

JVET-P0248

On Modifications of GEO

Hikvision

L. Xu, X. Cao, Y. Sun, F. Chen, L. Wang

- As the combination of TPM and SBT will create the visual artifact if it is used, N0483 which proposed to disable sub-block transform when triangle mode is used is adopted in the Nth meeting. And in the Oth meeting, GEO is proposed as a flexible non-rectangular partition for motion compensation blocks. A similar situation will be encountered for GEO.
- Besides, the size constraint for TPM and GEO differs. TPM can be enabled if width * height ≥ 64 is satisfied. While GEO is enabled only if both width ≥ 8 & width ≤ 128 and height ≥ 8 & height ≤ 128 are satisfied.

■ Method1

- In this part, the condition for SBT is modified. If current block is coded as GEO mode, SBT would be disabled.

■ Method2

- In this part, the size constraint of TPM and GEO is unified. GEO can also be enabled if $\text{width} * \text{height} \geq 64$ is satisfied.

Experimental Results

■ Results for Proposed Method1 VS GEO with 80 modes

	Random access Main10				
	Over VTM-6.0				
	Y	U	V	EncT	DecT
Class A1	-0.15%	-0.21%	-0.32%	103%	101%
Class A2	-0.19%	-0.25%	-0.24%	103%	101%
Class B	-0.19%	-0.22%	-0.33%	103%	103%
Class C	-0.64%	-1.08%	-1.09%	103%	104%
Class E					
Overall	-0.30%	-0.45%	-0.51%	103%	102%
Class D	-0.42%	-0.82%	-0.73%	103%	101%
Class F	-0.27%	-0.40%	-0.34%	101%	103%
	Low delay B Main10				
	Over VTM-6.0				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	-0.29%	-0.43%	-0.64%	103%	99%
Class C	-0.73%	-0.95%	-1.03%	102%	98%
Class E	-1.03%	-0.37%	-0.24%	101%	98%
Overall	-0.62%	-0.59%	-0.67%	102%	98%
Class D	-0.64%	-0.82%	-0.92%	102%	99%
Class F	-0.32%	-0.64%	-0.40%	101%	99%

Thank Alibaba for the crosscheck.

Experimental Results

■ Results for Proposed Method2 VS GEO with 80 modes

	Random access Main10				
	Over VTM-6.0				
	Y	U	V	EncT	DecT
Class A1	-0.17%	-0.14%	-0.25%	103%	101%
Class A2	-0.22%	-0.31%	-0.20%	104%	100%
Class B	-0.22%	-0.23%	-0.34%	104%	103%
Class C	-0.80%	-1.18%	-1.19%	104%	104%
Class E					
Overall	-0.37%	-0.48%	-0.52%	104%	103%
Class D	-0.58%	-1.05%	-0.75%	105%	101%
Class F	-0.34%	-0.52%	-0.47%	102%	103%
	Low delay B Main10				
	Over VTM-6.0				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	-0.36%	-0.50%	-0.56%	105%	100%
Class C	-0.86%	-1.11%	-1.26%	104%	99%
Class E	-0.93%	-0.49%	-0.01%	102%	99%
Overall	-0.67%	-0.70%	-0.66%	104%	99%
Class D	-0.80%	-1.35%	-0.61%	105%	100%
Class F	-0.53%	-0.36%	0.09%	103%	99%

Thank Alibaba for the crosscheck.

Experimental Results

■ Results for Proposed Method1 VS GEO with 64 modes

	Random access Main10				
	Over VTM-6.0				
	Y	U	V	EncT	DecT
Class A1	-0.17%	-0.16%	-0.28%	102%	101%
Class A2	-0.19%	-0.21%	-0.22%	103%	101%
Class B	-0.19%	-0.18%	-0.30%	103%	102%
Class C	-0.64%	-0.93%	-1.00%	102%	102%
Class E					
Overall	-0.31%	-0.38%	-0.47%	102%	102%
Class D	-0.45%	-0.78%	-0.66%	103%	101%
Class F	-0.27%	-0.47%	-0.40%	101%	102%
	Low delay B Main10				
	Over VTM-6.0				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	-0.35%	-0.51%	-0.64%	104%	103%
Class C	-0.75%	-0.95%	-1.04%	103%	103%
Class E	-0.87%	-0.21%	-0.20%	102%	102%
Overall	-0.61%	-0.58%	-0.66%	103%	103%
Class D	-0.63%	-0.51%	-0.56%	104%	104%
Class F	-0.31%	-0.90%	-0.22%	102%	103%

Thank Alibaba for the crosscheck.

Experimental Results

■ Results for Proposed Method2 VS GEO with 64 modes

	Random access Main10				
	Over VTM-6.0				
	Y	U	V	EncT	DecT
Class A1	-0.17%	-0.13%	-0.28%	103%	102%
Class A2	-0.24%	-0.34%	-0.27%	103%	102%
Class B	-0.23%	-0.25%	-0.33%	103%	102%
Class C	-0.81%	-1.19%	-1.39%	103%	103%
Class E					
Overall	-0.38%	-0.49%	-0.59%	103%	102%
Class D	-0.57%	-0.95%	-0.88%	104%	100%
Class F	-0.34%	-0.50%	-0.52%	101%	101%
	Low delay B Main10				
	Over VTM-6.0				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	-0.39%	-0.54%	-0.48%	105%	104%
Class C	-0.89%	-1.13%	-1.24%	105%	104%
Class E	-1.00%	-0.59%	-0.32%	103%	102%
Overall	-0.71%	-0.75%	-0.70%	104%	103%
Class D	-0.79%	-0.70%	-0.69%	105%	103%
Class F	-0.34%	-0.71%	-0.56%	103%	104%

Thank Alibaba for the crosscheck.

