CLAIMS

1. A method of processing video data, comprising:

determining, for a conversion between a picture of a video comprising one or more coding tree blocks and a bitstream of the video, that a first sample is unavailable in a classification operation for a first filtering process for a current sample of a current coding tree block because the first sample is located in a slice that is different from a slice of the current sample and samples across slices are disallowed in the first filtering process, wherein all slices of the picture are rectangular slices;

applying a padding process for the first sample, wherein a value of the first sample is padded from a second sample which is a nearest available sample located within a same slice of the current sample, and wherein a position of the second sample is determined based on:

when the first sample is unavailable due to a vertical coordinate of the first sample being outside of the same slice of the current sample, clipping the vertical coordinate of the first sample to a new vertical coordinate, which is a nearest vertical position located within the same slice of the current sample; and

when the first sample is unavailable due to a horizontal coordinate of the first sample being outside of the same slice of the current sample, clipping the horizontal coordinate of the first sample to a new horizontal coordinate, which is a nearest horizontal position located within the same slice of the current sample; and

performing the conversion by applying the first filtering process based on the value of the first sample padded from the second sample, wherein the first filtering process comprises:

determining, based on the classification operation, a filtering coefficient set for the current sample;

determining a clipping value set for the current sample; and

applying a filter on the current sample based on the filtering coefficient set and the clipping value set.

2. The method of claim 1, wherein the value of the first sample padded from the second sample is used to determine a classification filter index in the classification operation, and wherein the

classification filter index of a 4x4 region including the current sample is derived based on gradients calculated from a 10x10 region including the 4x4 region.

3. The method of claim 1, wherein the value of the first sample padded from the second sample is also used in the filter of the first filtering process.

4. The method of claim 1, wherein the padding process is applied in a uniform manner in case the current coding tree block coincides with other type of boundary which is not a slice boundary.

5. The method of claim 1, wherein the method further comprises determining whether a virtual boundary is enabled for the current coding tree block based on a relationship between a bottom boundary of the current coding tree block and a bottom boundary of the picture.

6. The method of claim 5, wherein the virtual boundary is enabled in case the bottom boundary of the current coding tree block is not the bottom boundary of the picture.

7. The method of claim 1, wherein the conversion includes encoding the video into the bitstream.

8. The method of claim 1, wherein the conversion includes decoding the video from the bitstream.

9. An apparatus for processing video data comprising a processor and a non-transitory memory with instructions thereon, wherein the instructions upon execution by the processor, cause the processor to:

determine, for a conversion between a picture of a video comprising one or more coding tree blocks and a bitstream of the video, that a first sample for a current sample of a current coding tree block is unavailable in a classification operation for a first filtering process for a current sample of a current tree block because the first sample is located in a slice that is different from a

slice of the current sample and samples across slices are disallowed in the first filtering process, wherein all slices of the picture are rectangular slices;

apply a padding process for the first sample, wherein a value of the first sample is padded from a second sample which is a nearest available sample located within a same slice of the current sample, and wherein a position of the second sample is determined based on:

when the first sample is unavailable due to a vertical coordinate of the first sample being outside of the same slice of the current sample, clipping the vertical coordinate of the first sample to a new vertical coordinate, which is a nearest vertical position located within the same slice of the current sample; and

when the first sample is unavailable due to a horizontal coordinate of the first sample being outside of the same slice of the current sample, clipping the horizontal coordinate of the first sample to a new horizontal coordinate, which is a nearest horizontal position located within the same slice of the current sample; and

perform the conversion by applying the first filtering process based on the value of the first sample padded from the second sample, wherein the first filtering process comprises:

determining, based on the classification operation, a filtering coefficient set for the current sample;

determining a clipping value set for the current sample; and

applying a filter on the current sample based on the filtering coefficient set and the clipping value set.

10. The apparatus of claim 9, wherein the value of the first sample padded from the second sample is used to determine a classification filter index in the classification operation, and wherein the classification filter index of a 4x4 region including the current sample is derived based on gradients calculated from a 10x10 region including the 4x4 region; and

wherein the value of the first sample padded from the second sample is also used in the filter of the first filtering process.

11. The apparatus of claim 9,

wherein the padding process is applied in a uniform manner in case the current coding tree block coincides with other type of boundary which is not a slice boundary.

12. The apparatus of claim 9,

wherein the processor is further configured to:

determine whether a virtual boundary is enabled for the current coding tree block based on a relationship between a bottom boundary of the current coding tree block and a bottom boundary of the picture;

wherein the virtual boundary is enabled in case the bottom boundary of the current coding tree block is not the bottom boundary of the picture.

