CLAIMS

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

coding motion information for a first coding tree unit (CTU) line of a picture, the motion information for the first CTU line including first one or more motion vectors for the first CTU line;

forming first one or more prediction blocks for first one or more coding units (CUs) of the first CTU line using first reference blocks identified by the motion information for the first CTU line;

coding first one or more residual blocks for the first one or more CUs, the first one or more residual blocks representing respective differences between the first one or more prediction blocks and the first one or more CUs;

storing the motion information for the first CTU line of the picture in a first history motion vector predictor (MVP) buffer of a memory, including storing the first one or more motion vectors for the first CTU line in the first history MVP buffer for use as first motion vector predictors to predict first one or more other motion vectors of the picture;

resetting a second history MVP buffer of the memory;

coding motion information for a second CTU line of the picture, the motion information for the second CTU line including second one or more motion vectors for the second CTU line;

forming second one or more prediction blocks for second one or more CUs of the second CTU line using second reference blocks identified by the motion information for the second CTU line;

coding second one or more residual blocks for the second one or more CUs, the second one or more residual blocks representing respective differences between the second one or more prediction blocks and the second one or more CUs; and

after resetting the second history MVP buffer, storing the motion information for the second CTU line of the picture in the second history MVP buffer, the second CTU line being different than the first CTU line, including storing the second one or more motion vectors for the second CTU line for use as second motion vector predictors to predict second one or more other motion vectors of the picture.

2. The method of claim 1, wherein the second history MVP buffer is different than the first history MVP buffer, wherein storing the motion information for the first CTU line comprises storing, by a first thread of a video coding process, the motion information for the first CTU line, and wherein storing the motion information for the second CTU line comprises storing, by a second thread of the video coding process, the motion information for the second CTU line, the first thread being different than the second thread.

3. The method of claim 1, wherein the second history MVP buffer is different than the first history MVP buffer, and wherein resetting the second history MVP buffer comprises resetting the second history MVP buffer in response to processing a beginning of the second CTU line during wavefront parallel processing.

4. The method of claim 1,

wherein storing the motion information for the first CTU line comprises storing only motion information unique within the first history MVP buffer to the first history MVP buffer, and

wherein storing the motion information for the second CTU line comprises storing only motion information unique within the second history MVP buffer to the second history MVP buffer.

5. The method of claim 1, further comprising:

when the first history MVP buffer becomes full, removing one or more oldest-inserted motion vectors from the first history MVP buffer according to a first-in-first-out (FIFO) rule; and

when the second history MVP buffer becomes full, removing one or more oldest-inserted motion vectors from the second history MVP buffer according to the FIFO rule.

6. The method of claim 1,

wherein storing the motion information for the first CTU line comprises storing motion information for each of a plurality of different types of motion models to respective, different history MVP buffers of a first plurality of history MVP buffers including the first history MVP buffer; and

wherein storing the motion information for the second CTU line comprises storing motion information for each of the plurality of different types of motion models to respective, different history MVP buffers of a second plurality of history MVP buffers including the second history MVP buffer.

7. The method of claim 6, wherein the plurality of different types of motion models comprises one or more of affine motion model, motion information of intra block copy mode, motion information of local illumination compensation, sub-block motion vector prediction (MVP), or temporal motion prediction.

8. The method of claim 1, further comprising generating a synthetic MVP from two or more MVPs in one or more history MVP buffers.

9. The method of claim 8, wherein the two or more MVPs have different motion information types comprising two or more of coded motion information, affine motion model motion information, motion information of intra block copy mode, motion information of local illumination compensation, sub-block MVP motion information, temporal motion predictor motion information, synthetic motion vector information based on an MVP motion information, spatial MVP motion information, or temporal MVP motion information.

10. The method of claim 1,

wherein storing the motion information for the first CTU line further comprises pre-filling the first history MVP buffer with first pre-defined motion information, wherein the first pre-defined motion information comprises a first zero motion vector with a first reference frame index and first inter prediction direction, and

wherein storing the motion information for the second CTU line further comprises pre-filling the second history MVP buffer with second pre-defined motion information, wherein the second pre-defined motion information comprises a second zero motion vector with a second reference frame index and second inter prediction direction.

