Reference Picture Management in Video Coding

~~CROSS-REFERENCE TO RELATED APPLICATIONS~~

~~**[0001]** This patent application claims the benefit of U.S. Provisional Patent Application No. 62/719,360, filed August 17, 2018, by Ye-Kui Wang, et al., and titled "Reference Picture Management in Video Coding," which is hereby incorporated by reference.~~

TECHNICAL FIELD

[~~0002~~0001] The present disclosure is generally related to techniques for reference picture management in video coding.

[0002] More specifically, this disclosure describes techniques for construction of reference picture lists and reference picture marking.

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] A first aspect relates to a method of decoding a coded video bitstream. The method comprises parsing a parameter set represented in the coded video bitstream, wherein the parameter set comprises a set of syntax elements that include a set of reference picture list structures; parsing a slice header of a current slice represented in the coded video bitstream,

CLAIMS

What is claimed is:

1. A method of decoding a coded video bitstream implemented by a video decoder, the method comprising:

parsing a parameter set represented in the coded video bitstream, wherein the parameter set comprises a set of syntax elements that include a set of reference picture list structures;

parsing a slice header of a current slice represented in the coded video bitstream, wherein the slice header comprises an index of a reference picture list structure among the set of reference picture list structures in the parameter set;

deriving, based on the set of syntax elements in the parameter set and the index of the reference picture list structure, a reference picture list of the current slice; and

obtaining, based on the reference picture list, at least one reconstructed block of the current slice.

2. The method of claim 1, wherein an order of entries in the reference picture list structure is the same as an order of corresponding reference pictures in the reference picture list.

3. The method of any of claims 1 to 2, wherein the order of entries is from zero to an indicated value.

4. The method of claim 3, wherein the indicated value is from zero to a value indicated by sps_max_dec_pic_buffering_minus1.

5. The method of any of claims 1 to 4, wherein the reference picture list is designated RefPictList[0].

6. The method of any of claims 1 to 4, wherein the reference picture list is designated RefPictList[1].

7. The method of any of claims 1 to 6, wherein the at least one reconstructed block is used to generate an image displayed on a display of an electronic device.

8. The method of any of claims 1 to 7, wherein the reference picture list comprises a list of reference pictures used for inter prediction.

9. The method of any of claims 1 to 8, wherein the inter prediction is for a P slice or for a B slice.

10. The method of any of claims 1 to 9, wherein the parameter set comprises a sequence parameter set (SPS).

11. The method of any of claims 1 to 10, wherein the set of syntax elements from the parameter set is disponsed in a Raw Byte Sequence Payload (RBSP) of a Network Abstraction Layer (NAL) unit.

12. The method of any of claims 7 to 11, wherein the reference picture list is designated RefPictList[0] or RefPictList[1], and an order of entries in the reference picture list structure is the same as an order of corresponding reference pictures in the reference picture list.

13. The method of any of claims 1 to 12, further comprising:

parsing a parameter set represented in the coded video bitstream, wherein the parameter set comprises a set of syntax elements that include a set of reference picture list structures;

obtaining a reference picture list structure represented in the coded video bitstream;

deriving, based on the reference picture list structure, a first reference picture list of a current slice, wherein the first reference picture list comprises at least one active entry and at least one inactive entry, wherein the at least one inactive entry refers to a reference picture not used for inter prediction of the current slice but referred to by an active entry in a second reference picture list, and wherein the second reference picture list is a reference picture list of a slice that follows the current slice in decoding order or a reference picture list of a picture that follows a current picture in decoding order; and

obtaining, based on at least one active entry of the first reference picture list, at least one reconstructed block of the current slice.

