

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 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 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 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, 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 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 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 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 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 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.