CLAIMS

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

receiving a current block of video data that is to be decoded using affine motion compensation;

constructing an affine motion vector predictor (MVP) list for a plurality of control points of an affine model used to code the current block of video data, including adding a motion vector from a neighboring block of video data to the affine MVP list as a motion vector predictor based on the motion vector having an associated reference picture that is the same as a target reference picture for the current block of video data, and refraining from adding the motion vector from the neighboring block of video data to the affine MVP list as a motion vector predictor based on the motion vector not having the associated reference picture that is the same as the target reference picture for the current block of video data,

wherein constructing the affine MVP list further comprises deriving a single candidate from a plurality of motion vector predictors, wherein the plurality of motion vector predictors includes a first motion vector predictor (MVP0), a second motion vector predictor (MVP1), and a third motion vector predictor (MVP2) based on the affine model being a 6-parameter affine model, and wherein the plurality of motion vector predictors includes the first motion vector predictor (MVP0) and the second motion vector predictor (MVP1) based on the affine model being a 4-parameter affine model;

determining motion vectors for the plurality of control points using the affine MVP list; and

decoding the current block of video data with the determined motion vectors for the plurality of control points of the current block of video data.

2. The method of claim 1, wherein the plurality of control points include at least a first control point, and wherein constructing the affine MVP list for the first control point comprises:

checking first neighboring blocks of the first control point in a first predetermined order, wherein the first neighboring blocks include a left-above neighboring block (A), a first above neighboring block (B), and a first left neighboring block (C), and wherein the first predetermined order is A then C then B; and

adding to the affine MVP list, as the first motion vector predictor (MVP0), a first motion vector of the first neighboring blocks having the associated reference picture that is the same as the target reference picture that occurs first in the first predetermined order.

3. The method of claim 2, further comprising:

marking the first motion vector predictor for the first control point as unavailable if no motion vectors of the first neighboring blocks of the first control point have the associated reference picture that is the same as the target reference picture.

4. The method of claim 2, wherein the plurality of control points further include a second control point, and wherein constructing the affine MVP list for the second control point comprises:

checking second neighboring blocks of the second control point in a second predetermined order, wherein the second neighboring blocks include a second above neighboring block (D), and a right-above neighboring block (E), and wherein the second predetermined order is D then E; and

adding to the affine MVP list, as the second motion vector predictor (MVP1), a second motion vector of the second neighboring blocks having the associated reference picture that is the same as the target reference picture that occurs first in the second predetermined order.

5. The method of claim 4, further comprising:

marking the second motion vector predictor for second first control point as unavailable if no motion vectors of the second neighboring blocks of the second control point have the associated reference picture that is the same as the target reference picture.

6. The method of claim 4, wherein the plurality of control points further include a third control point, and wherein constructing the affine MVP list for the third control point comprises:

checking third neighboring blocks of the third control point in a third predetermined order, wherein the third neighboring blocks include a second left neighboring block (F), and a left-below neighboring block (G), and wherein the third predetermined order is F then G; and

adding to the affine MVP list, as the third motion vector predictor (MVP2), a third motion vector of the third neighboring blocks having the associated reference picture that is the same as the target reference picture that occurs first in the third predetermined order.

7. The method of claim 6, further comprising:

marking the third motion vector predictor for third first control point as unavailable if no motion vectors of the third neighboring blocks of the third control point have the associated reference picture that is the same as the target reference picture.

8. The method of claim 6, further comprising:

determining that the third motion vector predictor (MVP2) is unavailable; and

calculating the third motion vector predictor (MVP2) as a function of the first motion vector predictor (MVP0) and the second motion vector predictor (MVP1) in response to determining that the third motion vector predictor (MVP2) is unavailable.

9. The method of claim 6, further comprising:

determining that the second motion vector predictor (MVP1) is unavailable; and

calculating the second motion vector predictor (MVP1) as a function of the first motion vector predictor (MVP0) and the third motion vector predictor (MVP2) in response to determining that the second motion vector predictor (MVP1) is unavailable.

