~~The present disclosure has been made in view of such circumstances, and is intended to~~ Embodiments of the present invention enable recognition of performance required for decoding more accurately.

Solution to Problem

[0009]

~~According to an aspect of the present technology, there is provided an information processing apparatus including: a file generating unit configured to generate a file of an MP4 file format, in which information specifying a plurality of NAL units corresponding to a partial image which can be independently decoded in a whole image is stored in moov and the encoded partial image is stored in mdat; and a transmitting unit configured to transmit the file generated by the file generating unit.~~

According to a first aspect of the present invention, there is provided an image decoding apparatus comprising: an acquiring unit configured to acquire subsample information from a file including encoded data of image data and management information of the encoded data, in which the subsample information of an image of the image data is arranged, the subsample information including hint information used as a reference for decoding processing of a subsample, which is a partial region which can be independently decoded; an encoded data generating unit configured to generate encoded data of the subsample from the encoded data included in the file based on the subsample information acquired by the acquiring unit; and a decoding unit configured to decode the encoded data of the subsample generated by the encoded data generating unit.

[0010]

~~The information specifying the plurality of NAL units can include information indicating a group of the plurality of NAL units corresponding to the partial image.~~.In an embodiment, the acquiring unit acquires subsample information including a hint data type indicating a type of hint information included in the subsample information, a sample count indicating the number of continuous samples associated with the subsample information, and the hint information.

[0011]

~~The information specifying the plurality of NAL units can include information indicating the number of the plurality of NAL units corresponding to the partial image.~~

In an embodiment, the hint information includes a level indicating a degree

of load of decoding processing of the subsample.

[0012]

~~The information specifying the plurality of NAL units can include information indicating a first NAL unit among the NAL units corresponding to the partial image.~~

In an embodiment, the hint information includes header information of the encoded data of the subsample.

[0013]

~~The information specifying the plurality of NAL units can include information indicating all the NAL units corresponding to the partial image.~~

In an embodiment, the acquiring unit acquires subsample information including a hint data type indicating a type of hint information included in the subsample information, a sample count indicating the number of continuous samples associated with the subsample information, and identification information of a group to which the subsample belongs.

[0014]

~~The information specifying the plurality of NAL units can be defined using VisualSampleGroupEntry in the moov.~~

In an embodiment, the acquiring unit further acquires subsample information including a hint data type indicating a type of hint information included in the subsample information, a sample count indicating the number of continuous samples associated with the subsample information, and hint information including a level indicating a degree of load of decoding processing of a group of a subsample.

[0015]

~~In the file, a plurality of pieces of information for mapping the plurality of NAL units can be further stored.~~

In an embodiment, the acquiring unit further acquires subsample information including a hint data type indicating a type of hint information included in the subsample information, a sample count indicating the number of continuous samples associated with the subsample information, and hint information including header information of encoded data of a group of a subsample.

[0016]

~~The partial image can be Tile in high efficiency video coding (HEVC).~~

In an embodiment, the acquiring unit acquires subsample information including a hint data type indicating a type of hint information included in the subsample information, a sample count indicating the number of continuous samples associated with the subsample information, identification information of a subsample belonging to a group, and hint information of the group.

[0017]

~~According to an aspect of the present technology, there is provided an information processing method including: generating a file of an MP4 file format, in which information specifying a plurality of NAL units corresponding to a partial image which can be independently decoded in a whole image is stored in moov and the encoded partial image is stored in mdat; and transmitting the generated file.~~

In an embodiment, the hint information includes a level indicating a degree of load of decoding processing of the group.

[0018]

~~According to another aspect of the present technology, there is provided an information processing apparatus including: a file reproducing unit configured to reproduce a file of an MP4 file format, in which information specifying a plurality of NAL units corresponding to a partial image which can be independently decoded in a whole image is stored in moov and the encoded partial image is stored in mdat.~~

In an embodiment, the hint information includes header information of encoded data of the group.

