[0032] Furthermore, the image coding apparatus uses only the motion vectors in the second prediction direction of adjacent blocks, when calculating the predicted motion vector PMvL1 in the second prediction direction of the current block. Here, the image coding apparatus does not use the motion vectors in the first prediction direction of the adjacent blocks.

[0033] In other words, the motion vectors of adjacent blocks to be used for calculating a predicted motion vector are limited in the conventional method. Thus, the optimal motion vector is not derived, and the coding efficiency will not be improved.

[0034] Embodiments of~~Thus,~~ the present invention ~~has an object of~~ providinge an image coding method and an image decoding method for deriving a predicted motion vector suitable for improving the coding efficiency of a motion vector.

[Solution to Problem]

[0035] ~~In order to solve the problems, an image coding method a~~According to an aspect of the present invention, there is provided a method of coding a current picture per block with prediction using one or both of a first reference picture list and a second reference picture list, said method including~~and includes~~: adding, to a candidate list, a first adjacent motion vector as a candidate for a predicted motion vector to be used for coding a current motion vector, the first adjacent motion vector being a motion vector of a block adjacent to a current block included in the current picture, and the current motion vector being a motion vector of the current block; selecting the predicted motion vector to be used for coding the current motion vector, from the candidate list including the first adjacent motion vector; and coding the current motion vector using the selected predicted motion vector, wherein in the adding, the first adjacent motion vector is added to the candidate list for the current motion vector, the first adjacent motion vector indicating a position in a first reference picture included in the first reference picture list, and the current motion vector indicating a position in a second reference picture included in the second reference picture list.

[0036] Accordingly, the adjacent motion vector corresponding to the first reference picture list is added to the candidate list

[0047] Furthermore, in the adding, a plurality of index values and a plurality of candidates for the predicted motion vector may be added to the candidate list so that the index values are in one-to-one correspondence with the candidates for the predicted motion vector, in the selecting, an index value may be selected from the candidate list as the predicted motion vector, and in the coding, the selected index value may be coded so that a code of the index value is longer as the index value is larger.

[0048] Accordingly, the selected predicted motion vector is appropriately coded. Thus, the coder and the decoder select the same predicted motion vector.

[0049] Furthermore, in the adding, the first adjacent motion vector of the adjacent block may be added to the candidate list, the adjacent block being one of a left adjacent block, an above-adjacent block, and an upper right adjacent block with respect to the current block.

[0050] Accordingly, a plurality of adjacent motion vectors is added to the candidate list as candidates for the predicted motion vector. Accordingly, the number of the options of predicted motion vectors increases.

[0051] ~~Furthermore, an image decoding method a~~According to another aspect of the present invention ~~may be~~, there is provided a method of decoding a current picture per block with prediction using one or both of a first reference picture list and a second reference picture list, said method including ~~and include~~: adding, to a candidate list, a first adjacent motion vector as a candidate for a predicted motion vector to be used for decoding a current motion vector, the first adjacent motion vector being a motion vector of a block adjacent to a current block included in the current picture, and the current motion vector being a motion vector of the current block; selecting the predicted motion vector to be used for decoding the current motion vector, from the candidate list including the first adjacent motion vector; and decoding the current motion vector using the selected predicted motion vector, wherein in the adding, the first adjacent motion vector may be added to the candidate list for the current motion vector, the first adjacent motion vector indicating a

is not identical to the third reference picture and that the second reference picture is not identical to the first reference picture.

[0062] Accordingly, decrease in the number of candidates is suppressed. Thus, a state where no candidate exists in the candidate list is avoided.

[0063] Furthermore, in the adding, a plurality of index values and a plurality of candidates for the predicted motion vector may be added to the candidate list so that the index values are in one-to-one correspondence with the candidates for the predicted motion vector, in the decoding, an index value may be decoded, the index value being coded so that a code of the index value is longer as the index value is larger, and in the selecting, the predicted motion vector corresponding to the decoded index value may be selected from the candidate list.

[0064] Accordingly, the selected predicted motion vector is appropriately decoded. Thus, the coder and the decoder select the same predicted motion vector.

