[0008]

However, when the HRD parameter is designated for each layer or a time layer serving as one of sublayers, it is difficult to detect whether the decoding process is performed by a single decoding device or a plurality of decoding devices.

[0009]

~~The present disclosure was made in light of the foregoing, and it is desirable to~~ Embodiments of the present invention perform a decoding process at a proper timing.

Solution to Problem

[0010]

According to one aspect of the present ~~disclosure~~ invention, there is provided an image processing device including a receiving section configured to receive a bitstream obtained by encoding an image having at least one layer and buffer management parameter information of each layer indicating at least one of that a parameter for managing a decoder buffer is a parameter for performing a decoding process of only a corresponding layer and that the parameter for managing the decoder buffer is a parameter for performing a decoding process of a corresponding layer and a lower layer, and a decoding section configured to decode the bitstream received by the receiving section and generate an image.

[0011]

The layer can include a layer and a sublayer.

[0012]

The layer is a view of multi-view coding.

[0013]

The layer is a layer of scalable video coding.

[0014]

The buffer management parameter information is described in supplemental enhancement information (SEI).

[0015]

The buffer management parameter information is described in buffering_period_SEI.

[0016]

Parameter presence/absence information indicating a presence or absence of the parameter for managing the decoder buffer serving as the parameter for performing the decoding process of only the corresponding layer is described in a vps (video parameter set)_extension.

[0017]

The receiving section can receive an AVC flag indicating that a layer lower than the corresponding layer is encoded by MPEG-4 Part10 Advanced Video Coding (AVC) and the buffer management parameter information of each layer indicating that the parameter for managing the decoder buffer is the parameter for performing the decoding process of only the corresponding layer.

[0018]

According to ~~one~~ another aspect of the present ~~disclosure~~ invention, there is provided an image processing method including receiving, by an image processing device, a bitstream obtained by encoding an image having at least one layer and buffer management parameter information of each layer indicating at least one of that a parameter for managing a decoder buffer is a parameter for performing a decoding process of only a corresponding layer and that the parameter for managing the decoder buffer is a parameter for performing a decoding process of a corresponding layer and a lower layer, receiving, by the image processing device, a bitstream obtained by encoding an image including at least one layer using a parameter corresponding to the buffer management parameter information, and decoding, by the image processing device, the received bitstream and generating an image.

[0019]

~~According to another aspect of the present disclosure, there is provided~~ Disclosed herein is an image processing device including a setting section configured to set buffer management parameter information of each layer indicating at least one of that a parameter for managing a decoder buffer is a parameter for performing a decoding process of only a corresponding layer and that the parameter for managing the decoder buffer is a parameter for performing a decoding process of a corresponding layer and a lower layer, an encoding section configured to encode an image having at

least one layer and generate a bitstream, and a transmitting section configured to transmit the buffer management parameter information set by the setting section and the bitstream generated by the encoding section.

[0020]

The layer can include a layer and a sublayer.

[0021]

The layer is a view of multi-view coding.

[0022]

The layer is a layer of scalable video coding.

[0023]

The buffer management parameter information is described in supplemental enhancement information (SEI).

[0024]

The buffer management parameter information is described in buffering_period_SEI.

[0025]

Parameter presence/absence information indicating a presence or absence of the parameter for managing the decoder buffer serving as the parameter for performing the decoding process of only the corresponding layer is described in a vps (video parameter set)_extension.

[0026]

The setting section can set an AVC flag indicating that a layer lower than the corresponding layer is encoded by MPEG-4 Part10 Advanced Video Coding (AVC) and the buffer management parameter information of each layer indicating that the parameter for managing the decoder buffer is the parameter for performing the decoding process of only the corresponding layer.

[0027]

~~According to another aspect of the present disclosure, there is provided~~ Disclosed herein is an image processing method including setting, by an image processing device, buffer management parameter information of each layer indicating at least one of that a parameter for managing a decoder buffer is a parameter for performing a decoding

process of only a corresponding layer and that the parameter for managing the decoder buffer is a parameter for performing a decoding process of a corresponding layer and a lower layer, encoding, by the image processing device, an image having at least one layer and generating a bitstream, and transmitting, by the image processing device, the set buffer management parameter information and the generated bitstream.

