

[CLAIMS]

~~[Claim 1]~~

1. An ~~image~~A coding method for coding last position information indicating a position of a last non-zero coefficient in a predetermined order in a current block to be coded, the ~~image-coding~~ method comprising:

binarizing the last position information to generate (i) a binary signal which includes a first signal having a length smaller than or equal to a predetermined maximum length and does not include a second signal or (ii) a binary signal which includes the first signal having the predetermined maximum length and the second signal;

first coding for arithmetically coding each of binary symbols included in the first signal using a context switched among a plurality of contexts according to a bit position of the binary symbol; and

second coding for arithmetically coding the second signal using a fixed probability when the binary signal includes the second signal,

wherein in the first coding, a binary symbol at a last bit position of the first signal is arithmetically coded using a context exclusive to the last bit position, when the first signal has the predetermined maximum length, and each of binary symbols at two or more bit positions other than the last bit position of the first signal is arithmetically coded using a context common to the two or more bit positions.

~~[Claim 2]~~

~~— The image coding method according to Claim 1,~~

~~— wherein in the first coding, each of binary symbols at two or more bit positions other than the last bit position of the first signal is arithmetically coded using a context common to the two or more bit positions.~~

~~[Claim 3]~~

2. The ~~image-coding~~ method according to Claim 1 ~~or Claim 2,~~

wherein the ~~binarizing~~ includes ~~varying~~ the predetermined maximum length is determined according to a size of the current block.

~~[Claim 4]~~

3. The ~~image-coding~~ method according to Claim 1, further comprising:

switching a coding process to either a first coding process compliant with a first standard or a second coding process compliant with a second standard; and

adding, to a bit stream, identification information indicating either the first standard or the second standard with which the coding process switched to is compliant,

wherein when the coding process is switched to the first coding process, the binarizing, the first coding, and the second coding are performed as the first coding process.

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~~[Claim 5]~~

4. ~~An image~~A coding apparatus that codes last position information indicating a position of a last non-zero coefficient in a predetermined order in a current block to be coded, the ~~image-coding~~ apparatus comprising:

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a binarizing unit configured to binarize the last position information to generate (i) a binary signal which includes a first signal having a length smaller than or equal to a predetermined maximum length and does not include a second signal or (ii) a binary signal which includes the first signal having the predetermined maximum length and the second signal;

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a first coding unit configured to arithmetically code each of binary symbols included in the first signal using a context switched among a plurality of contexts according to a bit position of the binary symbol; and

a second coding unit configured to arithmetically code the second signal using a fixed probability when the binary signal includes the second signal,

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wherein the first coding unit is configured to arithmetically code a binary symbol at a last bit position of the first signal using a context exclusive to the last bit position, when the first signal has the predetermined maximum length, and each of binary symbols at two or more bit positions other than the last bit position of the first signal is arithmetically coded using a context common to the two or more bit positions.

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~~[Claim 5]~~

5. A coding apparatus that codes last position information indicating a position of a last non-zero coefficient in a predetermined order in a current block to be coded, the coding apparatus comprising:

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processing circuitry; and
storage connected to the processing circuitry,
wherein the processing circuitry performs, using the storage, the
following steps of:

5 binarizing the last position information to generate (i) a binary signal
which includes a first signal having a length smaller than or equal to a
predetermined maximum length and does not include a second signal or (ii) a
binary signal which includes the first signal having the predetermined maximum
length and the second signal;

10 first coding for arithmetically coding each of binary symbols included in
the first signal using a context switched among a plurality of contexts according
to a bit position of the binary symbol; and

second coding for arithmetically coding the second signal using a fixed
probability when the binary signal includes the second signal, and

15 in the first coding, a binary symbol at a last bit position of the first signal
is arithmetically coded using a context exclusive to the last bit position, when
the first signal has the predetermined maximum length, and each of binary
symbols at two or more bit positions other than the last bit position of the first
signal is arithmetically coded using a context common to the two or more bit
20 positions.

