Non-Patent Literature

[0004]

Non-Patent Literature 1: MPEG-DASH (Dynamic Adaptive Streaming over HTTP) (URL:http://mpeg.chiariglione.org/standards/mpeg-dash/media-presentation-description-and-segment-formats/text-isoiec-23009-12012-dam-1)

Summary of Invention

Technical Problem

[0005]

However, the MPEG-DASH standard of the related art relates only to the concept of switching bit rates (Bitrates), and no selection of any partial image or supply of the data performed using tile structures described above, that is, adaptive supply of data of partial images, may be performed.

[0006]

It is desirable to provide a technology for adaptively supplying data of partial images.

Solution to Problem

[0007]

According to a first aspect of the present invention, there is provided an information processing device comprising: a partial image information generation unit configured to generate partial image information which is information regarding each partial image of a plurality of partial images, wherein each partial image is a part of an entire image, and the partial image information includes group identification information identifying a group to which respective partial images of the plurality of partial images belong; and a metadata generation unit configured to generate metadata to be used for supply of a bit stream of the entire image and supply of a bit stream of each partial image based on the partial image information generated by the partial image information generation unit, wherein the metadata generation unit stores the partial image information regarding the plurality of partial images in mutually different sub-representations (Sub-Representation) belonging to one representation (Representation) belonging to one adaptation set (AdaptationSet) of the metadata and assigns the bit streams of the plurality of partial images to the mutually different sub-representations.

[0008]

The partial image information may include positional information indicating a position of the partial image in the entire image.

[0009]

The positional information may indicate a position of an upper left of the partial image.

[0010]

The metadata generation unit may store the partial image information regarding the plurality of partial images in mutually different adaptation sets (AdaptationSet) of the

metadata and assign the bit streams of the plurality of partial images to the mutually different adaptation sets.

[0011]

The metadata generation unit may store the partial image information regarding the plurality of partial images in mutually different adaptation sets (AdaptationSet) of the metadata and assign a plurality of files for which one bit stream including the plurality of partial images is divided for each partial image to the mutually different adaptation sets.

[0012]

The metadata generation unit may store the partial image information regarding the plurality of partial images in mutually different sub-representations (Sub-Representation) belonging to one representation (Representation) belonging to one adaptation set (AdaptationSet) of the metadata and assign the bit streams of the plurality of partial images to the mutually different sub-representations.

[0013]

The partial image information generation unit may further generate information indicating that information regarding the bit stream is present under the sub-representation (Sub-Representation).

[0014]

Each of the bit streams of the plurality of partial images may be stored in a TRACK of one MP4 file.

[0015]

The metadata generation unit may further generate information indicating a location of data of the one MP4 file.

[0016]

The partial image information may further include information regarding a size of the entire image.

[0017]

The partial image information may further include group identification information identifying a group which is a group to which the partial images belong and which is a group of the partial images displayable as one image.

[0018]

The information processing device may further includes an encoding unit configured to encode image data of the entire image and the partial images and generate a bit stream.

[0019]

The information processing device may further includes a screen division processing unit configured to generate image data of each partial image from image data of the entire image.

[0020]

The partial image information may include information indicating the number of partial images forming the entire image, identification information indicating that sizes of the partial images are equal, and information indicating a position and a size of each partial

image when the sizes of the partial images are not equal.

[0021]

According to a second aspect of the present invention, there is provided an information processing method comprising: generating partial image information which is information regarding each partial image of a plurality of partial images, wherein each partial image is a part of an entire image, and the partial image information includes group identification information identifying a group to which respective partial images of the plurality of partial images belong; and generating metadata to be used for supply of a bit stream of the entire image and supply of a bit stream of each partial image based on the generated partial image information, wherein the step of generating metadata comprises: storing the partial image information regarding the plurality of partial images in mutually different sub-representations (Sub-Representation) belonging to one representation (Representation) belonging to one adaptation set (AdaptationSet) of the metadata, and assigning the bit streams of the plurality of partial images to the mutually different sub-representations.

