276 -----
 277
 278 New features
 279 * support for FMO, see JVT-C089-C092 (SW)
 280 -> FMO requires RTP file format and ConstrainedIntraPrediction = 1
 281
 282 Bug Fixes
 283 * many FMO and out-of-order slices related ones (SW)
 284 * fix old QPs (KS)
 285 * fix chroma coding (AT/KS)
 286 * error concealment fix (YW)
 287
 288 Cleanups
 289 * really remove old start codes (KS)
 290 * remove some unused decoder functions (KS)
 291
 292 Note:
 293 * in Version 3.5 and 3.6 is in the bit stream format the Slice mode broken
 294 * RTP still has the ASCII Parameter Set format
 295
 296 Changes for Version JM 3.4 to JM 3.5
 297 -----
 298
 299 New Features
 300 * improved SP technique [JVT-c114] (FW)
 301 * add syntax flag for switching (FW)
 302
 303
 304 Bug Fixes
 305 * new QP range bug fixes (chroma & SP coding) (AT/FW)
 306 * SKIP mode support and Runlength Coding for SP frames (AT/FW)

307 * Modified lambda weight in RDO for SP frames (AT/FW)
 308
 309
 310 Changes for Version JM 3.4 to JM 3.3
 311 -----
 312
 313 New Features
 314 * stuffing to prevent emulation of start-code [JVT-C064] (SR)
 315 * New start-code for byte-stream format. (SR)
 316 * New method for slice-level QP signaling [JVT-C136] (SR)
 317 * QP range shifted to [0,51] (SR)
 318 -> use #define _OLDSTYLEQP_ for old range
 319
 320 Bug Fixes
 321 * fix single reference frame problem (AT)
 322 * fix B-Frame coding (AT)
 323 * fix ADAPT_LAST_GROUP (DT)
 324 * fix bit statistics (KS)
 325 * fix search if _FAST_FULL_ME_ disabled (KS)
 326
 327 Cleanups
 328 * remove old slice-level QP signaling (KS)
 329 * remove old start codes (KS)
 330 * large QP handling cleanups (KS)
 331
 332
 333 Changes for Version JM 3.3 to JM 3.2
 334 -----
 335
 336 New Features
 337 * Consideration of MVs of Direct Mode Macroblocks in B frame MV prediction [JVT-C127] (AT)
 338
 339 Bug Fixes
 340 * fix deblocking filter for B frames [JVT-C127] (AT)
 341
 342
 343 Changes for Version JM 3.2 to JM 3.1
 344 -----
 345
 346 New Features
 347 * Skip mode motion compensation as defined in JVT-C027 (JL)
 348
 349
 350 Changes for Version JM 3.1 to JM 3.0
 351 -----
 352
 353 New Features
 354 * Quantization range changed from [-8,39] to [-12,39] [JVT-B039] (AH)
 355 * Simplified rounding for transform and quantization [JVT-C136] (AH)
 356 * Simplified formula for intra 16x16 plane prediction [JVT-C136] (AH)
 357

358 Bug Fixes
359 * fix RTP assert (DT)
360
361 Cleanups
362 * remove gcc warnings (KS)
363
364 Known Problems
365 * AFF + 1/8 pel motion compensation broken
366 * if "LastFrameNumber" is used, "FramesToBeEncoded" must be >= "LastFrameNumber"
367
368
369 Changes for Version JM 3.0 to JM 2.1
370 -----
371
372 New Features
373 * Signaling of "Clean" Random Access Points [JVT-B042, JVT-C083] (DT)
374
375 Bug Fixes
376 * error concealment fixes (TO)
377 * constrained intra prediction (GRC)
378 * align intra pred to CD text (GRC)
379 * adaptive frame/field fixes
380 - lambda calculation (LW)
381 - average psnr output (LW)
382 - fix slice modes 1 and 2 (LW)
383 - fix data partitioning (TO)
384 * add adaptive frame/field parameter consistency checks (KS/LW)
385 * encoder frame buffer management changes for non-AFF mode (DT)
386
387 Cleanups
388 * remove old 6 mode intra prediction (KS)
389
390
391 Changes for Version JM 2.1 to JM 2.0b
392 -----
393
394 New Features
395 * adaptive frame/field coding (LW)
396
397 Bug Fixes
398 * intra 4x4 prediction block availability (several people)
399 * DP fixes (TO)
400
401
402 Changes for Version JM 2.0b to JM 2.0
403 -----
404 Bug Fixes
405 * fix array bounds overflow in cabac.c (KS/IM)
406 * fix byte sex issues in IFF (KS)
407 * add UNIX preparation script (KS)
408

