

CLAIMS

1. A method of processing a file including fisheye video data, the method comprising: processing a file including fisheye video data, the file including a syntax structure including a plurality of syntax elements that specify attributes of the fisheye video data, wherein the plurality of syntax elements include one or more bits that indicate fisheye video type information, and wherein the fisheye video type information includes an indication that the fisheye video data is monoscopic fisheye video data or an indication that the fisheye video data is stereoscopic fisheye video data, an indication of whether images of the stereoscopic fisheye video data are in a left view or a right view, an indication of a number of circular images of the fisheye video data, an indication of a horizontal coordinate of a center of a particular circular image of the fisheye video data, and an indication of a vertical coordinate of a center of the particular circular image of the fisheye video data; determining, based on the one or more bits of the syntax structure, the fisheye video type information for the fisheye video data; and outputting, based on the determination, the fisheye video data for rendering.
2. The method of claim 1, wherein the syntax structure is an Omnidirectional MediA Format FisheyeOmnidirectionalVideoInfo() syntax structure, and wherein the one or more bits are two bits of an initial 24 reserved bits in the FisheyeOmnidirectionalVideoInfo() syntax structure.
3. The method of claim 2, wherein the one or more bits are a view_dimension_idc syntax element, wherein a value of 0 for the view_dimension_idc syntax element indicates the fisheye video data is stereoscopic fisheye video data, and wherein a value of 1 for the view_dimension_idc syntax element indicates the fisheye video data is monoscopic fisheye video data.
4. The method of claim 3, wherein a value of 2 for the view_dimension_idc syntax element indicates the fisheye video data is neither monoscopic fisheye video data nor stereoscopic fisheye video data.
5. The method of claim 1, wherein the fisheye video data is stereoscopic fisheye video data, and

wherein the syntax structure further includes one or more flags indicating whether images of the stereoscopic fisheye video data are in a left view or a right view.

6. The method of claim 5, wherein the one or more flags include a `left_view_flag`, wherein a value of 1 for the `left_view_flag` indicates a particular one of the images is in the left view, and wherein a value of 0 for the `left_view_flag` indicates a particular one of the images is in the right view.

7. The method of claim 5, further comprising: determining, based on the one or more flags of the syntax structure, whether images of the stereoscopic fisheye video data are in the left view or the right view; and outputting, based on the determination, the stereoscopic fisheye video data for rendering.

8. An apparatus configured to process a file including video data, the apparatus comprising: a memory configured to store the file; and one or more processors in communication with the memory, the one or more processors configured to: process the file including fisheye video data, the file including a syntax structure including a plurality of syntax elements that specify attributes of the fisheye video data, wherein the plurality of syntax elements include one or more bits that indicate fisheye video type information, and wherein the fisheye video type information includes an indication that the fisheye video data is monoscopic fisheye video data or an indication that the fisheye video data is stereoscopic fisheye video data, an indication of whether images of the stereoscopic fisheye video data are in a left view or a right view, an indication of a number of circular images of the fisheye video data, an indication of a horizontal coordinate of a center of a particular circular image of the fisheye video data, and an indication of a vertical coordinate of a center of the particular circular image of the fisheye video data; determine, based on the one or more bits of the syntax structure, the fisheye video type information for the fisheye video data; and output, based on the determination, the fisheye video data for rendering.

9. The apparatus of claim 8, wherein the syntax structure is an Omnidirectional Media Format `FisheyeOmnidirectionalVideoInfo( )` syntax structure, and wherein the one or more bits are two bits of an initial 24 reserved bits in the `FisheyeOmnidirectionalVideoInfo( )` syntax structure.

10. The apparatus of claim 9, wherein the one or more bits are a view_dimension_idc syntax element, wherein a value of 0 for the view_dimension_idc syntax element indicates the fisheye video data is stereoscopic fisheye video data, and wherein a value of 1 for the view_dimension_idc syntax element indicates the fisheye video data is monoscopic fisheye video data.

11. The apparatus of claim 10, wherein a value of 2 for the view_dimension_idc syntax element indicates the fisheye video data is neither monoscopic fisheye video data nor stereoscopic fisheye video data.

