denoted as H. 26x, and the ISO/IEC standards denoted as MPEG-x. The most up-to-date and advanced video coding standard is currently the standard denoted as H.264/AVC or MPEG-4/AVC (refer to Non Patent Literature 1).

[0004]

The coding approach which serves as a basis for these standards is based on prediction coding including major steps to be shown the following (a) to (d). (a) In order to perform data compression on a block level for each of the video frames, the video frame is divided into blocks of pixel. (b) By predicting each of the blocks from the already coded video data, temporal and spatial redundancy is specified. (c) By subtracting the prediction data from the video data, the specified redundancy is eliminated. (d) By Fourier transform, quantization, and entropy coding, the remaining data (residual blocks) are compressed.

[Citation List]

[Non Patent Literature]

[0005]

[NPL 1]

ITU-T Recommendation H.264 "Advanced video coding for generic audiovisual services," March 2010

[NPL 2]

JCT-VC "WD3: Working Draft 3 of High-Efficiency Video Coding," JCTVC-E603, March 2011

[Summary of Invention]

[Technical Problem]

[0006]

Recently, there has been a growing need for a further increase in coding efficiency against the backdrop of progress in high-definition moving pictures.

[0007]

Embodiments of~~Therefore,~~ the present invention ~~has an object to~~ provide a moving picture coding method, a moving picture coding apparatus, a moving picture decoding method, a moving picture decoding apparatus, and a moving picture coding and decoding apparatus

which have high coding efficiency.

[Solution to Problem]

[0008]

According to a first aspect, there is provided a decoding method for decoding a coded picture signal for a first unit, the first unit including one or more second units, the decoding method comprising: obtaining, from the coded picture signal, a luminance CBF flag indicating whether or not a quantized coefficient is included in a second unit from among the one or more second units; judging whether or not a size of the first unit is identical to a size of the second unit; selecting a first probability table or a second probability table so that (i) the first probability table is selected when the size of the first unit is identical to the size of the second unit and (ii) the second probability table is selected when the size of the first unit is not identical to the size of the second unit regardless of the size of the second unit; performing arithmetic decoding on the luminance CBF flag using the selected one of the first probability table and the second probability table; and reconstructing a picture signal for the first unit using the quantized coefficient of the second unit when the luminance CBF flag indicates that the quantized coefficient is included in the second unit, wherein when the size of the second unit is a first size which is not identical to the size of the first unit, said selecting selects the second probability table, and wherein when the size of the second unit is a second size which is not identical to the size of the first unit and not identical to the first size, said selecting selects the second probability table.

According to a second aspect, there is provided a decoding apparatus for decoding a coded picture signal for a first unit including one or more second units, the decoding apparatus comprising: a processor; and a non-transitory memory having stored thereon executable instructions, which when executed by the processor, cause the processor to perform the following: obtaining, from the coded picture signal, a luminance CBF flag

indicating whether or not a quantized coefficient is included in a second unit from among the one or more second units; judging whether or not a size of the first unit is identical to a size of the second unit; selecting a first probability table or a second probability table so that (i) the first probability table is selected when the size of the first unit is identical to the size of the second unit and (ii) the second probability table is selected when the size of the first unit is not identical to the size of the second unit regardless of the size of the second unit; performing arithmetic decoding on the luminance CBF flag using the selected one of the first probability table and the second probability table; and reconstructing a picture signal for the first unit using the quantized coefficient of the second unit when the luminance CBF flag indicates that the quantized coefficient is included in the second unit, wherein when the size of the second unit is a first size which is not identical to the size of the first unit, said selecting selects the second probability table, and wherein when the size of the second unit is a second size which is not identical to the size of the first unit and not identical to the first size, said selecting selects the second probability table.

Disclosed herein~~A moving picture coding method according to an aspect of the present invention~~ is a method for coding a moving picture signal for each of the first processing units. More specifically, the moving picture coding method comprising: transforming, for each of one or more second processing units included in the first processing unit, the moving picture signal in a spatial domain into a frequency domain coefficient and quantizing the frequency domain coefficient; and performing arithmetic coding on a luminance CBF flag indicating whether or not a quantized coefficient is included in each of the second processing units for which the transform and the quantization are performed. In the performing of arithmetic coding, a probability table for use in the arithmetic coding is determined according to whether or not a size of the first processing unit is identical to a size of the second processing unit and whether or not the second processing unit has a predetermined maximum size.

[0009]

It should be noted that embodiments of the present invention can be realized or implemented not only as coding methods and decoding methods, but also programs for causing computers to execute each of the steps included in the coding methods and decoding methods. Naturally, the programs can be distributed through a non-transitory recording medium such as Compact Disc-Read Only Memories (CD-ROMs) and communication networks such as the Internet.

[Advantageous Effects of Invention]

[0010]

Embodiments of t~~T~~he present invention make~~s~~ it possible to efficiently perform arithmetic coding and arithmetic decoding on a luminance CBF flag.

[Brief Description of Drawings]

[0011]

[FIG. 1]

FIG. 1 is a block diagram showing a decoding apparatus including a luminance CBF flag decoding unit according to