409
 410 Changes for Version JM 2.0 to JM 1.9
 411 -----
 412 I dropped adaptive frame/field coding, so only bugfixes for this release
 413
 414 Bug Fixes
 415 * decoder delta qp decoding fix (HS)
 416 * correction of wrong calculation of written bits in CABAC mode
 417 (correction according to the new coding engine) (DM)
 418 * major cleanup of the routines related to the statistics reported
 419 in stat.dat (DM):
 420 - correction of wrong calculation of used bits for header and mode info
 421 - addition of new table entries "motion info" and "stuffing bits"
 422 such that the sum of all entries matches exactly the
 423 plotted number of average bits/frame, which in turn is
 424 now equal to the number of bits reported on the console
 425 * correction of wrong calculation of written bytes for CABAC in RTP mode (DM)
 426 * correction of total bits/frame printed out to the data.txt file for with B-frames (JL)
 427 * fix mprp size for new intra pred modes (GC)
 428 * fix frame_rate calculation for B-frames (GH)
 429 * fix restriction on reference frames for intra frame period (KS)
 430 * first step RPSL fixes (KS)
 431 * fix RTP assert (WYK)
 432 * tracefile fix (DC)
 433 * fix spelling of config file parameter "NumberReferenceFrames" (MB)
 434
 435 Changes for Version JM 1.9 to JM 1.8
 436 -----
 437 New Features
 438 * Loopfilter revised (PL)
 439 * INTRA-Prediction on unfiltered content (PL)
 440
 441 Bug Fixes
 442 * use for each intra pred mode one CABAC context (DM)
 443 * increase version number (KS)
 444 * Interim file format updates (DT)
 445
 446 Cleanups
 447 * GCC compatibility, remove warnings/unused variables (KS)
 448 * Add UNIX Makefiles (KS/HS)
 449
 450
 451 Changes for Version JM 1.8 to JM 1.7
 452 -----
 453 New Features
 454 * New Intra Prediction Modes [JVT-B080] (GrC)
 455
 456
 457 Changes for Version JM 1.7 to JM 1.4
 458 -----
 459 New Features

460 * New Arithmetic Coding Engine [JVT-B036, Moffat/Neal/Witten ACM98]
 461 * Improved CABAC [JVT-B101] (GB)
 462 * Improved MB Pred Modes [JVT-B054] (HS)
 463
 464 Bug Fixes
 465 * Fix MB statistics (HS)
 466 * Compile fix ERPS test (KS)
 467 * Restrict qp_factor for CABAC initialization (DM/KS)
 468 * Uses MAX_QP for IFF qp encoding (KS)
 469 * Fix decoder TR calculation (again) (AT)
 470 * Fix wrong concealment for B-frames and TR wrap around (KS)
 471 * Correct error handling if first slice (or first frame) was lost (TO)
 472 * Introduced macroblock map for concealment of lost or damaged macroblocks (TO)
 473
 474
 475 Changes for Version JM 1.4 to JM 1.0
 476 -----
 477 New Features
 478 * Interim file format according to Appendix III of WD-1 [JVT-A003] (DT)
 479 * Transform and Quantizer changes [JVT-B008, JVT-B038] (AH)
 480 * VLC update [JVT-B029] (LK)
 481 * Updated Error Rebuild Macroblock Mode and Reference Frame Selection [JVT-B102] (DK)
 482
 483 Bug Fixes
 484 * DP & CABAC (TO)
 485
 486
 487 Changes for Version JM 1.0 to TML 9.6
 488 -----
 489
 490 New Features
 491 * ERPS works also with bitstream file
 492
 493 Bug Fixes
 494 * Bitstream file works again with new reference frame buffers (KS)
 495 * Leaky bucket memory allocation (KS/SR)
 496 * Fix encoder memory leak (KS)
 497 * Update workspace include path for Release mode (KS)
 498 * Data partitioning fixes (TO)
 499 * Update doxygen config files (KS)
 500 * Data Partitioning / ERPS fixes (KS/TO)
 501
 502 Cleanups
 503 * remove unused code (KS/TO)
 504 * use free_mem?D in encoder (KS)
 505
 506 Changes for Version 9.6 to Version 9.4
 507 -----
 508
 509 New Features
 510 * Data Partitioning (SW/TO)

