

What is claimed is:

1. A video coding method comprising:
receiving a video signal comprising one or more layers;
processing a base layer (BL) picture into an inter-layer reference (ILR) picture using picture level inter-layer prediction process;
selecting one or both of the processed ILR picture or an enhancement layer (EL) reference picture; and
predicting a current EL picture using the selected one or both of the ILR picture or the EL reference picture.
2. The method of claim 1, wherein the video signal comprises a BL and one or more ELs.
3. The method of claim 1 further comprising storing the processed ILR picture in an EL decoded picture buffer (DPB).
4. The method of claim 1, further comprising extracting a BL information from the BL, wherein the BL information comprises one or more of a BL mode information or a BL motion information.
5. The method of claim 4, further comprising processing the BL picture based on information comprising the extracted BL information.
6. The method of claim 1, further comprising:
converting a BL information from a first format to a second format; and
using the converted BL information in EL coding.
7. The method of claim 6, wherein the first format relates to a BL codec and the second format relates to an EL codec, and wherein the first format is different from the second format.
8. The method of claim 1, wherein the selected reference picture comprises one of the EL reference picture, or the ILR picture.
9. The method of claim 1, wherein the processed ILR picture is a non-collocated ILR picture.
10. The method of claim 1 wherein a plurality of the selected reference pictures correspond to a common time instance.

11. The method of claim 1, wherein processing the BL picture into an ILR picture comprises formatting the BL picture into a format that is suitable for prediction of the current EL picture.
12. The method of claim 11, wherein the format is dependent on a type of scalability between a BL codec and an EL codec.
13. The method of claim 12, wherein the type of scalability between the BL codec and the EL codec comprises one or more of spatial scalability or chroma format scalability.
14. The method of claim 13, wherein formatting the BL picture comprises upsampling the BL pictures.
15. The method of claim 12, wherein the type of scalability between the BL codec and the EL codec comprises one or more of quality scalability, spatial scalability, view scalability, standard scalability, or aspect ratio scalability.
16. The method of claim 15, wherein formatting a BL picture comprises one or more of denoising, restoration, or retargeting the BL pictures.
17. The method of claim 12, wherein the type of scalability between the BL codec and the EL codec comprises view scalability.
18. The method of claim 17, wherein formatting a BL picture comprises applying disparity compensation to the BL pictures.
19. The method of claim 12, wherein the type of scalability between the BL codec and the EL codec comprises bit-depth scalability.
20. The method of claim 19, wherein formatting a BL picture comprises inverse tone mapping the BL pictures.
21. The method of claim 1, further comprising packetizing inter-layer prediction (ILP) information.
22. The method of claim 21, wherein the ILP information comprises one or more of upsampling filter information, one or more coefficients for upsampling, one or more coefficients for denoising, one or more of disparity compensation parameters, or one or more of inverse tone mapping parameters.
23. The method of claim 21, further comprising sending the packetized ILP processing information via a network abstraction layer (NAL) unit.
24. A video coding system comprising:

a processor programmed to:

receive a video signal comprising one or more layers;
process a base layer (BL) picture into an inter-layer reference
(ILR) picture using picture level inter-layer prediction process;
select one or both of the processed ILR picture or an
enhancement layer (EL) reference picture; and
predict a current EL picture using the one or both of the selected
ILR picture or the EL reference picture.

25. The system of claim 24, wherein the video signal comprises a BL and one or more ELs.
26. The system of claim 24, wherein the processor is further programmed to store the processed ILR picture in an EL decoded picture buffer (DPB).
27. The system of claim 24, wherein the processor is further programmed to extract a BL information from the BL, wherein the BL information comprises one or more of a BL mode information or a BL motion information.
28. The system of claim 27, wherein the processor is further programmed to process the BL picture based on information comprising the extracted BL information.
29. The system of claim 24, wherein the processor is further programmed to:
convert a BL information from a first format to a second format; and
use the converted BL information in EL coding.
30. The system of claim 29, wherein the first format relates to a BL codec and the second format relates to an EL codec, and wherein the first format is different from the second format.
31. The system of claim 24, wherein the selected reference picture comprises one of the EL reference picture, or the ILR picture.
32. The system of claim 24, wherein the processed ILR picture is a non-located ILR picture.
33. The system of claim 24 wherein a plurality of the selected reference pictures correspond to a common time instance.
34. The system of claim 24, wherein processing the BL picture into an ILR picture comprises formatting the BL picture into a format that is suitable for prediction of the current EL picture.

