

J0218 – Bi-pred merge restriction for small PUs

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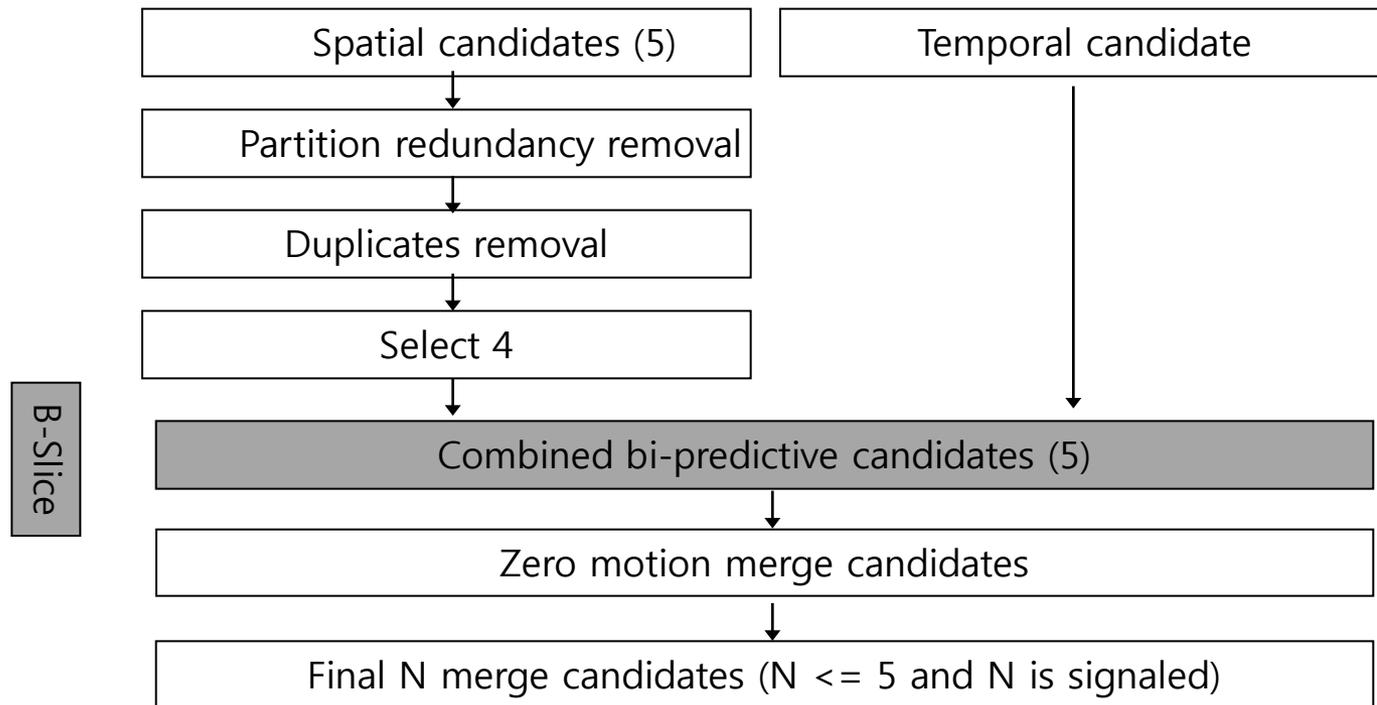
Introduction

- ❖ In the current HM, the bi-predictive motion for 8x4 and 4x8 PUs is restricted by force converting from bi-predictive to uni-predictive List0 motion compensation after motion information reconstruction to limit the maximum memory bandwidth of motion compensation
- ❖ If the encoder restricts motion search on such cases correctly, bi-predictive motion is the only occurred in merge candidate derivation process
- ❖ It is proposed to restrict bi-predictive merge candidate during merge candidate derivation process to avoid making unnecessary candidates

Merge candidates list

❖ Merge candidates list construction in B-slice

- Spatial candidates : Inter prediction direction is determined by neighbors
- Temporal candidates : Try to make bi-prediction if possible
- Combined candidates : Always make bi-prediction
- Zero candidates : Always make bi-prediction



Proposals

- ❖ Proposal1: Do not make efforts to make bi-predictive merge candidate in
 - Temporal candidates
 - Combined candidates
 - Zero candidates
- ❖ Proposal2: (Proposal1 +) Exclude bi-predictive spatial candidate
- ❖ Proposal3: (Proposal1 +) Convert bi-predictive spatial candidate

Proposal1

- ❖ Uni-predictive merge candidate generation for temporal, combined and zero merge candidates
 - Temporal candidates: List1 motion is not examined and set by List0 co-located motion as if it is in P-slice
 - This saves the unnecessary List1 co-located motion availability checking
 - Combined candidates: Disabled
 - By removing this redundant process, zero merge candidates have more chance to be included in merge candidate list
 - Zero candidates: Uni-predictive motion as if it is in P-slice

Proposal2

- ❖ (Proposal1 +) Exclusion of bi-predictive spatial merge candidate
 - Bi-predictive spatial neighboring merge candidate is excluded by marking it as unavailable
 - Bi-predictive merge candidates are never generated for small PUs
 - Force converting from bi-predictive motion to uni-predictive motion in compensation stage is not needed assuming that encoder correctly restricts bi-predictive motion search for small PUs in non-merge mode
 - This modification saves duplicates checking process by removing unnecessary candidates

Proposal3

- ❖ (Proposal1 +) Conversion of bi-predictive spatial merge candidate
 - Bi-predictive spatial neighboring merge candidate is converted to uni-predictive List0 motion during spatial merge candidate generation
 - Like in Proposal2, bi-predictive merge candidates are never generated for small PUs
 - This proposal increases chance to use spatial merge candidate compared to Proposal2 where such spatial candidates are excluded in the candidate list

Experimental result

❖ Experimental result

		Y	U	V
Prop1 (Temporal, Combined, Zero candidates as if in P_slice)	Main_RA	0.0	0.0	0.0
	Main_LD	-0.1	0.0	0.0
	HE10_RA	0.0	0.0	0.0
	HE10_LD	0.0	0.0	0.0
Prop2 (Prop1 + Exclusion of Bi-spatial candidates)	Main_RA	0.0	0.0	0.0
	Main_LD	0.0	0.0	0.0
	HE10_RA	0.0	0.0	0.0
	HE10_LD	0.0	-0.1	-0.1
Prop3 (Prop1 + Conversion of Bi-spatial candidates)	Main_RA	0.0	0.0	0.0
	Main_LD	-0.1	0.0	0.0
	HE10_RA	0.0	0.0	0.0
	HE10_LD	0.0	0.0	0.0

Summary

- ❖ By restricting bi-predictive merge candidates during derivation process,
 - List1 motion generation for temporal merge candidates and zero merge candidates is removed and unnecessary process as combined bi-predictive merge candidate generation is removed
 - Moreover, by converting bi-predictive spatial merge candidates to uni-predictive or excluding those, it saves the effort to check duplicates when insertion
 - This proposed methods can be regarded as to move the existing converting process inside merge candidate derivation process while saving complexity in candidate list generation

Thank you !