

CREATE  
CONNECT  
LIVE  
*inspire*

# JVET-X0139

---

AHG12: removing a discontinuity in the discrete angle comparison in DIMD



interdigital™

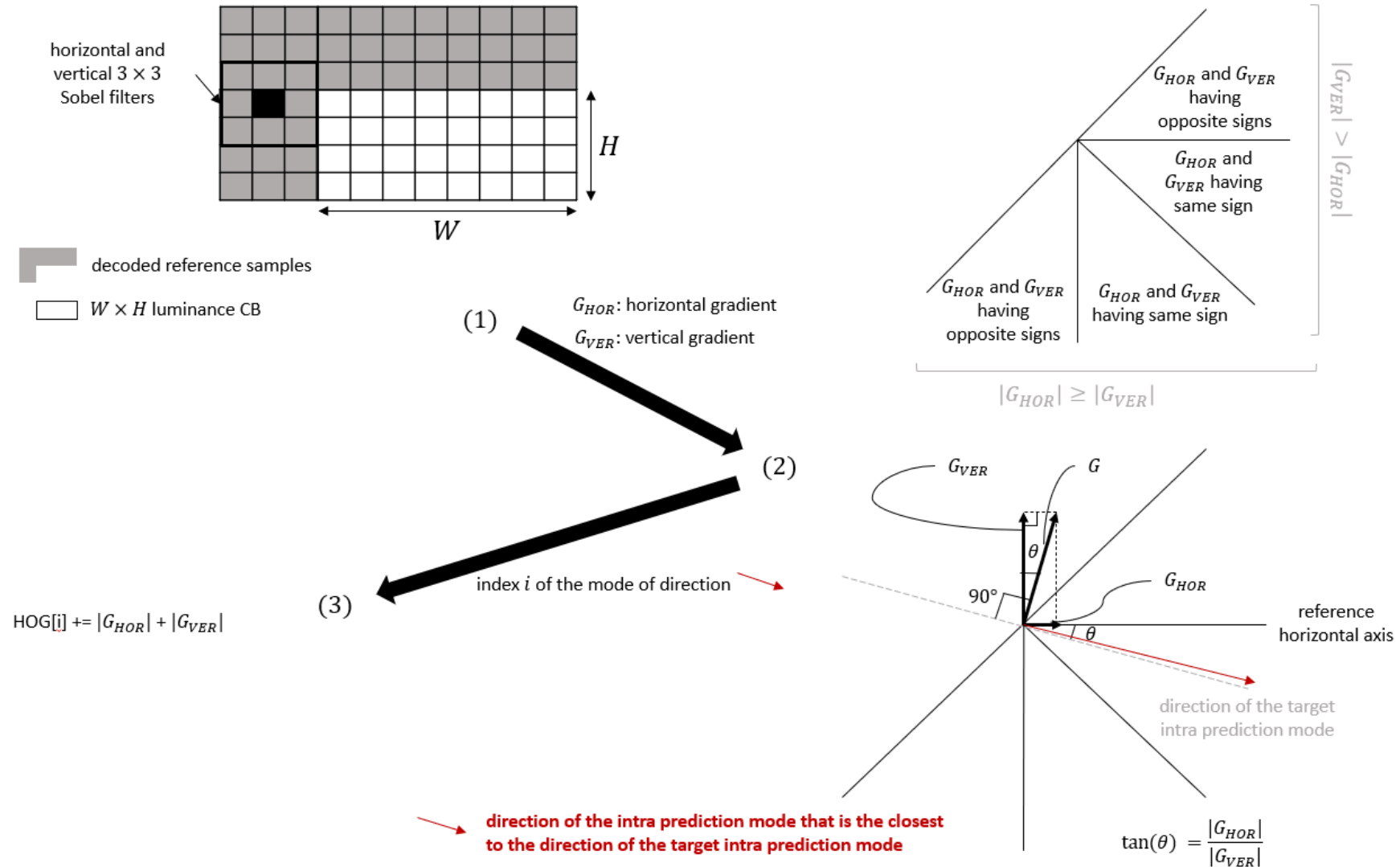
# 1. Principle of DIMD

The inference of the indices of the intra prediction modes that most likely generate the predictions of highest qualities according to DIMD is decomposed into two steps.

