[Non-Patent Literature 1] Benjamin Bross, Woo-Jin Han, Jens-Rainer Ohm, Gary J. Sullivan, Ye-Kui Wang, Thomas Wiegand, "High Efficiency Video Coding (HEVC) text specification draft 10 (for FDIS & Last Call)", JCTVC-L1003_v34, Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG 11 12th Meeting: Geneva, CH, 14-23 Jan. 2013.

Summary of Invention

Technical Problem

[0005]

However, as information on a level, which serves as a reference for determining whether a decoder can decode a stream, and a buffer capacity, only a value of the entire stream or a value of a layer unit is defined.

[0006]

Therefore, even in an application that decodes only a part of an entire image, determination of whether decoding is possible is performed by assuming a load when an entire screen is decoded. Accordingly, there is concern of an unnecessarily high level decoder being necessary. In addition, there is concern of applications to be delivered being unnecessarily limited accordingly.

[0007]

Embodiments of the present disclosure can recognize performance necessary for decoding more accurately.

Solution to Problem

[0007a]

According to a first aspect of the present disclosure, there is provided an image coding device including: a coding unit configured to code an image; and a setting unit configured to set information indicating a size of a partial region of the image and a level indicating a load of a decoding process of the partial region, for controlling decoding of coded data, which is transmitted from the image coding device to an image decoding device and in which the image is coded, the information indicating the size of the partial region of the image and the level indicating the load of the decoding process of the partial region both also being transmitted from the image coding device together with the coded data to the image decoding device, wherein the partial region is an independently decodable region of the image that is less than an entirety of the image and the entirety of the image has associated therewith a respective level set for decoding that is different than the level indicating the load of the decoding process of the partial region.

[0007b]

According to a second aspect of the present disclosure, there is provided image coding method including: coding an image; and setting information indicating a size of a partial region of the image and a level indicating a load of a decoding process of the partial region, for controlling decoding of coded data, which is transmitted from the image coding device to an image decoding device and in which the image is coded, the information indicating the size of the partial region of the image and the level indicating the load of the decoding process of the partial region both also being transmitted from the image coding device together with the coded data to the image decoding device, wherein the partial region is an independently decodable region of the image that is less than an entirety of the image and the entirety of the image has associated therewith a respective level set for decoding that is different than the level indicating the load of the decoding process of the partial region.

[0008]

Disclosed herein is an image decoding device including: an acquisition unit configured to acquire coded data of image data and decoding load definition information for defining a magnitude of a load of a decoding process of a partial region of an image of the image data; a control unit configured to control decoding of the coded data acquired by the acquisition unit based on the decoding load definition information acquired by the acquisition unit; and a decoding unit configured to decode the coded data acquired by the acquisition unit under control of the control unit.

[0009]

[0010]

The decoding load definition information may include information for defining a magnitude of a load of a decoding process of the partial region according to a level indicating a magnitude of a load of the decoding process.

[0011]

The decoding load definition information may include information for defining a magnitude of a load of a decoding process of the partial region according to information indicating a size of the partial region.

[0012]

The decoding load definition information may include information for defining a magnitude of a load of a decoding process of the partial region according to information indicating a length in a vertical direction and information indicating a length in a horizontal direction of the partial region.

[0013]

The decoding load definition information may be included in supplemental enhancement information (SEI) of an independently decodable partial region.

[0014]

The image data may include a plurality of layers, and the decoding load definition information of the plurality of layers may be included in the SEI.

[0015]

The decoding load definition information may include information indicating a size of the partial region serving as a reference, and a level indicating a magnitude of a load of a decoding process of the partial region.

[0016]

The partial region may be a tile.

[0017]

The partial region may be a set of a plurality of tiles.

[0018]

The decoding load definition information may include information for defining a maximum magnitude of a load of a decoding process among a plurality of partial regions included in a picture of the image data according to a level indicating a magnitude of a load of the decoding process.

[0019]

The decoding load definition information may include information for defining a magnitude of a load common in a plurality of partial regions included in a picture of the image data according to a level indicating a magnitude of a load of the decoding process.

[0020]

When the plurality of partial regions included in the picture have an L shape, a magnitude of the load may be defined for a rectangular region including the L shape.

[0021]

The acquisition unit may further acquire information indicating whether the decoding load definition information is set, and when the acquired information indicates that the decoding load definition information is set, acquires the the decoding load definition information.

[0022]

Disclosed herein is an image decoding method including: acquiring coded data of image data and decoding load definition information for defining a magnitude of a load of a decoding process of a partial region of an image of the image data; controlling decoding of the acquired coded data based on the acquired decoding load definition information; and

decoding the acquired coded data according to the controlling.

[0023]

In the above disclosure, coded data of image data and decoding load definition information for defining a magnitude of a load of a decoding process of a partial region of an image of the image data are acquired; decoding of the acquired coded data is controlled based on the acquired decoding load definition information; and the acquired coded data is decoded according to the controlling.