10. The method of claim 6, further comprising:

determining that the first motion vector predictor (MVP0) is unavailable; and

calculating the first motion vector predictor (MVP0) as a function of the second motion vector predictor (MVP1) and the third motion vector predictor (MVP2) in response to determining that the first motion vector predictor (MVP0) is unavailable.

11. The method of claim 6, further comprising:

rounding the first motion vector predictor (MVP0), the second motion vector predictor (MVP1), and the third motion vector predictor (MVP2) to a predefined motion precision.

12. The method of claim 1, wherein the associated reference picture is the same as the target reference picture for the current block of video data when the associated reference picture is in the same reference picture list as the target reference picture and has the same reference index as the target reference picture.

13. The method of claim 1, wherein the associated reference picture is the same as the target reference picture for the current block of video data when the associated reference picture has the same picture order count number as the target reference picture.

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

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

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

receive the current block of video data that is to be decoded using affine motion compensation;

construct an affine motion vector predictor (MVP) list for a plurality of control points of an affine model used to code the current block of video data, including adding a motion vector from a neighboring block of video data to the affine MVP list as a motion vector predictor based on the motion vector having an associated reference picture that is the same as a target reference picture for the current block of video data, and refraining from adding the motion vector from the neighboring block of video data to the affine MVP list as a motion vector predictor based on the motion vector not having the associated reference picture that is the same as the target reference picture for the current block of video data,

wherein to construct the affine MVP list, the apparatus is further configured to derive a single candidate from a plurality of motion vector predictors, wherein the plurality of motion vector predictors includes a first motion vector predictor (MVP0), a second motion vector predictor (MVP1), and a third motion vector predictor (MVP2) based on the affine model being a 6-parameter affine model, and wherein the plurality of motion vector predictors includes the first motion vector predictor (MVP0) and the second motion vector predictor (MVP1) based on the affine model being a 4-parameter affine model;

determine motion vectors for the plurality of control points using the affine MVP list; and

decode the current block of video data with the determined motion vectors for the plurality of control points of the current block of video data.

15. The apparatus of claim 14, wherein the plurality of control points include at least a first control point, and wherein to construct the affine MVP list for the first control point, the apparatus is further configured to:

check first neighboring blocks of the first control point in a first predetermined order, wherein the first neighboring blocks include a left-above neighboring block (A), a first above neighboring block (B), and a first left neighboring block (C), and wherein the first predetermined order is A then C then B; and

add to the affine MVP list, as the first motion vector predictor (MVP0), a first motion vector of the first neighboring blocks having the associated reference picture that is the same as the target reference picture that occurs first in the first predetermined order.

16. The apparatus of claim 15, wherein the apparatus is further configured to:

mark the first motion vector predictor for the first control point as unavailable if no motion vectors of the first neighboring blocks of the first control point have the associated reference picture that is the same as the target reference picture.

17. The apparatus of claim 15, wherein the plurality of control points further include a second control point, and wherein to construct the affine MVP list for the second control point, the apparatus is further configured to:

check second neighboring blocks of the second control point in a second predetermined order, wherein the second neighboring blocks include a second above neighboring block (D), and a right-above neighboring block (E), and wherein the second predetermined order is D then E; and

add to the affine MVP list, as the second motion vector predictor (MVP1), a second motion vector of the second neighboring blocks having the associated reference picture that is the same as the target reference picture that occurs first in the second predetermined order.

18. The apparatus of claim 17, wherein the apparatus is further configured to:

mark the second motion vector predictor for second first control point as unavailable if no motion vectors of the second neighboring blocks of the second control point have the associated reference picture that is the same as the target reference picture.

19. The apparatus of claim 17, wherein the plurality of control points further include a third control point, and wherein to construct the affine MVP list for the third control point, the apparatus is further configured to:

check third neighboring blocks of the third control point in a third predetermined order, wherein the third neighboring blocks include a second left neighboring block (F), and a left-below neighboring block (G), and wherein the third predetermined order is F then G; and

add to the affine MVP list, as the third motion vector predictor (MVP2), a third motion vector of the third neighboring blocks having the associated reference picture that is the same as the target reference picture that occurs first in the third predetermined order.

