HIGH LEVEL BITSTREAM SYNTAX FOR QUANTIZATION PARAMETERS

CROSS REFERENCE TO RELATED APPLICATIONS

[001] This application is based on International Patent Application No. PCT/CN2021/080183, filed on March 11, 2021, which claims the priority to and benefits of International Patent Application No. PCT/CN2020/078770, filed on March 11, 2020. All the aforementioned patent applications are hereby incorporated by reference in their entireties.

TECHNICAL FIELD

[002] This patent document relates to image and video coding and decoding.

BACKGROUND

[003] Digital video accounts for the largest bandwidth use on the internet and other digital communication networks. As the number of connected user devices capable of receiving and displaying video increases, it is expected that the bandwidth demand for digital video usage will continue to grow.

SUMMARY

[004] The present document discloses techniques that can be used by video encoders and decoders for processing coded representation of video using control information useful for decoding of the coded representation.

[005] In one example aspect, a video processing method is disclosed. The method includes performing a conversion between a video comprising a video unit and a bitstream of the video according to a rule, wherein the rule specifies whether or how to include, in an adaptation parameter set (APS), information related to a scaling list of the video is based on a first syntax element that indicates whether the APS includes chroma component related syntax elements and is independent of one or more syntax elements in a sequence parameter set (SPS).

[006] In another example aspect, a video processing method is disclosed. The method includes performing a conversion between a video and a bitstream of the video according to a rule, wherein the rule specifies that a syntax element is included in an adaptation parameter set (APS), and

CLAIMS

1. A method of processing video data, comprising:

performing a conversion between a video comprising blocks and a bitstream of the video according to a rule,

wherein the rule specifies that a first syntax element indicating whether a usage of quantization parameter (QP) difference values of coding unit (CU) level is enabled is included in a picture parameter set (PPS) and the first syntax element is used to control:

whether a second syntax element that indicates an absolute value of a difference value between a QP value of a current CU and a prediction QP value and/or a third syntax element that indicates a sign of the difference value between the QP value of the current CU and the prediction QP value are present in one or both of a transform unit syntax and a palette coding syntax.

2. The method of claim 1, wherein the rule specifies that the first syntax element indicates (1) whether a fourth syntax element indicating a first maximum splitting related value of CUs in an intra slice that conveys the second syntax element and the third syntax element and a fifth syntax element indicating a second maximum splitting related value of CUs in an inter slice that conveys the second syntax element and the third syntax element are present in one or more picture headers (PHs) referring to the PPS and (2) whether the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax.

3. The method of claim 2,

wherein the rule specifies that when a value of the first syntax element is equal to 1, the fourth syntax element and the fifth syntax element are present in the one or more PHs referring to the PPS, and the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax, and

wherein the rule specifies that when the value of the first syntax element is equal to 0, the fourth syntax element and the fifth syntax element are not present in the one or more PHs referring to the

PPS, and the second syntax element and the third syntax element are not present in the transform unit syntax and the palette coding syntax.

4. The method of claim 2 or 3, wherein the first syntax element is pps_cu_qp_delta_enabled_flag, the fourth syntax element is ph_cu_qp_delta_subdiv_intra_slice, the fifth syntax element is ph_cu_qp_delta_subdiv_inter_slice, and a PH syntax structure of the one or more PHs is as follows:

picture_header_structure( ) {	**Descriptor**
…	
if(ph_intra_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_intra_slice	ue(v)
…	
if(ph_inter_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_inter_slice	ue(v).
…	

5. The method of any of claims 1-4, wherein the rule specifies that responsive to a value of a sixth syntax element included in the PPS indicating that each subpicture of a video picture referring to the PPS includes one and only one rectangular slice, a value of a seventh syntax element included in the PPS is inferred to be equal to a value of an eighth syntax element included in a sequence parameter set (SPS), wherein the value of the seventh syntax element plus 1 indicating a number of rectangular slices in each video picture referring to the PPS and the value of the eighth syntax element plus 1 indicating a number of subpictures in each video picture referring to the SPS.

6. The method of any of claims 1-5, wherein the rule specifies that a first set of conformance cropping window offset parameters are excluded from the PPS in response to:

a width of each video picture referring to the PPS in units of luma samples being equal to a maximum width indicated in a sequence parameter set (SPS) in units of luma samples referred to by each video picture, and

a height of each video picture referring to the PPS in units of luma samples being equal to a maximum height indicated in the SPS in units of luma samples.

