

reduction in procession load has been demanded.

[0005]

Thus, the Embodiments of present invention ~~has an object seek~~ to provide an image coding method or an image decoding method which may enables a reduction in processing load.

[Solution to Problem]

[0006]

In order to achieve the above object, an image coding method according to an aspect of the present invention is an image encoding method of encoding one or more units that are included in a picture, the image coding method comprising: generating a first flag indicating whether or not a removal time of encoded data from a buffer by a hypothetical decoder is set per unit, the buffer being for storing the encoded data; generating a second flag indicating whether an interval between removal times of the units is constant or arbitrary when the removal time is set per unit; and generating an encoded bitstream including the encoded data, the first flag, and the second flag.

According to an aspect of the present invention, there is provided an image decoding method of decoding encoded data per unit included in units that are included in a picture, the image decoding method comprising:

obtaining, from an encoded bitstream including the encoded data, a first flag indicating whether or not a removal time of the encoded data from a buffer is set per unit, the buffer being for storing the encoded data;

obtaining, from the encoded bitstream, a second flag indicating whether an interval between removal times of the units is constant or arbitrary when the removal times are set per unit;

obtaining common-interval information from per-picture control information when the second flag indicates that the interval is constant, the common-interval information indicating the interval, and the per-picture control information being included in the encoded bitstream and provided per picture;

removing the encoded data from the buffer per unit and at a constant or arbitrary interval according to the second flag; and

decoding the removed encoded data,

wherein, in the removing, when the second flag indicates that the interval is constant, the encoded data is removed from the buffer per unit and at the interval

indicated in the common-interval information.

[0006a]

5 According to another aspect of the present invention, there is provided an image decoding apparatus for decoding encoded data per unit included in units that are included in a picture, the image decoding apparatus comprising:

control circuitry; and

a storage accessible from the control circuitry,

wherein the control circuitry executes:

10 obtaining, from an encoded bitstream including the encoded data, a first flag indicating whether or not a removal time of the encoded data from a buffer is set per unit, the buffer being for storing the encoded data;

obtaining, from the encoded bitstream, a second flag indicating whether an interval between removal times of the units is constant or arbitrary when the removal
15 times are set per unit;

obtaining common-interval information from per-picture control information when the second flag indicates that the interval is constant, the common-interval information indicating the interval, and the per-picture control information being included in the encoded bitstream and provided per picture;

20 removing the encoded data from the buffer per unit and at a constant or arbitrary interval according to the second flag; and
decoding the removed encoded data, and

wherein, in the removing, when the second flag indicates that the interval is constant, the encoded data is removed from the buffer per unit and at the interval
25 indicated in the common-interval information.

[0007]

30 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 compact disk read only memory (CD-ROM), and may also be implemented using any combination of systems, methods, integrated circuits, computer programs, and recording media.

[Advantageous Effects of Invention]

[0008]

Embodiments of the present invention can provide an image coding method or an image decoding method which may enables a reduction in processing load.

[Brief Description of Drawings]

5 [0009]

[FIG. 1] FIG. 1 shows an example of a syntax of VUI according to Embodiment 1.

[FIG. 2] FIG. 2 shows an example of a syntax of picture timing SEI

[CLAIMS]

[Claim 1]

An image encoding method of encoding one or more units that are included in a picture, the image encoding method comprising:

5 generating a first flag indicating whether or not a removal time of encoded data from a buffer by a hypothetical decoder is set per unit, the buffer being for storing the encoded data;

 generating a second flag indicating whether an interval between removal times of the units is constant or arbitrary when the
10 removal time is set per unit; and

 generating an encoded bitstream including the encoded data, the first flag, and the second flag.

[Claim 2]

15 The image encoding method according to Claim 1, wherein, in the generating of an encoded bitstream, the second flag is included into per-picture-group control information which is included in the encoded bitstream and provided per picture group including one or more pictures.

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[Claim 3]

The image encoding method according to Claim 2, further comprising

25 generating common-interval information when the second flag indicates that the interval is constant, the common-interval information indicating the interval,

 wherein, in the generating of an encoded bitstream, the common-interval information is included into per-picture control information which is included in the encoded bitstream and provided
30 per picture.

[Claim 4]

35 The image encoding method according to Claim 3, wherein the common-interval information includes a time interval between pictures and a total number of the units included in

one picture.

[Claim 5]

The image encoding method according to Claim 3, further
5 comprising

generating variable-interval information when the second flag indicates that the interval is arbitrary, the variable-interval information indicating the interval for each of the units, wherein, in the generating of an encoded bitstream, the
10 variable-interval information is included into the per-picture control information.

[Claim 6]

The image encoding method according to Claim 2, further
15 comprising

generating variable-interval information when the second flag indicates that the interval is arbitrary, the variable-interval information indicating the interval for each of the units, wherein, in the generating of an encoded bitstream, the
20 variable-interval information is included into per-unit control information which is included in the encoded bitstream and provided per unit.

[Claim 7]

The image encoding method according to Claim 1,
25 wherein the encoded bitstream includes a transport stream and a descriptor, and
in the generating of an encoded bitstream, the second flag is included into the descriptor.
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[Claim 8]

An image decoding method of decoding encoded data per unit included in one or more units that are included in a picture, the image decoding method comprising:

35 obtaining, from an encoded bitstream including the encoded

data, a first flag indicating whether or not a removal time of the encoded data from a buffer is set per unit, the buffer being for storing the encoded data;

obtaining, from the encoded bitstream, a second flag
5 indicating whether an interval between removal times of the units is constant or arbitrary when the removal time is set per unit;

removing the encoded data from the buffer per unit and at a constant or arbitrary interval according to the second flag; and
decoding the removed encoded data.

