

Temporal predictor restriction harmonized with motion vector compression

JCTVC-E097

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1. Overview

Overview

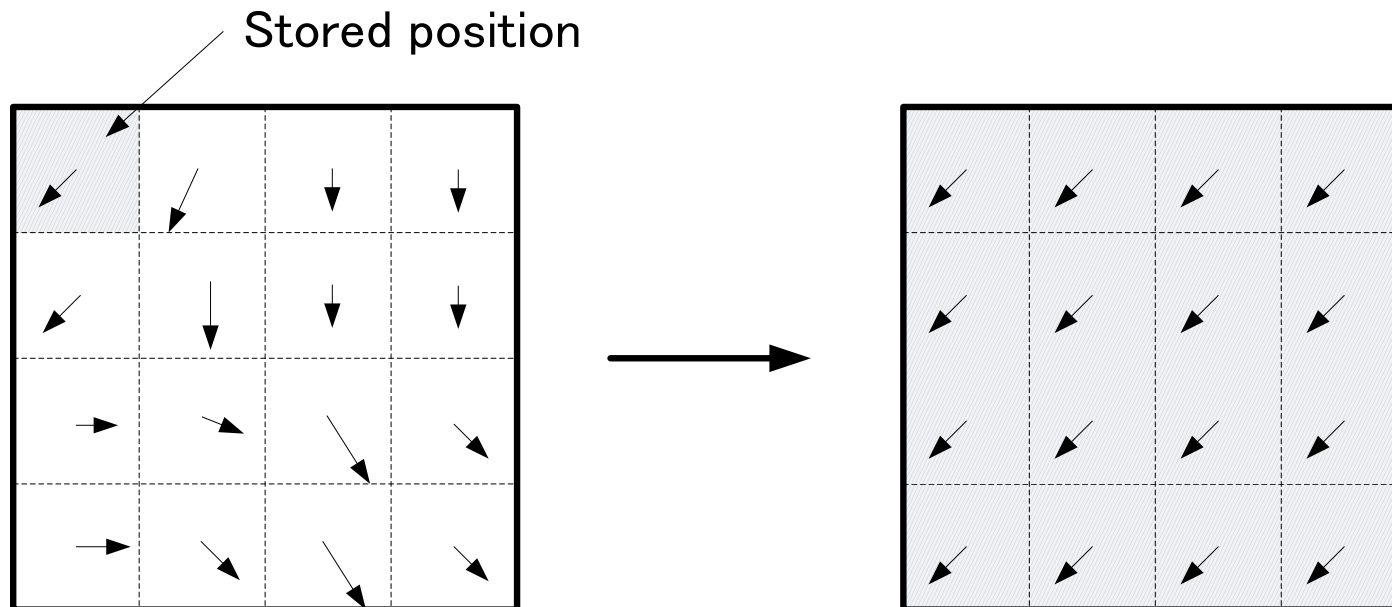
- Proposed technique
 - Temporal predictor restriction harmonized with MV compression crosschecked by NEC (JCTVC-E191)
- Algorithm
 - Restrict temporal predictor harmonized with the size of motion vector storage
- Software
 - HM2.0 based
- Simulation results
 - Overall BD-rate loss 0.1%
 - Almost same encoder runtime as the anchor
 - Slightly decreased decoder runtime compared to the anchor

2. Algorithm

Motion vector compression in the HM2.0

- Store motion vector by 16x16 block
- Temporal predictor used for any block sizes