20. The apparatus of claim 19, wherein the apparatus is further configured to:

mark the third motion vector predictor for third first control point as unavailable if no motion vectors of the third neighboring blocks of the third control point have the associated reference picture that is the same as the target reference picture.

21. The apparatus of claim 19, wherein the apparatus is further configured to:

determine that the third motion vector predictor (MVP2) is unavailable; and

calculate the third motion vector predictor (MVP2) as a function of the first motion vector predictor (MVP0) and the second motion vector predictor (MVP1) in response to determining that the third motion vector predictor (MVP2) is unavailable.

22. The apparatus of claim 19, wherein the apparatus is further configured to:

determine that the second motion vector predictor (MVP1) is unavailable; and

calculate the second motion vector predictor (MVP1) as a function of the first motion vector predictor (MVP0) and the third motion vector predictor (MVP2) in response to determining that the second motion vector predictor (MVP1) is unavailable.

23. The apparatus of claim 19, wherein the apparatus is further configured to:

determine that the first motion vector predictor (MVP0) is unavailable; and

calculate the first motion vector predictor (MVP0) as a function of the second motion vector predictor (MVP1) and the third motion vector predictor (MVP2) in response to determining that the first motion vector predictor (MVP0) is unavailable.

24. The apparatus of claim 19, wherein the apparatus is further configured to:

round the first motion vector predictor (MVP0), the second motion vector predictor (MVP1), and the third motion vector predictor (MVP2) to a predefined motion precision.

25. The apparatus of claim 14, wherein the associated reference picture is the same as the target reference picture for the current block of video data when the associated reference picture is in the same reference picture list as the target reference picture and has the same reference index as the target reference picture.

26. The apparatus of claim 14, wherein the associated reference picture is the same as the target reference picture for the current block of video data when the associated reference picture has the same picture order count number as the target reference picture.

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

means for receiving a current block of video data that is to be decoded using affine motion compensation;

means for constructing an affine motion vector predictor (MVP) list for a plurality of control points of an affine model used to code the current block of video data, including adding a motion vector from a neighboring block of video data to the affine MVP list as a motion vector predictor based on the motion vector having an associated reference picture that is the same as a target reference picture for the current block of video data, and refraining from adding the motion vector from the neighboring block of video data to the affine MVP list as a motion vector predictor based on the motion vector not having the associated reference picture that is the same as the target reference picture for the current block of video data,

wherein the means for constructing the affine MVP list further comprises means for deriving a single candidate from a plurality of motion vector predictors, wherein the plurality of motion vector predictors includes a first motion vector predictor (MVP0), a second motion vector predictor (MVP1), and a third motion vector predictor (MVP2) based on the affine model being a 6-parameter affine model, and wherein the plurality of motion vector predictors includes the first motion vector predictor (MVP0) and the second motion vector predictor (MVP1) based on the affine model being a 4-parameter affine model;

means for determining motion vectors for the plurality of control points using the affine MVP list; and

means for decoding the current block of video data with the determined motion vectors for the plurality of control points of the current block of video data.

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

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

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

receive the current block of video data that is to be encoded using affine motion compensation;

construct an affine motion vector predictor (MVP) list for a plurality of control points of an affine model used to code the current block of video data, including adding a motion vector from a neighboring block of video data to the affine MVP list as a motion vector predictor based on the motion vector having an associated reference picture that is the same as a target reference picture for the current block of video data, and refraining from adding the motion vector from the neighboring block of video data to the affine MVP list as a motion vector predictor based on the motion vector not having the associated reference picture that is the same as the target reference picture for the current block of video data,

wherein to construct the affine MVP list, the apparatus is further configured to derive a single candidate from a plurality of motion vector predictors, wherein the plurality of motion vector predictors includes a first motion vector predictor (MVP0), a second motion vector predictor (MVP1), and a third motion vector predictor (MVP2) based on the affine model being a 6-parameter affine model, and wherein the plurality of motion vector predictors includes the first motion vector predictor (MVP0) and the second motion vector predictor (MVP1) based on the affine model being a 4-parameter affine model;

determine motion vectors for the plurality of control points using the affine MVP list; and

encode the current block of video data with the determined motion vectors for the plurality of control points of the current block of video data.

