

CLAIMS

What is claimed is:

1. A method for inter-prediction of a current image block in a current picture of a video, the method comprising:

determining whether the current picture is temporally between a first reference picture and a second reference picture and whether a first temporal distance and a second temporal distance are the same distance, wherein the first temporal distance is between the current picture and the first reference picture, and the second temporal distance is between the current picture and the second reference picture; and

performing motion vector refinement (DMVR) procedure to determine a prediction block of the current image block, when it is determined that the current picture is temporally between the first reference picture and the second reference picture and that the first temporal distance and the second temporal distance are the same distance.

2. The method according to claim 1, further comprising:

performing motion compensation using a first initial motion vector and a second initial motion vector to determine the prediction block of the current image block, when it is determined that the first temporal distance and the second temporal distance are different distance or that the current picture is not temporally between the first reference picture and the second reference picture.

3. The method according to claim 1, wherein the step of performing motion vector refinement (DMVR) procedure comprises:

determining a pair of best-matching blocks pointed to by best motion vectors from a plurality of pairs of reference blocks, wherein each of said plurality of pairs of reference blocks includes a first reference block that is in the first reference picture and that is determined based on a first initial motion vector and a second reference block that is in the second reference picture and that is determined based on a second initial motion vector;

wherein the best motion vectors include a first refined motion vector and a second refined motion vector.

4. The method according to claim 1, wherein the step of performing motion vector refinement (DMVR) procedure comprises:

determining positions of a pair of reference blocks from positions of M pairs of reference blocks as a position of a first refined reference block and a position of a second refined reference block based on a matching cost criterion, wherein the positions of the M pairs of reference blocks are determined based on a first initial motion vector, a second initial motion vector and a position of the current image block, wherein positions of each pair of reference blocks include a position of a first reference block and a position of a second reference block, wherein the first reference block is included in the first reference image, and the second reference block is included in the second reference image, and wherein for each pair of reference blocks, a first position offset ($\Delta 0x$, $\Delta 0y$) and a second position offset ($\Delta 1x$, $\Delta 1y$) are equal in magnitude and opposite in sign, and the first position offset ($\Delta 0x$, $\Delta 0y$) represents an offset of the position of the first reference block relative to a position of a first initial reference block, and the second position offset ($\Delta 1x$, $\Delta 1y$) represents an offset of the position of the second reference block relative to a position of a second initial reference block, wherein M is an integer greater than or equal to 1.

5. The method according to any one of claims 2 to 4, wherein initial motion information of the current image block comprises the first initial motion vector, a first reference index, the second initial motion vector and a second reference index, wherein the first reference index indicates the first reference picture, and the second reference index indicates the second reference picture.

6. The method according to any one of the preceding claims, wherein the first reference picture is a reference image temporally preceding the current picture and the second reference picture is a reference image preceded temporally by the current picture; or

the first reference picture is a reference image preceded temporally by the current picture and the second reference picture is a reference image temporally preceding the current picture; or

wherein the first reference picture is a reference image in a past time and the second reference picture is a reference image in a future time; or the first reference picture is a reference image in the future time and the second reference picture is a reference image in the past time.

7. The method according to any one of the preceding claims, wherein the first temporal distance indicates a picture order count (POC) distance between the current picture and the first reference picture, and the second temporal distance indicates a POC distance between the current picture and the second reference picture; or

wherein the first temporal distance (TD0) is represented in terms of difference between a picture order count value (POCc) of the current picture and a picture order count value (POC0) of the first reference image; and the second temporal distance (TD1) is represented in terms of difference between the picture order count value (POCc) of the current picture and a picture order count value (POC1) of the second reference image.

8. The method according to any one of the preceding claims,

wherein the determining whether the current picture is temporally between a first reference picture and a second reference picture and whether a first temporal distance and a second temporal distance are the same distance, comprises:

determining whether the first temporal distance and the second temporal distance are equal in magnitude and opposite in sign, wherein the first temporal distance is represented in terms of a difference between the picture order count value of the current picture and the picture order count value of the first reference image; and the second temporal distance is represented in terms of a difference between the picture order count value of the current picture and the picture order count value of the second reference image;

wherein the performing motion vector refinement (DMVR) procedure comprises:

performing motion vector refinement (DMVR) procedure to determine a prediction block of the current image block, when it is determined that the first temporal distance and the second temporal distance are equal in magnitude and opposite in sign.