- This proposal is provided as a unification for TPM and GEO for the size constraint and the condition of SBT.
- The first method would help to reduce the visual artifact.
- The second method would unify the size constraint of GEO and TPM, which can increase the opportunity of GEO for $4 \times N$ and $N \times 4$ ($N \geq 16$).

Additional Experimental Results

■ Results for Proposed Method1 VS GEO with 80 modes

	Random access Main10				
	Over GEO with 80 modes				
	Y	U	V	EncT	DecT
Class A1	0.03%	-0.03%	0.00%	100%	100%
Class A2	0.04%	-0.04%	0.02%	100%	99%
Class B	0.02%	-0.04%	-0.06%	100%	100%
Class C	0.09%	-0.13%	0.09%	100%	100%
Class E					
Overall	0.04%	-0.06%	0.01%	100%	100%
Class D	0.09%	0.10%	0.00%	100%	99%
Class F	0.04%	0.10%	0.07%	100%	101%
	Low delay B Main10				
	Over GEO with 80 modes				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	0.08%	-0.03%	-0.23%	98%	99%
Class C	0.07%	-0.13%	-0.01%	98%	95%
Class E	0.00%	-0.30%	0.09%	98%	96%
Overall	0.05%	-0.13%	-0.08%	98%	97%
Class D	0.10%	-0.07%	0.06%	98%	93%
Class F	0.15%	0.47%	0.28%	98%	96%

Additional Experimental Results

■ Results for Proposed Method2 VS GEO with 80 modes

	Random access Main10				
	Over GEO with 80 modes				
	Y	U	V	EncT	DecT
Class A1	0.00%	0.04%	0.07%	100%	100%
Class A2	0.00%	-0.11%	0.06%	100%	99%
Class B	-0.01%	-0.06%	-0.07%	101%	101%
Class C	-0.08%	-0.23%	-0.02%	101%	101%
Class E					
Overall	-0.02%	-0.09%	0.00%	101%	100%
Class D	-0.07%	-0.13%	-0.02%	101%	99%
Class F	-0.03%	-0.02%	-0.07%	101%	101%
	Low delay B Main10				
	Over GEO with 80 modes				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	0.01%	-0.10%	-0.15%	100%	100%
Class C	-0.06%	-0.29%	-0.25%	100%	96%
Class E	0.10%	-0.42%	0.32%	99%	97%
Overall	0.01%	-0.24%	-0.06%	100%	98%
Class D	-0.06%	-0.61%	0.37%	100%	94%
Class F	-0.05%	0.77%	0.76%	100%	97%

Additional Experimental Results

■ Results for Proposed Method1 VS GEO with 64 modes

	Random access Main10				
	Over GEO with 64 modes				
	Y	U	V	EncT	DecT
Class A1	0.01%	-0.11%	0.03%	100%	99%
Class A2	0.04%	-0.01%	0.01%	100%	100%
Class B	0.02%	0.01%	0.04%	100%	98%
Class C	0.08%	0.01%	0.16%	99%	98%
Class E					
Overall	0.04%	-0.02%	0.06%	100%	99%
Class D	0.05%	-0.13%	0.01%	99%	100%
Class F	0.05%	0.00%	0.00%	100%	99%
	Low delay B Main10				
	Over GEO with 64 modes				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	0.01%	-0.06%	-0.20%	100%	103%
Class C	0.06%	0.20%	0.24%	99%	100%
Class E	0.15%	0.17%	-0.14%	100%	100%
Overall	0.06%	0.09%	-0.04%	100%	101%
Class D	0.08%	0.22%	0.02%	99%	99%
Class F	0.04%	-0.91%	-0.16%	99%	100%

Additional Experimental Results

■ Results for Proposed Method2 VS GEO with 64modes

	Random access Main10				
	Over GEO with 64 modes				
	Y	U	V	EncT	DecT
Class A1	0.00%	-0.07%	0.04%	100%	100%
Class A2	-0.02%	-0.13%	-0.04%	100%	100%
Class B	-0.02%	-0.06%	0.01%	100%	98%
Class C	-0.09%	-0.25%	-0.24%	100%	99%
Class E					
Overall	-0.03%	-0.13%	-0.06%	100%	99%
Class D	-0.07%	-0.31%	-0.20%	100%	98%
Class F	-0.02%	-0.03%	-0.11%	100%	99%
	Low delay B Main10				
	Over GEO with 64 modes				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	-0.04%	-0.08%	-0.04%	101%	104%
Class C	-0.09%	0.02%	0.03%	101%	100%
Class E	0.02%	-0.20%	-0.27%	100%	100%
Overall	-0.04%	-0.08%	-0.07%	101%	101%
Class D	-0.09%	0.02%	-0.11%	101%	98%
Class F	0.01%	-0.74%	-0.50%	100%	100%

Thank you !