511 * ERPS / Annex U functionality (KS)
 512
 513 -> see "Changes_detail.txt" for more details on changes
 514
 515 Bug Fixes
 516 * align CABAC MV coding to document (DM)
 517 * fixes for RD Optimization for error prone channels (DK)
 518
 519 Cleanups
 520 * cosmetic .dat file updates (ZX/KS)
 521 * Bitstream file cleanup
 522
 523 Changes for Version 9.4 to Version 9.0
 524 -----
 525 New Features
 526 * Block based interpolation at the decoder (AH)
 527 * vbv multiple leaky buffer compliance feature (SR)
 528 * 16x16 intra prediction clipping (GC)
 529
 530 Bug Fixes
 531 * CABAC dquant mapping (GB)
 532 * Interpolation filter fix (AH)
 533 * Chroma mismatch fix (MG)
 534
 535 Cleanups
 536 * move leaky buffer stuff into own files (KS)
 537 * make leaky buffer output look less ugly (KS)
 538 * remove some gcc -Wall warnings (KS)
 539
 540 Changes for Version 9.0 to Version 8.7
 541 -----
 542 New Features
 543 * Complexity reduced interpolation filter (AH)
 544 * Interpolation outside the picture (AH)
 545
 546 Bug Fixes
 547 * Fix the trace file bug (KS)
 548 * add line breaks for CABAC trace file output (KS)
 549 * Intra frame period fixes (YL)
 550 * Some more bug fixes for the new added EC mode (TO/TSt/DK)
 551 * correct picture numbers for B-frames (TO)
 552
 553
 554 Changes for Version 8.7 to Version 8.6
 555 -----
 556
 557 * Code cleanups (KS)
 558 - removed old Loop filter Code (#if !defined LOOP_FILTER_MB)
 559 - removed non UMV code (#if !defined UMV)
 560 * Bug fixing (KS)
 561 - correct SP frame coding for RTP file format

562 * Intra frame period (YL/KS)
 563 - known bug: decoder writes frames in wrong order
 564 * Bug fix (YW)
 565 - GOB update
 566
 567 Encoder:
 568
 569 * Removed the Interim File Format (TO)
 570 * Bug fixes for Slice Mode 2 in case of small slices (TO)
 571 * Bug fixes for Loop filter and Slice Mode 2 (TS)
 572 * RTP-File Format added (SW)
 573 - currently only one partition per slice is allowed
 574 - Support for multiple (3) partitions per slice will follow
 575 * RD Optimization for error prone channels added (DK)
 576 * Minor cleanups (cosmetical work) (TO)
 577 * Added new parameters to the Configfile (DK)
 578 * Added headerbits to the statistics
 579
 580 Decoder
 581 * Removed the Interim File Format (TO)
 582 * RTP-File Format added (StW)
 583 - currently only one partition per slice is allowed
 584 - Support for multiple (3) partitions per slice will follow
 585 * Changes in find_snr for case of slice losses (TO)
 586 * Some Bug fixes for the new added EC mode (TO)
 587 * Modifications to detect slice/frame losses in RTP File Format (TO)
 588 * Some modifications to enhance the robustness to loss of slices (TO)
 589 * Changes in the Configfile for the new RTP File Mode (SW)
 590 - note that if the RTP File Format was chosen the Entropy coding mode
 591 that is given in the Configfile is ignored
 592
 593 Known Bugs
 594 Encoder
 595 * If Slice Mode 2 is chosen a tracefile name must be given
 596 * A new parameter was added to the picture header of the 26L Format
 597 to deal with packet losses. As no errors or packet losses appear in
 598 a bitstream environment this is nonsense and should be removed one time
 599 (not really a bug)
 600
 601 Decoder
 602 * The equivalent for item two of the known bugs in the encoder
 603
 604 Changes for Version 8.6 relative to Version 8.5
 605 -----
 606
 607 Decoder:
 608
 609 * the error concealment algorithms (EC) in VCEG-N62 has been supported (WYK, VV)
 610 - six files (3 .c files and 3 .h files beginning with "erc_") added
 611 - important modifications in other files are marked with "_ERROR_CONCEALMENT_"
 612 or "WYK", and EC can be disabled as stated in "defines.h"

613 - modifications to make decoder robust and correct to slice/frame losses
 614 - all picture types (I, P, B, SP) are supported
 615 * some trivial modifications (WYK)
 616 - some unused codes and bad brace and code indentations cleaned
 617 - encoded SP-frames displayed as "SP" instead of "P"
 618
 619 Encoder:
 620
 621 * The picture header as slightly changed (WYK)
 622 - the last parameter are utilized as RefPicID, the ID of non-B frames
 623 - a variable "int refPicID" added into the structure ImageParameters
 624 * bug fixed for mismatch in SP-frames when RD-optimization enabled (RK)
 625 * some trivial modifications (WYK)
 626 - some unused codes and bad brace and code indentations cleaned
 627 - encoded SP-frames displayed as "SP" instead of "P"
 628
 629
 630 Changes for Version 8.5 relative to Version 8.4
 631 -----
 632
 633 * reformat software to comply with coding style (KS)
 634
 635 * convert comments to documentation comments (KS)
 636
 637 * Bug fix: bit counter (DM,KS)
 638
 639 * Bug fix: qp=0 not accepted (GS)
 640
 641 * Bug fix: mismatch if different frame qp settings (JL,KS)
 642
 643 * memory management cleanups (KS)
 644 - fix some memory leaks
 645 - check returned pointer after _every_ malloc/calloc
 646
 647 * use size checking string functions (KS)
 648 - replace sprintf and strcpy with snprintf and strncpy
 649
 650 * clean up exit calls (KS)
 651 - use common error() function for all error exits
 652
 653
 654 Changes for Version 8.4 relative to Version 8.0
 655 -----
 656
 657 * Datapartitioning according to VCEG-M52 supported (TO)
 658
 659 * Output in InterimFileFormat supported (TO)
 660
 661 * Bugfixes for SliceMode 2 (fixed Bytes/MB) (TO)
 662 - adaption for RLC of SkipMBs
 663

