parallel processing tool. Parallel decoding of picture units of each view using the dependent slice is possible.

Citation List

Non-Patent Literature

[0005]

Non-Patent Literature 1: Benjamin Bross, Woo-Jin Han, Jens-Rainer Ohm, Gary J. Sullivan, Thomas Wiegand, "High efficiency video coding (HEVC) text specification draft 8," JCTVC-J1003_d7, 2012.7.28

Summary of Invention

Technical Problem

[0006]

However, even when the dependent slice is used, it is difficult to decode pictures of a plurality of views in parallel because there is dependency of motion compensation between the views.

[0007]

Embodiments of the present invention disclose pictures of a plurality of views to be processed in parallel.

Solution to Problem

[0007a]

According to a first aspect of the present invention, there is provide an image processing device comprising: a setting section configured to set MV range limit information which is information about a limit of a value of a vertical direction of an MV for referring to a layer different from a layer of a current block in an inter-layer MV corresponding to the current block in syntax of an encoded stream; an encoding section configured to generate the encoded stream by encoding image data in units using the set MV range limit information set by the setting section; and a transmission section configured to transmit the encoded stream generated by the encoding section and the MV range limit information set by the setting section.

[0007b]

According to a second aspect of the present invention, there is provided an image processing method comprising: setting, by an image processing device, MV range limit information which is information about a limit of a value of a vertical direction of an MV for referring to a view different from a view of a current block in an inter-view MV corresponding to the current block in syntax of an encoded stream; generating, by the image processing device, the encoded stream by encoding image data in units using the set MV range limit information; and transmitting, by the image processing device, the generated encoded stream and the set MV range limit information.

[0008]

Disclosed herein is an image processing device that includes a reception section configured to receive an encoded stream set in syntax of the encoded stream in which motion vector (MV) range limit information is encoded in units in which image data have a hierarchical structure and the MV range limit information, the MV range limit information being information about a limit of a value of a vertical direction of an MV for referring to a view different from a view of a current block in an inter-view MV corresponding to the current block, and a decoding section configured to decode the encoded stream received by the reception section using the MV range limit information received by the reception section.

[0019]

Disclosed herein is an image processing method that by an image processing device, an encoded stream set in syntax of the encoded stream in which MV range limit information is encoded in units in which image data have a hierarchical structure and the MV range limit information, the MV range limit information being information about a limit of a value of a vertical direction of an MV for referring to a view different from a view of a current block in an inter-view MV corresponding to the current block, and decoding, by the image processing device, the received encoded stream using the received MV range limit information.

[0020]

Disclosed herein is a second image processing device that includes a setting section configured to set MV range limit information which is information about a limit of a value of a vertical direction of an MV for referring to a view different from a view of a current block in an inter-view MV corresponding to the current block in syntax of an encoded stream, an encoding section configured to generate the encoded stream by encoding image data in units having a hierarchical structure using the MV range limit information set by the setting section, and a transmission section configured to transmit the encoded stream generated by the encoding section and the MV range limit information set by the setting section.

[0021]

The setting section may set a flag indicating that there is a limit of the vertical direction in a range of the inter-view MV as the MV range limit information.

[0022]

The setting section may a value indicating the limit of the vertical positive direction in the range of the inter-view MV as the MV range limit information.

[0023]

A value of a limit of a vertical positive direction of the range of the inter-view MV may be preset and may be (LCU size – 8).

[0024]

A value of a limit of a vertical positive direction of the range of the inter-view MV may be preset and may be (LCU size – 4) when a loop filter is turned off.

[0025]

A value of a limit of a vertical positive direction of the range of the inter-

view MV may be determined according to vertical resolution of an image format.

[0026]

A value of a limit of a vertical positive direction of the range of the inter-view MV may be determined according to a level.

[0027]

The setting section may set the MV range limit information in an SPS.

[0028]

The setting section may set the MV range limit information in a VPS.

[0029]

The setting section may set the MV range limit information in VUI.

[0030]

The encoding section may generate the encoded stream by encoding the MV range limit information set by the setting section and encoding the image data using the encoded MV range limit information.

[0031]

Disclosed herein is an image processing method that includes setting, by an image processing device, MV range limit information which is information about a limit of a value of a vertical direction of an MV for referring to a view different from a view of a current block in an inter-view MV corresponding to the current block in syntax of an encoded stream, generating, by the image processing device, the encoded stream by encoding image data in units having a hierarchical structure using the set MV range limit information, and transmitting, by the image processing device, the generated encoded stream and the set MV range limit information.

[0032]

Disclosed herein is an image processing device that includes a reception section configured to receive an encoded stream set by a number of coding tree unit (CTU) lines in syntax of an encoded stream in which MV range limit information is encoded in units in which image data have a hierarchical structure and the MV range limit information, the MV range limit information being information about a limit of a value of a vertical direction of an MV for referring to a view different from a view of a current block in an inter-view MV corresponding to the current block, and a decoding section configured to decode the encoded stream received by the reception

section using the MV range limit information received by the reception section.

[0033]

The MV range limit information may be set by the number of CTU lines of the vertical direction delayed from the different view.

