CLAIMS

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

receiving a block of video data encoded using affine advanced motion vector prediction (AMVP) mode;

constructing an affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, wherein the affine AMVP motion vector predictor list includes at least one or more inherited affine motion vector predictors or one or more constructed affine motion vector predictors, and wherein the affine AMVP motion vector predictor list further includes one or more affine motion vector predictors that have all control point motion vectors equal to a designated motion vector;

determining the designated motion vector from a designated motion vector candidate list in the following order, wherein the designated motion vector candidate list is different than the affine AMVP motion vector predictor list:

1) a bottom-left control point motion vector in a constructed affine motion vector predictor, wherein the constructed affine motion vector predictor is a translational motion vector used to predict a particular control point motion vector for the affine AMVP mode,

2) a top-right control point motion vector in the constructed affine motion vector predictor,

3) a top-left control point motion vector in the constructed affine motion vector predictor,

4) a temporal motion vector predictor, and

5) a zero motion vector;

determining control point motion vectors for the block of video data from the affine AMVP motion vector predictor list; and

decoding the block of video data using the determined control point motion vectors.

2. The method of claim 1, wherein constructing the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data comprises:

inserting the one or more inherited affine motion vector predictors into the affine AMVP motion vector predictor list, if available;

inserting, if a number of the one or more inherited affine motion vector predictors is less

than a predefined maximum number for the affine AMVP motion vector predictor list, the one or more constructed affine motion vector predictors into the affine AMVP motion vector predictor list, if available; and

inserting, if a number of the one or more inherited affine motion vector predictors and the one or more constructed affine motion vector predictors is less than the predefined maximum number for the affine AMVP motion vector predictor list, the one or more affine motion vector predictors that have all control point motion vectors equal to the designated motion vector into the affine AMVP motion vector predictor list.

3. The method of claim 1, wherein constructing the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data comprises:

constructing the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data without performing a pruning process.

4. The method of claim 1, further comprising:

deriving the one or more inherited affine motion vector predictors from control point motion vectors of a neighboring block encoded using affine motion prediction.

5. The method of claim 1, further comprising:

deriving the one or more constructed affine motion vector predictors from motion vectors of neighboring blocks coded using inter prediction.

6. The method of claim 1, wherein the block of video data is decoded using a 6-parameter affine motion model, the method further comprising:

deriving the one or more constructed affine motion vector predictors from motion vectors of neighboring blocks coded using inter prediction only if all control point motion vectors for the 6-parameter affine motion model are available.

7. The method of claim 1, wherein determining the control point motion vectors for the block comprises:

receiving an index to the affine AMVP motion vector predictor list;

receiving a motion vector difference for each of the control point motion vectors for the block;

retrieving the candidate control point motion vectors associated with the index; and

adding the motion vector difference for each of the control point motion vectors for the block to the candidate control point motion vectors to determine the control point motion vectors for the block.

8. The method of claim 1, further comprising:

outputting for display a picture that includes the decoded block of video data.

9. An apparatus configured to decode video data, the apparatus comprising:

a memory configured to store a block of video data encoded using affine advanced motion vector prediction (AMVP) mode; and

one or more processors in communication with the memory, the one or more processors configured to:

receive the block of video data;

construct an affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, wherein the affine AMVP motion vector predictor list includes at least one or more inherited affine motion vector predictors or one or more constructed affine motion vector predictors, and wherein the affine AMVP motion vector predictor list further includes one or more affine motion vector predictors that have all control point motion vectors equal to a designated motion vector;

determine the designated motion vector from a designated motion vector candidate list in the following order, wherein the designated motion vector candidate list is different than the affine AMVP motion vector predictor list:

1) a bottom-left control point motion vector in a constructed affine motion vector predictor, wherein the constructed affine motion vector predictor is a translational motion vector used to predict a particular control point motion vector for the affine AMVP mode,

2) a top-right control point motion vector in the constructed affine motion vector predictor,

3) a top-left control point motion vector in the constructed affine motion vector predictor,

4) a temporal motion vector predictor, and

5) a zero motion vector;

determine control point motion vectors for the block of video data from the affine AMVP motion vector predictor list; and

decode the block of video data using the determined control point motion vectors.