[0022]

According to a third aspect of the present invention, there is provided an information processing device comprising: an analysis unit configured to analyze metadata that includes partial image information of a plurality of partial images, wherein each partial image is information regarding each partial image which is a part of an entire image, and the partial image information includes group identification information identifying a group to which respective partial images of plurality of the plurality of partial images belong, and wherein the partial image information is used for supply of a bit stream of the entire image and supply of a bit stream of each partial image, and to obtain the partial image information; a selection unit configured to select a desired bit stream of a desired partial image based on the partial image information obtained by the analysis unit; and a bit stream acquisition unit configured to acquire the desired bit stream selected by the selection unit, wherein the analysis unit analyzes the metadata in which the partial image information regarding the plurality of partial images is stored in mutually different sub-representations (Sub-Representation) belonging to one representation (Representation) belonging to one adaptation set (AdaptationSet) and the bit streams of the plurality of partial images are assigned to the mutually different sub-representations.

[0023]

The partial image information may include positional information indicating a position of the partial image in the entire image.

[0024]

The positional information may indicate a position of an upper left of the partial image.

[0025]

The analysis unit may analyze the metadata in which the partial image information regarding the plurality of partial images is stored in mutually different adaptation sets

(AdaptationSet) and the bit streams of the plurality of partial images are assigned to the mutually different adaptation sets.

[0026]

The analysis unit may analyze the metadata in which the partial image information regarding the plurality of partial images is stored in mutually different adaptation sets (AdaptationSet) and a plurality of files for which one bit stream including the plurality of partial images is divided for each partial image are assigned to the mutually adaptation sets.

[0027]

The analysis unit may analyze the metadata in which the partial image information regarding the plurality of partial images is stored in mutually different sub-representations (Sub-Representation) belonging to one representation (Representation) belonging to one adaptation set (AdaptationSet) and the bit streams of the plurality of partial images are assigned to the mutually different sub-representations.

[0028]

The partial image information may include information indicating that information regarding the bit stream is present under the sub-representation (Sub- Representation).

[0029]

Each of the bit streams of the plurality of partial images may be stored in a TRACK of one MP4 file.

[0030]

The metadata may include information indicating a location of data of the one MP4 file.

[0031]

The partial image information may further include information regarding a size of the entire image.

[0032]

The partial image information may further include group identification information identifying a group which is a group to which the partial images belong and which is a group of the partial images displayable as one image.

[0033]

The information processing device may further include a decoding unit configured to decode the bit stream acquired by the bit stream acquisition unit.

[0034]

The information processing device may further includes a screen combination processing unit configured to generate image data of the entire image from image data of the partial image obtained by the decoding unit decoding the bit stream.

[0035]

The partial image information may include information indicating the number of partial images forming the entire image, identification information indicating that sizes of the partial images are equal, and information indicating a position and a size of each partial image when the sizes of the partial images are not equal.

[0036]

According to a fourth aspect of the present invention, there is provided an information processing method comprising: analyzing metadata that includes partial image information which is information regarding each partial image of a plurality of partial images, wherein each partial image is a part of an entire image, and the partial image information includes group identification information identifying a group to which respective partial images of the plurality of partial images belong, and wherein the partial image information is used for supply of a bit stream of the entire image and supply of a bit stream of each partial image, and obtaining the partial image information; selecting a desired bit stream of a desired partial image based on the obtained partial image information; and acquiring the selected bit stream, wherein the step of analyzing the metadata comprises: storing the partial image information regarding the plurality of partial images in mutually different sub-representations (Sub-Representation) belonging to one representation (Representation) belonging to one adaptation set (AdaptationSet), and assigning the bit streams of the plurality of partial images to the mutually different sub-representations.

[0037]

According to embodiments of the present invention, partial image information which is information regarding each partial image which is a part of an entire image is generated; and metadata to be used for supply of a bit stream of the entire image and supply of a bit stream of the partial image is generated using the generated partial image information.