~~{Claim 6}~~

6. ~~An imageA~~ decoding method for decoding last position information
indicating a position of a last non-zero coefficient in a predetermined order in a
25 current block to be decoded, the ~~image-decoding~~ method comprising:

first decoding for arithmetically decoding each of binary symbols
included in a first signal using a context switched among a plurality of contexts
according to a bit position of the binary symbol, the first signal being included in
a binary signal of the last position information and having a length smaller than
30 or equal to a predetermined maximum length; and

second decoding for, when the binary signal of the last position
information includes a second signal, arithmetically decoding the second signal
using a fixed probability,

wherein in the first decoding, a binary symbol at a last bit position of the
35 first signal is arithmetically decoded using a context exclusive to the last bit

position, when the first signal has the predetermined maximum length, and each of binary symbols at two or more bit positions other than the last bit position of the first signal is arithmetically decoded using a context common to the two or more bit positions.

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~~{Claim 7}~~

~~—The image decoding method according to Claim 6,~~

~~—wherein in the first decoding, each of binary symbols at two or more bit positions other than the last bit position of the first signal is arithmetically~~
10 ~~decoded using a context common to the two or more bit positions.~~

~~{Claim 8}~~

7. The image decoding method according to Claim 6 ~~or Claim 7,~~

wherein the predetermined maximum length ~~varies~~ is determined
15 according to a size of the current block.

~~{Claim 9}~~

8. The image decoding method according to Claim 6, further comprising

switching a decoding process to either a first decoding process
20 compliant with a first standard or a second decoding process compliant with a second standard, according to identification information which is added to a bit stream and indicates either the first standard or the second standard,

wherein when the decoding process is switched to the first decoding process, the first decoding and the second decoding are performed as the first
25 decoding process.

~~{Claim 10}~~

9. ~~An image~~A decoding apparatus that decodes last position information indicating a position of a last non-zero coefficient in a predetermined order in a
30 current block to be decoded, the ~~image~~ decoding apparatus comprising:

a first decoding unit configured to arithmetically decode each of binary symbols included in a first signal using a context switched among a plurality of contexts according to a bit position of the binary symbol, the first signal being included in a binary signal of the last position information and having a length
35 smaller than or equal to a predetermined maximum length; and

a second decoding unit configured to, when the binary signal of the last position information includes a second signal, arithmetically decode the second signal using a fixed probability,

wherein the first decoding unit is configured to arithmetically decode a binary symbol at a last bit position of the first signal using a context exclusive to the last bit position, when the first signal has the predetermined maximum length, and each of binary symbols at two or more bit positions other than the last bit position of the first signal is arithmetically decoded using a context common to the two or more bit positions.

[Claim 10]

10. A decoding apparatus that decodes last position information indicating a position of a last non-zero coefficient in a predetermined order in a current block to be decoded, the decoding apparatus comprising:

_____ processing circuitry; and

_____ storage connected to the processing circuitry,

wherein the processing circuitry performs, using the storage, the following steps of:

_____ first decoding for arithmetically decoding each of binary symbols included in a first signal using a context switched among a plurality of contexts according to a bit position of the binary symbol, the first signal being included in a binary signal of the last position information and having a length smaller than or equal to a predetermined maximum length; and

_____ second decoding for, when the binary signal of the last position information includes a second signal, arithmetically decoding the second signal using a fixed probability, and

_____ in the first decoding, a binary symbol at a last bit position of the first signal is arithmetically decoded using a context exclusive to the last bit position, when the first signal has the predetermined maximum length, and each of binary symbols at two or more bit positions other than the last bit position of the first signal is arithmetically decoded using a context common to the two or more bit positions.

[Claim 11]

11. An image coding and decoding apparatus comprising:

~~the image~~ coding apparatus according to Claim 5; and that codes last position information indicating a position of a last non-zero coefficient in a predetermined order in a current block to be coded, the coding apparatus including:

5 a binarizing unit configured to binarize the last position information to generate (i) a binary signal which includes a first signal having a length smaller than or equal to a predetermined maximum length and does not include a second signal or (ii) a binary signal which includes the first signal having the predetermined maximum length and the second signal;

10 a first coding unit configured to arithmetically code each of binary symbols included in the first signal using a context switched among a plurality of contexts according to a bit position of the binary symbol; and

 a second coding unit configured to arithmetically code the second signal using a fixed probability when the binary signal includes the
15 second signal,

 wherein the first coding unit is configured to arithmetically code a binary symbol at a last bit position of the first signal using a context exclusive to the last bit position, when the first signal has the predetermined maximum length, and each of binary symbols at two or more bit positions other than the
20 last bit position of the first signal is arithmetically coded using a context common to the two or more bit positions; and

the image-decoding apparatus according to Claim 109.