Amended Set of Claims 1 to 54

1. A method of encoding a motion vector in a video coding process, the method comprising:

determining one of a plurality of modes for a motion vector prediction process for a current block of video data; and

performing the motion vector prediction process for the current block using the determined mode and a set of candidate blocks, wherein, for a merge mode motion vector prediction process, one candidate block in the set of candidate blocks is designated as an additional candidate block, and wherein the additional candidate block is used in the merge mode if another of the candidate blocks of the set of candidate blocks is unavailable or invalid.

2. The method of claim 1, wherein the plurality of modes include the merge mode and an adaptive motion vector prediction mode.

3. The method of claim 2, further comprising:

determining a motion vector relative to a reference frame for the current block of video data, wherein a location of a reference frame is based on a prediction direction.

4. The method of claim 3,

wherein the determined mode is the merge mode, the merge mode having a maximum number N of candidate blocks for use in performing the motion vector prediction process,

wherein the motion vector prediction process is performed according to a checking pattern, the checking pattern defining an order for checking each of candidate blocks in the set of candidate blocks, and

wherein the set of candidate blocks is defined as the first N available candidate blocks in the set of candidate blocks along the checking pattern.

5. The method of claim 4, wherein the checking pattern is based on one or more of a block size, a partition size, and a partition index.

6. The method of claim 4, further comprising:

updating for the checking pattern for subsequently coded blocks based on one or more of a merge index, the determined mode, a partition size, a partition index, a reference frame index, a motion vector difference, and a motion vector prediction.

7. The method of claim 1, wherein the set of candidate blocks include a below left candidate block, a left candidate block, an above candidate block, a right above candidate block, a left above candidate block, and a temporal candidate block, and wherein the additional candidate block is the left above candidate block.

8. The method of claim of claim 1, wherein the additional candidate block is a candidate block that is in a causal relationship to the current block.

9. An apparatus configured to encode a motion vector in a video coding process comprising:

a video encoder configured to:

determine one of a plurality of modes for a motion vector prediction process for a current block of video data; and

perform the motion vector prediction process for the current block using the determined mode and a set of candidate blocks, wherein, for a merge mode motion vector prediction process, one candidate block in the set of candidate blocks is designated as an additional candidate block, and wherein the additional candidate block is used in the merge mode if another of the candidate blocks of the set of candidate blocks is unavailable or invalid.

10. The apparatus of claim 9, wherein the plurality of modes include the merge mode and an adaptive motion vector prediction mode.

11. The apparatus of claim 10, wherein the video encoder is further configured to:

determine a motion vector relative to a reference frame for the current block of video data, wherein a location of a reference frame is based on a prediction direction.

12. The apparatus of claim 11,

wherein the determined mode is the merge mode, the merge mode having a maximum number N of candidate blocks for use in performing the motion vector prediction process,

wherein the motion vector prediction process is performed according to a checking pattern, the checking pattern defining an order for checking each of candidate blocks in the set of candidate blocks, and

wherein the set of candidate blocks is defined as the first N available candidate blocks in the set of candidate blocks along the checking pattern.

13. The apparatus of claim 12, wherein the checking pattern is based on one or more of a block size, a partition size, and a partition index.

14. The apparatus of claim 12, wherein the video encoder is further configured to:

update the checking pattern for subsequently coded blocks based on one or more of a merge index, the determined mode, a partition size, a partition index, a reference frame index, a motion vector difference, and a motion vector prediction.

15. The apparatus of claim 9, wherein the set of candidate blocks include a below left candidate block, a left candidate block, an above candidate block, a right above candidate block, a left above candidate block, and a temporal candidate block, and wherein the additional candidate block is the left above candidate block.

16. The apparatus of claim of claim 9, wherein the additional candidate block is a candidate block that is in a causal relationship to the current block.

17. An apparatus configured to encode a motion vector in a video coding process comprising:

means for determining one of a plurality of modes for a motion vector prediction process for a current block of video data; and

means for performing the motion vector prediction process for the current block using the determined mode and a set of candidate blocks, wherein, for a merge mode motion vector prediction process, one candidate block in the set of candidate blocks is

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designated as an additional candidate block, and wherein the additional candidate block is used in the merge mode if another of the candidate blocks of the set of candidate blocks is unavailable or invalid.

18. The apparatus of claim 17, wherein the plurality of modes include the merge mode and an adaptive motion vector prediction mode.

