

of specifying a value for every layer with VPS_EXT. The second type is a method of pointing to transfer-finished rep_format information in an SPS of the enhancement layer and overwriting VPS information, with VPS_EXT. NPL 1 is the related art of the present disclosure.

Citation List

Non Patent Literature

[0008]

NPL 1: J. Chen, J. Boyce, Y. Ye, M. M. Hannuksela, G. J. Sullivan, Y.-K. Wang (editors), "High efficiency video coding (HEVC) scalable extension Draft 5", JCTVC-P1008_v4, January 2014.

Summary of Invention

Technical Problem

[0009]

However, for information on the default mapping between the enhancement layer and the resolution information, which is described above, a flag like rep_format_idx_present_flag, a relationship between the number of the pieces of resolution information and the number of the layers, or the like is used, but because these are insufficient, there is room for improvement.

[0010]

It is desirable to improve default mapping between an enhancement layer and resolution information.

Solution to Problem

[0011]

According to a first aspect of the present disclosure, there is provided an image encoding apparatus comprising: circuitry configured to set the number of resolution information on a layer of an image, and information indicating whether or not a correspondence relationship between the resolution information and the layer is present, in a case where the number of the resolution information is greater than 1; and encode the image and generate a bitstream including the number of resolution information and the information relating to the correspondence relationship.

[0012]

According to a second aspect of the present disclosure, there is provided image encoding method comprising: setting the number of resolution information on a layer of an image, and information indicating whether or not a correspondence relationship between

the resolution information and the layer is present, in a case where the number of the resolution information is greater than 1; and encoding the image and generating a bitstream including the number of resolution and the information relating to the correspondence relationship.

[0013]

Disclosed herein is an image decoding apparatus including: circuitry configured to extract, from a bitstream generated by coding an image, information relating to a correspondence relationship between resolution information and an enhancement layer, wherein the correspondence information is set in a case where the number of the layers is greater than the number of multiple candidates for the resolution information on a layer of the image; and decode the bitstream using the extracted information relating to the correspondence relationship between the resolution information and the enhancement layer.

[0014]

Disclosed herein is an image decoding method including: extracting, from a bitstream generated by coding an image, information relating to a correspondence relationship between resolution information and an enhancement layer, wherein the correspondence information is set in a case where the number of the layers is greater than the number of multiple candidates for the resolution information on a layer of the image; and decoding the bitstream using the extracted information relating to the correspondence relationship between the resolution information and the enhancement layer.

[0015]

According to a third aspect of the present disclosure, there is provided a non-transitory computer-readable medium having embodied thereon a program, which when executed by a computer causes the computer to execute the above image encoding method.

[0016]

Disclosed herein is a non-transitory computer-readable medium having embodied thereon a program, which when executed by a computer causes the computer to execute an image decoding method, the method including: extracting, from a bitstream generated by coding an image, information relating to a correspondence relationship between resolution information and an enhancement layer, wherein the

correspondence information is set in a case where the number of the layers is greater than the number of multiple candidates for the resolution information on a layer of the image; and decoding the bitstream using the extracted information relating to the correspondence relationship between the resolution information and the enhancement layer.

[0017]

According to a fourth aspect of the present disclosure, there is provided image encoding apparatus comprising: setting unit configured to set the number of resolution information on a layer of an image, and information indicating whether or not a correspondence relationship between the resolution information and the layer is present, in a case where the number of the resolution information is greater than 1; and an encoding unit configured to encode the image and generate a bitstream including the number of resolution information and the information relating to the correspondence relationship.

[0018]

Disclosed herein is an image coding apparatus including: circuitry configured to set a correspondence relationship between resolution information and an enhancement layer, in a case where the number of the layers is greater than the number of multiple candidates for the resolution information on a layer of an image; automatically map the layers and the multiple candidates onto each other; and code the image and generate a bitstream including information relating to the set correspondence relationship.

