TITLE

AN ENCODER, A DECODER AND CORRESPONDING METHODS OF SIGNALING AND SEMANTICS IN PARAMETER SETS

~~CROSS-REFERENCE TO RELATED APPLICATIONS~~

~~This patent application claims the priority to PCT/EP/2020/055269, filed on February 28, 2020, PCT/EP/2020/065989, filed on June 9, 2020 and PCT/EP/2020/065999, filed on June 9, 2020. The disclosure of the aforementioned patent applications is hereby incorporated by reference in its entirety.~~

TECHNICAL FIELD

Embodiments of the present application generally relate to the field of picture processing and more particularly to signalling of syntax elements in a sequence parameter set.

BACKGROUND

Video coding (video encoding and decoding) is used in a wide range of digital video applications, for example broadcast digital TV, video transmission over internet and mobile networks, real-time conversational applications such as video chat, video conferencing, DVD and Blu-ray discs, video content acquisition and editing systems, and camcorders of security applications.

The amount of video data needed to depict even a relatively short video can be substantial, which may result in difficulties when the data is to be streamed or otherwise communicated across a communications network with limited bandwidth capacity. Thus, video data is generally compressed before being communicated across modern day telecommunications networks. The size of a video could also be an issue when the video is stored on a storage

CLAIMS

1. A method of decoding a video bitstream implemented by a decoding device, wherein a sequence parameter set, SPS, is coded in the video bitstream and contains syntax elements that apply to a video sequence, the method comprising:

obtaining (1410) a value of a first syntax element from the SPS, wherein the value of the first syntax element is used to specify whether a decoded picture buffer, DPB, parameters syntax structure is present in the SPS; and

obtaining (1420) a value of a second syntax element from the SPS, at least when determining that the value of the first syntax element specifies that the DPB parameters syntax structure is present in the SPS, wherein the value of the second syntax element is used to specify the presence of a DPB syntax element in the DPB parameters syntax structure, wherein the DPB syntax element is applied to a temporal sublayer except for the highest temporal sublayer in the video sequence.

2. The method of claim 1, wherein the method further comprises:

obtaining a value of the DPB syntax element based on the value of the second syntax element; and

reconstructing the video sequence based on the value of the DPB syntax element.

3. The method of claim 2, wherein the obtaining the value of the DPB syntax element based on the value of the second syntax element comprises:

obtaining the value of the DPB syntax element from the DPB parameters syntax structure, when determining that the value of the second syntax element specifies that the DPB syntax element is present in the DPB parameters syntax structure; or

setting the value of the DPB syntax element equal to a value of another DPB syntax element applied to the highest temporal sublayer in the DPB parameters syntax structure, when determining that the value of the second syntax element specifies that the DPB syntax element is not present in

the DPB parameters syntax structure.

4. The method of any one of claims 2 to 3, wherein the reconstructing the video sequence based on the value of the DPB syntax element comprises: configuring the DPB based on the value of the DPB syntax element; and reconstructing the video sequence using the DPB.

5. The method of any one of claims 2 to 3, wherein the reconstructing the video sequence based on the value of the DPB syntax element comprises: reconstructing the video sequence based on determining that the DPB used satisfies the requirement specified by the value of the DPB syntax element.

6. The method of any one of claims 1 to 5, wherein the method further comprises:

obtaining a value of a third syntax element from the SPS, wherein the value of the third syntax element is used to determine the maximum number of temporal sublayers that are present in the video sequence.

7. The method of claim 6, wherein the obtaining the value of the second syntax element from the SPS comprises:

determining whether the maximum number of the temporal sublayers in the video bitstream is greater than 1 based on the value of the third syntax element, when determining that the value of the first syntax element specifies that the DPB parameters syntax structure is present in the SPS; and

obtaining the value of the second syntax element from the SPS, when determining that the maximum number of temporal sublayers is greater than one.

8. A method of encoding a video bitstream implemented by an encoding device, wherein a sequence parameter set, SPS, is encoded in the video bitstream and contains syntax elements that

apply to a video sequence, the method comprising:

determining (1510) the presence of a decoded picture buffer, DPB, parameters syntax structure in the SPS;

encoding (1520) a value of a first syntax element into the SPS based on the determining of the presence of the DPB parameters syntax structure in the SPS, wherein the value of the first syntax element is used to specify whether the DPB parameters syntax structure is present in the SPS;

determining (1530) the presence of a DPB syntax element in the DPB parameters syntax structure, when determining that the DPB parameters syntax structure is present in the SPS, wherein the DPB syntax element is applied to a temporal sublayer except for the highest temporal sublayer in the video sequence; and

encoding (1540) a value of a second syntax element into the SPS based on the determining of the presence of the DPB syntax element in the DPB parameters syntax structure, wherein the value of the second syntax element is used to specify the presence of the DPB syntax element in the DPB parameters syntax structure.

9. The method of claim 8, wherein the method further comprises: determining a value of the DPB syntax element when determining that the DPB syntax element is present in the DPB parameters syntax structure; and reconstructing the video sequence based on the value of the DPB syntax element.