9. A method for inter-prediction of a current image block in a current picture of a video, the method comprising:

determining whether the current picture is temporally between a first reference picture and a second reference picture and whether a first temporal distance and a second temporal distance are the same distance, wherein the first temporal distance is between the current picture and the first reference picture, and the second temporal distance is between the current picture and the second reference picture; and

performing motion compensation using a first initial motion vector and a second initial motion vector to determine a prediction block of the current image block, when it is determined that the first temporal distance and the second temporal distance are different distance or that the current picture is not temporally between the first reference picture and the second reference picture.

10. The method according to claim 9, wherein initial motion information of the current image block comprises the first initial motion vector, a first reference index, the second initial motion vector and a second reference index, wherein the first reference index indicates the first reference picture, and the second reference index indicates the second reference picture.

11. The method according to claim 9 or 10, wherein the first temporal distance indicates a picture order count (POC) distance between the current picture and the first reference picture, and the second temporal distance indicates a POC distance between the current picture and the second reference picture; or

wherein the first temporal distance (TD0) is represented in terms of difference between a picture order count value (POCc) of the current picture and a picture order count value (POC0) of the first reference image; and the second temporal distance (TD1) is represented in terms of difference between the picture order count value (POCc) of the current picture and a picture order count value (POC1) of the second reference image.

12. A method for inter-prediction of a current image block in a current picture of a video, the method comprising:

determining whether a first temporal distance is equal to a second temporal distance, wherein the first temporal distance is represented in terms of a difference between a picture order count value of the current picture and a picture order count value of a first reference image; and the second

temporal distance is represented in terms of a difference between a picture order count value of a second reference image and the picture order count value of the current picture; and

performing motion vector refinement (DMVR) procedure to determine a prediction block of the current image block, when it is determined that the first temporal distance is equal to the second temporal distance.

13. The method according to claim 12, further comprising:

performing motion compensation using a first initial motion vector and a second initial motion vector to determine a prediction block of the current image block, when it is determined that the first temporal distance is not equal to the second temporal distance.

14. The method according to claim 12, the step of performing motion vector refinement (DMVR) procedure, comprises:

determining a pair of best-matching blocks pointed to by best motion vectors from a plurality of pairs of reference blocks, wherein said pair of reference blocks includes a first reference block that is of the first reference picture and that is determined based on a first initial motion vector and a second reference block that is of the second reference picture and that is determined based on a second initial motion vector;

wherein the best motion vectors include a first refined motion vector and a second refined motion vector.

15. The method according to claim 13 or 14,

wherein initial motion information of the current image block comprises the first initial motion vector, a first reference index, the second initial motion vector and a second reference index, wherein the first reference index indicates the first reference picture, and the second reference index indicates the second reference picture.

16. A method for inter-prediction of a current image block in a current picture of a video, the method comprising:

determining whether a first temporal distance is equal to a second temporal distance, wherein the first temporal distance is represented in terms of a difference between a picture order count value of the current picture and a picture order count value of a first reference image; and the second temporal distance is represented in terms of a difference between a picture order count value of a second reference image and the picture order count value of the current picture;

performing no motion vector refinement (DMVR) procedure on the current image block, when it is determined that the first temporal distance is not equal to the second temporal distance.

17. A method for encoding a video image comprising:

performing inter-prediction of a current image block in a current picture of the video to obtain a prediction block of the current image block according to the method of any of claims 1 to 15;

generating a bitstream including a residual between the current image block and the prediction block and an index for indicating initial motion information.

18. A method for decoding a video image from a bitstream comprising:

parsing from the bitstream an index for indicating an initial motion information and a residual between a current image block and a prediction block of the current image block;

performing inter-prediction of a current image block in a current picture of a video to obtain a prediction block of the current image block according to the method of any of claims 1 to 15; and

reconstructing the current image block based on the residual and the prediction block.

19. A method of encoding implemented by an encoding device, comprising:

determining value of a syntax element indicating whether the method according to any one of claims 1, 3-8 and 12-15 is enabled or not; and

generating a bitstream including the syntax element.

