[0007]

However, the quantization matrix adapted to quantization and inverse quantization differs according to the characteristics of each image included in a video. For this reason, the frequency of quantization matrix updates will rise if one attempts to encode video whose image characteristics change from moment to moment with optimal quantization matrices. In H.264/AVC, the quantization matrix is defined in the sequence parameter set (SPS) or the picture parameter set (PPS). Consequently, if the frequency of quantization matrix updates rises, the proportion of the encoded stream occupied by the SPS or the PPS will increase. This means that the encoding efficiency will decrease because of increased overhead. For HEVC, in which the quantization matrix size is further increased and in which several different quantization matrices may be defined for each picture, there is a risk that such decreases in the encoding efficiency accompanying the update of the quantization matrix may become even more significant.

[0008]

Consequently, it is desirable to provide a mechanism enabling moderation of the decrease in encoding efficiency accompanying the update of the quantization matrix.

Solution to Problem

[0009] According to a first aspect of the present invention, there is provided an image processing device comprising: ~~a decoding section configured to decode an encoded stream to generate quantized data; a setting section configured to set, according to a parameter indicating whether to copy another matrix, a quantization matrix to be used when inversely quantizing the quantized data generated by the decoding section; and an inverse quantization section configured to inversely quantize the quantized data generated by the decoding section using the quantization matrix set by the setting section~~ circuitry configured to decode an encoded stream to generate quantized data; set, according to a parameter indicating whether to use the same quantization matrix as a reference quantization matrix which is selected according to a type of the reference quantization matrix that includes a prediction mode and a size of the reference quantization matrix, a current quantization matrix; and inversely quantize the quantized data using the current quantization matrix.

[0009a] According to a second aspect of the present invention, there is provided an image processing method comprising: decoding an encoded stream to generate quantized data; setting, ~~according to a parameter indicating whether to copy another matrix, a quantization matrix to be used when inversely quantizing the generated quantized data; and inversely quantizing the generated quantized data using the set quantization matrix~~ according to a parameter indicating whether to use the same quantization matrix as a reference quantization matrix which is selected according to a type of the reference quantization matrix that includes a prediction mode and a size of the reference quantization matrix, a current quantization matrix; and inversely quantizing the generated quantized data using the current quantization matrix.

[0009b] According to a third aspect of the present invention, there is provided a non-transitory computer-readable recording medium for storing therein a computer program that includes instructions which when executed on an image processing device causes the image processing device to execute an image processing method comprising: decoding an encoded stream to generate quantized data; setting, according to a parameter indicating whether to use the same quantization matrix as a reference quantization matrix which is selected according to a type of the reference quantization matrix that includes a prediction mode and a size of the reference quantization matrix, a current quantization matrix; and inversely quantizing the generated quantized data using the current quantization matrix

~~[0009b]~~ [0009c]

According to an embodiment of the present disclosure, there is provided an image processing device including an acquiring section configured to acquire quantization matrix parameters from an encoded stream in which the quantization matrix parameters defining a quantization matrix are set within a parameter set which is different from a sequence parameter set and a picture parameter set, a setting section configured to set, based on the quantization matrix parameters acquired by the acquiring section, a quantization matrix which is used when inversely quantizing data decoded from the encoded stream, and an inverse quantization section configured to inversely quantize the data decoded from the encoded stream using the quantization matrix set by the setting section.

CLAIMS

1. An image processing device comprising:

circuitry configured to:

~~a decoding section configured to~~ decode an encoded stream to generate quantized data;

~~a setting section configured to~~ set, according to a parameter indicating whether to ~~copy another matrix, a quantization matrix to be used when inversely quantizing the quantized data generated by the decoding section~~ use the same quantization matrix as a reference quantization matrix which is selected according to a type of the reference quantization matrix that includes a prediction mode and a size of the reference quantization matrix, a current quantization matrix; and

~~an inverse quantization section configured to inversely quantize the quantized data generated by the decoding section using the quantization matrix set by the setting section~~ inversely quantize the quantized data using the current quantization matrix.

2. The image processing device according to claim 1, wherein the circuitry is configured to,

in a case where the parameter indicates that ~~another matrix is to be copied~~ the reference quantization matrix is to be used as the current quantization matrix, ~~the setting section sets~~ set the current quantization matrix by ~~copying the another matrix~~ using the same values as the values of the reference quantization matrix.

~~3. The image processing device according to claim 2, wherein~~

~~the setting section selects the another matrix to be copied according to identification information for identifying a copy source matrix.~~

~~4. The image processing device according to claim 3, wherein~~

~~the setting section selects the another matrix to be copied according to the identification information which is different for each size of the quantization matrix.~~

~~5~~3. The image processing device according to claim ~~3~~2, wherein

~~the setting section selects the another matrix to be copied according to the identification information that distinguishes~~ the reference quantization matrix is selected as the current quantization matrix from different ~~classes of~~ reference quantization matrices.

~~6~~4. The image processing device according to claim ~~5~~1, wherein

~~the identification information distinguishes different classes of quantization matrices by~~ the type of reference quantization matrix includes at least one combination of a prediction mode and a color component.

~~7. The image processing device according to claim 3, wherein~~

~~the setting section set a default matrix as the quantization matrix in a case where the identification information for identifying a copy source matrix is interpreted as indicating the quantization matrix itself which is to be set.~~

~~8. The image processing device according to claim 3, wherein~~

~~the identification information identifies one of the quantization matrices previously set by the setting section as a copy source matrix.~~

~~9~~5. The image processing device according to claim 1, wherein

the ~~decoding section~~ circuitry acquires the parameter from a picture parameter set of the encoded stream.

6. The image processing device according to claim 1, wherein the circuitry is further configured to separate a video stream and a voice stream from an input stream received by the image processing device.

7. The image processing device according to claim 1, wherein the circuitry is further configured to amplify a wireless signal received by the image processing device, apply frequency conversion to the received wireless signal to generate a reception signal, and demodulate the reception signal.

8. The image processing device according to claim 7, further comprising an antenna that receives a wireless signal.

9. The image processing device according to claim 8, further comprising a display unit that displays a series of images.

10. An image processing method comprising:

decoding an encoded stream to generate quantized data;

setting, according to a parameter indicating whether to ~~copy another matrix, a quantization matrix to be used when inversely quantizing the generated quantized data~~ use the same quantization matrix as a reference quantization matrix which is selected according to a type of the reference quantization matrix that includes a prediction mode and a size of the reference quantization matrix, a current quantization matrix; and

inversely quantizing the generated quantized data using the ~~set~~ current quantization matrix.

11. The image processing method according to claim 10, further comprising, in a case the parameter indicates that the reference quantization matrix is to be used as the current quantization matrix, setting the current quantization matrix by using the same values as the values of the reference quantization matrix.

12. The image processing method according to claim 11, further comprising selecting the reference quantization matrix as the current quantization matrix from different reference quantization matrices.

13. The image processing method according to claim 10, wherein
the type of the reference quantization matrix includes at least one combination of a prediction mode and a color component.

14. The image processing method according to claim 10, further comprising acquiring the parameter from a picture parameter set of the encoded stream.

15. A non-transitory computer-readable recording medium for storing therein a computer program that includes instructions which when executed on an image processing device causes the image processing device to execute an image processing method comprising:

decoding an encoded stream to generate quantized data;

setting, according to a parameter indicating whether to use the same quantization matrix as a reference quantization matrix which is selected according to a type of the reference quantization matrix that includes a prediction mode and a size of the reference quantization matrix, a current quantization matrix; and

inversely quantizing the generated quantized data using the current quantization matrix.