for selecting the prediction mode, the predicted block size, and the motion vector. They preferentially select the prediction mode, the predicted block size, and the motion vector, which are small in cost, whereby the optimum combination can be selected.

[0084] A variable MV_Cost indicating the cost for the motion vector is calculated by using a sum of absolute distance (SAD) of predicted residual errors, a code amount of the motion vector information (MV_Code), and a Lagrange multiplier (λ) calculated from the quantized information as in an equation (~~65~~ 65).

$$MV_Cost = SAD + \lambda \times MV_Code \qquad (65)$$

[0085] If the variable L is "true" (step S301: Yes), the prediction control unit 112 substitutes the predetermined maximum value MaxValue into the variable MV_Cost indicating the cost for the motion vector (step S302). With this process, the prediction control unit 112 controls not to select the motion vector having the large memory bandwidth (step S301).

[0086] In the method in FIG. 14, the value of the motion vector is restricted to control the motion vector information 117, so as not to generate the coded data by which the memory bandwidth increases, as in FIG. 13.

[0087] FIG. 15 is a flowchart illustrating another example of the method of reducing the memory bandwidth. FIG. 15 illustrates a method of controlling the prediction mode of the color difference, as another method of reducing the memory bandwidth.

[0088] If the variable L is "true" (step S401), only the prediction mode PredMode of color is forcibly rewritten to the uni-directional prediction PredL0 (step S402). With this process, the case of the bi-directional prediction with the color difference signal using large memory

CLAIMS

1. An image coding method of coding ~~an~~ target image including a luminance component and ~~a~~ color difference components, the method comprising:

~~an acquiring step of~~ acquiring a reference image; and

~~a generating step of~~ generating a predicted image ~~having resolution larger than that of the reference image~~ by interpolating~~performing, for each of~~ the luminance component and the color difference components~~,~~ in~~an interpolation on~~ the ~~acquired~~ reference image according to a motion vector, wherein

if~~the generating step includes generating the predicted image for the color difference component without performing a specific interpolation that means the interpolation in which a number of pixels to be accessed in the reference image is large, when~~ a size of a block, which is designated as a unit of the interpolation, is equal to or smaller than a predetermined first threshold value, the generating includes inhibiting a bi-directional prediction, and performing only a uni-directional prediction to generate the predicted image according to the motion vector.

2. The image coding method according to claim 1, wherein

in the generating, if the size of the block, which is designated as a unit of the interpolation, is equal to or smaller than a second threshold value that is different from the first threshold value, the uni-directional

prediction is not performed~~the specific interpolation is an interpolation for performing an interpolation both in a horizontal direction and in a vertical direction by using a bi-directional prediction in which the predicted image is generated from a plurality of the reference images~~.

3. The image coding method according to claim 1, wherein if the size of the block, which is designated as a unit of the interpolation, is equal to or smaller than the first threshold value, the generating includes changing the bi-directional prediction to the uni-directional prediction~~the generating step includes transforming the motion vector, which is a fractional-pel accuracy of the reference image, into a motion vector that is an integer-pel accuracy of the reference image, and generating the predicted image from the transformed motion vector and the reference image, when the size of the block is smaller than the threshold value~~.

4. The image coding method according to claim 1, wherein the predicted image is generated from two reference images if the bi-directional prediction is performed and generated from a single reference image if the the uni-directional prediction is performed

~~the generating step includes generating the predicted image by performing the interpolation on the reference image according to the motion vector by using a uni-~~

~~directional prediction in which the predicted image is generated from the single reference image, when the size of the block is smaller than the threshold value~~.

~~5. The image coding method according to claim 1, wherein the generating step includes preferentially selecting the motion vector that is small in allocated cost, and generating the predicted image by performing the interpolation by using the selected motion vector, so as to increase cost of the motion vector that is a fractional pel accuracy of the reference image, when the size of the block is smaller than the threshold value.~~

~~6. An image decoding method of decoding an image including a luminance component and a color difference component, the method comprising:~~

~~an acquiring step of acquiring a reference image; and~~

~~a generating step of generating a predicted image having resolution larger than that of the reference image, by performing, for each of the luminance component and the color difference component, an interpolation on the acquired reference image according to a motion vector, wherein~~

~~the generating step includes generating the predicted image for the color difference component without performing a specific interpolation that means the interpolation in which a number of pixels to be accessed in the reference~~

~~image is large, when a size of a block, which is designated as a unit of the interpolation, is smaller than a predetermined threshold value.~~

~~7. The image decoding method according to claim 6, wherein~~

~~the specific interpolation is an interpolation for performing an interpolation both in a horizontal direction and in a vertical direction by using a bi-directional prediction in which the predicted image is generated from a plurality of the reference images.~~

~~8. The image decoding method according to claim 6, wherein~~

~~the generating step includes transforming the motion vector, which is a fractional pel accuracy of the reference image, into a motion vector that is an integer pel accuracy of the reference image, and generating the predicted image from the transformed motion vector and the reference image, when the size of the block is smaller than the threshold value.~~

~~9. The image decoding method according to claim 6, wherein~~

~~the generating step includes generating the predicted image by performing the interpolation on the reference image according to the motion vector by using a uni-~~

~~directional prediction in which the predicted image is generated from the single reference image, when the size of the block is smaller than the threshold value.~~

5 5~~1~~0. An image coding apparatus that codes a~~n~~ target image including a luminance component and ~~a~~ color difference component~~s~~, the apparatus comprising:

~~a memory unit configured to store therein a reference image; and~~

10 a generating unit configured to generate a predicted image ~~having resolution larger than that of the reference image,~~ by interpolating~~performing, for each of~~ the luminance component and the color difference component~~s~~~~, an interpolation~~ in~~on~~ a~~the acquired~~ reference image according 15 to a motion vector; and

a coding unit configured to code coefficient information acquired from a prediction error indicating a difference between the predicted image and to the target image, wherein

20 if~~the generating unit generates the predicted image for the color difference component without performing a specific interpolation that means the interpolation in which a number of pixels to be accessed in the reference image is large, when~~ a size of a block, which is designated 25 as a unit of the interpolation, is equal to or smaller than a predetermined first threshold value, the generating unit inhibits a bi-directional prediction, and performs only a

uni-directional prediction to generate the predicted image according to the motion vector.

6. The image coding apparatus according to claim 5, wherein

if the size of the block, which is designated as a unit of the interpolation, is equal to or smaller than a second threshold value that is different from the first threshold value, the generating unit does not perform the uni-directional prediction.

7. The image coding apparatus according to claim 5, wherein

if the size of the block, which is designated as a unit of the interpolation, is equal to or smaller than the first threshold value, the generating unit changes the bi-directional prediction to the uni-directional prediction.

8. The image coding apparatus according to claim 5, wherein the predicted image is generated from two reference images if the bi-directional prediction is performed and generated from a single reference image if the uni-directional prediction is performed.

9. The image coding apparatus according to claim 5, wherein

the generating unit and the coding unit are

implemented as a processor.

~~11. An image decoding apparatus that decodes an image including a luminance component and a color difference component, the apparatus comprising:~~

~~a memory unit configured to store therein a reference image; and~~

~~a generating unit configured to generate a predicted image having resolution larger than that of the reference image, by performing, for each of the luminance component and the color difference component, an interpolation on the acquired reference image according to a motion vector, wherein~~

~~the generating unit generates the predicted image for the color difference component without performing a specific interpolation that means the interpolation in which a number of pixels accessed by the reference image is large, when a size of a block, which is designated as a unit of the interpolation, is smaller than a predetermined threshold value.~~