7. The method of claim 6, wherein the rule specifies that in response to a ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS being equal to 0, the width of each video picture referring to the PPS is equal to the maximum width indicated in the SPS, and the height of each video picture referring to the PPS is equal to the maximum height indicated in the SPS, and

wherein the first set of conformance cropping window offset parameters are inferred to be equal to a second set of conformance cropping window offset parameters included in the SPS, wherein the second set of conformance cropping window offset parameters include one or more additional syntax elements.

8. The method of any of claims 1-7,

wherein the rule specifies that a ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS is equal to 0 and present in the PPS in response to:

a width of each video picture referring to the PPS in units of luma samples being equal to a maximum width indicated in a sequence parameter set (SPS) in units of luma samples referred to by each video picture, and

a height of each video picture referring to the PPS in units of luma samples being equal to a maximum height indicated in the SPS in units of luma samples, and

wherein the ninth syntax element equal to 0 specifies that the conformance cropping window offset parameters are not present in the PPS.

9. The method of any of claims 1-8, wherein the performing the conversion comprises encoding the video into the bitstream.

10. The method of any of claims 1-8, wherein the performing the conversion comprises decoding the video from the bitstream.

11. An apparatus for processing video data comprising a processor and a non-transitory memory with instructions thereon, wherein the instructions upon execution by the processor, cause the processor to:

perform a conversion between a video comprising blocks and a bitstream of the video according to a rule,

wherein the rule specifies that a first syntax element indicating whether a usage of quantization parameter (QP) difference values of coding unit (CU) level is enabled is included in a picture parameter set (PPS) and the first syntax element is used to control:

whether a second syntax element that indicates an absolute value of a difference value between a QP value of a current CU and a prediction QP value and/or a third syntax element that indicates a sign of the difference value between the QP value of the current CU and the prediction QP value are present in one or both of a transform unit syntax and a palette coding syntax.

12. The apparatus of claim 11, wherein the rule specifies that the first syntax element indicates (1) whether a fourth syntax element indicating a first maximum splitting related value of CUs in an intra slice that conveys the second syntax element and the third syntax element and a fifth syntax element indicating a second maximum splitting related value of CUs in an inter slice that conveys the second syntax element and the third syntax element are present in one or more picture headers (PHs) referring to the PPS and (2) whether the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax;

wherein the rule specifies that when a value of the first syntax element is equal to 1, the fourth syntax element and the fifth syntax element are present in the one or more PHs referring to the PPS, and the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax;

wherein the rule specifies that when the value of the first syntax element is equal to 0, the fourth syntax element and the fifth syntax element are not present in the one or more PHs referring

to the PPS, and the second syntax element and the third syntax element are not present in the transform unit syntax and the palette coding syntax; and

wherein the first syntax element is pps_cu_qp_delta_enabled_flag, the fourth syntax element is ph_cu_qp_delta_subdiv_intra_slice, the fifth syntax element is ph_cu_qp_delta_subdiv_inter_slice, and a PH syntax structure of the one or more PHs is as follows:

picture_header_structure( ) {	**Descriptor**
…	
if(ph_intra_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_intra_slice	ue(v)
…	
if(ph_inter_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_inter_slice	ue(v).
…	

13. The apparatus of claim 11 or 12, wherein the rule specifies that responsive to a value of a sixth syntax element included in the PPS indicating that each subpicture of a video picture referring to the PPS includes one and only one rectangular slice, a value of a seventh syntax element included in the PPS is inferred to be equal to a value of an eighth syntax element included in a sequence parameter set (SPS), wherein the value of the seventh syntax element plus 1 indicating a number of rectangular slices in each video picture referring to the PPS and the value of the eighth syntax element plus 1 indicating a number of subpictures in each video picture referring to the SPS.

