CLAIMS

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

determining that a block of video data is encoded using a bi-directional inter prediction mode;

determining that the block of video data is encoded using a bi-directional optical flow (BIO) process;

inter predicting the block of video data according to the bi-directional inter prediction mode;

performing the BIO process for the block, wherein performing the BIO process for the block comprises:

determining a single motion vector refinement for a group of pixels in the block based on pixels within a neighborhood surrounding the group of pixels, wherein the neighborhood comprises a first square block of pixels; and

refining the group of pixels based on the single motion vector refinement, wherein the group of pixels comprises a second square block of pixels that is smaller than the first square block of pixels; and

outputting a BIO refined predictive block of video data comprising the refined group of pixels.

2. The method of claim 1, wherein the group of pixels comprises a 4x4 block.

3. The method of claim 1, wherein refining the group of pixels based on the single motion vector refinement comprises applying a same refinement to all pixels in the group.

4. The method of claim 1, wherein:

inter predicting the block of video data comprises locating a first reference block in a first picture, locating a second reference block in a second reference picture, and generating a first predictive block based on the first reference block and the second reference block, wherein the group of pixels belongs to the first predictive block; and

performing the BIO process for the block comprises applying the BIO process to the

group of pixels of the first predictive block to generate the BIO refined predictive block.

5. The method of claim 1, wherein determining the single motion vector refinement for the group of pixels comprises determining a motion vector field for a window of pixels, wherein the window of pixels comprises the group of pixels and pixels in a region surrounding the group of pixels.

6. The method of claim 5, wherein the window comprises an 8x8 block of pixels.

7. The method of claim 5, wherein the window comprises a 6x6 block of pixels.

8. The method of claim 5, wherein determining the motion vector field for the window of pixels comprises:

applying a first weighting to a pixel adjacent to a boundary of the window; and

applying a second weighting to a pixel not adjacent to any boundary of the window, wherein the second weighting is greater than the first weighting.

9. The method of claim 5, wherein determining the motion vector field for the window of pixels comprises:

applying a median filter to the window of pixels.

10. The method of claim 1, further comprising:

applying an Overlapped Block Motion Compensation (OBMC) process to the BIO refined predictive block.

11. The method of claim 1, wherein the method for decoding the video data is performed as part of a reconstruction loop of a video encoding process.

12. A device for decoding video data, the device comprising:

a memory configured to store the video data; and

one or more processors configured to:

determine that a block of video data is encoded using a bi-directional inter prediction mode;

determine that the block of video data is encoded using a bi-directional optical flow (BIO) process;

inter predict the block of video data according to the bi-directional inter prediction mode;

perform the BIO process for the block, wherein to perform the BIO process for the block, the one or more processors are configured to:

determine a single motion vector refinement for a group of pixels in the block based on pixels within a neighborhood surrounding the group of pixels, wherein the neighborhood comprises a first square block of pixels, and

refine the group of pixels based on the single motion vector refinement, wherein the group of pixels comprises a second square block of pixels that is smaller than the first square block of pixels; and

output a BIO refined predictive block of video data comprising the refined group of pixels.

13. The device of claim 12, wherein the group of pixels comprises a 4x4 block.

14. The device of claim 12, wherein to refine the group of pixels based on the single motion vector refinement, the one or more processors are configured to apply a same refinement to all pixels in the group.

15. The device of claim 12, wherein:

to inter predict the block of video data, the one or more processors are configured to locate a first reference block in a first picture, locate a second reference block in a second reference picture, and generate a first predictive block based on the first reference block and the second reference block, wherein the group of pixels belongs to the first predictive block; and

to perform the BIO process for the block, the one or more processors are configured to apply the BIO process to the group of pixels of the first predictive block to generate the BIO refined predictive block.

16. The device of claim 12, wherein to determine the single motion vector refinement for the group of pixels, the one or more processors are configured to determine a motion vector field for a window of pixels, wherein the window of pixels comprises the group of pixels and pixels in a region surrounding the group of pixels.

17. The device of claim 16, wherein the window comprises an 8x8 block of pixels.

18. The device of claim 16, wherein the window comprises a 6x6 block of pixels.

19. The device of claim 16, wherein to determine the motion vector field for the window of pixels, the one or more processors are configured to:

apply a first weighting to a pixel adjacent to a boundary of the window; and apply a second weighting to a pixel not adjacent to any boundary of the window, wherein the second weighting is greater than the first weighting.

