CLAIMS

1. A decoding method based on an adaptive intra refresh mechanism, the decoding method comprising:

receiving a bit stream of a current frame;

if there is extension data in the bit stream of the current frame and the extension data carries an adaptive intra refresh video extension identifier, ID, obtaining virtual boundary position information carried in the extension data, wherein the virtual boundary position information is for indicating a position of a virtual boundary, and the virtual boundary is at least for distinguishing a refreshed area from an unrefreshed area in the current frame; and determining whether the current frame supports an adaptive intra refresh technology based on the virtual boundary position information;

if the current frame supports the adaptive intra refresh technology, and a previous frame of the current frame in a decoding order does not support the adaptive intra refresh technology, determining that the current frame is a random access point;

if there is no adaptive intra refresh video extension ID in the extension data in the bit stream of the current frame, determining that the current frame does not support the adaptive intra refresh technology.

2. The decoding method according to claim 1, wherein the virtual boundary position information comprises first virtual boundary position information and second virtual boundary position information, and

wherein the first virtual boundary position information is for indicating a pixel position of the virtual boundary in a horizontal direction of the current frame, and the second virtual boundary position information is for indicating a pixel position of the virtual boundary in a vertical direction of the current frame.

3. The decoding method according to claim 2, wherein the first virtual boundary position information comprises an x-coordinate of the virtual boundary in the horizontal direction of the current frame, and the second virtual boundary position information comprises a y-coordinate of the virtual boundary in the vertical direction of the current frame; and

wherein the refreshed area refers to a rectangular area with coordinates (0, 0) of an upper left corner of a picture as an origin, a width being the x-coordinate, and a height being the y-coordinate, and the unrefreshed area refers to other areas in the current frame except the refreshed area.

4. The decoding method according to claim 2, wherein determining whether the current frame supports the adaptive intra refresh technology based on the virtual boundary position information comprises:

if a value of the first virtual boundary position information and a value of the second virtual boundary position information are both greater than 0, determining that the current frame supports the adaptive intra refresh technology;

if the value of the first virtual boundary position information is equal to 0 and/or the value of the second virtual boundary position information is equal to 0, determining that the current frame does not support the adaptive intra refresh technology.

5. The decoding method according to claim 2, wherein the previous frame does not support the adaptive intra refresh technology, comprises:

there is no adaptive intra refresh video extension ID in extension data of the previous frame; or

there is the adaptive intra refresh video extension ID in the extension data of the previous frame, and a value of first virtual boundary position information of the previous frame is equal to 0 and/or a value of second virtual boundary position information of the previous frame is equal to 0.

6. The decoding method according to claim 2, further comprising:

if it is determined that the current frame supports the adaptive intra refresh technology, and it is determined that the pixel position of the virtual boundary is equal to or exceeds a right boundary of the current frame based on the first virtual boundary position information of the current frame, and that the pixel position of the virtual boundary is equal to or exceeds a lower boundary of the current frame based on the second virtual boundary position

information of the current frame, determining that the current frame is a recovery point of random access.

7. The decoding method according to claim 2, wherein

an accuracy of the first virtual boundary position information is a width of a Largest Coding Unit, LCU, and an accuracy of the second virtual boundary position information is a height of the LCU.

8. An encoding method based on an adaptive intra refresh mechanism, the encoding method comprising:

determining whether a current frame supports an adaptive intra refresh technology;

if the current frame supports the adaptive intra refresh technology, carrying an adaptive intra refresh video extension identifier, ID, and virtual boundary position information of the current frame in extension data of the current frame, wherein the virtual boundary position information is for indicating a position of a virtual boundary, and the virtual boundary is at least for distinguishing a refreshed area from an unrefreshed area in the current frame;

if the current frame does not support the adaptive intra refresh technology, carrying no adaptive intra refresh video extension ID in the extension data of the current frame;

wherein if the current frame is a random access point, determining that the current frame supports the adaptive intra refresh technology, and that a previous frame of the current frame in an encoding order does not support the adaptive intra refresh technology.