20. The method according to claim 19, wherein the syntax element is signaled at any one of a sequence parameter set (SPS) level, a picture parameter set (PPS) level, a slice header, coding tree unit (CTU) syntax, or coding unit (CU) syntax.

21. A method of decoding implemented by a decoding device, comprising:

parsing from a bitstream a syntax element indicating whether the method according to any one of claims 1, 3-8 and 12-15 is enabled or not; and

adaptively enabling or disabling a decoder-side motion vector refinement (DMVR) procedure according to the syntax element.

22. The method according to claim 21, wherein the syntax element is obtained from any one of a sequence parameter set (SPS) level of a bitstream, a picture parameter set (PPS) level of the bitstream, a slice header, coding tree unit (CTU) syntax, or coding unit (CU) syntax.

23. A coding device, comprising:

a 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:

determine whether a current picture is temporally between a first reference picture and a second reference picture and whether a first temporal distance and a second temporal distance are the same distance, wherein the first temporal distance (TD0) is between the current picture and the first reference picture (RefPic0), and the second temporal distance (TD1) is between the current picture and the second reference picture (RefPic1); and

perform motion vector refinement (DMVR) procedure to determine a prediction block of a current image block in the current picture, when it is determined that the current picture is temporally between the first reference picture and the second reference picture and that the first temporal distance and the second temporal distance are the same distance.

24. The coding device according to claim 23, wherein the processor is further configured to perform motion compensation using a first initial motion vector and a second initial motion vector to determine a prediction block of the current image block, when it is determined that the first temporal distance and the second temporal distance are different or that the current picture is not temporally between the first reference picture and the second reference picture.

25. The device according to claim 23, for performing motion vector refinement (DMVR) procedure, wherein the processor is configured to:

determine a pair of best-matching blocks pointed to by best motion vectors from a plurality of pairs of reference blocks, wherein said pair of reference blocks includes a first reference block that is in the first reference picture and that is determined based on a first initial motion vector and a second reference block that is in the second reference picture and that is determined based on a second initial motion vector;

wherein the best motion vectors include a first refined motion vector and a second refined motion vector.

26. The device according to claim 23, for performing motion vector refinement (DMVR) procedure, wherein the processor is specifically configured to:

determine positions of a pair of reference blocks from positions of M pairs of reference blocks as a position of a first refined reference block and a position of a second refined reference block based on a matching cost criterion, wherein the positions of the M pairs of reference blocks are determined based on the first initial motion vector, the second initial motion vector and a position of the current image block; and positions of each pair of reference blocks include a position of a first reference block and a position of a second reference block, wherein the first reference block is included in the first reference image, and the second reference block is included in the second reference image, and for each pair of reference blocks, a first position offset and a second position offset are equal in magnitude and opposite in sign, and the first position offset represents an offset of the position of the first reference block relative to a position of a first initial reference block, and the second position offset represents an offset of the

position of the second reference block relative to a position of a second initial reference block, wherein M is an integer greater than or equal to 1.

27. The device according to any one of claims 24 to 26, wherein the processor is further configured to obtain initial motion information of the current image block in the current picture, wherein the initial motion information comprises the first initial motion vector, a first reference index, the second initial motion vector and a second reference index, wherein the first reference index indicates the first reference picture, and the second reference index indicates the second reference picture.

28. The device according to any one of the preceding claims, wherein the first reference picture is a reference image temporally preceding the current picture and the second reference picture is a reference image preceded temporally by the current picture; or the first reference picture is a reference image preceded temporally by the current picture and the second reference picture is a reference image temporally preceding the current picture; or

wherein the first reference picture is a reference image in a past time and the second reference picture is a reference image in a future time; or the first reference picture is a reference image in the future time and the second reference picture is a reference image in the past time.

29. The device according to any one of the preceding claims, wherein the first temporal distance indicates a picture order count (POC) distance between the current picture and the first reference picture, and the second temporal distance indicates a POC distance between the current picture and the second reference picture; or

wherein the first temporal distance (TD0) is represented in terms of difference between the picture order count value (POCc) of the current picture and the picture order count value (POC0) of the first reference image; and the second temporal distance (TD1) is represented in terms of difference between the picture order count value (POCc) of the current picture and the picture order count value (POC1) of the second reference image.

