Claims

1. A method comprising:

encoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer;

encoding an indication of both the base layer and the first enhancement layer used for prediction for the second enhancement layer in the bitstream;

encoding, in the bitstream, an indication of a first set of prediction types that is applicable from the base layer to the second enhancement layer, wherein the first set of prediction types is a subset of all prediction types available for prediction between layers, and

encoding, in the bitstream, an indication of a second set of prediction types that is applicable from the base layer or the first enhancement layer to the second enhancement layer, wherein the second set of prediction types is a subset of all prediction types available for prediction between layers.

2. The method according to claim 1, wherein instead or in addition to the indication of the first or the second set of prediction types that is applicable from the base or the first enhancement layer to the second enhancement layer, the method comprises

encoding, in the bitstream, an indication of at least one set of prediction types that is not applicable from the base or the first enhancement layer to the second enhancement layer.

3. The method according to claim 1 or 2, wherein the second enhancement layer enhances a first scalability type relative to the base layer and a second scalability type relative to the first enhancement layer.

4. The method according to any preceding claim, the method further comprising

associating an indication for each of one or more combinations of the base and/or the first enhancement layer and the second enhancement layer; and

encoding one or more of said indications in the bitstream to indicate whether a particular set of prediction types is applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer or whether that particular set of prediction types is not applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer.

5. The method according to any preceding claim, the method further comprising

encoding said indications in at least one of the following syntax structures: a video parameter set, a sequence parameter set, a picture parameter set, any other type of a parameter set, a sequence header, a group of pictures header, a picture header, a slice header, and/or a supplemental enhancement information message.

6. The method according to any preceding claim, wherein said prediction types include at least one of the following: sample prediction, motion information prediction, filtering parameter prediction.

7. The method according to any preceding claim, the method further comprising

associating an indication to indicate the applicability of several types of prediction into one value of a syntax element.

8. The method according to any preceding claim, the method further comprising

encoding, in a syntax structure, an indication for a certain prediction type; and

encoding, in the syntax structure, a list of pairs of reference and enhancement layers between which the prediction type is applicable.

9. The method according to any preceding claim, the method further comprising

encoding one or more indications for a first type of pictures, such as for RAP pictures; and

encoding one or more indications for a second type of pictures, such as for non-RAP pictures.

10. The method according to any preceding claim, the method further comprising

encoding indications separately for different types of scalability, different sets of scalability layers, and/or different sets of temporal sub-layers.

11. An apparatus comprising:

at least one processor and at least one memory, said at least one memory stored with code thereon, which when executed by said at least one processor, causes the apparatus to perform:

encoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer;

encoding an indication of both the base layer and the first enhancement layer used for prediction for the second enhancement layer in the bitstream;

encoding, in the bitstream, an indication of a first set of prediction types that is applicable from the base layer to the second enhancement layer, wherein the first set of prediction types is a subset of all prediction types available for prediction between layers, and

encoding, in the bitstream, an indication of a second set of prediction types that is applicable from the base layer or the first enhancement layer to the second enhancement layer, wherein the second set of prediction types is a subset of all prediction types available for prediction between layers.

12. The apparatus according to claim 11, wherein instead or in addition to the indication of the first or the second set of prediction types that is applicable from the base or the first enhancement layer to the second enhancement layer, the apparatus being further configured for

encoding, in the bitstream, an indication of at least one set of prediction types that is not applicable from the base or the first enhancement layer to the second enhancement layer.

13. The apparatus according to claim 11 or 12, wherein the second enhancement layer enhances a first scalability type relative to the base layer and a second scalability type relative to the first enhancement layer.

14. The apparatus according to any of claims 11 - 13, the apparatus being further configured for

associating an indication for each of one or more combinations of the base and/or the first enhancement layer and the second enhancement layer; and

encoding one or more of said indications in the bitstream to indicate whether a particular set of prediction types is applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer or whether that particular set of prediction types is not applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer.

15. The apparatus according to any of claims 11 - 14, the apparatus being further configured for

encoding said indications in at least one of the following syntax structures: a video parameter set, a sequence parameter set, a picture parameter set, any other type of a parameter set, a sequence header, a group of pictures header, a picture header, a slice header, and/or a supplemental enhancement information message.

16. The apparatus according to any of claims 11 - 15, wherein said prediction types include at least one of the following: sample prediction, motion information prediction, filtering parameter prediction.

