CLAIMS

1. A pose determination method, comprising:

acquiring a reference image matched with an image to be processed, the image to be processed and the reference image being acquired by an image acquisition device, the reference image having a corresponding reference pose and the reference pose being configured to represent a pose of the image acquisition device when the reference image is collected by the image acquisition device;

performing key point extraction processing on the image to be processed and the reference image to obtain a first key point in the image to be processed and a second key point, corresponding to the first key point, in the reference image respectively; and

determining, according to a corresponding relationship between the first key point and the second key point and the reference pose corresponding to the reference image, a target pose of the image acquisition device when the image to be processed is collected by the image acquisition device.

2. The method of claim 1, wherein acquiring the reference image matched with the image to be processed comprises:

performing feature extraction processing on the image to be processed and at least one first image respectively to obtain first feature information of the image to be processed and second feature information of each of the at least one first image, the at least one first image being sequentially acquired by the image acquisition device in a rotation process; and

determining, according to a similarity between the first feature information and each piece of second feature information, the reference image from each of the at least one first image.

3. The method of claim 2, further comprising:

determining a second homography matrix between an imaging plane of the image acquisition device when a second image is collected by the image acquisition device and a geographical plane, and determining an intrinsic matrix of the image acquisition device, the second image being any one image in ~~multiple~~ at least one first image~~s~~ and the geographical plane being a plane where geographical position coordinates of target points are located;

determining, according to the intrinsic matrix and the second homography matrix, a reference pose corresponding to the second image; and

determining, according to the reference pose corresponding to the second image, a reference pose corresponding to each of the at least one first image.

4. The method of claim 3, wherein determining the second homography matrix between the imaging plane of the image acquisition device when the second image is collected by the image acquisition device and the geographical plane and determining the intrinsic matrix of the image acquisition device comprises:

determining, according to image position coordinates and geographical position coordinates of the target points in the second image, the second homography matrix between the imaging plane of the image acquisition device when the second image is collected by the image acquisition device and the geographical plane the target points being multiple non-collinear points in the second image; and

performing decomposition processing on the second homography matrix to determine the intrinsic matrix of the image acquisition device.

5. The method of claim 4, wherein determining, according to the intrinsic matrix and the second homography matrix, the reference pose corresponding to the second image comprises:

determining, according to the intrinsic matrix of the image acquisition device and the

second homography matrix, an extrinsic matrix corresponding to the second image; and

determining, according to the extrinsic matrix corresponding to the second image, the reference pose corresponding to the second image.

6. The method of claim 3, wherein determining, according to the reference pose corresponding to the second image, the reference pose corresponding to each of the at least one first image comprises:

performing key point extraction processing on a current first image and a next first image respectively to obtain a third key point in the current first image and a fourth key point, corresponding to the third key point, in the next first image, wherein the current first image is an image, corresponding to a known reference pose, in the ~~multiple~~ at least one first image~~s~~, the current first image comprises the second image, and the next first image is an image adjacent to the current first image in the at least one first image;

determining, according to a corresponding relationship between the third key point and the fourth key point, a third homography matrix between the current first image and the next first image; and

determining, according to the third homography matrix and the reference pose corresponding to the current first image, a reference pose corresponding to the next first image.

7. The method of claim 6, wherein determining the third homography matrix between the current first image and the next first image according to the corresponding relationship between the third key point and the fourth key point comprises:

determining the third homography matrix between the current first image and the next first image according to a third position coordinate of the third key point in the current first image and a fourth position coordinate of the fourth key point in the next first image.

8. The method of claim 6, wherein determining the reference pose corresponding to the next first image according to the third homography matrix and the reference pose corresponding to the current first image comprises:

performing decomposition processing on the third homography matrix to determine a value for a second pose change of the image acquisition device between acquisition of the current first image and acquisition of the next first image; and

determining, according to the reference pose corresponding to the current first image and the value for the second pose change, the reference pose corresponding to the next first image .