14. The apparatus of any of claims 11-13, wherein the rule specifies that a first set of conformance cropping window offset parameters are excluded from the PPS in response to: a width of each video picture referring to the PPS in units of luma samples being equal to a maximum

width indicated in a sequence parameter set (SPS) in units of luma samples referred to by each video picture, and a height of each video picture referring to the PPS in units of luma samples being equal to a maximum height indicated in the SPS in units of luma samples;

wherein the rule specifies that in response to a ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS being equal to 0, the width of each video picture referring to the PPS is equal to the maximum width indicated in the SPS, and the height of each video picture referring to the PPS is equal to the maximum height indicated in the SPS;

wherein the first set of conformance cropping window offset parameters are inferred to be equal to a second set of conformance cropping window offset parameters included in the SPS, wherein the second set of conformance cropping window offset parameters include one or more additional syntax elements;

wherein the rule specifies that the ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS is equal to 0 and present in the PPS in response to:

the width of each video picture referring to the PPS in units of luma samples being equal to the maximum width indicated in the SPS in units of luma samples referred to by each video picture, and

the height of each video picture referring to the PPS in units of luma samples being equal to the maximum height indicated in the SPS in units of luma samples, and

wherein the ninth syntax element equal to 0 specifies that the conformance cropping window offset parameters are not present in the PPS.

15. A non-transitory computer-readable storage medium storing instructions that cause a processor to:

perform a conversion between a video comprising blocks and a bitstream of the video according to a rule,

wherein the rule specifies that a first syntax element indicating whether a usage of quantization parameter (QP) difference values of coding unit (CU) level is enabled is included in a picture parameter set (PPS) and the first syntax element is used to control:

whether a second syntax element that indicates an absolute value of a difference value between a QP value of a current CU and a prediction QP value and/or a third syntax element that indicates a sign of the difference value between the QP value of the current CU and the prediction QP value are present in one or both of a transform unit syntax and a palette coding syntax.

16. The non-transitory computer-readable storage medium of claim 15, wherein the rule specifies that the first syntax element indicates (1) whether a fourth syntax element indicating a first maximum splitting related value of CUs in an intra slice that conveys the second syntax element and the third syntax element and a fifth syntax element indicating a second maximum splitting related value of CUs in an inter slice that conveys the second syntax element and the third syntax element are present in one or more picture headers (PHs) referring to the PPS and (2) whether the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax;

wherein the rule specifies that when a value of the first syntax element is equal to 1, the fourth syntax element and the fifth syntax element are present in the one or more PHs referring to the PPS, and the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax;

wherein the rule specifies that when the value of the first syntax element is equal to 0, the fourth syntax element and the fifth syntax element are not present in the one or more PHs referring to the PPS, and the second syntax element and the third syntax element are not present in the transform unit syntax and the palette coding syntax; and

wherein the first syntax element is pps_cu_qp_delta_enabled_flag, the fourth syntax element is ph_cu_qp_delta_subdiv_intra_slice, the fifth syntax element is ph_cu_qp_delta_subdiv_inter_slice, and a PH syntax structure of the one or more PHs is as follows:

picture_header_structure( ) {	**Descriptor**
…	
if(ph_intra_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	

ph_cu_qp_delta_subdiv_intra_slice	ue(v)
…	
if(ph_inter_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_inter_slice	ue(v).
…	

17. The non-transitory computer-readable storage medium of claim 15 or 16, wherein the rule specifies that responsive to a value of a sixth syntax element included in the PPS indicating that each subpicture of a video picture referring to the PPS includes one and only one rectangular slice, a value of a seventh syntax element included in the PPS is inferred to be equal to a value of an eighth syntax element included in a sequence parameter set (SPS), wherein the value of the seventh syntax element plus 1 indicating a number of rectangular slices in each video picture referring to the PPS and the value of the eighth syntax element plus 1 indicating a number of subpictures in each video picture referring to the SPS;

wherein the rule specifies that a first set of conformance cropping window offset parameters are excluded from the PPS in response to: a width of each video picture referring to the PPS in units of luma samples being equal to a maximum width indicated in the SPS in units of luma samples referred to by each video picture, and a height of each video picture referring to the PPS in units of luma samples being equal to a maximum height indicated in the SPS in units of luma samples;

wherein the rule specifies that in response to a ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS being equal to 0, the width of each video picture referring to the PPS is equal to the maximum width indicated in the SPS, and the height of each video picture referring to the PPS is equal to the maximum height indicated in the SPS;

wherein the first set of conformance cropping window offset parameters are inferred to be equal to a second set of conformance cropping window offset parameters included in the SPS,

wherein the second set of conformance cropping window offset parameters include one or more additional syntax elements;

wherein the rule specifies that the ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS is equal to 0 and present in the PPS in response to:

the width of each video picture referring to the PPS in units of luma samples being equal to the maximum width indicated in the SPS in units of luma samples referred to by each video picture, and

the height of each video picture referring to the PPS in units of luma samples being equal to the maximum height indicated in the SPS in units of luma samples, and

wherein the ninth syntax element equal to 0 specifies that the conformance cropping window offset parameters are not present in the PPS.

