during the coding.

[0005]

Embodiments of~~In view of the above,~~ the present invention provides an image coding method which allows coding with high coding efficiency.

[Solution to Problem]

~~[0006]~~

~~An image coding method according to an aspect of the present invention includes: performing context arithmetic coding to consecutively code (i) first information indicating whether or not to perform sample adaptive offset (SAO) processing for a first region of an image and (ii) second information indicating whether or not to use, in the SAO processing for the first region, information on SAO processing for a region other than the first region, the context arithmetic coding being arithmetic coding using a variable probability, the SAO processing being offset processing on a pixel value; and performing bypass arithmetic coding to code other information which is information on the SAO processing for the first region and different from the first information or the second information, after the first information and the second information are coded, the bypass arithmetic coding being arithmetic coding using a fixed probability, wherein the other information includes third information indicating whether the SAO processing for the first region is edge offset processing performed according to an edge, or band offset processing performed according to the pixel value, in the performing of context arithmetic coding, a value of an initial bit in a bit string of a parameter is coded as the first information, the parameter indicating a type of the SAO processing for the first region, and in the performing of bypass arithmetic coding, a value of a next bit following the initial bit in the bit string of the parameter is coded as the third information.~~

[0006]

In a first aspect, there is provided an image coding method comprising: performing context arithmetic coding to consecutively code (i) first information indicating whether or not to perform sample adaptive offset (SAO) processing for a first region of an image and (ii) second information indicating whether or not to use, in the SAO processing for the first region, information on SAO processing for a region other than the first region, the context arithmetic coding being arithmetic coding using a variable probability, the SAO processing being offset processing on a pixel value; and performing bypass arithmetic coding to code other information which is information on the SAO processing for the first region and different from the first information or the second information, after the first information and the second information are coded, the bypass arithmetic coding being arithmetic coding using a fixed probability, wherein the other information includes third information indicating whether the SAO processing for the first region is edge offset processing performed according to an edge, or band offset processing performed according to the pixel value, in the performing of context arithmetic coding, a value of an initial bit in a bit string of a parameter is coded as the first information, the parameter indicating a type of the SAO processing for the first region, and in the performing of bypass arithmetic coding, a value of a next bit following the initial bit in the bit string of the parameter is coded as the third information.

[0006a]

In a second aspect, there is provided an image decoding method comprising: performing context arithmetic decoding to consecutively decode (i) first information indicating whether or not to perform sample adaptive offset (SAO) processing for a first region of an image and (ii) second information indicating whether or not to use, in the SAO

processing for the first region, information on SAO processing for a region other than the first region, the context arithmetic decoding being arithmetic decoding using a variable probability, the SAO processing being offset processing on a pixel value; and performing bypass arithmetic decoding to decode other information which is information on the SAO processing for the first region and different from the first information or the second information, after the first information and the second information are decoded, the bypass arithmetic decoding being arithmetic decoding using a fixed probability, wherein the other information includes third information indicating whether the SAO processing for the first region is edge offset processing performed according to an edge, or band offset processing performed according to the pixel value, in the performing of context arithmetic decoding, a value of an initial bit in a bit string of a parameter is decoded as the first information, the parameter indicating a type of the SAO processing for the first region, and in the performing of bypass arithmetic decoding, a value of a next bit following the initial bit in the bit string of the parameter is decoded as the third information.

[0006b]

In a third aspect, there is provided an image coding apparatus comprising: control circuitry; and storage accessible from the control circuitry, wherein the control circuitry performs context arithmetic coding to consecutively code (i) first information indicating whether or not to perform sample adaptive offset (SAO) processing for a first region of an image and (ii) second information indicating whether or not to use, in the SAO processing for the first region, information on SAO processing for a region other than the first region, the context arithmetic coding being arithmetic coding using a variable probability, the SAO processing being offset processing on a pixel value; and performs bypass arithmetic coding

to code other information which is information on the SAO processing for the first region and different from the first information or the second information, after the first information and the second information are coded, the bypass arithmetic coding being arithmetic coding using a fixed probability, wherein the other information includes third information indicating whether the SAO processing for the first region is edge offset processing performed according to an edge, or band offset processing performed according to the pixel value, in the performing of context arithmetic coding, a value of an initial bit in a bit string of a parameter is coded as the first information, the parameter indicating a type of the SAO processing for the first region, and in the performing of bypass arithmetic coding, a value of a next bit following the initial bit in the bit string of the parameter is coded as the third information.

[0006c]

In a fourth aspect, there is provided an image decoding apparatus comprising: control circuitry; and storage accessible from the control circuitry, wherein the control circuitry performs context arithmetic decoding to consecutively decode (i) first information indicating whether or not to perform sample adaptive offset (SAO) processing for a first region of an image and (ii) second information indicating whether or not to use, in the SAO processing for the first region, information on SAO processing for a region other than the first region, the context arithmetic decoding being arithmetic decoding using a variable probability, the SAO processing being offset processing on a pixel value; and performs bypass arithmetic decoding to decode other information which is information on the SAO processing for the first region and different from the first information or the second information, after the first information and the second information are decoded, the bypass arithmetic decoding being arithmetic decoding using a fixed probability, wherein the other

information includes third information indicating whether the SAO processing for the first region is edge offset processing performed according to an edge, or band offset processing performed according to the pixel value, in the performing of context arithmetic decoding, a value of an initial bit in a bit string of a parameter is decoded as the first information, the parameter indicating a type of the SAO processing for the first region, and in the performing of bypass arithmetic decoding, a value of a next bit following the initial bit in the bit string of the parameter is decoded as the third information.

[0006d]

In a fifth aspect, there is provided an image coding and decoding apparatus, comprising the above image coding apparatus; and the above image decoding apparatus.

[0006e]

In a sixth aspect, there is provided a program for causing a computer to execute the above image coding method.

[0006f]

In a seventh aspect, there is provided a program for causing a computer to execute the above image decoding method.

[0007]

It is to be noted that these general and specific aspects may be implemented using a system, an apparatus, an integrated circuit, a computer program, or a non-transitory computer-readable recording