10. The method of claim 8, wherein the method further comprises: setting the value of the DPB syntax element equal to a value of another DPB syntax element applied to the highest temporal sublayer in the DPB parameters syntax structure; and reconstructing the video sequence based on the value of the DPB syntax element.

11. The method of any one of claims 9 to 10, the reconstructing the video sequence based on the value of the DPB syntax element comprises: configuring the DPB to satisfy the value of the DPB

syntax element; and reconstructing the video sequence using the DPB.

12. The method of any one of claims 8 to 11, wherein the presence of a DPB syntax element in the DPB parameters syntax structure is determined, when it is determined that the DPB parameters syntax structure is present in the SPS and the maximum number of temporal sublayers in the video bitstream is greater than one.

13. An apparatus (1600) for decoding a coded video bitstream, wherein the apparatus comprises:
an obtaining unit (1610) configured to obtain a value of a first syntax element from a SPS coded in the video bitstream, wherein the value of the first syntax element is used to specify whether a decoded picture buffer, DPB, parameters syntax structure is present in the SPS; and
a determining unit (1620) configured to determine whether the value of the first syntax element specifies that the DPB parameters syntax structure is present in the SPS; and wherein
the obtaining unit is further configured to obtain a value of a second syntax element from the SPS, at least when determining that the value of the first syntax element specifies that the DPB parameters syntax structure is present in the SPS, wherein the value of the second syntax element is used to specify the presence of a DPB syntax element in the DPB parameters syntax structure, wherein the DPB syntax element is applied to a temporal sublayer except for the highest temporal sublayer in the video sequence.

14. An apparatus (1700) for encoding a video bitstream, wherein the apparatus comprises:
a determining unit (1710) configured to determine the presence of a decoded picture buffer, DPB, parameters syntax structure in a SPS encoded in the video bitstream; and
an encoding unit (1720) configured to encode a value of a first syntax element into the SPS based on the determining of the presence of the DPB parameters syntax structure in the SPS, wherein the value of the first syntax element is used to specify whether the DPB parameters syntax structure is present in the SPS; wherein

the determining unit (1710) is further configured to determine the presence of a DPB syntax element in the DPB parameters syntax structure, when determining that the DPB parameters syntax structure is present in the SPS, wherein the DPB syntax element is applied to a temporal sublayer except for the highest temporal sublayer in the video sequence; and wherein

the encoding unit (1720) is further configured to encode a value of a second syntax element into the SPS based on the determining of the presence of the DPB syntax element in the DPB parameters syntax structure, wherein the value of the second syntax element is used to specify the presence of the DPB syntax element in the DPB parameters syntax structure.

15. An encoder comprising processing circuitry for carrying out the method according to any one of claims 8 to 12.

16. A decoder comprising processing circuitry for carrying out the method according to any one of claims 1 to 7.

17. A computer program product comprising a program code for performing the method according to any one of the claims 1 to 12 when executed on a computer or a processor.

18. A decoder, comprising:

one or more processors; and

a non-transitory computer-readable storage medium coupled to the processors and storing programming for execution by the processors, wherein the programming, when executed by the processors, configures the decoder to carry out the method according to any one of the claims 1 to 7.

19. An encoder, comprising:

one or more processors; and

a non-transitory computer-readable storage medium coupled to the processors and storing programming for execution by the processors, wherein the programming, when executed by the processors, configures the encoder to carry out the method according to any one of the claims 8 to 12.

20. A non-transitory computer-readable medium carrying a program code which, when executed by a computer device, causes the computer device to perform the method of any one of the claims 1 to 12.

21. A non-transitory storage medium which includes an encoded bitstream, the bitstream being generated by dividing a current picture of a video signal or an image signal into a plurality blocks, and comprising a plurality of syntax elements, wherein the plurality of syntax elements comprises a first syntax element in a SPS, wherein the value of the first syntax element is used to specify whether a decoded picture buffer, DPB, parameters syntax structure is present in the SPS; in case that the value of the first syntax element specifies that the DPB parameters syntax structure is present in the SPS, the bitstream further comprises a second syntax element in the SPS, wherein the value of the second syntax element is used to specify the presence of a DPB syntax element in the DPB parameters syntax structure, wherein the DPB syntax element is applied to a temporal sublayer except for the highest temporal sublayer in the video sequence.

22. An encoded bitstream, wherein the bitstream being generated by dividing a current picture of a video signal or an image signal into a plurality blocks, and comprising a plurality of syntax elements, wherein the plurality of syntax elements comprises a first syntax element in a SPS, wherein the value of the first syntax element is used to specify whether a decoded picture buffer, DPB, parameters syntax structure is present in the SPS; in case that the value of the first syntax element specifies that the DPB parameters syntax structure is present in the SPS, the bitstream

further comprises a second syntax element in the SPS, wherein the value of the second syntax element is used to specify the presence of a DPB syntax element in the DPB parameters syntax structure, wherein the DPB syntax element is applied to a temporal sublayer except for the highest temporal sublayer in the video sequence.