

[NPL 4] Gisle Bjøntegaard, "Improvements of the BD-PSNR model," ITU-T SG16 Q.6 Document, VCEG-AI11, Berlin, July 2008

[Summary of Invention]

[Technical Problem]

[0008] In such an image coding method and an image decoding method, memory usage (memory capacity to be used) is desired to be reduced.

[0009] Here, embodiments of the present invention ~~has an object of~~ providing an image coding method or an image decoding method that can reduce the memory usage.

[Solution to Problem]

[0009a] In a first aspect, there is provided a decoding method for decoding a control parameter for controlling decoding of an image, the decoding method comprising: determining a context for a current block in the image, from among a plurality of contexts; and performing arithmetic decoding on a bitstream corresponding to the current block, using the determined context to obtain the control parameter for the current block, wherein the determining further includes: determining a signal type under which the control parameter for the current block is classified; determining the context by using both of decoded control parameters for a left block and an upper block, when the signal type is a first type, the left block being a neighboring block to the left of the current block, and the upper block being a neighboring block on top of the current block; and determining the context by using a predetermined fixed value, without using any of the decoded control parameters for the left block and the upper block, when the signal type is a second type different from the first type, wherein one of a split flag and a skip flag is classified under the first type, the split flag indicating whether or not the current block is partitioned into a plurality of blocks, and the skip flag indicating whether or not the current block is to be skipped, and wherein a difference parameter and a residual flag are classified under the second type, the difference parameter indicating a difference between a motion vector and a motion vector predictor of the current block, and the residual flag indicating whether or not luma coefficient data and chroma coefficient data are included in the current block.

[0009b] In a second aspect, there is provided a decoding apparatus for decoding a control parameter for controlling decoding of an image, the decoding apparatus comprising: a context determination unit configured to determine a context for a current block in the image, from among a plurality of contexts; and an arithmetic decoding unit configured to perform arithmetic decoding on a bitstream corresponding to the current block, using the determined context to obtain the control parameter for the current block, wherein the context determination unit is configured to: determine a signal type under which the control parameter for the current block is classified; determine the context by using both of decoded control parameters for a left block and an upper block, when the signal type is a first type, the left block being a neighboring block to the left of the current block, and the upper block being a neighboring block on top of the current block; and determine the context by using a predetermined fixed value, without using any of the decoded control parameters for the left block and the upper block, when the signal type is a second type different from the first type, wherein one of a split flag and a skip flag is classified under the first type, the split flag indicating whether or not the current block is partitioned into a plurality of blocks, and the skip flag indicating whether or not the current block is to be skipped, and wherein a difference parameter and a residual flag are classified under the second type, the difference parameter indicating a difference between a motion vector and a motion vector predictor of the current block, and the residual flag indicating whether or not luma coefficient data and chroma coefficient data are included in the current block.

[0009c] In a third aspect, there is provided a decoding apparatus for decoding a control parameter for controlling decoding of an image, the decoding apparatus comprising: processing circuitry; and storage coupled to the processing circuitry, wherein the processing circuitry performs the following using the storage: determining a context for a current block in the image, from among a plurality of contexts; and performing arithmetic decoding on a bitstream corresponding to the current block, using the determined context to obtain the control parameter for the current block, and wherein the determining further includes: determining a signal type under which the control parameter for the current block is classified; determining the context by using both of

decoded control parameters for a left block and an upper block, when the signal type is a first type, the left block being a neighboring block to the left of the current block, and the upper block being a neighboring block on top of the current block; and determine the context by using a predetermined fixed value, without using any of the decoded control parameters for the left block and the upper block, when the signal type is a second type different from the first type, wherein one of a split flag and a skip flag is classified under the first type, the split flag indicating whether or not the current block is partitioned into a plurality of blocks, and the skip flag indicating whether or not the current block is to be skipped, and wherein a difference parameter and a residual flag are classified under the second type, the difference parameter indicating a difference between a motion vector and a motion vector predictor of the current block, and the residual flag indicating whether or not luma coefficient data and chroma coefficient data are included in the current block.

[0010] ~~In order to achieve the object, the image decoding method according to an aspect of the present invention~~Disclosed herein is an image decoding method using arithmetic decoding, and the method includes: determining a context for use in a current block, from among a plurality of contexts; performing arithmetic decoding on a bit sequence corresponding to the current block, using the determined context to decode a binary sequence, the bit sequence being obtained by performing arithmetic coding on a control parameter of the current block; and inversely binarizing the binary sequence to decode the control parameter of the current block, wherein the determining of a context includes: determining a signal type of the control parameter of the current block; determining the context under a first condition that decoded control parameters of neighboring blocks of the current block are used, when the signal type is a first type, the neighboring blocks being a left block and an upper block of the current block; and determining the context under a second condition that the decoded control parameter of the upper block is not used, when the signal type is a second type different from the first type, the first type is one of "split_coding_unit_flag" and "skip_flag", and the second type is (i) "merge_flag", (ii) "ref_idx_l0" or "ref_idx_l1", (iii) "inter_pred_flag", (iv) "mvd_l0" or "mvd_l1", (v) "no_residual_data_flag", (vi) "intra_chroma_pred_mode", (vii) "cbf_luma", and (viii) "cbf_cb" or "cbf_cr".

[Advantageous Effects of Invention]

[0011] Embodiments of the present invention can provide an image coding method or an image decoding method that can reduce the memory usage.

[Brief Description of Drawings]

5 [0012]

[FIG. 1] FIG. 1 is a functional block diagram of an image coding apparatus according to Embodiment 1.

[FIG. 2] FIG. 2 is a functional block diagram of a variable length coding unit according to Embodiment 1.

10 [FIG. 3] FIG. 3 is a table of a context model of a control parameter according to Embodiment 1.

[FIG. 4] FIG. 4 is a flowchart indicating an arithmetic coding method according to Embodiment 1.

15 [FIG. 5] FIG. 5 is a functional block diagram of an image decoding apparatus according to Embodiment 2.

[FIG. 6] FIG. 6 is a functional block diagram of a variable length decoding unit according to Embodiment 2.

[FIG. 7] FIG. 7 is a flowchart indicating an arithmetic decoding method according to Embodiment 2.

20 [FIG. 8] FIG. 8 is a flowchart indicating a modification of the arithmetic decoding method according to Embodiment 2.

[FIG. 9A] FIG. 9A illustrates the mapping information and the assignment of context indexes according to Embodiment 2.

25 [FIG. 9B] FIG. 9B illustrates partitioned blocks (a tree structure) in accordance with HEVC according to Embodiment 2.

[FIG. 10] FIG. 10 illustrates a multi-layer block structure according to Embodiment 2.

[FIG. 11] FIG. 11 illustrates an arithmetic decoding method for split_coding_unit_flag according to Embodiment 3.

30 [FIG. 12A] FIG. 12A is a table indicating a result of verification on split_coding_unit_flag according to Embodiment 3.

[FIG. 12B] FIG. 12B is a table indicating a result of verification on split_coding_unit_flag according to Embodiment 3.

35 [FIG. 13] FIG. 13 illustrates an arithmetic decoding method for skip_flag according to Embodiment 3.