[0019]

~~The information specifying the plurality of NAL units can include information indicating a group of the plurality of NAL units corresponding to the partial image.~~

In an embodiment, the acquiring unit acquires subsample information including information indicating a size and a location of a subsample.

[0020]

~~The information specifying the plurality of NAL units can include information indicating the number of the plurality of NAL units corresponding to the partial image.~~

In an embodiment, the acquiring unit acquires subsample information

including information indicating that a subsample can be independently decoded.

[0021]

~~The information specifying the plurality of NAL units can include information indicating a first NAL unit among the NAL units corresponding to the partial image.~~

In an embodiment, the acquiring unit acquires subsample information including information for grouping NAL units constituting a sample.

[0022]

~~The information specifying the plurality of NAL units can include information indicating all the NAL units corresponding to the partial image.~~

In an embodiment, the acquiring unit acquires the subsample information arranged as a subsample hint information box (SubsampleHint Information Box) different from a subsample information box (Subsample Information Box) of a sample table box (Sample Table Box) of the management information of the file.

[0023]

~~The information specifying the plurality of NAL units can be defined using~~

~~VisualSampleGroupEntry in the moov.~~

In an embodiment, the acquiring unit acquires the subsample information arranged as a visual sample group entry (VisualSampleGroupEntry) in a sample group description box (Sample Group Description Box) of a sample table box (Sample Table Box) of the management information of the file and information designating a sample to which the subsample information is applied arranged in a sample to group box (Sample To Group Box).

[0024]

~~In the file, a plurality of pieces of information for mapping the plurality of NAL units can be further stored.~~

In an embodiment, the encoded data generating unit generates, when the decoding unit can decode the encoded data of the subsample, the encoded data of the subsample based on the hint information of the subsample information acquired by the acquiring unit.

[0025]

~~The partial image can be Tile in high efficiency video coding (HEVC).~~

In an embodiment, the encoded data generating unit updates header information of the encoded data of the subsample based on the subsample information acquired by the acquiring unit.

[0026]

~~In the file, information indicating a location of the partial image in the whole image, information indicating a size of the partial image and the information specifying the plurality of NAL units can be stored in VisualSampleGroupEntry. The file reproducing unit can select a partial image which is desired to be reproduced based on the information indicating the location of the partial image in the whole image and the information indicating the size of the partial image, and acquire data of the partial image which is desired to be reproduced based on the information specifying the plurality of NAL units and generate a bit stream.~~

In an embodiment, the subsample is a tile (Tile) in high efficiency video coding (HEVC).

[0027]

~~In the file, information indicating a location of the partial image in the whole image, information indicating a size of the partial image and the information specifying the plurality of NAL units can be stored in VisualSampleGroupEntry. The file reproducing unit can select a region which is desired to be reproduced based~~

~~on the information indicating the location of the partial image in the whole image and the information indicating the size of the partial image, and acquire data of a partial image corresponding to the region which is desired to be reproduced based on the information specifying the plurality of NAL units and generate a bit stream.~~

According to a second aspect of the present invention, there is provided an image decoding method comprising: acquiring subsample information from a file including encoded data of image data and management information of the encoded data, in which the subsample information of an image of the image data is arranged, the subsample information including hint information used as a reference for decoding processing of a subsample, which is a partial region which can be independently decoded; generating encoded data of the subsample from the encoded data included in the file based on the acquired subsample information; and decoding the generated encoded data of the subsample.

[0028]

~~In the file, information indicating a location of the partial image in the whole image, information indicating a size of the partial image and the information specifying the plurality of NAL units can be stored in TileRegionGroupEntry. The file reproducing unit can select a tile which is desired to be reproduced based on the information indicating the location of the partial image in the whole image and the information indicating the size of the partial image, acquire a track corresponding to~~

~~the selected tile which is desired to be reproduced based on the information specifying the plurality of NAL units, and generate a bit stream of a partial image corresponding to the acquired track.~~

[0029]

