

[CLAIMS]

[Claim 1] An image decoding method using arithmetic decoding, the method comprising:

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".

[Claim 2] The image decoding method according to Claim 1,

wherein the second condition is a condition that the decoded control parameters of the left block and the upper block are not used.

[Claim 3] The image decoding method according to Claim 2,

wherein in the determining of a context, a predetermined

context is determined under the second condition, as the context for use in the arithmetic decoding of the current block, when the signal type is the second type.

5 [Claim 4] The image decoding method according to one of Claims 1 to 3,

wherein the determining of a context further includes

determining whether or not the decoded control parameter of the upper block is available in decoding, based on a position of the
10 current block; and

determining the context under the second condition, when the decoded control parameter of the upper block is not available.

[Claim 5] The image decoding method according to Claim 4,

15 wherein in the determining of a context, it is determined that the decoded control parameter of the upper block is not available in decoding, when the current block is at a slice boundary.

[Claim 6] The image decoding method according to Claim 4,

20 wherein in the determining of a context, it is determined whether or not the decoded control parameter of the upper block is available in decoding, according to a hierarchical depth of a data unit to which the control parameter of the current block belongs.

25 [Claim 7] The image decoding method according to one of Claims 1 to 6,

wherein the second type is a control parameter having a predetermined data structure.

30 [Claim 8] The image decoding method according to one of Claims 1 to 7,

wherein the determining of a context further includes determining a context of a control parameter of a second unit smaller than a first unit by switching between the first condition and the
35 second condition, based on a control parameter of the first unit.

[Claim 9] The image decoding method according to one of Claims 1 to 8,

wherein the "split_coding_unit_flag" indicates whether or not the current block is partitioned into a plurality of blocks,

the "skip_flag" indicates whether or not the current block is to be skipped,

the "merge_flag" indicates whether or not a merge mode is used for the current block,

the "ref_idx_l0" indicates a reference picture index of a list 0 for the current block,

the "ref_idx_l1" indicates a reference picture index of a list 1 for the current block,

the "inter_pred_flag" indicates one of uni-prediction and bi-prediction to be used for the current block,

the "mvd_l0" indicates a difference between a motion vector component of the list 0 and a predicted value of the motion vector component, the motion vector component and the predicted value being used for the current block,

the "mvd_l1" indicates a difference between a motion vector component of the list 1 and a predicted value of the motion vector component, the motion vector component and the predicted value being used for the current block,

the "no_residual_data_flag" indicates whether or not residual data for the current block exists,

the "intra_chroma_pred_mode" indicates an intra prediction mode for a chroma sample of the current block,

the "cbf_luma" indicates whether or not a luma transform block of the current block contains one or more transform coefficient levels not equal to 0,

the "cbf_cb" indicates whether or not a Cb transform block of the current block contains one or more transform coefficient levels not equal to 0, and

the "cbf_cr" indicates whether or not a Cr transform block of the current block contains one or more transform coefficient levels not

equal to 0.

[Claim 10] The image decoding method according to one of Claims 1 to 9,

5 wherein decoding processes in accordance with a first standard and decoding processes in accordance with a second standard are switched according to an identifier indicating one of the first standard and the second standard, the identifier being included in a coded signal, and

10 the determining of a context, the performing, and the inversely binarizing are performed as the decoding processes in accordance with the first standard, when the identifier indicates the first standard.

15 [Claim 11] An image coding method using arithmetic coding, the method comprising:

binarizing a control parameter of a current block to generate a binary sequence;

20 determining a context for use in the current block, from among a plurality of contexts; and

performing arithmetic coding on the binary sequence using the determined context to generate a bit sequence,

wherein the determining of a context includes:

25 determining a signal type of the control parameter of the current block;

determining the context under a first condition that 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

30 determining the context under a second condition that the 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

35 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".

5 [Claim 12] An image decoding apparatus using arithmetic decoding, the apparatus comprising:

a context control unit configured to determine a context for use in a current block, from among a plurality of contexts;

an arithmetic decoding unit configured to perform arithmetic
10 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

an inverse binarization unit configured to inversely binarize the
15 binary sequence to decode the control parameter of the current block, wherein the context control unit is configured to:

determine a signal type of the control parameter of the current block;

determine the context under a first condition that decoded
20 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

determine the context under a second condition that the
25 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)
30 "no_residual_data_flag", (vi) "intra_chroma_pred_mode", (vii) "cbf_luma", and (viii) "cbf_cb" or "cbf_cr".

[Claim 13] An image coding apparatus using arithmetic coding, the apparatus comprising:

35 a binarization unit configured to binarize a control parameter of

a current block to generate a binary sequence;

a context control unit configured to determine a context for use in the current block, from among a plurality of contexts; and

an arithmetic coding unit configured to perform arithmetic coding on the binary sequence using the determined context to generate a bit sequence,

wherein the context control unit is configured to:

determine a signal type of the control parameter of the current block;

determine the context under a first condition that 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

determine the context under a second condition that the 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".

[Claim 14] An image coding and decoding apparatus comprising:

the image decoding apparatus according to Claim 12; and
the image coding apparatus according to Claim 13.

CLAIMS:

1. 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.

2. The decoding method according to claim 1, further comprising:

switching between decoding processes based on a codec standard in accordance with which coding has been performed to obtain the image,

wherein in the determining of a context,

the context for the control parameter classified under the second type is also determined by using both of the decoded control parameters for the left block and the upper block, when the codec standard is a first standard, and

the context for the control parameter classified under the second type is determined by using the predetermined fixed value, without using any of the decoded control parameters for the left block and the upper block, when the codec standard is a second standard.

3. 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.

4. 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

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.