14. A decoding device, comprising:

a receiver configured to receive a coded video bitstream;

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

a processor coupled to the memory, the processor configured to execute the instructions stored in the memory to cause the processor to:

parse a parameter set represented in the coded video bitstream, wherein the parameter set comprises a set of syntax elements that include a set of reference picture list structures;

parse a slice header of a current slice represented in the coded video bitstream, wherein the slice header comprises an index of a reference picture list structure among the set of reference picture list structures in the parameter set;

derive, based on the set of syntax elements in the parameter set and the index of the reference picture list structure, a reference picture list of the current slice; and

obtain, based on the reference picture list, at least one reconstructed block of the current slice.

15. The decoding coding device of claim 14, further comprising a display configured to display an image based on the at least one reconstructed block.

16. A coding apparatus, comprising:

a receiver configured to receive a bitstream to decode;

a transmitter coupled to the receiver, the transmitter configured to transmit a decoded image to a display;

a memory coupled to at least one of the receiver or the transmitter, the memory configured to store instructions; and

a processor coupled to the memory, the processor configured to execute the instructions stored in the memory to perform the method in any of claims 1 to 13.

17. A system, comprising:

an encoder; and

a decoder in communication with the encoder, wherein the decoder includes the decoding device or the coding apparatus of any of claims 14 to 16.

18. A means for coding, comprising:

receiving means configured to receive a bitstream to decode;

~~transmission means coupled to the receiving means, the transmission means configured to transmit a decoded image to a display means;~~

~~storage means coupled to at least one of the receiving means or the transmission means, the storage means configured to store instructions; and~~

~~processing means coupled to the storage means, the processing means configured to execute the instructions stored in the storage means to perform the method in any of claims 1 to 13.~~

1. A method of decoding a coded video bitstream implemented by a video decoder, the method comprising:

parsing a parameter set represented in the coded video bitstream, wherein the parameter set comprises a sequence parameter set (SPS), the SPS comprises a set of reference picture list syntax structures, each reference picture list syntax structure comprises a list index (listIdx), the listIdx has a value of i to specify a reference picture list and the value of the listIdx equals to 0 or 1;

parsing a slice header of a current slice represented in the coded video bitstream, wherein the slice header comprises an index of a reference picture list syntax structure among the set of reference picture list syntax structures in the parameter set;

deriving, based on the set of reference picture list syntax structures and the index of the reference picture list syntax structure, a reference picture list of the current slice; and

obtaining, based on the reference picture list, at least one reconstructed block of the current slice.

2. The method of claim 1, wherein an order of entries in the reference picture list syntax structure is the same as an order of corresponding reference pictures in the reference picture list, wherein each entry in the reference picture list syntax structure describes a corresponding reference picture in the reference picture list.

3. The method of any of claims 1 to 2, wherein the at least one reconstructed block is used to generate an image displayed on a display of an electronic device.

4. The method of any of claims 1 to 2, wherein the reference picture list comprises a list of reference pictures used for inter prediction of the at least one reconstructed block.

5. The method of any of claims 1 to 2, wherein the current slice is a P slice or for a B slice.

6. The method of any of claims 1 to 2, wherein the set of syntax elements from the parameter set is disposed in a Raw Byte Sequence Payload (RBSP) of a Network Abstraction Layer (NAL) unit.

7. A decoding device, comprising:

a receiver configured to receive a coded video bitstream;

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

a processor coupled to the memory, the processor configured to execute the instructions stored in the memory to cause the processor to:

parse a parameter set represented in the coded video bitstream, wherein the parameter set comprises a sequence parameter set (SPS), the SPS comprises a set of reference picture list syntax structures, each reference picture list syntax structure comprises a list index (listIdx), the listIdx has a value of i to specify a reference picture list and the value of the listIdx equals to 0 or 1;

parse a slice header of a current slice represented in the coded video bitstream, wherein the slice header comprises an index of a reference picture list syntax structure among the set of reference picture list syntax structures in the parameter set;

derive, based on the set of reference picture list syntax structures and the index of the reference picture list structure, a reference picture list of the current slice; and

obtain, based on the reference picture list, at least one reconstructed block of the current slice.

