CLAIMS

1. A method of decoding video data, the method comprising:

selecting, for a current block of video data of a current picture, a motion information derivation mode from a plurality of motion information derivation modes for determining motion information for the current block, wherein the motion information indicates motion of the current block relative to reference video data for the current block, wherein the motion information is based on a first set of reference video data and a second set of reference video data, wherein each motion information derivation mode of the plurality of motion information derivation modes comprises performing a motion search for the first set of reference video data based on the second set of reference video data, and wherein the plurality of motion information derivation modes comprises at least a bilateral matching mode in which the first set of reference video data is included in a first reference picture and the second set of reference video data is included in a second reference picture and a template matching mode in which the first set of reference video data is included in the first reference picture and the second set of reference video data is included in the current picture;

determining the motion information for the current block using the selected motion information derivation mode; and

decoding the current block using the determined motion information and without decoding syntax elements representative of the motion information from an encoded bitstream, wherein decoding the current block comprises decoding residual data for the current block from the encoded bitstream, determining the reference video data for the current block using the determined motion information, and combining the residual data for the current block with the reference video data to reconstruct the current block.

2. The method of claim 1, wherein the plurality of motion information derivation modes further comprises at least one of a unilateral motion estimation mode or a mirror based mode.

3. The method of claim 1, wherein determining the motion information for the current block comprises using an optimization process to refine initial motion information, wherein the optimization process is the same for each of the motion information derivation modes.

4. The method of claim 1, further comprising decoding one or more syntax elements that indicate whether to perform motion derivation for the current block.

5. The method of claim 1, further comprising decoding one or more syntax elements that indicate the motion information derivation mode from the plurality of motion information derivation modes, and wherein selecting the motion information derivation mode comprises selecting the motion information derivation mode in accordance with the one or more syntax elements.

6. The method of claim 5, wherein decoding one or more syntax elements that indicate the motion information derivation mode comprises decoding a flag that indicates one of the bilateral matching mode or the template matching mode as the motion information derivation mode.

7. The method of claim 5, wherein decoding one or more syntax elements that indicate the motion information derivation mode comprises decoding an index that indicates the motion information derivation mode.

8. The method of claim 7, wherein decoding the index comprises context adaptive entropy decoding the index.

9. The method of claim 1, further comprising:

determining a merge mode or advanced motion vector prediction (AMVP) candidate list for the current block, the candidate list comprising one or more motion vector candidates and a candidate that is assigned to the motion information derivation mode; and

wherein selecting the motion information derivation mode comprises selecting the candidate that is assigned to the motion information derivation mode from the merge mode or AMVP list.

10. The method of claim 1, further comprising:

decoding one or more syntax elements, within a sequence parameter set (SPS), a picture

parameter set (PPS), or a slice header, that indicate whether motion information derivation is enabled for the current block of video data.

11. The method of claim 10, wherein, when the one or more syntax elements indicate that motion information derivation is not enabled, the method further comprises skipping decoding of motion information derivation at a decoding unit (CU) or prediction unit (PU) level.

12. The method of claim 1, wherein selecting the motion information derivation mode comprises selecting the bilateral matching mode, and wherein determining the motion information for the current block using the selected motion information derivation mode comprises:

performing bilateral matching, such that temporal positions of both the first reference picture and the second reference picture occur before or after the current picture that contains the current block;

determining two interpolated motion vectors for the current block based on the first reference picture and the second reference picture.

13. The method of claim 1, wherein determining the motion information for the current block using the selected motion information derivation mode comprises:

searching for the first set of reference video data that best matches the second set of reference video data; and

determining at least one motion vector for the current block based on the first set of reference video data and the second set of reference video data.

14. The method of claim 13, wherein searching for the first set of reference video data is performed using an interpolation filter that is different than an interpolation filter used for performing motion compensation for the current block.

15. The method of claim 14, wherein searching for the first set of reference video data is performed using a bi-linear filter to determine pixel values of the first set of reference video data or the second set of reference video data at a sub-pixel location.

