

JCTVC-B045

Adaptive spatial-temporal prediction of filter coefficients for in-loop filter

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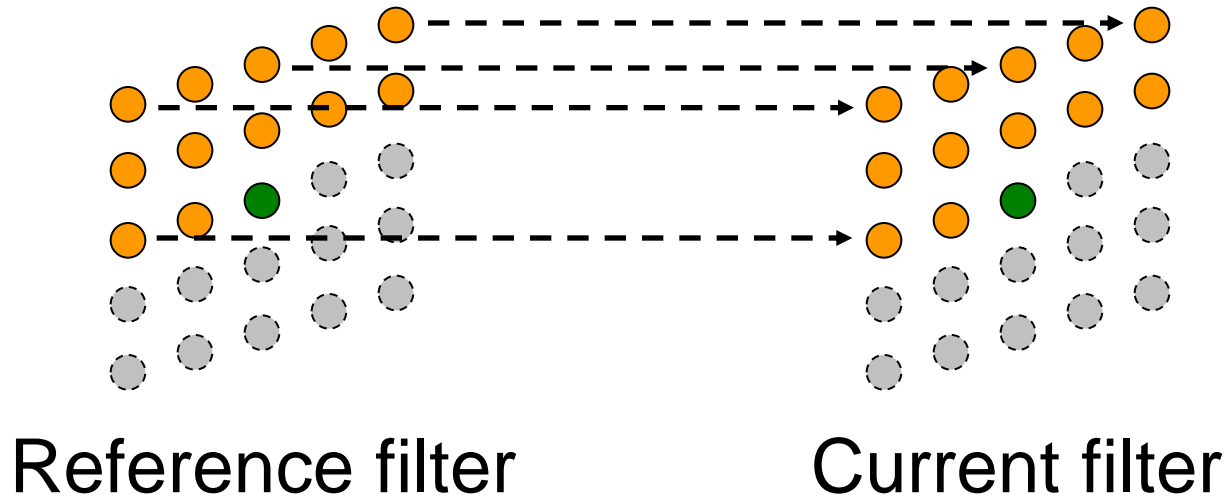
Summary

- **An improvement of coding of filter coefficients of in-loop filter**
 - Current specification of TMuC Software is spatial prediction.
- **Adaptive spatial-temporal prediction**
 - A part of our proposal, C324, at previous SG16 meeting
 - A part of our proposal, JCTVC-A117
- **Experimental results**
 - Average of 0.20% improvement from in-loop filter adhoc group common condition
 - That is about 40% bitrate reduction of filter coefficients information

Additional two predictions

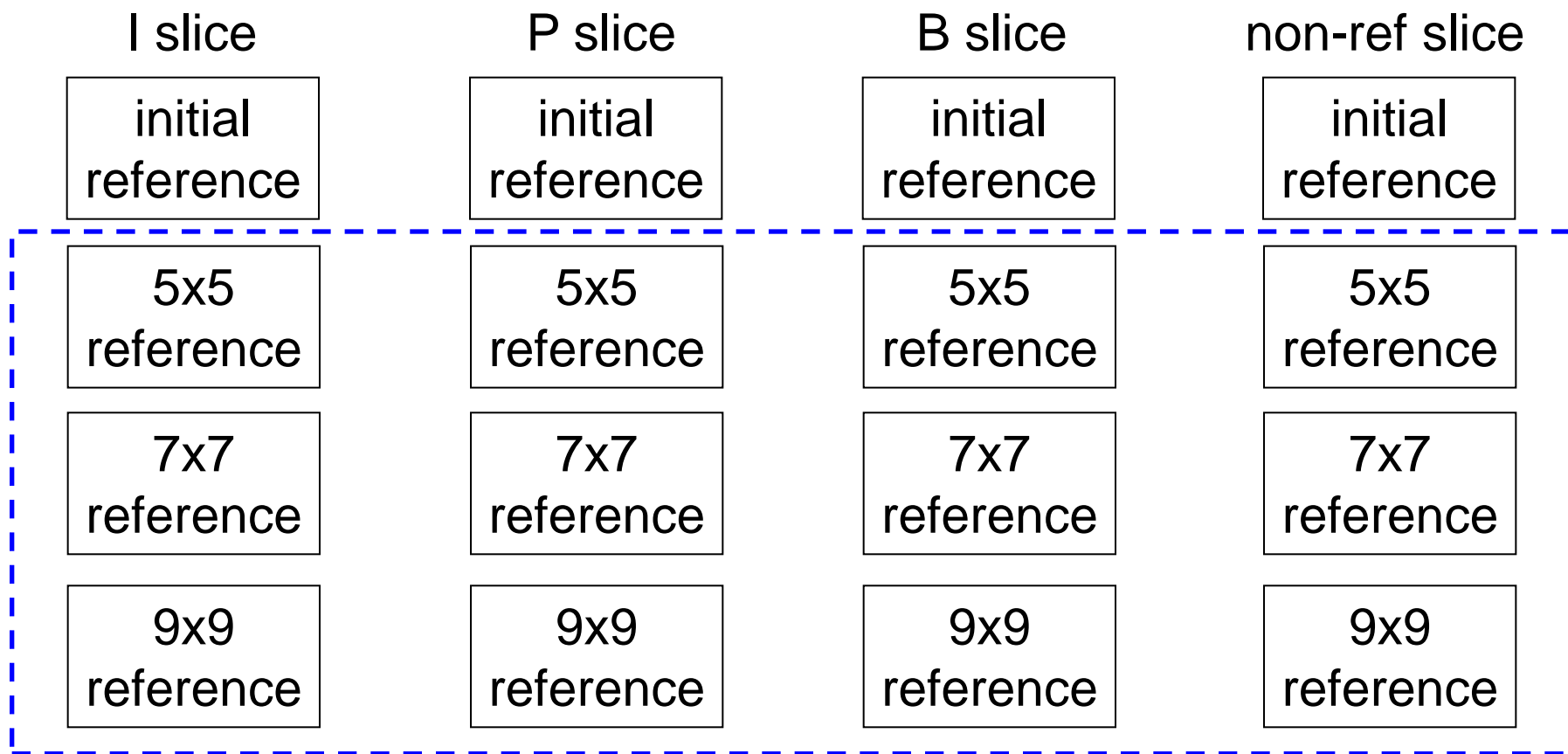
- **Current specification**
 - TMuC software: spatial prediction
 - KTA2.6r1: Temporal prediction or spatial prediction
- **Adaptive spatial-temporal prediction**
 - Spatial-temporal prediction mode
 - Switch spatial prediction and temporal prediction
 - Temporal direct prediction mode
 - Select a set of available temporal reference coefficients

