

# JVET-Q0188

**CE4-related: Simplification on geometric partitioning mode by replacing motion index calculation with subsampled weight information**

**Authors:**

**Yu-Ling Hsiao, Chun-Chia Chen, Chih-Wei Hsu, Yu-Wen Huang, Shaw-Min Lei**

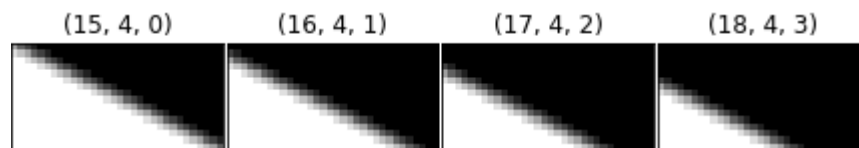
**Presenter: Yu-Ling Hsiao**

# Overall Summary

- Remove motion index calculation in GEO with two methods
  - 1. Motion indexes are subsampled from luma blending weights
  - 2. Motion indexes are subsampled from luma blending weight indexes

Over VTM-7.0 (%)			Y	U	V	EncT	DecT
1	Method 1: Subsampling luma blending weights	RA	-0.28	-0.32	-0.34	103%	99%
		LB	-0.69	-0.58	-0.64	103%	98%
2	Method 2: Subsampling luma blending weight indexes	RA	-0.28	-0.40	-0.36	103%	98%
		LB	-0.66	-0.57	-0.55	104%	98%
GEO common base		RA	-0.28	-0.35	-0.34	104%	98%
		LB	-0.70	-0.67	-0.77	105%	103%

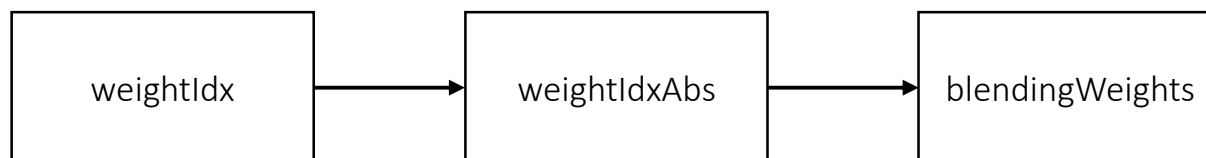
# GEO Common Base



Examples: CU=32x16  
(splitIdx, angleIdx, distanceIdx)

- Blending weights, for predictor blending

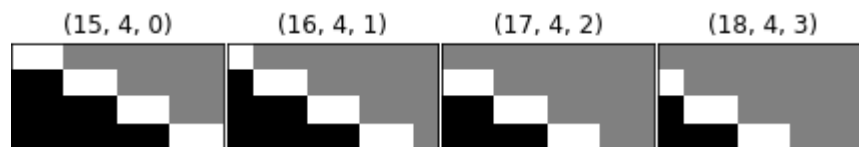
- Sample based, in range from 0 to 8, inclusive



Clip3(0, 26, abs(weightIdx))

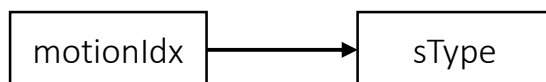
weightIdx ≤ 0 ?

WedgeFilter[weightIdxAbs] :  
8 – WedgeFilter[weightIdxAbs]



- sType, for motion storage

- Sub-block based, in range from 0 to 2, inclusive
- 0: store MV0; 1: store MV1; 2: store derived MV

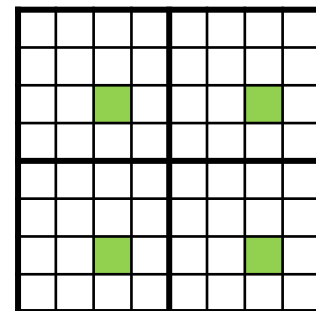


abs(motionIdx) < 32 ? 2 :

