

Non-Patent Documents

Non-Patent Document 1: Benjamin Bross, Woo-Jin Han,
Jens-Rainer Ohm, Gary J. Sullivan, Thomas Wiegand, "High
efficiency video coding (HEVC) text specification draft 6",
5 JCTVC-H1003 ver21, Joint Collaborative Team on Video Coding
(JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG117th
Meeting: Geneva, CH, 21-30 November, 2011

Non-Patent Document 2: Jizheng Xu, "AHG10: Selective
inter-layer prediction signalling for HEVC scalable
10 extension", JCTVC-J0239, Joint Collaborative Team on Video
Coding (JCT-VC) of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG
1110th Meeting: Stockholm, SE, 11-20 July 2012

SUMMARY OF THE INVENTION

15 PROBLEMS TO BE SOLVED BY THE INVENTION

[0015]

However, in the conventional method, the information
for controlling the on/off (on/off) of the prediction process
between the layers has been generated and transmitted for every
20 picture. Therefore, there has been a risk that the code amount
would increase due to the transmission of the information to
thereby deteriorate the encoding efficiency.

[0016]

25 ~~The Embodiments of the present invention has been made
in view of the above and is to suppress the deterioration in
encoding efficiency.~~

SOLUTIONS TO PROBLEMS

[0017]

30 ~~An aspect of the present technique is an image processing
device including: a reception unit that receives encoded data
in which an image with a plurality of main layers is encoded,~~

~~and inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of main layers, with the use of a sublayer, and a decoding unit that decodes each main layer of the encoded data received by the reception unit by performing the inter-layer prediction on only the sublayer specified by the inter-layer prediction control information received by the reception unit.~~

According to a first aspect of the present invention, there is provided an image processing device comprising: a decoding unit that decodes encoded data in which an image with a plurality of layers is encoded by performing the inter-layer prediction on only the sublayer specified by the inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of layers, using information related to a sublayer.

The image processing device may further comprise a reception unit that receives encoded data in which an image with a plurality of main layers is encoded, and inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of main layers, with the use of a sublayer.

[0018]

If a current picture of a current main layer belongs to the sublayer specified as the sublayer for which the inter-layer prediction is performed by the inter-layer prediction control information, the decoding unit may decode the encoded data of the current picture using the inter-layer prediction.

[0019]

The inter-layer prediction control information may specify a highest sublayer for which the inter-layer prediction is allowed; and the decoding unit may decode using the inter-layer prediction, the encoded data of the picture
5 belonging to the sublayers from a lowest sublayer to the highest sublayer specified by the inter-layer prediction control information.

[0020]

The inter-layer prediction control information may be
10 set for each main layer.

[0021]

The inter-layer prediction control information may be set as a parameter common to all the main layers.

[0022]

15 The reception unit may receive inter-layer pixel

parameter set (vps_extension).

[0025]

The inter-layer syntax prediction control information may be transmitted as a nal unit (nal_unit), a picture parameter set (PPS (Picture Parameter Set)), or a slice header (SliceHeader).

[0026]

~~Further, an aspect of the present technique is an image processing method including: receiving encoded data in which an image with a plurality of main layers is encoded, and inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of main layers, with the use of a sublayer, and decoding each main layer of the received encoded data by performing the inter-layer prediction on only the sublayer specified by the received inter-layer prediction control information.~~

According to a second aspect of the present invention, there is provided an image processing method comprising: decoding encoded data in which an image with a plurality of layers is encoded by performing the inter-layer prediction on only the sublayer specified by the inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of layers, using information related to a sublayer.

[0027]

Another aspect of the present technique is Disclosed herein is an image processing device including: an encoding unit that encodes each main layer of the image data by performing inter-layer prediction, which is prediction between a

plurality of main layers, on only a sublayer specified by inter-layer prediction control information that controls whether to perform the inter-layer prediction with the use of a sublayer; and a transmission unit that transmits encoded
5 data obtained by encoding by the encoding unit, and the inter-layer prediction control information.

