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SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0020]

However, in the suggestion of the Non-Patent Document 3, it is necessary to perform processing on the PU in question after waiting for determination of the motion vector information with respect to a PU located at the top right among the adjacent PUs explained above. For this reason, there has been such concern that when processing for deriving Spatial predictor in the MV Competition or Merge mode is tried to be achieved with pipeline, the PU located at the top right causes delay.

[0021]

Embodiments of the present invention improve the processing efficiency by pipeline processing in the encoding or decoding of a motion vector.

SOLUTIONS TO PROBLEMS

[0021a]

According to a first aspect of the present invention, there is provided an image processing apparatus including a setting unit which, on a condition that a spatial prediction motion vector is generated with a prediction motion vector used for decoding of a motion vector of a current block of an image being as a target, set a motion vector of a top right block located adjacent to top right of the current block as not available; a prediction motion vector generation unit which generates a spatial prediction vector of the current block, using a motion vector other than the motion vector of the top right block which is set as not available by the setting unit, with a motion vector of a spatial adjacent block located adjacent to the current block in terms of space being as a target;

and a motion vector decoding unit which decodes the motion vector of the current block, using the prediction motion vector of the current block.

[0021b]

According to a second aspect of the present invention, there is provided an image processing method including setting, on a condition that a spatial prediction motion vector is generated with a prediction motion vector used for decoding of a motion vector of a current block of an image being as a target, a motion vector of a top right block located adjacent to top right of the current block as not available; generating a spatial prediction vector of the current block, using a motion vector other than the motion vector of the top right block which is set as not available by the setting unit, with a motion vector of a spatial adjacent block located adjacent to the current block in terms of space being as a target; and decoding the motion vector of the current block, using the prediction motion vector of the current block.

[0022]

Disclosed herein is an image processing apparatus including an adjacent motion vector information setting unit which, when a spatial prediction motion vector is generated with a prediction motion vector used for decoding of a motion vector of a current block of an image being as a target, prohibits use of a motion vector of a top right block located adjacent to top right of the current block; a prediction motion vector generation unit which generates a spatial prediction vector of the current block, using a motion vector other than the motion vector of the top right block which is prohibited from being used by the adjacent motion vector information setting unit, with a motion vector of a spatial adjacent block located adjacent to the current block in terms of space being as a target; and a motion vector decoding unit which decodes the motion vector of the current block, using the prediction motion vector of the current block.

[0023]

The prediction motion vector generation unit can perform, with pipeline, generation processing of the spatial prediction vector with respect to the current block and generation processing of a spatial prediction vector with respect to a block subsequent to the current block in scan order.

[0024]

The prediction motion vector generation unit can generate the spatial prediction vector of the current block, using a motion vector of a first block which is a spatial adjacent block of the current block and which is located at a right end with a top block in surface contact with a top of the current block being as a target.

[0025]

The prediction motion vector generation unit can generate the spatial prediction vector of the current block, using a motion vector of a first block which is a spatial adjacent block of the current block and which is located at a right end with a top block in surface contact with a top of the current block being as a target, and a motion vector of a second block other than the first block with the top block being as a target.

[0026]

The second block is a block which is located adjacent to left of the first block with the top block being as a target.

[0027]

The second block is a block which is located around a center of a length in a horizontal direction of the current block with the top block being as a target.

[0028]

The adjacent motion vector information setting unit can prohibit the use of the motion vector of the top right block in a maximum encoding unit.

[0029]

A border determination unit is further provided which

determines whether a border of the current block is a border of the maximum encoding unit, wherein the adjacent motion vector information setting unit can prohibit the use of the motion vector of the top right block only when the border determination unit determines that the border of the current block is the border of the maximum encoding unit.

[0030]

The adjacent motion vector information setting unit can prohibit the use of the motion vector of the top right block in accordance with identification information for identifying whether the use of the motion vector of the top right block is prohibited in a prediction unit or the use of the motion vector of the top right block is prohibited in the maximum encoding unit.

[0031]

In the above disclosure, when a spatial prediction motion vector is generated with a prediction motion vector used for decoding of a motion vector of a current block of an image being as a target, an image processing apparatus prohibits use of a motion vector of a top right block located adjacent to top right of the current block; generates a spatial prediction vector of the current block, using a motion vector other than the motion vector of the top right block which is prohibited from being used, with a motion vector of a spatial adjacent block located adjacent to the current block in terms of space being as a target; and decodes the motion vector of the current block, using the prediction motion vector of the current block.

