CLAIMS

What is claimed is:

1. A method for dividing a group of pictures based on scene switching, comprising:

determining whether a scene switching frame is present in a current group of pictures of received video data, wherein the current group of pictures comprises a specified number of video frames;

in response to at least two scene switching frames being present in the current group of pictures, determining whether a last video frame of the current group of pictures is the scene switching frame;

in response to the last video frame of the current group of pictures being one of the at least two scene switching frames, determining the first scene switching frame from front to back of the current group of pictures as a target scene switching frame of the current group of pictures;

in response to the last video frame of the current group of pictures not being one of the at least two scene switching frames, acquiring the target scene switching frame by traversing the at least two scene switching frames in the current group of pictures from back to front;

determining a previous video frame adjacent to the target scene switching frame as the last video frame of the current group of pictures; and

determining the specified number of video frames that follow the target scene switching frame and comprise the target scene switching frame as a next group of pictures, encoding the target scene switching frame as a key frame of the next group of pictures, determining the next group of pictures as the current group of pictures, and returning to the step of determining whether a scene switching frame is present in a current group of pictures of received video data, wherein each group of pictures comprises only one key frame.

2. The method according to claim 1, further comprising:

upon determining the target scene switching frame, determining video frames in the current group of pictures except for the target scene switching frame as non-scene switching frames.

3. The method according to claim 1, wherein prior to determining whether the scene switching frame is present in the current group of pictures of the received video data, the method further comprises:

performing a scene switching detection operation on the current group of pictures of the received video data; and

in a case that the scene switching frame is detected to be present in the current group of pictures, generating a scene switching marker for the current group of pictures.

4. The method according to claim 3, wherein performing the scene switching detection operation on the current group of pictures of the received video data comprises:

traversing video frames following the first video frame from front to back in the current group of pictures;

during traversing the video frames, determining whether a current video frame is the scene switching frame relative to the first video frame in the current group of pictures; and

in response to the current video frame being the scene switching frame relative to the first video frame in the current group of pictures, in a case that the current video frame is the scene switching frame relative to a previous video frame adjacent to the current video frame, marking the current video frame as the scene switching frame; in response to the current video frame being not the scene switching frame relative to the first video frame in the current group of pictures, determining video frames between the current video frame and the first video frame as non-scene switching frames;

in response to the current video frame not being the scene switching frame relative to the first video frame in the current group of pictures, in a case that the current video frame is the scene switching frame relative to a previous video frame adjacent to the current video frame, determining video frames between the current video frame and the first video frame as non-scene switching frames.

5. The method according to claim 4, wherein performing the scene switching detection operation on the current group of pictures of the received video data further comprises:

in a case that the current video frame is marked as the scene switching frame:

calculating a first intra-frame prediction cost of the current video frame and an $(n-1)^{th}$ video frame, wherein n is a position at which the current video frame is in the current group of pictures;

calculating a second intra-frame prediction cost of the $(n-1)^{th}$ video frame and an $(n-2)^{th}$ video frame;

calculating a difference between the first intra-frame prediction cost and the second intra-frame prediction cost; and

in a case that a ratio of the difference to the second intra-frame prediction cost is greater than a predefined threshold, keeping the current video frame being marked as the scene switching frame;

in a case that the ratio of the difference to the second intra-frame prediction cost is less than the predefined threshold, determining the current video frame as the non-scene switching frame,

wherein the intra-frame prediction cost is a residual acquired by subtracting an original value from a prediction value, after the prediction value is generated using encoded pixels in adjacent pictures.

6. The method according to any one of claims 1 to 5, wherein determining whether the scene switching frame is present in the current group of pictures of the received video data comprises:

determining whether the scene switching marker is present in the current group of pictures of the received video data;

in response to the scene switching marker being present in the current group of pictures of the received video data, determining that at least two scene switching frames are present in the current group of pictures;

in response to the scene switching marker not being present in the current group of pictures of the received video data, determining that the scene switching frame is not present in the current group of pictures.

7. The method according to any one of claims 1 to 5, wherein upon determining whether the scene switching frame is present in the current group of pictures of the received video data, the method further comprises:

in a case that the scene switching frame is not present in the current group of pictures, determining a next group of pictures as the current group of pictures, and returning to the step of determining whether a scene switching frame is present in a current group of pictures of received video data.

