INTRA RANDOM ACCESS POINTS FOR PICTURE CODING

CROSS-REFERENCE TO RELATED APPLICATIONS

[001] This application is based on International Patent Application No. PCT/US2021/022572, filed on March 16, 2021, which claims claim the priority to and benefits of U.S. Provisional Patent Application No. US 62/992,046 filed on March 19, 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 a bitstream syntax that provides improved performance. The disclosed methods may be used by apparatus that performs video processing such as video encoding or video decoding or video transcoding.

[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 comp\rising one or more video pictures and a coded representation of the video; wherein the coded representation is organized according to a rule that specifies that a first video picture that is an intra random access point picture of a second picture and the second picture are constrained to belong to a same video layer.

[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 comprising one or more video pictures and a coded representation of the video, wherein the coded representation conforms to a format rule that specifies that a trailing picture in the coded

CLAIMS

1. A method of video processing, comprising:

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

wherein the first rule specifies to apply a first constraint on a decoding order of a current picture associated with an intra random access point picture and a non-leading picture if and only if the current picture, the intra random access point picture and the non-leading picture are in a same layer.

2. The method of claim 1, wherein the first constraint specifies that in case that a value of a field sequence flag is equal to 0 and the current picture with a NAL (network abstraction layer) unit header layer identifier equal to a particular value is a leading picture associated with the intra random access point picture, the current picture precedes, in the decoding order, all non-leading pictures that are associated with the intra random access point picture.

3. The method of claim 2, wherein if the value of the field sequence flag is equal to 1, let picA and picB be the first and the last leading pictures, in decoding order, associated with an IRAP picture, respectively, there is at most one non-leading picture with NAL unit header layer identifier equal to layerId preceding picA in decoding order, and there is no non-leading picture with NAL unit header layer identifier equal to layerId between picA and picB in decoding order.

4. The method of claim 2, wherein the value of the field sequence flag that is equal to 0 indicates that a coded layer video sequence conveys pictures that represent frames.

5. The method of any one of claims 1-4, wherein the conversion is performed according to a second rule;

wherein the second rule specifies that when a current picture, with NAL unit header layer identifier equal to a particular value layerId, is a specific picture, there is no picture referred to by an entry in RefPicList[0] or RefPicList[1] that precedes, in output order or decoding order,

any preceding IRAP picture with NAL unit header layer identifier equal to layerId in decoding order.

6. The method of claim 5, wherein the specific picture is an IRAP picture or a clean random access picture.

7. The method of any one of claims 1-6, wherein the conversion is performed according to a third rule;

wherein the third rule specifies that a first video picture that is an associated intra random access point picture of a second picture and the second picture are constrained to belong to a same video layer.

8. The method of claim 7, wherein, between the first video picture and the second picture in decoding or output order, there is no gradual decoding refresh picture in the same video layer.

9. The method of claim 7, wherein the first video picture and the second picture have a same identifier of a layer to which a video coding layer network abstraction layer unit belongs or a same identifier of a layer to which a non-video coding layer network abstraction layer unit applies.

10. The method of any one of claims 1-9, the conversion is performed according to a fourth rule;

wherein the fourth rule specifies that a trailing picture in the bitstream is permitted to be associated with a gradual decoding refresh picture or an intra random access point picture.

11. The method of claim 10, wherein the trailing picture is a picture for which each video coding layer network abstraction layer unit has a trail network abstraction layer unit type.

12. The method of claim 10, wherein the trailing picture associated with an intra random access point picture or a gradual decoding refresh picture follows the intra random access point picture or the gradual decoding refresh picture in decoding or output order.

13. The method claim 10, wherein pictures that follow the associated intra random access point picture in output order and precede the associated intra random access point picture in decoding order are not allowed.

14. The method of claim 10, wherein the fourth rule further specifies that, for each layer, each picture of the layer, except the first picture in the layer in the bitstream, is specified to be associated with a closer one of a previous intra random access point or a gradual decoder refresh picture of the same layer in decoding order.

15. The method of any one of claims 1-14, wherein the conversion is performed according to a fifth rule;

wherein the fifth rule specifies that a fifth constraint for an output order of pictures preceding an intra random access point in a decoding order is applicable to pictures in a same video layer.

16. The method of claim 15, wherein the fifth constraint specifies that any picture having a NAL unit header layer identifier equal to a particular value and preceding, in a decoding order, an intra random access point picture with the NAL unit header layer identifier equal to the particular value is required to precede, in an output order, the intra random access point picture and all associated random access decodable leading pictures.

17. The method of any one of claims 1-16, wherein the conversion includes encoding the video into the bitstream.

18. The method of any one of claims 1-16, wherein the conversion includes decoding the video from the bitstream.

19. 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 comprising one or more video pictures and a bitstream of the video according to a first rule, and

wherein the first rule specifies to apply a first constraint on a decoding order of a current picture associated with an intra random access point picture and a non-leading picture if and only if the current picture, the intra random access point picture and the non-leading picture are in a same layer.

20. 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 comprising one or more video pictures and a bitstream of the video according to a first rule, and

wherein the first rule specifies to apply a first constraint on a decoding order of a current picture associated with an intra random access point picture and a non-leading picture if and only if the current picture, the intra random access point picture and the non-leading picture are in a same layer.

21. 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 comprising one or more video pictures according to a first rule, and

wherein the first rule specifies to apply a first constraint on a decoding order of a current picture associated with an intra random access point picture and a non-leading picture if and only if the current picture, the intra random access point picture and the non-leading picture are in a same layer.