

[0019]

In the case of executing the dither or the error diffusion, flattening of the pixel values is reduced as illustrated on the right side of Fig. 23(c). As a result, expressing the gradation closer to the original 16-bit image data can be achieved as illustrated on the left side of Fig. 23(c). Thus, it can be grasped that dither and error diffusion are the methods to express the gradation with dot density.

10

CITATION LIST

PATENT DOCUMENT

[0020]

Patent Document 1: Japanese Patent Application

15 Laid-Open No. 2009-207113

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0021]

20 In an image transmitting/receiving system, banding suppression processing described above can be executed on a transmitting side, and also can be executed on a receiving side. In the case where banding suppression processing is executed on the transmitting side, the banding suppression processing is not necessary on the receiving side while in the case where the banding suppression processing is not executed on the transmitting side, the banding suppression processing is expected to be executed on the receiving side.

30 [0022]

~~The Embodiments of the present technology-~~
~~is invention~~ are directed to appropriately

executing the banding suppression processing on the receiving side.

SOLUTIONS TO PROBLEMS

5 [0023]

According to an first aspect of the present technology invention, there is provided a transmission device including comprising: a transmitting unit configured to transmit a container having a predetermined format and including a video stream including encoded image data; and an information inserting unit configured to insert information related to banding suppression processing for the image data into the video stream.

[0024]

15 According to the present technology embodiments of the present invention, the container having the predetermined format and including the video stream including the encoded image data is transmitted by the transmitting unit. For example, the transmitting unit may transmit the container having the predetermined format in response to a request from the receiving side. For example, the container may be a transport stream (MPEG-2 TS) adopted in the digital broadcasting standards. Further, for example, the container may be a container having a MP4 format used in the Internet delivery, or other formats.

[0025]

The information related to banding suppression processing for the image data is inserted into the video stream by the information inserting unit. For example, the information inserting unit may insert the information related to the banding suppression processing into the video stream per picture or per scene.

[0026]

For example, the information related to banding suppression processing may include information indicating whether the banding suppression processing has been
5 applied to the image data. Further, in this case, the information related to banding suppression processing may include information indicating a type of the banding suppression processing applied to the image data.

[0027]

10 Moreover, for example, the information related to the banding suppression processing may include information indicating whether the banding suppression processing should be applied to the image data. Furthermore, for example, the information related to the
15 banding suppression processing may include information indicating whether gradation number reducing processing has been applied to the image data. Further, in this case, the information related to the banding suppression processing may include information indicating a gradation
20 number before the gradation number reducing processing.

[0028]

Thus, according to ~~the present technology~~
embodiments of the present invention, the information
related to the banding suppression processing for the
25 image data is inserted into the video stream. Therefore, on the receiving side, the banding suppression processing can be appropriately executed based on the information related to the banding suppression processing. For
example, control can be made such that the banding
30 suppression processing is executed only in the case where the banding suppression processing has not been executed on the transmitting side. Further, for example, control

can be made such that the banding suppression processing is executed only to the image data that should be applied with the banding suppression processing.

[0029]

5 Meanwhile, according to ~~the present technology~~
embodiments of the present invention, an identifying
information inserting unit configured to insert, for
example, into a layer of the container, identifying
information indicating whether the information related to
10 the banding suppression processing is inserted into the
video stream. In this case, for example, the container
is a transport stream, and the identifying information
inserting unit may insert the identifying information
under a video elementary loop of a program map table
15 included in the transport stream. In this case, a
receiver can detect whether the information related to
the banding suppression processing is inserted into the
video stream without decoding the video stream, and can
appropriately extract the information.

20 [0029a]

According to a second aspect of the present
invention, there is provided a transmitting method,
comprising: transmitting a container having a
predetermined format and including a video stream
25 including encoded image data; and inserting information
related to banding suppression processing for the image
data into the video stream.