16. The method of claim 1, wherein decoding the current block comprises:

decoding one or more syntax elements that indicate the motion information derivation mode for the current block; and

wherein selecting the motion information derivation mode comprises selecting the motion information derivation mode based on the decoded one or more syntax elements.

17. A method of encoding video data, the method comprising:

selecting, for a current block of video data of a current picture, a motion information derivation mode from a plurality of motion information derivation modes for determining motion information for the current block, wherein the motion information indicates motion of the current block relative to reference video data for the current block, wherein the motion information is based on a first set of reference video data and a second set of reference video data, wherein each motion information derivation mode of the plurality of motion information derivation modes comprises performing a motion search for the first set of reference video data based on the second set of reference video data, and wherein the plurality of motion information derivation modes comprises at least a bilateral matching mode in which the first set of reference video data is included in a first reference picture and the second set of reference video data is included in a second reference picture and a template matching mode in which the first set of reference video data is included in the first reference picture and the second set of reference video data is included in the current picture;

determining the motion information for the current block using the selected motion information derivation mode; and

encoding the current block using the determined motion information and without encoding syntax elements representative of the motion information, wherein encoding the current block comprises determining the reference video data for the current block using the determined motion information, determining residual data based on a difference between the current block and the reference video data and encoding the residual data in an encoded bitstream.

18. The method of claim 17, wherein the plurality of motion information derivation modes further comprises at least one of a unilateral motion estimation mode or a mirror based mode.

19. The method of claim 17, wherein determining the motion information for the current block comprises using an optimization process to refine initial motion information, wherein the optimization process is the same for each of the motion information derivation modes.

20. The method of claim 17, further comprising encoding one or more syntax elements that indicate whether to perform motion derivation for the current block.

21. The method of claim 17, further comprising encoding one or more syntax elements that indicate the motion information derivation mode from the plurality of motion information derivation modes, and wherein selecting the motion information derivation mode comprises selecting the motion information derivation mode in accordance with the one or more syntax elements.

22. The method of claim 21, wherein encoding one or more syntax elements that indicate the motion information derivation mode comprises encoding a flag that indicates one of the bilateral matching mode or the template matching mode as the motion information derivation mode.

23. The method of claim 21, wherein encoding one or more syntax elements that indicate the motion information derivation mode comprises encoding an index that indicates the motion information derivation mode.

24. The method of claim 23, wherein encoding the index comprises context adaptive entropy encoding the index.

25. The method of claim 17, further comprising:

determining a merge mode or advanced motion vector prediction (AMVP) candidate list for the current block, the candidate list comprising one or more motion vector candidates and a candidate that is assigned to the motion information derivation mode; and

wherein selecting the motion information derivation mode comprises selecting the candidate that is assigned to the motion information derivation mode from the merge mode or

AMVP list.

26. The method of claim 17, further comprising:

encoding one or more syntax elements, within a sequence parameter set (SPS), a picture parameter set (PPS), or a slice header, that indicate whether motion information derivation is enabled for the current block of video data.

27. The method of claim 26, wherein, when the one or more syntax elements indicate that motion information derivation is not enabled, the method further comprises skipping encoding of motion information derivation at a encoding unit (CU) or prediction unit (PU) level.

28. The method of claim 17, wherein selecting the motion information derivation mode comprises selecting the bilateral matching mode, and wherein determining the motion information for the current block using the selected motion information derivation mode comprises:

performing bilateral matching, such that temporal positions of both the first reference picture and the second reference picture occur before or after the current picture that contains the current block;

determining two interpolated motion vectors for the current block based on the first reference picture and the second reference picture.

29. The method of claim 17, wherein determining the motion information for the current block using the selected motion information derivation mode comprises:

searching for the first set of reference video data that best matches the second set of reference video data; and

determining at least one motion vector for the current block based on the first set of reference video data and the second set of reference video data.