[0065] Furthermore, in the adding, the first adjacent motion vector of the adjacent block may be added to the candidate list, the adjacent block being one of a left adjacent block, an above-adjacent block, and an upper right adjacent block with respect to the current block.

[0066] Accordingly, a plurality of adjacent motion vectors is added to the candidate list as candidates for the predicted motion vector. Accordingly, the number of the options of predicted motion vectors increases.

[0067] ~~Furthermore, an image coding apparatus a~~According to another aspect of the present invention ~~may be~~, there is provided an image coding apparatus that codes a current picture per block with prediction using one or both of a first reference picture list and a second reference picture list, said apparatus comprising ~~and include~~: an addition unit configured to add, to a candidate list, a first adjacent motion vector as a candidate for a predicted motion vector to be used for coding a current motion vector, the first adjacent motion vector being a motion vector of a block adjacent to a current block included in the current picture, and the current motion vector being a motion vector of the current block; a selecting unit configured

to select the predicted motion vector to be used for coding the current motion vector, from the candidate list including the first adjacent motion vector; and a coding unit configured to code the current motion vector using the selected predicted motion vector, wherein the addition unit may be configured to add the first adjacent motion vector to the candidate list for the current motion vector, the first adjacent motion vector indicating a position in a first reference picture included in the first reference picture list, and the current motion vector indicating a position in a second reference picture included in the second reference picture list.

[0068] Accordingly, the image coding method is implemented as the image coding apparatus.

[0069] ~~Furthermore, an image decoding apparatus a~~According to another aspect of the present invention ~~may be~~, there is provided an image decoding apparatus that decodes a current picture per block with prediction using one or both of a first reference picture list and a second reference picture list, said apparatus including~~and include~~: an addition unit configured to add, to a candidate list, a first adjacent motion vector as a candidate for a predicted motion vector to be used for decoding a current motion vector, the first adjacent motion vector being a motion vector of a block adjacent to a current block included in the current picture, and the current motion vector being a motion vector of the current block; a selecting unit configured to select the predicted motion vector to be used for decoding the current motion vector, from the candidate list including the first adjacent motion vector; and a decoding unit configured to decode the current motion vector using the selected predicted motion vector, wherein the addition unit may be configured to add the first adjacent motion vector to the candidate list for the current motion vector, the first adjacent motion vector indicating a position in a first reference picture included in the first reference picture list, and the current motion vector indicating a position in a second reference picture included in the second reference picture list.

[0070] Accordingly, the image decoding method is implemented as the image decoding apparatus.

[0071] ~~Furthermore, an image coding and decoding apparatus~~

Aaccording to another aspect of the present invention ~~may be~~, there is provided an image coding and decoding apparatus that codes a current picture per block and decodes a current picture per block, with prediction using one or both of a first reference picture list and a second reference picture list, said apparatus including~~and include~~: an addition unit configured to add, to a candidate list, a first adjacent motion vector as a candidate for a predicted motion vector to be used for coding or decoding a current motion vector, the first adjacent motion vector being a motion vector of a block adjacent to a current block to be processed and included in the current picture to be coded or decoded, and the current motion vector being a motion vector of the current block; a selecting unit configured to select the predicted motion vector to be used for coding or decoding the current motion vector, from the candidate list including the first adjacent motion vector; a coding unit configured to code the current motion vector using the selected predicted motion vector; and a decoding unit configured to decode the current motion vector using the selected predicted motion vector, wherein the addition unit may be configured to add the first adjacent motion vector to the candidate list for the current motion vector, the first adjacent motion vector indicating a position in a first reference picture included in the first reference picture list, and the current motion vector indicating a position in a second reference picture included in the second reference picture list.

[0072] Accordingly, the image coding and decoding apparatus implements both of the functions of the image coding apparatus and the image decoding apparatus.

[Advantageous Effects of Invention]

[0073] According to embodiments of the present invention, a predicted motion vector suitable for improving the coding efficiency of a motion vector is derived. Accordingly, it is possible to improve the coding efficiency of the motion vector.

[Brief Description of Drawings]

[0074]

[FIG. 1] FIG. 1 illustrates a configuration of an image coding apparatus according to Embodiment 1;

[FIG. 2] FIG. 2 illustrates a flowchart of operations performed by