motionIdx ≤ 0 ? partIdx : 1-partIdx

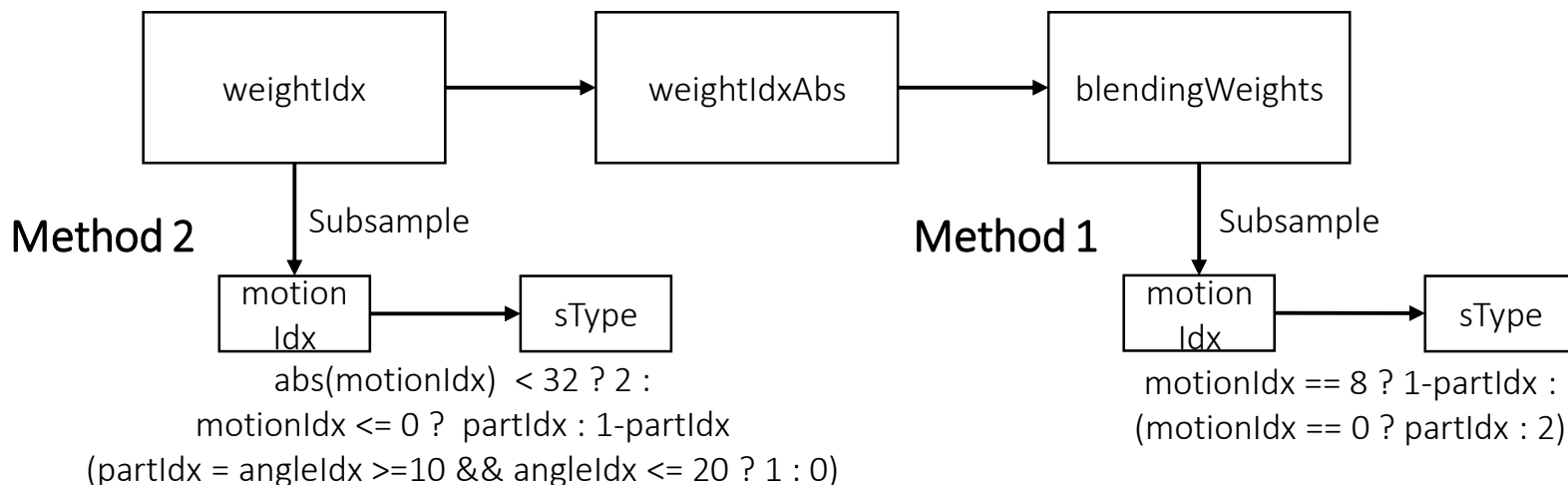
(partIdx = angleIdx ≥ 10 && angleIdx ≤ 20 ? 1 : 0)

# Proposed Methods



Subsampling

- Method 1: Subsampling luma blending weights
  - $\text{motionIdx}[i,j] = \text{blendingWeights}[4i+2,4j+2]$
  - $\text{sType} = \text{motionIdx} == 8 ? 1 - \text{partIdx} : (\text{motionIdx} == 0 ? \text{partIdx} : 2)$
- Method 2: Subsampling luma blending weight indexes
  - $\text{motionIdx}[i,j] = \text{weightIdx}[4i+2,4j+2]$
  - $\text{sType} = \text{abs}(\text{motionIdx}) < 32 ? 2 : (\text{motionIdx} \leq 0 ? \text{partIdx} : 1 - \text{partIdx})$



# Simulation Results

GEO common base

Method 1

Method 2

	Random access Main10					Random access Main10					Random access Main10				
	Over VTM-7.0					Over VTM-7.0					Over VTM-7.0				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1	-0.14%	-0.09%	-0.18%	105%	98%	-0.11%	-0.17%	-0.18%	103%	99%	-0.14%	-0.26%	-0.19%	103%	97%
Class A2	-0.22%	-0.19%	-0.02%	104%	100%	-0.22%	-0.10%	-0.03%	103%	105%	-0.21%	-0.19%	-0.07%	103%	101%
Class B	-0.14%	-0.10%	-0.17%	104%	99%	-0.15%	-0.06%	-0.17%	103%	98%	-0.16%	-0.16%	-0.18%	103%	97%
Class C	-0.59%	-0.99%	-0.90%	104%	98%	-0.61%	-0.91%	-0.92%	102%	97%	-0.59%	-0.96%	-0.92%	103%	97%
Class E															
<b>Overall</b>	-0.28%	-0.35%	-0.34%	104%	98%	-0.28%	-0.32%	-0.34%	103%	99%	-0.28%	-0.40%	-0.36%	103%	98%
Class D	-0.43%	-0.67%	-0.62%	105%	100%	-0.48%	-0.70%	-0.61%	103%	99%	-0.41%	-0.69%	-0.57%	103%	98%
Class F	-0.32%	-0.38%	-0.33%	103%	99%	-0.31%	-0.38%	-0.30%	101%	102%	-0.29%	-0.37%	-0.29%	101%	98%

	Low delay B Main10					Low delay B Main10					Low delay B Main10				
	Over VTM-7.0					Over VTM-7.0					Over VTM-7.0				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1															
Class A2															
Class B	-0.36%	-0.51%	-0.60%	106%	102%	-0.38%	-0.58%	-0.43%	105%	96%	-0.36%	-0.53%	-0.37%	105%	97%
Class C	-0.79%	-1.25%	-0.89%	106%	104%	-0.79%	-0.94%	-0.81%	104%	98%	-0.78%	-1.14%	-0.71%	105%	100%
Class E	-1.17%	-0.19%	-0.88%	103%	102%	-1.08%	-0.11%	-0.76%	101%	98%	-1.01%	0.12%	-0.62%	101%	98%
<b>Overall</b>	-0.70%	-0.67%	-0.77%	105%	103%	-0.69%	-0.58%	-0.64%	103%	98%	-0.66%	-0.57%	-0.55%	104%	98%
Class D	-0.68%	-0.44%	-1.04%	105%	102%	-0.70%	-0.83%	-1.36%	103%	100%	-0.66%	-0.88%	-1.35%	102%	101%
Class F	-0.51%	-0.90%	-0.30%	105%	105%	-0.47%	-1.30%	-0.35%	102%	99%	-0.55%	-0.87%	-0.14%	103%	99%

# Conclusion

- Remove motion index calculation by subsampling luma weight information
  - Simplify specification text
  - Possible to share resource for some software and hardware implementations
  - BD-rate change is minor
- Thanks to Huawei for cross-checking