30. The device according to any one of the preceding claims,

wherein the processor is configured to determine whether the first temporal distance and the second temporal distance are equal in magnitude and opposite in sign, wherein the first temporal distance is represented in terms of difference between the picture order count value of the current picture and the picture order count value of the first reference image; and the second temporal distance is represented in terms of difference between the picture order count value of the second reference image and the picture order count value of the current picture ; and perform motion vector refinement (DMVR) procedure to determine a prediction block of the current image block, when it is determined that the first temporal distance and the second temporal distance are equal in magnitude and opposite in sign.

31. A coding device, comprising:

a 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:

determine whether a current picture is temporally between a first reference picture and a second reference picture and whether a first temporal distance and a second temporal distance are the same distance, wherein the first temporal distance is between the current picture and the first reference picture, and the second temporal distance is between the current picture and the second reference picture; and

perform motion compensation using a first initial motion vector and a second initial motion vector to determine a prediction block of a current image block in the current picture, when it is determined that the first temporal distance and the second temporal distance are different distance or that the current picture is not temporally between the first reference picture and the second reference picture.

32. The coding device according to claim 31, wherein the processor is further configured to obtain initial motion information of the current image block in the current picture, wherein the initial motion information comprises the first initial motion vector, a first reference index, the second initial motion vector and a second reference index, wherein the first reference index

indicates the first reference picture, and the second reference index indicates the second reference picture.

33. The coding device according to claim 31 or 32, wherein the first temporal distance indicates a picture order count (POC) distance between the current picture and the first reference picture, and the second temporal distance indicates a POC distance between the current picture and the second reference picture; or

wherein the first temporal distance (TD0) is represented in terms of difference between a picture order count value (POCc) of the current picture and a picture order count value (POC0) of the first reference image; and the second temporal distance (TD1) is represented in terms of difference between the picture order count value (POCc) of the current picture and a picture order count value (POC1) of the second reference image.

34. A coding device, comprising:

a 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:

determine whether a first temporal distance is equal to a second temporal distance, wherein the first temporal distance is represented in terms of a difference between a picture order count value of a current picture and a picture order count value of a first reference image; and the second temporal distance is represented in terms of a difference between a picture order count value of a second reference image and the picture order count value of the current picture; and

perform motion vector refinement (DMVR) procedure to determine a prediction block of the current image block, when it is determined that the first temporal distance is equal to the second temporal distance.

35. The device according to claim 34, wherein the processor is further configured to:

perform motion compensation using a first initial motion vector and a second initial motion vector to determine a prediction block of the current image block, when it is determined that the first temporal distance is not equal to the second temporal distance.

36. The device according to claim 34, wherein for the performing motion vector refinement (DMVR) procedure, the processor is configured to:

determine a pair of best-matching blocks pointed to by best motion vectors from a plurality of pairs of reference blocks, wherein said pair of reference blocks includes a first reference block that is of the first reference picture and that is determined based on a first initial motion vector and a second reference block that is of the second reference picture and that is determined based on a second initial motion vector;

wherein the best motion vectors include a first refined motion vector and a second refined motion vector.

37. The device according to claim 35 or 36, wherein the processor is further configured to:

obtain initial motion information of the current image block in the current picture, wherein the initial motion information comprises the first initial motion vector, a first reference index, the second initial motion vector and a second reference index, wherein the first reference index indicates the first reference picture, and the second reference index indicates the second reference picture.

38. A coding device, comprising:

a 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:

determine whether a first temporal distance is equal to a second temporal distance, wherein the first temporal distance is represented in terms of a difference between a picture order count value of a current picture and a picture order count value of a first reference image; and the second temporal distance is represented in terms of a difference between a picture order count value of a second reference image and the picture order count value of the current picture; and

performing no motion vector refinement (DMVR) procedure on the current image block, when it is determined that the first temporal distance is not equal to the second temporal distance.

