

WHAT IS CLAIMED IS:

1. A method of decoding a sequence of video data that includes a plurality of pictures, the method comprising:
 - decoding a first syntax element that indicates whether a first decoder-side refinement tool is enabled or disabled for a first subset of video data within the sequence of video data;
 - determining whether the first decoder-side refinement tool is enabled or disabled for the first subset of video data based on a value of the first syntax element;
 - decoding a second syntax element that indicates whether a second decoder-side refinement tool is enabled or disabled for the first subset of video data with the sequence of video data;
 - determining whether the second decoder-side refinement tool is enabled or disabled for the first subset of video data based on a value of the first syntax element;
 - decoding the first subset of video data using the first decoder-side refinement tool in response to the first decoder-side refinement tool being enabled for the first subset;
 - decoding the first subset of video data without using the first decoder-side refinement tool in response to the first decoder-side refinement tool being disabled for the first subset;
 - decoding the first subset of video data using the second decoder-side refinement tool in response to the second decoder-side refinement tool being enabled for the first subset; and
 - decoding the first subset of video data without using the second decoder-side refinement tool in response to the second decoder-side refinement tool being disabled for the first subset.
2. The method of claim 1, wherein the first decoder-side refinement tool comprises a decoder-side motion vector refinement (DMVR) tool and wherein the second decoder-side refinement tool comprises a bi-directional optical flow (BDOF) tool.
3. The method of claim 1, wherein decoding the first syntax element comprises decoding a first instance of the first syntax element and wherein decoding the second

syntax element comprises decoding a first instance of the second syntax element, the method further comprising:

- decoding a second instance of the first syntax element that indicates whether the first decoder-side refinement tool is enabled or disabled for a second subset of video data within the sequence of video data, wherein the second subset is different than the first subset;

- determining whether the first decoder-side refinement tool is enabled or disabled for the second subset of video data based on a value of the second instance of the first syntax element;

- decoding a second instance of the second syntax element that indicates whether the second decoder-side refinement tool is enabled or disabled for the second subset of video data within the sequence of video data;

- determining whether the second decoder-side refinement tool is enabled or disabled for the second subset of video data based on a value of the second instance of the second syntax element;

- decoding the second subset of video data using the first decoder-side refinement tool in response to the first decoder-side refinement tool being enabled for the second subset;

- decoding the second subset of video data without using the first decoder-side refinement tool in response to the first decoder-side refinement tool being disabled for the second subset;

- decoding the second subset of video data using the second decoder-side refinement tool in response to the second decoder-side refinement tool being enabled for the second subset; and

- decoding the second subset of video data without using the second decoder-side refinement tool in response to the second decoder-side refinement tool being disabled for the second subset.

4. The method of claim 3, further comprising:

- decoding a third instance of the first syntax element that indicates whether the first decoder-side refinement tool is enabled or disabled for a third subset of video data within the sequence of video data, wherein the third subset is different than the first subset and the third subset is different than the second subset;

determining whether the first decoder-side refinement tool is enabled or disabled for the third subset of video data based on a value of the third instance of the first syntax element;

decoding a third instance of the second syntax element that indicates whether the second decoder-side refinement tool is enabled or disabled for the third subset of video data within the sequence of video data;

determining whether the second decoder-side refinement tool is enabled or disabled for the third subset of video data based on a value of the third instance of the second syntax element;

decoding the third subset of video data using the first decoder-side refinement tool in response to the first decoder-side refinement tool being enabled for the third subset;

decoding the third subset of video data without using the first decoder-side refinement tool in response to the first decoder-side refinement tool being disabled for the third subset;

decoding the third subset of video data using the second decoder-side refinement tool in response to the second decoder-side refinement tool being enabled for the third subset; and

decoding the third subset of video data without using the second decoder-side refinement tool in response to the second decoder-side refinement tool being disabled for the third subset.