[0038]

According to embodiments of the present invention, metadata is analyzed, the metadata including partial image information which is information regarding each partial image which is a part of an entire image and used for supply of a bit stream of the entire image and supply of a bit stream of the partial image and obtaining the partial image information; a bit stream of a desired partial image is selected using the obtained partial image information; and the selected bit stream is acquired.

Advantageous Effects of Invention

[0039]

According to embodiments of the present invention, information can be processed. In particular, it is possible to adaptively supply data of partial images.

Brief Description of Drawings

[0040]

[FIG. 1] FIG. 1 is a diagram for describing the overview of MPEG-DASH.

[FIG. 2] FIG. 2 is a diagram illustrating an example of the configuration of an MPD.

[FIG. 3] FIG. 3 is a diagram for describing temporal separation of content.

[FIG. 4] FIG. 4 is a diagram illustrating an example of a layered structure below a

CLAIMS

1. An information processing device comprising:

a partial image information generation unit configured to generate partial image information which is information regarding each partial image of a plurality of partial images, wherein each partial image is a part of an entire image, and the partial image information includes group identification information identifying a group to which respective partial images of the plurality of partial images belong; and

a metadata generation unit configured to generate metadata to be used for supply of a bit stream of the entire image and supply of a bit stream of each partial image based on the partial image information generated by the partial image information generation unit,

wherein the metadata generation unit stores the partial image information regarding the plurality of partial images in mutually different sub-representations (Sub-Representation) belonging to one representation (Representation) belonging to one adaptation set (AdaptationSet) of the metadata and assigns the bit streams of the plurality of partial images to the mutually different sub-representations.

2. The information processing device according to claim 1,

wherein each partial image information includes positional information indicating a position of each partial image in the entire image.

3. The information processing device according to claim 2,

wherein the positional information indicates a position of an upper left of each partial image.

4. The information processing device according to claim 1,

wherein the metadata generation unit stores the partial image information regarding the plurality of partial images in mutually different adaptation sets (AdaptationSet) of the metadata and assigns the bit streams of the plurality of partial images to the mutually different adaptation sets.

5. The information processing device according to claim 1,

wherein the metadata generation unit stores the partial image information regarding the plurality of partial images in mutually different adaptation sets (AdaptationSet) of the

metadata and assigns a plurality of files for which one bit stream including the plurality of partial images is divided for each partial image to the mutually different adaptation sets.

6. The information processing device according to claim 1,

wherein the partial image information generation unit further generates information indicating that information regarding the bit stream is present under the sub-representation (Sub-Representation).

7. The information processing device according to claim 1,

wherein each of the bit streams of the plurality of partial images is stored in a TRACK of one MP4 file.

8. The information processing device according to claim 7,

wherein the metadata generation unit further generates information indicating a location of data of the one MP4 file.

9. The information processing device according to claim 1,

wherein the partial image information includes information regarding a size of the entire image.

10. The information processing device according to claim 1,

wherein each partial image is a tile (Tile) in high efficiency video coding (HEVC).

11. The information processing device according to claim 1,

wherein the partial image information includes a view type (viewtype) indicating whether an image is the partial image.

12. The information processing device according to claim 1, further comprising:

an encoding unit configured to encode image data of the entire image and each partial image and generate a bit stream.

13. The information processing device according to claim 1, further comprising:

a screen division processing unit configured to generate image data of each partial

image from image data of the entire image.

14. The information processing device according to claim 1,

wherein the partial image information includes information indicating the number of partial images forming the entire image, identification information indicating whether sizes of the plurality of partial images are equal, and information indicating a position and a size of each partial image when the sizes of the plurality of partial images are not equal.

15. An information processing method comprising:

generating partial image information which is information regarding each partial image of a plurality of partial images, wherein each partial image is a part of an entire image, and the partial image information includes group identification information identifying a group to which respective partial images of the plurality of partial images belong ; and

generating metadata to be used for supply of a bit stream of the entire image and supply of a bit stream of each partial image based on the generated partial image information,

wherein the step of generating metadata comprises:

storing the partial image information regarding the plurality of partial images in mutually different sub-representations (Sub-Representation) belonging to one representation (Representation) belonging to one adaptation set (AdaptationSet) of the metadata, and

assigning the bit streams of the plurality of partial images to the mutually different sub-representations.