39. An apparatus for inter-prediction of a current image block in a current picture of a video, comprising:

a determining unit configured to determine whether the current picture is temporally between a first reference picture and a second reference picture and whether a first temporal distance and a second temporal distance are the same distance, wherein the first temporal distance (TD0) is between the current picture and the first reference picture (RefPic0), and the second temporal distance (TD1) is between the current picture and the second reference picture (RefPic1); and

an inter prediction processing unit configured to perform motion vector refinement (DMVR) procedure to determine a prediction block of the current image block, when it is determined that the current picture is temporally between the first reference picture and the second reference picture and that the first temporal distance and the second temporal distance are the same distance.

40. The apparatus according to claim 39,

wherein the inter prediction processing unit is further configured to perform motion compensation using a first initial motion vector and a second initial motion vector to determine a prediction block of the current image block, when it is determined that the first temporal distance and the second temporal distance is different or that the current picture is not temporally between the first reference picture and the second reference picture.

41. The apparatus according to claim 39, for the performing motion vector refinement (DMVR) procedure, wherein the inter prediction processing unit is specifically configured to:

determine a pair of best-matching blocks pointed to by best motion vectors from a plurality of pairs of reference blocks, wherein said pair of reference blocks includes a first reference block that is in the first reference picture and that is determined based on a first initial motion vector and a second reference block that is in the second reference picture and that is determined based on a second initial motion vector;

wherein the best motion vectors include a first refined motion vector and a second refined motion vector.

42. The apparatus according to claim 39, for the performing motion vector refinement (DMVR) procedure, wherein the inter prediction processing unit is specifically configured to:

determine positions of a pair of reference blocks from positions of M pairs of reference blocks as a position of a first refined reference block and a position of a second refined reference block based on a matching cost criterion, wherein the positions of the M pairs of reference blocks are determined based on a first initial motion vector, a second initial motion vector and a position of the current image block; and positions of each pair of reference blocks includes a position of a first reference block and a position of a second reference block, wherein the first reference block is included in the first reference image, and the second reference block is included in the second reference image, and for each pair of reference blocks, the first position offset and the second position offset are equal in magnitude and opposite in sign, and the first position offset represents an offset of the position of the first reference block relative to a position of a first initial reference block, and the second position offset represents an offset of the position of the second reference block relative to a position of a second initial reference block, wherein M is an integer greater than or equal to 1.

43. The apparatus according to any one of claims 40 to 42, wherein the inter prediction processing unit is further configured to obtain initial motion information of the current image block in the current picture, wherein the initial motion information comprises the first initial motion vector, a first reference index, the second initial motion vector and a second reference index, wherein the first reference index indicates the first reference picture, and the second reference index indicates the second reference picture.

44. The apparatus according to any one of the preceding claims, wherein the first reference picture is a reference image temporally preceding the current picture and the second reference picture is a reference image preceded temporally by the current picture; or the first reference picture is a reference image preceded temporally by the current picture and the second reference picture is a reference image temporally preceding the current picture; or

wherein the first reference picture is a reference image in a past time and the second reference picture is a reference image in a future time; or the first reference picture is a reference image in the future time and the second reference picture is a reference image in the past time.

45. The apparatus according to any one of the preceding claims, wherein the first temporal distance indicates a picture order count (POC) distance between the current picture and the first reference picture, and the second temporal distance indicates a POC distance between the current picture and the second reference picture; or

wherein the first temporal distance (TD0) is represented in terms of difference between a picture order count value (POCc) of the current picture and a picture order count value (POC0) (POC0) of the first reference image; and the second temporal distance (TD1) is represented in terms of difference between the picture order count value (POCc) of the current picture and a picture order count value (POC1) of the second reference image.

46. The apparatus according to any one of the preceding claims,

wherein the determining unit is configured to determine whether the first temporal distance and the second temporal distance are equal in magnitude and opposite in sign, wherein the first temporal distance is represented in terms of a difference between the picture order count value of the current picture and the picture order count value of the first reference image; and the second temporal distance is represented in terms of a difference between the picture order count value of the current picture and the picture order count value of the second reference image; and

wherein the inter prediction processing unit is configured to perform motion vector refinement (DMVR) procedure to determine a prediction block of the current image block, when it is determined that the first temporal distance and the second temporal distance are equal in magnitude and opposite in sign.

