

CLAIMS:

1. A video decoding method for motion compensation performed under an inter-frame prediction, the method comprising computer executable steps executed by a processor of a video decoder to implement:

retrieving samples from a reference picture memory;

applying a first fractional sample interpolation on the retrieved samples in a first direction to generate a first set of fractional samples; and

applying a second fractional sample interpolation on the first set of fractional samples in a second direction to generate a second set of fractional samples, wherein the first set of fractional samples is represented with a precision independent of a precision of representation of the samples retrieved from the reference picture memory.

2. The method according to claim 1, wherein the fractional sample interpolation applies an 8-tap FIR filter having one of the following three sets of coefficients to generate a quarter-pel sample:

[-1, 4, -10, 58, 17, -5, 1, 0];

[-1, 4, -11, 40, 40, -11, 4, -1]; and

[0, 1, -5, 17, 58, -10, 4, -1].

3. The method according to claim 2, wherein the fractional sample interpolation comprises truncating each of filtered results so that the fractional samples have a desired precision.

4. The method according to claim 3, wherein the desired precision is constant throughout the first and second fractional interpolation processes.

5. The method according to claim 3, wherein truncating each of filtered results comprises rounding truncated results towards minus infinity.

6. The method according to claim 1, further comprising scaling the retrieved samples up to a second bit depth which is constant for the samples, regardless of original bit depths of the samples, wherein the second bit depth is set equal to a number of bits available to represent the sample, and a scaling up factor is set equal to the number of bits available to represent the sample minus the original bit depth of the sample.

7. The method according to claim 1, further comprising subtracting an offset from the scaled up samples.

8. A video encoding method for motion compensation performed under an inter-frame prediction, the method comprising computer executable steps executed by a processor of a video encoder to implement:

retrieving samples from a reference picture memory;

applying a first fractional sample interpolation on the retrieved samples in a first direction to generate a first set of fractional samples; and

applying a second fractional sample interpolation on the first set of fractional samples in a second direction to generate a second set of fractional samples, wherein the first set of fractional samples is represented with a precision independent of a precision of representation of the samples retrieved from the reference picture memory.

9. The method according to claim 8, wherein the fractional sample interpolation applies an 8-tap FIR filter having one of the following three sets of coefficients to generate a quarter-pel sample:

[-1, 4, -10, 58, 17, -5, 1, 0];

[-1, 4, -11, 40, 40, -11, 4, -1]; and

[0, 1, -5, 17, 58, -10, 4, -1].

10. The method according to claim 9, wherein the fractional sample interpolation comprises truncating each of filtered results so that the fractional samples have a desired precision.
11. The method according to claim 10, wherein the desired precision is constant throughout the first and second interpolation processes.
12. The method according to claim 10, wherein truncating each of filtered results comprises rounding truncated results towards minus infinity.
13. The method according to claim 8, further comprising scaling the retrieved samples up to a second bit depth which is constant for the samples regardless of their original bit depths, wherein the unified bit depth is set equal to a number of bits available to represent the sample, and a scaling up factor is set equal to the number of bits available to represent the sample minus the original bit depth of the sample.
14. The method according to claim 13, further comprising subtracting an offset from the scaled up samples.

CLAIMS:

1. A video decoding method for motion compensation performed under an inter-frame prediction, the method comprising computer executable steps executed by a processor of a video decoder to implement:

retrieving integer samples from a reference picture memory;

applying a first fractional sample interpolation on the integer samples retrieved from the reference picture memory, in a first direction to generate a first set by adjusting a fractional sample applied with the first fractional sample interpolation, to a predetermined bit depth independent of the bit depth of the integer samples retrieved from the reference picture memory;

applying a second fractional sample interpolation on the first set of fractional samples in a second direction to generate a second set of fractional samples,

wherein the predetermined bit depth is set equal to a number of bits available to represent the fractional samples, and the adjustment process of the bit depth is based on a factor set equal to the number of bits available to represent the sample minus the first bit depth of the sample.

2. The method according to claim 1, wherein the bit depth of the integer samples retrieved from the reference picture memory is 8 or 10.

3. The method according to claim 1 or 2, wherein the bit depth of the fractional samples is 14.

4. A video encoding method for motion compensation performed under an inter-frame prediction, the method comprising computer executable steps executed by a processor of a video decoder to implement:

retrieving integer samples from a reference picture memory;

applying a first fractional sample interpolation on the integer samples retrieved from the reference picture memory, in a first direction to generate a first set by adjusting a fractional sample applied with the first fractional sample interpolation, to a predetermined bit depth independent of the bit depth of the integer samples retrieved from the reference picture memory;

applying a second fractional sample interpolation on the first set of fractional samples in a second direction to generate a second set of fractional samples,

wherein the predetermined bit depth is set equal to a number of bits available to represent the fractional samples, and the adjustment process of the bit depth is based on a factor set equal to the number of bits available to represent the sample minus the first bit

depth of the sample.

5. The method according to claim 4, wherein the bit depth of the integer samples retrieved from the reference picture memory is 8 or 10.

6. The method according to claim 4 or 5, wherein the bit depth of the fractional samples is 14.