664 * Changed initialisation values for CABAC contexts (TO)
 665
 666 * PictureHeader and SliceHeader at the beginning of every slice (TO)
 667
 668 * RunLength and constrained intra prediction (RS)
 669
 670 * Implementation of delta-QP (IL)
 671
 672 * loopfilter simplification including a macroblock-based approach (PL)
 673
 674 * Removal of RD Quant (IL)
 675
 676 * Chroma coefficient removal (IL)
 677
 678
 679 Changes for Version 8.0 relative to Version 6.1
 680 -----
 681
 682 * Fast Integer Pixel Motion Estimation (HS)
 683 - precalculation of SAD for all 4x4 blocks and all vector positions
 684 - SAD calculation of nxm blocks is based on 4x4 SAD's
 685 - search range center is the predictor of 16x16 block for all block sizes
 686
 687 * Extended Search range (HS, SW)
 688 - search range can be 39x39 at maximum
 689 - search range reductions for older reference frames or older reference frames
 690 and smaller blocks can be enabled in the configuration file
 691
 692 * Unrestricted Motion Vectors (HS, SW)
 693 - Unrestricted motion vectors for P- and B-frames
 694 - no range checking in Direct mode
 695
 696 * Adaption of P-Interval and Single Quantizer Change (primarily for MPEG-test) (HS)
 697 - the interval P-P can be adapted at the very end of a sequence to hit the last
 698 frame which then have to be specified in the configuration file
 699 - the quantization parameters can be changed once per sequence (config file)
 700
 701 * Rate-Distortion Optimization (HS, TW)
 702 - a rd-optimized mode can be enabled in the configuration file
 703 - in rd-opt. mode:
 704 - slightly modified rate-constrained motion estimation
 705 - rate-constrained macroblock mode decision
 706 - rate-constrained mode decision for 4x4 intra modes
 707 - the rd-opt. mode decision need to code (DCT, Q, Q⁻¹, IDCT, entropy coding)
 708 each block/macroblock several times
 709
 710 * Increased Frame Buffer (HS, TW)
 711 - the frame buffer for long term memory prediction is no longer restricted to
 712 five reference frames
 713 - the buffer size in the encoder will be adapted according to the number of reference
 714 frames given (config file) and the config file parameter "AdditionalReferenceFrame"

715 - the buffer size in the decoder has to be specified in the config file
 716 - the parameter "AdditionalReferenceFrame" specifies a reference frame index which is
 717 considered during motion estimation
 718 - E.g: NumberReferenceFrames=5, AdditionalReferenceFrame=19
 719 -> 20 reference frames are stored at encoder side
 720 -> the frames with indices 0,1,2,3,4, and 19 are searched during motion estimation
 721
 722 * NAL/Slices (TO)
 723 - support of slices in both symbol modes
 724 - at the decoder UVLC symbols are decoded by the time they are needed, not for the whole
 725 slice at one time (to be in line with the encoder)
 726
 727
 728 * Added Motion Compensated Prediction with 1/8-pel MV-resolution: (TWe)
 729 - New Parameter in CFG-file to switch between 1/4- and 1/8-pel
 730 - New interpolation filter for 1/8-pel MV-resolution added.
 731 a) reference frames are sampled up and stored by a factor of 4 (1/4-pel resolution)
 732 b) 1/8-pel positions are calculated on the fly by bilinear interpolation
 733 c) all chroma values are interpolated with a bilinear filter
 734 d) items b) and c) lead to a slightly reduced gain compared to implementation
 735 in M20, but still a gain up to 1.0 dB is obtained compared to TML591.
 736 Thus, further improvements are possible.
 737
 738 * General (all / KS)
 739 - Some clean-ups of data structures
 740 - removal of superfluous source and include files in the decoder
 741
 742 %%%
 743 %%%
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