17. The apparatus according to any of claims 11 - 16, the apparatus being further configured for

associating an indication to indicate the applicability of several types of prediction into one value of a syntax element.

18. The apparatus according to any of claims 11 - 17, the apparatus being further configured for

encoding, in a syntax structure, an indication for a certain prediction type; and

encoding, in the syntax structure, a list of pairs of reference and enhancement layers between which the prediction type is applicable.

19. The apparatus according to any of claims 11 - 18, the apparatus being further configured for

encoding one or more indications for a first type of pictures, such as for RAP pictures; and

encoding one or more indications for a second type of pictures, such as for non-RAP pictures.

20. The apparatus according to any of claims 11 - 19, the apparatus being further configured for

encoding indications separately for different types of scalability, different sets of scalability layers, and/or different sets of temporal sub-layers.

21. A computer readable storage medium stored with code thereon for use by an apparatus, which when executed by a processor, causes the apparatus to perform:

encoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer;

encoding an indication of both the base layer and the first enhancement layer used for prediction for the second enhancement layer in the bitstream;

encoding, in the bitstream, an indication of a first set of prediction types that is applicable from the base layer to the second enhancement layer, wherein the first set of prediction types is a subset of all prediction types available for prediction between layers, and

encoding, in the bitstream, an indication of a second set of prediction types that is applicable from the base layer or the first enhancement layer to the second enhancement layer, wherein the second set of prediction types is a subset of all prediction types available for prediction between layers.

22. A method comprising:

decoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer, the method comprising

interpreting, from the bitstream, an indication indicating both the base layer and the first enhancement layer used for prediction for the second enhancement layer;

interpreting, from the bitstream, an indication of a first set of prediction types that is applicable from the base layer to the second enhancement layer, wherein the first set of prediction types is a subset of all prediction types available for prediction between layers;

interpreting, from the bitstream, an indication of a second set of prediction types that is applicable from the base layer or the first enhancement layer to the second enhancement layer, wherein the second set of prediction types is a subset of all prediction types available for prediction between layers; and

decoding said second enhancement layer using only said first set of prediction types from the base layer and said second set of prediction types from the first enhancement layer.

23. The method according to claim 22, wherein instead or in addition to the indication of the first or the second set of prediction types that is applicable from the base or the first enhancement layer to the second enhancement layer, the method comprises

decoding, from the bitstream, an indication of at least one set of prediction types that is not applicable from the base or the first enhancement layer to the second enhancement layer.

24. The method according to claim 22 or 23, wherein the second enhancement layer enhances of a first scalability type relative to the base layer and a second scalability type relative to the first enhancement layer.

25. The method according to any of claims 22 - 24, wherein the bitstream comprises an indication associated for each of one or more combinations of the base and/or the first enhancement layer and the second enhancement layer; the method further comprising

decoding one or more of said indications from the bitstream to interpret whether a particular set of prediction types is applicable for prediction from the base and/or the first enhancement layer

to the second enhancement layer or whether that particular prediction type is not applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer.

26. The method according to any of claims 22 - 25, the method further comprising decoding said indication from at least one of the following syntax structures: a video parameter set, a sequence parameter set, a picture parameter set, any other type of a parameter set, a sequence header, a group of pictures header, a picture header, a slice header, and/or a supplemental enhancement information message.

27. The method according to any of claims 22 - 26, wherein said prediction types include at least one of the following: sample prediction, motion information prediction, filtering parameter prediction.

28. The method according to any of claims 22 - 27, the method further comprising interpreting an indication indicating the applicability of several types of prediction into one value of a syntax element.

29. The method according to any of claims 22 - 28, the method further comprising decoding, from the syntax structure, an indication for a certain prediction type; and decoding, from the syntax structure, a list of pairs of reference and enhancement layers between which the prediction type is applicable.

30. The method according to any of claims 22 - 29, the method further comprising decoding one or more indications for a first type of pictures, such as for RAP pictures; and decoding one or more indications for a second type of pictures, such as for non-RAP pictures.

31. The method according to any of claims 22 - 30, the method further comprising decoding indications separately for different types of scalability, different sets of scalability layers, and/or different sets of temporal sub-layers.