8. The method according to any one of claims 1 to 5, wherein acquiring the target scene switching frame by traversing the at least two scene switching frames in the current group of pictures from back to front comprises:

traversing the at least two scene switching frames in the current group of pictures from back to front;

with respect to a current scene switching frame, determining whether a next video frame adjacent to the current scene switching frame, relative to a previous video frame adjacent to the current scene switching frame, constitutes scene switching;

in response to the next video frame adjacent to the current scene switching frame, relative to the previous video frame adjacent to the current scene switching frame, constituting the scene switching, determining the current scene switching frame as the target scene switching frame; and

determining video frames in the current group of pictures except for the current scene switching frame as the non-scene switching frames.

9. The method according to claim 8, wherein determining the current scene switching frame as the target scene switching frame comprises:

calculating a number of video frames between the current scene switching frame and a last video frame of the video data; and

in a case that the number of video frames is less than a predefined number, determining the current scene switching frame as the non-scene switching frame.

10. The method according to any one of claims 1 to 5, wherein prior to determining the first scene switching frame of the current group of pictures as the target scene switching frame of the current group of pictures, the method further comprises:

calculating a number of video frames between the first scene switching frame and a last video frame of the video data; and

in a case that the number of video frames is less than a predefined number, determining the first scene switching frame as the non-scene switching frame.

11. The method according to any of claims 1 to 5, wherein prior to determining whether the last video frame of the current group of pictures is the scene switching frame, the method further comprises:

in a case that the at least two scene switching frames are present in the current group of pictures, determining whether a previous group of pictures is re-divided, wherein the previous group of pictures is a received group of pictures prior to receiving the current group of pictures;

in response to the previous group of pictures being re-divided, not re-dividing the current group of pictures, and receiving a next group of pictures of the current group of pictures as the current group of pictures, and returning to the step of determining whether a scene switching frame is present in a current group of pictures of received video data;

in response to the previous group of pictures being not re-divided, in a case that the scene switching frame is present in the previous group of pictures, not re-dividing the current group of pictures, and receiving the next group of pictures of the current group of pictures as the current

group of pictures, and returning to the step of determining whether a scene switching frame is present in a current group of pictures of received video data; and

in a case that the scene switching frame is not present in the previous group of pictures, returning to the step of determining whether a last video frame of the current group of pictures is the scene switching frame.

12. A method for encoding a video, comprising:

receiving video data;

dividing the video data into a plurality of groups of pictures; and

encoding a first video frame in each of the groups of pictures as a key frame;

wherein the plurality of groups of pictures are divided according to the method for dividing the group of pictures based on scene switching as defined in any one of claims 1 to 11.

13. An apparatus for dividing a group of pictures based on scene switching, comprising:

a first determining module, configured to determine whether a scene switching frame is present in a current group of pictures of received video data, wherein the current group of pictures comprises a specified number of video frames;

a second determining module, configured to, in response to at least two scene switching frames being present in the current group of pictures, determine whether a last video frame of the current group of pictures is one of the at least two scene switching frames;

a first target scene switching frame determining module, configured to, in response to the last video frame of the current group of pictures being one of the at least two scene switching frames, determine the first scene switching frame from front to back of the current group of pictures as a target scene switching frame of the current group of pictures;

a second target scene switching frame determining module, configured to, in response to the last video frame of the current group of pictures being not one of the at least two scene switching frames, acquire the target scene switching frame by traversing the at least two scene switching frames in the current group of pictures from back to front;

a current group of pictures re-dividing module, configured to determine a previous video frame adjacent to the target scene switching frame as the last video frame of the current group of pictures; and

a next group of pictures determining module, configured to determine the specified number of video frames that follow the target scene switching frame and comprise the target scene switching frame as a next group of pictures, encode the target scene switching frame as a key frame

of the next group of pictures, determine the next group of pictures as the current group of pictures, and return to the first determining module, wherein each group of pictures comprises only one key frame.

14. An apparatus for encoding a video, comprising:

a video data receiving module, configured to receive video data;

a group of pictures dividing module, configured to divide the video data into a plurality of groups of pictures; and

an encoding module, configured to encode the first video frame from front to back of each of the groups of pictures as a key frame;

wherein the plurality of groups of pictures are divided according to the method for dividing the group of pictures based on scene switching as defined in any one of claims 1 to 11.

15. An electronic device, comprising:

at least one processor; and

a memory, configured to store at least one program;

wherein the at least one program, when loaded and run by the at least one processor, causes the at least one processor to perform at least one of: the method for dividing the group of pictures based on scene switching as defined in any one of claims 1 to 11, and the method for encoding the video as defined in claim 12.

16. A computer-readable storage medium, storing one or more computer programs, wherein the one or more computer programs, when loaded and run by a processor, cause the processor to perform at least one of: the method for dividing the group of pictures based on scene switching as defined in any one of claims 1 to 11, and the method for encoding the video as defined in claim 12.