[0019]

According to a fifth aspect of the present disclosure, there is provided image encoding apparatus comprising: circuitry configured to set `vps_num_rep_formats_minus1` on a layer of an image, and information indicating whether or not a correspondence relationship between `vps_num_rep_formats_minus1` on the layer of the image and the layer is present, in a case where the `vps_num_rep_formats_minus1` is greater than 1; and encode the image and generate a bitstream

including vps_num_rep_formats_minus 1 and the information relating to the correspondence relationship.

[0020]

Disclosed herein is an image coding apparatus including: a setting unit that sets a correspondence relationship between resolution information and an enhancement layer in a case where multiple candidates for the resolution information on a layer of an image are present, and the number of the layers is greater than the number of the candidates; a coding unit that codes the image and generates a bitstream; and a transfer unit that transfers information relating to the correspondence relationship that is set by the setting unit and the bitstream that is generated by the coding unit.

[0021]

In a case where the number of the candidates is greater than the number of the layers, the setting unit may set the correspondence relationship between the resolution information and the enhancement layer, beginning with the leading candidate.

[0022]

In a case where multiple candidates are present, the setting unit may set information that indicates whether or not the correspondence relationship between the resolution information and the enhancement layer is present.

[0023]

In a case where the number of the candidates is 1, the setting unit may prohibit updating of the correspondence relationship between the resolution information and the enhancement layer in a sequence parameter set.

[0024]

Disclosed herein is an image coding method causing an image coding apparatus to perform: setting a correspondence relationship between resolution information and an enhancement layer in a case where multiple candidates for the resolution information on a layer of an image are present, and the number of the layers is greater than the number of the candidates; coding the image and generating a bitstream; and transferring information relating to the correspondence relationship that is set and the generated bitstream.

[0025]

Disclosed herein is an image decoding apparatus including: a receiving unit that receives a bitstream generated by coding an image; an extraction unit that extracts information relating to a correspondence relationship between resolution information and an enhancement layer from the bitstream received by the receiving unit, which is set in a case where multiple candidates for the resolution information on a layer of the image are present, and the number of the layers is greater than the number of the candidates; and a decoding unit that decodes the bitstream received by the receiving unit and generates the image, using the information relating to the correspondence relationship between the resolution information and the enhancement layer, which is extracted by the extraction unit.

[0026]

In a case where the number of the candidates is greater than the number of the layers, the correspondence relationship between the resolution information and the enhancement layer may be set, beginning with the leading candidate.

[0027]

In a case where multiple candidates are present, information may be set that indicates whether or not the correspondence relationship between the resolution information and the enhancement layer is present.

[0028]

In a case where the number of the candidates is 1, updating of the correspondence relationship between the resolution information and the enhancement layer in a sequence parameter set may be prohibited.

[0029]

Disclosed herein is an image decoding method causing an image decoding apparatus to perform: receiving a bitstream generated by coding an image; extracting information relating to a correspondence relationship between resolution information and an enhancement layer from the bitstream received by the receiving unit, which is set in a case where multiple candidates for the resolution information on a layer of the image are present, and the number of the layers is greater than the number of the candidates; and decoding the bitstream and generating the image, using the extracted

information relating to the correspondence relationship between the resolution information and the enhancement layer.

[0030]

According to embodiments of the present disclosure, in a case where multiple candidates for the resolution information on the layer of the image are present and the number of the layers is greater than the number of the candidates, the correspondence relationship between the resolution information and the enhancement layer is set. Then, the image is coded, the bitstream is generated, and the information relating to the correspondence being set and the generated bitstream are transferred.

[0031]

According to embodiments of the present disclosure, the image is coded, the generated bitstream is received, and the information relating to the correspondence relationship between the resolution information and the enhancement layer, which is set in a case where multiple candidates for the resolution information on the layer of the image are present and the number of the layers is greater than the number of the candidates, is extracted from the received bitstream. Then, the bitstream is decoded, and the image is generated, using the extracted information relating to the correspondence relationship between the resolution information and the enhancement layer.