[0028]

According to one ~~aspect~~ embodiment of the present ~~disclosure~~ invention, a bitstream obtained by encoding an image having at least one layer and buffer management parameter information of each layer indicating at least one of that a parameter for managing a decoder buffer is a parameter for performing a decoding process of only a corresponding layer and that the parameter for managing the decoder buffer is a parameter for performing a decoding process of a corresponding layer and a lower layer are received. Then, the received bitstream is decoded to generate an image.

[0029]

According to another ~~aspect~~ embodiment of the present ~~disclosure~~ invention, buffer management parameter information of each layer indicating at least one of that a parameter for managing a decoder buffer is a parameter for performing a decoding process of only a corresponding layer and that the parameter for managing the decoder buffer is a parameter for performing a decoding process of a corresponding layer and a lower layer is set, and an image having at least one layer is encoded to generate a bitstream. Then, the set buffer management parameter information and the generated bitstream are transmitted.

[0030]

Also, embodiments of the above-described image processing device may be an independent device or an inner block constituting one image encoding device or image decoding device.

Advantageous Effects of Invention

[0031]

According to ~~one aspect~~ embodiments of the present ~~disclosure~~ invention, it is possible to decode an

image. Particularly, it is possible to perform a decoding process at a proper timing.

[0032]

According to ~~another aspect~~ embodiments of the present ~~disclosure~~ invention, it is possible to encode an image. Particularly, it is possible to perform ~~a decoding~~ an encoding process at a proper timing.

Brief Description of Drawings

[0033]

[FIG. 1] FIG. 1 is a diagram for describing an example of a configuration of a coding unit.

[FIG. 2] FIG. 2 is a diagram for describing an example of spatial scalable video coding.

[FIG. 3] FIG. 3 is a diagram for describing an example of temporal scalable video coding.

[FIG. 4] FIG. 4 is a diagram for describing an example of scalable video coding of a signal to noise ratio.

[FIG. 5] FIG. 5 is a diagram illustrating an example of syntax of an HRD parameter of a HEVC.

[FIG. 6] FIG. 6 is a diagram for describing a parallel process of scalability video coding.

[FIG. 7] FIG. 7 is a diagram illustrating an example of syntax of an HRD parameter according to the present technology.

[FIG. 8] FIG. 8 is a diagram illustrating another example of syntax of an HRD parameter according to the present technology.

[FIG. 9] FIG. 9 is a diagram illustrating another example of syntax of an HRD parameter according to the present technology.

[FIG. 10] FIG. 10 is a block diagram illustrating an example of a main configuration of a scalable encoding device.

[FIG. 11] FIG. 11 is a block diagram illustrating an example of a main configuration of an enhancement layer image encoding section.

[FIG. 12] FIG. 12 is a block diagram illustrating an example of a main configuration

CLAIMS

Claim 1

An image processing device comprising:

a receiving section configured to receive a bitstream obtained by encoding an image having at least one layer and buffer management parameter information of each layer indicating at least one of that a parameter for managing a decoder buffer is a parameter for performing a decoding process of only a corresponding layer and that the parameter for managing the decoder buffer is a parameter for performing a decoding process of a corresponding layer and a lower layer; and

a decoding section configured to decode the bitstream received by the receiving section and generate an image.

Claim 2

The image processing device according to claim 1,

wherein the layer includes a layer and a sublayer.

Claim 3

The image processing device according to claim 2,

wherein the layer is a view of multi-view coding.

Claim 4

The image processing device according to claim 2,

wherein the layer is a layer of scalable video coding.

Claim 5

The image processing device according to claim 1,

wherein the buffer management parameter information is described in supplemental enhancement information (SEI).

Claim 6

The image processing device according to claim 5,

wherein the buffer management parameter information is described in buffering_period_SEI.

Claim 7

The image processing device according to claim 1,

wherein parameter presence/absence information indicating a presence or absence of the parameter for managing the decoder buffer serving as the parameter for performing the decoding process of only the corresponding layer is described in a vps (video parameter set)_extension.

Claim 8

The image processing device according to claim 1,

wherein the receiving section receives an AVC flag indicating that a layer lower than the corresponding layer is encoded by MPEG-4 Part10 Advanced Video Coding (AVC) and the buffer management parameter information of each layer indicating that the parameter for managing the decoder buffer is the parameter for performing the decoding process of only the corresponding layer.