47. An apparatus for inter-prediction of a current image block in a current picture of a video, comprising:

a determining unit configured to determine whether the current picture is temporally between a first reference picture and a second reference picture and whether a first temporal distance and a second temporal distance are the same distance, wherein the first temporal distance is between

the current picture and the first reference picture, and the second temporal distance is between the current picture and the second reference picture; and

an inter prediction processing unit configured to perform motion compensation using a first initial motion vector and a second initial motion vector to determine a prediction block of the current image block, when it is determined that the first temporal distance and the second temporal distance are different distance or that the current picture is not temporally between the first reference picture and the second reference picture.

48. The apparatus according to claim 47, wherein initial motion information of the current image block comprises the first initial motion vector, a first reference index, the second initial motion vector and a second reference index, wherein the first reference index indicates the first reference picture, and the second reference index indicates the second reference picture.

49. The apparatus according to claim 47 or 48, wherein the first temporal distance indicates a picture order count (POC) distance between the current picture and the first reference picture, and the second temporal distance indicates a POC distance between the current picture and the second reference picture; or

wherein the first temporal distance (TD0) is represented in terms of difference between a picture order count value (POC_c) of the current picture and a picture order count value (POC₀) of the first reference image; and the second temporal distance (TD1) is represented in terms of difference between the picture order count value (POC_c) of the current picture and a picture order count value (POC₁) of the second reference image.

50. An apparatus for inter-prediction of a current image block in a current picture of a video, comprising:

a determining unit configured to determine whether a first temporal distance is equal to a second temporal distance, wherein the first temporal distance is represented in terms of a difference between a picture order count value of the current picture and a picture order count value of a first reference image; and the second temporal distance is represented in terms of a difference between a picture order count value of a second reference image and the picture order count value of the current picture; and

an inter prediction processing unit configured to perform motion vector refinement (DMVR) procedure to determine a prediction block of the current image block, when it is determined that the first temporal distance is equal to the second temporal distance.

51. The apparatus according to claim 50, wherein the inter prediction processing unit is further configured to perform motion compensation using a first initial motion vector and a second initial motion vector to determine a prediction block of the current image block, when it is determined that the first temporal distance is not equal to the second temporal distance.

52. The apparatus according to claim 50, wherein for the performing motion vector refinement (DMVR) procedure, the inter prediction processing unit is configured to determine a pair of best-matching blocks pointed to by best motion vectors from a plurality of pairs of reference blocks, wherein said pair of reference blocks includes a first reference block that is of the first reference picture and that is determined based on a first initial motion vector and a second reference block that is of the second reference picture and that is determined based on a second initial motion vector; wherein the best motion vectors include a first refined motion vector and a second refined motion vector.

53. The apparatus according to claim 51 or 52, wherein the inter prediction processing unit is further configured to obtain an initial motion information of the current image block in the current picture, wherein the initial motion information comprises the first initial motion vector, a first reference index, the second initial motion vector and a second reference index, wherein the first reference index indicates the first reference picture, and the second reference index indicates the second reference picture.

54. An apparatus for inter-prediction of a current image block in a current picture of a video, comprising:

a determining unit configured to determine whether a first temporal distance is equal to a second temporal distance, wherein the first temporal distance is represented in terms of a difference between a picture order count value of the current picture and a picture order count value of a first reference image; and the second temporal distance is represented in terms of a difference

between a picture order count value of a second reference image and the picture order count value of the current picture; and

an inter prediction processing unit configured to perform no motion vector refinement (DMVR) procedure on the current image block, when it is determined that the first temporal distance is not equal to the second temporal distance.

55. An encoding apparatus for encoding a video image, the encoding apparatus comprising:

the apparatus according to any of claims 39 to 53 for obtaining a prediction block of a current image block,

an entropy coding unit configured to generate a bitstream including a residual between the current image block and the prediction block and an index for indicating initial motion information.

56. A decoding apparatus for decoding a video image from a bitstream, the apparatus comprising:

an entropy decoding unit configured to parse from the bitstream an index for indicating an initial motion information and a residual between a current image block and a prediction block of the current image block;

the apparatus according to any of claims 39 to 53 for obtaining the prediction block of the current image block,

an image reconstruction unit configured to reconstruct the current image block based on the residual and the prediction block.

57. An encoding device, comprising one or more processing circuitry configured to:

determine value of a syntax element for enabling or disabling the method according to any one of claims 1, 3-8 and 12-15; and

generate a bitstream including the syntax element.