[0032]

Moreover, the image coding apparatus and the image decoding apparatus, which are described above, may be an independent image processing apparatus, and may be an internal block that makes up one image coding apparatus or image decoding apparatus.

Advantageous Effects of Invention

[0033]

According to embodiments of the present disclosure, the image can be coded. Particularly, the default mapping between the enhancement layer and the resolution information is improved.

[0034]

According to embodiments of the present disclosure, the image can be decoded. Particularly, the default mapping between the enhancement layer and the resolution information is improved.

[0035]

Moreover, these effects are not necessarily limited, and any effects that are described in the present disclosure may be possible.

Brief Description of Drawings

[0036]

[Fig. 1]

Fig. 1 is a diagram for describing a configuration example of a coding unit.

[Fig. 2]

Fig. 2 is a diagram illustrating an example of syntax of VPS_EXT.

[Fig. 3]

Fig. 3 is a diagram illustrating an example of syntax of an SPS associated with an RBSP.

[Fig. 4]

Fig. 4 is a diagram illustrating an example of semantics.

[Fig. 5]

Fig. 5 is a diagram for describing pointing in a case of the syntax in Fig. 2.

[Fig. 6]

Fig. 6 is a diagram for describing the pointing in the case of the syntax in Fig. 2.

[Fig. 7]

Fig. 7 is a diagram for describing the pointing in the case of the syntax in Fig. 2.

[Fig. 8]

Fig. 8 is a diagram for describing the pointing in a case of the syntax according to the present technology.

[Fig. 9]

Fig. 9 is a diagram for describing the pointing in the case of the syntax according to the present technology.

[Fig. 10]

Fig. 10 is a diagram for describing the pointing in the case of the syntax according to the present technology.

[Fig. 11]

Fig. 11 is a diagram for describing pointing in the case of the syntax according to the present technology.

[Fig. 12]

Fig. 12 is a diagram illustrating an example of the syntax according to the present technology.

[Fig. 13]

Fig. 13 is a diagram illustrating an example of the syntax according to the

CLAIMS

1. An image encoding apparatus comprising:
circuitry configured to

set the number of resolution information on a layer of an image, and information indicating whether or not a correspondence relationship between the resolution information and the layer is present, in a case where the number of the resolution information is greater than 1; and
encode the image and generate a bitstream including the number of resolution information and the information relating to the correspondence relationship.

2. An image encoding method comprising:

setting the number of resolution information on a layer of an image, and information indicating whether or not a correspondence relationship between the resolution information and the layer is present, in a case where the number of the resolution information is greater than 1; and

encoding the image and generating a bitstream including the number of resolution and the information relating to the correspondence relationship.

3. A non-transitory computer-readable medium having embodied thereon a program, which when executed by a computer causes the computer to execute the image encoding method of claim 2.

4. An image encoding apparatus comprising:

a setting unit configured to set the number of resolution information on a layer of an image, and information indicating whether or not a correspondence relationship between the resolution information and the layer is present, in a case where the number of the resolution information is greater than 1; and

an encoding unit configured to encode the image and generate a bitstream including the number of resolution information and the information relating to the correspondence relationship.

5. The image encoding apparatus according to claim 4, wherein the setting unit and the encoding unit are each implemented via at least one processor.

6. An image encoding apparatus comprising:
circuitry configured to

set $vps_num_rep_formats_minus\ 1$ on a layer of an image, and information indicating whether or not a correspondence relationship between $vps_num_rep_formats_minus\ 1$ on the layer of the image and the layer is present, in a case where the $vps_num_rep_formats_minus\ 1$ is greater than 1; and

encode the image and generate a bitstream including $vps_num_rep_formats_minus\ 1$ and the information relating to the correspondence relationship.