5. The method of claim 3, further comprising:

determining that the first decoder-side refinement tool is enabled for the first subset of video data based on a value of the first instance of the first syntax element;

determining that the second decoder-side refinement tool is disabled for the first subset of video data based on a value of the first instance of the second syntax element;

decoding the first subset of video data using the first decoder-side refinement tool and without using the second decoder-side refinement tool;

determining that the first decoder-side refinement tool is disabled for the second subset of video data based on a value of the second instance of the first syntax element;

determining that the second decoder-side refinement tool is enabled for the second subset of video data based on a value of the second instance of the second syntax element; and

decoding the second subset of video data using the second decoder-side refinement tool and without using the first decoder-side refinement tool.

6. The method of claim 1, wherein the first and second decoder-side refinement tools are available for decoding any of the plurality of pictures of the sequence of video data, wherein one or both the first and second decoder-side refinement tools are enabled for some subsets of video data within the sequence of video data, and wherein one or both of the first and second decoder-side refinement tools are disabled for other subsets of video data within the sequence of video data.

7. The method of claim 1, further comprising:
decoding one or more syntax elements associated with the sequence of video data; and
determining, based on the one or more syntax elements associated with the sequence of video data, that the first and second decoder-side refinement tools are enabled so as to be available for decoding the plurality of pictures of the sequence of video data.

8. The method of claim 1, wherein the first subset comprises at least a portion of a first picture among the plurality of pictures of the sequence of video data.

9. The method of claim 8, wherein the first subset of video data within the sequence of video data comprises one or more of:

- a slice of video data;
- a frame of video data;
- a picture among the plurality of pictures of the sequence of video data;
- a sub-picture of video data; and
- a block of video data.

10. A method of encoding a sequence of video data that includes a plurality of pictures, the method comprising:

encoding a first instance of a first syntax element to identify whether a first decoder-side refinement tool is enabled or disabled for a first subset of video data within the sequence of video data;

encoding a second instance of the first syntax element to identify whether the first decoder-side refinement tool is enabled or disabled for a second subset of video data within the sequence of video data, wherein the second subset is different than the first subset;

encoding a first instance of a second syntax element to identify whether a second decoder-side refinement tool is enabled or disabled for a first subset of video data within the sequence of video data; and

encoding a second instance of the second syntax element to identify whether the second decoder-side refinement tool is enabled or disabled for a second subset of video data within the sequence of video data.

11. The method of claim 10, wherein the first decoder-side refinement tool comprises a decoder-side motion vector refinement (DMVR) tool and wherein the second decoder-side refinement tool comprises a bi-directional optical flow (BDOF) tool.

12. The method of claim 10, further comprising:

encoding a third instance of the first syntax element to identify whether the first decoder-side refinement tool is enabled or disabled for a third subset of video data within the sequence of video data, wherein the third subset is different than the first subset and the third subset is different than the second subset; and

encoding a third instance of the second syntax element to identify whether the second decoder-side refinement tool is enabled or disabled for the third subset of video data within the sequence of video data.

13. The method of claim 10, wherein one or both the first and second decoder-side refinement tools are enabled for some subsets of video data within the sequence of video data, and wherein one or both of the first and second decoder-side refinement tools are disabled for other subsets of video data within the sequence of video data.

14. The method of claim 10, further comprising:

encoding one or more syntax elements associated with the sequence of video data to indicate that the first and second decoder-side refinement tools are available for decoding the plurality of pictures of the sequence of video data,

wherein one or both the first and second decoder-side refinement tools are enabled for some subsets of video data within the sequence of video data, and wherein one or both of the first and second decoder-side refinement tools are disabled for other subsets of video data within the sequence of video data.

15. The method of claim 10, wherein the first subset comprises at least a portion of a first picture among the plurality of pictures of the sequence of video data.

16. The method of claim 15, wherein the first subset of video data within the sequence of video data comprises one or more of:

- a slice;
- a frame;
- a picture;
- a sub-picture; and
- a block.