58. The encoding device according to claim 57, wherein the syntax element is signaled at any one of a sequence parameter set (SPS) level, a picture parameter set (PPS) level, a slice header, coding tree unit (CTU) syntax, or coding unit (CU) syntax.

59. A decoding device, comprising one or more processing circuitry configured to:

parse from a bitstream a syntax element for indicating whether the method according to any one of claims 1, 3-8 and 12-15 is enable or not; and

adaptively enable or disable a decoder-side motion vector refinement (DMVR) procedure according to the syntax element.

60. The decoding device according to claim 59, wherein the syntax element is obtained from any one of a sequence parameter set (SPS) level of a bitstream, a picture parameter set (PPS) level of the bitstream, a slice header, coding tree unit (CTU) syntax, or coding unit (CU) syntax.

61. A computer-readable medium storing computer-readable instructions which when executed on a processor perform the steps according to any of claims 1 to 22.

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1. A method for inter-prediction of a current image block in a current picture of a video, the method comprising:

determining whether a first temporal distance is equal to a second temporal distance, wherein the first temporal distance is represented in terms of a difference between a picture order count value of the current picture and a picture order count value of a first reference picture, and the second temporal distance is represented in terms of a difference between a picture order count value of a second reference picture and the picture order count value of the current picture; and

performing a decoder motion vector refinement (DMVR) procedure for the current image block, in response to determining that a plurality of conditions are satisfied, wherein the plurality of conditions comprises:

a value of a flag which signaled at a sequence parameter set level or a picture level, indicating the DMVR procedure is enabled at the picture level; and

the first temporal distance is equal to the second temporal distance;

wherein the performing the DMVR procedure, comprises:

determining positions of a pair of first and second reference blocks, from positions of a plurality of pairs of first and second reference blocks based on a matching cost criterion, wherein the positions of the pair of first and second reference blocks includes a position of a first reference block that is of the first reference picture and that is determined based on a first initial motion vector and a position of a second reference block that is of the second reference picture and that is determined based on a second initial motion vector, wherein the matching cost criterion is based on a cost comparison between the first reference block and the second reference block; wherein a first refined motion vector and a second refined motion vector are associated with the position of the first reference block and the position of the second reference block respectively.

2. The method according to claim 1, further comprising:

performing motion compensation using a first initial motion vector and a second initial motion vector to determine a prediction block of the current image block, in response to determining that the first temporal distance is not equal to the second temporal distance.

3. The method according to claim 2, further comprising:

obtaining initial motion information of the current image block, wherein the initial motion information comprises the first initial motion vector, a first reference index, the second initial motion vector and a second reference index, wherein the first reference index indicates the first reference picture, and the second reference index indicates the second reference picture.

4. A coding device, comprising:

a 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:

determine whether a first temporal distance is equal to a second temporal distance, wherein the first temporal distance is represented in terms of a difference between a picture order count value of a current picture and a picture order count value of a first reference picture; and the second temporal distance is represented in terms of a difference between a picture order count value of a second reference picture and the picture order count value of the current picture; and

perform a decoder motion vector refinement (DMVR) procedure for a current image block, in response to determining a plurality of conditions are satisfied, wherein the plurality of conditions comprises:

a value of a flag which signaled at a picture level, indicating the DMVR procedure is enabled at the picture level; and

the first temporal distance is equal to the second temporal distance;

wherein the performing the DMVR procedure, comprises:

determining positions of a pair of first and second reference blocks, from positions of a plurality of pairs of first and second reference blocks based on a matching cost criterion, wherein the positions of the pair of first and second reference blocks includes a position of a first reference block that is of the first reference picture and that is determined based on a first initial motion vector and a position of a second reference block that is of the second reference picture and that is determined based on a second initial motion vector, wherein the matching cost criterion is based on a cost comparison between the first reference block and the second reference block; wherein a first refined motion vector and a second refined motion vector are associated with the position of the first reference block and the position of the second reference block respectively.