16. An information processing device comprising:

an analysis unit configured to analyze metadata that includes partial image information of a plurality of partial images, wherein each partial image is information regarding each partial image which is a part of an entire image, and the partial image information includes group identification information identifying a group to which respective partial images of plurality of the plurality of partial images belong, and wherein the partial image information is used for supply of a bit stream of the entire image and supply of a bit stream of each partial image, and to obtain the partial image information;

a selection unit configured to select a desired bit stream of a desired partial image based on the partial image information obtained by the analysis unit; and

a bit stream acquisition unit configured to acquire the desired bit stream selected by the selection unit,

wherein the analysis unit analyzes the metadata in which the partial image information regarding the plurality of partial images is stored in mutually different sub-representations (Sub-Representation) belonging to one representation (Representation) belonging to one adaptation set (AdaptationSet) and the bit streams of the plurality of partial images are assigned to the mutually different sub-representations.

17. The information processing device according to claim 16,

wherein the partial image information includes positional information indicating a position of each partial image in the entire image.

18. The information processing device according to claim 17,

wherein the positional information indicates a position of an upper left of each partial image.

19. The information processing device according to claim 16,

wherein the analysis unit analyzes the metadata in which the partial image information regarding the plurality of partial images is stored in mutually different adaptation sets (AdaptationSet) and the bit streams of the plurality of partial images are assigned to the mutually different adaptation sets.

20. The information processing device according to claim 16,

wherein the analysis unit analyzes the metadata in which the partial image information regarding the plurality of partial images is stored in mutually different adaptation sets (AdaptationSet) and a plurality of files for which one bit stream including the plurality of partial images is divided for each partial image are assigned to the mutually different adaptation sets.

21. The information processing device according to claim 20,

wherein the partial image information includes information indicating that information regarding the bit stream is present under the sub-representation (Sub-Representation).

22. The information processing device according to claim20,

wherein each of the bit streams of the plurality of partial images is stored in a TRACK of one MP4 file.

23. The information processing device according to claim 22,

wherein the metadata includes information indicating a location of data of the one MP4 file.

24. The information processing device according to claim 15,

wherein the partial image information includes information regarding a size of the entire image.

25. The information processing device according to claim 15,

wherein each partial image is a tile (Tile) in high efficiency video coding (HEVC).

26. The information processing device according to claim 15,

wherein the partial image information includes a view type (viewtype) indicating whether an image is the partial image.

27. The information processing device according to claim 15, further comprising:

a decoding unit configured to decode the bit streams acquired by the bit stream acquisition unit.

28. The information processing device according to claim 27, further comprising:

a screen combination processing unit configured to generate image data of the entire image from image data of each partial image obtained by the decoding unit decoding the bit stream.

29. The information processing device according to claim 15,

wherein the partial image information includes information indicating the number of partial images forming the entire image, identification information indicating whether sizes of the plurality of partial images are equal, and information indicating a position and a size of each partial image when the sizes of the plurality of partial images are not equal.

30. An information processing method comprising:

analyzing metadata that includes partial image information which is information regarding each partial image of a plurality of partial images, wherein each partial image is a part of an entire image, and the partial image information includes group identification information identifying a group to which respective partial images of the plurality of partial images belong, and wherein the partial image information is used for supply of a bit stream of the entire image and supply of a bit stream of each partial image, and obtaining the partial image information;

selecting a desired bit stream of a desired partial image based on the obtained partial image information; and

acquiring the selected bit stream,

wherein the step of analyzing the metadata comprises:

storing the partial image information regarding the plurality of partial images in mutually different sub-representations (Sub-Representation) belonging to one representation (Representation) belonging to one adaptation set (AdaptationSet), and

assigning the bit streams of the plurality of partial images to the mutually different sub-representations.