35. The system of claim 34, wherein the format is dependent on a type of scalability between a BL codec and an EL codec.
36. The system of claim 35, wherein the type of scalability between the BL codec and the EL codec comprises one or more of spatial scalability or chroma format scalability.
37. The system of claim 36, wherein formatting the BL picture comprises upsampling the BL pictures.
38. The system of claim 35, wherein the type of scalability between the BL codec and the EL codec comprises one or more of quality scalability, spatial scalability, view scalability, standard scalability, or aspect ratio scalability.
39. The system of claim 38, wherein formatting a BL picture comprises one or more of denoising, restoration, or retargeting the BL pictures.
40. The system of claim 35, wherein the type of scalability between the BL codec and the EL codec comprises view scalability.
41. The system of claim 40, wherein formatting a BL picture comprises applying disparity compensation to the BL pictures.
42. The system of claim 35, wherein the type of scalability between the BL codec and the EL codec comprises bit-depth scalability.
43. The system of claim 42, wherein formatting a BL picture comprises inverse tone mapping the BL pictures.
44. The system of claim 24, wherein the processor is further programmed to packetize an inter-layer prediction (ILP) information.
45. The system of claim 44, wherein the ILP information comprises one or more of upsampling filter information, one or more coefficients for upsampling, one or more coefficients for denoising, one or more of disparity compensation parameters, or one or more of inverse tone mapping parameters.
46. The system of claim 44, wherein the processor is further programmed to send the packetized ILP information via a network abstraction layer (NAL) unit.

CLAIMS

1. A video coding method comprising:
 - receiving a video signal comprising at least a base layer (BL), an enhancement layer (EL), and an indication of a scalability type that relates the EL to the BL;
 - determining, based on the scalability type, a picture level inter-layer process for processing a BL picture into an inter-layer reference (ILR) picture;
 - performing the determined picture level inter-layer process on the BL picture to generate the ILR picture; and
 - in response to a determination that the ILR picture is included in a reference picture set associated with a current EL picture, predicting the current EL picture using the ILR picture.
2. The method of claim 1 further comprising storing the processed ILR picture in an EL decoded picture buffer (DPB).
3. The method of claim 1, wherein the video signal further comprises an indication of a second scalability type that relates the EL to the BL, and the method further comprises:
 - determining, based on the second scalability type, a second picture level inter-layer process for processing the BL picture into the ILR picture, wherein performing the determined picture level inter-layer process on the BL picture to generate the ILR picture further comprises performing the second picture level inter-layer process on the BL picture to generate the ILR picture.
4. The method of claim 1, wherein the video signal further comprises an indication of a second scalability type that relates the EL to the BL, and the method further comprises:
 - determining, based on the scalability type and the second scalability type, a combined picture level inter-layer process for processing the BL picture into the ILR

picture, wherein performing the determined picture level inter-layer process on the BL picture to generate the ILR picture further comprises performing the combined picture level inter-layer process on the BL picture to generate the ILR picture.

5. The method of claim 1, the method further comprising:
receiving packetized inter-layer prediction (ILP) information, wherein the determined picture level inter-layer process is performed based on the packetized ILP information.
6. The method of claim 5, wherein the packetized ILP information comprises at least one of upsampling filter information, denoising information, one or more of disparity compensation parameters, or one or more of inverse tone mapping parameters.
7. The method of claim 6, further comprising:
in response to a determination that the scalability type comprises at least one of spatial scalability or chroma format scalability, extracting the upsampling filter information from the packetized ILP information, wherein the determined picture level inter-layer process is performed using the extracted upsampling filter information.
8. The method of claim 6, the method further comprising, in response to a determination that the scalability type comprises bit-depth scalability, extracting the one or more of inverse tone mapping parameters from the packetized ILP information, wherein the determined picture level inter-layer process is performed using the extracted one or more of inverse tone mapping parameters.
9. The method of claim 6, wherein the packetized ILP information is received via a separate network abstraction layer (NAL) unit from a NAL carrying BL information or EL information.