19. A computer program product comprising a computer-readable storage medium having stored thereon instructions that, when executed, cause a processor of a device for encoding video data to:

determine one of a plurality of modes for a motion vector prediction process for a current block of video data; and

perform the motion vector prediction process for the current block using the determined mode and a set of candidate blocks, wherein, for a merge mode motion vector prediction process, one candidate block in the set of candidate blocks is designated as an additional candidate block, and wherein the additional candidate block is used in the merge mode if another of the candidate blocks of the set of candidate blocks is unavailable or invalid.

20. The computer program product of claim 19, wherein the plurality of modes include the merge mode and an adaptive motion vector prediction mode.

21. A method of decoding a motion vector in a video coding process comprising:

determining one of a plurality of modes for a motion vector prediction process for a current block of video data; and

determining a candidate block from a set of candidate blocks, wherein, for a merge mode motion vector prediction process, one candidate block in the set of candidate blocks is designated as an additional candidate block, wherein the additional candidate block is used in the merge mode if another of the candidate blocks of the set of candidate blocks is unavailable or invalid, and wherein information associated with the candidate block is used to decode a motion vector for the current block.

22. The method of claim 21, wherein the mode for the motion vector prediction process is determined from a received syntax element, and wherein the candidate block is determined from a received syntax element.

23. The method of claim 21, wherein the mode for the motion vector prediction process is the merge mode.

24. The method of claim 21, wherein the mode for the motion vector prediction process is an adaptive motion vector prediction mode.

25. The method of claim 21, wherein the mode for the motion vector prediction process is the merge mode, wherein the method further comprises:

retrieving a motion vector, a reference frame, and a prediction direction associated with the candidate block having the received index; and

performing an inter-prediction process on the current block using the retrieved motion vector, reference frame, and prediction direction.

26. The method of claim 21, wherein the mode for the motion vector prediction process is the merge mode, the merge mode having a maximum number N of candidate blocks for use in performing the motion vector prediction process,

wherein the motion vector prediction process is performed according to a checking pattern, the checking pattern defining an order for checking each of candidate blocks in the set of candidate blocks, and

wherein the set of candidate blocks is defined as the first N available candidate blocks in the set of candidate blocks along the checking pattern.

27. The method of claim 26, wherein the checking pattern is based on one or more of a block size, a partition size, and a partition index.

28. The method of claim 26, further comprising:

updating the checking order pattern for subsequently coded blocks based on one or more of a merge index, the determined mode, a partition size, a partition index, a reference frame index, a motion vector difference, and a motion vector prediction.

29. The method of claim 21, wherein the set of candidate blocks include a below left candidate block, a left candidate block, an above candidate block, a right above candidate block, a left above candidate block, and a temporal candidate block, and wherein the additional candidate block is the left above candidate block.

30. The method of claim of claim 21, wherein the additional candidate block is a candidate block that is in a causal relationship to the current block.

31. The method of claim 21, wherein the mode for the motion vector prediction process is an adaptive motion vector prediction mode, and wherein the method further comprises:

receiving a reference frame index, a motion vector difference, and a syntax element indicating a prediction direction;

retrieving a candidate motion vector associated with the candidate block having the received index;

calculating a motion vector for the current block using the candidate motion vector and the motion vector difference; and

performing an inter-prediction process using the calculated motion vector, the received reference frame index, and the received prediction direction.

32. An apparatus configured to decode a motion vector in a video coding process comprising, the apparatus comprising:

a video decoder configured to:

determine one of a plurality of modes for a motion vector prediction process for a current block of video data; and

determine a candidate block from a set of candidate blocks, wherein, for a merge mode motion vector prediction process, one candidate block in the set of candidate blocks is designated as an additional candidate block, wherein the additional candidate block is used in the merge mode if another of the candidate blocks of the set of candidate blocks is unavailable or invalid, and wherein information associated with the candidate block is used to decode a motion vector for the current block.

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33. The apparatus of claim 32, wherein the mode for the motion vector prediction process is determined from a received syntax element, and wherein the candidate block is determined from a received syntax element.

34. The apparatus of claim 32, wherein the mode for the motion vector prediction process is the merge mode

35. The apparatus of claim 32, wherein the mode for the motion vector prediction process is an adaptive motion vector prediction mode.

36. The apparatus of claim 32, wherein the mode for the motion vector prediction process is the merge mode, wherein the video coder is further configured to:

retrieve a motion vector, a reference frame, and a prediction direction associated with the candidate block having the received index; and

perform an inter-prediction process on the current block using the retrieved motion vector, reference frame, and prediction direction.

