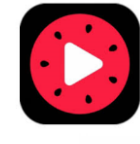
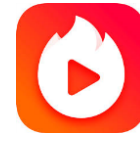


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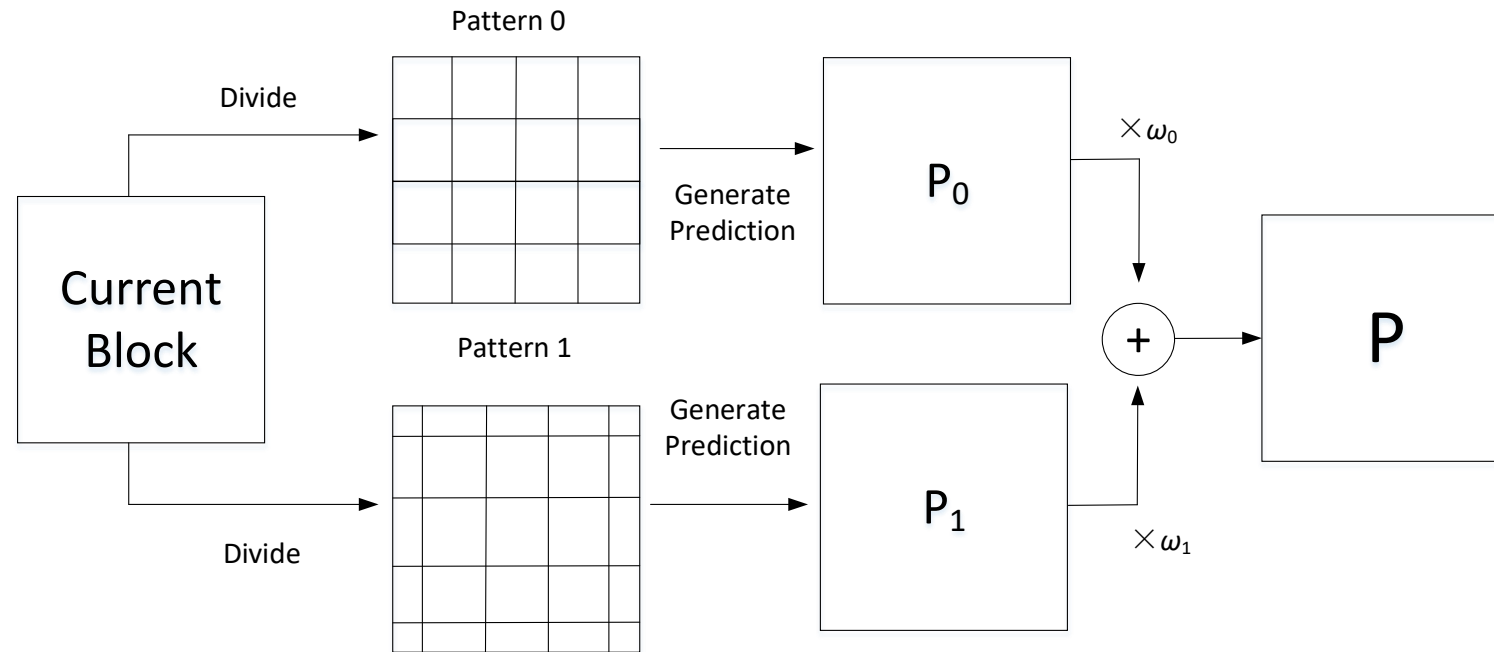
CE2-1.1: INTERWEAVED PREDICTION FOR AFFINE MOTION COMPENSATION

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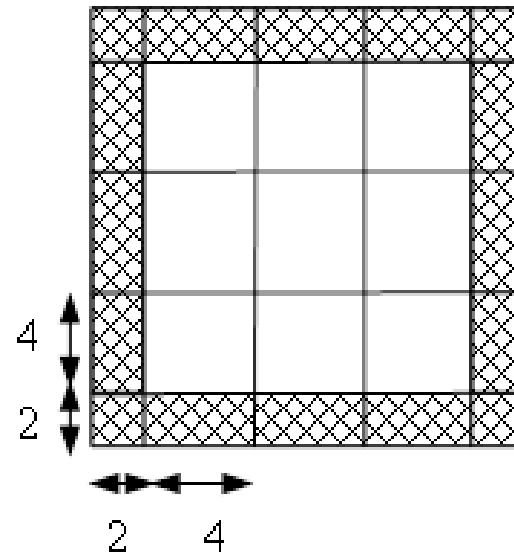
Interweaved affine