Claim 9

An image processing method comprising:

receiving, by an image processing device, a bitstream obtained by encoding an image having at least one layer and buffer management parameter information of each layer indicating at least one of that a parameter for managing a decoder buffer is a parameter for performing a decoding process of only a corresponding layer and that the parameter for managing the decoder buffer is a parameter for performing a decoding process of a corresponding layer and a lower layer; and

decoding, by the image processing device, the received bitstream and generating an image.

CLAIMS

Claim 1

An image processing device comprising:

a receiving section configured to receive a bitstream obtained by encoding an image having at least one layer and buffer management parameter information of each layer indicating at least one of that a parameter for managing a decoder buffer is a parameter for performing a decoding process of only a corresponding layer and that the parameter for managing the decoder buffer is a parameter for performing a decoding process of a corresponding layer and a lower layer; and

a decoding section configured to decode the bitstream received by the receiving section and generate an image.

Claim 2

The image processing device according to claim 1,

wherein the layer includes a layer and a sublayer.

Claim 3

The image processing device according to claim 2,

wherein the layer is a view of multi-view coding.

Claim 4

The image processing device according to claim 2,

wherein the layer is a layer of scalable video coding.

Claim 5

The image processing device according to claim 1,

wherein the buffer management parameter information is described in supplemental enhancement information (SEI).

Claim 6

The image processing device according to claim 5,

wherein the buffer management parameter information is described in buffering_period_SEI.

Claim 7

The image processing device according to claim 1,

wherein parameter presence/absence information indicating a presence or absence of the parameter for managing the decoder buffer serving as the parameter for performing the decoding process of only the corresponding layer is described in a vps (video parameter set)_extension.

Claim 8

The image processing device according to claim 1,

wherein the receiving section receives an AVC flag indicating that a layer lower than the corresponding layer is encoded by MPEG-4 Part10 Advanced Video Coding (AVC) and the buffer management parameter information of each layer indicating that the parameter for managing the decoder buffer is the parameter for performing the decoding process of only the corresponding layer.

Claim 9

An image processing method comprising:

receiving, by an image processing device, a bitstream obtained by encoding an image having at least one layer and buffer management parameter information of each layer indicating at least one of that a parameter for managing a decoder buffer is a parameter for performing a decoding process of only a corresponding layer and that the parameter for managing the decoder buffer is a parameter for performing a decoding process of a corresponding layer and a lower layer; and

decoding, by the image processing device, the received bitstream and generating an image.

Claim 10

An image processing device comprising:

a setting section configured to set buffer management parameter information of each layer indicating at least one of that a parameter for managing a decoder buffer is a parameter for performing a decoding process of only a corresponding layer and that the parameter for managing the decoder buffer is a parameter for performing a decoding process of a corresponding layer and a lower layer;

an encoding section configured to encode an image having at least one layer and generate a bitstream; and

a transmitting section configured to transmit the buffer management parameter information set by the setting section and the bitstream generated by the encoding section.

Claim 11

The image processing device according to claim 10,

wherein the layer includes a layer and a sublayer.

Claim 12

The image processing device according to claim 11,

wherein the layer is a view of multi-view coding.

Claim 13

The image processing device according to claim 11,

wherein the layer is a layer of scalable video coding.

Claim 14

The image processing device according to claim 10,

wherein the buffer management parameter information is described in supplemental enhancement information (SEI).

Claim 15

The image processing device according to claim 14,

wherein the buffer management parameter information is described in

buffering_period_SEI.

Claim 16

The image processing device according to claim 10,

wherein parameter presence/absence information indicating a presence or absence of the parameter for managing the decoder buffer serving as the parameter for performing the decoding process of only the corresponding layer is described in a vps (video parameter set)_extension.

Claim 17

The image processing device according to claim 10,

wherein the setting section sets an AVC flag indicating that a layer lower than the corresponding layer is encoded by MPEG-4 Part10 Advanced Video Coding (AVC) and the buffer management parameter information of each layer indicating that the parameter for managing the decoder buffer is the parameter for performing the decoding process of only the corresponding layer.

Claim 18

An image processing method comprising:

setting, by an image processing device, buffer management parameter information of each layer indicating at least one of that a parameter for managing a decoder buffer is a parameter for performing a decoding process of only a corresponding layer and that the parameter for managing the decoder buffer is a parameter for performing a decoding process of a corresponding layer and a lower layer;

encoding, by the image processing device, an image having at least one layer and generating a bitstream; and

transmitting, by the image processing device, the set buffer management parameter information and the generated bitstream.