

JVET-AF0162 AHG12: Fixes to template matching

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Introduction

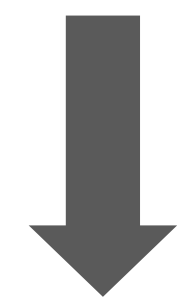
- Two issues in the inter template matching (TM) in ECM-10.0 are reported and fixed in this contribution.
- By fixing the reported issues, it achieves
 - ✓ RA: {-0.01%, 0.05%, 0.03%, 99.5%, 99.3%, 100.1%}
 - ✓ LD: {-0.05%, 0.09%, -0.08%, 100.3%, 99.8%, 99.9%}

Issue 1

- In TM search, for each search position, MV cost is calculated but not used in the final TM cost calculation in ECM-10.0.
- Proposed fix: to consider MV cost in TM cost calculation

Distortion cost = getDecoderSideDerivedMvCost (m_mvStart, mvCand, TM_SEARCH_RANGE, DECODER_SIDE_MV_WEIGHT) ;

cost = xGetTempMatchError<tplSize> (mvCand) ;



Proposed fix

cost += xGetTempMatchError<tplSize> (mvCand) ;

Issue 2

- In the current TM design, bi-prediction may be converted into uni-prediction by comparing TM cost of bi-prediction and uni-prediction.
- Logically, the bi-prediction TM cost should be compared with the smaller one of two uni-prediction TM costs (i.e., TM cost for list 0 and list 1)
- However, the current process cannot be guaranteed it.
- Thus, it is proposed to always compare bi-prediction TM cost with the smaller one of the two uni-prediction TM costs to determine whether convert bi-prediction to uni-prediction.

Issue 2

■ The proposed fix

- if ($\text{CostBi} > 1.125 * \text{CostUni}[1-\text{target}]$){ // $\text{MV}[1-\text{target}]$ is the MV being fixed and $\text{MV}[\text{target}]$ is the MV being refined
 Convert bi-prediction to uni-prediction;
 set MV to $\text{MV}[1-\text{target}]$;
}



Proposed fix

```
if ( $\text{CostBi} > 1.125 * \text{min}(\text{CostUni}[0], \text{CostUni}[1])$ ) {  
    Convert bi-prediction to uni-prediction;  
    MV to the one corresponding one;  
}
```

Simulation Results

	Random Access Main 10					
	Over ECM-10.0					
	Y	U	V	EncT	DecT	VmPeak
Class A1	0.02%	0.03%	0.13%	99.9%	98.9%	100.1%
Class A2	0.02%	-0.02%	0.02%	99.6%	99.6%	100.0%
Class B	0.00%	0.18%	-0.05%	99.4%	99.5%	100.2%
Class C	-0.06%	-0.04%	0.07%	99.2%	99.2%	100.0%
Class E						
Overall	-0.01%	0.05%	0.03%	99.5%	99.3%	100.1%
Class D	-0.03%	0.11%	0.02%	98.9%	99.3%	100.0%

	Low delay B Main 10					
	Over ECM-10.0					
	Y	U	V	EncT	DecT	VmPeak
Class A1						
Class A2						
Class B	-0.01%	0.50%	-0.33%	100.0%	99.2%	99.9%
Class C	-0.11%	-0.25%	0.07%	100.8%	100.6%	100.0%
Class E	-0.04%	-0.13%	0.12%	100.1%	99.7%	100.0%
Overall	-0.05%	0.09%	-0.08%	100.3%	99.8%	99.9%
Class D	-0.05%	0.09%	-0.09%	99.5%	99.6%	100.0%

Conclusion

- Two issues of the template matching in ECM-10.0 are reported and fixed.
- It is asserted the fixes are quite straightforward and reflect the actual design intention.
- The codes change is quite minor and some gain is observed.
- The software was uploaded in the contribution package and crosschecked.
- It is suggested to adopt the fixes into the next release of ECM.

Thanks

