Non-Patent Document 1: Benjamin Bross, Woo-Jin Han, Jens-Rainer Ohm, Gary J. Sullivan, Thomas Wiegand, "High efficiency video coding (HEVC) text specification draft 7", JCTVC-I1003_d4, 2012.4.27-5.7

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0019]

However, the amount of information relating to the reference image specifying information such as the RPS is not sufficiently reduced.

[0020]

Embodiments of the present invention enable reduction of the amount of information relating to the information that specifies a reference image.

SOLUTIONS TO PROBLEMS

[0021]

~~According to a first aspect of the present invention, there is provided a decoding device comprising: a reception unit that receives reference information representing whether reference image specifying information specifying a reference image, which is used for generating a predicted image, of a prior image that is an image prior to a current coding image in coding order that is transmitted only in a case where the current coding image is an image other than a first image of a GOP (Group of Picture) is used as the reference image specifying information of the current coding image; a reference image setting unit that generates the reference image specifying information of a current decoding image based on the reference information in a case where the reference information is received by the reception unit and generates the reference image specifying information of the current decoding image based on reference information representing that the reference image specifying information of the prior image is not used as the reference image specifying information of the current coding image in a case where the~~

~~reference information is not received by the reception unit; and a predicted image generation unit that generates a predicted image by using the reference image that is specified by the reference image specifying information generated by the reference image setting unit.~~

According to a first aspect of the present invention, there is provided an information processing apparatus comprising: circuitry configured to: determine whether a current picture is an initial picture in a group of pictures or not, extract reference information indicating whether reference picture specification information for a preceding picture that precedes the current picture is to be used as the reference picture specification information for the current picture, according to whether the current picture is the initial picture in the group of pictures or not, wherein the reference picture specification information being information specifying a reference picture used to generate a prediction picture, in a case where the reference information is extracted, generate the reference picture specification information for the current picture in accordance with the reference information, and generate a prediction picture using the reference picture specified by the reference picture specification information generated.

[0022]

~~According to a second aspect of the present invention, there is provided a decoding method, the decoding method comprising, by a decoding device: a receiving step of receiving reference information representing whether reference image specifying information specifying a reference image, which is used for generating a predicted image, of a prior image that is an image prior to a current coding image in coding order that is transmitted only in a case where the current coding image is an image other than a first image of a GOP (Group of Picture) is used as the reference image specifying information of the current coding image; a reference image setting step of generating the reference image specifying information of a current decoding image based on the reference information in a case where the reference information is received in the process of the receiving step and generating the reference image specifying information of the current decoding image based on reference information representing that the reference image specifying information of~~

~~the prior image is not used as the reference image specifying information of the current coding image in a case where the reference information is not received in the process of the receiving step; and a predicted image generating step of generating a predicted image by using the reference image that is specified by the reference image specifying information generated in the process of the reference image setting step.~~

According to a second aspect of the present invention, there is provided an information processing method of an information processing apparatus comprising: determining, by circuitry of the information processing apparatus, whether a current picture is an initial picture in a group of pictures or not; extracting reference information indicating whether reference picture specification information for a preceding picture that precedes the current picture is to be used as the reference picture specification information for the current picture, according to whether the current picture is the initial picture in the group of pictures or not, wherein the reference picture specification information being information specifying a reference picture used to generate a prediction picture; in a case where the reference information is extracted, generating the reference picture specification information for the current picture in accordance with the reference information; and generating, by the circuitry of the information processing apparatus, a prediction picture using the reference picture specified by the reference picture specification information generated.

0023]

According to the above aspect of the present invention, reference information representing whether reference image specifying information specifying a reference image, which is used for generating a predicted image, of a prior image that is an image prior to a current coding image in coding order that is transmitted in a case where the current coding image is an image other than a first image of a GOP (Group of Picture) is used as the reference image specifying information of the current coding image is received. The reference image specifying information of a current decoding image is generated based on the reference information in a case where the reference information is received and the reference image specifying information of the current decoding image is generated based on reference information representing

CLAIMS

1.(Amended) A decoding device comprising:

a reception unit that receives reference information representing whether reference image specifying information specifying a reference image, which is used for generating a predicted image, of a prior image that is an image prior to a current coding image in coding order that is transmitted only in a case where the current coding image is an image other than a first image of a GOP (Group of Picture) is used as the reference image specifying information of the current coding image;

a reference image setting unit that generates the reference image specifying information of a current decoding image based on the reference information in a case where the reference information is received by the reception unit and generates the reference image specifying information of the current decoding image based on reference information representing that the reference image specifying information of the prior image is not used as the reference image specifying information of the current coding image in a case where the reference information is not received by the reception unit; and

a predicted image generation unit that generates a predicted image by using the reference image that is specified by the reference image specifying information generated by the reference image setting unit.

