Claims

1. An image decoding method performed by an image decoding apparatus, the image decoding method comprising:

obtaining a reconstructed picture;

determining a target boundary of deblocking filtering in the reconstructed picture;

determining a boundary strength for the target boundary; and

applying deblocking filtering to the target boundary based on the boundary strength,

wherein, based on the target boundary being a transform block boundary and a color component of the reconstructed picture being a chroma component, the boundary strength is determined based on ~~whether joint CbCr residual coding is performed on at least one of two blocks adjacent to the target boundary~~ a sum of two first flags specifying whether joint CbCr residual coding is performed on two blocks adjacent the target boundary and two second flags specifying whether two blocks adjacent to the target boundary include non-zero transform coefficient level, and

wherein the joint CbCr residual coding corresponds to encoding residual samples for a chroma Cb component and a chroma Cr component as a single transform block.

~~2. The image decoding method of claim 1, wherein whether joint CbCr residual coding is performed on a block adjacent to the target boundary is determined based on a first flag signaled for the adjacent block.~~

~~3. The image decoding method of claim 2, wherein, based on the target boundary being a transform block boundary and the color component of the reconstructed picture being a chroma component, the boundary strength is determined further based on whether at least one of two blocks adjacent to the target boundary includes a non-zero transform coefficient level.~~

~~4. The image decoding method of claim 3, wherein whether a block adjacent to the target boundary includes at least one non-zero transform coefficient level is determined based on a second flag signaled for the adjacent block.~~

~~5. The image decoding method of claim 4, wherein, based on the target boundary being a transform block boundary and the color component of the reconstructed picture being a chroma component, the boundary strength is determined based on a sum of two first flags and two second flags for two blocks adjacent to the target boundary.~~

~~6~~2. The image decoding method of claim ~~5~~1, wherein the boundary strength is

determined to be 1, based on the sum being greater than 0.

~~7~~3. The image decoding method of claim 1, wherein, based on the target boundary being a transform block boundary and the color component of the reconstructed picture being a luma component, the boundary strength is determined based on whether at least one of two blocks adjacent to the target boundary includes a non-zero transform coefficient level.

~~8. An image decoding apparatus comprising:~~
~~a memory; and~~
~~at least one processor,~~
~~wherein the at least one processor is configured to:~~
~~obtain a reconstructed picture;~~
~~determine a target boundary of deblocking filtering in the reconstructed picture;~~
~~determine a boundary strength for the target boundary; and~~
~~apply deblocking filtering to the target boundary based on the boundary strength,~~
~~wherein, based on the target boundary being a transform block boundary and a color component of the reconstructed picture being a chroma component, the boundary strength is determined based on whether joint CbCr residual coding is performed on at least one of two blocks adjacent to the target boundary, and~~
~~wherein the joint CbCr residual coding corresponds to encoding residual samples for a chroma Cb component and a chroma Cr component as a single transform block.~~

~~9~~4. An image encoding method performed by an image encoding apparatus, the image encoding method comprising:
generating a reconstructed picture;
determining a target boundary of deblocking filtering in the reconstructed picture;
determining a boundary strength for the target boundary; and
applying deblocking filtering to the target boundary based on the boundary strength,
wherein, based on the target boundary being a transform block boundary and a color component of the reconstructed picture being a chroma component, the boundary strength is determined based on ~~whether joint CbCr residual coding is performed on at least one of two blocks adjacent to the target boundary~~ a sum of two first flags specifying whether joint CbCr residual coding is performed on two blocks adjacent the target boundary and two second flags specifying whether two blocks adjacent to the target boundary include non-zero transform coefficient level, and
wherein the joint CbCr residual coding corresponds to encoding residual samples for a chroma Cb component and a chroma Cr component as a single transform block.

~~10. The image encoding method of claim 9, wherein whether joint CbCr residual coding is performed on a block adjacent to the target boundary is determined based on a first flag signaled for the adjacent block.~~

~~11. The image encoding method of claim 10, wherein, based on the target boundary being a transform block boundary and the color component of the reconstructed picture being a chroma component, the boundary strength is determined further based on whether at least one of two blocks adjacent to the target boundary includes a non-zero transform coefficient level.~~

~~12. The image encoding method of claim 11, wherein whether a block adjacent to the target boundary includes at least one non-zero transform coefficient level is determined based on a second flag signaled for the adjacent block.~~

~~13. The image encoding method of claim 12, wherein, based on the target boundary being a transform block boundary and the color component of the reconstructed picture being a chroma component, the boundary strength is determined based on a sum of two first flags and two second flags for two blocks adjacent to the target boundary.~~

~~14~~5. The image encoding method of claim ~~13~~4, wherein the boundary strength is determined to be 1, based on the sum being greater than 0.

~~15~~6. A method of transmitting a bitstream generated by the image encoding method of claim ~~9~~4.