For such image coding method and image decoding method, it has been demanded to reduce a processing amount while suppressing deterioration of coding efficiency.

[0005]

~~The~~Embodiments of the present invention provide~~s~~ an image coding method and an image decoding method each capable of reducing a processing amount while suppressing deterioration of coding efficiency.

[Solution to Problem]

[0006]

~~In order to solve the above problem, according to an aspect of the present invention, there is provided an image coding method using arithmetic coding, the image coding method including: performing arithmetic coding on a first flag that indicates whether or not an absolute value of a target coefficient in a target coefficient block is greater than 1; and performing arithmetic coding on a second flag that indicates whether or not the absolute value is greater than 2, wherein, in the performing of the arithmetic coding on the first flag and the performing of the arithmetic coding on the second flag, it is determined whether or not an immediately-prior coefficient block that has been coded immediately prior to the target coefficient block includes a coefficient having an absolute value greater than a threshold value, and a context to be used in the arithmetic coding on the first flag and a context to be used in the arithmetic coding on the second flag are selected based on a result of the determination.~~

[0006a]

According to a first aspect of the present invention, there is provided an image coding method using arithmetic coding, the image coding method comprising: performing arithmetic coding on a first flag that indicates whether or not an absolute value of a target coefficient in a target coefficient block is greater than a first threshold value of 1; and performing arithmetic coding on a second flag that indicates whether or not the absolute value is greater than a second threshold value of 2, wherein, in the performing of the arithmetic coding on the first flag and the performing of the arithmetic coding on the second flag, it is determined whether or not an immediately-prior coefficient block that has been coded immediately prior to the target coefficient block includes a coefficient having an absolute value greater than

a third threshold value, and a context to be used in the arithmetic coding on the first flag and a context to be used in the arithmetic coding on the second flag are selected based on a result of the determination.

According to a second aspect of the present invention, there is provided an image coding apparatus that performs arithmetic coding, the image coding apparatus comprising: control circuitry; and storage accessible from the control circuitry, wherein the control circuitry executes: performing arithmetic coding on a first flag that indicates whether or not an absolute value of a target coefficient in a target coefficient block is greater than a first threshold value of 1; and performing arithmetic coding on a second flag that indicates whether or not the absolute value is greater than a second threshold value of 2, wherein, in the performing of the arithmetic coding on the first flag and the performing of the arithmetic coding on the second flag, it is determined whether or not an immediately-prior coefficient block that has been coded immediately prior to the target coefficient block includes a coefficient having an absolute value greater than a third threshold value, and a context to be used in the arithmetic coding on the first flag and a context to be used in the arithmetic coding on the second flag are selected based on a result of the determination.

[0007]

These general and specific aspects may be implemented using a system, a method, an integrated circuit, a computer program, or a computer-readable recording medium such as a CD-ROM, or any combination of systems, methods, integrated circuits, computer programs, or computer-readable recording media.

[Advantageous Effects of Invention]

[0008]

~~The~~Embodiments of the present invention provide~~s~~ an image coding method and an

[CLAIMS]

1. An image coding method using arithmetic coding, the image coding method comprising:

performing arithmetic coding on a first flag that indicates whether or not an absolute value of a target coefficient in a target coefficient block is greater than 1; and

performing arithmetic coding on a second flag that indicates whether or not the absolute value is greater than 2,

wherein, in the performing of the arithmetic coding on the first flag and the performing of the arithmetic coding on the second flag, it is determined whether or not an immediately-prior coefficient block that has been coded immediately prior to the target coefficient block includes a coefficient having an absolute value greater than a threshold value, and a context to be used in the arithmetic coding on the first flag and a context to be used in the arithmetic coding on the second flag are selected based on a result of the determination.

2. The image coding method according to Claim 1,

wherein in the performing of the arithmetic coding on the first flag and the performing of the arithmetic coding on the second flag, the determination is made based on a variable generated in arithmetic coding on the immediately-prior coefficient block.

3. The image coding method according to Claim 2, further comprising

binarizing a remainder according to a transform table designated by a binarization parameter from among a plurality of transform tables, when the absolute value of the target coefficient is greater than 2, the remainder being a value obtained by subtracting 3 from the absolute value,

wherein the binarization parameter is determined according to whether or not the immediately-prior coefficient block includes a coefficient having an absolute value greater than the threshold value, and

wherein the variable is the binarization parameter.