17. A video decoding device comprising:

- a memory configured to store a sequence of video data that includes a plurality of pictures; and

- processing circuitry configured to:

- decode a first syntax element that indicates whether a first decoder-side refinement tool is enabled or disabled for a first subset of video data within the sequence of video data;

- determine whether the first decoder-side refinement tool is enabled or disabled for the first subset of video data based on a value of the first syntax element;

- decode a second syntax element that indicates whether a second decoder-side refinement tool is enabled or disabled for the first subset of video data with the sequence of video data;

- determine whether the second decoder-side refinement tool is enabled or disabled for the first subset of video data based on a value of the first syntax element;

- decode the first subset of video data using the first decoder-side refinement tool in response to the first decoder-side refinement tool being enabled for the first subset;

decode the first subset of video data without using the first decoder-side refinement tool in response to the first decoder-side refinement tool being disabled for the first subset;

decode the first subset of video data using the second decoder-side refinement tool in response to the second decoder-side refinement tool being enabled for the first subset; and

decode the first subset of video data without using the second decoder-side refinement tool in response to the second decoder-side refinement tool being disabled for the first subset.

18. The video decoding device of claim 17, wherein the first decoder-side refinement tool comprises a decoder-side motion vector refinement (DMVR) tool and wherein the second decoder-side refinement tool comprises a bi-directional optical flow (BDOF) tool.

19. The video decoding device of claim 17, wherein the processing circuitry is configured to decode the first syntax element by decoding a first instance of the first syntax element and to decode the second syntax element by decoding a first instance of the second syntax element, the processing circuitry being further configured to:

decode a second instance of the first syntax element that indicates whether the first decoder-side refinement tool is enabled or disabled for a second subset of video data within the sequence of video data, wherein the second subset is different than the first subset;

determine whether the first decoder-side refinement tool is enabled or disabled for the second subset of video data based on a value of the second instance of the first syntax element;

decode a second instance of the second syntax element that indicates whether the second decoder-side refinement tool is enabled or disabled for the second subset of video data within the sequence of video data;

determine whether the second decoder-side refinement tool is enabled or disabled for the second subset of video data based on a value of the second instance of the second syntax element;

decode the second subset of video data using the first decoder-side refinement tool in response to the first decoder-side refinement tool being enabled for the second subset;

decode the second subset of video data without using the first decoder-side refinement tool in response to the first decoder-side refinement tool being disabled for the second subset;

decode the second subset of video data using the second decoder-side refinement tool in response to the second decoder-side refinement tool being enabled for the second subset; and

decode the second subset of video data without using the second decoder-side refinement tool in response to the second decoder-side refinement tool being disabled for the second subset.

20. The video decoding device of claim 19, wherein the processing circuitry is further configured to:

decode a third instance of the first syntax element that indicates whether the first decoder-side refinement tool is enabled or disabled for a third subset of video data within the sequence of video data, wherein the third subset is different than the first subset and the third subset is different than the second subset;

determine whether the first decoder-side refinement tool is enabled or disabled for the third subset of video data based on a value of the third instance of the first syntax element;

decode a third instance of the second syntax element that indicates whether the second decoder-side refinement tool is enabled or disabled for the third subset of video data within the sequence of video data;

determine whether the second decoder-side refinement tool is enabled or disabled for the third subset of video data based on a value of the third instance of the second syntax element;

decode the third subset of video data using the first decoder-side refinement tool in response to the first decoder-side refinement tool being enabled for the third subset;

decode the third subset of video data without using the first decoder-side refinement tool in response to the first decoder-side refinement tool being disabled for the third subset;

decode the third subset of video data using the second decoder-side refinement tool in response to the second decoder-side refinement tool being enabled for the third subset; and

decode the third subset of video data without using the second decoder-side refinement tool in response to the second decoder-side refinement tool being disabled for the third subset.

