CLAIMS

~~What is claimed is:~~

1. A method implemented by a video decoder and comprising:

receiving, by the video decoder, a video bitstream comprising a picture and loop_filter_across_subpic_enabled_flag, wherein the picture comprises a subpicture; and

applying a deblocking filter process to all subblock edges and transform block edges of the picture except edges that coincide with boundaries of the subpicture when loop_filter_across_subpic_enabled_flag is equal to 0.

2. The method of claim 1, wherein loop_filter_across_subpic_enabled_flag equal to 1 specifies that in-loop filtering operations may be performed across boundaries of a subpicture in each coded picture in a coded video sequence (CVS).

3. The method of ~~any of claims~~any one of claims 1-2, wherein loop_filter_across_subpic_enabled_flag equal to 0 specifies that in-loop filtering operations are not performed across boundaries of a subpicture in each coded picture in a coded video sequence (CVS).

4. A video decoder comprising:

a memory configured to store instructions; and

a processor coupled to the memory and configured to execute the instructions to perform ~~any of claims~~any one of claims 1-3.

5. A computer program ~~product~~ comprising computer-executable instructions for storage on a non-transitory medium and that, when executed by a processor, cause a video decoder to perform ~~any of claims~~any one of claims 1-3.

6. A method implemented by a video encoder and comprising:

generating, by the video encoder, loop_filter_across_subpic_enabled_flag so that a deblocking filter process is applied to all subblock edges and transform block edges of a picture except edges that coincide with boundaries of a subpicture when loop_filter_across_subpic_enabled_flag is equal to 0;

encoding, by the video encoder, loop_filter_across_subpic_enabled_flag into a video bitstream~~; and~~

~~storing, by the video encoder, the video bitstream for communication toward a video decoder~~.

7. The method of claim ~~7~~6, wherein loop_filter_across_subpic_enabled_flag equal to 1 specifies that in-loop filtering operations may be performed across boundaries of a subpicture in each coded picture in a coded video sequence (CVS).

8. The method of ~~any of claims~~any one of claims 6-7, wherein loop_filter_across_subpic_enabled_flag equal to 0 specifies that in-loop filtering operations are not performed across boundaries of a subpicture in each coded picture in a coded video sequence (CVS).

9. The method of ~~any of claims~~any one of claims 6-8, further comprising:

generating seq_parameter_set_rbsp;

including loop_filter_across_subpic_enabled_flag in seq_parameter_set_rbsp; and

further encoding loop_filter_across_subpic_enabled_flag into the video bitstream by encoding seq_parameter_set_rbsp into the video bitstream.

10. A video encoder comprising:

a memory configured to store instructions; and

a processor coupled to the memory and configured to execute the instructions to perform ~~any of claims~~any one of claims 6-9.

11. A computer program ~~product~~ comprising computer-executable instructions for storage on a non-transitory medium and that, when executed by a processor, cause a video encoder to perform ~~any of claims~~any one of claims 6-9.

12. A video coding system comprising:

an encoder; and

a decoder,

wherein the encoder or the decoder is configured to perform ~~any of claims~~any one of claims 1-3 or 6-9.

~~13. A method implemented by a video decoder and comprising:~~

~~receiving, by the video decoder, a video bitstream comprising a picture, EDGE_VER, and loop_filter_across_subpic_enabled_flag, wherein the picture comprises a subpicture; and~~

~~setting filterEdgeFlag to 0 if edgeType is equal to the EDGE_VER, a left boundary of a current coding block is a left boundary of the subpicture, and the loop_filter_across_subpic_enabled_flag is equal to 0.~~

~~14. The method of claim 13, wherein the edgeType is a variable specifying whether a vertical edge or a horizontal edge is filtered.~~

~~15. The method of any of claims 13-14, wherein the edgeType equal to 0 specifies that the vertical edge is filtered, and wherein the EDGE_VER is the vertical edge.~~

~~16. The method of any of claims 13-15, wherein the edgeType equal to 1 specifies that the horizontal edge is filtered, and wherein the EDGE_HOR is the horizontal edge.~~

~~17. The method of any of claims 13-16, wherein the loop_filter_across_subpic_enabled_flag equal to 0 specifies that in-loop filtering operations are not performed across boundaries of a subpicture in each coded picture in a coded video sequence (CVS).~~

18. The method of any of claims 13-17, further comprising filtering the picture based on the filterEdgeFlag.

19. A video decoder comprising:

a memory configured to store instructions; and

a processor coupled to the memory and configured to execute the instructions to perform any of claims 13-18.