5. The coding device according to claim 4, wherein the processor is further configured to:
perform motion compensation using a first initial motion vector and a second initial motion vector to determine a prediction block of the current image block, in response to determining that the first temporal distance is not equal to the second temporal distance.
6. The coding device according to claim 5, wherein the processor is further configured to:
obtain initial motion information of the current image block in the current picture, wherein the initial motion information comprises the first initial motion vector, a first reference index, the second initial motion vector and a second reference index, wherein the first reference index indicates the first reference picture, and the second reference index indicates the second reference picture.
7. The coding device according to claim 4,
wherein the processor is further configured to generate a bitstream including a residual between the current image block and a prediction block, and an index indicating initial motion information, and wherein the coding device is an encoding device.
8. The coding device according to claim 4, wherein the coding device is a decoding apparatus,
wherein the processor is further configured to parse from a bitstream an index indicating an initial motion information and a residual between the current image block and a prediction block of the current image block; and to reconstruct the current image block based on the residual and the prediction block.
9. A non-transitory storage medium comprising an encoded bitstream for a video signal by including a plurality of syntax elements, wherein the plurality of syntax elements comprises a first syntax element, wherein a value of the first syntax element indicates whether a decoder motion vector refinement (DMVR) procedure is enabled or not; and wherein a plurality of operations are performed at least based on the value of the first syntax element, and the operations comprising:
determining whether a first temporal distance is equal to a second temporal distance, wherein the first temporal distance is represented in terms of a difference between a picture order count value of a current picture and a picture order count value of a first reference picture; and the second

temporal distance is represented in terms of a difference between a picture order count value of a second reference picture and the picture order count value of the current picture; and

performing the DMVR procedure for a current image block, in response to determining a plurality of conditions are satisfied, wherein the plurality of conditions comprises:

a value of the first syntax element being a flag which signaled at a picture level, indicating the DMVR procedure is enabled at the picture level; and

the first temporal distance is equal to the second temporal distance;

wherein the performing the DMVR procedure, comprises:

determining positions of a pair of first and second reference blocks, from positions of a plurality of pairs of first and second reference blocks based on a matching cost criterion, wherein the positions of the pair of first and second reference blocks includes a position of a first reference block that is of the first reference picture and that is determined based on a first initial motion vector and a position of a second reference block that is of the second reference picture and that is determined based on a second initial motion vector, wherein the matching cost criterion is based on a cost comparison between the first reference block and the second reference block; wherein a first refined motion vector and a second refined motion vector are associated with the position of the first reference block and the position of the second reference block respectively.

10. A non-transitory computer-readable medium storing instructions, which when executed by a processor, cause the processor to perform operations comprising:

determining whether a first temporal distance is equal to a second temporal distance, wherein the first temporal distance is represented in terms of a difference between a picture order count value of a current picture and a picture order count value of a first reference picture; and the second temporal distance is represented in terms of a difference between a picture order count value of a second reference picture and the picture order count value of the current picture; and

performing a decoder motion vector refinement (DMVR) procedure for a current image block, in response to determining that a plurality of conditions are satisfied, wherein the plurality of conditions comprises:

a value of a flag which signaled at a picture level, indicating the DMVR procedure is enabled at the picture level; and

the first temporal distance is equal to the second temporal distance;

wherein the performing the DMVR procedure, comprises:

determining positions of a pair of first and second reference blocks, from positions of a plurality of pairs of first and second reference blocks based on a matching cost criterion, wherein the positions of the pair of first and second reference blocks includes a position of a first reference block that is of the first reference picture and that is determined based on a first initial motion vector and a position of a second reference block that is of the second reference picture and that is determined based on a second initial motion vector, wherein the matching cost criterion is based on a cost comparison between the first reference block and the second reference block; wherein a first refined motion vector and a second refined motion vector are associated with the position of the first reference block and the position of the second reference block respectively.

11. The non-transitory computer-readable medium according to claim 17, wherein the operations further comprise:

performing motion compensation using a first initial motion vector and a second initial motion vector to determine a prediction block of the current image block, in response to determining that the first temporal distance is not equal to the second temporal distance.

12. The non-transitory computer-readable medium according to claim 11, wherein the operations further comprise:

obtaining initial motion information of the current image block, wherein the initial motion information comprises the first initial motion vector, a first reference index, the second initial motion vector and a second reference index, wherein the first reference index indicates the first reference picture, and the second reference index indicates the second reference picture.