[0034]

The number of CTU lines of the vertical direction may be

[Math 3]

$$1<<(6-\mathrm{Log}_2\mathrm{CTUsize}) \quad \cdots (3)$$

[0035]

The MV range limit information may be set in an SPS.

[0036]

Disclosed herein is an image processing method that includes receiving, by an image processing device, an encoded stream set by a number of CTU lines in syntax of an encoded stream in which MV range limit information is encoded in units in which image data have a hierarchical structure and the MV range limit information, the MV range limit information being information about a limit of a value of a vertical direction of an MV for referring to a view different from a view of a current block in an inter-view MV corresponding to the current block, and decoding, by the image processing device, the received encoded stream using the received MV range limit information.

[0037]

Disclosed herein is an image processing device that includes a setting section configured to set MV range limit information by a number of CTU lines, the MV range limit information being information about a limit of a value of a vertical direction of an MV for referring to a view different from a view of a current block in an inter-view MV corresponding to the current block in syntax of an encoded stream, an encoding section configured to generate the encoded stream by encoding image data in units having a hierarchical structure using the MV range limit information set by the setting section, and a transmission section configured to transmit the encoded stream generated by the encoding section and the MV range limit information set by the setting section.

[0038]

The setting section may set the MV range limit information by the number of CTU lines of the vertical direction delayed from the different view.

[0039]

The number of CTU lines of the vertical direction may be

[Math 3]

$$1<<(6-\mathrm{Log}_2\mathrm{CTUsize}) \quad \cdots (3)$$

[0040]

The setting section may set the MV range limit information in an SPS.

[0041]

Disclosed herein is an image processing method that includes setting, by an image processing device, MV range limit information by a number of CTU lines, the MV range limit information being information about a limit of a value of a vertical direction of an MV for referring to a view different from a view of a current block in an inter-view MV corresponding to the current block in syntax of an encoded stream, generating, by the image processing device, the encoded stream by encoding image data in units having a hierarchical structure using the set MV range limit information, and transmitting, by the image processing device, the generated encoded stream and the set MV range limit information.

[0042]

In the above disclosure, an encoded stream set in syntax of the encoded stream in which motion vector (MV) range limit information is encoded in units in which image data have a hierarchical structure and the MV range limit information are received, the MV range limit information being information about a limit of a value of a vertical direction of an MV for referring to a view different from a view of a current block in an inter-view MV corresponding to the current block. The received encoded stream is decoded using the received MV range limit information.

[0043]

In the above disclosure, MV range limit information which is information about a limit of a value of a vertical direction of an MV for referring to a view different from a view of a current block in an inter-view MV corresponding to the

current block in syntax of an encoded stream is set, the encoded stream is generated by encoding image data in units having a hierarchical structure using the set MV range limit information, and the generated encoded stream and the set MV range limit information are transmitted.

[0044]

In the above disclosure, an encoded stream set by a number of coding tree unit (CTU) lines in syntax of an encoded stream in which MV range limit information is encoded in units in which image data have a hierarchical structure and the MV range limit information are received, the MV range limit information being information about a limit of a value of a vertical direction of an MV for referring to a view different from a view of a current block in an inter-view MV corresponding to the current block, and the received encoded stream is decoded using the received MV range limit information.

[0045]

In the above disclosure, MV range limit information by a number of CTU lines is set, the MV range limit information being information about a limit of a value of a vertical direction of an MV for referring to a view different from a view of a current block in an inter-view MV corresponding to the current block in syntax of an encoded stream, and the encoded stream is generated by encoding image data in units having a hierarchical structure using the set MV range limit information. The generated encoded stream and the set MV range limit information are transmitted.

[0046]

Also, the above-described image processing device may be an independent device or an inner block constituting one image encoding device or image decoding device.

Advantageous Effects of Invention

[0047]

According to the above aspects of the present invention, it is possible to decode an image. In particular, it is possible to process pictures of a plurality of views in parallel.

[0048]

According to the above aspects of the present invention, it is possible to encode an image. In particular, it is possible to process pictures of a plurality of views in parallel.

Brief Description of Drawings

[0049]

[FIG. 1] FIG. 1 is a diagram illustrating an example of a multi-view image encoding device to which the present technology is applied.

[FIG. 2] FIG. 2 is a block diagram illustrating a main configuration of the multi-view image encoding device.

[FIG. 3] FIG. 3 is a block diagram illustrating a configuration example of a view encoding section.

[FIG. 4] FIG. 4 is a diagram illustrating the constraint of a search range of an inter-view motion vector.

[FIG. 5] FIG. 5 is a diagram illustrating the constraint of a search range of an inter-view motion vector.

[FIG. 6] FIG. 6 is a diagram illustrating an example of an effect of the present technology.

[FIG. 7] FIG. 7 is a flowchart illustrating a multi-view image encoding process.

[FIG. 8] FIG. 8 is a flowchart illustrating an encoding process.

[FIG. 9] FIG. 9 is a flowchart illustrating an encoding process of a dependent view image.

[FIG. 10] FIG. 10 is a diagram illustrating an example of a multi-view decoding