32. An apparatus comprising:

at least one processor and at least one memory, said at least one memory stored with code thereon, which when executed by said at least one processor, causes the apparatus to perform:

decoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer, the method comprising

interpreting, from the bitstream, an indication indicating both the base layer and the first enhancement layer used for prediction for the second enhancement layer;

interpreting, from the bitstream, an indication of a first set of prediction types that is applicable from the base layer to the second enhancement layer, wherein the first set of prediction types is a subset of all prediction types available for prediction between layers;

interpreting, from the bitstream, an indication of a second set of prediction types that is applicable from the base layer or the first enhancement layer to the second enhancement layer, wherein the second set of prediction types is a subset of all prediction types available for prediction between layers; and

decoding said second enhancement layer using only said first set of prediction types from the base layer and said second set of prediction types from the first enhancement layer.

33. The apparatus according to claim 32, wherein instead or in addition to the indication of the first or the second set of prediction types that is applicable from the base or the first enhancement layer to the second enhancement layer, the apparatus being configured for

decoding, from the bitstream, an indication of at least one set of prediction types that is not applicable from the base or the first enhancement layer to the second enhancement layer.

34. The apparatus according to claim 32 or 33, wherein the second enhancement layer enhances of a first scalability type relative to the base layer and a second scalability type relative to the first enhancement layer.

35. The apparatus according to any of claims 32 - 34, wherein the bitstream comprises an indication associated for each of one or more combinations of the base and/or the first enhancement layer and the second enhancement layer; the apparatus being further configured for

decoding one or more of said indications from the bitstream to interpret whether a particular set of prediction types is applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer or whether that particular prediction type is not applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer.

36. The apparatus according to any of claims 32 - 35, the apparatus being further configured for

decoding said indication from at least one of the following syntax structures: a video parameter set, a sequence parameter set, a picture parameter set, any other type of a parameter set, a sequence header, a group of pictures header, a picture header, a slice header, and/or a supplemental enhancement information message.

37. The apparatus according to any of claims 32 - 36, wherein said prediction types include at least one of the following: sample prediction, motion information prediction, filtering parameter prediction.

38. The apparatus according to any of claims 32 - 37, the apparatus being further configured for

interpreting an indication indicating the applicability of several types of prediction into one value of a syntax element.

39. The apparatus according to any of claims 32 - 38, the apparatus being further configured for

decoding, from the syntax structure, an indication for a certain prediction type; and

decoding, from the syntax structure, a list of pairs of reference and enhancement layers between which the prediction type is applicable.

40. The apparatus according to any of claims 32 - 39, the apparatus being further configured for

decoding one or more indications for a first type of pictures, such as for RAP pictures; and

decoding one or more indications for a second type of pictures, such as for non-RAP pictures.

41. The apparatus according to any of claims 32 - 40, the apparatus being further configured for

decoding indications separately for different types of scalability, different sets of scalability layers, and/or different sets of temporal sub-layers.

42. A computer readable storage medium stored with code thereon for use by an apparatus, which when executed by a processor, causes the apparatus to perform:

decoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer, the method comprising

interpreting, from the bitstream, an indication indicating both the base layer and the first enhancement layer used for prediction for the second enhancement layer;

interpreting, from the bitstream, an indication of a first set of prediction types that is applicable from the base layer to the second enhancement layer, wherein the first set of prediction types is a subset of all prediction types available for prediction between layers;

interpreting, from the bitstream, an indication of a second set of prediction types that is applicable from the base layer or the first enhancement layer to the second enhancement layer, wherein the second set of prediction types is a subset of all prediction types available for prediction between layers; and

decoding said second enhancement layer using only said first set of prediction types from the base layer and said second set of prediction types from the first enhancement layer.

43. A video encoder configured for encoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer, wherein said video encoder is further configured for:

encoding an indication of both the base layer and the first enhancement layer used for prediction for the second enhancement layer in the bitstream;

encoding, in the bitstream, an indication of a first set of prediction types that is applicable from the base layer to the second enhancement layer, wherein the first set of prediction types is a subset of all prediction types available for prediction between layers, and

encoding, in the bitstream, an indication of a second set of prediction types that is applicable from the base layer or the first enhancement layer to the second enhancement layer, wherein the second set of prediction types is a subset of all prediction types available for prediction between layers.

