USING VIDEO PARAMETER SET IN VIDEO CODING

CROSS REFERENCE TO RELATED APPLICATIONS

[001] This application is a national phase of International Application No. PCT/US2021/022547, filed on March 16, 2021, which ~~Under the applicable patent law and/or rules pursuant to the Paris Convention, this application is made to timely~~ claims the priority to and benefits of U.S. Provisional Patent Application No. 62/990,749, filed on March 17, 2020. For all purposes under the law, the entire disclosures of the aforementioned applications ~~is~~ are incorporated by reference as part of the disclosure of this application.

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 having one or more video layers comprising one or more video pictures and a coded representation of the video; wherein the coded representation includes a video parameter set that indicates a maximum value of a chroma format indicator and/or a maximum value of bit depth used to represent pixels of the video.

[006] In another example aspect, another video processing method is disclosed. The method includes performing a conversion between a video having one or more video layers and a coded representation of the video, wherein the coded representation conforms to a format rule that specifies that a maximum picture width and/or a maximum picture height for video pictures of all

CLAIMS

1. A method of video processing, comprising:

performing a conversion between a video and a bitstream of the video according to a format rule, wherein the bitstream includes one or more output layer sets (OLSs), each OLS comprising one or more coded layer video sequences, and

wherein the format rule specifies that a video parameter set indicates, for each of the one or more OLSs, a greatest allowed value of a chroma format indicator and/or a greatest allowed value of a bit depth used to represent pixels of the video.

2. The method of claim 1, wherein the greatest allowed value of the chroma format indicator for an OLS is applicable to all sequence parameter sets that are referred to by the one or more coded layer video sequences in the OLS.

3. The method of claim 1 or 2, wherein the greatest allowed value of the bit depth for an OLS is applicable to all sequence parameter sets that are referred to by the one or more coded layer video sequences in the OLS.

4. The method of any of claims 1 to 3, wherein, for performing the conversion for an OLS containing more than one coded layer video sequence and having an OLS index, i, the rule specifies to allocate memory for a decoded picture buffer according to values of at least one of syntax elements that include ols_dpb_pic_width[i] indicating a width of each picture storage buffer for an i-th OLS, ols_dpb_pic_height[i] indicating a height of each picture storage buffer for the i-th OLS, a syntax element indicating the greatest allowed value of the chroma format indicator for the i-th OLS, and a syntax element indicating the greatest allowed value of a bit depth for the i-th OLS.

5. The method of any of claims 1 to 4, wherein the video parameter set is included in the bitstream.

1. A method of video processing, comprising:

performing a conversion between a video having one or more video layers and a bitstream of the video according to a format rule, and

wherein the format rule specifies that a maximum picture width and/or a maximum picture height for video pictures of at least one layer control a value of a variable that indicates whether pictures in a decoded picture buffer prior to a current picture in decoding order in the bitstream are output before the pictures being removed from the decoded picture buffer.

2. The method of claim 1, wherein the maximum picture width and/or the maximum picture height are included in a video parameter set.

3. The method of claim 1 or 2, wherein the value of the variable is set to 1 in case that a value of the maximum width of each picture, the maximum height of each picture, a greatest allowed value of a chroma format indicator, or a greatest allowed value of a bit depth that is derived for a current access unit is different from a value of the maximum width of each picture, the maximum height of each picture, a greatest allowed value of a chroma format indicator or a greatest allowed value of a bit depth that is derived for a preceding access unit in decoding order; wherein the value of the variable being equal to 1 indicates pictures in the decoded picture buffer prior to the current picture in decoding order are not output before the pictures being removed from the decoded picture buffer.

4. The method of any one of claims 1 to 3, wherein the value of the variable is further based on a greatest allowed value of a chroma format indicator and/or a greatest allowed value of a bit depth used to represent pixels of the video.

5. The method of claim 4, wherein the greatest allowed value of the chroma format indicator and/or the greatest allowed value of a bit depth used to represent pixels of the video are included in a video parameter set.

6. The method of any of claims 1 to 4, wherein the video parameter set is indicated separately from the bitstream.

7. A method of video processing, comprising:

performing a conversion between a video having one or more video layers and a bitstream of the video according to a format rule, and

wherein the format rule specifies that a maximum picture width and/or a maximum picture height for video pictures of all video layers controls a value of a variable that indicates whether pictures in a decoded picture buffer prior to a current picture in decoding order in the bitstream are output before the pictures are removed from the decoded picture buffer.