20. The device of claim 16, wherein to determine the motion vector field for the window of pixels, the one or more processors are configured to:

apply a median filter to the window of pixels.

21. The device of claim 12, wherein the one or more processors are configured to:

apply an Overlapped Block Motion Compensation (OBMC) process to the BIO refined predictive block.

22. The device of claim 12, wherein the device comprises a wireless communication device, further comprising a receiver configured to receive encoded video data.

23. The device of claim 22, wherein the wireless communication device comprises a telephone handset and wherein the receiver is configured to demodulate, according to a wireless communication standard, a signal comprising the encoded video data.

24. The device of claim 12, wherein the device comprises a wireless communication device,

further comprising a transmitter configured to transmit encoded video data.

25. The device of claim 24, wherein the wireless communication device comprises a telephone handset and wherein the transmitter is configured to modulate, according to a wireless communication standard, a signal comprising the encoded video data.

26. An apparatus for decoding video data, the apparatus comprising:

means for determining that a block of video data is encoded using a bi-directional inter prediction mode;

means for determining that the block of video data is encoded using a bi-directional optical flow (BIO) process;

means for inter predicting the block of video data according to the bi-directional inter prediction mode;

means for performing the BIO process for the block, wherein the means for performing the BIO process for the block comprises:

means for determining a single motion vector refinement for a group of pixels in the block based on pixels within a neighborhood surrounding the group of pixels, wherein the neighborhood comprises a first square block of pixels; and

means for refining the group of pixels based on the single motion vector refinement, wherein the group of pixels comprises a second square block of pixels that is smaller than the first square block of pixels; and

means for outputting a BIO refined predictive block of video data comprising the refined group of pixels.

27. The apparatus of claim 26, wherein the means for refining the group of pixels based on the single motion vector refinement comprises means for applying a same refinement to all pixels in the group.

28. The apparatus of claim 26, wherein:

the means for inter predicting the block of video data comprises means for locating a first reference block in a first picture, means for locating a second reference block in a second

reference picture, and means for generating a first predictive block based on the first reference block and the second reference block, wherein the group of pixels belongs to the first predictive block; and

the means for performing the BIO process for the block comprises means for applying the BIO process to the group of pixels of the first predictive block to generate the BIO refined predictive block.

29. The apparatus of claim 26, wherein the means for determining the single motion vector refinement for the group of pixels comprises means for determining a motion vector field for a window of pixels, wherein the window of pixels comprises the group of pixels and pixels in a region surrounding the group of pixels.

30. A computer-readable storage medium storing instructions that when executed by one or more processors cause the one or more processors to:

determine that a block of video data is encoded using a bi-directional inter prediction mode;

determine that the block of video data is encoded using a bi-directional optical flow (BIO) process;

inter predict the block of video data according to the bi-directional inter prediction mode;

perform the BIO process for the block, wherein to perform the BIO process for the block, the instructions cause the one or more processors to:

determine a single motion vector refinement for a group of pixels in the block based on pixels within a neighborhood surrounding the group of pixels, wherein the neighborhood comprises a first square block of pixels; and

refine the group of pixels based on the single motion vector refinement, wherein the group of pixels comprises a second square block of pixels that is smaller than the first square block of pixels; and

output a BIO refined predictive block of video data comprising the refined group of pixels.

31. The computer-readable storage medium of claim 30, wherein to refine the group of pixels

based on the single motion vector refinement, the instructions cause the one or more processors to apply a same refinement to all pixels in the group.

32. The computer-readable storage medium of claim 30, wherein:

to inter predict the block of video data, the instructions cause the one or more processors locate a first reference block in a first picture, locate a second reference block in a second reference picture, and generate a first predictive block based on the first reference block and the second reference block, wherein the group of pixels belongs to the first predictive block; and

to perform the BIO process for the block, the instructions cause the one or more processors apply the BIO process to the group of pixels of the first predictive block to generate the BIO refined predictive block.

33. The computer-readable storage medium of claim 30, wherein to determine the single motion vector refinement for the group of pixels, the instructions cause the one or more processors to determine a motion vector field for a window of pixels, wherein the window of pixels comprises the group of pixels and pixels in a region surrounding the group of pixels.