29. The apparatus of claim 28, wherein the plurality of control points include at least a first control point, and wherein to construct the affine MVP list for the first control point, the apparatus is further configured to:

check first neighboring blocks of the first control point in a first predetermined order, wherein the first neighboring blocks include a left-above neighboring block (A), a first above neighboring block (B), and a first left neighboring block (C), and wherein the first predetermined order is A then C then B; and

add to the affine MVP list, as the first motion vector predictor (MVP0), a first motion vector of the first neighboring blocks having the associated reference picture that is the same as the target reference picture that occurs first in the first predetermined order.

30. The apparatus of claim 29, wherein the apparatus is further configured to:

mark the first motion vector predictor for the first control point as unavailable if no motion vectors of the first neighboring blocks of the first control point have the associated reference picture that is the same as the target reference picture.

31. The apparatus of claim 29, wherein the plurality of control points further include a second control point, and wherein to construct the affine MVP list for the second control point, the apparatus is further configured to:

check second neighboring blocks of the second control point in a second predetermined order, wherein the second neighboring blocks include a second above neighboring block (D), and a right-above neighboring block (E), and wherein the second predetermined order is D then E; and

add to the affine MVP list, as the second motion vector predictor (MVP1), a second motion vector of the second neighboring blocks having the associated reference picture that is the same as the target reference picture that occurs first in the second predetermined order.

32. The apparatus of claim 31, wherein the apparatus is further configured to:

mark the second motion vector predictor for second first control point as unavailable if no motion vectors of the second neighboring blocks of the second control point have the associated reference picture that is the same as the target reference picture.

33. The apparatus of claim 31, wherein the plurality of control points further include a third control point, and wherein to construct the affine MVP list for the third control point, the apparatus is further configured to:

check third neighboring blocks of the third control point in a third predetermined order, wherein the third neighboring blocks include a second left neighboring block (F), and a left-below neighboring block (G), and wherein the third predetermined order is F then G; and

add to the affine MVP list, as the third motion vector predictor (MVP2), a third motion vector of the third neighboring blocks having the associated reference picture that is the same as the target reference picture that occurs first in the third predetermined order.

34. The apparatus of claim 33, wherein the apparatus is further configured to:

mark the third motion vector predictor for third first control point as unavailable if no motion vectors of the third neighboring blocks of the third control point have the associated reference picture that is the same as the target reference picture.

35. The apparatus of claim 33, wherein the apparatus is further configured to:

determine that the third motion vector predictor (MVP2) is unavailable; and

calculate the third motion vector predictor (MVP2) as a function of the first motion vector predictor (MVP0) and the second motion vector predictor (MVP1) in response to determining that the third motion vector predictor (MVP2) is unavailable.

36. The apparatus of claim 33, wherein the apparatus is further configured to:

determine that the second motion vector predictor (MVP1) is unavailable; and

calculate the second motion vector predictor (MVP1) as a function of the first motion vector predictor (MVP0) and the third motion vector predictor (MVP2) in response to determining that the second motion vector predictor (MVP1) is unavailable.

37. The apparatus of claim 33, wherein the apparatus is further configured to:

determine that the first motion vector predictor (MVP0) is unavailable; and

calculate the first motion vector predictor (MVP0) as a function of the second motion vector predictor (MVP1) and the third motion vector predictor (MVP2) in response to determining that the first motion vector predictor (MVP0) is unavailable.

38. The apparatus of claim 33, wherein the apparatus is further configured to:

round the first motion vector predictor (MVP0), the second motion vector predictor (MVP1), and the third motion vector predictor (MVP2) to a predefined motion precision.

39. The apparatus of claim 28, wherein the associated reference picture is the same as the target reference picture for the current block of video data when the associated reference picture is in the same reference picture list as the target reference picture and has the same reference index as the target reference picture.

40. The apparatus of claim 28, wherein the associated reference picture is the same as the target reference picture for the current block of video data when the associated reference picture has the same picture order count number as the target reference picture.