8. The method of claim 7, wherein the variable is derived based at least on one or more syntax elements included in a video parameter set.

9. The method of claim 7, wherein the value of the variable is set to 1 in case that a value of a maximum width of each picture, a maximum height of each picture, a greatest allowed value of a chroma format indicator, or a greatest allowed value of a bit depth that is derived for a current access unit is different from a value of a maximum width of each picture, a maximum height of each picture, a greatest allowed value of a chroma format indicator or a greatest allowed value of a bit depth that is derived for a preceding access unit in decoding order.

10. The method of claim 9, wherein the value of the variable being equal to 1 indicates pictures in a decoded picture buffer prior to a current picture in decoding order are not output before the pictures are removed from the decoded picture buffer.

11. The method of any of claims 7 to 10, wherein the value of the variable is further based on a greatest allowed value of a chroma format indicator and/or a greatest allowed value of a bit depth used to represent pixels of the video.

12. The method of any of claims 7 to 11, wherein the video parameter set is included in the bitstream.

6. The method of claim 4, wherein the greatest allowed value of the chroma format indicator for a layer is applicable to all sequence parameter sets that are referred to by one or more layer video sequences in the layer.

7. The method of claim 4, wherein, for performing the conversion for an layer containing more than one coded layer video sequence and having an layer index i, the rule specifies to allocate memory for a decoded picture buffer according to values of at least one of syntax elements that include ols_dpb_pic_width[i] indicating a width of each picture storage buffer for an i-th layer, ols_dpb_pic_height[i] indicating a height of each picture storage buffer for the i-th layer, a syntax element indicating the greatest allowed value of the chroma format indicator for the i-th layer, and a syntax element indicating the greatest allowed value of a bit depth for the i-th layer.

8. The method of any one of claims 1 to 7, wherein the conversion includes encoding the video into the bitstream.

9. The method of any one of claims 1 to 7, wherein the conversion includes decoding the video from the bitstream.

10. 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 having one or more video layers and a bitstream of the video according to a format rule, and

wherein the format rule specifies that a maximum picture width and/or a maximum picture height for video pictures of at least one layer control a value of a variable that indicates whether pictures in a decoded picture buffer prior to a current picture in decoding order in the bitstream are output before the pictures being removed from the decoded picture buffer.

11. The apparatus of claim 10, wherein the maximum picture width and/or the maximum picture height are included in a video parameter set.

13. The method of any of claims 7 to 11, wherein the video parameter set is indicated separately from the bitstream.

14. A method of video processing, comprising:

performing a conversion between a video having one or more video layers and a bitstream of the video according to a format rule, and

wherein the format rule specifies that a greatest allowed value of a chroma format indicator and/or a greatest allowed value of a bit depth used to represent pixels of the video control a value of a variable that indicates whether pictures in a decoded picture buffer prior to a current picture in decoding order in the bitstream are output before the pictures are removed from the decoded picture buffer.

15. The method of claim 14, wherein the variable is derived based at least on one or more syntax elements signaled in a video parameter set.

16. The method of claim 14, wherein the value of the variable is set to 1 in case that a value of a maximum width of each picture, a maximum height of each picture, a greatest allowed value of a chroma format indicator or a greatest allowed value of a bit depth that is derived for a current access unit is different from a value of a maximum width of each picture, a maximum height of each picture, a greatest allowed value of a chroma format indicator or a greatest allowed value of a bit depth that is derived for a preceding access unit in decoding order.

17. The method of claim 16, wherein the value of the variable being equal to 1 indicates pictures in a decoded picture buffer prior to a current picture in decoding order are not output before the pictures are removed from the decoded picture buffer.

18. The method of any of claims 14 to 17, wherein the value of the variable is further based on a maximum picture width and/or a maximum picture height for video pictures of all video layers.