10. The method of claim 9, wherein the NAL carrying the BL information or EL information comprises inverse tone mapping parameters.
11. A video coding system comprising:
 - a processor programmed to:
 - receive a video signal comprising at least a base layer (BL), an enhancement layer (EL), and an indication of a scalability type that relates the EL to the BL;
 - determine, based on the scalability type, a picture level inter-layer process for processing a BL picture into an inter-layer reference (ILR) picture;
 - perform the determined picture level inter-layer process on the BL picture to generate the ILR picture; and
 - in response to a determination that the ILR picture is included in a reference picture set associated with a current EL picture, predict the current EL picture using the ILR picture.
12. The system of claim 11 wherein the processor is further programmed to store the ILR picture in an EL decoded picture buffer (DPB).
13. The system of claim 11 or the method of claim 1, wherein the current EL picture corresponds to a time instance, and the ILR picture corresponds to a different time instance from the time instance that the current EL picture corresponds to.
14. The system of claim 11 or the method of claim 1, wherein the reference picture set further comprises a reference EL picture, and predicting the current EL picture comprises using the ILR picture and the reference EL picture.
15. The system of claim 11 or the method of claim 1, wherein predicting the current EL picture further comprises:
 - predicting a first portion of the current EL picture using the ILR picture; and

predicting a second portion of the current EL picture using a reference EL picture.

16. The system of claim 11, wherein the video signal further comprises an indication of a second scalability type that relates the EL to the BL, and the processor is further configured to:

determine, based on the second scalability type, a second picture level inter-layer process for processing the BL picture into the ILR picture, wherein performing the determined picture level inter-layer process on the BL picture to generate the ILR picture further comprises performing the second picture level inter-layer process on the BL picture to generate the ILR picture.

17. The system of claim 11, wherein the video signal further comprises an indication of a second scalability type that relates the EL to the BL, and the processor is further configured to:

determine, based on the scalability type and the second scalability type, a combined picture level inter-layer process for processing the BL picture into the ILR picture, wherein performing the determined picture level inter-layer process on the BL picture to generate the ILR picture further comprises performing the combined picture level inter-layer process on the BL picture to generate the ILR picture.

18. The system of claim 11 or the method of claim 1, wherein, in response to a determination that the scalability type comprises at least one of spatial scalability or chroma format scalability, the picture level inter-layer process is determined to comprise upsampling.

19. The system of claim 11 or the method of claim 1, wherein, in response to a determination that the scalability type comprises at least one of quality scalability, spatial scalability, view scalability, standard scalability, or aspect ratio scalability, the picture level inter-layer process is determined to comprise denoising.

20. The system of claim 11 or the method of claim 1, wherein, in response to a determination that the scalability type comprises view scalability, the picture level inter-layer process is determined to comprise disparity compensation.

21. The system of claim 11 or the method of claim 1, wherein, in response to a determination that the scalability type comprises bit-depth scalability, the picture level inter-layer process is determined to comprise inverse tone mapping.

22. The system of claim 11 or the method of claim 1, wherein, in response to a determination that the scalability type comprises bit-depth scalability and spatial scalability, the picture level inter-layer process is determined to comprise upsampling and inverse tone mapping.

23. The system of claim 11, the processor is further configured to:
receive packetized inter-layer prediction (ILP) information, wherein the determined picture level inter-layer process is performed based on the packetized ILP information.

24. The system of claim 23, wherein the packetized ILP information comprises at least one of upsampling filter information, denoising information, one or more of disparity compensation parameters, or one or more of inverse tone mapping parameters.

25. The system of claim 24, wherein the processor is further configured to, in response to a determination that the scalability type comprises at least one of spatial scalability or chroma format scalability, extract the upsampling filter information from the video signal, wherein the determined picture level inter-layer process is performed using the extracted upsampling filter information.

26. The system of claim 24, wherein the processor is further configured to, in response to a determination that the scalability type comprises bit-depth scalability, extract the one or more of inverse tone mapping parameters from the video signal, wherein the determined picture level inter-layer process is performed using the extracted one or more of inverse tone mapping parameters.

27. The system of claim 23, wherein the processor is further programmed to receive the packetized ILP information via a separate network abstraction layer (NAL) unit from a NAL carrying BL information or EL information.

28. The system of claim 27, wherein the NAL carrying the BL information or EL information comprises inverse tone mapping parameters.