20. A computer program product comprising computer-executable instructions for storage on a non-transitory medium and that, when executed by a processor, cause a video decoder to perform any of claims 13-18.

21. A video coding system comprising:

an encoder; and

a decoder configured to perform any of claims 13-18.

22. A method implemented by a video decoder and comprising:

receiving, by the video decoder, a video bitstream comprising a picture, EDGE_HOR, and loop_filter_across_subpic_enabled_flag, wherein the picture comprises a subpicture; and

setting filterEdgeFlag to 0 if edgeType is equal to the EDGE_HOR, a top boundary of a current coding block is a top boundary of the subpicture, and the loop_filter_across_subpic_enabled_flag is equal to 0.

23. The method of claim 22, wherein the edgeType is a variable specifying whether a vertical edge or a horizontal edge is filtered.

24. The method of any of claims 22-23, wherein the edgeType equal to 0 specifies that the vertical edge is filtered, and wherein the EDGE_VER is the vertical edge.

25. The method of any of claims 22-24, wherein the edgeType equal to 1 specifies that the horizontal edge is filtered, and wherein the EDGE_HOR is the horizontal edge.

~~26. The method of any of claims 22-25, wherein the loop_filter_across_subpic_enabled_flag equal to 0 specifies that in loop filtering operations are not performed across boundaries of a subpicture in each coded picture in a coded video sequence (CVS).~~

~~27. The method of any of claims 22-26, further comprising filtering the picture based on the filterEdgeFlag.~~

~~28. A video decoder comprising:~~

~~a memory configured to store instructions; and~~

~~a processor coupled to the memory and configured to execute the instructions to perform any of claims 22-27.~~

~~29. A computer program product comprising computer-executable instructions for storage on a non-transitory medium and that, when executed by a processor, cause a video decoder to perform any of claims 22-27.~~

~~30. A video coding system comprising:~~

~~an encoder; and~~

~~a decoder configured to perform any of claims 22-27.~~

13. A coding apparatus, comprising:

a receiver configured to receive a picture to encode or to receive a bitstream to decode;

a transmitter coupled to the receiver, the transmitter configured to transmit the bitstream to a decoder or to transmit a decoded image to a display;

a memory coupled to at least one of the receiver or the transmitter, the memory configured to store instructions; and

a processor coupled to the memory, the processor configured to execute the instructions stored in the memory to perform the method in any one of claims 1-3 or any one of claims 6-9.

14. A means for coding, comprising:

receiving means configured to receive a picture to encode or to receive a bitstream to decode;

transmission means coupled to the receiving means, the transmission means configured to transmit the bitstream to a decoding means or to transmit a decoded image to a display means;

storage means coupled to at least one of the receiving means or the transmission means, the storage means configured to store instructions; and

processing means coupled to the storage means, the processing means configured to execute the instructions stored in the storage means to perform the method in any one of claims 1-3 or any one of claims 6-9.

15. A storage medium storing a bitstream which is obtained by using a decoding/encoding method that using the method of any one of claims 1-3 or any one of claims 6-9.

16. A computer-readable storage medium, wherein the computer-readable storage medium stores a computer program that can be executed by a processor, and when the computer program is executed by the processor, the processor performs the method according to any one of claims 1-3 or any one of claims 6-9.

17. A coder comprising processing circuitry for carrying out the method according to any one of claims 1-3 or any one of claims 6-9.