COMBINATION OF SUBPICTURES AND SCALABILITY

CROSS REFERENCE TO RELATED APPLICATIONS

[001] This application is a national phase of International Application No. PCT/CN2021/082029, filed on March 22, 2021, which claims the priority to and benefits of International Patent Application No. PCT/CN2020/080533, filed on March 21, 2020. The entire disclosure of the aforementioned application is 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 current picture of a video and a bitstream of the video according to a rule. The rule specifies that multiple syntax elements are used to specify usage of a reference picture resampling tool in which a reference picture that has a different resolution than the current picture is resampled for the conversion.

[006] In another example aspect, a video processing method is disclosed. The method includes performing a conversion between a current picture of a video and a bitstream of the video according to a rule. The rule specifies that a syntax element that has a non-binary value is used to specify usage of (1) a reference picture resampling tool in which a reference picture that has a

CLAIMS

1. A video processing method, comprising:

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

wherein the rule specifies that, in case a subpicture with a first subpicture index of i is treated as a video picture for the conversion, a cross-layer alignment restriction is applied to a current layer that includes the subpicture and a subset of layers associated with the current layer,

wherein the cross-layer alignment restriction includes a restriction of at least:

a value of a first syntax element specifying a dimension of a video picture,

a value of a second syntax element included in a sequence parameter set indicating number of subpictures in a video picture,

a value of a third syntax element indicating a dimension of an i-th subpicture,

a value of a fourth syntax element indicating a location of the i-th subpicture, or

an identification value of the i-th subpicture.

2. The method of claim 1, wherein the subset of layers associated with the current layer includes one or more higher layers that depend on the current layer.

3. The method of claim 1 or 2, wherein the subset of layers associated with the current layer excludes all higher layers that do not depend on the current layer.

4. The method of any one of claims 1 to 3, wherein the subset of layers associated with the current layer excludes all lower layers of the current layer.

5. The method of any one of claims 1 to 4, wherein the subset of layers associated with the current layer are a subset of a dependency tree associated with the current layer,

wherein the dependency tree associated with the current layer includes the current layer, all layers that have the current layer as a reference layer, and all reference layers of the current layer.

6. The method of claim 5, wherein the subset of layers associated with the current layer are the subset of the dependency tree regardless of whether any of the subset of the dependency tree is an output layer in an output layer set.

7. The method of any one of claims 1 to 6, wherein the cross-layer alignment restriction further includes a restriction regarding a value of a fifth syntax element, and wherein the current layer and the subset of layers associated with the current layer have a same value of the fifth syntax element,

wherein the fifth syntax element specifies whether the subpicture of each coded picture in a coded layer video sequence is treated as a picture in the decoding process excluding in-loop filtering operations.

8. The method of any one of claims 1 to 7, wherein the cross-layer alignment restriction excludes a value of a sixth syntax element,

wherein the sixth syntax element specifies whether an in-loop filtering operation across subpicture boundaries is enabled.

9. The method of any one of claims 1 to 8, wherein the rule further specifies that the cross-layer alignment restriction is not applied in case the second syntax element indicates that the video picture includes a single subpicture.

10. The method of any one of claims 1 to 9, wherein the rule further specifies that the cross-layer alignment restriction is not applied in case a seventh syntax element included in a sequence parameter set indicates that subpicture information is not present.

11. The method of any one of claims 1 to 10, wherein the rule further specifies that the cross-layer alignment restriction is applied to pictures in a target set of access units.

12. The method of any one of claims 1 to 11, wherein, for each CLVS of the current layer referring to a sequence parameter set, the target set of access units includes all access units

starting from a first access unit that includes a first picture of the CLVS to a second access unit that includes a last picture of the CLVS according to a decoding order.

13. The method of any one of claims 1 to 12, wherein the conversion comprises encoding the video into the bitstream.

14. The method of any one of claims 1 to 12, wherein the conversion comprises decoding the bitstream to generate the video.

15. 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 multiple layers and a bitstream of the video according to a rule,

wherein the rule specifies that, in case a subpicture with a first subpicture index of i is treated as a video picture for the conversion, a cross-layer alignment restriction is applied to a current layer that includes the subpicture and a subset of layers associated with the current layer,

wherein the cross-layer alignment restriction includes a restriction of at least:

a value of a first syntax element specifying a dimension of a video picture,

a value of a second syntax element included in a sequence parameter set indicating number of subpictures in a video picture,

a value of a third syntax element indicating a dimension of an i-th subpicture,

a value of a fourth syntax element indicating a location of the i-th subpicture, or

an identification value of the i-th subpicture.

16. The apparatus of claim 15, wherein the subset of layers associated with the current layer includes one or more higher layers that depend on the current layer.

17. The apparatus of claim 15 or 16, wherein the subset of layers associated with the current layer excludes all higher layers that do not depend on the current layer.

18. The apparatus of any one of claims 15 to 17, wherein the subset of layers associated with the current layer excludes all lower layers of the current layer.

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

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

wherein the rule specifies that, in case a subpicture with a first subpicture index of i is treated as a video picture for the conversion, a cross-layer alignment restriction is applied to a current layer that includes the subpicture and a subset of layers associated with the current layer,

wherein the cross-layer alignment restriction includes a restriction of at least:

a value of a first syntax element specifying a dimension of a video picture,

a value of a second syntax element included in a sequence parameter set indicating number of subpictures in a video picture,

a value of a third syntax element indicating a dimension of an i-th subpicture,

a value of a fourth syntax element indicating a location of the i-th subpicture, or

an identification value of the i-th subpicture.

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 comprising multiple layers according to a rule,

wherein the rule specifies that, in case a subpicture with a first subpicture index of i is treated as a video picture for the conversion, a cross-layer alignment restriction is applied to a current layer that includes the subpicture and a subset of layers associated with the current layer,

wherein the cross-layer alignment restriction includes a restriction of at least:

a value of a first syntax element specifying a dimension of a video picture,

a value of a second syntax element included in a sequence parameter set indicating number of subpictures in a video picture,

a value of a third syntax element indicating a dimension of an i-th subpicture,

a value of a fourth syntax element indicating a location of the i-th subpicture, or

an identification value of the i-th subpicture.