- Affine motion compensation is done in a interweaved way
 - A coding block is divided into sub-blocks with two different dividing patterns
 - Two auxiliary predictions are generated by AMC with the two dividing patterns.
 - The final prediction is calculated as a weighted-sum of the two auxiliary predictions



Constraints

- Interweaved prediction is applied only when sub-block size is not smaller than 4x4
- Only on uni-prediction
- Cannot cross a VPDU boundary



Simulations results on VTM-4.0

■ Test a: only on luma

	RA					LB				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1	-0.11%	0.08%	0.01%	100%	101%					
Class A2	-0.53%	0.17%	0.16%	100%	101%					
Class B	-0.37%	-0.14%	-0.07%	100%	99%	-0.15%	-0.03%	-0.13%	100%	101%
Class C	-0.18%	0.05%	-0.10%	100%	98%	-0.15%	0.08%	-0.12%	101%	103%
Class E						-0.12%	0.08%	-0.21%	103%	99%
Overall	-0.30%	0.02%	-0.02%	100%	100%	-0.14%	0.04%	-0.15%	101%	101%
Class D	-0.28%	-0.13%	-0.05%	100%	103%	-0.17%	-0.06%	-0.70%	100%	100%
Class F	-0.53%	-0.27%	-0.23%	99%	97%	-0.79%	-0.70%	-1.01%	100%	100%

■ Test b: on both luma and chroma

	RA					LB				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1	-0.11%	0.01%	0.02%	101%	101%					
Class A2	-0.62%	-0.30%	-0.19%	100%	101%					
Class B	-0.37%	-0.35%	-0.30%	100%	99%	-0.16%	-0.39%	-0.19%	101%	101%
Class C	-0.18%	-0.11%	-0.16%	100%	96%	-0.15%	-0.08%	-0.25%	101%	101%
Class E						-0.09%	0.25%	-0.06%	103%	98%
Overall	-0.32%	-0.21%	-0.18%	100%	99%	-0.14%	-0.13%	-0.18%	101%	100%
Class D	-0.31%	-0.07%	-0.01%	100%	101%	-0.15%	-0.03%	-0.36%	100%	98%
Class F	-0.53%	-0.51%	-0.51%	99%	97%	-0.84%	-0.78%	-0.84%	99%	99%

	Test a
CatRobot1	-0.85%
DaylightRoad2	-0.55%
Cactus	-1.25%
BQSquare	-0.50%
SlideShow	-1.74%

Simulations results on VTM-4.0

■ Test c: Based on CE-2.4.6 as anchor

	RA					LB				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1	-0.10%	0.07%	0.06%	100%	99%					
Class A2	-0.50%	0.30%	0.12%	101%	99%					
Class B	-0.34%	-0.10%	-0.01%	101%	99%	-0.11%	-0.03%	0.11%	102%	100%
Class C	-0.18%	-0.02%	-0.01%	100%	100%	-0.12%	0.07%	-0.09%	100%	104%
Class E						-0.10%	0.36%	0.08%	102%	101%
Overall	-0.28%	0.03%	0.03%	101%	100%	-0.11%	0.10%	0.03%	101%	102%
Class D	-0.25%	0.01%	0.02%	100%	99%	-0.05%	0.35%	0.43%	100%	98%
Class F	-0.53%	-0.30%	-0.30%	101%	100%	-0.78%	-0.41%	-0.39%	102%	97%

■ Test d: Based on CE-2.4.8 as anchor

	RA					LB				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1	-0.07%	-0.11%	0.06%	100%	100%					
Class A2	-0.50%	0.14%	0.16%	100%	100%					
Class B	-0.37%	-0.06%	-0.05%	101%	102%	-0.15%	-0.15%	0.41%	100%	101%
Class C	-0.17%	0.07%	-0.02%	101%	103%	-0.07%	0.16%	-0.17%	101%	101%
Class E						-0.17%	-0.46%	0.41%	104%	100%
Overall	-0.28%	0.01%	0.02%	101%	101%	-0.13%	-0.13%	0.22%	101%	101%
Class D	-0.27%	0.09%	-0.01%	100%	102%	-0.10%	0.47%	-0.21%	102%	104%
Class F	-0.52%	-0.25%	-0.24%	101%	104%	-0.76%	-0.44%	-0.41%	101%	100%

Conclusion

- Propose:
 - *Interweaved prediction for affine motion compensation*
- Benefits:
 - *Achieve a coding gain (0.30%) with almost no extra complexity (enc: 100%, dec: 100%)*
- Recommend:
 - *Adopt CE2-1.1.a into VTM-4.0.*