37. The apparatus of claim 32, wherein the mode for the motion vector prediction process is the merge mode, the merge mode having a maximum number N of candidate blocks for use in performing the motion vector prediction process,

wherein the motion vector prediction process is performed according to a checking pattern, the checking pattern defining an order for checking each of candidate blocks in the set of candidate blocks, and

wherein the set of candidate blocks is defined as the first N available candidate blocks in the set of candidate blocks along the checking pattern.

38. The apparatus of claim 37, wherein the checking pattern is based on one or more of a block size, a partition size, and a partition index.

39. The apparatus of claim 37, wherein the video decoder is further configured to:

update the checking order pattern for subsequently coded blocks based on one or more of a merge index, the determined mode, a partition size, a partition index, a reference frame index, a motion vector difference, and a motion vector prediction.

40. The apparatus of claim 32, wherein the set of candidate blocks include a below left candidate block, a left candidate block, an above candidate block, a right above candidate block, a left above candidate block, and a temporal candidate block, and wherein the additional candidate block is the left above candidate block.

41. The apparatus of claim of claim 32, wherein the additional candidate block is a candidate block that is in a causal relationship to the current block.

42. The apparatus of claim 32, wherein the mode for the motion vector prediction process is an adaptive motion vector prediction mode, and wherein the video decoder is further configured to:

receive a reference frame index, a motion vector difference, and a syntax element indicating a prediction direction;

retrieve a candidate motion vector associated with the candidate block having the received index;

calculate a motion vector for the current block using the candidate motion vector and the motion vector difference; and

perform an inter-prediction process using the calculated motion vector, the received reference frame index, and the received prediction direction.

43. An apparatus configured to decode a motion vector in a video coding process comprising:

means for determining one of a plurality of modes for a motion vector prediction process for a current block of video data; and

means for determining a candidate block from a set of candidate blocks, wherein, for a merge mode motion vector prediction process, one candidate block in the set of candidate blocks is designated as an additional candidate block, wherein the additional candidate block is used in the merge mode process if another of the candidate

blocks of the set of candidate blocks is unavailable or invalid, and wherein information associated with the candidate block is used to decode a motion vector for the current block.

44. The apparatus of claim 43, wherein the plurality of modes include the merge mode and an adaptive motion vector prediction mode.

45. A computer program product comprising a computer-readable storage medium having stored thereon instructions that, when executed, cause a processor of a device for decoding video data to:

determine one of a plurality of modes for a motion vector prediction process for a current block of video data; and

determine a candidate block from a set of candidate blocks, wherein, for a merge mode motion vector prediction process, one candidate block in the set of candidate blocks is designated as an additional candidate block, wherein the additional candidate block is used in the merge mode if another of the candidate blocks of the set of candidate blocks is unavailable or invalid, and wherein information associated with the candidate block is used to decode a motion vector for the current block.

46. The computer program product of claim 45, wherein the plurality of modes include the merge mode and an adaptive motion vector prediction mode.

47. The method of claim 1, wherein the set of candidate blocks is the same for each of the plurality of modes.

48. The apparatus of claim 9, wherein the set of candidate blocks is the same for each of the plurality of modes.

49. The apparatus of claim 17, wherein the set of candidate blocks is the same for each of the plurality of modes.

50. The computer program product of claim 19, wherein the set of candidate blocks is the same for each of the plurality of modes.

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51. The method of claim 21, wherein the set of candidate blocks is the same for each of the plurality of modes.

52. The apparatus of claim 32, wherein the set of candidate blocks is the same for each of the plurality of modes.

53. The apparatus of claim 43, wherein the set of candidate blocks is the same for each of the plurality of modes.

54. The computer program product of claim 45, wherein the set of candidate blocks is the same for each of the plurality of modes.

CLAIMS

1. A method of encoding a motion vector in a video coding process, the method comprising:

determining one of a plurality of modes for a motion vector prediction process for a current block of video data, the determined mode being a merge mode;

determining a set of candidate blocks, the determined set comprising a below-left candidate block, a left candidate block, an above candidate block, a right-above candidate block, a left-above candidate block, and a temporal candidate block;

performing the motion vector prediction process for the current block using the determined mode and the set of candidate blocks, and

wherein one candidate block in the set of candidate blocks is designated as an additional candidate block, and wherein the additional candidate block is used in the merge mode if another of the candidate blocks of the set of candidate blocks is unavailable or invalid.

