Claims

[Claim 1] An apparatus configured to decode an image, the apparatus comprising:

a processor; and

a memory storing a program which causes the processor to:

extract an intra prediction mode of a current block from a bitstream, the intra prediction mode indicating a particular direction among a plurality of directions, wherein the particular direction is indicated by using one of a dx number in a horizontal direction and a fixed number in a vertical direction, or a dy number in the vertical direction and a fixed number in the horizontal direction, wherein dx and dy are integers;

determine a number of neighboring pixels located on a left side of the current block or an upper side of the current block, configured to determine a location of one or more neighboring pixels among the neighboring pixels located on the left side of the current block or the upper side of the current block using a bitwise shift operation based on a position of a current pixel (j, i) and one of the dx or dy numbers indicating the particular direction, where j and i are integers, and configured to perform intra prediction on the current block using the number of neighboring pixels and the location of the one or more neighboring pixels;

restore the current block by adding the intra-predicted current block and a residual obtained from the bitstream; and

obtain a value of the current pixel using the number of neighboring pixels, and the location of the one or more neighboring pixels,

wherein, when the number of neighboring pixels is 1, the value of the current pixel is obtained based on the neighboring pixel; and when the number of the neighboring pixels is 2, a prediction value of the current pixel is obtained based on a weighted average of the neighboring pixels,

wherein:

i) the dx number has a fixed value of 32, and the dy number is determined from among {32, 26, 21, 17, 13, 9, 5, 2, 0, −2, −5, −9, −13, −17, −21, −26}, or

ii) the dy number has a fixed value of 32, and the dx number is determined from among {32, 26, 21, 17, 13, 9, 5, 2, 0, −2, −5, −9, −13, −17, −21, −26},

the location of the one or more neighboring pixels located on the upper side of the current block is determined based on i*dx>>m, where i is a position of the current pixel in the vertical direction, m is related to the fixed number in the vertical direction, and >> is the bitwise shift operation, and

the location of the one or more neighboring pixels located on the left side of the current block is determined based on j*dy>>n, where j is a position of the current pixel in the horizontal direction, and n is related to the fixed number in the horizontal direction, and

wherein the bitwise shift operation operates on a binary representation of i*dx and j*dy.