44. A video decoder configured for decoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer, wherein said video decoder is further configured for:

decoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer, the method comprising

interpreting, from the bitstream, an indication indicating both the base layer and the first enhancement layer used for prediction for the second enhancement layer;

interpreting, from the bitstream, an indication of a first set of prediction types that is applicable from the base layer to the second enhancement layer, wherein the first set of prediction types is a subset of all prediction types available for prediction between layers;

interpreting, from the bitstream, an indication of a second set of prediction types that is applicable from the base layer or the first enhancement layer to the second enhancement layer, wherein the second set of prediction types is a subset of all prediction types available for prediction between layers; and

decoding said second enhancement layer using only said first set of prediction types from the base layer and said second set of prediction types from the first enhancement layer.

Claims

1. A method for encoding video into a bitstream, the method comprising:

encoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer;

encoding an indication of both the base layer and the first enhancement layer used for prediction for the second enhancement layer in the bitstream;

encoding, in the bitstream, an indication of a first set of prediction types that is applicable from the base layer to the second enhancement layer, wherein the first set of prediction types is a subset of all prediction types available for prediction between layers, and

encoding, in the bitstream, an indication of a second set of prediction types that is applicable from the base layer or the first enhancement layer to the second enhancement layer, wherein the second set of prediction types is a subset of all prediction types available for prediction between layers.

2. The method according to claim 1, wherein instead or in addition to the indication of the first or the second set of prediction types that is applicable from the base or the first enhancement layer to the second enhancement layer, the method comprises

encoding, in the bitstream, an indication of at least one set of prediction types that is not applicable from the base or the first enhancement layer to the second enhancement layer.

3. The method according to claim 1 or 2, the method further comprising

associating an indication for each of one or more combinations of the base and/or the first enhancement layer and the second enhancement layer; and

encoding one or more of said indications in the bitstream to indicate whether a particular set of prediction types is applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer or whether that particular set of prediction types is not applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer.

4. The method according to claim 1 or 2, the method further comprising

associating an indication to indicate the applicability of several types of prediction into one value of a syntax element.

5. The method according to claim 1 or 2, the method further comprising

encoding, in a syntax structure, an indication for a certain prediction type; and

encoding, in the syntax structure, a list of pairs of reference and enhancement layers between which the prediction type is applicable.

6. An apparatus for encoding video into a bitstream, the apparatus comprising:

means for encoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer;

means for encoding an indication of both the base layer and the first enhancement layer used for prediction for the second enhancement layer in the bitstream;

means for encoding, in the bitstream, an indication of a first set of prediction types that is applicable from the base layer to the second enhancement layer, wherein the first set of prediction types is a subset of all prediction types available for prediction between layers, and

means for encoding, in the bitstream, an indication of a second set of prediction types that is applicable from the base layer or the first enhancement layer to the second enhancement layer, wherein the second set of prediction types is a subset of all prediction types available for prediction between layers.

7. The apparatus according to claim 6, the apparatus further comprises:

means for encoding, in the bitstream, an indication of at least one set of prediction types that is not applicable from the base or the first enhancement layer to the second enhancement layer.

8. The apparatus according to claim 6 or 7, the apparatus further comprises:

means for associating an indication for each of one or more combinations of the base and/or the first enhancement layer and the second enhancement layer; and

means for encoding one or more of said indications in the bitstream to indicate whether a particular set of prediction types is applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer or whether that particular set of prediction types is not applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer.

9. The apparatus according to claim 6 or 7, the apparatus further comprises:

means for associating an indication to indicate the applicability of several types of prediction into one value of a syntax element.

10. The apparatus according to claim 6 or 7, the apparatus further comprises:

means for encoding, in a syntax structure, an indication for a certain prediction type; and

means for encoding, in the syntax structure, a list of pairs of reference and enhancement layers between which the prediction type is applicable.

11. A method for decoding an encoded video bitstream, the method comprising:

decoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer, the method comprising

interpreting, from the bitstream, an indication indicating both the base layer and the first enhancement layer used for prediction for the second enhancement layer;

interpreting, from the bitstream, an indication of a first set of prediction types that is applicable from the base layer to the second enhancement layer, wherein the first set of prediction types is a subset of all prediction types available for prediction between layers;

interpreting, from the bitstream, an indication of a second set of prediction types that is applicable from the base layer or the first enhancement layer to the second enhancement layer, wherein the second set of prediction types is a subset of all prediction types available for prediction between layers; and

decoding said second enhancement layer using only said first set of prediction types from the base layer and said second set of prediction types from the first enhancement layer.