2. The method of claim **1**, further comprising:

determining a motion vector relative to a reference frame for the current block of video data, wherein a location of a reference frame is based on a prediction direction.

3. The method of claim **2**, the merge mode having a maximum number N of candidate blocks for use in performing the motion vector prediction process,

wherein the motion vector prediction process is performed according to a checking pattern, the checking pattern defining an order for checking each of candidate blocks in the set of candidate blocks, and

wherein the set of candidate blocks is defined as the first N available candidate blocks in the set of candidate blocks along the checking pattern.

4. The method of claim **3**, wherein the checking pattern is based on one or more of a block size, a partition size, and a partition index.

5. The method of claim **3**, further comprising:

updating for the checking pattern for subsequently coded blocks based on one or more of a merge index, the determined mode, a partition size, a partition index, a reference frame index, a motion vector difference, and a motion vector prediction.

6. The method of claim **1**, wherein the set of candidate blocks include a below left candidate block, a left candidate block, an above candidate block, a right above candidate block, a left above candidate block, and a temporal candidate block, and wherein the additional candidate block is the left above candidate block.

7. The method of claim of claim **1**, wherein the additional candidate block is a candidate block that is in a causal relationship to the current block.

8. An apparatus configured to encode a motion vector in a video coding process comprising:

a memory configured to store motion vector information for a set of candidate blocks; and

a video encoder configured to:

determine one of a plurality of modes for a motion vector prediction process for a current block of video data, the determined mode being a merge mode;

determine a set of candidate blocks, the determined set comprising a below-left candidate block, a left candidate block, an above candidate block, a fight-above candidate block, a left-above candidate block, and a temporal candidate block;

perform the motion vector prediction process for the current block using the determined mode and the set of candidate blocks; and

wherein one candidate block in the set of candidate blocks is designated as an additional candidate block, and wherein the additional candidate block is used in the merge mode if another of the candidate blocks of the set of candidate blocks is unavailable or invalid.

9. The apparatus of claim **8**, wherein the video encoder is further configured to:

determine a motion vector relative to a reference frame for the current block of video data, wherein a location of a reference frame is based on a prediction direction.

10. The apparatus of claim **9**, the merge mode having a maximum number N of candidate blocks for use in performing the motion vector prediction process,

wherein the motion vector prediction process is performed according to a checking pattern, the checking pattern defining an order for checking each of candidate blocks in the set of candidate blocks; and

wherein the set of candidate blocks is defined as the first N available candidate blocks in the set of candidate blocks along the checking pattern.

11. The apparatus of claim **10**, wherein the checking pattern is based on one or more of a block size, a partition size, and a partition index.

12. The apparatus of claim **10**, wherein the video encoder is further configured to:

update the checking pattern for subsequently coded blocks based on one or more of a merge index, the determined mode, a partition size, a partition index, a reference frame index, a motion vector difference, and a motion vector prediction.

13. The apparatus of claim **8**, wherein the set of candidate blocks include a below left candidate block, a left candidate block, an above candidate block, a right above candidate block, a left above candidate block, and a temporal candidate block, and wherein the additional candidate block is the left above candidate block.

14. The apparatus of claim of claim **8**, wherein the additional candidate block is a candidate block that is in a causal relationship to the current block.

15. A non-transitory computer-readable storage medium having stored thereon instructions that, when executed, cause a processor of a device for encoding video data to:

determine one of a plurality of modes for a motion vector prediction process for a current block of video data, the determined mode being a merge mode an;

determine a set of candidate blocks, the determined set comprising a below-left candidate block, a left candidate block, an above candidate block, a right-above candidate block, a left- above candidate block, and a temporal candidate block;

perform the motion vector prediction process for the current block using the determined mode and the set of candidate blocks;

wherein one candidate block in the set of candidate blocks is designated as an additional candidate block, and wherein the additional candidate block is used in the merge mode if another of the candidate blocks of the set of candidate blocks is unavailable or invalid.

16. A method of decoding a motion vector in a video coding process comprising:

determining one of a plurality of modes for a motion vector prediction process for a current block of video data, the determined mode being a merge mode;

determining a candidate block from a set of candidate blocks comprising a below-left candidate block, a left candidate block, an above candidate block, a fight-above candidate block, a left-above candidate block, and a temporal candidate block; and

wherein one candidate block in the set of candidate blocks is designated as an additional candidate block, wherein the additional candidate block is used in the merge mode if another of the candidate blocks of the set of candidate blocks is unavailable or invalid, and wherein information associated with the candidate block is used to decode a motion vector for the current block.

