CONSTRAINTS ON REFERENCE PICTURE LISTS FOR SUBPICTURES

CROSS REFERENCE TO RELATED APPLICATIONS

[001] This application is based on International Patent Application No. PCT/US2021/022990 filed on March 18, 2021, which claims the priority to and benefits of U.S. Provisional Patent Application No. 62/992,724, filed on March 20, 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 various rules of syntax.

[005] In one example aspect, a video processing method is disclosed. The method includes performing a conversion between a video comprising one or more pictures comprising one or more subpictures and a bitstream of the video, wherein the bitstream conforms to a format rule that specifies a syntax of network abstraction layer (NAL) units in the bitstream, and wherein the format rule specifies that a NAL unit of a video coding layer (VCL) NAL unit type includes a content associated with a particular type of picture or a particular type of subpicture.

[006] In another example aspect, a video processing method is disclosed. The method includes performing a conversion between a video comprising a picture comprising a subpicture and a bitstream of the video, wherein the bitstream conforms to a format rule, and wherein the format rule specifies that the subpicture is a random access type of subpicture in response to the subpicture being a leading subpicture of an intra random access point subpicture.

CLAIMS

1. A method of video processing, comprising:

performing a conversion between a video comprising a current picture comprising a current subpicture comprising a current slice and a bitstream of the video,

wherein the bitstream conforms to a first format rule that disallows an active entry in a reference picture list of the current slice from including a first picture that precedes in a decoding order a second picture that includes a step-wise temporal sublayer access subpicture when:

(a) the first picture has a same temporal identifier and a same layer identifier of a network abstraction layer (NAL) unit as that of the current subpicture, and

(b) the current subpicture follows in the decoding order the step-wise temporal sublayer access subpicture, and

(c) the current subpicture and the step-wise temporal sublayer access subpicture have the same temporal identifier, the same layer identifier, and a same subpicture index.

2. The method of claim 1, wherein the reference picture list includes a List 0 reference picture list.

3. The method of claim 1 or 2, wherein the reference picture list includes a List 1 reference picture list.

4. The method of any one of claims 1-3, wherein the bitstream further conforms to a second format rule that disallows an active entry in the reference picture list of the current slice from including a third picture that is generated by a decoding process for generating unavailable reference pictures for a clean random access picture containing a clean random access subpicture associated with the current subpicture when:

the current subpicture is not a random access skipped leading subpicture associated with the clean random access subpicture in the clean random access picture with a value of a flag that indicates no output before recovery equal to 1.

5. The method of any one of claims 1-4, wherein the bitstream further conforms to a third format rule that disallows an active entry in the reference picture list of the current slice from including a fourth picture when a set of conditions related to the current picture are satisfied,

wherein the fourth picture is generated by a decoding process for generating unavailable reference pictures for an intra random access point picture containing an intra random access point subpicture associated with the current subpicture, or for a gradual decoding refresh picture containing a gradual decoding refresh subpicture associated with the current subpicture.

6. The method of claim 5, wherein the set of conditions comprises that the current picture is not a clean random access subpicture in a clean random access picture with a value of a flag that indicates no output before recovery equal to 1.

7. The method of claim 5 or 6, wherein the set of conditions further comprises that the current subpicture is not a subpicture that associated with a clean random access subpicture of a clean random access picture with a value of a flag that indicates no output before recovery equal to 1,

wherein the clean random access picture precedes, in a decoding order, one or more leading pictures associated with the clean random access picture.

8. The method of any one of claims 5-7, wherein the set of conditions further comprises that the current subpicture is not a leading subpicture associated with a clean random access subpicture in a clean random access picture with a value of a flag that indicates no output before recovery equal to 1.

9. The method of any one of claims 5-8, wherein the set of conditions further comprises that the current subpicture is not a gradual decoding refresh subpicture in a gradual decoding refresh picture with a value of a flag that indicates no output before recovery equal to 1.