9. The encoding method according to claim 8, wherein the virtual boundary position information comprises first virtual boundary position information and second virtual boundary position information, and

wherein the first virtual boundary position information is for indicating a pixel position of the virtual boundary in a horizontal direction of the current frame, and the second virtual boundary position information is for indicating a pixel position of the virtual boundary in a vertical direction of the current frame.

10. The encoding method according to claim 9, wherein the first virtual boundary position information comprises an x-coordinate of the virtual boundary in the horizontal direction of the current frame, and the second virtual boundary position information comprises a y-coordinate of the virtual boundary in the vertical direction of the current frame; and

wherein the refreshed area refers to a rectangular area with coordinates (0, 0) of an upper left corner of a picture as an origin, a width being the x-coordinate, and a height being the y-coordinate, and the unrefreshed area refers to other areas in the current frame except the refreshed area.

11. The encoding method according to claim 9, wherein

if the current frame does not support the adaptive intra refresh technology, the adaptive intra refresh video extension ID is carried in the extension data of the current frame, and a value of the first virtual boundary position information carried in the extension data of the current frame is equal to 0 and/or a value of the second virtual boundary position information carried in the extension data of the current frame is equal to 0.

12. The encoding method according to claim 9, wherein

if the current frame supports the adaptive intra refresh technology, the value of the first virtual boundary position information and the value of the second virtual boundary position information carried in the extension data of the current frame are both greater than 0.

13. The encoding method according to claim 9, further comprising:

if the current frame is a recovery point of random access, determining that the current frame supports the adaptive intra refresh technology, and that the pixel position of the virtual boundary indicated by the first virtual boundary position information is equal to or exceeds a right boundary of the current frame, and the pixel position of the virtual boundary indicated by the second virtual boundary position information is equal to or exceeds a lower boundary of the current frame.

14. The encoding method according to claim 9, wherein

an accuracy of the first virtual boundary position information is a width of a Largest Coding Unit, LCU, and an accuracy of the second virtual boundary position information is a height of the LCU.

15. A decoding apparatus, comprising:

a receiving module, configured to receive a bit stream of a current frame; and

a processing module, configured to,

if there is extension data in the bit stream of the current frame and the extension data carries an adaptive intra refresh video extension identifier, ID, obtain virtual boundary position information carried in the extension data, wherein the virtual boundary position information is for indicating a position of a virtual boundary, and the virtual boundary is at least for distinguishing a refreshed area from an unrefreshed area in the current frame;

the processing module is further configured to,

determine whether the current frame supports an adaptive intra refresh technology based on the virtual boundary position information; and if the current frame supports the adaptive intra refresh technology, and a previous frame of the current frame in a decoding order does not support the adaptive intra refresh technology, determine that the current frame is a random access point;

the processing module is further configured to,

if there is no adaptive intra refresh video extension ID in the extension data in the bit stream of the current frame, determine that the current frame does not support the adaptive intra refresh technology.

16. An encoding apparatus, comprising:

an encoding module, configured to determine whether a current frame supports an adaptive intra refresh technology;

the encoding module is further configured to,

if the current frame supports the adaptive intra refresh technology, carry an

adaptive intra refresh video extension identifier, ID, and virtual boundary position information of the current frame in extension data of the current frame, wherein the virtual boundary position information is for indicating a position of a virtual boundary, and the virtual boundary is at least for distinguishing a refreshed area from an unrefreshed area in the current frame; wherein if the current frame is a random access point, determine that the current frame supports the adaptive intra refresh technology, and that a previous frame of the current frame in an encoding order does not support the adaptive intra refresh technology;

the encoding module is further configured to,

if the current frame does not support the adaptive intra refresh technology, carry no the adaptive intra refresh video extension ID in the extension data of the current frame.

17. A decoding device, comprising:

a processor; and

a memory configured to store instructions executable by the processor,

wherein the processor is configured to perform the steps of the decoding method according to any one of claims 1 to 7.

18. An encoding device, comprising:

a processor; and

a memory configured to store instructions executable by the processor,

wherein the processor is configured to perform the steps of the encoding method according to any one of claims 8 to 14.

19. A computer-readable storage medium storing instructions that, when executed by a processor, implement the steps of the decoding method according to any one of claims 1 to 7 or the steps of the encoding method according to any one of claims 8 to 14.