17. The method of claim **16**, wherein the mode for the motion vector prediction process is determined from a received syntax element, and wherein the candidate block is determined from a received syntax element.

18. The method of claim **16**, wherein the method further comprises:

retrieving a motion vector, a reference frame, and a prediction direction associated with the candidate block having the received index; and

performing an inter-prediction process on the current block using the retrieved motion vector, reference frame, and prediction direction.

19. The method of claim **16**, the merge mode having a maximum number N of candidate blocks for use in performing the motion vector prediction process,

wherein the motion vector prediction process is performed according to a checking pattern, the checking pattern defining an order for checking each of candidate blocks in the set of candidate blocks; and

wherein the set of candidate blocks is defined as the first N available candidate blocks in the set of candidate blocks along the checking pattern.

20. The method of claim **19**, wherein the checking pattern is based on one or more of a block size, a partition size, and a partition index.

21. The method of claim **19**, further comprising:

updating the checking order pattern for subsequently coded blocks based on one or more of a merge index, the determined mode, a partition size, a partition index, a reference frame index, a motion vector difference, and a motion vector prediction.

22. The method of claim **16**, wherein the set of candidate blocks include a below left candidate block, a left candidate block, an above candidate block, a right above candidate

block, a left above candidate block, and a temporal candidate block, and wherein the additional candidate block is the left above candidate block.

23. The method of claim of claim **16**, wherein the additional candidate block is a candidate block that is in a causal relationship to the current block.

24. An apparatus configured to decode a motion vector in a video coding process comprising, the apparatus comprising:

a memory configured to store motion vector information for a set of candidate blocks; and

a video decoder configured to:

determine one of a plurality of modes for a motion vector prediction process for a current block of video data, the determined mode being a merge mode;

determine a candidate block from the set of candidate blocks comprising a below- left candidate block, a left candidate block, an above candidate block, a fight-above candidate block, a left-above candidate block, and a temporal candidate block;

wherein if the one candidate block in the set of candidate blocks is designated as an additional candidate block, wherein the additional candidate block is used in the merge mode if another of the candidate blocks of the set of candidate blocks is unavailable or invalid, and wherein information associated with the candidate block is used to decode a motion vector for the current block.

25. The apparatus of claim **24**, wherein the mode for the motion vector prediction process is determined from a received syntax element, and wherein the candidate block is determined from a received syntax element.

26. The apparatus of claim **24**, wherein the video coder is further configured to:

retrieve a motion vector, a reference frame, and a predic-

tion direction associated with the candidate block having the received index; and

perform an inter-prediction process on the current block using the retrieved motion vector, reference frame, and prediction direction.

27. The apparatus of claim **24**, the merge mode having a maximum number N of candidate blocks for use in performing the motion vector prediction process,

wherein the motion vector prediction process is performed according to a checking pattern, the checking pattern defining an order for checking each of candidate blocks in the set of candidate blocks; and

wherein the set of candidate blocks is defined as the first N available candidate blocks in the set of candidate blocks along the checking pattern.

28. The apparatus of claim **27**, wherein the checking pattern is based on one or more of a block size, a partition size, and a partition index.

29. The apparatus of claim **27**, wherein the video decoder is further configured to:

update the checking order pattern for subsequently coded blocks based on one or more of a merge index, the determined mode, a partition size, a partition index, a reference frame index, a motion vector difference, and a motion vector prediction.

30. The apparatus of claim **24**, wherein the set of candidate blocks include a below left candidate block, a left candidate block, an above candidate block, a right above candidate block, a left above candidate block, and a temporal candidate block, and wherein the additional candidate block is the left above candidate block.

31. The apparatus of claim of claim **24**, wherein the additional candidate block is a candidate block that is in a causal relationship to the current block.

32. A non-transitory computer-readable storage medium having stored thereon instructions that, when executed, cause a processor of a device for decoding video data to:

determine one of a plurality of modes for a motion vector prediction process for a current block of video data, the determined mode being a merge mode;

determine a candidate block from a set of candidate blocks comprising a below-left candidate block, a left candidate block, an above candidate block, a right-above candidate block, a left-above candidate block, and a temporal candidate block;

wherein one candidate block in the set of candidate blocks is designated as an additional candidate block, wherein the additional candidate block is used in the merge mode if another of the candidate blocks of the set of candidate blocks is unavailable or invalid, and wherein information associated with the candidate block is used to decode a motion vector for the current block.