18. A non-transitory computer-readable recording medium storing a bitstream of a video which is generated by a method performed by a video processing apparatus, wherein the method comprises:

generating the bitstream of the video which comprises blocks according to a rule,

wherein the rule specifies that a first syntax element indicating whether a usage of quantization parameter (QP) difference values of coding unit (CU) level is enabled is included in a picture parameter set (PPS) and the first syntax element is used to control:

whether a second syntax element that indicates an absolute value of a difference value between a QP value of a current CU and a prediction QP value and/or a third syntax element that indicates a sign of the difference value between the QP value of the current CU and the prediction QP value are present in one or both of a transform unit syntax and a palette coding syntax.

19. The non-transitory computer-readable recording medium of claim 18, wherein the rule specifies that the first syntax element indicates (1) whether a fourth syntax element indicating a first maximum splitting related value of CUs in an intra slice that conveys the second syntax element and the third syntax element and a fifth syntax element indicating a second maximum splitting related value of CUs in an inter slice that conveys the second syntax element and the third

syntax element are present in one or more picture headers (PHs) referring to the PPS and (2) whether the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax;

wherein the rule specifies that when a value of the first syntax element is equal to 1, the fourth syntax element and the fifth syntax element are present in the one or more PHs referring to the PPS, and the second syntax element and the third syntax element are allowed to be present in the transform unit syntax and the palette coding syntax;

wherein the rule specifies that when the value of the first syntax element is equal to 0, the fourth syntax element and the fifth syntax element are not present in the one or more PHs referring to the PPS, and the second syntax element and the third syntax element are not present in the transform unit syntax and the palette coding syntax; and

wherein the first syntax element is pps_cu_qp_delta_enabled_flag, the fourth syntax element is ph_cu_qp_delta_subdiv_intra_slice, the fifth syntax element is ph_cu_qp_delta_subdiv_inter_slice, and a PH syntax structure of the one or more PHs is as follows:

picture_header_structure( ) {	**Descriptor**
…	
if(ph_intra_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_intra_slice	ue(v)
…	
if(ph_inter_slice_allowed_flag) {	
…	
if(pps_cu_qp_delta_enabled_flag)	
ph_cu_qp_delta_subdiv_inter_slice	ue(v).
…	

20. The non-transitory computer-readable recording medium of claim 18 or 19, wherein the rule specifies that responsive to a value of a sixth syntax element included in the PPS indicating that

each subpicture of a video picture referring to the PPS includes one and only one rectangular slice, a value of a seventh syntax element included in the PPS is inferred to be equal to a value of an eighth syntax element included in a sequence parameter set (SPS), wherein the value of the seventh syntax element plus 1 indicating a number of rectangular slices in each video picture referring to the PPS and the value of the eighth syntax element plus 1 indicating a number of subpictures in each video picture referring to the SPS;

wherein the rule specifies that a first set of conformance cropping window offset parameters are excluded from the PPS in response to: a width of each video picture referring to the PPS in units of luma samples being equal to a maximum width indicated in the SPS in units of luma samples referred to by each video picture, and a height of each video picture referring to the PPS in units of luma samples being equal to a maximum height indicated in the SPS in units of luma samples;

wherein the rule specifies that in response to a ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS being equal to 0, the width of each video picture referring to the PPS is equal to the maximum width indicated in the SPS, and the height of each video picture referring to the PPS is equal to the maximum height indicated in the SPS;

wherein the first set of conformance cropping window offset parameters are inferred to be equal to a second set of conformance cropping window offset parameters included in the SPS, wherein the second set of conformance cropping window offset parameters include one or more additional syntax elements;

wherein the rule specifies that the ninth syntax element specifying whether conformance cropping window offset parameters are present in the PPS is equal to 0 and present in the PPS in response to:

the width of each video picture referring to the PPS in units of luma samples being equal to the maximum width indicated in the SPS in units of luma samples referred to by each video picture, and

the height of each video picture referring to the PPS in units of luma samples being equal to the maximum height indicated in the SPS in units of luma samples, and

wherein the ninth syntax element equal to 0 specifies that the conformance cropping window offset parameters are not present in the PPS.