[0030]

30 ~~Further, according~~ According to a different third
aspect of the present technology invention, there is
provided a reception device includes comprising: a
receiving unit configured to receive a container having a

predetermined format and including a video stream, the video stream including encoded image data and inserted with information related to banding suppression processing for the image data; a decoding unit configured
5 to decode the video stream and obtain image data; a processing unit configured to apply banding suppression processing to the decoded image data; and a control unit configured to control the processing unit based on the information related to banding suppression processing,

inserted into the video stream.

[0031]

According to ~~the present technology~~ embodiments of the present invention, the container having the
5 predetermined format and including the video stream is received by the receiving unit. In this video stream, the encoded image data is included and further the information related to the banding suppression processing for the image data is inserted. The video stream is
10 decoded by the decoding unit, and decoded image data is obtained. The banding suppression processing is applied to the decoded image data by the processing unit. Further, the processing unit is controlled by the control unit based on the information related to the banding
15 suppression processing, inserted into the video stream.

[0032]

For example, the information related to the banding suppression processing includes information indicating whether the banding suppression processing should be
20 applied to the image data, and information indicating whether the banding suppression processing has been applied to the image data. The control unit may execute control such that the banding suppression processing is applied to the decoded image data in the control unit
25 when the image data is the image data to which the banding suppression processing should be applied and further the banding suppression processing has not been applied to the image data.

[0033]

30 Thus, according to ~~the present technology~~ embodiments of the present invention, the banding suppression processing for the decoded image data is controlled based on the information related to the

banding suppression processing for the image data, inserted into the video stream. Therefore, the banding suppression processing can be appropriately executed.

[0034]

5 ~~Further, according~~ According to another different a
 fourth aspect of the present technology invention, there
 is provided a reception device includes comprising: a
 receiving unit configured to receive a container having a
 predetermined format and including a video stream
10 including encoded image data; a decoding unit configured
 to decode the video stream and obtain image data; a
 processing unit configured to apply banding suppression
 processing to the decoded image data; and a control unit
 configured to control the processing unit such that
15 banding suppression processing is applied to the decoded
 image data when a gradation number that can be displayed
 on a display unit configured to display an image based on
 the decoded image data differs from a bit number of image
 data in the video stream.

20 [0035]

~~According to the present technology embodiments of~~
 the present invention, the container having the
 predetermined format and including the video stream
 including the encoded image data is received by the
25 receiving unit. The video stream is decoded by the
 decoding unit, and decoded image data is obtained. The
 banding suppression processing is applied to the decoded
 image data by the processing unit.

[0036]

30 Further, the processing unit is controlled by the
 control unit. In this case, control is made such that
 the banding suppression processing is applied to the
 decoded image data when the gradation number that can be

displayed on a display unit configured to display an image based on the decoded image data differs from the bit number of the image data in the video stream. With this configuration, the banding suppression processing is appropriately executed.

[0036a]

According to a fifth aspect of the present invention, there is provided a receiving method, comprising: receiving a container having a predetermined format and including a video stream, the video stream including encoded image data and inserted with information related to banding suppression processing for the image data; decoding the video stream to obtain image data; and applying banding suppression processing to the decoded image data based on the information related to banding suppression processing, inserted into the video stream.

EFFECTS OF THE INVENTION

[0037]

According to the present technology embodiments of the present invention, banding suppression processing can be appropriately executed on a receiving side.

BRIEF DESCRIPTION OF DRAWINGS

[0038]

Fig. 1 is a block diagram illustrating an exemplary configuration of an image transmitting/receiving system according to an embodiment.

Fig. 2 is a block diagram illustrating an exemplary transmission device constituting the image transmitting/receiving system.

Fig. 3 is a block diagram illustrating an exemplary configuration of a banding suppression processing unit constituting the transmission device.

5 Figs. 4(a) and 4(b) are diagrams for describing a picture processing SEI message inserted into a "SEIs" portion of an access unit.

Figs. 5(a) and 5(b) are diagrams illustrating an exemplary structure (Syntax) of the "picture processing SEI message".

10 Fig. 6 is a diagram illustrating an exemplary structure (Syntax) of "Picture processing_sei ()".