CLAIMS

1. An intra prediction method comprising:

searching for a neighboring block restored prior to a current block from among blocks of an image;

checking whether the found neighboring block is a block restored in an intra mode and whether an intra mode of the current block is also a CIP mode in which only blocks pre-restored in the intra mode are referred to;

determining based on a checking result whether the found neighboring block is a reference block available for intra prediction of the current block; and

performing intra prediction on the current block by using sample values of the reference block determined as an available block.

2. The intra prediction method of claim 1, wherein the searching for a neighboring block comprises searching for neighboring blocks restored prior to the current block before determining whether a prediction mode of the current block is an intra mode of the CIP mode, and

the checking comprises checking whether each of the found neighboring blocks is restored in the intra mode and whether the intra mode of the current block is also the CIP mode.

3. The intra prediction method of claim 1, wherein the performing of the intra prediction comprises padding a region deviating from a boundary of the image with a sample value of a pixel adjacent to the inside of the boundary from among pixels of the reference block when the reference block deviates from the boundary of the image.

4. The intra prediction method of claim 3, wherein the performing of the intra prediction comprises padding a region deviating from the boundary of the image with the sample value of the pixel adjacent to the inside of the boundary from among the pixels of the reference block when the reference block deviates from the boundary of the image regardless of whether the intra mode of the current block is the CIP mode.

5. An intra prediction apparatus comprising:

an intra reference block determiner for searching for a neighboring block restored prior to a current block from among blocks of an image and determining whether the found neighboring block is a reference block available for intra prediction of the current block, based on a result of checking whether the found neighboring block is a block restored in an intra mode and whether an intra mode of the current block is also a CIP mode in which only blocks pre-restored in the intra mode are referred to; and

an intra predictor for performing intra prediction on the current block by using sample values of the reference block.

6. The intra prediction apparatus of claim 5, wherein the intra reference block determiner searches for neighboring blocks restored prior to the current block before determining whether a prediction mode of the current block is an intra mode of the CIP mode and checks whether each of the found neighboring blocks is restored in the intra mode and whether the intra mode of the current block is also the CIP mode.

7. The intra prediction apparatus of claim 5, wherein the intra predictor pads a region deviating from a boundary of the image with a sample value of a pixel adjacent to the inside of the boundary from among pixels of the reference block when the reference block deviates from the boundary of the image.

8. The intra prediction apparatus of claim 7, wherein the intra predictor pads the region deviating from the boundary of the image with the sample value of the pixel adjacent to the inside of the boundary from among the pixels of the reference block when the reference block deviates from the boundary of the image regardless of whether the intra mode of the current block is the CIP mode.

9. A video decoding apparatus comprising:

a parser for restoring samples by performing entropy decoding on a bit string parsed from a received bitstream;

an inverse transformer for restoring samples by performing inverse quantization and inverse transformation on a quantized transformation coefficient from among the restored samples;

an intra predictor for searching for a neighboring block restored prior to a current block, determining whether the found neighboring block is a reference block available for intra prediction of the current block, based on a result of checking whether the found neighboring block is a block restored in an intra mode and whether an intra mode of the current block is also a CIP mode in which only blocks pre-restored in the intra mode are referred to, and performing intra prediction on the current block by using sample values of the reference block, to perform the intra prediction on the current block that is in the intra mode from among the samples;

a motion compensator for performing motion compensation on blocks in an inter prediction mode from among the samples; and

a restorer for restoring an image by using blocks restored by the inter prediction or the intra prediction.

10. The video decoding apparatus of claim 9, wherein the intra predictor searches for neighboring blocks restored prior to the current block before determining based on CIP mode information of a current image parsed from the bitstream whether a prediction mode of the current block is an intra mode of the CIP mode, and checks whether each of the found neighboring blocks is restored in the intra mode and whether

the intra mode of the current block is also the CIP mode.

11. The video decoding apparatus of claim 9, wherein the intra predictor pads a region deviating from a boundary of the image with a sample value of a pixel adjacent to the inside of the boundary from among pixels of the reference block when the reference block deviates from the boundary of the image regardless of whether the intra mode of the current block is the CIP mode.

12. A video encoding apparatus comprising:

an intra predictor for searching for a neighboring block restored prior to a current block, determining whether the found neighboring block is a reference block available for intra prediction of the current block, based on a result of checking whether the found neighboring block is a block restored in an intra mode and whether an intra mode of the current block is also a CIP mode in which only blocks pre-restored in the intra mode are referred to, and performing intra prediction on the current block by using sample values of the reference block, to perform the intra prediction on the current block that is in the intra mode from among blocks of a video;

an inter predictor for performing inter prediction on blocks in an inter prediction mode from among the blocks;

a transformer and quantizer for performing transformation and quantization on a result of performing the intra prediction or the inter prediction; and

an output unit for outputting a bitstream generated by performing entropy encoding on samples including a quantized transformation coefficient generated as a result of the transformation and quantization.

13. The video encoding apparatus of claim 12, wherein the intra predictor searches for neighboring blocks restored prior to the current block before determining based on CIP mode information of a current image parsed from the bitstream whether a prediction mode of the current block is an intra mode of the CIP mode, and checks whether each of the found neighboring blocks is restored in the intra mode and whether the intra mode of the current block is also the CIP mode.

14. The video encoding apparatus of claim 12, wherein the intra predictor pads a region deviating from a boundary of the image with a sample value of a pixel adjacent to the inside of the boundary from among pixels of the reference block when the reference block deviates from the boundary of the image regardless of whether the intra mode of the current block is the CIP mode.

15. A computer-readable recording medium having recorded thereon a program for executing the intra prediction method of claim 1.

Claims

1. A video decoding method comprising:

obtaining intra prediction constraint information which indicates whether a prediction mode of a current block is a constrained intra prediction mode;

determining whether neighboring pixels are available to be referred to for intra prediction by using one or more pieces of information among the intra prediction constraint information and boundary information which indicates whether the neighboring pixels of the current block are previously reconstructed samples;

when a first pixel which is available to be referred to for the intra prediction and a second pixel which is not available to be referred to for the intra prediction exist among the neighboring pixels, generating a pixel value of the second pixel by using a pixel value of the first pixel, the first pixel being adjacent to the second pixel; and

generating a predicted block of the current block by using the neighboring pixels,

wherein the constrained intra prediction mode is a mode which refers only to a pixel which is reconstructed by using an intra prediction mode, and

when the intra prediction constraint information indicates that the prediction mode of the current block is not the constrained intra prediction mode, the second pixel is determined to be not available to be referred to for the intra prediction according to the boundary information.

2. The video decoding method of claim 1, wherein the boundary information indicates that a sample for the second pixel is not reconstructed when the second pixel is adjacent to outside of a boundary of an image.

3. The video decoding method of claim 1, wherein the boundary information indicates that a sample for the second pixel is not reconstructed when the second pixel is positioned in a region which is reconstructed later than the current block.