11. The method of claim 1, wherein a picture including the first CTU line and the second CTU line is in a first temporal layer,

wherein storing the motion information for the first CTU line further comprises pre-filling the first history MVP buffer with first motion information from first one or more coded pictures in the first temporal layer or one or more temporal layers lower than the first temporal layer, and

wherein storing the motion information for the second CTU line further comprises pre-filling the second history MVP buffer with second motion information from second one or more coded pictures in the first temporal layer or one or more temporal layers lower than the first temporal layer,

the method further comprising scaling at least one of the first motion information or the second motion information according to temporal differences.

12. The method of claim 1, further comprising:

initializing the first history MVP buffer with a first zero motion vector having a first reference frame index and first inter prediction direction; and

initializing the second history MVP buffer with a second zero motion vector having a second reference frame index and second inter prediction direction.

13. The method of claim 1, wherein the second CTU line is directly below the first CTU line, the method further comprising initializing or modifying the second history MVP buffer using the first history MVP buffer.

14. The method of claim 1, further comprising:

decoding coding units (CUs) of CTUs of the first CTU line using the first history MVP buffer; and

decoding CUs of CTUs of the second CTU line using the second history MVP buffer.

15. The method of claim 1, further comprising:

encoding coding units (CUs) of CTUs of the first CTU line using the first history MVP buffer; and

encoding CUs of CTUs of the second CTU line using the second history MVP buffer.

16. The method of claim 1, further comprising:

coding first motion information of coding units (CUs) of CTUs of the first CTU line using the first history MVP buffer, wherein coding the first motion information comprises coding the first motion information using AMVP, merge, or affine mode; and

coding second motion information of CUs of CTUs of the second CTU line using the second history MVP buffer, wherein coding the second motion information comprises coding the second motion information using AMVP, merge, or affine mode.

17. The method of claim 1, further comprising:

adding one or more motion vectors to first one or more motion vectors of first uni-directional motion information in the first history MVP buffer to convert the first uni-directional motion information to first bi-directional motion information, and

adding one or more motion vectors to second one or more motion vectors of second uni-directional motion information in the second history MVP buffer to convert the second uni-directional motion information to second bi-directional motion information.

18. The method of claim 1,

wherein storing the motion information for the first CTU line comprises storing only motion vectors that differ from other motion vectors within the first history MVP buffer by a threshold to the first history MVP buffer, and

wherein storing the motion information for the first CTU line comprises storing only motion vectors that differ from other motion vectors within the second history MVP buffer by the threshold to the second history MVP buffer.

19. The method of claim 1,

wherein storing the motion information for the first CTU line comprises storing data indicating whether motion vectors of the motion information for the first CTU line are associated with merge mode coded coding units (CUs) or AMVP coded CUs, and

wherein storing the motion information for the first CTU line comprises storing data indicating whether motion vectors of the motion information for the second CTU line are associated with merge mode coded CUs or AMVP coded CUs.

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

a memory configured to store video data; and

one or more processing units implemented in circuitry and configured to:

code motion information for a first coding tree unit (CTU) line of a picture, the motion information for the first CTU line including first one or more motion vectors for the first CTU line;

form first one or more prediction blocks for first one or more coding units (CUs) of the first CTU line using first reference blocks identified by the first motion information for the first CTU line;

code first one or more residual blocks for the first one or more CUs, the first one or more residual blocks representing respective differences between the first one or more prediction blocks and the first one or more CUs;

store the motion information for the first CTU line of the picture in a first history motion vector predictor (MVP) buffer of the memory, the motion information for the first CTU line including the first one or more motion vectors for the first CTU line for use as first motion vector predictors to predict first one or more other motion vectors of the picture;

reset a second history MVP buffer of the memory;

code motion information for a second CTU line of the picture, the motion information for the second CTU line including second one or more motion vectors for the second CTU line;

form second one or more prediction blocks for second one or more CUs of the second CTU line using second reference blocks identified by the motion information for the second CTU line;

code second one or more residual blocks for the second one or more CUs, the second one or more residual blocks representing respective differences between the second one or more prediction blocks and the second one or more CUs; and

after resetting the second history MVP buffer, store the motion information for the second CTU line of the picture in the second history MVP buffer, the second CTU line being different than the first CTU line, the motion information for the second CTU line including the second one or more motion vectors for the second CTU line for use as second motion vector predictors to predict second one or more other motion vectors of the picture.