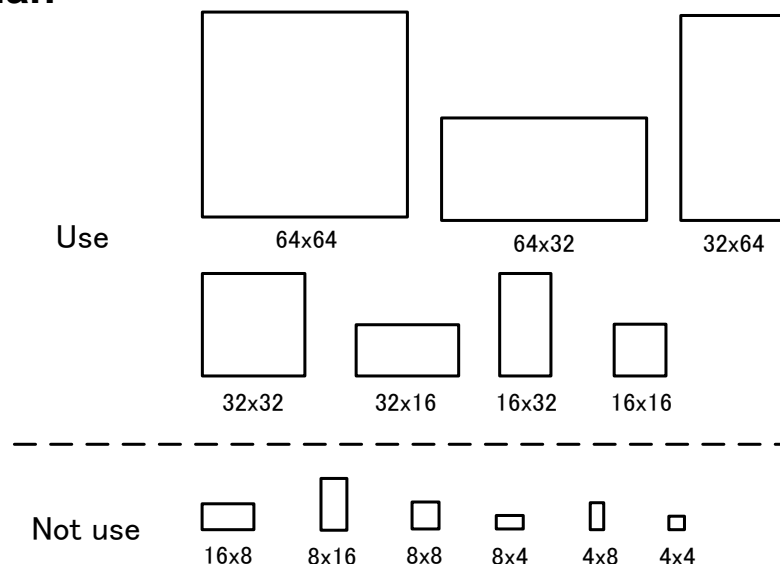
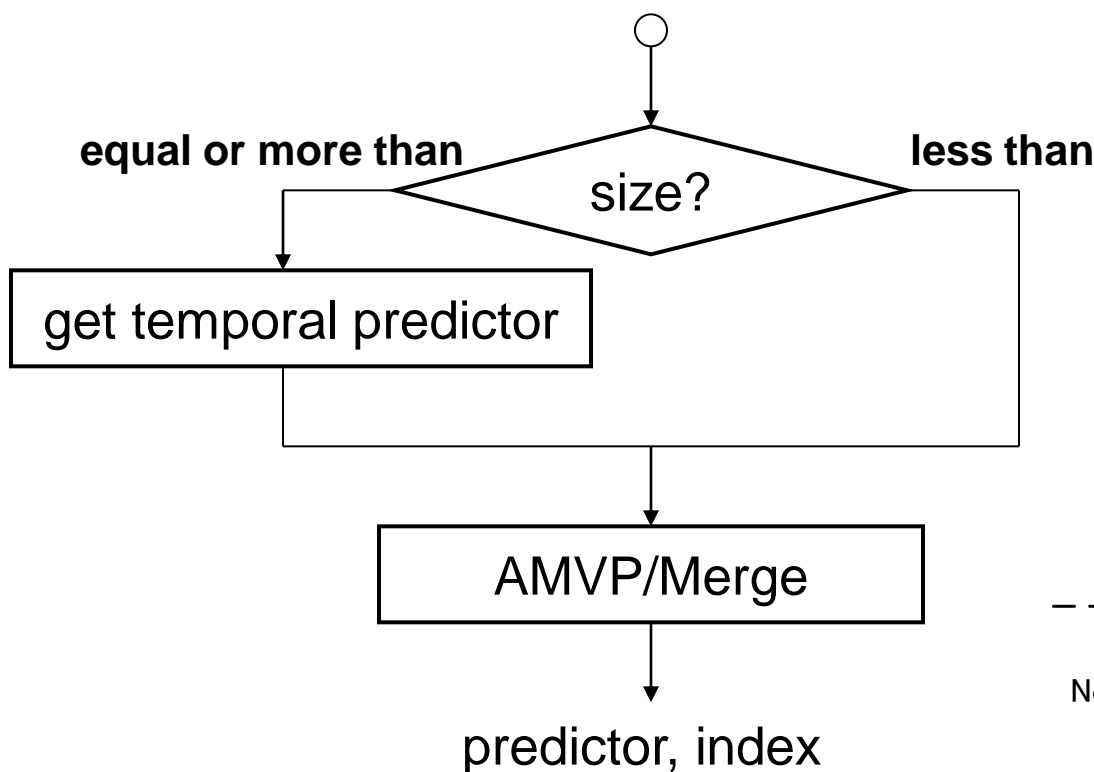
To use temporal predictor less than 16x16 block
Necessary?