[0032]

Disclosed herein is an image processing apparatus including an adjacent motion vector information setting unit which, when a spatial prediction motion vector is generated with a prediction motion vector used for encoding of a motion vector of a current block of an image being as a target, prohibits use of a motion vector of a top right block located adjacent to top right of the current block; a prediction motion vector generation unit which generates

a spatial prediction vector of the current block, using a motion vector other than the motion vector of the top right block which is prohibited from being used by the adjacent motion vector information setting unit, with a motion vector of a spatial adjacent block located adjacent to the current block in terms of space being as a target; and a motion vector encoding unit which encodes the motion vector of the current block, using the prediction motion vector of the current block.

[0033]

The prediction motion vector generation unit can perform, with pipeline, generation processing of the spatial prediction vector with respect to the current block and generation processing of a spatial prediction vector with respect to a block subsequent to the current block in scan order.

[0034]

The prediction motion vector generation unit can generate the spatial prediction vector of the current block, using a motion vector of a first block which is a spatial adjacent block of the current block and which is located at a right end with a top block in surface contact with a top of the current block being as a target.

[0035]

The prediction motion vector generation unit can generate the spatial prediction vector of the current block, using a motion vector of a first block which is a spatial adjacent block of the current block and which is located at a right end with a top block in surface contact with a top of the current block being as a target, and a motion vector of a second block other than the first block with the top block being as a target

[0036]

The second block is a block which is located adjacent to left of the first block with the top block being as a target.

[0037]

The second block is a block which is located around a center

of a length in a horizontal direction of the current block with the top block being as a target.

[0038]

The adjacent motion vector information setting unit can prohibit the use of the motion vector of the top right block in a maximum encoding unit.

[0039]

A border determination unit is further provided which determines whether a border of the current block is a border of the maximum encoding unit, wherein the adjacent motion vector information setting unit can prohibit the use of the motion vector of the top right block only when the border determination unit determines that the border of the current block is the border of the maximum encoding unit.

[0040]

The image processing apparatus may further include an identification information setting unit which sets identification information for identifying whether the use of the motion vector of the top right block is prohibited in a prediction unit or the use of the motion vector of the top right block is prohibited in the maximum encoding unit; and a transmission unit which transmits the identification information, which is set by the identification information setting unit, and a coded stream.

[0041]

In the above disclosure, when a spatial prediction motion vector is generated with a prediction motion vector used for encoding of a motion vector of a current block of an image being as a target, an image processing apparatus prohibits use of a motion vector of a top right block located adjacent to top right of the current block; generates a spatial prediction vector of the current block, using a motion vector other than the motion vector of the top right block which is prohibited from being used, with a motion vector of a spatial adjacent block located adjacent to the current block in terms of

space being as a target; and encodes the motion vector of the current block, using the prediction motion vector of the current block.
[0042]

According to the above disclosure, when a spatial prediction motion vector is generated with a prediction motion vector used for decoding of a motion vector of a current block of an image being as a target, a motion vector of a top right block located adjacent to top right of the current block is prohibited from being used, and a spatial prediction vector of the current block is generated, using a motion vector other than the motion vector of the current block which is prohibited from being used, with a motion vector of a spatial adjacent block located adjacent to the current block in terms of space being as a target. Then, the motion vector of the current block is decoded, using the prediction motion vector of the current block.

[0043]

According to the above disclosure, when a spatial prediction motion vector is generated with a prediction motion vector used for encoding of a motion vector of a current block of an image being as a target, a motion vector of a top right block located adjacent to top right of the current block is prohibited from being used, and a spatial prediction vector of the current block is generated, using a motion vector other than the motion vector of the top right block which is prohibited from being used, with a motion vector of a spatial adjacent block located adjacent to the current block in terms of space being as a target. Then, the motion vector of the current block is encoded, using the prediction motion vector of the current block.

[0044]

It should be noted that the image processing apparatus explained above may be an independent apparatus, or may be an internal block constituting an image coding device or an image decoding device.

EFFECTS OF THE INVENTION

[0045]

According to embodiments of the present invention, an image can be decoded. In particular, the processing efficiency can be improved by pipeline processing.

[0046]

According to embodiments of the present invention, an image can be encoded. In particular, the processing efficiency can be improved by pipeline processing.

BRIEF DESCRIPTION OF DRAWINGS

[0047]

Fig. 1 is a block diagram illustrating an example of main configuration of an image coding device.

Fig. 2 is an explanatory diagram illustrating median operation.

Fig. 3 is an explanatory diagram illustrating multi-reference frames.

Fig. 4 is an explanatory diagram illustrating a temporal direct mode.

Fig. 5 is an explanatory diagram illustrating a motion vector coding method.

Fig. 6 is a figure illustrating an example of configuration of a coding unit.

Fig. 7 is an explanatory diagram illustrating Motion Partition Merging.

Fig. 8 is an explanatory diagram illustrating a generation method of a spatial prediction motion vector according to the related art.

Fig. 9 is an explanatory diagram illustrating a