12. The apparatus of claim 8, wherein the fisheye video data is stereoscopic fisheye video data, and wherein the syntax structure further includes one or more flags indicating whether images of the stereoscopic fisheye video data are in a left view or a right view.

13. The apparatus of claim 12, wherein the one or more flags include a left_view_flag, wherein a value of 1 for the left_view_flag indicates a particular one of the images is in the left view, and wherein a value of 0 for the left_view_flag indicates a particular one of the images is in the right view.

14. The apparatus of claim 12, wherein the one more processors are further configured to: determine, based on the one or more flags of the syntax structure, whether images of the stereoscopic fisheye video data are in the left view or the right view; and output, based on the determination, the stereoscopic fisheye video data for rendering.

15. An apparatus configured to process a file including video data, the apparatus comprising: means for processing a file including fisheye video data, the file including a syntax structure including a plurality of syntax elements that specify attributes of the fisheye video data, wherein the plurality of syntax elements include one or more bits that indicate fisheye video type information, and wherein the fisheye video type information includes an indication that the fisheye video data is monoscopic fisheye video data or an indication that the fisheye video data is

stereoscopic fisheye video data, an indication of whether images of the stereoscopic fisheye video data are in a left view or a right view, an indication of a number of circular images of the fisheye video data, an indication of a horizontal coordinate of a center of a particular circular image of the fisheye video data, and an indication of a vertical coordinate of a center of the particular circular image of the fisheye video data; means for determining, based on the one or more bits of the syntax structure, the fisheye video type information for the fisheye video data; and means for outputting, based on the determination, the fisheye video data for rendering.

16. A non-transitory computer-readable storage medium storing instructions that, when executed, cause one or more processors to: process a file including fisheye video data, the file including a syntax structure including a plurality of syntax elements that specify attributes of the fisheye video data, wherein the plurality of syntax elements include one or more bits that indicate fisheye video type information, and wherein the fisheye video type information includes an indication that the fisheye video data is monoscopic fisheye video data or an indication that the fisheye video data is stereoscopic fisheye video data, an indication of whether images of the stereoscopic fisheye video data are in a left view or a right view, an indication of a number of circular images of the fisheye video data, an indication of a horizontal coordinate of a center of a particular circular image of the fisheye video data, and an indication of a vertical coordinate of a center of the particular circular image of the fisheye video data; determine, based on the one or more bits of the syntax structure, the fisheye video type information for the fisheye video data; and output, based on the determination, the fisheye video data for rendering.

17. A method of generating a file including video data, the method comprising: receiving fisheye video data; generating a file including the fisheye video data, the file including a syntax structure including a plurality of syntax elements that specify attributes of the fisheye video data, wherein the plurality of syntax elements include one or more bits that indicate fisheye video type information, and wherein the fisheye video type information includes an indication that the fisheye video data is monoscopic fisheye video data or an indication that the fisheye video data is stereoscopic fisheye video data, an indication of whether images of the stereoscopic fisheye video data are in a left view or a right view, an indication of a number of circular images of the fisheye video data, an indication of a horizontal coordinate of a center of a particular circular

image of the fisheye video data, and an indication of a vertical coordinate of a center of the particular circular image of the fisheye video data; and outputting the file.

18. The method of claim 17, wherein the syntax structure is an Omnidirectional Media Format FisheyeOmnidirectionalVideoInfo() syntax structure, and wherein the one or more bits are two bits of an initial 24 reserved bits in the FisheyeOmnidirectionalVideoInfo() syntax structure.

19. The method of claim 18, wherein the one or more bits are a view_dimension_idc syntax element, wherein a value of 0 for the view_dimension_idc syntax element indicates the fisheye video data is stereoscopic fisheye video data, and wherein a value of 1 for the view_dimension_idc syntax element indicates the fisheye video data is monoscopic fisheye video data.

20. The method of claim 19, wherein a value of 2 for the view_dimension_idc syntax element indicates the fisheye video data is neither monoscopic fisheye video data nor stereoscopic fisheye video data.

