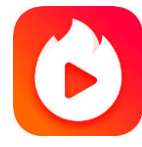


JVET-AF0168

NON-EE2: GEOMETRIC PARTITIONING MODE WITH AFFINE PREDICTION

Kai Zhang, Zhipin Deng, Li Zhang
Bytedance Inc.



Introduction

- GPM in VVC splits a CU into two partitions separated by a straight splitting line
 - *After obtaining two predictions, a sample-based weighted blending process is applied*
 - *GPM is treated as a type of merge mode*
 - Each partition of a GPM CU has its own merge candidate index, constrained to be uni-prediction
- Extensions of GPM in ECM
 - *A GPM partition can be predicted by a merge MMVD candidate*
 - *One of the two GPM partitions can be predicted by intra-prediction*
 - *Merge candidates of the two GPM partitions can be refined by template matching*
 - *The splitting ways can be reordered according to template costs*
 - *The blending weights in GPM can be adaptive*
 - *Bi-prediction is allowed to predict a GPM partition.*
- Only translational motions are considered by GPM in VVC and ECM
 - *How about affine motions?*

Proposed: GPM-Affine

- GPM-Affine method is proposed: Affine motion compensation (AMC) can be enabled in GPM
 - *A GPM partition can be predicted by AMC inter-prediction, non-AMC inter-prediction or intra-prediction.*
 - *A GPM partition predicted by AMC can be combined with the other GPM partition predicted by AMC, non-AMC, or intra-prediction.*
- When AMC is applied for a GPM partition, a uni-prediction affine merge candidate list is constructed
 - *Similar to the uni-prediction merge candidate list construction for GPM in VVC*
 - *From the subblock-based merge candidate list after discarding sub-TMVP candidates*
 - *AMC is performed for a GPM partition using the control point motion vectors (CPMVs) of a merge candidate in the uni-prediction affine merge candidate list.*
- A flag is signaled for each GPM partition to indicate whether AMC is applied for the GPM partition.
 - *A merge candidate index for the GPM partition is signaled using different arithmetic context models depending on whether AMC or non-AMC is applied*
- In the current implementation, AMC is not allowed for GPM-MMVD and GPM-TM

Simulations results on ECM-10.0

■

	RA					LB				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1	-0.09%	-0.23%	-0.13%	100.7%	100.3%					
Class A2	-0.29%	-0.26%	-0.23%	100.6%	98.3%					
Class B	-0.18%	-0.08%	-0.22%	101.8%	99.6%					
Class C	-0.19%	-0.21%	-0.21%	101.3%	100.6%	-0.08%	-0.55%	-0.30%	101.7%	100.2%
Class E						-0.30%	0.56%	0.27%	100.9%	98.8%
Overall	-0.19%	-0.18%	-0.20%	101.2%	99.8%					
Class D	-0.16%	-0.04%	-0.02%	102.1%	98.6%	-0.13%	-0.03%	0.12%	100.1%	97.9%
Class F	-0.05%	-0.04%	0.07%	100.8%	99.5%					

Conclusion

- GPM-affine is proposed
 - *0.19% RA coding gain in average*
 - *Negligible complexity increase*
- Recommend to be further studied in EE2