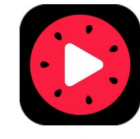


JVET-AD0155

Non-EE2: High-Accuracy template matching

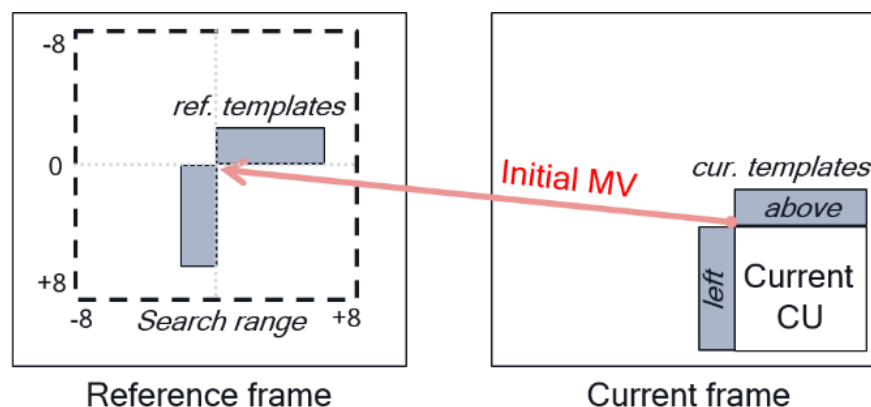
Yang Wang, Kai Zhang, Li Zhang
Bytedance Inc.



Introduction

■ Template matching (TM) in ECM

- *TM is a decoder-side MV derivation method to refine the motion information of the current CU by finding the closest match between a template in the current picture and a block in a reference picture*



Introduction

■ TM for bi-prediction

1. *The initial motion vector of list 0 (MV_0) is refined to derive a refined MV (MV'_0) and a TM cost C_0 is calculated*
2. *The initial motion vector of list 1 (MV_1) is refined to derive a refined MV (MV'_1) and a TM cost C_1 is calculated*
3. *When C_0 is larger than C_1 , MV'_1 is used to derive a further refined MV (MV''_0) by refining MV'_0 ; Otherwise, MV'_0 is used to derive a further refined MV (MV''_1) by refining MV'_1*

High-Accuracy template matching

■ Aspect #1

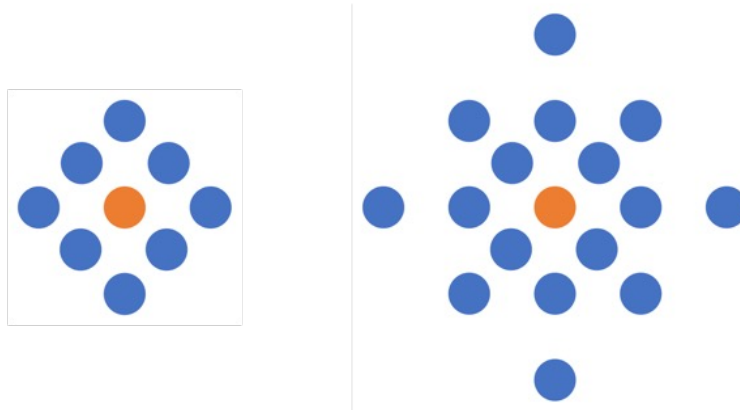
– *An additional refinement step is applied after step 3*

1. *The initial motion vector of list 0 (MV_0) is refined to derive a refined MV (MV'_0) and a TM cost C_0 is calculated*
2. *The initial motion vector of list 1 (MV_1) is refined to derive a refined MV (MV'_1) and a TM cost C_1 is calculated*
3. *When C_0 is larger than C_1 , MV'_1 is used to derive a further refined MV (MV''_0) by refining MV'_0 ; Otherwise, MV'_0 is used to derive a further refined MV (MV''_1) by refining MV'_1*
4. *When MV'_0 is refined in step 3), MV''_0 is used to derive MV'''_1 by refining MV'_1 ; Otherwise, MV''_1 is used to derive MV'''_0 by refining MV'_0 .*

High-Accuracy template matching

■ Aspect #2

- *The 8-point diamond search pattern used in TM is modified to 16-point diamond search pattern*



- TM for bi-prediction is also enabled when DMVR condition is satisfied

Simulation results

■ On top of ECM-8.0

	Random Access Main 10					Low delay B Main 10				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1	-0.06%	-0.19%	-0.17%	101%	100%					
Class A2	-0.07%	-0.19%	0.04%	99%	100%					
Class B	-0.05%	-0.01%	-0.06%	100%	100%	-0.14%	-0.51%	0.07%	100%	100%
Class C	-0.07%	-0.07%	-0.08%	101%	101%	-0.17%	0.14%	-0.21%	100%	100%
Class E						-0.11%	0.36%	0.05%	101%	100%
Overall	-0.06%	-0.09%	-0.07%	100%	100%	-0.14%	-0.08%	-0.03%	100%	100%
Class D	-0.07%	-0.06%	-0.17%	101%	101%	-0.06%	-0.13%	-0.07%	103%	100%
Class F	-0.07%	-0.11%	-0.09%	100%	100%	0.15%	-0.01%	0.90%	101%	99%

Conclusions

- Proposed:

- *High-Accuracy template matching with two aspects are proposed*
 - *-0.06% and -0.14% BD-rate reduction for RA and LB*

- It is recommended to adopt the proposed method in EE2

- Thanks to Alibaba for crosschecking!