

JCTVC-E064

Improvement to AMVP/Merge process

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Summary

- Propose two minor changes to optimize AMVP/Merge process
 - Add MV scaling process only when no candidate found with the WD2 candidate list generation for AMVP
 - Disable the use of collocated MV for small PUs in both AMVP and Merge
- Observed performance gain
 - RA: 0.1%(HE) and 0.3%(LC)
 - LD: 0.1%(HE) and 0.3%(LC)
- Text is ready, Cross-verified by TI (E122)

Proposal 1: Addition of MV scaling in AMVP

- Enhancement of MV coding efficiency with additional MV scaling process for spatial candidates
- Minimize complexity by limiting the use of MV scaling process
 - Apply MV scaling to the first available PU **only when** no candidate can be found with WD2 candidate list generation process

Proposal 2: Disabling the use of collocated MV for small PUs

- Motivated by WD2 adoption of temporal MV storage (D072)
 - Stored MV be decimated to 16x16 block area
 - PUs smaller than 16x16 may need to refer to “unreliable” collocated MV for AMVP/Merge
- Propose to disable the use of collocated MV for small PUs ($\leq 8 \times 8$) in both AMVP/Merge process
 - Reduce encoding/decoding complexity required to consider collocated MV, by discarding “unreliable” candidate

Coding performance (RA)

	Random access			Random access LoCo		
	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate
Class A	-0.1	-0.2	-0.4	-0.3	-0.5	-0.4
Class B	-0.1	0.0	0.0	-0.4	-0.3	-0.3
Class C	-0.2	-0.2	-0.2	-0.4	-0.2	-0.3
Class D	-0.1	-0.2	-0.2	-0.2	-0.4	-0.3
Class E						
All	-0.1	-0.1	-0.2	-0.3	-0.3	-0.3
Enc Time[%]	98%			98%		
Dec Time[%]	100%			100%		

Coding performance (LD)

	Low delay			Low delay LoCo		
	Y BD- rate	U BD- rate	V BD- rate	Y BD- rate	U BD- rate	V BD- rate
Class A						
Class B	-0.1	-0.2	-0.3	-0.4	-0.4	-0.1
Class C	0.0	0.0	-0.1	-0.2	0.0	-0.2
Class D	-0.2	-0.3	-1.0	-0.2	0.0	0.2
Class E	-0.3	-0.6	-0.5	-0.3	-0.1	0.2
All	-0.1	-0.2	-0.5	-0.3	-0.2	0.0
Enc Time[%]	99%			99%		
Dec Time[%]	99%			99%		

Performance of Proposal 1(RA)

	Random access			Random access LoCo		
	Y BD- rate	U BD- rate	V BD- rate	Y BD- rate	U BD- rate	V BD- rate
Class A	-0.1	-0.3	-0.4	-0.4	-0.5	-0.6
Class B	-0.1	0.0	0.0	-0.2	-0.1	-0.1
Class C	-0.2	-0.2	-0.3	-0.3	-0.2	-0.3
Class D	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
Class E						
All	-0.1	-0.2	-0.2	-0.2	-0.3	-0.3
Enc Time[%]	100%			101%		
Dec Time[%]	100%			101%		

Performance of Proposal 1(LD)

	Low delay			Low delay LoCo		
	Y BD- rate	U BD- rate	V BD- rate	Y BD- rate	U BD- rate	V BD- rate
Class A						
Class B	-0.1	0.1	0.0	-0.1	0.0	0.3
Class C	-0.1	0.0	-0.3	-0.2	0.0	-0.2
Class D	-0.2	-0.1	-0.4	-0.1	-0.1	0.2
Class E	-0.4	-0.5	-0.3	0.0	0.2	0.4
All	-0.2	-0.1	-0.2	-0.1	0.0	0.2
Enc Time[%]	101%			102%		
Dec Time[%]	101%			100%		

Performance of Proposal 2(RA)

	Random access			Random access LoCo		
	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate
Class A	0.0	0.0	-0.3	0.0	0.0	0.1
Class B	0.0	0.0	0.0	-0.2	-0.2	-0.1
Class C	0.1	0.1	0.0	-0.1	0.0	0.0
Class D	0.3	0.1	0.0	0.2	-0.1	-0.1
Class E						
All	0.1	0.0	0.0	0.0	-0.1	0.0
Enc Time[%]	99%			99%		
Dec Time[%]	100%			100%		

Performance of Proposal 2(LD)

	Low delay			Low delay LoCo		
	Y BD- rate	U BD- rate	V BD- rate	Y BD- rate	U BD- rate	V BD- rate
Class A						
Class B	0.0	-0.2	-0.6	-0.2	-0.4	-0.2
Class C	0.2	0.1	0.0	0.1	0.1	-0.1
Class D	0.0	-0.5	-0.4	0.1	0.0	0.0
Class E	-0.4	-0.7	-0.2	-0.3	-0.1	0.0
All	0.0	-0.3	-0.3	-0.1	-0.1	-0.1
Enc Time[%]	100%			101%		
Dec Time[%]	100%			99%		

Conclusion

- Propose two minor changes to AMVP/Merge process that can enhance coding performance without increasing complexity
- No syntax changes
- Text is ready, cross-verified

- We recommend to consider the proposed changes for HM update