



CREATING THE LIVING NETWORK™

JVET-P0416

Non-CE4: Using integer MV in
CIIP

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Introduction

- The inter prediction signal in the CIIP mode is derived using the same inter prediction process applied to regular merge mode; and the intra prediction signal is derived following the intra prediction process with the planar mode.
- As a result, the complexity in CIIP is also a combination of regular inter prediction and intra prediction process.

Proposal

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 - Use integer MV in the inter prediction process to avoid subsequent interpolation.
 - Specifically, MVs are rounded to the nearest integers, such that the subsequent motion compensation process uses integer reference samples directly to generate the inter prediction signals.
- Tests
 - Test 1: Integer MV used in bi-prediction
 - Test 2: Integer MV used in bi-prediction and 4x8 and 8x4 CUs.

Simulations

Test 1: Integer MV for Bi-pred

	Random Access Main 10				
	Over VTM-6.0				
	Y	U	V	EncT	DecT
Class A1	0.02%	0.07%	0.00%	101%	100%
Class A2	0.03%	0.03%	0.06%	101%	99%
Class B	0.02%	0.01%	0.01%	100%	99%
Class C	0.04%	-0.05%	0.00%	100%	98%
Class E	-	-	-	-	-
Overall	0.03%	0.01%	0.02%	100%	99%
Class D	-0.03%	0.13%	-0.06%	100%	99%
Class F	0.00%	0.00%	-0.05%	101%	99%
	Low delay B Main10				
	Over VTM-6.0				
	Y	U	V	EncT	DecT
Class A1	-	-	-	-	-
Class A2	-	-	-	-	-
Class B	0.00%	0.13%	0.04%	101%	102%
Class C	0.00%	0.09%	-0.04%	101%	99%
Class E	-0.07%	0.56%	0.65%	102%	100%
Overall	-0.02%	0.23%	0.17%	101%	100%
Class D	-0.06%	-0.05%	0.39%	100%	98%
Class F	0.06%	0.00%	0.85%	101%	100%

Test 2: Integer MV for Bi-pred and 4x8 and 8x4 CUs

	Random Access Main 10				
	Over CE-6.0				
	Y	U	V	EncT	DecT
Class A1	0.00%	0.02%	-0.09%	101%	100%
Class A2	0.02%	0.05%	0.02%	101%	100%
Class B	-0.01%	0.12%	0.01%	101%	100%
Class C	-0.04%	-0.03%	-0.05%	101%	101%
Class E	-	-	-	-	-
Overall	-0.01%	0.04%	-0.03%	101%	100%
Class D	-0.10%	-0.16%	-0.03%	101%	102%
Class F	-0.05%	-0.07%	-0.05%	101%	101%
	Low delay B Main10				
	Over CE-6.0				
	Y	U	V	EncT	DecT
Class A1	-	-	-	-	-
Class A2	-	-	-	-	-
Class B	0.01%	0.05%	-0.10%	101%	102%
Class C	-0.03%	0.18%	-0.04%	101%	101%
Class E	0.00%	0.13%	0.15%	101%	101%
Overall	-0.01%	0.11%	-0.02%	101%	101%
Class D	-0.06%	0.32%	0.67%	101%	100%
Class F	0.04%	0.21%	0.96%	101%	101%

Summary

- Propose to use integer MV in CIIP inter-prediction.
 - Avoid expensive interpolation process
- Two tests
 - Test 1: Integer MV for Bi-pred
 - Y-BD-rate: 0.03% for RA, -0.02% for LDB.
 - Test 2: Integer MV for Bi-pred and 4x8 and 8x4 CUs
 - Y-BD-rate: -0.01% for RA, -0.01% for LDB
- This simplification does not introduce performance loss.

Thank Kwai for cross-checking !
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