Claims

1. A video decoder (410) configured to:

decode a video (450) from a data stream (420) using motion compensation prediction to predict current pictures from reference pictures

based on motion vector differences (423) transmitted in the data stream (450) at half-sample resolution,

with first reference pictures (421) of equal picture resolution as respective current pictures for which they are used in prediction and second reference pictures (422) of different picture resolution than respective current pictures for which they are used in prediction, and

using interpolation filters (431, 432) to obtain sub-sample values within reference sample arrays formed from respective reference pictures,

select an interpolation filter to obtain half-sample values within a reference sample array, the reference sample array formed from a reference picture by using a motion vector, the interpolation filter selected from a first interpolation filter version (431) and a second interpolation filter version (432), wherein the first interpolation filter version (431) is a 6 tap filter with coefficients 3,9,20,20,9,3 and the second interpolation filter version (432) is an 8 tap filter with coefficients -1,4,-11,40,40,-11,4,-1, by

selecting the first interpolation filter version when the reference picture is equal in picture resolution to the current picture in horizontal dimension and selecting the second interpolation filter version when the reference picture is unequal in picture resolution to the current picture in horizontal dimension, and/or

selecting the first interpolation filter version when the reference picture is equal in picture resolution to the current picture in vertical dimension and selecting the second interpolation filter version when the reference picture is unequal in picture resolution to the current picture in vertical dimension.

2. A video decoder according to claim 1, further configured to:

obtain full-sample values within the reference sample array without using the interpolation filter.

3. A video decoder according to claim 1 or 2, further configured to:

obtain non-half-sample sub-sample values within the reference sample array by using further interpolation filter versions having a higher edge preserving property than the first interpolation filter version.

4. A video decoder according to any one of claims 1 to 3, further configured to:

perform the selection separately for horizontal interpolation and vertical interpolation.

5. A video decoder according to any one of claims 1 to 4,

wherein the second interpolation filter version is selected for horizontal interpolation if the current picture is not equal in picture resolution to the reference picture in horizontal dimension,

wherein the second interpolation filter version is selected for vertical interpolation if the current picture is not equal in picture resolution to the reference picture in vertical dimension, and

wherein the second interpolation filter version is selected for horizontal and vertical interpolation if the current picture is not equal in picture resolution to the reference picture in horizontal and vertical dimension.

6. The video decoder according to any one of claims 1 to 5, wherein the second interpolation filter version has a higher edge preserving property than the first interpolation filter version.

7. A video decoder according to any one of claims 1 to 6, wherein the data stream comprises information indicating whether temporal consecutive pictures have same or different horizontal and/or vertical picture resolution dimensions.

8. A video decoder according to any one of claims 1 to 7,

wherein the reference sample array is a region, subpicture, or picture.

9. A video encoder (510) configured to:

encode a video (550) into a data stream (520) using motion compensation prediction to predict current pictures from reference pictures,

indicate by transmitting in the data stream (520) motion vector differences (523) at half-sample resolution,

with first reference pictures (521) of equal picture resolution as respective current pictures for which they are used in prediction and second reference pictures (522) of different picture resolution than respective current pictures for which they are used in prediction, and

using interpolation filters (531, 532) to obtain sub-sample values within reference sample arrays formed from respective reference pictures,

select an interpolation filter to obtain half-sample values within a reference sample array, the reference sample array formed from a reference picture by using a motion vector, the interpolation filter selected from a first interpolation filter version (531) and a second interpolation filter version (532), wherein the first interpolation filter version (531) is a 6 tap filter with coefficients 3,9,20,20,9,3 and the second interpolation filter version (532) is an 8 tap filter with coefficients -1,4,-11,40,40,-11,4,-1, by

selecting the first interpolation filter version when the reference picture is equal in picture resolution to the current picture in horizontal dimension and selecting the second interpolation filter version when the reference picture is unequal in picture resolution to the current picture in horizontal dimension, and/or

selecting the first interpolation filter version when the reference picture is equal in picture resolution to the current picture in vertical dimension and selecting the second interpolation filter version when the reference picture is unequal in picture resolution to the current picture in vertical dimension.

10. A video encoder according to claim 9, further configured to:

obtain full-sample values within the reference sample array without using the interpolation filter.

11. A video encoder according to claim 9 or 10, further configured to:

obtain non half-sample sub-sample values within the reference sample array by using further interpolation filter versions having a higher edge preserving property than the first interpolation filter version.

12. A video encoder according to any one of claims 9 to 11, further configured to:

perform the selection separately for horizontal interpolation and vertical interpolation.

13. A video encoder according to any one of claims 9 to 12,

wherein the second interpolation filter version is selected for horizontal interpolation if the current picture is not equal in picture resolution to the reference picture in horizontal dimension,

wherein the second interpolation filter version is selected for vertical interpolation if the current picture is not equal in picture resolution to the reference picture in vertical dimension, and

wherein the second interpolation filter version is selected for horizontal and vertical interpolation if the current picture is not equal in picture resolution to the reference picture in horizontal and vertical dimension.

14. A video encoder according to any one of claims 9 to 13, wherein the second interpolation filter version has a higher edge preserving property than the first interpolation filter version.

15. A video encoder according to any one of claims 9 to 14, wherein the data stream comprises information indicating whether temporal consecutive pictures have the same or different horizontal and/or vertical picture resolution dimensions.

16. A video encoder according to any one of claims 9 to 15,

wherein the reference sample array is a region, subpicture, or picture.