Advantageous Effects of Invention

[0024]

According to embodiments of the present disclosure, it is possible to code and decode an image. In particular, it is possible to recognize performance necessary for decoding more accurately.

Brief Description of Drawings

[0025]

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

[FIG. 2] FIG. 2 is a diagram illustrating an example of a layered image encoding scheme.

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

[FIG. 4] FIG. 4 is a diagram for describing an example of temporal scalable coding.

[FIG. 5] FIG. 5 is a diagram for describing an example of scalable coding of a signal-to-noise ratio.

[FIG. 6] FIG. 6 is a diagram describing an exemplary application that performs partial display.

[FIG. 7] FIG. 7 is a diagram describing another exemplary application that performs partial display.

[FIG. 8] FIG. 8 is a diagram describing an exemplary method of defining a decoding load to which the present technology is applied.

[FIG. 9] FIG. 9 is a diagram illustrating an extension example of MCTS SEI.

[FIG. 10] FIG. 10 is a diagram describing an overview of MCTS SEI.

[FIG. 11] FIG. 11 is a diagram describing an overview of MCTS SEI.

[FIG. 12] FIG. 12 is a diagram describing an overview of MCTS SEI.

[FIG. 13] FIG. 13 is a diagram describing an overview of MCTS SEI.

[FIG. 14] FIG. 14 is a diagram describing an overview of MCTS SEI.

[FIG. 15] FIG. 15 is a diagram describing an overview of MCTS SEI.

[FIG. 16] FIG. 16 is a diagram describing an overview of MCTS SEI.

CLAIMS

1. An image coding device comprising:

a coding unit configured to code an image; and

a setting unit configured to set information indicating a size of a partial region of the image and a level indicating a load of a decoding process of the partial region, for controlling decoding of coded data, which is transmitted from the image coding device to an image decoding device and in which the image is coded, the information indicating the size of the partial region of the image and the level indicating the load of the decoding process of the partial region both also being transmitted from the image coding device together with the coded data to the image decoding device,

wherein the partial region is an independently decodable region of the image that is less than an entirety of the image and the entirety of the image has associated therewith a respective level set for decoding that is different than the level indicating the load of the decoding process of the partial region.

2. The image coding device according to claim 1,

wherein the setting unit generates information for defining a load of a decoding process of the partial region according to the level indicating the load of the decoding process of the partial region.

3. The image coding device according to any one of the preceding claims,

wherein the setting unit generates information for defining the load of the decoding process of the partial region according to information indicating a size of the partial region.

4. The image coding device according to any one of the preceding claims,

wherein the setting unit generates information for defining the load of the decoding process of the partial region according to information indicating a length in a vertical direction and information indicating a length in a horizontal direction of the partial region.

5. The image coding device according to any one of the preceding claims, further comprising a transmission unit configured to transmit information indicating the size of the partial region and the level indicating the load of the decoding process of the partial region as

decoding load definition information indicating the load of the decoding process of the partial region.

6. The image coding device according to 5,

wherein the transmission unit transmits the decoding load definition information as auxiliary information of coded data in which the image obtained by the coding unit is coded.

7. The image coding device according to claim 5 or 6,

wherein the transmission unit transmits the decoding load definition information as supplemental enhancement information (SEI) of an independently decodable partial region.

8. The image coding device according to claim 5, 6 or 7,

wherein the coded data includes image data of a plurality of layers, and

wherein the transmission unit transmits the decoding load definition information of the plurality of layers as the SEI.

9. The image coding device according to any one of the preceding claims,

wherein the partial region is a tile.

10. The image coding device according to any one of claims 1 to 8,

wherein the partial region is a set of a plurality of tiles.

11. The image coding device according to any one of the preceding claims,

wherein the setting unit generates information for defining a maximum load of a decoding process among a plurality of partial regions included in a picture of the image data included in the coded data according to a level indicating a load of the decoding process.

12. The image coding device according to any one of the preceding claims,

wherein the setting unit generates information for defining a load common in a plurality of partial regions included in a picture of the image data included in the coded data according to a level indicating a load of the decoding process.

13. The image coding device according to claim 12,

wherein, when a plurality of the partial regions included in the picture have an L shape, the setting unit generates information for defining the load for a rectangular region including the L shape.

14. The image coding device according to any one of claims 5 to 8,

wherein the setting unit generates information indicating whether the decoding load definition information is set.

15. An image coding method comprising:

coding an image; and

setting information indicating a size of a partial region of the image and a level indicating a load of a decoding process of the partial region, for controlling decoding of coded data, which is transmitted from the image coding device to an image decoding device and in which the image is coded, the information indicating the size of the partial region of the image and the level indicating the load of the decoding process of the partial region both also being transmitted from the image coding device together with the coded data to the image decoding device,

wherein the partial region is an independently decodable region of the image that is less than an entirety of the image and the entirety of the image has associated therewith a respective level set for decoding that is different than the level indicating the load of the decoding process of the partial region.