~~In the file, information indicating a location of the partial image in the whole image, information indicating a size of the partial image and the information specifying the plurality of NAL units can be stored in TileRegionGroupEntry. The file reproducing unit can select a region which is desired to be reproduced based on the information indicating the location of the partial image in the whole image and the information indicating the size of the partial image, acquire a plurality of tracks corresponding to the selected region which is desired to be reproduced based on the information specifying the plurality of NAL units, and generate a bit stream of a partial image corresponding to the acquired plurality of tracks.~~

[0030]

~~A decoding unit configured to decode a bit stream of the partial image reproduced and generated by the file reproducing unit can be further included.~~

[0031]

~~According to another aspect of the present technology, there is provided~~ Disclosed herein is an information processing method including: reproducing a file of an MP4 file format, in which information specifying a plurality of NAL units corresponding to a partial image which can be independently decoded in a whole image is stored in moov and the encoded partial image is stored in mdat.

[0032]

~~In an aspect of the present technology,~~ Disclosed herein is a file of an MP4 file format, in which information specifying a plurality of NAL units corresponding to a partial image which can be independently decoded in a whole image is stored in moov and the encoded partial image is stored in mdat, is generated, and the generated file is transmitted.

[0033]

~~In another aspect of the present technology,~~ Disclosed herein is a file of an MP4 file format, in which information specifying a plurality of NAL units corresponding to a partial

image which can be independently decoded in a whole image is stored in moov and the encoded partial image is stored in mdat, is reproduced.

Advantageous Effects of Invention

[0034]

According to embodiments of the present ~~disclosure~~ invention, it is possible to encode and decode an image. Particularly, it is possible to recognize performance required for decoding more accurately.

Brief Description of Drawings

[0035]

[FIG. 1] FIG. 1 is a diagram for explaining an example of application for performing partial display.

[FIG. 2] FIG. 2 is a diagram for explaining another example of the application for performing partial display.

[FIG. 3] FIG. 3 is a diagram for explaining an example of definition of a subsample.

[FIG. 4] FIG. 4 is a diagram for explaining outline of an MP4 file format.

[FIG. 5] FIG. 5 is a diagram for explaining outline of an MP4 file format.

[FIG. 6] FIG. 6 is a diagram for explaining outline of an MP4 file format.

[FIG. 7] FIG. 7 is a diagram illustrating an extension example of a sample table box.

[FIG. 8] FIG. 8 is a diagram illustrating an example of a subsample hint information box.

[FIG. 9] FIG. 9 is a diagram illustrating an example of semantics of independent.

[FIG. 10] FIG. 10 is a diagram illustrating an example of a group of subsamples.

[FIG. 11] FIG. 11 is a diagram illustrating another example of the subsample hint information box.

[FIG. 12] FIG. 12 is a diagram illustrating another example of the subsample hint information box.

[FIG. 13] FIG. 13 is a diagram illustrating still another example of the subsample hint information box.

[FIG. 14] FIG. 14 is a diagram for explaining outline of an MP4 file format.

~~CLAIMS~~

CLAIMS

~~Claim 1 (Amended)~~

1. An image decoding apparatus comprising:

an acquiring unit configured to acquire subsample information from a file including encoded data of image data and management information of the encoded data, in which the subsample information of an image of the image data is arranged, the subsample information including hint information used as a reference for decoding processing of a subsample, which is a partial region which can be independently decoded;

an encoded data generating unit configured to generate encoded data of the subsample from the encoded data included in the file based on the subsample information acquired by the acquiring unit; and

a decoding unit configured to decode the encoded data of the subsample generated by the encoded data generating unit.

~~Claim 2 (Amended)~~

2. The image decoding apparatus according to claim 1,

wherein the acquiring unit acquires subsample information including a hint data type indicating a type of hint information included in the subsample information, a sample count indicating the number of continuous samples associated with the subsample information, and the hint information.

~~Claim 3 (Amended)~~

3. The image decoding apparatus according to claim 2,

wherein the hint information includes a level indicating a degree of load of decoding processing of the subsample.

~~Claim 4 (Amended)~~

4. The image decoding apparatus according to claim 2,

wherein the hint information includes header information of the encoded data of the subsample.