30. The method of claim 29, wherein searching for the first set of reference video data is performed using an interpolation filter that is different than an interpolation filter used for performing motion compensation for the current block.

31. The method of claim 30, wherein searching for the first set of reference video data is performed using a bi-linear filter to determine pixel values of the first set of reference video data or the second set of reference video data at a sub-pixel location.

32. A device for coding video data, the device comprising:

a memory configured to store a current block of video data of a current picture; and

one or more processors configured to:

select, for the current block of video data, a motion information derivation mode from a plurality of motion information derivation modes for determining motion information for the current block, wherein the motion information indicates motion of the current block relative to reference video data for the current block, wherein the motion information is based on a first set of reference video data and a second set of reference video data, wherein each motion information derivation mode of the plurality of motion information derivation modes comprises performing a motion search for the first set of reference video data based on the second set of reference video data, and wherein the plurality of motion information derivation modes comprises at least a bilateral matching mode in which the first set of reference video data is included in a first reference picture and the second set of reference video data is included in a second reference picture and a template matching mode in which the first set of reference video data is included in the first reference picture and the second set of reference video data is included in the current picture;

determine the motion information for the current block using the selected motion information derivation mode; and

code the current block using the determined motion information and without coding syntax elements representative of the motion information.

33. The device of claim 32, wherein the plurality of motion information derivation modes further comprises at least one of a unilateral motion estimation mode or a mirror based mode.

34. The device of claim 32, wherein to determine the motion information for the current

block, the one or more processors are configured to use an optimization process to refine initial motion information, wherein the optimization process is the same for each of the motion information derivation modes.

35. The device of claim 32, wherein the one or more processors are further configured to code one or more syntax elements that indicate whether to perform motion derivation for the current block.

36. The device of claim 32, wherein the one or more processors are further configured to code one or more syntax elements that indicate the motion information derivation mode from the plurality of motion information derivation modes, and wherein to select the motion information derivation mode, the one or more processors are configured to select the motion information derivation mode in accordance with the one or more syntax elements.

37. The device of claim 36, wherein to code one or more syntax elements that indicate the motion information derivation mode, the one or more processors are configured to code a flag that indicates one of the bilateral matching mode or the template matching mode as the motion information derivation mode.

38. The device of claim 36, wherein to code one or more syntax elements that indicate the motion information derivation mode, the one or more processors are configured to code an index that indicates the motion information derivation mode.

39. The device of claim 38, wherein to code the index, the one or more processors are configured to context adaptive entropy coding the index.

40. The device of claim 36, wherein the one or more processors are further configured to:

determine a merge mode or advanced motion vector prediction (AMVP) candidate list for the current block, the candidate list comprising one or more motion vector candidates and a candidate that is assigned to the motion information derivation mode; and

wherein to select the motion information derivation mode, the one or more processors are

configured to select the candidate that is assigned to the motion information derivation mode from the merge mode or AMVP list.

41. The device of claim 32, wherein the one or more processors are further configured to code one or more syntax elements, within a sequence parameter set (SPS), a picture parameter set (PPS), or a slice header, that indicate whether motion information derivation is enabled for the current block of video data.

42. The device of claim 41, wherein, when the one or more syntax elements indicate that motion information derivation is not enabled, the one or more processors are further configured to skip coding of motion information derivation at a coding unit (CU) or prediction unit (PU) level.

43. The device of claim 32, wherein to select the motion information derivation mode, the one or more processors are configured to select the bilateral matching mode, and wherein to determine the motion information for the current block using the selected motion information derivation mode, the one or more processors are configured to:

perform bilateral matching, such that temporal positions of both the first reference picture and the second reference picture occur before or after the current picture that contains the current block;

determine two interpolated motion vectors for the current block based on the first reference picture and the second reference picture.

44. The device of claim 32, wherein to determine the motion information for the current block using the selected motion information derivation mode, the one or more processors are configured to:

search for the first set of reference video data that best matches the second set of reference video data; and

determine at least one motion vector for the current block based on the first set of reference video data and the second set of reference video data.