10. The apparatus of claim 9, wherein to construct the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, the one or more processors are configured to:

insert the one or more inherited affine motion vector predictors into the affine AMVP motion vector predictor list, if available;

insert, if a number of the one or more inherited affine motion vector predictors is less than a predefined maximum number for the affine AMVP motion vector predictor list, the one or more constructed affine motion vector predictors into the affine AMVP motion vector predictor list, if available; and

insert, if a number of the one or more inherited affine motion vector predictors and the one or more constructed affine motion vector predictors is less than the predefined maximum number for the affine AMVP motion vector predictor list, the one or more affine motion vector predictors that have all control point motion vectors equal to the designated motion vector into the affine AMVP motion vector predictor list.

11. The apparatus of claim 9, wherein to construct the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, the one or more processors are configured to:

construct the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data without performing a pruning process.

12. The apparatus of claim 9, wherein the one or more processors are further configured to:

derive the one or more inherited affine motion vector predictors from control point

motion vectors of a neighboring block encoded using affine motion prediction.

13. The apparatus of claim 9, wherein the one or more processors are further configured to:

derive the one or more constructed affine motion vector predictors from motion vectors of neighboring blocks coded using inter prediction.

14. The apparatus of claim 9, wherein the block of video data is decoded using a 6-parameter affine motion model, and wherein the one or more processors are further configured to:

derive the one or more constructed affine motion vector predictors from motion vectors of neighboring blocks coded using inter prediction only if all control point motion vectors for the 6-parameter affine motion model are available.

15. The apparatus of claim 9, wherein to determine the control point motion vectors for the block, the one or more processors are configured to:

receive an index to the affine AMVP motion vector predictor list;

receive a motion vector difference for each of the control point motion vectors for the block;

retrieve the candidate control point motion vectors associated with the index; and

add the motion vector difference for each of the control point motion vectors for the block to the candidate control point motion vectors to determine the control point motion vectors for the block.

16. The apparatus of claim 9, further comprising:

a display configured to display a picture that includes the decoded block of video data.

17. An apparatus configured to decode video data, the apparatus comprising:

means for receiving a block of video data encoded using affine advanced motion vector prediction (AMVP) mode;

means for constructing an affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, wherein the affine AMVP motion vector predictor list further includes at least one or more inherited affine motion vector predictors or

one or more constructed affine motion vector predictors, and wherein the affine AMVP motion vector predictor list further includes one or more affine motion vector predictors that have all control point motion vectors equal to a designated motion vector;

means for determining the designated motion vector from a designated motion vector candidate list in the following order, wherein the designated motion vector candidate list is different than the affine AMVP motion vector predictor list:

1) a bottom-left control point motion vector in a constructed affine motion vector predictor, wherein the constructed affine motion vector predictor is a translational motion vector used to predict a particular control point motion vector for the affine AMVP mode,

2) a top-right control point motion vector in the constructed affine motion vector predictor,

3) a top-left control point motion vector in the constructed affine motion vector predictor,

4) a temporal motion vector predictor, and

5) a zero motion vector;

means for determining control point motion vectors for the block of video data from the affine AMVP motion vector predictor list; and

means for decoding the block of video data using the determined control point motion vectors.

18. The apparatus of claim 17, wherein the means for constructing the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data comprises:

means for inserting the one or more inherited affine motion vector predictors into the affine AMVP motion vector predictor list, if available;

means for inserting, if a number of the one or more inherited affine motion vector predictors is less than a predefined maximum number for the affine AMVP motion vector predictor list, the one or more constructed affine motion vector predictors into the affine AMVP motion vector predictor list, if available; and

means for inserting, if a number of the one or more inherited affine motion vector predictors and the one or more constructed affine motion vector predictors is less than the

predefined maximum number for the affine AMVP motion vector predictor list, the one or more affine motion vector predictors that have all control point motion vectors equal to the designated motion vector into the affine AMVP motion vector predictor list.

19. The apparatus of claim 17, wherein the means for constructing the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data comprises:

means for constructing the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data without performing a pruning process.

