

CLAIMS

1. A method for constructing a projection image, comprising:

performing projection of an equirectangular panoramic image with a cylindrical surface equal-area projection model to obtain a cylindrical surface equal-area projection image;

obtaining a two-dimensional coordinate of each pixel in the cylindrical surface equal-area projection image;

performing coordinate transformation on the obtained two-dimensional coordinate of each pixel in the cylindrical surface equal-area projection image to obtain a two-dimensional coordinate in the equirectangular panoramic image corresponding to each pixel in the cylindrical surface equal-area projection image;

performing pixel interpolation on the cylindrical surface equal-area projection image, based on color information of each pixel in the equirectangular panoramic image and the obtained two-dimensional coordinate in the equirectangular panoramic image corresponding to each pixel in the cylindrical surface equal-area projection image, to generate a panoramic image subjected to the cylindrical surface equal-area projection transformation.

2. The method of claim 1, wherein performing coordinate transformation on the two-dimensional coordinate of each pixel in the cylindrical surface equal-area projection image to obtain a two-dimensional coordinate in the equirectangular panoramic image corresponding to each pixel in the cylindrical surface equal-area projection image, comprises:

performing the coordinate transformation, by using a formula
$$\begin{cases} x = ((2 * u / (n - 1) - 1) * \pi + \pi) * (n - 1) / (2 * \pi) \\ y = (m - 1) - \arcsin((1 - 2 * v / (m - 1)) + \pi / 2) * (m - 1) / \pi \end{cases}$$
, on the obtained two-dimensional coordinate of each pixel in the cylindrical surface equal-area projection image to obtain the two-dimensional coordinate in the equirectangular panoramic image corresponding to each pixel in the cylindrical surface equal-area projection image;

wherein, x denotes an abscissa of a two-dimensional coordinate of a pixel in the equirectangular panoramic image, y denotes an ordinate of the two-dimensional coordinate of the pixel in the equirectangular panoramic image, u denotes an abscissa of the pixel in the cylindrical surface equal-area projection image, v denotes an ordinate of the pixel in the cylindrical surface equal-area projection image, m and n denote a height and a width of the equirectangular panoramic image, respectively, and π denotes the PI.

3. The method of claim 1, wherein performing pixel interpolation on the cylindrical surface equal-area projection image, based on color information of each pixel in the equirectangular panoramic image and the obtained two-dimensional coordinate in the equirectangular panoramic image corresponding to each pixel in the cylindrical surface equal-area projection image, to generate a panoramic image subjected to the cylindrical surface equal-area projection transformation, comprises:

performing the pixel interpolation on the cylindrical surface equal-area projection image, by using a bilinear interpolation algorithm, based on the color information of each pixel in the equirectangular panoramic image and the obtained two-dimensional coordinate in the equirectangular panoramic image corresponding to each pixel in the cylindrical surface equal-area projection image, to generate the panoramic image subjected to the cylindrical surface equal-area projection transformation.

4. The method of claim 1, wherein performing pixel interpolation on the cylindrical surface equal-area projection image, based on color information of each pixel in the equirectangular panoramic image and the obtained two-dimensional coordinate in the equirectangular panoramic image corresponding to each pixel in the cylindrical surface equal-area projection image, to generate a panoramic image subjected to the cylindrical surface equal-area projection transformation, comprises:

performing the pixel interpolation on the cylindrical surface equal-area projection image, by using a spline interpolation algorithm, based on the color information of each pixel in the equirectangular panoramic image and the obtained two-dimensional coordinate in the equirectangular panoramic image corresponding to

each pixel in the cylindrical surface equal-area projection image, to generate the panoramic image subjected to the cylindrical surface equal-area projection transformation.

5. A device for constructing a projection image, comprising:

a projection module used to perform projection of an equirectangular panoramic image with a cylindrical surface equal-area projection model to obtain a cylindrical surface equal-area projection image;

a first obtaining module used to obtain a two-dimensional coordinate of each pixel in the cylindrical surface equal-area projection image;

a transformation module used to perform coordinate transformation on the obtained two-dimensional coordinate of each pixel in the cylindrical surface equal-area projection image to obtain a two-dimensional coordinate in the equirectangular panoramic image corresponding to each pixel in the cylindrical surface equal-area projection image;

a first generation module used to perform pixel interpolation on the cylindrical surface equal-area projection image, based on color information of each pixel in the equirectangular panoramic image and the obtained two-dimensional coordinate in the equirectangular panoramic image corresponding to each pixel in the cylindrical surface equal-area projection image, to generate a panoramic image subjected to the cylindrical surface equal-area projection transformation.

6. The device of claim 5, wherein the transformation module comprises:

a transformation unit used to perform coordinate transformation, by using a

formula
$$\begin{cases} x = ((2 * u / (n - 1) - 1) * \pi + \pi) * (n - 1) / (2 * \pi) \\ y = (m - 1) - \arcsin((1 - 2 * v / (m - 1)) + \pi / 2) * (m - 1) / \pi \end{cases}$$
, on the obtained two-dimensional coordinate of each pixel in the cylindrical surface equal-area projection image to obtain a two-dimensional coordinate in the equirectangular panoramic image corresponding to each pixel in the cylindrical surface equal-area projection image;

wherein, x denotes an abscissa of a two-dimensional coordinate of a pixel in the

quirectangular panoramic image, y denotes an ordinate of the two-dimensional coordinate of the pixel in the equirectangular panoramic image, u denotes an abscissa of the pixel in the cylindrical surface equal-area projection image, v denotes an ordinate of the pixel in the cylindrical surface equal-area projection image, m and n denote a height and a width of the equirectangular panoramic image, respectively, and π denotes the PI.

7. The device of claim 5, wherein the first generation module comprises:

a first generation unit used to perform the pixel interpolation on the cylindrical surface equal-area projection image, by using a bilinear interpolation algorithm, based on the color information of each pixel in the equirectangular panoramic image and the obtained two-dimensional coordinate in the equirectangular panoramic image corresponding to each pixel in the cylindrical surface equal-area projection image, to generate the panoramic image subjected to the cylindrical surface equal-area projection transformation.

8. The device of claim 5, wherein the first generation module comprises:

a second generation unit used to perform the pixel interpolation on the cylindrical surface equal-area projection image, by using a spline interpolation algorithm, based on the color information of each pixel in the equirectangular panoramic image and the obtained two-dimensional coordinate in the equirectangular panoramic image corresponding to each pixel in the cylindrical surface equal-area projection image, to generate the panoramic image subjected to the cylindrical surface equal-area projection transformation.

9. An electronic device comprising a processor, a communication interface, a memory and a communication bus, wherein the processor, the communication interface and the memory communicate with each other via the communication bus;

the memory is used to store a computer program;

the processor is used to, when executing the computer program stored on the memory, implement steps of the method of any one of claims 1 to 4.

10. A computer-readable storage medium, wherein the computer-readable storage medium stores a computer program thereon which, when being executed by a processor, causes the processor to implement steps of the method of any one of claims 1 to 4.