Temporal predictor on proposed algorithm

Harmonized with the size of motion vector storage

- Used size: 64x64, 64x32, 32x64, 32x32, 32x16, 16x32, 16x16
- Not used size: 16x8, 8x16, 8x8, 8x4, 4x8, 4x4



Benefit

- Reduce access times to temporal predictor in parsing process
 - Make hardware design free
- Reduce the index cost for AMVP/Merge
 - Reduced mvp_idx, merge_idx cost in less than 16x16 block
- Reduce the candidates to be checked on Encoder
 - No need to check temporal predictor in less than 16x16 block

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3. Experiments

Simulation results

- Overall BD-rate **loss 0.1%**
- Slightly decreased decoder runtime compared to the anchor

	Random access			Random access LoCo		
	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate
Class A	0.1	0.1	0.0	0.1	-0.1	0.2
Class B	0.1	0.0	-0.1	-0.1	-0.1	-0.1
Class C	0.2	0.1	0.1	0.0	0.0	0.0
Class D	0.4	0.2	0.1	0.3	-0.1	-0.1
Class E						
All	0.2	0.1	0.0	0.1	-0.1	0.0
Enc Time[%]	99%			101%		
Dec Time[%]	98%			99%		

	Low delay			Low delay LoCo		
	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate
Class A						
Class B	0.1	-0.2	-0.3	-0.2	-0.3	-0.1
Class C	0.4	0.4	0.1	0.2	0.1	0.0
Class D	0.2	-0.2	-0.6	0.2	-0.1	-0.2
Class E	-0.2	-0.2	0.0	-0.4	-0.3	-0.2
All	0.1	0.0	-0.2	0.0	-0.1	-0.1
Enc Time[%]	100%			104%		
Dec Time[%]	98%			99%		

Simulation results (each sequence)

- Obtain coding gain for higher resolution and low complexity setting

Class	Test Sequence	Random Access	Random Access LoCo	Low Delay	Low Delay LoCo
Class A	Traffic	0.0	-0.1	-	-
	PeopleOnStreet	0.2	0.3	-	-
	Nebuta	0.0	0.2	-	-
	StremLocomotive	0.0	-0.2	-	-
Class B	Kimono	0.1	-0.2	0.0	-0.4
	ParkScene	0.1	-0.2	0.0	-0.5
	Cactus	0.2	0.1	0.2	0.0
	BasketballDrive	0.0	-0.2	0.3	0.2
	BQTerrace	0.2	-0.1	0.2	-0.3
Class C	BasketballDrill	0.0	-0.1	0.3	0.2
	BQMall	0.1	0.0	0.5	0.6
	PartyScene	0.5	0.4	0.3	-0.1
	RaceHorses	0.0	-0.1	0.5	0.1
Class D	BasketballPass	0.1	0.1	0.2	0.4
	BQSquare	1.3	1.0	0.4	0.2
	BlowingBubbles	0.2	0.1	-0.4	-0.4
	RaceHorses	0.1	0.0	0.4	0.7
Class E	Vidyo1	-	-	-0.5	-0.4
	Vidyo3	-	-	-0.1	-0.8
	Vidyo4	-	-	0.0	-0.1
Average		0.2	0.1	0.1	0.0

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4. Conclusion

Conclusion

- Proposed technique
 - Temporal predictor restriction harmonized with MV compression
- Benefit
 - Reduce access times to temporal predictor in parsing process
 - Decrease the index cost for AMVP/Merge
 - Reduce the candidates to check RD-cost on Encoder
- Simulation results
 - Overall BD-rate **loss 0.1%**
- Suggestion
 - **This proposal be adopted to HM**

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HOLDINGS

The logo graphic consists of two parallel, curved, grey swooshes that originate from the right side of the word 'HOLDINGS' and extend towards the right edge of the frame.