21. The video decoding device of claim 19, wherein the processing circuitry is configured to:

determine that the first decoder-side refinement tool is enabled for the first subset of video data based on a value of the first instance of the first syntax element;

determine that the second decoder-side refinement tool is disabled for the first subset of video data based on a value of the first instance of the second syntax element;

decode the first subset of video data using the first decoder-side refinement tool and without using the second decoder-side refinement tool;

determine that the first decoder-side refinement tool is disabled for the second subset of video data based on a value of the second instance of the first syntax element;

determine that the second decoder-side refinement tool is enabled for the second subset of video data based on a value of the second instance of the second syntax element; and

decode the second subset of video data using the second decoder-side refinement tool and without using the first decoder-side refinement tool.

22. The video decoding device of claim 17, wherein the first and second decoder-side refinement tools are available for decoding any of the plurality of pictures of the sequence of video data, wherein one or both the first and second decoder-side refinement tools are enabled for some subsets of video data within the sequence of video data, and wherein one or both of the first and second decoder-side refinement tools are disabled for other subsets of video data within the sequence of video data.

23. The video decoding device of claim 17, wherein the processing circuitry is further configured to:

decode one or more syntax elements associated with the sequence of video data; and

determine, based on the one or more syntax elements associated with the sequence of video data, that the first and second decoder-side refinement tools are enabled so as to be available for decoding the plurality of pictures of the sequence of video data.

24. The video decoding device of claim 17, wherein the first subset comprises at least a portion of a first picture among the plurality of pictures of the sequence of video data.

25. The video decoding device of claim 24, wherein the first subset of video data within the sequence of video data comprises one or more of:

- a slice of video data;
- a frame of video data;
- a picture among the plurality of pictures of the sequence of video data;
- a sub-picture of video data; and
- a block of video data.

26. A video encoding device comprising:

- a memory configured to store a sequence of video data that includes a plurality of pictures; and

- processing circuitry configured to:

- encode a first instance of a first syntax element to identify whether a first decoder-side refinement tool is enabled or disabled for a first subset of video data within the sequence of video data;

- encode a second instance of the first syntax element to identify whether the first decoder-side refinement tool is enabled or disabled for a second subset of video data within the sequence of video data, wherein the second subset is different than the first subset;

- encode a first instance of a second syntax element to identify whether a second decoder-side refinement tool is enabled or disabled for a first subset of video data within the sequence of video data; and

- encode a second instance of the second syntax element to identify whether the second decoder-side refinement tool is enabled or disabled for a second subset of video data within the sequence of video data.

27 The video encoding device of claim 26, wherein the first decoder-side refinement tool comprises a decoder-side motion vector refinement (DMVR) tool and wherein the second decoder-side refinement tool comprises a bi-directional optical flow (BDOF) tool.

28. The video encoding device of claim 26, wherein the processing circuitry is further configured to:

encode a third instance of the first syntax element to identify whether the first decoder-side refinement tool is enabled or disabled for a third subset of video data within the sequence of video data, wherein the third subset is different than the first subset and the third subset is different than the second subset; and

encode a third instance of the second syntax element to identify whether the second decoder-side refinement tool is enabled or disabled for the third subset of video data within the sequence of video data.

29. The video encoding device of claim 26, wherein one or both the first and second decoder-side refinement tools are enabled for some subsets of video data within the sequence of video data, and wherein one or both of the first and second decoder-side refinement tools are disabled for other subsets of video data within the sequence of video data.

30. The video encoding device of claim 26, wherein the processing circuitry is further configured to:

encode one or more syntax elements associated with the sequence of video data to indicate that the first and second decoder-side refinement tools are available for decoding the plurality of pictures of the sequence of video data,

wherein one or both the first and second decoder-side refinement tools are enabled for some subsets of video data within the sequence of video data, and wherein one or both of the first and second decoder-side refinement tools are disabled for other subsets of video data within the sequence of video data.

31. The video encoding device of claim 26, wherein the first subset comprises at least a portion of a first picture among the plurality of pictures of the sequence of video data.