45. The device of claim 44, wherein to search for the first set of reference video data, the one or more processors are configured to use an interpolation filter that is different than an interpolation filter used for performing motion compensation for the current block.

46. The device of claim 45, wherein to search for the first set of reference video data, the one or more processors are configured to use a bi-linear filter to determine pixel values of the first set of reference video data or the second set of reference video data at a sub-pixel location.

47. The device of claim 32, wherein coding comprises decoding, and wherein to decode the current block, the one or more processors are configured to:

decode one or more syntax elements that indicate the motion information derivation mode for the current block;

wherein to select the motion information derivation mode, the one or more processors are configured to select the motion information derivation mode based on the decoded one or more syntax elements;

determine a reference block in a reference picture based on the determined motion information;

decode residual data from an encoded bitstream, wherein the encoded bitstream does not include the syntax elements representative of the motion information; and

combine the decoded residual and the determined reference block to reconstruct the current block.

48. The device of claim 47, further comprising a display configured to display the decoded block.

49. The device of claim 32, wherein to coding comprises encoding, and wherein to encode the current block, the one or more processors are configured to encode residual data for the current block in a encoded bitstream, wherein the encoded bitstream does not include the coding syntax elements representative of the motion information.

50. The device of claim 49, further comprising a camera configured to capture a picture that

includes the block of video data.

51. The device of claim 32, wherein the device comprises at least one of:
an integrated circuit;
a microprocessor; or
a wireless communication device.

52. An apparatus for coding video data, the apparatus comprising:

means for selecting, for a current block of video data of a current picture, a motion information derivation mode from a plurality of motion information derivation modes for determining motion information for the current block, wherein the motion information indicates motion of the current block relative to reference video data for the current block, wherein the motion information is based on a first set of reference video data and a second set of reference video data, wherein each motion information derivation mode of the plurality of motion information derivation modes comprises performing a motion search for the first set of reference video data based on the second set of reference video data, and wherein the plurality of motion information derivation modes comprises at least a bilateral matching mode in which the first set of reference video data is included in a first reference picture and the second set of reference video data is included in a second reference picture and a template matching mode in which the first set of reference video data is included in the first reference picture and the second set of reference video data is included in the current picture;

means for determining the motion information for the current block using the selected motion information derivation mode; and

means for coding the current block using the determined motion information and without decoding syntax elements representative of the motion information.

53. A non-transitory computer-readable medium having instructions stored thereon that, when executed, cause one or more processors to:

select, for a current block of video data of a current picture, a motion information derivation mode from a plurality of motion information derivation modes for determining motion information for the current block, wherein the motion information indicates motion of the current

block relative to reference video data for the current block, wherein the motion information is based on a first set of reference video data and a second set of reference video data, wherein each motion information derivation mode of the plurality of motion information derivation modes comprises performing a motion search for the first set of reference video data based on the second set of reference video data, and wherein the plurality of motion information derivation modes comprises at least a bilateral matching mode in which the first set of reference video data is included in a first reference picture and the second set of reference video data is included in a second reference picture and a template matching mode in which the first set of reference video data is included in the first reference picture and the second set of reference video data is included in the current picture;

determine the motion information for the current block using the selected motion information derivation mode; and

code the current block using the determined motion information and without decoding syntax elements representative of the motion information.

54. The method of claim 13, wherein the searching comprises searching for the first set of reference video data using a starting point, and wherein the starting point is the same for each motion information mode of the plurality of motion information derivation modes.

55. The method of claim 29, wherein the searching comprises searching for the first set of reference video data using a starting point, and wherein the starting point is the same for each motion information mode of the plurality of motion information derivation modes.

56. The device of claim 44, wherein to search, the one or more processors are configured to search for the first set of reference video data using a starting point, and wherein the starting point is the same for each motion information mode of the plurality of motion information derivation modes.