

CONSTRAINTS ON NUMBER OF SUBPICTURE IN A VIDEO PICTURE

CROSS REFERENCE TO RELATED APPLICATIONS

[001] This application is based on International Application No. PCT/US2021/036257, filed on June 7, 2021, which claims the priority to and benefits of U.S. Provisional Patent Application No. 63/036,365, filed on June 8, 2020. For all purposes under the law, 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 a video or an image.

[005] In one example aspect, a method of processing video data is disclosed. The method includes performing a conversion between a video and a bitstream of the video comprising one or more output layer sets (OLSs) according to a rule. The rule specifies that a subpicture level information (SLI) supplemental enhancement information (SEI) message includes information about a level of subpicture sequences in a set of coded video sequences of the one or more OLSs to which the SLI SEI message applies. A syntax structure of the SLI SEI message includes (1) a first syntax element specifying a maximum number of sublayers for the subpicture sequences, (2) a second syntax element specifying whether level information for the subpicture sequences is present for one or more sublayer representations, and (3) a loop for a number of sublayers each

CLAIMS

1. A method of processing video data, comprising:
performing a conversion between a current access unit of a video comprising one or more output layer sets (OLSs) and a bitstream of the video according to a rule,
wherein a subpicture level information (SLI) supplemental enhancement information (SEI) message includes information related to a level of subpicture sequences in a set of coded video sequences of the one or more OLSs to which the SLI SEI message applies, wherein layers in the one or more OLSs for which a referenced sequence parameter set have a first syntax element with a specific value indicating that a number of subpictures is greater than 1 are referred to as multi-subpicture layers,
wherein coded video sequences (CVSs) in the one or more OLSs are referred to as target CVSs, and
wherein the rule specifies that a subpicture sequence of the subpicture sequences includes (1) all subpictures within the target CVSs that have a same subpicture index and are included in layers in the multi-subpicture layers, and (2) all subpictures in the target CVSs that have a subpicture index of 0 and are included in layers of the OLSs but not in the multi-subpicture layers.
2. The method of claim 1, wherein the rule specifies bitstream conformance requires that, in response to the SLI SEI message being present for a coded video sequence, for all sequence parameter sets referenced by pictures in the multi-subpicture layers, values of the first syntax element are the same.
3. The method of claim 1 or 2, wherein, in response to the SLI SEI message being present for any access unit of a coded video sequence (CVS) of the one or more OLSs, the rule specifies that the SLI SEI message is present for a first access unit of the CVS.
4. The method of any one of claims 1-3, wherein the SLI SEI message is allowed to be present for the current access unit by either being included in the bitstream or by being provided externally.

5. The method of any one of claims 1-4, wherein a second syntax element in a syntax structure of the SLI SEI message specifies a number of subpictures in a picture in the multi-subpicture layers in the target CVSs.
6. The method of any one of claims 1-5, wherein the SLI SEI message remains persistent in a decoding order from the current access unit until an end of the bitstream or until a next access unit containing a subsequent SLI SEI message that includes different content than the SLI SEI message.
7. The method of any one of claims 1-6, wherein the rule specifies that all SLI SEI messages applicable to a same CVS have the same content.
8. The method of any one of claims 1-7, wherein a first variable indicating a subpicture level indicator is specified to include values for each of the subpicture sequences.
9. The method of any one of claims 1-8, wherein a second variable indicating a subpicture level index is specified to include values for each of the subpicture sequences.
10. The method of any one of claims 1-9, wherein the conversion comprises encoding the video into the bitstream.
11. The method of any one of claims 1-9, wherein the conversion comprises decoding the video from the bitstream.
12. 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 current access unit of a video comprising one or more output layer sets (OLSs) and a bitstream of the video according to a rule,
 - wherein a subpicture level information (SLI) supplemental enhancement information (SEI) message includes information related to a level of subpicture sequences in a set of coded video

sequences of the one or more OLSs to which the SLI SEI message applies, wherein layers in the one or more OLSs for which a referenced sequence parameter set have a first syntax element with a specific value indicating that a number of subpictures is greater than 1 are referred to as multi-subpicture layers,

wherein coded video sequences (CVSs) in the one or more OLSs are referred to as target CVSs, and

wherein the rule specifies that a subpicture sequence of the subpicture sequences includes (1) all subpictures within the target CVSs that have a same subpicture index and are included in layers in the multi-subpicture layers, and (2) all subpictures in the target CVSs that have a subpicture index of 0 and are included in layers of the OLSs but not in the multi-subpicture layers.