10. The method of any one of claims 5-9, wherein the set of conditions further comprises that the current subpicture is not a subpicture in a recovering picture of a gradual decoding refresh

picture with a value of a flag that indicates no output before recovery equal to 1, and with a same layer identifier of a NAL unit as that of the current subpicture.

11. The method of any one of claims 1-10, wherein the bitstream further conforms to a fourth format rule that disallows an active entry in a reference picture list of the current slice from including a fifth picture that precedes in a first order or a second order the picture containing an intra random access point subpicture when the current subpicture follows the intra random access point subpicture in the first order and the second order, and

wherein the intra random access point subpicture has a same layer identifier and a same subpicture index as that of the current subpicture.

12. The method of any one of claims 1-11, wherein the conversion includes encoding the video into the bitstream.

13. The method of any one of claims 1-11, wherein the conversion includes decoding the video from the bitstream.

14. 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 a current picture comprising a current subpicture comprising a current slice and a bitstream of the video,

wherein the bitstream conforms to a first format rule that disallows an active entry in a reference picture list of the current slice from including a first picture that precedes in a decoding order a second picture that includes a step-wise temporal sublayer access subpicture when:

(a) the first picture has a same temporal identifier and a same layer identifier of a network abstraction layer (NAL) unit as that of the current subpicture, and

(b) the current subpicture follows in the decoding order the step-wise temporal sublayer access subpicture, and

(c) the current subpicture and the step-wise temporal sublayer access subpicture have the same temporal identifier, the same layer identifier, and a same subpicture index.

15. The apparatus of claim 14, wherein the reference picture list includes a List 0 reference picture list.

16. The apparatus of claim 14 or 15, wherein the reference picture list includes a List 1 reference picture list.

17. The apparatus of any one of claims 14-16, wherein the bitstream further conforms to a second format rule that disallows an active entry in the reference picture list of the current slice from including a third picture that is generated by a decoding process for generating unavailable reference pictures for a clean random access picture containing a clean random access subpicture associated with the current subpicture when:

the current subpicture is not a random access skipped leading subpicture associated with the clean random access subpicture in the clean random access picture with a value of a flag that indicates no output before recovery equal to 1.

18. The apparatus of any one of claims 14-17, wherein the bitstream further conforms to a third format rule that disallows an active entry in the reference picture list of the current slice from including a fourth picture when a set of conditions related to the current picture are satisfied,

wherein the fourth picture is generated by a decoding process for generating unavailable reference pictures for an intra random access point picture containing an intra random access point subpicture associated with the current subpicture, or for a gradual decoding refresh picture containing a gradual decoding refresh subpicture associated with the current subpicture.

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

perform a conversion between a video comprising a current picture comprising a current subpicture comprising a current slice and a bitstream of the video,

wherein the bitstream conforms to a first format rule that disallows an active entry in a reference picture list of the current slice from including a first picture that precedes in a decoding order a second picture that includes a step-wise temporal sublayer access subpicture when:

(a) the first picture has a same temporal identifier and a same layer identifier of a network abstraction layer (NAL) unit as that of the current subpicture, and

(b) the current subpicture follows in the decoding order the step-wise temporal sublayer access subpicture, and

(c) the current subpicture and the step-wise temporal sublayer access subpicture have the same temporal identifier, the same layer identifier, and a same subpicture index.

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, for a video comprising a current picture comprising a current subpicture comprising a current slice, the bitstream of the video,

wherein the bitstream conforms to a first format rule that disallows an active entry in a reference picture list of the current slice from including a first picture that precedes in a decoding order a second picture that includes a step-wise temporal sublayer access subpicture when:

(a) the first picture has a same temporal identifier and a same layer identifier of a network abstraction layer (NAL) unit as that of the current subpicture, and

(b) the current subpicture follows in the decoding order the step-wise temporal sublayer access subpicture, and

(c) the current subpicture and the step-wise temporal sublayer access subpicture have the same temporal identifier, the same layer identifier, and a same subpicture index.