CLAIMS

1. A calibration method for an image acquisition device, comprising:

obtaining one or more images collected by the image acquisition device, wherein the one or more images involve a plurality of calibration plates with different position-orientation information and without being shaded by each other;

detecting corner points corresponding to the plurality of calibration plates in each of the one or more images; and

calibrating the image acquisition device based on the detected corner points.

2. The method according to claim 1,

wherein the image acquisition device comprises a monocular camera, and the one or more images comprise at least one image collected by the monocular camera, and

wherein calibrating the image acquisition device based on the detected corner points comprises:

determining at least one of intrinsic parameters or extrinsic parameters of the monocular camera based on the detected corner points.

3. The method according to claim 1,

wherein the image acquisition device comprises a binocular camera, and the one or more images comprise a first image collected using a first camera lens of the binocular camera and a second image collected using a second camera lens of the binocular camera, and

wherein calibrating the image acquisition device based on the detected corner points comprises:

matching first corner points detected in the first image with second corner points detected in the second image, and determining intrinsic parameters and/or extrinsic parameters of the binocular camera based on the first corner points and the second corner points that have been successfully matched.

4. The method according to claim 3, wherein matching the first corner points detected in the first image with the second corner points detected in the second image comprises:

matching the plurality of calibration plates involved in the first image with the plurality of calibration plates involved in the second image, and

matching the first corner points corresponding to lattice points of the plurality of calibration plates in the first image with the second corner points corresponding to the lattice points of the plurality of calibration plates in the second image.

5. The method according to any one of claims 1-4, wherein detecting the corner points corresponding to the plurality of calibration plates in each of the one or more images comprises:

determining corner point candidates in the one or more images, and

clustering the corner point candidates in the one or more images to obtain the corner points corresponding to the plurality of calibration plates in the one or more images.

6. The method according to claim 5, wherein after clustering the corner point candidates in the one or more images to obtain the corner points corresponding to the plurality of calibration plates in the one or more images, the method further comprises:

for each calibration plate of the plurality of calibration plates,

correcting positions of the clustered corner points that correspond to three or more lattice points on the calibration plate based on a straight line constraint relationship of the three or more lattice points.

7. The method according to claim 4, wherein matching the plurality of calibration plates involved in the first image with the plurality of calibration plates involved in the second image comprises:

determining a disparity between the first image and the second image, and

matching the plurality of calibration plates involved in the first image with the plurality of calibration plates involved in the second image based on the disparity.

8. The method according to claim 7, wherein determining the disparity between the first image and the second image comprises:

determining an overall displacement of reflections of the plurality of calibration plates in the second image with respect to reflections of the plurality of calibration plates in the first image, and

determining the overall displacement as the disparity.

9. The method according to claim 7, wherein determining the disparity between the first image and the second image comprises:

obtaining a binocular disparity of the binocular camera, and

determining the binocular disparity of the binocular camera as the disparity between the first image and the second image.

10. The method according to any one of claims 7-9, wherein matching the plurality of calibration plates involved in the first image with the plurality of calibration plates involved in the second image based on the disparity comprises:

for each calibration plate of the plurality of calibration plates,

determining a first position coordinate in the first image corresponding to a preset position of the calibration plate,

determining a second position coordinate in the second image corresponding to the preset position based on the first position coordinate and the disparity between the first image and the second image, and

determining that the calibration plate indicated by the second position coordinate in the second image is matched with the calibration plate indicated by the first position coordinate in the first image.

11. The method according to any one of claims 4 and 7-10, wherein matching the first corner points corresponding to the lattice points of the plurality of calibration plates in the first image with the second corner points corresponding to the lattice points of the plurality of calibration plates in the second image comprises:

for the lattice points of each calibration plate of the plurality of calibration plates,

determining, based on coordinates of the first corner points in the first image corresponding to the lattice points and the disparity between the first image and the second image, the second corner points in the second image that correspond to the first corner points in the first image.

12. The method according to of claim 11, wherein matching the first corner points corresponding to the lattice points of the plurality of calibration plates in the first image with the second corner points corresponding to the lattice points of the plurality of calibration plates in the second image further comprises:

in response to failing to determine the second corner points in the second image that correspond to the first corner points in the first image, transposing and/or rotating a matrix of the corner points in the second image at least once until corresponding second corner points are matched.

13. The method according to any one of claims 1-12, wherein the image acquisition device is deployed on a vehicle.

14. The method according to any one of claims 1-13, wherein the plurality of calibration plates are completely involved in the one or more images collected by the image acquisition device.

15. A calibration apparatus, comprising:

an obtaining module, configured to obtain one or more images collected by an image acquisition device, wherein the one or more images involve a plurality of calibration plates with different position-orientation information and without being shaded by each other;

a detecting module, configured to detect corner points corresponding to the plurality of calibration plates in each of the one or more images; and

a calibrating module, configured to calibrate the image acquisition device based on the detected corner points.

16. A system for an image acquisition device, comprising the image acquisition device and a plurality of calibration plates, wherein the plurality of calibration plates are located within a field of view of the image acquisition device, with different position-orientation information and without being shaded by each other.

17. A carrier, comprising:

a calibration apparatus according to claim 15; and

a carrier body;

wherein the calibration apparatus is arranged on the carrier body.

18. A calibration device, comprising:

a memory;

one or more processors; and

a computer program;

wherein the computer program is stored in the memory and is configured to be executed by the one or more processors to implement the method according to any one of claims 1-14.

19. A computer-readable storage medium having a computer program stored thereon, wherein the computer program, when being executed by one or more processors, implements the method according to any one of claims 1-14.

20. A computer program comprising computer-readable codes, wherein the computer-readable codes, when running on a device, cause one or more processors in the device to execute the method according to any one of claims 1-14.