21. The device of claim 20, wherein the second history MVP buffer is different than the first history MVP buffer, wherein the one or more processors execute a first thread of a video coding process to store the motion information for the first CTU line, and wherein the one or more processors execute a second thread of the video coding process to store the motion information for the second CTU line, the first thread being different than the second thread.

22. The device of claim 20, wherein the second history MVP buffer is different than the first history MVP buffer, and wherein to reset the second history MVP buffer, the one or more processing units are configured to reset the second history MVP buffer in response to processing a beginning of the second CTU line during wavefront parallel processing.

23. The device of claim 20,

wherein the one or more processing units are configured to store only motion information unique within the first history MVP buffer to the first history MVP buffer, and

wherein the one or more processing units are configured to store only motion information unique within the second history MVP buffer to the second history MVP buffer.

24. The device of claim 20, wherein the one or more processing units are further configured to:

when the first history MVP buffer becomes full, remove one or more oldest-inserted motion vectors from the first history MVP buffer according to a first-in-first-out (FIFO) rule; and

when the second history MVP buffer becomes full, remove one or more oldest-inserted motion vectors from the second history MVP buffer according to the FIFO rule.

25. The device of claim 20,

wherein the one or more processing units are configured to store motion information for each of a plurality of different types of motion models to respective, different history MVP buffers of a first plurality of history MVP buffers including the first history MVP buffer; and

wherein the one or more processing units are configured to store motion information for each of the plurality of different types of motion models to respective, different history MVP buffers of a second plurality of history MVP buffers including the second history MVP buffer.

26. The device of claim 25, wherein the plurality of different types of motion models comprises one or more of affine motion model, motion information of intra block copy mode, motion information of local illumination compensation, sub-block motion vector prediction (MVP), or temporal motion prediction.

27. The device of claim 20, wherein the one or more processing units are further configured to generate a synthetic MVP from two or more MVPs in one or more history MVP buffers.

28. The device of claim 27, wherein the two or more MVPs have different motion information types comprising two or more of coded motion information, affine motion model motion information, motion information of intra block copy mode, motion information of local illumination compensation, sub-block MVP motion information, temporal motion predictor motion information, synthetic motion vector information based on an MVP motion information, spatial MVP motion information, or temporal MVP motion information.

29. The device of claim 20, further comprising a display configured to display the video data.

30. The device of claim 20, further comprising a camera configured to capture the video data.

31. The device of claim 20, wherein the device comprises one or more of a camera, a computer, a mobile device, a broadcast receiver device, or a set-top box.

32. The device of claim 20, wherein the device comprises at least one of:

an integrated circuit;

a microprocessor; or

a wireless communication device.

33. A computer-readable storage medium having stored thereon instructions that, when executed, cause a processor to:

code motion information for a first coding tree unit (CTU) line of a picture, the motion information for the first CTU line including first one or more motion vectors for the first CTU line;

form first one or more prediction blocks for first one or more coding units (CUs) of the first CTU line using first reference blocks identified by the motion information for the first CTU line;

code first one or more residual blocks for the first one or more CUs, the first one or more residual blocks representing respective differences between the first one or more prediction blocks and the first one or more CUs;

store the motion information for the first CTU line of the picture in a first history motion vector predictor (MVP) buffer of a memory, the motion information for the first CTU line including the first one or more motion vectors for the first CTU line for use as first motion vector predictors to predict first one or more other motion vectors of the picture;

reset a second history MVP buffer of the memory;

code motion information for a second CTU line of the picture, the motion information for the second CTU line including second one or more motion vectors for the second CTU line;

form second one or more prediction blocks for second one or more CUs of the second CTU line using second reference blocks identified by the motion information for the second CTU line;

code second one or more residual blocks for the second one or more CUs, the second one or more residual blocks representing respective differences between the second one or more prediction blocks and the second one or more CUs; and

after resetting the second history MVP buffer, store the motion information for the second CTU line of the picture in the second history MVP buffer, the second CTU line being different than the first CTU line, the motion information for the second CTU line including the

second one or more motion vectors for the second CTU line for use as second motion vector predictors.