17. A method for decoding a video, the method comprising:

decoding a video from a data stream using motion compensation prediction to predict current pictures from reference pictures

based on motion vector differences transmitted in the data stream at half-sample resolution,

with first reference pictures of equal picture resolution as respective current pictures for which they are used in prediction and second reference pictures of different picture resolution than respective current pictures for which they are used in prediction, and

using interpolation filters to obtain sub-sample values within reference sample arrays formed from respective reference pictures,

selecting an interpolation filter to obtain half-sample values within a reference sample array, the reference sample array formed from a reference picture by using a motion vector, the interpolation filter selected from a first interpolation filter version and a second interpolation filter version, wherein the first interpolation filter version is a 6 tap filter with coefficients 3,9,20,20,9,3 and the second interpolation filter version is an 8 tap filter with coefficients -1,4,-11,40,40,-11,4,-1, by

selecting the first interpolation filter version when the reference picture is equal in picture resolution to the current picture in horizontal dimension and selecting the second interpolation filter version when the reference picture is unequal in picture resolution to the current picture in horizontal dimension, and/or

selecting the first interpolation filter version when the reference picture is equal in picture resolution to the current picture in vertical dimension and selecting the second interpolation filter version when the reference picture is unequal in picture resolution to the current picture in vertical dimension.

18. The method for decoding a video according to claim 17, further comprising:

obtaining full-sample values within the reference sample array without using the interpolation filter.

19. The method for decoding a video according to claim 17 or 18, further comprising:

obtaining non half-sample sub-sample values by using further interpolation filters having a higher edge preserving property than the first interpolation filter version.

20. The method for decoding a video according to any one of claims 17 to 19, further comprising:

performing the selection separately for horizontal interpolation and vertical interpolation.

21. The method for decoding a video according to any one of claims 17 to 20,

wherein the second interpolation filter is selected for horizontal interpolation if the current picture is not equal in picture resolution to the reference picture in horizontal dimension,

wherein the second interpolation filter is selected for vertical interpolation if the current picture is not equal in picture resolution to the reference picture in vertical dimension, and

wherein the second interpolation filter is selected for horizontal and vertical interpolation if the current picture is not equal in picture resolution to the reference picture in horizontal and vertical dimension.

22. The method for decoding a video according to any one of claims 17 to 21, wherein the second interpolation filter version has a higher edge preserving property than the first interpolation filter version.

23. The method for decoding a video according to any one of claims 17 to 22,

wherein the data stream comprises information indicating whether temporal consecutive pictures have same or different horizontal and/or vertical picture resolution dimensions.

24. The method for decoding a video according to any one of claims 17 to 23,

wherein the reference sample array is a region, subpicture, or picture.

25. A method for encoding a video comprising:

encoding a video into a data stream using motion compensation prediction to predict current pictures from reference pictures,

indicating by transmitting in the data stream motion vector differences at half-sample resolution,

with first reference pictures of equal picture resolution as respective current pictures for which they are used in prediction and second reference pictures of different picture resolution than respective current pictures for which they are used in prediction, and

using interpolation filters to obtain sub-sample values within reference sample arrays formed from respective reference pictures,

selecting an interpolation filter to obtain half-sample values within a reference sample array, the reference sample array formed from a reference picture by using for a motion vector, the interpolation filter selected from a first interpolation filter version and a second

interpolation filter version, wherein the first interpolation filter version is a 6 tap filter with coefficients 3,9,20,20,9,3 and the second interpolation filter version is an 8 tap filter with coefficients -1,4,-11,40,40,-11,4,-1, by

selecting the first interpolation filter version when the reference picture is equal in picture resolution to the current picture in horizontal dimension and selecting the second interpolation filter version when the reference picture is unequal in picture resolution to the current picture in horizontal dimension, and/or

selecting the first interpolation filter version when the reference picture is equal in picture resolution to the current picture in vertical dimension and selecting the second interpolation filter version when the reference picture is unequal in picture resolution to the current picture in vertical dimension.

26. The method for encoding a video according to claim 25, further comprising:

obtaining full-sample values within the reference sample array without using the interpolation filter.

27. The method for encoding a video according to claim 25 or 26, further comprising:

obtaining non half-sample sub-sample values by using further interpolation filters having a higher edge preserving property than the first interpolation filter version.

28. The method for encoding a video according to any one of claims 25 to 27, further comprising:

performing the selection separately for horizontal interpolation and vertical interpolation.

29. The method for encoding a video according to any one of claims 25 to 28,

wherein the second interpolation filter is selected for horizontal interpolation if the current picture is not equal in picture resolution to the reference picture in horizontal dimension,

wherein the second interpolation filter is selected for vertical interpolation if the current picture is not equal in picture resolution to the reference picture in vertical dimension, and

wherein the second interpolation filter is selected for horizontal and vertical interpolation if the current picture is not equal in picture resolution to the reference picture in horizontal and vertical dimension.

30. The method for encoding a video according to any one of claims 25 to 29, wherein the second interpolation filter version has a higher edge preserving property than the first interpolation filter version.

31. The method for encoding a video according to any one of claims 25 to 30,

wherein the data stream comprises information indicating whether temporal consecutive pictures have the same or different horizontal and/or vertical picture resolution dimensions.

32. The method for encoding a video according to any one of claims 25 to 31,

wherein the reference sample array is a region, subpicture, or picture.

33. A computer program product including a program for a processing device, comprising software code portions for performing the steps of any one of claims 17 to 32, when the program is run on the processing device.

34. The computer program product according to claim 33, wherein the computer program product comprises a computer-readable medium on which the software code portions are stored, wherein the program is directly loadable into an internal memory of the processing device.

35. A data stream, produced by the method for encoding a video according to any one of claims 25 to 32.