[0028]

If a current picture of a current main layer belongs to the sublayer specified as the sublayer for which the

and the inter-layer syntax prediction control information that are set independently from each other as the inter-layer prediction control information.

[0033]

5 The inter-layer pixel prediction control information may control using the sublayer, whether to perform the inter-layer pixel prediction; the encoding unit may perform the inter-layer pixel prediction on only the sublayers specified by the inter-layer pixel prediction control information; the
10 inter-layer syntax prediction control information may control whether to perform the inter-layer syntax prediction for each picture or slice; and the encoding unit may perform the inter-layer syntax prediction on only the picture or slice specified by the inter-layer syntax prediction control
15 information.

[0034]

 The transmission unit may transmit the inter-layer pixel prediction control information as a nal unit (nal_unit), a video parameter set (VPS (Video Parameter Set)), or an
20 extension video parameter set (vps_extension).

[0035]

 The transmission unit may transmit the inter-layer syntax prediction control information as a nal unit (nal_unit), a picture parameter set (PPS (Picture Parameter Set)), or a
25 slice header (SliceHeader).

[0036]

~~Further, another aspect of the present technique~~
Disclosed herein is an image processing method including:
encoding each main layer of the image data by performing
30 inter-layer prediction, which is prediction between a plurality of main layers, on only a sublayer specified by inter-layer prediction control

information that controls whether to perform the inter-layer prediction with the use of a sublayer; and transmitting encoded data obtained by the encoding, and the inter-layer prediction control information.

5 [0037]

In an ~~aspect~~ embodiment of the ~~present technique~~ invention, the encoded data in which the image with the plural main layers is encoded, and the inter-layer prediction control information that controls whether to perform the inter-layer prediction, which is the prediction between the main layers, using the sublayer are received and the inter-layer prediction is performed on just the sublayer specified by the received inter-layer prediction control information; thus, each main layer of the received encoded data is decoded.

15 [0038]

In another ~~aspect~~ embodiment of the ~~present technique~~ invention, the inter-layer prediction is performed on just the sublayer specified by the inter-layer prediction control information that controls whether to perform the inter-layer prediction, which is the prediction between the main layers, using the sublayer; thus, each main layer of the image data is encoded and the encoded data obtained by the encoding and the inter-layer prediction control information are transmitted.

25

EFFECTS OF THE INVENTION

[0039]

According to ~~the present disclosure~~ embodiments of the present invention, the image can be encoded and decoded and particularly, the deterioration in encoding efficiency can be suppressed.

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BRIEF DESCRIPTION OF DRAWINGS

CLAIMS

1. An image processing device comprising:
a decoding unit that decodes encoded data in which an image with a plurality of layers is encoded by performing the inter-layer prediction on only the sublayer specified by the inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of layers, using information related to a sublayer.
2. The image processing device according to claim 1, further comprising a reception unit that receives encoded data in which an image with a plurality of main layers is encoded, and inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of main layers, with the use of a sublayer.
3. The image processing device according to claim 2, wherein if a current picture of a current main layer belongs to the sublayer specified as the sublayer for which the inter-layer prediction is performed by the inter-layer prediction control information, the decoding unit decodes the encoded data of the current picture using the inter-layer prediction.
4. The image processing device according to claim 3, wherein the inter-layer prediction control information specifies a highest sublayer for which the inter-layer prediction is allowed, and
the decoding unit decodes using the inter-layer prediction, the encoded data of the picture belonging to the sublayers from a lowest sublayer to the highest sublayer specified by the inter-layer prediction control information.
5. The image processing device according to claim 1, wherein the inter-layer prediction control information is set for each main layer.

6. The image processing device according to claim 1, wherein the inter-layer prediction control information is set as a parameter common to all the main layers.

7. The image processing device according to claim 1, wherein the reception unit receives inter-layer pixel prediction control information that controls whether to perform inter-layer pixel prediction, which is pixel prediction between the plurality of main layers, and inter-layer syntax prediction control information that controls whether to perform inter-layer syntax prediction, which is syntax prediction between the plurality of main layers, the inter-layer pixel prediction control information and the inter-layer syntax prediction control information being set independently as the inter-layer prediction control information, and

the decoding unit performs the inter-layer pixel prediction based on the inter-layer pixel prediction control information received by the reception unit, and performs the inter-layer syntax prediction based on the inter-layer syntax prediction control information received by the reception unit.