9. The method of claim 1, wherein determining, according to the corresponding relationship between the first key point and the second key point and the reference pose corresponding to the reference image, the target pose of the image acquisition device when the image to be processed is collected by the image acquisition device comprises:

determining, according to a first position coordinate of the first key point in the image to be processed, a second position coordinate of the second key point in the reference image and the reference pose corresponding to the reference image, the target pose of the image acquisition device when the image to be processed is collected by the image acquisition device.

10. The method of claim 9, wherein determining, according to the first position coordinate of the first key point in the image to be processed, the second position coordinate of the second key point in the reference image and the reference pose corresponding to the reference image, the target pose of the image acquisition device when the image to be processed is collected by the image acquisition device comprises:

determining, according to the first position coordinate and the second position

coordinate, a first homography matrix between the reference image and the image to be processed;

performing decomposition processing on the first homography matrix to determine a value for a first pose change of the image acquisition device between acquisition of the image to be processed and acquisition of the reference image; and

determining, according to the reference pose corresponding to the reference image and the value for the first pose change, the target pose.

11. The method of any one of claims 1-10, wherein the reference pose corresponding to the reference image comprises a rotation matrix and displacement vector of the image acquisition device when the reference image is acquired by the image acquisition device, and the target pose corresponding to the image to be processed comprises a rotation matrix and displacement vector of the image acquisition device when the image to be processed is acquired by the image acquisition device.

12. The method of any one of claims 1-10, wherein feature extraction processing and key point extraction processing are implemented through a convolutional neural network, and

the method further comprises:

performing convolution processing on a sample image through a convolutional layer of the convolutional neural network to obtain a feature map of the sample image;

performing convolution processing on the feature map to obtain feature information of the sample image respectively;

performing key point extraction processing on the feature map to obtain a key point of the sample image; and

training the convolutional neural network according to the feature information and key point of the sample image.

13. The method of claim 12, wherein performing key point extraction processing on the feature map to obtain the key point of the sample image comprises:

processing the feature map through a Region Proposal Network (RPN) of the convolutional neural network to obtain a Region Of Interest (ROI); and

pooling the ROI through an ROI pooling layer of the convolutional neural network, and performing convolution processing through the convolutional layer to determine the key point of the sample image in the ROI.

14. A pose determination device, comprising:

an acquisition module, configured to acquire a reference image matched with an image to be processed, the image to be processed and the reference image being acquired by an image acquisition device, the reference image having a corresponding reference pose and the reference pose being configured to represent a pose of the image acquisition device when the reference image is collected by the image acquisition device;

a first extraction module, configured to perform key point extraction processing on the image to be processed and the reference image to obtain a first key point in the image to be processed and a second key point, corresponding to the first key point, in the reference image respectively; and

a first determination module, configured to determine, according to a corresponding relationship between the first key point and the second key point and the reference pose corresponding to the reference image, a target pose of the image acquisition device when the image to be processed is collected by the image acquisition device.

15. The device of claim 14, wherein the acquisition module is further configured to:

perform feature extraction processing on the image to be processed and at least one

first image respectively to obtain first feature information of the image to be processed and second feature information of each of the at least one first image, the at least one first image being sequentially acquired by the image acquisition device in a rotation process; and

determine, according to a similarity between the first feature information and each piece of second feature information, the reference image from each of the at least one first image.

16. The device of claim 15, further comprising:

a second determination module, configured to determine a second homography matrix between an imaging plane of the image acquisition device when a second image is collected by the image acquisition device and a geographical plane and determine an intrinsic matrix of the image acquisition device, the second image being any one image in ~~multiple~~ at least one first image~~s~~ and the geographical plane being a plane where geographical position coordinates of target points are located;

a third determination module, configured to determine, according to the intrinsic matrix and the second homography matrix, a reference pose corresponding to the second image; and

a fourth determination module, configured to determine, according to the reference pose corresponding to the second image, a reference pose corresponding to each of the at least one first image.

17. The device of claim 16, wherein the second determination module is further configured to:

determine, according to an image position coordinate and geographical position coordinates of the target points in the second image, the second homography matrix between the imaging plane of the image acquisition device when the second image is collected by the image acquisition device and the geographical plane, the target points being multiple non-collinear points in the second image; and

perform decomposition processing on the second homography matrix to determine the intrinsic matrix of the image acquisition device.