4. The image coding method according to Claim 1, wherein the threshold value is 1.

5. An image decoding method using arithmetic decoding, the image decoding method comprising:

performing arithmetic decoding on a first flag that indicates whether or not an absolute value of a target coefficient in a target coefficient block is greater than 1; and

performing arithmetic decoding on a second flag that indicates whether or not the absolute value is greater than 2,

wherein, in the performing of the arithmetic decoding on the first flag and the performing of the arithmetic decoding on the second flag, it is determined whether or not an immediately-prior coefficient block that has been decoded immediately prior to the target coefficient block includes a coefficient having an absolute value greater than a threshold value, and a context to be used in the arithmetic decoding on the first flag and a context to be used in the arithmetic decoding on the second flag are selected based on a result of the determination.

6. The image decoding method according to Claim 5, wherein in the performing of the arithmetic decoding on the first flag and the performing of the arithmetic decoding on the second flag, the determining is made based on a variable generated in arithmetic decoding on the immediately-prior coefficient block.

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

transforming a remainder to a multivalue according to a transform table designated by a binarization parameter from among a plurality of transform tables, when the absolute value of the target coefficient is greater than 2, the remainder being a value obtained by subtracting 3 from the absolute value; and

determining the binarization parameter according to whether or not the immediately-prior coefficient block includes a coefficient having an absolute value greater than the threshold value,

wherein the variable is the binarization parameter.

8. The image decoding method according to Claim 5,

wherein the threshold value is 1.

9. An image coding apparatus that performs arithmetic coding, the image coding apparatus comprising:

control circuitry; and

storage accessible from the control circuitry,

wherein the control circuitry executes:

performing arithmetic coding on a first flag that indicates whether or not an absolute value of a target coefficient in a target coefficient block is greater than 1; and

performing arithmetic coding on a second flag that indicates whether or not the absolute value is greater than 2,

wherein, in the performing of the arithmetic coding on the first flag and the performing of the arithmetic coding on the second flag, it is determined whether or not an immediately-prior coefficient block that has been coded immediately prior to the target coefficient block includes a coefficient having an absolute value greater than a threshold value, and a context to be used in the arithmetic coding on the first flag and a context to be used in the arithmetic coding on the second flag are selected based on a result of the determination.

10. An image decoding apparatus that performs arithmetic decoding, the image decoding apparatus comprising:

control circuitry; and

storage accessible from the control circuitry,

wherein the control circuitry executes:

performing arithmetic decoding on a first flag that indicates whether or not an absolute value of a target coefficient in a target

coefficient block is greater than 1; and

performing arithmetic decoding on a second flag that indicates whether or not the absolute value is greater than 2,

wherein, in the performing of the arithmetic decoding on the first flag and the performing of the arithmetic decoding on the second flag, it is determined whether or not an immediately-prior coefficient block that has been decoded immediately prior to the target coefficient block includes a coefficient having an absolute value greater than a threshold value, and a context to be used in the arithmetic decoding on the first flag and a context to be used in the arithmetic decoding on the second flag are selected based on a result of the determination.

11. An image coding and decoding apparatus, comprising:

the image coding apparatus according to Claim 9; and

the image decoding apparatus according to Claim 10.

CLAIMS

1. An image coding method using arithmetic coding, the image coding method comprising:

performing arithmetic coding on a first flag that indicates whether or not an absolute value of a target coefficient in a target coefficient block is greater than a first threshold value of 1; and

performing arithmetic coding on a second flag that indicates whether or not the absolute value is greater than a second threshold value of 2,

wherein, in the performing of the arithmetic coding on the first flag and the performing of the arithmetic coding on the second flag, it is determined whether or not an immediately-prior coefficient block that has been coded immediately prior to the target coefficient block includes a coefficient having an absolute value greater than a third threshold value, and a context to be used in the arithmetic coding on the first flag and a context to be used in the arithmetic coding on the second flag are selected based on a result of the determination.

2. An image coding apparatus that performs arithmetic coding, the image coding apparatus comprising:

control circuitry; and

storage accessible from the control circuitry,

wherein the control circuitry executes:

performing arithmetic coding on a first flag that indicates whether or not an absolute value of a target coefficient in a target coefficient block is greater than a first threshold value of 1; and

performing arithmetic coding on a second flag that indicates whether or not the absolute value is greater than a second threshold value of 2,

wherein, in the performing of the arithmetic coding on the first flag and the performing of the arithmetic coding on the second flag, it is determined whether or not an immediately-prior coefficient block that has been coded immediately prior to the target coefficient block includes a coefficient having an absolute value greater than a third threshold value, and a context to be used in the arithmetic coding on the first flag and a context to be used in the arithmetic coding on the second flag are selected based on a result of the determination.