2. The decoding device according to claim 1,

wherein the reception unit receives prior image specifying information specifying the prior image in a case

where the reference information represents that the reference image specifying information of the prior image is used as the reference image specifying information of the current coding image, and

the reference image setting unit generates the reference image specifying information of the prior image that is specified by the prior image specifying information received by the reception unit as the reference image specifying information of the current decoding image.

3. The decoding device according to claim 2,

wherein the reception unit receives the reference image specifying information of the current coding image in a case where the reference information represents that the reference image specifying information of the prior image is not used as the reference image specifying information of the current coding image, and

the reference image setting unit generates the reference image specifying information received by the reception unit as the reference image specifying information of the current decoding image.

4. The decoding device according to claim 3,

wherein the reception unit receives a plurality of pieces of reference image information including the reference information and the prior image specifying information or the reference image specifying information and receives reference image information specifying information that specifies the reference image information of the current coding image, among the plurality of pieces of reference image information, that is transmitted in a case where the current coding image is

an image other than the first image of the GOP (Group of Picture), and

the reference image setting unit generates the reference image specifying information of the current decoding image based on the reference information included in the reference image information that is specified by the reference image specifying information received by the reception unit.

5. The decoding device according to claim 4,

wherein the reception unit receives reference image information for the first image that includes the reference image specifying information as the reference image information and receives the reference image information specifying information specifying the reference image information for the first image that is transmitted in a case where the current coding image is the first image of the GOP (Group of Picture), and

the reference image setting unit generates the reference image specifying information of the current decoding image based on the reference image specifying information included in the reference image information for the first image that is specified by the reference image information specifying information received by the reception unit.

6. (Amended) A decoding method, the decoding method comprising, by a decoding device:

a receiving step of receiving reference information representing whether reference image specifying information specifying a reference image, which is used for generating a predicted image, of a prior image that is an image prior to a current coding image in coding order that is transmitted

only in a case where the current coding image is an image other than a first image of a GOP (Group of Picture) is used as the reference image specifying information of the current coding image;

a reference image setting step of generating the reference image specifying information of a current decoding image based on the reference information in a case where the reference information is received in the process of the receiving step and generating the reference image specifying information of the current decoding image based on reference information representing that the reference image specifying information of the prior image is not used as the reference image specifying information of the current coding image in a case where the reference information is not received in the process of the receiving step; and

a predicted image generating step of generating a predicted image by using the reference image that is specified by the reference image specifying information generated in the process of the reference image setting step.

Claims

1. An information processing apparatus comprising:

circuitry configured to:

determine whether a current picture is an initial picture in a group of pictures or not,

extract reference information indicating whether reference picture specification information for a preceding picture that precedes the current picture is to be used as the reference picture specification information for the current picture, according to whether the current picture is the initial picture in the group of pictures or not, wherein the reference picture specification information being information specifying a reference picture used to generate a prediction picture,

in a case where the reference information is extracted, generate the reference picture specification information for the current picture in accordance with the reference information, and

generate a prediction picture using the reference picture specified by the reference picture specification information generated.

2. The information processing apparatus according to claim 1, wherein the circuitry is configured to:

extract preceding picture specification information specifying the preceding picture in a case where the reference information indicates that the reference picture specification information for the preceding picture is to be used as the reference picture specification information for the current picture, and

generate the reference picture specification information for the current picture, by using, as the reference picture specification information for the current picture, the reference

picture specification information for the preceding picture specified by the preceding picture specification information extracted.

3. The information processing apparatus according to claim 2, wherein the circuitry is configured to:

extract the reference picture specification information for the current picture in a case where the reference information indicates that the reference picture specification information for the preceding picture is not to be used as the reference picture specification information for the current picture, and

generate the reference picture specification information for the current picture, by using, as the reference picture specification information for the current picture, the reference picture specification information received.

4. The information processing apparatus according to claim 3, wherein the preceding picture specification information is expressed by a first value obtained by subtracting coding number of the preceding picture from the coding number of the current picture.

5. The information processing apparatus according to claim 4, wherein the preceding picture specification information is expressed by a second value obtained by subtracting 1 from the first value.

6. The information processing apparatus according to claim 5, wherein the circuitry is configured to:

extract the reference information and the preceding picture specification information in a short-term reference picture set.

7. The information processing apparatus according to claim 6, wherein the syntax is included in a sequence parameter set.