8. The image processing device according to claim 7, wherein the inter-layer pixel prediction control information controls using the sublayer, whether to perform the inter-layer pixel prediction,

the decoding unit performs the inter-layer pixel prediction on only the sublayer specified by the inter-layer pixel prediction control information,

the inter-layer syntax prediction control information controls whether to perform the inter-layer syntax prediction for each picture or slice, and

the decoding unit performs the inter-layer syntax prediction on only the picture or slice specified by the inter-layer syntax prediction control information.

9. The image processing device according to claim 8, wherein the inter-layer pixel prediction control information is received as a nal unit (nal_unit), a video parameter set (VPS (Video Parameter Set)), or an extension video parameter set (vps_extension).

10. The image processing device according to claim 8, wherein the inter-layer syntax prediction control information is received as a nal unit (nal_unit), a picture parameter set (PPS (Picture Parameter Set)), or a slice header (SliceHeader).

11. An image processing method comprising:

decoding encoded data in which an image with a plurality of layers is encoded by performing the inter-layer prediction on only the sublayer specified by the inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of layers, using information related to a sublayer.

CLAIMS

1. An image processing device comprising:
 - a reception unit that receives encoded data in which
 - 5 an image with a plurality of main layers is encoded, and
 - inter-layer prediction control information controlling
 - whether to perform inter-layer prediction, which is prediction
 - between the plurality of main layers, with the use of a sublayer;
 - and
 - 10 a decoding unit that decodes each main layer of the
 - encoded data received by the reception unit by performing the
 - inter-layer prediction on only the sublayer specified by the
 - inter-layer prediction control information received by the
 - reception unit:
 - 15
2. The image processing device according to claim 1, wherein
- if a current picture of a current main layer belongs to the
- sublayer specified as the sublayer for which the inter-layer
- prediction is performed by the inter-layer prediction control
- 20 information, the decoding unit decodes the encoded data of
- the current picture using the inter-layer prediction.
3. The image processing device according to claim 2, wherein
- the inter-layer prediction control information
- 25 specifies a highest sublayer for which the inter-layer
- prediction is allowed, and
- the decoding unit decodes using the inter-layer
- prediction, the encoded data of the picture belonging to the
- sublayers from a lowest sublayer to the highest sublayer
- 30 specified by the inter-layer prediction control information.

4. The image processing device according to claim 1, wherein the inter-layer prediction control information is set for each main layer.

5 5. The image processing device according to claim 1, wherein the inter-layer prediction control information is set as a parameter common to all the main layers.

6. The image processing device according to claim 1, wherein
10 the reception unit receives inter-layer pixel prediction control information that controls whether to perform inter-layer pixel prediction, which is pixel prediction between the plurality of main layers, and inter-layer syntax prediction control information that
15 controls whether to perform inter-layer syntax prediction, which is syntax prediction between the plurality of main layers, the inter-layer pixel prediction control information and the inter-layer syntax prediction control information being set independently as the inter-layer prediction control
20 information, and

the decoding unit performs the inter-layer pixel prediction based on the inter-layer pixel prediction control information received by the reception unit, and performs the inter-layer syntax prediction based on the inter-layer syntax prediction control information received by the reception unit.
25

7. The image processing device according to claim 6, wherein the inter-layer pixel prediction control information controls using the sublayer, whether to perform the inter-layer
30 pixel prediction,

the decoding unit performs the inter-layer pixel

prediction on only the sublayer specified by the inter-layer
pixel prediction control information,

the inter-layer syntax prediction control information
controls whether to perform the inter-layer syntax prediction
5 for each picture or slice, and

the decoding unit performs the inter-layer syntax
prediction on only the picture or slice specified by the
inter-layer syntax prediction control information.