~~18. The device of claim 17, wherein the third determination module is further configured to:~~

~~determine, according to the intrinsic matrix of the image acquisition device and the second homography matrix, an extrinsic matrix corresponding to the second image; and~~

~~determine, according to the extrinsic matrix corresponding to the second image, the reference pose corresponding to the second image.~~

~~19. The device of claim 16, wherein the fourth determination module is further configured to:~~

~~perform key point extraction processing on a current first image and a next first image respectively to obtain a third key point in the current first image and a fourth key point, corresponding to the third key point, in the next first image, wherein the current first image is an image, corresponding to a known reference pose, in the multiple first images, the current first image comprises the second image, and the next first image is an image adjacent to the current first image in the at least one first image;~~

~~determine, according to a corresponding relationship between the third key point and the fourth key point, a third homography matrix between the current first image and the next first image; and~~

~~determine, according to the third homography matrix and the reference pose corresponding to the current first image, a reference pose corresponding to the next first image.~~

~~20. The device of claim 19, wherein the fourth determination module is further configured to:~~

~~determine the third homography matrix between the current first image and the next~~

first image according to a third position coordinate of the third key point in the current first image and a fourth position coordinate of the fourth key point in the next first image.

21. The device of claim 19, wherein the fourth determination module is further configured to:

perform decomposition processing on the third homography matrix to determine a value for a second pose change of the image acquisition device between acquisition of the current first image and acquisition of the next first image; and

determine, according to the reference pose corresponding to the current first image and the value for the second pose change, the reference pose corresponding to the next first image.

22. The device of claim 14, wherein the first determination module is further configured to:

determine, according to a first position coordinate of the first key point in the image to be processed, a second position coordinate of the second key point in the reference image and the reference pose corresponding to the reference image, the target pose of the image acquisition device when the image to be processed is collected by the image acquisition device.

23. The device of claim 22, wherein the first determination module is further configured to:

determine, according to the first position coordinate and the second position coordinate, a first homography matrix between the reference image and the image to be processed;

perform decomposition processing on the first homography matrix to determine a value for a first pose change of the image acquisition device between acquisition of the image to be processed and acquisition of the reference image; and

determine, according to the reference pose corresponding to the reference image and

the value for the first pose change, the target pose.

24. The device of any one of claims 14-23, wherein the reference pose corresponding to the reference image comprises a rotation matrix and displacement vector of the image acquisition device when the reference image is acquired by the image acquisition device, and the target pose corresponding to the image to be processed comprises a rotation matrix and displacement vector of the image acquisition device when the image to be processed is acquired by the image acquisition device.

25. The device of any one of claims 14-23, wherein feature extraction processing and key point extraction processing are implemented through a convolutional neural network, and

the device further comprises:

a first convolution module, configured to perform convolution processing on a sample image through a convolutional layer of the convolutional neural network to obtain a feature map of the sample image;

a second convolution module, configured to perform convolution processing on the feature map to obtain feature information of the sample image respectively;

a second extraction module, configured to perform key point extraction processing on the feature map to obtain a key point of the sample image; and

a training module, configured to train the convolutional neural network according to the feature information and key point of the sample image.

26. The device of claim 25, wherein the second extraction module is further configured to:

process the feature map through a Region Proposal Network (RPN) of the convolutional neural network to obtain a Region Of Interest (ROI); and

~~pool the ROI through an ROI pooling layer of the convolutional neural network and perform convolution processing through the convolutional layer to determine the key point of the sample image in the ROI.~~

~~27~~18. An electronic device, comprising:

a processor; and

a memory, configured to store instructions executable for the processor.

wherein the processor is configured to call the instructions stored in the memory to execute the method of any one of claims 1-13.

~~28~~19. A computer-readable storage medium, in which computer program instructions are stored, the computer program instructions being executed by a processor to implement the method of any one of claims 1-13.

~~29~~20. A computer program, comprising computer-readable codes, the computer-readable codes running in an electronic device to enable a processor in the electronic device to execute the method of any one of claims 1-13.