JCTVC-J0222

Improved weighted prediction parameter signaling

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Summary

- Weighted prediction of current WD7
  - At the last Geneva meeting, by removing the combined reference list scheme, the weighted prediction parameter signaling scheme is reverted to AVC spec.
  - Current WP parameter signaling scheme has still redundant representation, when there are same entries in both lists

- Proposal
  - Re-use functionality is introduced to WP parameter signaling for List 1

- Experimental results
  - For Black-fade and White-fade sequences
    - RA-Main: 0.1%/0.2%   RA-HE10: 0.2%/0.3%
    - LB-Main: 1.2%/1.5%   LB-HE10: 1.9%/2.2%
  - It's doesn't affect encoding/decoding time

Weighted prediction (WP) in WD7

● **Issue on WP parameter signaling**

Low delay B structure (M=1)

| 0 | 1 | 2 | 3 | 4 |
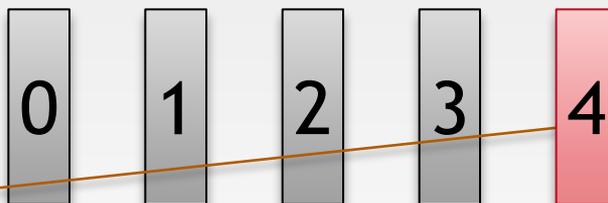
Reference pictures for List 1 are identical to reference pictures for List 0
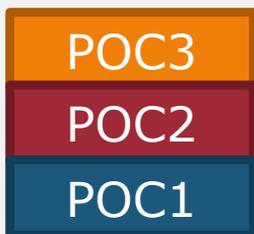
List 0	List 1
POC3	POC3
POC2	POC2
POC1	POC1
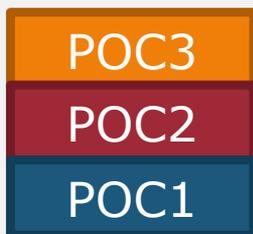
WP params for List 1 might be identical to WP params for List 0
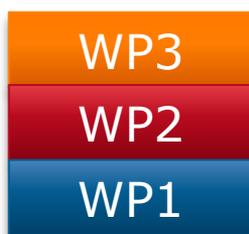
WP param for List 0	WP param for List 1
WP3	WP3
WP2	WP2
WP1	WP1

Signaling WP params twice

WP params for List 1 are reused from WP params for L0

WP param for List 0	WP param for List 1
WP3	WP3
WP2	WP2
WP1	WP1

Reuse

● Proposal

- Introducing reuse functionality of WP parameter for List 0

→The above redundant representation is removed

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Proposed pred_weight_table Syntax

pred_weight_table( ) {	Descriptor
luma_log2_weight_denom	ue(v)
if(chroma_format_idc != 0)	
delta_chroma_log2_weight_denom	se(v)
if(slice_type == P || slice_type == B)	
…	
/* WP parameter signaling for List 0 does not changed */	
…	
}	
if(slice_type == B)	
for(i = 0; i <= num_ref_idx_l1_active_minus1; i++) {	
delta_wp_param_signaling_flag	u(1)
if(delta_wp_param_signaling_flag) {	
luma_weight_l1_flag	u(1)
if(luma_weight_l1_flag) {	
delta_luma_weight_l1[i]	se(v)
luma_offset_l1[i]	se(v)
}	
if(chroma_format_idc != 0) {	
chroma_weight_l1_flag	u(1)
if(chroma_weight_l1_flag)	
for(j = 0; j < 2; j++) {	
delta_chroma_weight_l1[i][j]	se(v)
delta_chroma_offset_l1[i][j]	se(v)
}	
}	
} else {	
delta_wp_ref_idx[i]	se(v)
}	
}	
}	

If this flag is 1, conventional WP signaling for List 1 is used. Otherwise, WP parameter for List 1 is reused from WP parameter for List 0

If reuse functionality is used, the difference between the current refIdx for List 1 and the copied refIdx for List 0 is signaled.

Experimental results

Black-fade seuqnces

White-fade seuqnces

Black-fade seuqnces

	Random Access Main			Random Access HE10		
	Y	U	V	Y	U	V
Class A	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Class B	-0.1%	0.0%	0.0%	-0.1%	-0.1%	-0.1%
Class C	-0.1%	-0.1%	-0.1%	-0.2%	-0.2%	-0.2%
Class D	-0.4%	-0.4%	-0.4%	-0.7%	-0.6%	-0.6%
Class E						
Overall	-0.1%	-0.1%	-0.1%	-0.2%	-0.2%	-0.2%
Enc Time[%]	99%			100%		
Dec Time[%]	98%			99%		

	Low delay B Main			Low delay B HE10		
	Y	U	V	Y	U	V
Class A						
Class B	-0.3%	-0.3%	-0.3%	-0.5%	-0.4%	-0.4%
Class C	-0.7%	-0.6%	-0.6%	-1.0%	-0.9%	-0.9%
Class D	-2.1%	-1.9%	-2.0%	-3.3%	-3.0%	-3.0%
Class E	-2.2%	-1.9%	-1.9%	-3.8%	-3.4%	-3.4%
Overall	-1.2%	-1.1%	-1.1%	-1.9%	-1.7%	-1.7%
Enc Time[%]	100%			99%		
Dec Time[%]	99%			100%		

White-fade seuqnces

	Random Access Main			Random Access HE10		
	Y	U	V	Y	U	V
Class A	0.0%	0.0%	0.0%	-0.1%	0.0%	0.0%
Class B	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Class C	-0.2%	-0.1%	-0.1%	-0.3%	-0.2%	-0.2%
Class D	-0.5%	-0.5%	-0.5%	-0.8%	-0.8%	-0.8%
Class E						
Overall	-0.2%	-0.2%	-0.2%	-0.3%	-0.3%	-0.3%
Enc Time[%]	100%			100%		
Dec Time[%]	97%			99%		

	Low delay B Main			Low delay B HE10		
	Y	U	V	Y	U	V
Class A						
Class B	-0.4%	-0.3%	-0.3%	-0.6%	-0.5%	-0.5%
Class C	-0.8%	-0.8%	-0.8%	-1.2%	-1.1%	-1.1%
Class D	-2.7%	-2.4%	-2.5%	-3.8%	-3.4%	-3.5%
Class E	-2.9%	-2.4%	-2.5%	-4.3%	-3.9%	-4.0%
Overall	-1.5%	-1.4%	-1.4%	-2.2%	-2.0%	-2.1%
Enc Time[%]	100%			100%		
Dec Time[%]	97%			100%		

- RA-Main: 0.1%/0.2%   RA-HE10: 0.2%/0.3%
- LB-Main: 1.2%/1.5%   LB-HE10: 1.9%/2.2%

- It's doesn't affect encoding/decoding time

Conclusion

- Proposal
  - Introduce a re-use functionality from WP parameter for List 0
  - For Black-fade and White-fade sequences
    - RA-Main: 0.1%/0.2%   RA-HE10: 0.2%/0.3%
    - LB-Main: 1.2%/1.5%   LB-HE10: 1.9%/2.2%
  - It's doesn't affect encoding/decoding time

- Suggestion;
  - This scheme is adopted to the next version of HEVC WD and software.