21. The method of claim 17, wherein the fisheye video data is stereoscopic fisheye video data, and wherein the syntax structure further includes one or more flags indicating whether images of the stereoscopic fisheye video data are in a left view or a right view.

22. The method of claim 21, wherein the one or more flags include a left_view_flag, wherein a value of 1 for the left_view_flag indicates a particular one of the images is in the left view, and wherein a value of 0 for the left_view_flag indicates a particular one of the images is in the right view.

23. An apparatus configured to generate a file including video data, the apparatus comprising: a memory configured to store the file; and one or more processors in communication with the memory, the one or more processors configured to: receive fisheye video data; generate the file including the fisheye video data, the file including a syntax structure including a plurality of syntax elements that specify attributes of the fisheye video data, wherein the plurality of syntax

elements include one or more bits that indicate fisheye video type information, and wherein the fisheye video type information includes an indication that the fisheye video data is monoscopic fisheye video data or an indication that the fisheye video data is stereoscopic fisheye video data, an indication of whether images of the stereoscopic fisheye video data are in a left view or a right view, an indication of a number of circular images of the fisheye video data, an indication of a horizontal coordinate of a center of a particular circular image of the fisheye video data, and an indication of a vertical coordinate of a center of the particular circular image of the fisheye video data; and output the file.

24. The apparatus of claim 23, wherein the syntax structure is an Omnidirectional Media Format FisheyeOmnidirectionalVideoInfo() syntax structure, and wherein the one or more bits are two bits of an initial 24 reserved bits in the FisheyeOmnidirectionalVideoInfo() syntax structure.

25. The apparatus of claim 24, wherein the one or more bits are a view_dimension_idc syntax element, wherein a value of 0 for the view_dimension_idc syntax element indicates the fisheye video data is stereoscopic fisheye video data, and wherein a value of 1 for the view_dimension_idc syntax element indicates the fisheye video data is monoscopic fisheye video data.

26. The apparatus of claim 25, wherein a value of 2 for the view_dimension_idc syntax element indicates the fisheye video data is neither monoscopic fisheye video data nor stereoscopic fisheye video data.

27. The apparatus of claim 23, wherein the fisheye video data is stereoscopic fisheye video data, and wherein the syntax structure further includes one or more flags indicating whether images of the stereoscopic fisheye video data are in a left view or a right view.

28. The apparatus of claim 27, wherein the one or more flags include a left_view_flag, wherein a value of 1 for the left_view_flag indicates a particular one of the images is in the left view, and wherein a value of 0 for the left_view_flag indicates a particular one of the images is in the right view.

29. An apparatus configured to generate a file including video data, the apparatus comprising: means for receiving fisheye video data; means for generating a file including the fisheye video data, the file including a syntax structure including a plurality of syntax elements that specify attributes of the fisheye video data, wherein the plurality of syntax elements include one or more bits that indicate fisheye video type information, and wherein the fisheye video type information includes an indication that the fisheye video data is monoscopic fisheye video data or an indication that the fisheye video data is stereoscopic fisheye video data, an indication of whether images of the stereoscopic fisheye video data are in a left view or a right view, an indication of a number of circular images of the fisheye video data, an indication of a horizontal coordinate of a center of a particular circular image of the fisheye video data, and an indication of a vertical coordinate of a center of the particular circular image of the fisheye video data; and means for outputting the file.

30. A non-transitory computer-readable storage medium storing instructions that, when executed, cause one or more processors to: receive fisheye video data; generate a file including the fisheye video data, the file including a syntax structure including a plurality of syntax elements that specify attributes of the fisheye video data, wherein the plurality of syntax elements include one or more bits that indicate fisheye video type information, and wherein the fisheye video type information includes an indication that the fisheye video data is monoscopic fisheye video data or an indication that the fisheye video data is stereoscopic fisheye video data, an indication of whether images of the stereoscopic fisheye video data are in a left view or a right view, an indication of a number of circular images of the fisheye video data, an indication of a horizontal coordinate of a center of a particular circular image of the fisheye video data, and an indication of a vertical coordinate of a center of the particular circular image of the fisheye video data; and output the file.