34. The computer-readable storage medium of claim 33, wherein the second history MVP buffer is different than the first history MVP buffer, wherein the instructions that cause the processor to store the motion information for the first CTU line comprise instructions that cause the processor to execute a first thread of a video coding process to store the motion information for the first CTU line, and wherein the instructions that cause the processor to store the motion information for the second CTU line comprise instructions that cause the processor to execute a second thread of the video coding process to store the motion information for the second CTU line, the first thread being different than the second thread.

35. The computer-readable storage medium of claim 33, wherein the second history MVP buffer is different than the first history MVP buffer, and wherein the instructions that cause the processor to reset the second history MVP buffer comprise instructions that cause the processor to reset the second history MVP buffer in response to processing a beginning of the second CTU line during wavefront parallel processing.

36. The computer-readable storage medium of claim 33,

wherein the instructions that cause the processor to store the motion information for the first CTU line comprise instructions that cause the processor to store only motion information unique within the first history MVP buffer to the first history MVP buffer, and

wherein the instructions that cause the processor to store the motion information for the second CTU line comprise instructions that cause the processor to store only motion information unique within the second history MVP buffer to the second history MVP buffer.

37. The computer-readable storage medium of claim 33, further comprising instructions that cause the processor to:

when the first history MVP buffer becomes full, remove one or more oldest-inserted motion vectors from the first history MVP buffer according to a first-in-first-out (FIFO) rule; and

when the second history MVP buffer becomes full, remove one or more oldest-inserted motion vectors from the second history MVP buffer according to the FIFO rule.

38. The computer-readable storage medium of claim 33,

wherein the instructions that cause the processor to store the motion information for the first CTU line comprise instructions that cause the processor to store motion information for each of a plurality of different types of motion models to respective, different history MVP buffers of a first plurality of history MVP buffers including the first history MVP buffer; and

wherein the instructions that cause the processor to store the motion information for the second CTU line comprise instructions that cause the processor to store motion information for each of the plurality of different types of motion models to respective, different history MVP buffers of a second plurality of history MVP buffers including the second history MVP buffer.

39. The computer-readable storage medium of claim 38, wherein the plurality of different types of motion models comprises one or more of affine motion model, motion information of intra block copy mode, motion information of local illumination compensation, sub-block motion vector prediction (MVP), or temporal motion prediction.

40. The computer-readable storage medium of claim 33, further comprising instructions that cause the processor to generate a synthetic MVP from two or more MVPs in one or more history MVP buffers.

41. The computer-readable storage medium of claim 40, wherein the two or more MVPs have different motion information types comprising two or more of coded motion information, affine motion model motion information, motion information of intra block copy mode, motion information of local illumination compensation, sub-block MVP motion information, temporal motion predictor motion information, synthetic motion vector information based on an MVP motion information, spatial MVP motion information, or temporal MVP motion information.

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

a memory configured to store video data;

means for coding motion information for a first coding tree unit (CTU) line of a picture, the motion information for the first CTU line including first one or more motion vectors for the first CTU line;

means for forming first one or more prediction blocks for first one or more coding units (CUs) of the first CTU line using first reference blocks identified by the motion information for the first CTU line;

means for coding first one or more residual blocks for the first one or more CUs, the first one or more residual blocks representing respective differences between the first one or more prediction blocks and the first one or more CUs;

means for storing the motion information for the first CTU line of the picture in a first history motion vector predictor (MVP) buffer of a memory, including means for storing the first one or more motion vectors for the first CTU line in the first history MVP buffer for use as first motion vector predictors to predict first one or more other motion vectors of the picture;

means for resetting a second history MVP buffer of the memory;

means for coding motion information for a second CTU line of the picture, the motion information for the second CTU line including second one or more motion vectors for the second CTU line;