20. A non-transitory computer-readable storage medium storing instructions that, when executed, cause one or more processors to:

receive a block of video data encoded using affine advanced motion vector prediction (AMVP) mode;

construct an affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, wherein the affine AMVP motion vector predictor list further includes at least one or more inherited affine motion vector predictors or one or more constructed affine motion vector predictors, and wherein the affine AMVP motion vector predictor list further includes one or more affine motion vector predictors that have all control point motion vectors equal to a designated motion vector;

determine the designated motion vector from a designated motion vector candidate list in the following order, wherein the designated motion vector candidate list is different than the affine AMVP motion vector predictor list:

1) a bottom-left control point motion vector in a constructed affine motion vector predictor, wherein the constructed affine motion vector predictor is a translational motion vector used to predict a particular control point motion vector for the affine AMVP mode,

2) a top-right control point motion vector in the constructed affine motion vector predictor,

3) a top-left control point motion vector in the constructed affine motion vector predictor,

4) a temporal motion vector predictor, and

5) a zero motion vector;

determine control point motion vectors for the block of video data from the affine AMVP motion vector predictor list; and

decode the block of video data using the determined control point motion vectors.

21. The non-transitory computer-readable storage medium of claim 20, wherein to construct the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, the instructions cause the one or more processors to:

insert the one or more inherited affine motion vector predictors into the affine AMVP motion vector predictor list, if available;

insert, if a number of the one or more inherited affine motion vector predictors is less than a predefined maximum number for the affine AMVP motion vector predictor list, the one or more constructed affine motion vector predictors into the affine AMVP motion vector predictor list, if available; and

insert, if a number of the one or more inherited affine motion vector predictors and the one or more constructed affine motion vector predictors is less than the predefined maximum number for the affine AMVP motion vector predictor list, the one or more affine motion vector predictors that have all control point motion vectors equal to the designated motion vector into the affine AMVP motion vector predictor list.

22. The non-transitory computer-readable storage medium of claim 20, wherein to construct the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, the instructions cause the one or more processors to:

construct the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data without performing a pruning process.

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

receiving a block of video data to be encoded using affine advanced motion vector prediction (AMVP) mode;

constructing an affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, wherein the affine AMVP motion vector predictor list

further includes at least one or more inherited affine motion vector predictors or one or more constructed affine motion vector predictors, and wherein the affine AMVP motion vector predictor list further includes one or more affine motion vector predictors that have all control point motion vectors equal to a designated motion vector;

determining the designated motion vector from a designated motion vector candidate list in the following order, wherein the designated motion vector candidate list is different than the affine AMVP motion vector predictor list:

1) a bottom-left control point motion vector in a constructed affine motion vector predictor, wherein the constructed affine motion vector predictor is a translational motion vector used to predict a particular control point motion vector for the affine AMVP mode,

2) a top-right control point motion vector in the constructed affine motion vector predictor,

3) a top-left control point motion vector in the constructed affine motion vector predictor,

4) a temporal motion vector predictor, and

5) a zero motion vector;

determining control point motion vectors for the block of video data from the affine AMVP motion vector predictor list; and

encoding the block of video data using the determined control point motion vectors.

24. The method of claim 23, wherein constructing the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data comprises:

inserting the one or more inherited affine motion vector predictors into the affine AMVP motion vector predictor list, if available;

inserting, if a number of the one or more inherited affine motion vector predictors is less than a predefined maximum number for the affine AMVP motion vector predictor list, the one or more constructed affine motion vector predictors into the affine AMVP motion vector predictor list, if available; and

inserting, if a number of the one or more inherited affine motion vector predictors and the one or more constructed affine motion vector predictors is less than the predefined maximum number for the affine AMVP motion vector predictor list, the one or more affine motion vector

predictors that have all control point motion vectors equal to the designated motion vector into the affine AMVP motion vector predictor list.

25. The method of claim 23, wherein constructing the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data comprises:

constructing the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data without performing a pruning process.

26. The method of claim 23, further comprising:

deriving the one or more inherited affine motion vector predictors from control point motion vectors of a neighboring block coded using affine motion prediction.