32. The video encoding device of claim 31, wherein the first subset of video data within the sequence of video data comprises one or more of:

- a slice;
- a frame;
- a picture;
- a sub-picture; and
- a block.

33. A video decoding device configured to decode a sequence of video data that includes a plurality of pictures, the video decoding device comprising:

- means for decoding a first syntax element that indicates whether a first decoder-side refinement tool is enabled or disabled for a first subset of video data within the sequence of video data;

- means for determining whether the first decoder-side refinement tool is enabled or disabled for the first subset of video data based on a value of the first syntax element;

- means for decoding a second syntax element that indicates whether a second decoder-side refinement tool is enabled or disabled for the first subset of video data with the sequence of video data;

- means for determining whether the second decoder-side refinement tool is enabled or disabled for the first subset of video data based on a value of the first syntax element;

- means for decoding the first subset of video data using the first decoder-side refinement tool in response to the first decoder-side refinement tool being enabled for the first subset;

- means for decoding the first subset of video data without using the first decoder-side refinement tool in response to the first decoder-side refinement tool being disabled for the first subset;

- means for decoding the first subset of video data using the second decoder-side refinement tool in response to the second decoder-side refinement tool being enabled for the first subset; and

means for decoding the subset of video data without using the second decoder-side refinement tool in response to the second decoder-side refinement tool being disabled for the first subset.

34. A video encoding device configured to encode a sequence of video data that includes a plurality of pictures, the video encoding device comprising:

means for encoding a first instance of a first syntax element to identify whether a first decoder-side refinement tool is enabled or disabled for a first subset of video data within the sequence of video data;

means for encoding a second instance of the first syntax element to identify whether the first decoder-side refinement tool is enabled or disabled for a second subset of video data within the sequence of video data, wherein the second subset is different than the first subset;

means for encoding a first instance of a second syntax element to identify whether a second decoder-side refinement tool is enabled or disabled for a first subset of video data within the sequence of video data; and

means for encoding a second instance of the second syntax element to identify whether the second decoder-side refinement tool is enabled or disabled for a second subset of video data within the sequence of video data.

35. A computer-readable storage medium storing instructions that, when executed, cause one or more processors of a video decoding device to:

decode a first syntax element that indicates whether a first decoder-side refinement tool is enabled or disabled for a first subset of video data within a sequence of video data, wherein the sequence of video data includes a plurality of pictures;

determine whether the first decoder-side refinement tool is enabled or disabled for the first subset of video data based on a value of the first syntax element;

decode a second syntax element that indicates whether a second decoder-side refinement tool is enabled or disabled for the first subset of video data with the sequence of video data;

determine whether the second decoder-side refinement tool is enabled or disabled for the first subset of video data based on a value of the first syntax element;

decode the first subset of video data using the first decoder-side refinement tool in response to the first decoder-side refinement tool being enabled for the first subset;

decode the first subset of video data without using the first decoder-side refinement tool in response to the first decoder-side refinement tool being disabled for the first subset;

decode the first subset of video data using the second decoder-side refinement tool in response to the second decoder-side refinement tool being enabled for the first subset; and

decode the subset of video data without using the second decoder-side refinement tool in response to the second decoder-side refinement tool being disabled for the first subset.

36. A computer-readable storage medium storing instructions that, when executed, cause one or more processors of a video encoding device to:

encode a first instance of a first syntax element to identify whether a first decoder-side refinement tool is enabled or disabled for a first subset of video data within a sequence of video data wherein the sequence of video data that includes a plurality of pictures;

encode a second instance of the first syntax element to identify whether the first decoder-side refinement tool is enabled or disabled for a second subset of video data within the sequence of video data, wherein the second subset is different than the first subset;

encode a first instance of a second syntax element to identify whether a second decoder-side refinement tool is enabled or disabled for a first subset of video data within the sequence of video data; and

encode a second instance of the second syntax element to identify whether the second decoder-side refinement tool is enabled or disabled for a second subset of video data within the sequence of video data.