13. A non-transitory computer-readable storage medium storing instructions that cause a processor to:

determine, for a conversion between a picture of a video comprising one or more coding tree blocks and a bitstream of the video, that a first sample for a current sample of a current coding tree block is unavailable in a classification operation for a first filtering process for a current sample of a current coding tree block because the first sample is located in a slice that is different from a slice of the current sample and samples across slices are disallowed in the first filtering process, wherein all slices of the picture are rectangular slices;

apply a padding process for the first sample, wherein a value of the first sample is padded from a second sample which is a nearest available sample located within a same slice of the current sample, and wherein a position of the second sample is determined based on:

when the first sample is unavailable due to a vertical coordinate of the first sample being outside of the same slice of the current sample, clipping the vertical coordinate of the first sample to a new vertical coordinate, which is a nearest vertical position located within the same slice of the current sample; and

when the first sample is unavailable due to a horizontal coordinate of the first sample being outside of the same slice of the current sample, clipping the horizontal coordinate of the first sample to a new horizontal coordinate, which is a nearest horizontal position located within the same slice of the current sample; and

perform the conversion by applying the first filtering process based on the value of the first sample padded from the second sample, wherein the first filtering process comprises:

determining, based on the classification operation, a filtering coefficient set for the current sample;

determining a clipping value set for the current sample; and

applying a filter on the current sample based on the filtering coefficient set and the clipping value set.

14. The non-transitory computer-readable storage medium of claim 13, wherein the value of the first sample padded from the second sample is used to determine a classification filter index in the classification operation, and wherein the classification filter index of a 4x4 region including the current sample is derived based on gradients calculated from a 10x10 region including the 4x4 region;

wherein the value of the first sample padded from the second sample is also used in the filter of the first filtering process;

and

wherein the padding process is applied in a uniform manner in case the current coding tree block coincides with other type of boundary which is not a slice boundary.

15. The non-transitory computer-readable storage medium of claim 13,

wherein the processor is further caused to determine whether a virtual boundary is enabled for the current coding tree block based on a relationship between a bottom boundary of the current coding tree block and a bottom boundary of the picture; and

wherein the virtual boundary is enabled in case the bottom boundary of the current coding tree block is not the bottom boundary of the picture.

16. A non-transitory computer-readable storage medium storing a bitstream of a video which is generated by a method performed by a video processing apparatus, wherein the method comprises:

determining, for a picture of a video comprising one or more coding tree blocks, that a first sample for a current sample of a current coding tree block is unavailable in a classification operation for a first filtering process for a current sample of a current coding tree block because the first sample is located in a slice that is different from a slice of the current sample and

samples across slices are disallowed in the first filtering process, wherein all slices of the picture are rectangular slices;

applying a padding process for the first sample, wherein a value of the first sample is padded from a second sample which is a nearest available sample located within a same slice of the current sample, and wherein a position of the second sample is determined based on:

when the first sample is unavailable due to a vertical coordinate of the first sample being outside of the same slice of the current sample, clipping the vertical coordinate of the first sample to a new vertical coordinate, which is a nearest vertical position located within the same slice with the current sample; and

when the first sample is unavailable due to a horizontal coordinate of the first sample being outside of the same slice of the current sample, clipping the horizontal coordinate of the first sample to a new horizontal coordinate, which is a nearest horizontal position located within the same slice of the current sample; and

generating the bitstream by applying the first filtering process based on the value of the first sample padded from the second sample, wherein the first filtering process comprises:

determining, based on the classification operation, a filtering coefficient set for the current sample;

determining a clipping value set for the current sample; and

applying a filter on the current sample based on the filtering coefficient set and the clipping value set.

17. The non-transitory computer-readable storage medium of claim 16, wherein the value of the first sample padded from the second sample is used to determine a classification filter index in the classification operation, and wherein the classification filter index of a 4x4 region including the current sample is derived based on gradients calculated from a 10x10 region including the 4x4 region;

wherein the value of the first sample padded from the second sample is also used in the filter of the first filtering process;

and

wherein the padding process is applied in a uniform manner in case the current coding tree block coincides with other type of boundary which is not a slice boundary.

18. The non-transitory computer-readable storage medium of claim 16,

wherein the method further comprises determining whether a virtual boundary is enabled for the current coding tree block based on a relationship between a bottom boundary of the current coding tree block and a bottom boundary of the picture; and

wherein the virtual boundary is enabled in case the bottom boundary of the current coding tree block is not the bottom boundary of the picture.