1. creation of a Histogram of Oriented Gradients (HOG) from a set of decoded pixels around the current luminance CB
2. setting the **indices of the two intra prediction modes that most likely generate the predictions of highest qualities** according to DIMD to the **indices of the two HOG bins of largest magnitudes**

# 1. Principle of DIMD

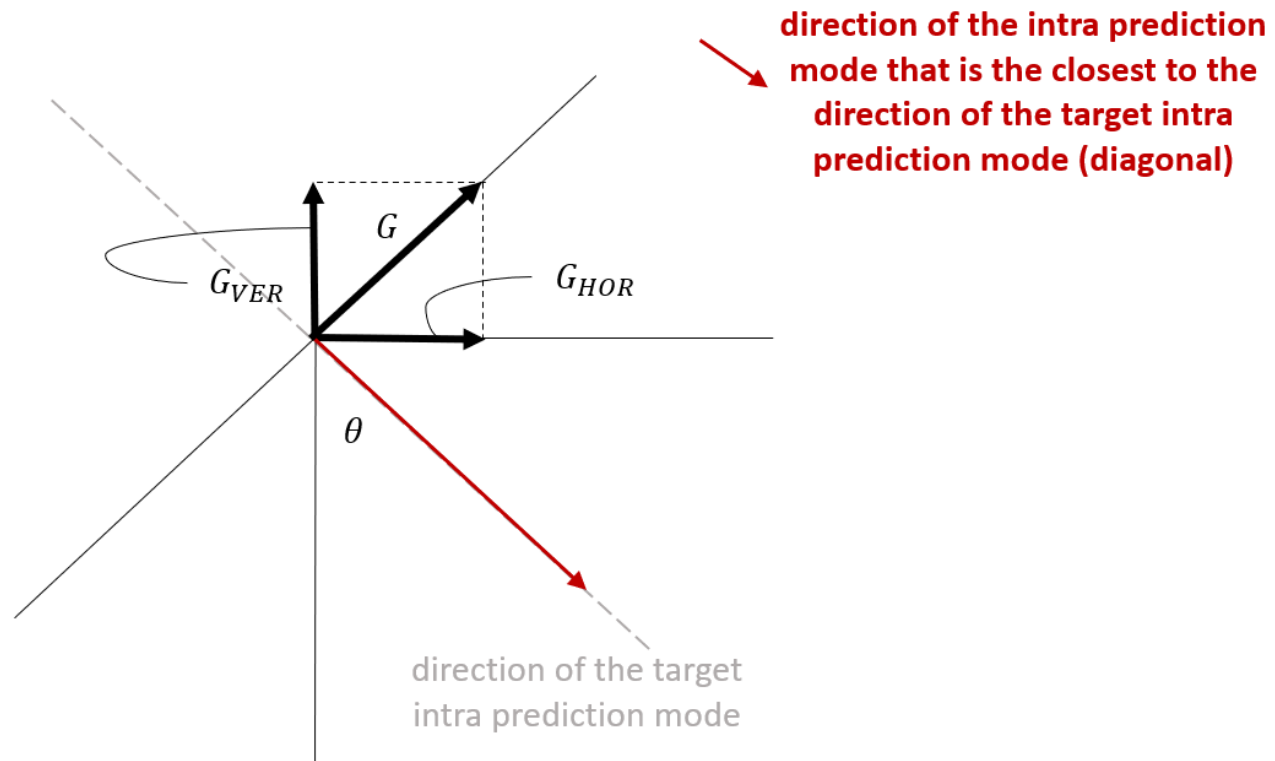
Figure 1: filling of the HOG in DIMD for a given set of decoded reference sample around the current  $W \times H$  luminance CB.



