

AN ENCODER, A DECODER AND CORRESPONDING METHODS

[0001]

TECHNICAL FIELD

[0002] The present disclosure is generally related to video coding, and is specifically related to efficient signaling of coding tool parameters used to compress video data in video coding.

BACKGROUND

[0003] 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 device because memory resources may be limited. Video compression devices often use software and/or hardware at the source to code the video data prior to transmission or storage, thereby decreasing the quantity of data needed to represent digital video images. The compressed data is then received at the destination by a video decompression device that decodes the video data. With limited network resources and ever increasing demands of higher video quality, improved compression and decompression techniques that improve compression ratio with little to no sacrifice in image quality are desirable.

CLAIMS

What is claimed is:

1. A method implemented in a decoder, the method comprising:
receiving, by a receiver of the decoder, a bitstream comprising a first adaptation parameter set (APS) network abstraction layer (NAL) unit with an adaptive loop filter (ALF) type associated with a coded slice;
obtaining, by a processor of the decoder, ALF parameters from the first APS NAL unit; and
decoding, by the processor, the coded slice using the ALF parameters.
2. The method of claim 1, wherein the bitstream further comprises a second APS NAL unit with a scaling list type, wherein the method further comprises obtaining, by the processor, scaling list parameters from the second APS NAL unit, and wherein the coded slice is further decoded using the scaling list parameters.
3. The method of any of claims 1-2, wherein the bitstream further comprises a third APS NAL unit with a luma mapping with chroma scaling (LMCS) type, wherein the method further comprises obtaining, by the processor, LMCS parameters from the third APS NAL unit, and wherein the coded slice is further decoded using the LMCS parameters.
4. The method of any of claims 1-3, wherein the bitstream further comprises a slice header of the coded slice, wherein the slice header references the first APS NAL unit.
5. The method of any of claims 1-4, wherein each APS includes an APS parameter type (aps_params_type) code set to a predefined value indicating a type of parameters included in the each APS.

6. The method of any of claims 1-5, wherein a current APS includes a current APS identifier (ID) from a predefined range, wherein the current APS ID is related to a previous APS ID associated with a previous APS of a same type as the current APS, and wherein the current APS ID is not related to another previous APS ID associated with another previous APS of a different type than the current APS.
7. The method of any of claims 1-6, wherein each APS includes an APS ID from a predefined range, and wherein the predefined range is determined based on a parameter type of the each APS.
8. The method of any of claims 1-7, wherein each APS is identified by a combination of a parameter type and an APS ID.
9. The method of any of claims 1-8, wherein the bitstream further comprises a sequence parameter set (SPS) including a flag set to indicate ALF is enabled for an encoded video sequence including the coded slice, and wherein the ALF parameters from the first APS NAL unit are obtained based on the flag.
10. A method implemented in an encoder, the method comprising:
 - determining, by the processor, adaptive loop filter (ALF) parameters associated with the coded slice;
 - encoding, by a processor of the encoder, a slice into a bitstream as a coded slice as part of an encoded video sequence;
 - encoding, by the processor, the ALF parameters into a first adaptation parameter set (APS) network abstraction layer (NAL) unit with an ALF type of the bitstream; and
 - storing, by a memory coupled to the processor, the bitstream for communication toward a decoder.
11. The method of claim 10, further comprising:
 - determining, by the processor, scaling list parameters for the coded slice; and
 - encoding, by the processor, the scaling list parameters into a second APS NAL unit with a scaling list type of the bitstream.
12. The method of any of claims 10-11, further comprising:

determining, by the processor, luma mapping with chroma scaling (LMCS) parameters for the coded slice; and

encoding, by the processor, the LMCS parameters into a third APS NAL unit with a LMCS type of the bitstream.

13. The method of any of claims 10-12, further comprising encoding, by the processor, a slice header of the coded slice into the bitstream, wherein the coded slice header references the first APS NAL unit.

14. The method of any of claims 10-13, wherein each APS includes an APS parameter type (`aps_params_type`) code set to a predefined value indicating a type of parameters included in the each APS.

15. The method of any of claims 10-14, wherein a current APS includes a current APS identifier (ID) from a predefined range, wherein the current APS ID is related to a previous APS ID associated with a previous APS of a same type as the current APS, and wherein the current APS ID is not related to another previous APS ID associated with another previous APS of a different type than the current APS.

16. The method of any of claims 10-15, wherein each APS includes an APS ID from a predefined range, and wherein the predefined range is determined based on a parameter type of the each APS.

17. The method of any of claims 10-16, wherein each APS is identified by a combination of a parameter type and an APS ID.

18. The method of any of claims 10-17, further comprising encoding, by the processor, a sequence parameter set (SPS) into the bitstream, wherein the SPS includes a flag set to indicate ALP is enabled for the encoded video sequence including the coded slice.

19. A video coding device comprising:
a processor, a receiver coupled to the processor, a memory coupled to the processor, and a transmitter coupled to the processor, wherein the processor, receiver, memory, and transmitter are configured to perform the method of any of claims 1-18.

20. A non-transitory computer readable medium comprising a computer program product for use by a video coding device, the computer program product comprising computer executable instructions stored on the non-transitory computer readable medium such that when executed by a processor cause the video coding device to perform the method of any of claims 1-18.

21. A decoder comprising:

- a receiving unit, configured to receive a bitstream comprising a first adaptation parameter set (APS) network abstraction layer (NAL) unit with an adaptive loop filter (ALF) type, a second APS NAL unit with a scaling list type, and a third APS NAL unit with a luma mapping with chroma scaling (LMCS) type associated with a coded slice;

- an obtaining unit, configured to:

- obtain ALF parameters from the first APS NAL unit;

- obtain scaling list parameters from the second APS NAL unit; and

- obtain LMCS parameters from the third APS NAL unit; and

- a decoding unit, configured to decoded the coded slice using the ALF parameters, the scaling list parameters, and the LMCS parameters.

22. The decoder of claim 21, wherein the decoder is further configured to perform the method of any of claims 1-9.

23. An encoder comprising:

- a determining unit, configured to determine adaptive loop filter (ALF) parameters, scaling list parameters, and luma mapping with chroma scaling (LMCS) parameters associated with a coded slice;

- an encoding unit, configured to:

- encode a slice into a bitstream as the coded slice as part of an encoded video sequence;

- encode the ALF parameters into a first adaptation parameter set (APS) network abstraction layer (NAL) unit with an ALF type of the bitstream;

- encode the scaling list parameters into a second APS NAL unit with a scaling list type of the bitstream; and

encode the LMCS parameters into a third APS NAL unit with a LMCS type of the bitstream; and
a storing means for storing the bitstream for communication toward a decoder.

24. The encoder of claim 23, wherein the encoder is further configured to perform the method of any of claims 10-18.

25. A non-transitory storage medium which includes an encoded bitstream, the bitstream comprising a first adaptation parameter set (APS) network abstraction layer (NAL) unit with an adaptive loop filter (ALF) type associated with a coded slice, wherein the first APS NAL unit comprise ALF parameters.

26. An decoder comprising processing circuitry for carrying out the method according to any one of claims 1 to 9.

27. A encoder comprising processing circuitry for carrying out the method according to any of claims 10 to 18.

28. A computer program product comprising program code for performing the method according to any of claims 1 to 18 when executed on a computer or a processor.

29. 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 claims 1 to 18.