8. The decoding coding device of claim 7, further comprising a display configured to display an image based on the at least one reconstructed block.

9. A method of encoding a coded video bitstream implemented by a video encoder, the method comprising:

constructing a reference picture list for a current slice;

obtaining, based on the reference picture list, at least one reconstructed block of the current slice;

enconding an index of the reference picture list syntax structure into a slice header, of the current slice, in the coded video bitstream, wherein the reference picture list syntax structure contains a number of entries used to derive the entries in the reference picture list, wherein the reference picture list syntax structure is among a set of reference picture list syntax structures in a parameter set of coded video bitstream,

wherein the parameter set comprises a sequence parameter set (SPS), the SPS comprises a set of reference picture list syntax structures, each reference picture list syntax structure comprises a list index (listIdx), the listIdx has a value of i to specify a reference picture list and the value of the listIdx equals to 0 or 1.

10. A encoding device, comprising:

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

a processor coupled to the memory, the processor configured to execute the instructions stored in the memory to cause the processor to:

construct a reference picture list for a current slice;

obtain, based on the reference picture list, at least one reconstructed block of the current slice;

enconde an index of a reference picture list syntax structure into a slice header, of the current slice, in the coded video bitstream, wherein the reference picture list syntax structure contains a number of entries used to derive the entries in the reference picture list, wherein the reference picture list syntax structure is among a set of reference picture list syntax structures in a parameter set of coded video bitstream,

wherein the parameter set comprises a sequence parameter set (SPS), the SPS comprises a set of reference picture list syntax structures, each reference picture list syntax structure comprises a list index (listIdx), the listIdx has a value of i to specify a reference picture list and the value of the listIdx equals to 0 or 1.

11. 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 slices, and comprising a slice header of a current slice and data represent the current slice, wherein the slice header comprises an index of a reference picture list syntax structure, wherein the reference picture list syntax structure contains a number of entries used to derive the entries

in a reference picture list, wherein the reference picture list syntax structure is among a set of reference picture list syntax structures in a parameter set of coded video bitstream,

wherein the parameter set comprises a sequence parameter set (SPS), the SPS comprises a set of reference picture list syntax structures, each reference picture list syntax structure comprises a list index (listIdx), the listIdx has a value of i to specify a reference picture list and the value of the listIdx equals to 0 or 1.

12. An encoder comprising processing circuitry for carrying out the method according to claim 9.

13. A decoder comprising processing circuitry for carrying out the method according to any of claims 1 to 2.

14. A computer program being stored in a non-transitory computer-readable storage medium, wherein the computer program comprises program code for performing the method according to any of claims 1 to 2 when executed on a computer or a processor.

15. A computer program being stored in a non-transitory computer-readable storage medium, wherein the computer program comprises program code for performing the method according to claim 9 when executed on a computer or a processor.

16. A non-transitory computer-readable storage medium carrying a program code which, when executed by a computer device, causes the computer device to perform the method of any of claims 1 to 2.

17. A non-transitory computer-readable storage medium carrying a program code which, when executed by a computer device, causes the computer device to perform the method of claim 9.

18. A coding apparatus, comprising:

a receiver configured to receive a bitstream to decode;

a transmitter coupled to the receiver, the transmitter configured to transmit a decoded image to a display;

a memory coupled to at least one of the receiver or the transmitter, the memory configured to store instructions; and

a processor coupled to the memory, the processor configured to execute the instructions stored in the memory to perform the method in any of claims 1 to 2 or claim 9.

19. A means for coding, comprising:

receiving means configured to receive a bitstream to decode;

transmission means coupled to the receiving means, the transmission means configured to transmit a decoded image to a display means;

storage means coupled to at least one of the receiving means or the transmission means, the storage means configured to store instructions; and

processing means coupled to the storage means, the processing means configured to execute the instructions stored in the storage means to perform the method in any of claims 1 to 2 or claim 9.