Spatial-temporal prediction



- Center coefficient always uses spatial prediction
- Non-center coefficients can select direct encoding or temporal prediction

Temporal direct prediction



Select one from available references

Test Condition

- **The configurations are based on in-loop filter adhoc group condition**
 - Implementation for KTA software version 2.6
 - HP4 + MVC + MDDT + ExtMB2 + QALF + RDOQ1
- **Anchor is temporal prediction**
 - The gain of spatial prediction is average of -0.04%

Experimental results

			IBDI		IBDI off	
			CS1	CS2	CS1	CS2
A	S01	Traffic	0.18	N/A	0.07	N/A
	S02	PeopleOnStreet	2.25	N/A	-0.05	N/A
B	S03	Kimono	0.17	0.47	0.30	0.09
	S04	ParkScene	0.11	0.14	0.15	0.00
	S05	Cactus	0.08	0.17	0.08	0.33
	S06	BasketballDrive	0.16	0.06	0.39	0.23
	S07	BQTerrace	0.58	0.37	0.04	0.29
C	S08	BasketballDrill	0.24	0.06	0.24	-0.02
	S09	BQMall	-0.11	0.02	0.21	0.07
	S10	PartyScene	0.09	0.13	0.13	-0.04
	S11	RaceHorses	-0.01	0.04	0.04	0.00
D	S12	BasketballPass	0.27	0.09	0.17	0.59
	S13	BQSquare	0.86	0.37	0.83	0.12
	S14	BlowingBubbles	0.06	0.02	0.38	0.26
	S15	RaceHorses	0.48	0.47	0.48	0.48
E	S16	Vidyo1	N/A	0.41	N/A	0.37
	S17	Vidyo3	N/A	-0.07	N/A	0.56
	S18	Vidyo5	N/A	0.04	N/A	0.19

Experimental results (Summary)

	IBDI		IBDI off	
	CS1	CS2	CS1	CS2
Class A	1.22	N/A	0.01	N/A
Class B	0.22	0.24	0.19	0.19
Class C	0.10	0.06	0.16	0.00
Class D	0.42	0.24	0.47	0.36
Class E	N/A	0.13	N/A	0.37
Total	0.36	0.17	0.23	0.22

Total average is 0.20% bitrate reduction, but..

Filter coefficients information

	IBDI		IBDI off	
	CS1	CS2	CS1	CS2
Class A	37.82	N/A	36.16	N/A
Class B	37.63	26.36	32.70	32.01
Class C	43.77	41.47	39.95	43.23
Class D	54.73	50.16	52.71	47.70
Class E	N/A	27.79	N/A	25.75
Total	44.39	36.36	41.17	37.57

Average of 39.87% of filter coefficients information is reduced

Conclusion

- **Adaptive spatial-temporal prediction of filter coefficients for in-loop filter**
- **Total average of 0.20% bitrate reduction that means about 40% filter coefficients information reduction**
- **We are testing this tool on TMuC software, now.**

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