27. The method of claim 23, further comprising:

deriving the one or more constructed affine motion vector predictors from motion vectors of neighboring blocks coded using inter prediction.

28. The method of claim 23, wherein the block of video data is encoded using a 6-parameter affine motion model, the method further comprising:

deriving the one or more constructed affine motion vector predictors from motion vectors of neighboring blocks coded using inter prediction only if all control point motion vectors for the 6-parameter affine motion model are available.

29. The method of claim 23, further comprising:

determining candidate control point motion vectors in the affine AMVP motion vector predictor;

encoding an index to the affine AMVP motion vector predictor list corresponding to the determined candidate control point motion vectors;

determining a motion vector difference for each of the control point motion vectors for the block relative to the determined candidate control point motion vectors; and

encoding the motion vector differences.

30. The method of claim 23, further comprising:

capturing a picture that includes the block of video data.

31. An apparatus configured to encode video data, the apparatus comprising:

a memory configured to store a block of video data to be encoded using affine advanced motion vector prediction (AMVP) mode; and

one or more processors in communication with the memory, the one or more processors configured to:

receive the block of video data;

construct an affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, wherein the affine AMVP motion vector predictor list further includes at least one or more inherited affine motion vector predictors or one or more constructed affine motion vector predictors, and wherein the affine AMVP motion vector predictor list further includes one or more affine motion vector predictors that have all control point motion vectors equal to a designated motion vector;

determine the designated motion vector from a designated motion vector candidate list in the following order, wherein the designated motion vector candidate list is different than the affine AMVP motion vector predictor list:

1) a bottom-left control point motion vector in a constructed affine motion vector predictor, wherein the constructed affine motion vector predictor is a translational motion vector used to predict a particular control point motion vector for the affine AMVP mode,

2) a top-right control point motion vector in the constructed affine motion vector predictor,

3) a top-left control point motion vector in the constructed affine motion vector predictor,

4) a temporal motion vector predictor, and

5) a zero motion vector;

determine control point motion vectors for the block of video data from the affine AMVP motion vector predictor list; and

encode the block of video data using the determined control point motion vectors.

32. The apparatus of claim 31, wherein to construct the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, the one or more processors are configured to:

insert the one or more inherited affine motion vector predictors into the affine AMVP motion vector predictor list, if available;

insert, if a number of the one or more inherited affine motion vector predictors is less than a predefined maximum number for the affine AMVP motion vector predictor list, the one or more constructed affine motion vector predictors into the affine AMVP motion vector predictor list, if available; and

insert, if a number of the one or more inherited affine motion vector predictors and the one or more constructed affine motion vector predictors is less than the predefined maximum number for the affine AMVP motion vector predictor list, the one or more affine motion vector predictors that have all control point motion vectors equal to the designated motion vector into the affine AMVP motion vector predictor list.

33. The apparatus of claim 31, wherein to construct the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, the one or more processors are configured to:

construct the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data without performing a pruning process.

34. The apparatus of claim 31, wherein the one or more processors are further configured to:

derive the one or more inherited affine motion vector predictors from control point motion vectors of a neighboring block coded using affine motion prediction.

35. The apparatus of claim 31, wherein the one or more processors are further configured to:

derive the one or more constructed affine motion vector predictors from motion vectors of neighboring blocks coded using inter prediction.

36. The apparatus of claim 31, wherein the block of video data is to be encoded using a 6-parameter affine motion model, and wherein the one or more processors are further configured to:

derive the one or more constructed affine motion vector predictors from motion vectors of neighboring blocks coded using inter prediction only if all control point motion vectors for the 6-parameter affine motion model are available.

37. The apparatus of claim 31, wherein the one or more processors are further configured to:

determine candidate control point motion vectors in the affine AMVP motion vector predictor;

encode an index to the affine AMVP motion vector predictor list corresponding to the determined candidate control point motion vectors;

determine a motion vector difference for each of the control point motion vectors for the block relative to the determined candidate control point motion vectors; and

encode the motion vector differences.

38. The apparatus of claim 31, further comprising:

a camera configured to capture a picture that includes the block of video data.