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[Claim 9]

The image decoding method according to Claim 8,
wherein, in the obtaining of a second flag, the second flag is
obtained from per-picture-group control information which is
15 included in the encoded bitstream and provided per picture group
including one or more pictures.

[Claim 10]

The image decoding method according to Claim 9, further
20 comprising

obtaining common-interval information from per-picture
control information when the second flag indicates that the interval is
constant, the common-interval information indicating the interval,
and the per-picture control information being included in the
25 encoded bitstream and provided per picture,

wherein, in the removing, when the second flag indicates that
the interval is constant, the encoded data is removed from the buffer
per unit and at the interval indicated in the common-interval
information.

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[Claim 11]

The image decoding method according to Claim 10,
wherein the common-interval information indicates a time
interval between pictures and a total number of the units included in
35 one picture, and

in the removing, the interval is calculated using the time interval between the pictures and the total number of the units, and the encoded data is removed from the buffer per unit and at the calculated interval.

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[Claim 12]

The image decoding method according to Claim 10, further comprising

obtaining variable-interval information from the per-picture control information when the second flag indicates that the interval is arbitrary, the variable-interval information indicating the interval for each of the units,

wherein, in the removing, when the second flag indicates that the interval is arbitrary, the encoded data is removed from the buffer per unit and at the interval indicated in the variable-interval information.

[Claim 13]

The image decoding method according to Claim 9, further comprising

obtaining variable-interval information from per-unit control information when the second flag indicates that the interval is arbitrary, the variable-interval information indicating the interval for each of the units, and the per-unit control information being included in the encoded bitstream and provided per unit,

wherein, in the removing, when the second flag indicates that the interval is arbitrary, the encoded data is removed from the buffer per unit and at the interval indicated in the variable-interval information.

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[Claim 14]

The image decoding method according to Claim 8, wherein the encoded bitstream includes a transport stream and a descriptor, and

in the obtaining of a second flag, the second flag is obtained

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from the descriptor.

[Claim 15]

5 An image encoding apparatus for encoding one or more units that are included in a picture, the image encoding apparatus comprising:

control circuitry; and

storage accessible from the control circuitry,

wherein the control circuitry executes:

10 generating a first flag indicating whether or not a removal time of encoded data from a buffer by a hypothetical decoder is set per unit, the buffer being for storing the encoded data;

generating a second flag indicating whether an interval between removal times of the units is constant or arbitrary when the
15 removal time is set per unit; and

generating an encoded bitstream including the encoded data, the first flag, and the second flag.

[Claim 16]

20 An image decoding apparatus for decoding encoded data per unit included in one or more units that are included in a picture, the image decoding apparatus comprising:

control circuitry; and

storage accessible from the control circuitry,

25 wherein the control circuitry executes:

obtaining, from an encoded bitstream including the encoded data, a first flag indicating whether or not a removal time of the encoded data from a buffer is set per unit, the buffer being for storing the encoded data;

30 obtaining, from the encoded bitstream, a second flag indicating whether an interval between removal times of the units is constant or arbitrary when the removal time is set per unit;

removing the encoded data from the buffer per unit and at a constant or arbitrary interval according to the second flag; and

35 decoding the removed encoded data.

[Claim 17]

5 An image encoding and decoding apparatus comprising:
the image coding apparatus according to Claim 15; and
the image decoding apparatus according to Claim 16.

CLAIMS:

1. An image decoding method of decoding encoded data per unit included in units that are included in a picture, the image decoding method comprising:

- obtaining, from an encoded bitstream including the encoded data, a first flag indicating whether or not a removal time of the encoded data from a buffer is set per unit, the buffer being for storing the encoded data;

- obtaining, from the encoded bitstream, a second flag indicating whether an interval between removal times of the units is constant or arbitrary when the removal times are set per unit;

- obtaining common-interval information from per-picture control information when the second flag indicates that the interval is constant, the common-interval information indicating the interval, and the per-picture control information being included in the encoded bitstream and provided per picture;

- removing the encoded data from the buffer per unit and at a constant or arbitrary interval according to the second flag; and

- decoding the removed encoded data,

- wherein, in the removing, when the second flag indicates that the interval is constant, the encoded data is removed from the buffer per unit and at the interval indicated in the common-interval information.

2. An image decoding apparatus for decoding encoded data per unit included in units that are included in a picture, the image decoding apparatus comprising:

- control circuitry; and

- a storage accessible from the control circuitry,

- wherein the control circuitry executes:

- obtaining, from an encoded bitstream including the encoded data, a first flag indicating whether or not a removal time of the encoded data from a buffer is set per unit, the buffer being for storing the encoded data;

obtaining, from the encoded bitstream, a second flag indicating whether an interval between removal times of the units is constant or arbitrary when the removal times are set per unit;

obtaining common-interval information from per-picture control information when the second flag indicates that the interval is constant, the common-interval information indicating the interval, and the per-picture control information being included in the encoded bitstream and provided per picture;

removing the encoded data from the buffer per unit and at a constant or arbitrary interval according to the second flag; and

decoding the removed encoded data, and

wherein, in the removing, when the second flag indicates that the interval is constant, the encoded data is removed from the buffer per unit and at the interval indicated in the common-interval information.