CLAIMS

[1] An image decoding device comprising:

an intra prediction unit for, when a coding mode for a coding block is an intra coding mode, carrying out an intra-frame prediction process on each of processing blocks to generate a predicted value of pixels of a prediction image, each of the processing blocks being the coding block or a sub-block obtained by dividing the coding block,

wherein, when an intra prediction parameter indicates a horizontal prediction process, and coordinates of a pixel at an upper left of said block are expressed as origin (0,0) and coordinates of each pixel for which a predicted value is calculated are expressed as (x,y),

when a size of the processing block is less than a predetermined size, the intra prediction unit adds a value to a signal value of a pixel at coordinates (-1, y) adjacent to left of the processing block and outputs the added value as the predicted value of a pixel at said coordinates (x,y), the value being proportional to a value calculated by subtracting a signal value of a pixel at coordinates (-1,-1) from a signal value of a pixel at coordinates (x, -1) adjacent to top of the processing block, and

when the size of the processing block is greater than or equal to the predetermined size, said intra prediction unit outputs the signal value of the pixel at coordinates (-1, y) adjacent to left of said processing block as the predicted value of a pixel at said coordinates (x,y).

[2] An image encoding device comprising:

an intra prediction unit for, when a coding mode for a coding block is an intra coding mode, carrying out an intra-frame prediction process on each of processing blocks to generate a predicted value of pixels of a prediction image, each of the processing blocks being the coding block or a sub-block obtained by dividing the coding block,

wherein, when an intra prediction parameter indicates a horizontal prediction process, and coordinates of a pixel at an upper left of said block are expressed as origin (0,0) and coordinates of each pixel for which a predicted value is calculated are expressed as (x,y),

when a size of the processing block is less than a predetermined size, the intra prediction unit adds a value to a signal value of a pixel at coordinates (-1, y) adjacent to left of the processing block and outputs the added value as the predicted value of a pixel at said

coordinates (x,y), the value being proportional to a value calculated by subtracting a signal value of a pixel at coordinates (-1,-1) from a signal value of a pixel at coordinates (x, -1) adjacent to top of the processing block, and

when the size of the processing block is greater than or equal to the predetermined size, said intra prediction unit outputs the signal value of the pixel at coordinates (-1, y) adjacent to left of said processing block as the predicted value of a pixel at said coordinates (x,y).

[3] A storage medium storing a data structure of encoded data encoded by carrying out a prediction process on each of processing blocks, each of the processing blocks being a coding block or a sub-block obtained by dividing the coding block,

wherein the encoded data comprises

a coding mode for the coding block,

an intra prediction parameter indicating an intra prediction mode used for carrying out an intra-frame prediction process on each of the processing blocks when the coding mode is an intra coding mode,

information defining a block size of each of the processing blocks, and

compressed data generated by carrying out a compression process on a difference image between an image of each of the processing blocks and each of the prediction images obtained by carrying out the prediction process on each of the processing blocks,

wherein, when the coding mode is an intra coding mode and the intra prediction parameter indicates a horizontal prediction process, and coordinates of a pixel at an upper left of said block are expressed as origin (0,0) and coordinates of each pixel for which a predicted value is calculated are expressed as (x,y),

when a size of the processing block is less than a predetermined size, a predicted value of pixels of the prediction image is obtained by adding a value to a signal value of a pixel at coordinates (-1, y) adjacent to left of the processing block and outputting the added value as the predicted value of pixels at said coordinates (x,y), the value being proportional to a value calculated by subtracting a signal value of a pixel at coordinates (-1,-1) from a signal value of a pixel at coordinates (x, -1) adjacent to top of the processing block, and

when the size of the processing block is greater than or equal to the predetermined size,

a predicted value of pixels of the prediction image is obtained by outputting the signal value of the pixel at coordinates (-1, y) adjacent to left of said processing block as the predicted value of a pixel at said coordinates (x,y).

[4] An image decoding method comprising an intra prediction processing step performed by an intra prediction unit, the intra prediction processing step including processes of,

when a coding mode for a coding block is an intra coding mode, carrying out an intra-frame prediction process on each of processing blocks to generate a predicted value of pixels of a prediction image, each of the processing blocks being the coding block or a sub-block obtained by dividing the coding block,

when an intra prediction parameter indicates a horizontal prediction process, and coordinates of a pixel at an upper left of said block are expressed as origin (0,0) and coordinates of each pixel for which a predicted value is calculated are expressed as (x,y),

when a size of the processing block is less than a predetermined size, adding a value to a signal value of a pixel at coordinates (-1, y) adjacent to left of the processing block and outputting the added value as the predicted value of a pixel at said coordinates (x,y), the value being proportional to a value calculated by subtracting a signal value of a pixel at coordinates (-1,-1) from a signal value of a pixel at coordinates (x, -1) adjacent to top of the processing block, and

when the size of the processing block is greater than or equal to the predetermined size, outputting the signal value of the pixel at coordinates (-1, y) adjacent to left of said processing block as the predicted value of a pixel at said coordinates (x,y).

[5] An image encoding method comprising an intra prediction processing step performed by an intra prediction unit, the intra prediction processing step including processes of,

when a coding mode for a coding block is an intra coding mode, carrying out an intra-frame prediction process on each of processing blocks to generate a predicted value of pixels of a prediction image, each of the processing blocks being the coding block or a sub-block obtained by dividing the coding block,

when an intra prediction parameter indicates a horizontal prediction process, and

coordinates of a pixel at an upper left of said block are expressed as origin (0,0) and coordinates of each pixel for which a predicted value is calculated are expressed as (x,y),

when a size of the processing block is less than a predetermined size, adding a value to a signal value of a pixel at coordinates (-1, y) adjacent to left of the processing block and outputting the added value as the predicted value of a pixel at said coordinates (x,y), the value being proportional to a value calculated by subtracting a signal value of a pixel at coordinates (-1,-1) from a signal value of a pixel at coordinates (x, -1) adjacent to top of the processing block, and

when the size of the processing block is greater than or equal to the predetermined size, outputting the signal value of the pixel at coordinates (-1, y) adjacent to left of said processing block as the predicted value of a pixel at said coordinates (x,y).