means for forming second one or more prediction blocks for second one or more CUs of the second CTU line using second reference blocks identified by the motion information for the second CTU line;

means for coding second one or more residual blocks for the second one or more CUs, the second one or more residual blocks representing respective differences between the second one or more prediction blocks and the second one or more CUs; and

means for storing the motion information for the second CTU line of the picture in the second history MVP buffer after resetting the second history MVP buffer, the second CTU line being different than the first CTU line, including means for storing the second one or more motion vectors for the second CTU line for use as second motion vector predictors to predict second one or more other motion vectors of the picture.

43. The device of claim 42, wherein the second history MVP buffer is different than the first history MVP buffer, wherein the means for storing the motion information for the first CTU line comprises a first thread of a video coding process, and wherein the means for storing the motion information for the second CTU line comprises a second thread of the video coding process.

44. The device of claim 42, wherein the second history MVP buffer is different than the first history MVP buffer, and wherein the means for resetting the second history MVP buffer comprises means for resetting the second history MVP buffer in response to processing a beginning of the second CTU line during wavefront parallel processing.

45. The device of claim 42,

wherein the means for storing the motion information for the first CTU line comprises means for storing only motion information unique within the first history MVP buffer to the first history MVP buffer, and

wherein the means for storing the motion information for the second CTU line comprises means for storing only motion information unique within the second history MVP buffer to the second history MVP buffer.

46. The device of claim 42, further comprising:

means for removing, when the first history MVP buffer becomes full, one or more oldest-inserted motion vectors from the first history MVP buffer according to a first-in-first-out (FIFO) rule; and

means for removing, when the second history MVP buffer becomes full, one or more oldest-inserted motion vectors from the second history MVP buffer according to the FIFO rule.

47. The device of claim 42,

wherein the means for storing the motion information for the first CTU line comprises means for storing motion information for each of a plurality of different types of motion models to respective, different history MVP buffers of a first plurality of history MVP buffers including the first history MVP buffer; and

wherein the means for storing the motion information for the second CTU line comprises means for storing motion information for each of the plurality of different types of motion models to respective, different history MVP buffers of a second plurality of history MVP buffers including the second history MVP buffer.

48. The device of claim 47, wherein the plurality of different types of motion models comprises one or more of affine motion model, motion information of intra block copy mode, motion information of local illumination compensation, sub-block motion vector prediction (MVP), or temporal motion prediction.

49. The device of claim 42, further comprising means for generating a synthetic MVP from two or more MVPs in one or more history MVP buffers.

50. The device of claim 49, wherein the two or more MVPs have different motion information types comprising two or more of coded motion information, affine motion model motion information, motion information of intra block copy mode, motion information of local illumination compensation, sub-block MVP motion information, temporal motion predictor motion information, synthetic motion vector information based on an MVP motion information, spatial MVP motion information, or temporal MVP motion information.

51. The method of claim 1, wherein the first CTU line has a length that is less than a full width of the picture.

52. The method of claim 1, wherein storing the motion information for the first CTU line comprises storing the motion information for a number of CUs in the first CTU line that is less than a total number of CUs in the first CTU line.

53. The device of claim 20, wherein the first CTU line has a length that is less than a full width of the picture.

54. The device of claim 20, wherein to store the motion information for the first CTU line, the one or more processing units are configured to store, in the memory, the motion information for a number of CUs in the first CTU line that is less than a total number of CUs in the first CTU line.

55. The computer-readable storage medium of claim 33, wherein the first CTU line has a length that is less than a full width of the picture.

56. The computer-readable storage medium of claim 33, wherein the instructions that cause the processor to store the motion information for the first CTU line comprise instructions that cause the processor to store the motion information for a number of CUs in the first CTU line that is less than a total number of CUs in the first CTU line.

57. The device of claim 42, wherein the first CTU line has a length that is less than a full width of the picture.

58. The device of claim 42, wherein the means for storing the motion information for the first CTU line comprises means for storing the motion information for a number of CUs in the first CTU line that is less than a total number of CUs in the first CTU line.