Temporal Identifier Constraints For SEI Messages

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims the benefit of U.S. Provisional Patent Application No. 62/905,236 filed September 24, 2019 by Ye-Kui Wang, and titled "Video Coding Improvements~~,~~" ~~which is hereby incorporated by reference~~.

TECHNICAL FIELD

[0002] The present disclosure is generally related to video coding, and is specifically related to improvements in signaling parameters to support coding of multi-layer bitstreams.

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.

SUMMARY

[0004] In an embodiment, the disclosure includes a method implemented by a decoder, the method comprising: receiving, by a receiver of the decoder, a bitstream comprising a coded picture in one or more video coding layer (VCL) network abstraction layer (NAL) units and a non-VCL NAL unit, wherein a temporal identifier (TemporalId) for the non-VCL NAL unit is constrained to be equal to a TemporalId of an access unit (AU) containing the non-VCL NAL unit when a NAL unit type (nal_unit_type) of the non-VCL NAL is equal to a prefix

CLAIMS

What is claimed is:

1. A method implemented by a decoder, the method comprising:

receiving, by a receiver of the decoder, a bitstream comprising a coded picture in one or more video coding layer (VCL) network abstraction layer (NAL) units and a non-VCL NAL unit, wherein a temporal identifier (TemporalId) for the non-VCL NAL unit is constrained to be equal to a TemporalId of an access unit (AU) containing the non-VCL NAL unit when a NAL unit type (nal_unit_type) of the non-VCL NAL is equal to a prefix supplemental enhancement information (SEI) NAL unit type (PREFIX_SEI_NUT) or a suffix SEI NAL unit type (SUFFIX_SEI_NUT);

deriving, by a processor of the decoder, the TemporalId for the non-VCL NAL unit based on a NAL unit header temporal identifier plus one (nuh_temporal_id_plus1) syntax element in the non-VCL NAL unit; and

decoding, by the processor of the decoder, the coded picture from the VCL NAL units to produce a decoded picture.

2. The method of claim 1, wherein the nal_unit_type of the non-VCL NAL is equal to the PREFIX_SEI_NUT.

3. The method of claim 1, wherein the nal_unit_type of the non-VCL NAL is equal to the SUFFIX_SEI_NUT.

4. The method of any of claims 1-3, wherein the coded picture is decoded from the VCL NAL units based on a SEI message in the non-VCL NAL unit.

5. The method of any of claims 1-4, further comprising deriving the TemporalId for the non-VCL NAL unit as follows:
TemporalId = nuh_temporal_id_plus1 – 1.

6. The method of any of claims 1-5, wherein a value of nuh_temporal_id_plus1 is not equal to zero.

7. The method of any of claims 1-6, wherein a TemporalId of the VCL NAL units is constrained to be the same for all VCL NAL units in a same AU.

8. The method of any of claims 1-7, further comprising:

receiving, by the decoder, a second bitstream including a second one or more VCL NAL units and a second non-VCL NAL unit, wherein a TemporalId for the second non-VCL NAL unit is not equal to a TemporalId of a second AU containing the second non-VCL NAL unit when a nal_unit_type of the second non-VCL NAL is a SEI message; and

in response to the receiving, taking some other corrective measures to ensure that a conforming bitstream corresponding to the second bitstream is received prior to decoding the coded picture from the second VCL NAL units.

~~9. A method implemented by an encoder, the method comprising:~~

~~encoding, by a processor of the encoder, a coded picture in one or more video coding layer (VCL) network abstraction layer (NAL) units in a bitstream;~~

~~encoding into the bitstream, by the processor, a non-VCL NAL unit such that a NAL unit header temporal identifier plus one (nuh_temporal_id_plus1) for the non-VCL NAL unit is constrained to be equal to a nuh_temporal_id_plus1of an access unit (AU) containing the non-VCL NAL unit when a NAL unit type (nal_unit_type) of the non-VCL NAL is a supplemental enhancement information (SEI) message;~~

~~performing, by the processor, a set of bitstream conformance tests on the bitstream based on the SEI message; and~~

~~storing, by a memory coupled to the processor, the bitstream for communication toward a decoder.~~

~~10. The method of claim 9, wherein the nal_unit_type of the non-VCL NAL is equal to a prefix SEI NAL unit type (PREFIX_SEI_NUT).~~

~~11. The method of claim 9, wherein the nal_unit_type of the non-VCL NAL is equal to a suffix SEI NAL unit type (SUFFIX_SEI_NUT).~~

~~12. The method of any of claims 9-11, wherein a value of nuh_temporal_id_plus1 is not equal to zero.~~

~~13. The method of any of claims 9-12, wherein a nuh_temporal_id_plus1 of the VCL NAL units is constrained to be the same for all VCL NAL units in a same AU.~~

~~14. 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 1-13.~~

~~15~~9. A non-transitory computer-readable medium storing computer instructions that when executed by at least one hardware processors, cause the at least one hardware processors to perform the method of any one of claims 1 to 8.~~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 1-13.~~

10. A decoding device, comprising:

a receiver configured to receive a bitstream comprising a coded picture in one or more video coding layer (VCL) network abstraction layer (NAL) units and a non-VCL NAL unit, wherein a temporal identifier (TemporalId) for the non-VCL NAL unit is constrained to be equal to a TemporalId of an access unit (AU) containing the non-VCL NAL unit when a NAL unit type (nal_unit_type) of the non-VCL NAL is a supplemental enhancement information (SEI) message;

a memory coupled to the receiver, the memory storing instructions; and

a processor coupled to the memory, the processor configured to execute the instructions to cause the decoding device to: perform the method according to any one of claims 1 to 8.

~~16. A decoder comprising:~~

~~a receiving means for receiving a bitstream comprising a coded picture in one or more video coding layer (VCL) network abstraction layer (NAL) units and a non-VCL NAL unit, wherein a temporal identifier (TemporalId) for the non-VCL NAL unit is constrained to be equal to a TemporalId of an access unit (AU) containing the non-VCL NAL unit when a NAL unit type (nal_unit_type) of the non-VCL NAL is a supplemental enhancement information (SEI) message;~~

a decoding means for decoding the coded picture from the VCL NAL units to produce a decoded picture; and

a forwarding means for forwarding the decoded picture for display as part of a decoded video sequence.

17. The decoder of claim 16, wherein the decoder is further configured to perform the method of any of claims 1-8.

18. An encoder comprising:

an encoding means for:

encoding a coded picture in one or more video coding layer (VCL) network abstraction layer (NAL) units in a bitstream; and

encoding into the bitstream a non-VCL NAL unit such that a temporal identifier (TemporalId) for the non-VCL NAL unit is constrained to be equal to a TemporalId of an access unit (AU) containing the non-VCL NAL unit when a NAL unit type (nal_unit_type) of the non-VCL NAL is a supplemental enhancement information (SEI) message;

a hypothetical reference decoder (HRD) means for performing a set of bitstream conformance tests on the bitstream based on the SEI message; and

a storing means for storing the bitstream for communication toward a decoder.

19. The encoder of claim 18, wherein the encoder is further configured to perform the method of any of claims 9-13.