

[0008]

Further, with image compression technology, standardization is being studied for HEVC (High Efficiency Video Coding) which realizes even higher encoding efficiency than the H.264/AVC format. With this HDVC, basic units called coding units (CU: Coding Unit) which are extensions of the concept of macroblocks. In the event that each block illustrated in Fig. 2 is a coding unit, the decoding order is the order of blocks with numbers sequentially increasing from "0". In the event that the decoding order is not raster scan order in this way, moving from block "7" to block "8", for example, or from block "15" to block "16", may conceivably lead to a greater difference value since the spatial distance is great.

[0009]

~~Accordingly, it is an object-Embodiments~~ of the present ~~technology to invention~~ improve the encoding efficiency of quantization parameters.

Solution to Problem

[0010]

~~A first aspect of this technology-Disclosed herein is~~ an image decoding device, including: an information acquiring unit configured to take quantization parameters of decoded blocks spatially or temporally adjacent to a block to be decoded, as selection candidates, and extract, from stream information,

difference information indicating difference as to a prediction quantization parameter selected from the selection candidates; and a quantization parameter calculating unit configured to calculate, from the prediction quantization parameter and the difference information, a quantization parameter of the block to be decoded.

[0011]

With ~~this technology~~ the above device, difference information indicating difference as to a prediction quantization parameter selected from selection candidates, which are quantization parameters of decoded blocks spatially or temporally adjacent to a block to be decoded, is extracted from stream information. Also, with the image decoding device, at least blocks where quantization parameters are redundant or blocks where inverse quantization using quantization parameters is not performed are excluded from quantization parameters of decoded blocks spatially or temporally adjacent to the block to be decoded, and selection candidates are taken. For setting of the prediction quantization parameter, a quantization parameter is selected in an order indicated by identification information included in the stream information, with the adjacent decoded blocks in a predetermined order, for example. Alternatively, determination is performed of selection candidates in an

order set beforehand, and the prediction quantization parameter is set based on the determination result. Alternatively, one or the other is selected of processing of setting to the prediction quantization parameter a quantization parameter in an order indicated by identification information included in the stream information, and processing of determining selection candidates in an order set beforehand and setting the prediction quantization parameter, based on the determination result included in the stream information. Further, with the image decoding device, a quantization parameter of the block to be decoded is calculated by adding difference which the difference information indicates to the prediction quantization parameter. Further, in the event that there is no selection candidate, a quantization parameter of an initial value in a slice is taken as the prediction quantization parameter. Also, including a quantization parameter updated last in the selection candidates is also performed.

[0012]

~~A second aspect of this technology is Disclosed herein~~
is an image decoding method, including: a process of taking quantization parameters of decoded blocks spatially or temporally adjacent to a block to be decoded, as selection candidates, and extracting, from stream information, difference

information indicating difference as to a prediction quantization parameter selected from the selection candidates; and a process of calculating, from the prediction quantization parameter and the difference information, a quantization parameter of the block to be decoded.

~~A third aspect of the present technology is an image encoding device, including: a control unit configured to set a quantization parameter as to a block to be encoded; an information generating unit configured to take quantization parameters of encoded blocks spatially or temporally adjacent to a block to be encoded, as selection candidates, select from the selection candidates a prediction quantization parameter in accordance to the set quantization parameter, and generate difference information indicating difference between the prediction quantization parameter and the set quantization parameters; and an encoding unit configured to include the difference information in stream information generated by performing encoding processing of the block to be encoded, using the set quantization parameter.~~

According to a first aspect of the present invention,
there is provided an image encoding method, comprising:
obtaining, when a block adjacent to the left of a current
block and a block adjacent above the current block are

referenceable, a prediction quantization parameter derived from an average value of a quantization parameter of the block adjacent to the left and a quantization parameter of the block adjacent above; obtaining, when the block adjacent to the left and the block adjacent above are not referenceable, the prediction quantization parameter derived from a quantization parameter of a processing unit not adjacent to the current block; generating a difference information indicating a difference between the obtained prediction quantization parameter and a quantization parameter of the current block; and transmitting bit stream information including the difference information.

[0013]

With this technology the above device, at least blocks where quantization parameters are redundant or blocks where quantization using quantization parameters is not performed

the image encoding device, difference information indicating the difference between the prediction quantization parameter and the set quantization parameter is generated. Also, in the event that there is no selection candidate, difference information indicating difference between a quantization parameter of an initial value in a slice, and the set quantization parameters, is generated. Also, selection can be made between processing of setting a quantization parameter of which the difference as to the set quantization parameter is the smallest as the prediction quantization parameter, and processing of performing determination of selection candidates in an order set beforehand and selecting the prediction quantization parameter based on the determination result, and determination information indicating the selected processing is generated. The generated difference information, identification information, and determination information are included in stream information generated by performing encoding processing of the block to be encoded using the set quantization parameter.

[0014]

~~A fourth aspect of this technology is an image encoding method, including: a process of setting a quantization parameter as to a block to be encoded; a process of taking quantization parameters of encoded blocks spatially or temporally adjacent to a block to be encoded, as selection~~

~~candidates, selecting from the selection candidates a prediction quantization parameter in accordance to the set quantization parameter, and generating difference information indicating difference between the prediction quantization parameter and the set quantization parameters; and a process of including the difference information in stream information generated by performing encoding processing of the block to be encoded, using the set quantization parameter.~~

According to a second aspect of the present invention, there is provided an image encoding apparatus comprising: a circuitry configured to: obtain, when a block adjacent to the left of a current block and a block adjacent above the current block are referenceable, a prediction quantization parameter derived from an average value of a quantization parameter of the block adjacent to the left and a quantization parameter of the block adjacent above; obtain, when the block adjacent to the left and the block adjacent above are not referenceable, the prediction quantization parameter derived from a quantization parameter of a processing unit not adjacent to the current block; generate a difference information indicating a difference between the obtained prediction quantization parameter and a quantization parameter of the current block; and transmit bit stream information including the difference information.

Advantageous Effects of Invention

[0015]

According to ~~this technology~~ the above aspects, quantization parameters of encoded blocks spatially or temporally adjacent to a block to be encoded are taken as selection candidates, and a prediction quantization parameter is selected from the selection candidates in accordance with the quantization parameter set to the block to be encoded. Difference information indicating difference between the prediction quantization parameter and the quantization parameters set as to the block to be encoded is generated. Accordingly, the difference of quantization parameters can be prevented from becoming a great value, and encoding efficiency of quantization parameters can be improved.

[0016]

Also, in a case of decoding stream information where