10 8. The image processing device according to claim 7, wherein
the inter-layer pixel prediction control information is
transmitted as a nal unit (nal_unit), a video parameter set
(VPS (Video Parameter Set)), or an extension video parameter
set (vps_extension).

15 9. The image processing device according to claim 7, wherein
the inter-layer syntax prediction control information is
transmitted as a nal unit (nal_unit), a picture parameter set
(PPS (Picture Parameter Set)), or a slice header (SliceHeader).

20 10. An image processing method comprising:
receiving encoded data in which an image with a plurality
of main layers is encoded, and inter-layer prediction control
information controlling whether to perform inter-layer
25 prediction, which is prediction between the plurality of main
layers, with the use of a sublayer; and

decoding each main layer of the received encoded data
by performing the inter-layer prediction on only the sublayer
specified by the received inter-layer prediction control
30 information.

11. An image processing device comprising:
an encoding unit that encodes each main layer of the image data by performing inter-layer prediction, which is prediction between a plurality of main layers, on only a sublayer specified by inter-layer prediction control information that controls whether to perform the inter-layer prediction with the use of a sublayer; and
a transmission unit that transmits encoded data obtained by encoding by the encoding unit, and the inter-layer prediction control information.
12. The image processing device according to claim 11, wherein if a current picture of a current main layer belongs to the sublayer specified as the sublayer for which the inter-layer prediction is performed by the inter-layer prediction control information, the encoding unit encodes the image data of the current picture using the inter-layer prediction.
13. The image processing device according to claim 12, wherein
the inter-layer prediction control information specifies a highest sublayer for which the inter-layer prediction is allowed, and
the encoding unit encodes using the inter-layer prediction, the image data of the picture belonging to the sublayers from a lowest sublayer to the highest sublayer specified by the inter-layer prediction control information.
14. The image processing device according to claim 11, wherein the inter-layer prediction control information is set

for each main layer.

15. The image processing device according to claim 11,
wherein the inter-layer prediction control information is set
5 as parameters common to all the main layers.

16. The image processing device according to claim 11,
wherein

the encoding unit performs inter-layer pixel prediction
10 as pixel prediction between the plurality of main layers based
on inter-layer pixel prediction control information that
controls whether to perform the inter-layer pixel prediction
and that is set as the inter-layer prediction control
information,

15 the encoding unit performs inter-layer syntax
prediction as syntax prediction between the plurality of main
layers based on inter-layer syntax prediction control
information that controls whether to perform the inter-layer
syntax prediction and that is set as the inter-layer prediction
20 control information independently from the inter-layer pixel
prediction control information, and

the transmission unit transmits the inter-layer pixel
prediction control information and the inter-layer syntax
prediction control information that are set independently from
25 each other as the inter-layer prediction control information.

17. The image processing device according to claim 16,
wherein

the inter-layer pixel prediction control information
30 controls using the sublayer, whether to perform the inter-layer
pixel prediction,

the encoding unit performs the inter-layer pixel prediction on only the sublayer specified by the inter-layer pixel prediction control information,

the inter-layer syntax prediction control information
5 controls whether to perform the inter-layer syntax prediction for each picture or slice, and

the encoding unit performs the inter-layer syntax prediction on only the picture or slice specified by the inter-layer syntax prediction control information.

10

18. The image processing device according to claim 17, wherein the transmission unit transmits the inter-layer pixel prediction control information as a nal unit (nal_unit), a video parameter set (VPS (Video Parameter Set)), or an
15 extension video parameter set (vps_extension).

19. The image processing device according to claim 17, wherein the transmission unit transmits the inter-layer syntax prediction control information as a nal unit (nal_unit), a
20 picture parameter set (PPS (Picture Parameter Set)), or a slice header (SliceHeader).

20. An image processing method comprising:
encoding each main layer of the image data by performing
25 inter-layer prediction, which is prediction between a plurality of main layers, on only a sublayer specified by inter-layer prediction control information that controls whether to perform the inter-layer prediction with the use of a sublayer; and
30 transmitting encoded data obtained by the encoding, and the inter-layer prediction control information.