13. The apparatus of claim 12, wherein the rule specifies bitstream conformance requires that, in response to the SLI SEI message being present for a coded video sequence, for all sequence parameter sets referenced by pictures in the multi-subpicture layers, values of the first syntax element are the same,

wherein, in response to the SLI SEI message being present for any access unit of a coded video sequence (CVS) of the one or more OLSs, the rule specifies that the SLI SEI message is present for a first access unit of the CVS, and

wherein the SLI SEI message is allowed to be present for the current access unit by either being included in the bitstream or by being provided externally.

14. The apparatus of claim 12 or 13, wherein a second syntax element in a syntax structure of the SLI SEI message specifies a number of subpictures in a picture in the multi-subpicture layers in the target CVSs.

15. The apparatus of any one of claims 12-13, wherein the SLI SEI message remains persistent in a decoding order from the current access unit until an end of the bitstream or until a next access unit containing a subsequent SLI SEI message that includes different content than the SLI SEI message, and

wherein the rule specifies that all SLI SEI messages applicable to a same CVS have the same content.

16. The apparatus of any one of claims 12-14, wherein a first variable indicating a subpicture level indicator is specified to include values for each of the subpicture sequences, and a second variable indicating a subpicture level index is specified to include values for each of the subpicture sequences.

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

- performing a conversion between a current access unit of a video comprising one or more output layer sets (OLSs) and a bitstream of the video according to a rule,

- wherein a subpicture level information (SLI) supplemental enhancement information (SEI) message includes information related to a level of subpicture sequences in a set of coded video sequences of the one or more OLSs to which the SLI SEI message applies, wherein layers in the one or more OLSs for which a referenced sequence parameter set have a first syntax element with a specific value indicating that a number of subpictures is greater than 1 are referred to as multi-subpicture layers,

- wherein coded video sequences (CVSs) in the one or more OLSs are referred to as target CVSs, and

- wherein the rule specifies that a subpicture sequence of the subpicture sequences includes (1) all subpictures within the target CVSs that have a same subpicture index and are included in layers in the multi-subpicture layers, and (2) all subpictures in the target CVSs that have a subpicture index of 0 and are included in layers of the OLSs but not in the multi-subpicture layers.

18. The non-transitory computer-readable storage medium of claim 17, wherein the rule specifies bitstream conformance requires that, in response to the SLI SEI message being present for a coded video sequence, for all sequence parameter sets referenced by pictures in the multi-subpicture layers, values of the first syntax element are the same,

- wherein, in response to the SLI SEI message being present for any access unit of a coded video sequence (CVS) of the one or more OLSs, the rule specifies that the SLI SEI message is present for a first access unit of the CVS, and

wherein the SLI SEI message is allowed to be present for the current access unit by either being included in the bitstream or by being provided externally, and

wherein a second syntax element in a syntax structure of the SLI SEI message specifies a number of subpictures in a picture in the multi-subpicture layers in the target CVSs.

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 the video from the video comprising one or more output layer sets (OLSs) according to a rule,

wherein a subpicture level information (SLI) supplemental enhancement information (SEI) message includes information related to a level of subpicture sequences in a set of coded video sequences of the one or more OLSs to which the SLI SEI message applies, wherein layers in the one or more OLSs for which a referenced sequence parameter set have a first syntax element with a specific value indicating that a number of subpictures is greater than 1 are referred to as multi-subpicture layers,

wherein coded video sequences (CVSs) in the one or more OLSs are referred to as target CVSs, and

wherein the rule specifies that a subpicture sequence of the subpicture sequences includes (1) all subpictures within the target CVSs that have a same subpicture index and are included in layers in the multi-subpicture layers, and (2) all subpictures in the target CVSs that have a subpicture index of 0 and are included in layers of the OLSs but not in the multi-subpicture layers.

20. The non-transitory computer-readable recording medium of claim 19, wherein the rule specifies bitstream conformance requires that, in response to the SLI SEI message being present for a coded video sequence, for all sequence parameter sets referenced by pictures in the multi-subpicture layers, values of the first syntax element are the same,

wherein, in response to the SLI SEI message being present for any access unit of a coded video sequence (CVS) of the one or more OLSs, the rule specifies that the SLI SEI message is present for a first access unit of the CVS, and

wherein the SLI SEI message is allowed to be present for the current access unit by either being included in the bitstream or by being provided externally, and

wherein a second syntax element in a syntax structure of the SLI SEI message specifies a number of subpictures in a picture in the multi-subpicture layers in the target CVSs.