39. An apparatus configured to encode video data, the apparatus comprising:

means for receiving a block of video data to be encoded using affine advanced motion vector prediction (AMVP) mode;

means for constructing an affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, wherein the affine AMVP motion vector predictor list further includes at least one or more inherited affine motion vector predictors or one or more constructed affine motion vector predictors, and wherein the affine AMVP motion vector predictor list further includes one or more affine motion vector predictors that have all control point motion vectors equal to a designated motion vector;

means for determining the designated motion vector from a designated motion vector candidate list in the following order, wherein the designated motion vector candidate list is different than the affine AMVP motion vector predictor list:

1) a bottom-left control point motion vector in a constructed affine motion vector predictor, wherein the constructed affine motion vector predictor is a translational motion vector used to predict a particular control point motion vector for the affine AMVP mode,

2) a top-right control point motion vector in the constructed affine motion vector predictor,

3) a top-left control point motion vector in the constructed affine motion vector predictor,

4) a temporal motion vector predictor, and

5) a zero motion vector;

means for determining control point motion vectors for the block of video data from the affine AMVP motion vector predictor list; and

means for encoding the block of video data using the determined control point motion vectors.

40. The apparatus of claim 39, wherein the means for constructing the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data comprises:

means for inserting the one or more inherited affine motion vector predictors into the affine AMVP motion vector predictor list, if available;

means for inserting, if a number of the one or more inherited affine motion vector predictors is less than a predefined maximum number for the affine AMVP motion vector predictor list, the one or more constructed affine motion vector predictors into the affine AMVP motion vector predictor list, if available; and

means for inserting, if a number of the one or more inherited affine motion vector predictors and the one or more constructed affine motion vector predictors is less than the predefined maximum number for the affine AMVP motion vector predictor list, the one or more affine motion vector predictors that have all control point motion vectors equal to the designated motion vector into the affine AMVP motion vector predictor list.

41. The apparatus of claim 39, wherein the means for constructing the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data

comprises:

means for constructing the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data without performing a pruning process.

42. A non-transitory computer-readable storage medium storing instructions that, when executed, cause one or more processors to:

receive a block of video data to be encoded using affine advanced motion vector prediction (AMVP) mode;

construct an affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, wherein the affine AMVP motion vector predictor list further includes at least one or more inherited affine motion vector predictors or one or more constructed affine motion vector predictors, and wherein the affine AMVP motion vector predictor list further includes one or more affine motion vector predictors that have all control point motion vectors equal to a designated motion vector;

determine the designated motion vector from a designated motion vector candidate list in the following order, wherein the designated motion vector candidate list is different than the affine AMVP motion vector predictor list:

1) a bottom-left control point motion vector in a constructed affine motion vector predictor, wherein the constructed affine motion vector predictor is a translational motion vector used to predict a particular control point motion vector for the affine AMVP mode,

2) a top-right control point motion vector in the constructed affine motion vector predictor,

3) a top-left control point motion vector in the constructed affine motion vector predictor,

4) a temporal motion vector predictor, and

5) a zero motion vector;

determine control point motion vectors for the block of video data from the affine AMVP motion vector predictor list; and

encode the block of video data using the determined control point motion vectors.

43. The non-transitory computer-readable storage medium of claim 42, wherein to construct

the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, the instructions cause the one or more processors to:

insert the one or more inherited affine motion vector predictors into the affine AMVP motion vector predictor list, if available;

insert, if a number of the one or more inherited affine motion vector predictors is less than a predefined maximum number for the affine AMVP motion vector predictor list, the one or more constructed affine motion vector predictors into the affine AMVP motion vector predictor list, if available; and

insert, if a number of the one or more inherited affine motion vector predictors and the one or more constructed affine motion vector predictors is less than the predefined maximum number for the affine AMVP motion vector predictor list, the one or more affine motion vector predictors that have all control point motion vectors equal to the designated motion vector into the affine AMVP motion vector predictor list.

44. The non-transitory computer-readable storage medium of claim 42, wherein to construct the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data, the instructions cause the one or more processors to:

construct the affine AMVP motion vector predictor list of candidate control point motion vectors for the block of video data without performing a pruning process.