



Non-SCCE3: memory reduction for palette mode software

JCTVC-R0317

C. Gisquet, G. Laroche, P. Onno (Canon)

T.-D. Chuang (Mediatek)

18th JCT-VC Meeting, Sapporo, June 30th – July 9th 2014

Memory consumption at the encoder (Kbytes)

	SCM 1.0		SCCE3 basis	
Scenario	AI	RA	AI	RA
Operating System 1	236828	562260	456420	1000484
Operating System 2	253372	577248	460228	990308

System 1: Windows Seven 64bits version,
using Visual Studio 2010;

System 2: Linux x86_64, version 2.6.18,
using gcc 4.1.2 for x86_64 and glibc
2.2.3.

+92%

+70%

Proposed changes

- Reduce the types of various arrays (`m_piSPoint`, `m_piLevel`, `m_bPrevPLTReusedFlag`) from 2-bytes-wide (Pel) to 1-byte-wide (UChar)
 - `m_bPrevPLTReusedFlag` in particular could be further cleaned to be actual bitflags, but this represents a diminishing return
- Remove or merge some redundant or unused arrays (`m_piSPoint`, `m_piEscapeFlag` and `m_piPixelPredFlag`)
 - as well as clean up the related code;
- Change the allocation of `m_piPLT`, `m_puhPLTSize` and `m_bPrevPLTReusedFlag` to be on a palette CU-basis whose smallest size is 8x8.
 - Previously, the memory allocation was performed on a 4x4 basis, quadrupling the memory needs.

Further improvements

- To reduce further buffer storage, it is possible to simply reuse existing buffers.
- The following are controllable through macros:
 - Level storage: reuse IPCM sample buffer;
 - Run storage: reuse transform coefficient buffer;
 - Palette size: instead, reuse transform skip buffer (explicit RDPCM being another possibility).
- Although not implemented
 - further palette buffers could be shared, e.g. `m_piSPoint` and `m_piRun`, or `m_piSPoint` and `m_piLevel`.

New memory consumption (Kbytes)

	SCM 1.0		SCCE3 basis		SCCE3 suggestions		Further improvements	
Scenario	AI	RA	AI	RA	AI	RA	AI	RA
System 1	236828	562260	456420	1000484	306040	700381	267712	625536

■ SCCE3 basis vs. SCM1.0

- Memory increase was of 78% in RA

■ SCCE3 suggestion vs. SCM1.0:

- Memory increase is of 10% in RA

Results on with 2CTB or Full search

- No encoder/decoder change.
- No impact on the results

	All Intra		
	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p	0.0%	0.0%	0.0%
RGB, text & graphics with motion,720p	0.0%	0.0%	0.0%
RGB, mixed content, 1440p	0.0%	0.0%	0.0%
RGB, mixed content, 1080p	0.0%	0.0%	0.0%
RGB, Animation, 720p	0.0%	0.0%	0.0%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p	0.0%	0.0%	0.0%
YUV, text & graphics with motion,720p	0.0%	0.0%	0.0%
YUV, mixed content, 1440p	0.0%	0.0%	0.0%
YUV, mixed content, 1080p	0.0%	0.0%	0.0%
YUV, Animation, 720p	0.0%	0.0%	0.0%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%
Enc Time[%]	92%		
Dec Time[%]	99%		

Lossy

	All Intra			
	Bit-rate saving (Total)	Bit-rate saving (Average)	Bit-rate saving (Min)	Bit-rate saving (Max)
RGB, text & graphics with motion, 1080p	0.0%	0.0%	0.0%	0.0%
RGB, text & graphics with motion,720p	0.0%	0.0%	0.0%	0.0%
RGB, mixed content, 1440p	0.0%	0.0%	0.0%	0.0%
RGB, mixed content, 1080p	0.0%	0.0%	0.0%	0.0%
RGB, Animation, 720p	0.0%	0.0%	0.0%	0.0%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p	0.0%	0.0%	0.0%	0.0%
YUV, text & graphics with motion,720p	0.0%	0.0%	0.0%	0.0%
YUV, mixed content, 1440p	0.0%	0.0%	0.0%	0.0%
YUV, mixed content, 1080p	0.0%	0.0%	0.0%	0.0%
YUV, Animation, 720p	0.0%	0.0%	0.0%	0.0%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%
Enc Time[%]	95%			
Dec Time[%]	99%			

Lossless

Conclusion

- Suggest to integrate this memory reduction if the SCCE3 basis software is used in the future SCM2.0.
- No impact on the results.