~~Claim 5 (Amended)~~

5. The image decoding apparatus according to claim 1,

wherein the acquiring unit acquires subsample information including a hint data type indicating a type of hint information included in the subsample information, a sample count indicating the number of continuous samples associated with the subsample information, and identification information of a group to which the subsample belongs.

~~Claim 6 (Amended)~~

6. The image decoding apparatus according to claim 5,

wherein the acquiring unit further acquires subsample information including a hint data type indicating a type of hint information included in the subsample information, a sample count indicating the number of continuous samples associated with the subsample information, and hint information including a level indicating a degree of load of decoding processing of a group of a subsample.

~~Claim 7 (Amended)~~

7. The image decoding apparatus according to claim 5,

wherein the acquiring unit further acquires subsample information including a hint data type indicating a type of hint information included in the subsample information, a sample count indicating the number of continuous samples associated with the subsample information, and hint information including header information of encoded data of a group of a subsample.

~~Claim 8 (Amended)~~

8. The image decoding apparatus according to claim 1,

wherein the acquiring unit acquires subsample information including a hint data type indicating a type of hint information included in the subsample information, a sample count indicating the number of continuous samples associated with the subsample information, identification information of a subsample belonging to a

group, and hint information of the group.

~~Claim 9 (Amended)~~

9. The image decoding apparatus according to claim 8,

wherein the hint information includes a level indicating a degree of load of decoding processing of the group.

~~Claim 10 (Amended)~~

10. The image decoding apparatus according to claim 8,

wherein the hint information includes header information of encoded data of the group.

~~Claim 11 (Amended)~~

11. The image decoding apparatus according to claim 1,

wherein the acquiring unit acquires subsample information including information indicating a size and a location of a subsample.

~~Claim 12 (Amended)~~

12 The image decoding apparatus according to claim 1,

wherein the acquiring unit acquires subsample information including information indicating that a subsample can be independently decoded.

~~Claim 13 (Amended)~~

13. The image decoding apparatus according to claim 1,

wherein the acquiring unit acquires subsample information including information for grouping NAL units constituting a sample.

~~Claim 14 (Amended)~~

14. The image decoding apparatus according to claim 1,

wherein the acquiring unit acquires the subsample information arranged as a subsample hint information box (SubsampleHint Information Box) different from a

subsample information box (Subsample Information Box) of a sample table box (Sample Table Box) of the management information of the file.

~~Claim 15 (Amended)~~

15 The image decoding apparatus according to claim 1,

wherein the acquiring unit acquires the subsample information arranged as a visual sample group entry (VisualSampleGroupEntry) in a sample group description box (Sample Group Description Box) of a sample table box (Sample Table Box) of the management information of the file and information designating a sample to which the subsample information is applied arranged in a sample to group box (Sample To Group Box).

~~Claim 16 (Amended)~~

16. The image decoding apparatus according to claim 1,

wherein the encoded data generating unit generates, when the decoding unit can decode the encoded data of the subsample, the encoded data of the subsample based on the hint information of the subsample information acquired by the acquiring unit.

~~Claim 17 (Amended)~~

17. The image decoding apparatus according to claim 1,

wherein the encoded data generating unit updates header information of the encoded data of the subsample based on the subsample information acquired by the acquiring unit.

~~Claim 18 (Amended)~~

18. The image decoding apparatus according to claim 1,

wherein the subsample is a tile (Tile) in high efficiency video coding (HEVC).

~~Claim 19 (Amended)~~

19. An image decoding method comprising:

acquiring subsample information from a file including encoded data of image data and management information of the encoded data, in which the subsample information of an image of the image data is arranged, the subsample information including hint information used as a reference for decoding processing of a subsample, which is a partial region which can be independently decoded;

generating encoded data of the subsample from the encoded data included in the file based on the acquired subsample information; and

decoding the generated encoded data of the subsample.

~~Claim 20 (Cancelled)~~

~~Claim 21 (Cancelled)~~

~~Claim 22 (Cancelled)~~

~~Claim 23 (Cancelled)~~