ORDER RELATIONSHIP BETWEEN SUBPICTURES

CROSS REFERENCE TO RELATED APPLICATIONS

[001] This application is a national phase of International Patent Application No. PCT/US2021/022982, 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. The entire disclosure of the aforementioned applications 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 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 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 that a subpicture precedes in a first order an intra random access point subpicture and one or more random access decodable leading subpictures associated with the intra random access point subpicture when:

(1) the subpicture precedes the intra random access point subpicture in a second order,

(2) the subpicture and the intra random access point subpicture have a same value for a layer to which a network abstraction layer (NAL) unit of the subpicture and the intra random access point subpicture belong, and

(3) the subpicture and the intra random access point subpicture have a same value of a subpicture index.

2. The method of claim 1, wherein the format rule further specifies that a random access skipped leading subpicture associated with a clean random access subpicture precedes in the first order one or more random access decodable leading subpictures associated with the clean random access subpicture.

3. The method of claim 1, wherein the format rule further specifies that a random access skipped leading subpicture associated with a clean random access subpicture follows in the first order one or more intra random access point subpictures that precede the clean random access subpicture in the second order.

4. The method of claim 3, wherein the random access skipped leading subpicture and the one or more intra random access point subpictures have a same value for a layer to which a network abstraction layer (NAL) unit of the random access skipped leading subpicture and the one or more intra random access point subpictures belong, and

wherein the random access skipped leading subpicture and the one or more intra random access point subpictures have a same value of a subpicture index .

5. The method of any of claims 1 to 4, wherein the format rule further specifies that a current subpicture precedes in a decoding order one or more non-leading subpictures associated with an intra random access point subpicture when:

(1) a syntax element indicates that a coded layer video sequence conveys pictures that represent frames, and

(2) the current subpicture is a leading subpicture associated with the intra random access point subpicture.

6. The method of claim 5, wherein when (1) the syntax element indicating that the coded layer video sequence conveys pictures that represent fields, and (2) the current subpicture is not the leading subpicture, the format rule further specifies:

a presence of at most one non-leading subpicture preceding a first leading subpicture associated with the intra random access point subpicture in the decoding order, and

an absence of a non-leading picture in between the first leading subpicture and a last leading subpicture associated with the intra random access point subpicture in the second order.

7. The method of claim 6, wherein the current subpicture, the at most one non-leading subpicture, and the non-leading picture have a same value for a layer to which a network abstraction layer (NAL) unit of the current subpicture, the at most one non-leading subpicture, and the non-leading picture belong, and

wherein the current subpicture, the at most one non-leading subpicture, and the non-leading picture having a same value of a subpicture index.

8. The method of any of claims 1 to 7, wherein the format rule further specifies that a trailing subpicture that is associated with an intra random access point subpicture or a gradual decoding refresh subpicture follows the intra random access point subpicture or the gradual decoding refresh subpicture in the second order.

9. The method of any of claims 1 to 8, wherein the first order is an output order.

10. The method of any of claims 1 to 9, wherein the second order is a decoding order.

11. The method of any of claims 1 to 10, wherein the conversion includes encoding the video into the bitstream.

12. The method of any of claims 1 to 10, wherein the conversion includes decoding the video from the bitstream.

13. 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 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 that a subpicture precedes in a first order an intra random access point subpicture and one or more random access decodable leading subpictures associated with the intra random access point subpicture when:

(1) the subpicture precedes the intra random access point subpicture in a second order,

(2) the subpicture and the intra random access point subpicture have a same value for a layer to which a network abstraction layer (NAL) unit of the subpicture and the intra random access point subpicture belong, and

(3) the subpicture and the intra random access point subpicture have a same value of a subpicture index.

14. The apparatus of claim 13, wherein the format rule further specifies that a random access skipped leading subpicture associated with a clean random access subpicture precedes in the first order one or more random access decodable leading subpictures associated with the clean random access subpicture.

15. The apparatus of claim 13, wherein the format rule further specifies that a random access skipped leading subpicture associated with a clean random access subpicture follows in the first order one or more intra random access point subpictures that precede the clean random access subpicture in the second order.

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

perform 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 that a subpicture precedes in a first order an intra random access point subpicture and one or more random access decodable leading subpictures associated with the intra random access point subpicture when:

(1) the subpicture precedes the intra random access point subpicture in a second order,

(2) the subpicture and the intra random access point subpicture have a same value for a layer to which a network abstraction layer (NAL) unit of the subpicture and the intra random access point subpicture belong, and

(3) the subpicture and the intra random access point subpicture have a same value of a subpicture index.

17. The non-transitory computer-readable storage medium of claim 16, wherein the format rule further specifies that a random access skipped leading subpicture associated with a clean random access subpicture precedes in the first order one or more random access decodable leading subpictures associated with the clean random access subpicture.

18. The non-transitory computer-readable storage medium of claim 16, wherein the format rule further specifies that a random access skipped leading subpicture associated with a clean random access subpicture follows in the first order one or more intra random access point subpictures that precede the clean random access subpicture in the second order.

19. 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 a bitstream of a video comprising one or more pictures comprising one or more subpictures,

wherein the bitstream conforms to a format rule that specifies that a subpicture precedes in a first order an intra random access point subpicture and one or more random access decodable leading subpictures associated with the intra random access point subpicture when:

(1) the subpicture precedes the intra random access point subpicture in a second order,

(2) the subpicture and the intra random access point subpicture have a same value for a layer to which a network abstraction layer (NAL) unit of the subpicture and the intra random access point subpicture belong, and

(3) the subpicture and the intra random access point subpicture have a same value of a subpicture index.

20. The non-transitory computer-readable storage medium of claim 19, wherein the format rule further specifies that a random access skipped leading subpicture associated with a clean random access subpicture precedes in the first order one or more random access decodable leading subpictures associated with the clean random access subpicture.