8. The information processing apparatus according to claim 7, wherein the syntax is included in a slice header.

9. The information processing apparatus according to claim 5, wherein the one syntax is included in a slice header and another syntax is included in a sequence parameter set.

10. The information processing apparatus according to claim 8, wherein the circuitry is configured to:

determine whether or not index i of the short-term reference picture set is equal to 0 to determine whether the current picture is a picture other than the initial picture in the group of pictures.

11. The information processing apparatus according to claim 10, wherein the circuitry is configured to:

increment the index i by 1 and to compare the index i with number of the short-term reference picture set.

12. The information processing apparatus according to claim 10, wherein the circuitry is configured to increment the index i by 1 and to compare the index i with number of the short-term reference picture set.

13. The information processing apparatus according to claim 1, wherein the information processing apparatus further comprising a tuner configured to select a desired channel using received broadcast wave signals and obtain an encoded bit stream through demodulation.

14. The information processing apparatus according to claim 1, wherein the information processing apparatus further comprising a demultiplexer configured to extract video and audio packets carrying a program to be viewed from an encoded bit stream, supply packets of electronic program guide (EPG) data to control circuitry, and descramble scrambled content.

15. The information processing apparatus according to claim 1, wherein the information processing apparatus further comprising video signal processing circuitry configured to

perform noise removal or reduction and video processing according to user settings on video data,

generate video data of a program to be displayed and video data for displaying a menu screen used for selection of an item, and

superimpose the generated video data for displaying the menu on the video data of the program.

16. The information processing apparatus according to claim 1, wherein the information processing apparatus further comprising display circuitry configured to drive a display device in accordance with a drive signal supplied from video signal processing circuitry.

17. The information processing apparatus according to claim 1, wherein the information processing apparatus further comprising an antenna to receive broadcast wave signals.

18. The information processing apparatus according to claim 1, wherein the information processing apparatus further comprising audio signal processing circuitry configured to perform noise removal or reduction on audio data, perform a D/A conversion

process and an amplification process on the audio data, and supply the audio data to a speaker.

19. An information processing method of an information processing apparatus comprising:

determining, by circuitry of the information processing apparatus, whether a current picture is an initial picture in a group of pictures or not;

extracting reference information indicating whether reference picture specification information for a preceding picture that precedes the current picture is to be used as the reference picture specification information for the current picture, according to whether the current picture is the initial picture in the group of pictures or not, wherein the reference picture specification information being information specifying a reference picture used to generate a prediction picture;

in a case where the reference information is extracted, generating the reference picture specification information for the current picture in accordance with the reference information; and

generating, by the circuitry of the information processing apparatus, a prediction picture using the reference picture specified by the reference picture specification information generated.

20. The information processing method according to claim 19, further comprising

extracting preceding picture specification information specifying the preceding picture in a case where the reference information indicates that the reference picture specification information for the preceding picture is to be used as the reference picture specification information for the current

picture, and

generating the reference picture specification information for the current picture, by using, as the reference picture specification information for the current picture, the reference picture specification information for the preceding picture specified by the preceding picture specification information extracted.

21. The information processing method according to claim 20, further comprising

extracting the reference picture specification information for the current picture in a case where the reference information indicates that the reference picture specification information for the preceding picture is not to be used as the reference picture specification information for the current picture, and

generating the reference picture specification information for the current picture, by using, as the reference picture specification information for the current picture, the reference picture specification information received.

22. The information processing method according to claim 21, wherein the preceding picture specification information is expressed by a first value obtained by subtracting coding number of the preceding picture from the coding number of the current picture.

23. The information processing method according to claim 22, wherein the preceding picture specification information is expressed by a second value obtained by subtracting 1 from the first value.

24. The information processing method according to claim 23, further comprising extracting the reference information and the preceding picture specification information in a short-term reference picture set.

25. The information processing method according to claim 24, wherein the syntax is included in a sequence parameter set.

26. The information processing method according to claim 25, wherein the syntax is included in a slice header.

27. The information processing method according to claim 23, wherein the one syntax is included in a slice header and another syntax is included in a sequence parameter set.

28. The information processing method according to claim 26, further comprising determining whether or not index i of the short-term reference picture set is equal to 0 to determine whether the current picture is a picture other than the initial picture in the group of pictures.

29. The information processing method according to claim 28, further comprising incrementing the index i by 1 and comparing the index i with number of the short-term reference picture set.

30. The information processing method according to claim 28, further comprising incrementing the index i by 1 and comparing the index i with number of the short-term reference picture set.