## 2. Discontinuity in the discrete angle comparison

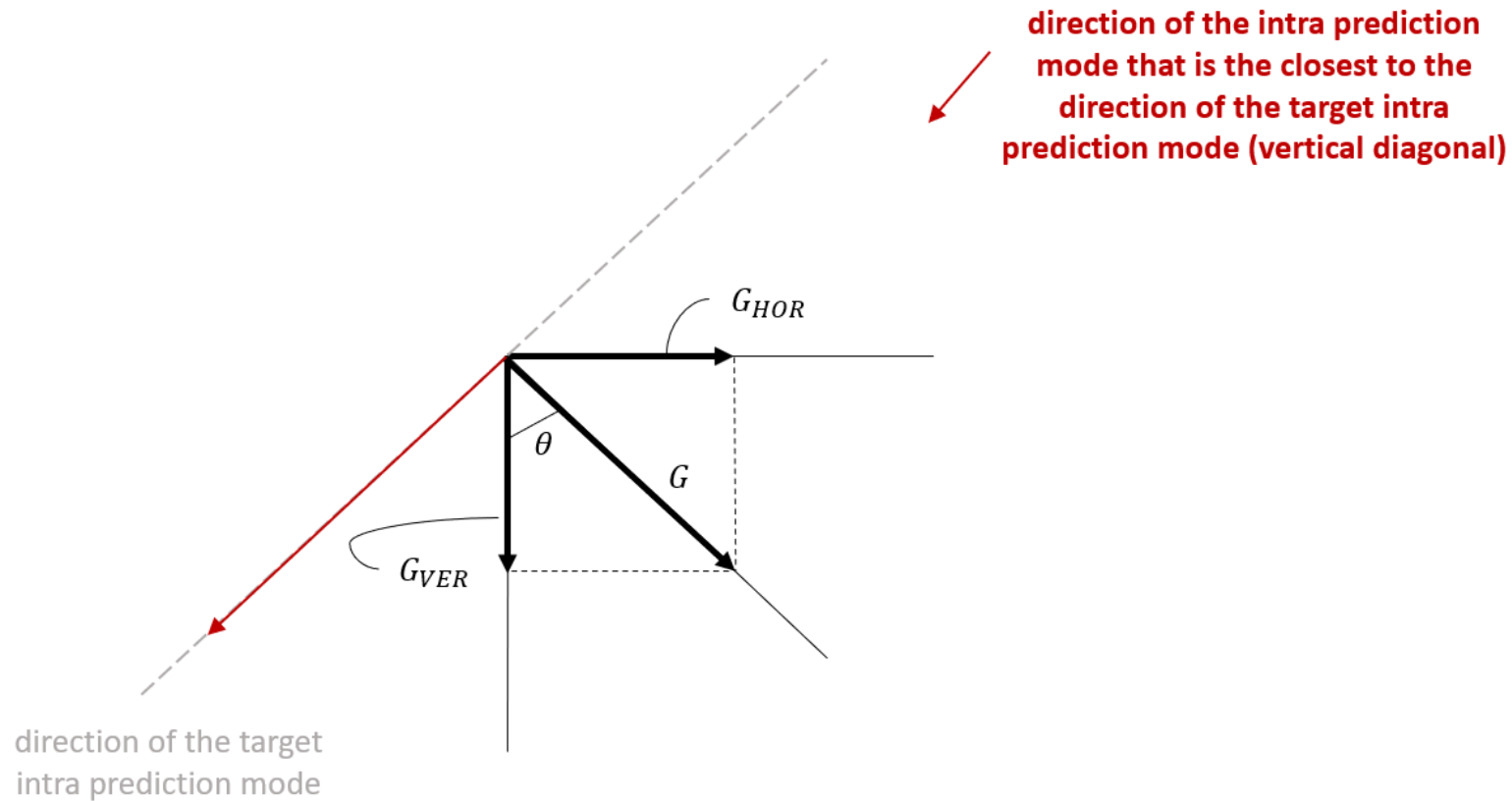
**Problem: if  $|G_{HOR}| = |G_{VER}|$ , the comparison of the discrete scale version of  $\theta$  with the discrete scale version of the angle of each directional intra prediction mode existing in ECM-2.0 is skipped.**

- if  $|G_{HOR}| = |G_{VER}|$  and  $G_{VER}$  and  $G_{HOR}$  have the same sign, the HOG bin of index 51 is incremented. But, according to the DIMD principle, the HOG bin of index 34 should be incremented



## 2. Discontinuity in the discrete angle comparison

- if  $|G_{HOR}| = |G_{VER}|$  and  $G_{VER}$  and  $G_{HOR}$  have opposite signs, the HOG bin of index 49 is incremented. But, according to the DIMD principle, the HOG bin of index 66 should be incremented



### 3. Proposition

- if  $|G_{HOR}| = |G_{VER}|$  and  $G_{VER}$  and  $G_{HOR}$  have the same sign, the HOG bin of index 34 is incremented
- if  $|G_{HOR}| = |G_{VER}|$  and  $G_{VER}$  and  $G_{HOR}$  have opposite signs, the HOG bin of index 66 is incremented

## 4. Experiments

	All Intra Main10				
	over ECM-2.0				
	Y	U	V	EncT	DecT
Class A1	0.00%	-0.05%	-0.12%	88%	105%
Class A2	-0.02%	0.06%	-0.05%	90%	109%
Class B	0.00%	0.00%	0.01%	92%	91%
Class C	-0.02%	-0.04%	0.01%	90%	83%
Class E	-0.01%	-0.07%	0.10%	92%	86%
Overall	<b>-0.01%</b>	<b>-0.02%</b>	<b>-0.01%</b>	91%	93%
Class D	0.01%	0.03%	-0.02%	93%	88%
Class F	-0.06%	-0.15%	-0.18%	99%	95%

*Table 1: AI – ECM-2.0 with the fixed discontinuity in DIMD w.r.t ECM-2.0.*

	Random Access Main 10				
	Over ECM-2.0				
	Y	U	V	EncT	DecT
Class A1	-0.01%	-0.04%	0.05%	105%	113%
Class A2	0.00%	-0.21%	-0.01%	104%	113%
Class B	-0.01%	0.13%	0.17%	92%	93%
Class C	-0.02%	0.22%	0.07%	89%	87%
Class E					
Overall	<b>-0.01%</b>	<b>0.05%</b>	<b>0.08%</b>	96%	99%
Class D	0.00%	-0.45%	0.01%	90%	85%
Class F	-0.02%	-0.11%	-0.14%	94%	83%

*Table 2: RA – ECM-2.0 with the fixed discontinuity in DIMD w.r.t ECM-2.0.*

## 5. Conclusion

A correction of DIMD that is **aligned with the DIMD principle** is proposed, yielding very slight mean BD-rate reductions in AI and RA.

*Many Thanks for your attention!*