12. The apparatus of claim 10 or 11, wherein the value of the variable is set to 1 in case that a value of the maximum width of each picture, the maximum height of each picture, a greatest allowed value of a chroma format indicator, or a greatest allowed value of a bit depth that is derived for a current access unit is different from a value of the maximum width of each picture, the maximum height of each picture, a greatest allowed value of a chroma format indicator or a greatest allowed value of a bit depth that is derived for a preceding access unit in decoding order; wherein the value of the variable being equal to 1 indicates pictures in the decoded picture buffer prior to the current picture in decoding order are not output before the pictures being removed from the decoded picture buffer.

13. The apparatus of any one of claims 10 to 12, wherein the value of the variable is further based on a greatest allowed value of a chroma format indicator and/or a greatest allowed value of a bit depth used to represent pixels of the video.

14. The apparatus of claim 13, wherein the greatest allowed value of the chroma format indicator and/or the greatest allowed value of a bit depth used to represent pixels of the video are included in a video parameter set.

15. The apparatus of claim 13, wherein the greatest allowed value of the chroma format indicator for a layer is applicable to all sequence parameter sets that are referred to by one or more layer video sequences in the layer.

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

perform a conversion between a video having one or more video layers and a bitstream of the video according to a format rule, and

wherein the format rule specifies that a maximum picture width and/or a maximum picture height for video pictures of at least one layer control a value of a variable that indicates whether pictures in a decoded picture buffer prior to a current picture in decoding order in the bitstream are output before the pictures being removed from the decoded picture buffer.

19. The method of any of claims 14 to 18, wherein the video parameter set is included in the bitstream.

20. The method of any of claims 14 to 18, wherein the video parameter set is indicated separately from the bitstream.

21. A method of video processing, comprising:

performing a conversion between a video having one or more video layers and a bitstream of the video according to a rule, and

wherein the rule specifies that a value of a variable that indicates whether pictures in a decoded picture buffer prior to a current picture in decoding order in the bitstream are output before the pictures are removed from the decoded picture buffer is independent of whether separate color planes are used for encoding the video.

22. The method of claim 21, wherein, in case that separate color planes are not used for encoding the video, the rule specifies that decoding is performed only once for a video picture or, in case that separate color planes are used for encoding the video, the rule specifies that picture decoding is invoked three times.

23. The method of any of claims 1 to 22, wherein the conversion includes encoding the video into the bitstream.

24. The method of any of claims 1 to 22, wherein the conversion includes decoding the video from the bitstream.

25. The method of claims 1 to 22, wherein the conversion includes generating the bitstream from the video, and the method further comprises: storing the bitstream in a non-transitory computer-readable recording medium.

26. A video processing apparatus comprising a processor configured to implement a method recited in any one or more of claims 1 to 25.

17. The medium of claim 16, wherein the maximum picture width and/or the maximum picture height are included in a video parameter set.

18. The medium of claim 16 or 17, wherein the value of the variable is set to 1 in case that a value of the maximum width of each picture, the maximum height of each picture, a greatest allowed value of a chroma format indicator, or a greatest allowed value of a bit depth that is derived for a current access unit is different from a value of the maximum width of each picture, the maximum height of each picture, a greatest allowed value of a chroma format indicator or a greatest allowed value of a bit depth that is derived for a preceding access unit in decoding order; wherein the value of the variable being equal to 1 indicates pictures in the decoded picture buffer prior to the current picture in decoding order are not output before the pictures being removed from the decoded picture buffer.

19. The medium of any one of claims 16 to 18, wherein the value of the variable is further based on a greatest allowed value of a chroma format indicator and/or a greatest allowed value of a bit depth used to represent pixels of the video.

20. 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 having one or more video layers and a bitstream of the video according to a format rule, and

wherein the format rule specifies that a maximum picture width and/or a maximum picture height for video pictures of at least one layer control a value of a variable that indicates whether pictures in a decoded picture buffer prior to a current picture in decoding order in the bitstream are output before the pictures being removed from the decoded picture buffer.

27. A method of storing a bitstream of a video, comprising, a method recited in any one of claims 1 to 25, and further including storing the bitstream to a non-transitory computer-readable recording medium.

28. A computer readable medium storing program code that, when executed, causes a processor to implement a method recited in any one or more of claims 1 to 25.

29. A computer readable medium that stores a bitstream generated according to any of the above described methods.

30. A video processing apparatus for storing a bitstream representation, wherein the video processing apparatus is configured to implement a method recited in any one or more of claims 1 to 25.