12. The method according to claim 11, wherein instead or in addition to the indication of the first or the second set of prediction types that is applicable from the base or the first enhancement layer to the second enhancement layer, the method comprises

decoding, from the bitstream, an indication of at least one set of prediction types that is not applicable from the base or the first enhancement layer to the second enhancement layer.

13. The method according to claim 11 or 12, wherein the bitstream comprises an indication associated for each of one or more combinations of the base and/or the first enhancement layer and the second enhancement layer; the method further comprising

decoding one or more of said indications from the bitstream to interpret whether a particular set of prediction types is applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer or whether that particular prediction type is not applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer.

14. The method according to claim 11 or 12, the method further comprising

interpreting an indication indicating the applicability of several types of prediction into one value of a syntax element.

15. The method according to claim 11 or 12, the method further comprising

decoding, from the syntax structure, an indication for a certain prediction type; and

decoding, from the syntax structure, a list of pairs of reference and enhancement layers between which the prediction type is applicable.

16. An apparatus for decoding an encoded video bitstream, the apparatus comprising:

means for decoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer, the method comprising

means for interpreting, from the bitstream, an indication indicating both the base layer and the first enhancement layer used for prediction for the second enhancement layer;

means for interpreting, from the bitstream, an indication of a first set of prediction types that is applicable from the base layer to the second enhancement layer, wherein the first set of prediction types is a subset of all prediction types available for prediction between layers;

means for interpreting, from the bitstream, an indication of a second set of prediction types that is applicable from the base layer or the first enhancement layer to the second enhancement layer, wherein the second set of prediction types is a subset of all prediction types available for prediction between layers; and

means for decoding said second enhancement layer using only said first set of prediction types from the base layer and said second set of prediction types from the first enhancement layer.

17. The apparatus according to claim 16, the apparatus further comprises:

means for decoding, from the bitstream, an indication of at least one set of prediction types that is not applicable from the base or the first enhancement layer to the second enhancement layer.

18. The apparatus according to claim 16 or 17, wherein the bitstream comprises an indication associated for each of one or more combinations of the base and/or the first enhancement layer and the second enhancement layer; the apparatus further comprises:

means for decoding one or more of said indications from the bitstream to interpret whether a particular set of prediction types is applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer or whether that particular prediction type is not applicable for prediction from the base and/or the first enhancement layer to the second enhancement layer.

19. The apparatus according to claim 16 or 17, the apparatus further comprises:

means for interpreting an indication indicating the applicability of several types of prediction into one value of a syntax element.

20. The apparatus according to claim 16 or 17, the apparatus further comprises:

means for decoding, from the syntax structure, an indication for a certain prediction type; and

means for decoding, from the syntax structure, a list of pairs of reference and enhancement layers between which the prediction type is applicable.

21. A video encoder configured for encoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer, wherein said video encoder is further configured for:

encoding an indication of both the base layer and the first enhancement layer used for prediction for the second enhancement layer in the bitstream;

encoding, in the bitstream, an indication of a first set of prediction types that is applicable from the base layer to the second enhancement layer, wherein the first set of prediction types is a subset of all prediction types available for prediction between layers, and

encoding, in the bitstream, an indication of a second set of prediction types that is applicable from the base layer or the first enhancement layer to the second enhancement layer, wherein the second set of prediction types is a subset of all prediction types available for prediction between layers.

22. A video decoder configured for decoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer, wherein said video decoder is further configured for:

decoding a bitstream comprising a base layer, a first enhancement layer and a second enhancement layer, the method comprising

interpreting, from the bitstream, an indication indicating both the base layer and the first enhancement layer used for prediction for the second enhancement layer;

interpreting, from the bitstream, an indication of a first set of prediction types that is applicable from the base layer to the second enhancement layer, wherein the first set of prediction types is a subset of all prediction types available for prediction between layers;

interpreting, from the bitstream, an indication of a second set of prediction types that is applicable from the base layer or the first enhancement layer to the second enhancement layer,

wherein the second set of prediction types is a subset of all prediction types available for prediction between layers; and

decoding said second enhancement layer using only said first set of prediction types from the base layer and said second set of prediction types from the first enhancement layer.