

CLAIMS

1. A method of video processing, comprising:
determining, for a conversion between a block that is in a video picture of a video and a bitstream representation of the video, a manner of padding a first set of samples located across boundaries of multiple video regions of the video picture for a current sample in an adaptive loop filter process; and
performing the conversion according to the determining.
2. The method of claim 1, wherein the adaptive loop filter processing comprises a classification of samples or a filtering of samples.
3. The method of claim 1 or 2, wherein a video region comprises a slice, a brick, a tile, or a sub-picture.
4. The method of any one or more of claims 1 to 3, wherein the manner specifies that values of the first set of samples are padded with values of a second set of samples that is located within the same video region of the current sample.
5. The method of claim 4, wherein positions of the second set of samples are determined based on:
clipping vertical coordinates of the first set of samples along a horizontal direction to obtain nearest positions whose vertical coordinates are located within the same video region of the current sample.
6. The method of claim 5, wherein the positions of the second set of samples are further determined based on:
selectively clipping horizontal coordinates of the first set of samples along a vertical direction to obtain nearest positions whose horizontal coordinates are located within the same video region of the current sample.

7. The method of claim 4, wherein positions of the second set of samples are determined based on:
- clipping horizontal coordinates of the first set of samples along a vertical direction to obtain nearest positions whose horizontal coordinates are located within the same video region of the current sample.
8. The method of claim 7, wherein the positions of the second set of samples are further determined based on:
- selectively clipping vertical coordinates of the first set of samples along a horizontal direction to obtain nearest positions whose vertical coordinates are located within the same video region of the current sample.
9. The method of claim 4, wherein positions of the second set of samples are determined based on:
- clipping positions of the first set of samples along both a horizontal direction and a vertical direction to obtain nearest positions that are located within the same video region of the current sample.
10. The method of any one or more of claims 5 to 9, wherein a sample in the first set of sample is at position (x_1, y_1) and the sample is clipped to position (x_2, y_2) , wherein a distance along the horizontal direction is denoted as $|x_1 - x_2|$, wherein a distance along the vertical direction is denoted as $|y_1 - y_2|$, and wherein a distance between two positions is denoted as $|x_1 - x_2| + |y_1 - y_2|$ or $(x_1 - x_2)^2 + (y_1 - y_2)^2$.
11. The method of any one or more of claims 1 to 3, wherein the manner specifies that the filtering of the current sample is disabled.
12. The method of any one or more of claims 1 to 3, wherein the manner specifies that use of the first set of samples is disallowed in the classification of samples.

13. The method of any one or more of claims 1 to 12, wherein whether the manner is applicable to the block is based on whether the block coincides with a boundary of the multiple video regions.
14. The method of claim 13, wherein the manner is applicable to the block in case the block does not coincide with any boundaries of the multiple video regions and a sample of the first set of samples is needed in the adaptive loop filter process.
15. The method of claim 13, wherein the manner is applicable to the block in case: (1) the block does not coincide with any boundaries of the multiple video regions, (2) a sample of the first set of samples is needed in the adaptive loop filter process, and (3) the filtering of the first set of samples is disallowed.
16. The method of claim 13, wherein the manner is applicable to the block in case: (1) the block does not coincide with any boundaries of the multiple video regions, (2) a sample of the first set of samples is needed in the adaptive loop filter process, (3) another sample located within a same video region of the block is needed in the adaptive loop filter process, and (4) the filtering of the first set of samples is disallowed.
17. The method of any one or more of claims 13 to 16, wherein the video region is a slice.
18. The method of any one or more of claims 1 to 17, wherein a symmetric padding manner in which padded samples are generated using samples from both sides of a boundary is not applicable to the first set of samples.
19. The method of any one or more of claims 1 to 17, wherein a single-side padding manner in which padded samples are generated using samples from a single side of a boundary is not applicable to the first set of samples.
20. A method of video processing, comprising:

determining, for a conversion between a block that is in a video picture of a video and a bitstream representation of the video, a uniform padding operation that generates samples for a current sample of the block in an adaptive loop filter process in case the block coincides with at least one type of boundary of multiple video regions of the video picture; and
performing the conversion based on the determining.

21. The method of claim 20, wherein the uniform padding process comprises using samples along a single side of a boundary.

22. The method of claim 20, wherein the uniform padding process comprises using samples along both sides of a boundary.

23. The method of any one or more of claims 20 to 22, wherein the uniform padding operation is applied to the block in case the block coincides with multiple types of boundaries and filtering of samples located across boundaries of the multiple video regions of the video picture is disabled.

24. A method of video processing, comprising:

determining, for a conversion between a block that is in a video picture of a video and a bitstream representation of the video, a manner in which a padding operation is invoked in an adaptive loop filter process for a current sample that is located between two types of boundaries of multiple video regions, wherein one of the two types of boundaries comprises a 360 virtual boundary;

performing the conversion according to the determining.

25. The method of claim 24, wherein the manner specifies that the padding operation is invoked only once in the adaptive loop filter process.

26. The method of claim 25, wherein the padding operation comprises a symmetric padding operation in which padded samples are generated using samples from both sides of a boundary.

27. The method of claim 25, wherein the padding operation comprises a single-side padding operation in which padded samples are generated using samples from a single side of a boundary.
28. The method of claim 24, wherein the manner specifies that the padding operation is invoked with at least one other padding operation in the adaptive loop filter process according to an order.
29. The method of claim 28, wherein the padding operation is applied prior to the at least one other padding operation, wherein the padding operation comprises a single-side padding operation in which padded samples are generated using samples from a single side of a boundary, and wherein the at least one other padding operation comprises a symmetric padding operation in which padded samples are generated using samples from both sides of a boundary.
30. The method of claim 29, wherein padded samples after the padding operation are used as available samples in the at least one other padding operation.
31. The method of claim 24, wherein, in case the other type of the two types of boundaries comprises an adaptive loop filter virtual boundary or an actual boundary of the multiple video regions, the manner specifies that the padding operation comprises only a symmetric padding operation in which padded samples are generated using samples from both sides of a boundary.
32. The method of claim 24, wherein, in case the other type of the two types of boundaries comprises an actual boundary of the video picture, the manner specifies that the padding operation comprises only a single-side padding operation in which padded samples are generated using samples from a single side of a boundary.
33. The method of claim 24, wherein, in case the one of the two types of boundaries does not coincide with the block, the manner specifies that the padding operation comprises only a symmetric padding operation in which padded samples are generated using samples from both sides of a boundary.

34. The method of claim 24, wherein the manner specifies that the padding operation comprises only a symmetric padding operation in which padded samples are generated using samples from both sides of a boundary.
35. The method of any one or more of claims 1 to 34, wherein the conversion includes encoding the video into the bitstream representation.
36. The method of any one or more of claims 1 to 34, wherein the conversion includes decoding the bitstream representation into the video.
37. A video processing apparatus comprising a processor configured to implement a method recited in any one or more of claims 1 to 36.
38. A computer-readable medium having code stored thereon, the code, upon execution by a processor, causing the processor to implement a method recited in any one or more of claims 1 to 36.