DUAL-VIEW ANGLE IMAGE CALIBRATION METHOD AND APPARATUS, STORAGE MEDIUM AND ELECTRONIC DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

The present disclosure claims priority to Chinese Patent Application No. CN201710448540.X, filed with the Chinese Patent Office on June 14, 2017 and entitled "DUAL-VIEW ANGLE IMAGE CALIBRATION METHOD AND APPARATUS, IMAGE PROCESSING METHOD AND APPARATUS, STORAGE MEDIUM AND ELECTRONIC DEVICE", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

Embodiments of the present application relate to the computer vision technologies, and in particular, to a dual-view angle image calibration method and apparatus, a storage medium and an electronic device, and an image processing method and apparatus, a storage medium and an electronic device.

BACKGROUND

Dual-view angle image calibration is a key step for processing two images of different view angles (such as two images taken by a dual camera). Corresponding pixels on the two images are located on the same horizontal line, which is a precondition for processing such as image depth of field calculation.

SUMMARY

Embodiments of the present disclosure provide a dual-view angle image calibration technical solution and an image processing solution.

According to an aspect of the embodiments of the present disclosure, provided is a dual-view angle image calibration method, including: performing feature matching on a first image pair to obtain a first feature point pair set, where the first

CLAIMS

1. A dual-view angle image calibration method, comprising:

performing feature matching on a first image pair to obtain a first feature point pair set, wherein the first image pair comprises two images respectively photographed corresponding to two different view angles of a same scene;

obtaining multiple different first fundamental matrices of the first image pair at least according to the first feature point pair set;

obtaining first image deformation information indicating relative deformation between the first image pair after mapping transformation is performed through multiple different first fundamental matrices and the first image pair before the mapping transformation is performed;

determining a first optimization fundamental matrix from the multiple different first fundamental matrices at least according to the first image deformation information; and

calibrating the first image pair according to the first optimization fundamental matrix.

2. The method according to claim 1, wherein the obtaining first image deformation information indicating relative deformation between the first image pair after mapping transformation is performed through the multiple different first fundamental matrices and the first image pair before the mapping transformation is performed comprises:

performing mapping transformation on the two images in the first image pair according to the first fundamental matrix; and

obtaining the first image deformation information according to a distance between at least one pair of corresponding feature points before and after mapping in each image.

3. The method according to claim 1 or 2, wherein the obtaining multiple different first fundamental matrices of the first image pair according to the first feature point pair set comprises:

generating each of at least two first fundamental matrices according to a respective one of at least two different feature point pair subsets in the first feature point pair set.

4. The method according to claim 3, further comprising:

determining matching error information of each feature point pair subset;

the determining a first optimization fundamental matrix from the multiple different first fundamental matrices at least according to the first image deformation information comprises:

determining the first optimization fundamental matrix from the multiple different first fundamental matrices according to the matching error information and the first image deformation information.

5. The method according to claim 3 or 4, wherein the matching error information comprises a proportion of feature point pairs that do not satisfy a predetermined matching condition in the feature point pair subset or the first feature point pair set.

6. The method according to any one of claims 1 to 5, further comprising:

storing or updating the first optimization fundamental matrix.

7. The method according to any one of claims 1 to 6, further comprising:

storing or updating information of at least one feature point pair satisfying the predetermined matching condition and being in the first feature point pair set.

8. The method according to claim 7, wherein a proportion of a number of stored or updated feature point pairs with respect to a total number of feature point pairs comprised in the feature point pair set is less than a set threshold.

9. The method according to claim 7 or 8, wherein the information of at least one feature point pair satisfying the predetermined matching condition comprises:

coordinates of the at least one feature point pair satisfying the predetermined matching condition.

10. The method according to any one of claims 6 to 9, further comprising:

calibrating a second image pair according to the first optimization fundamental matrix.

11. The method according to claim 10, further comprising:

performing feature matching on the second image pair to obtain a second feature point pair set, and determining mapping cost information according to the second feature point pair set, wherein the mapping cost information comprises at least one of second image deformation information of the second image pair or matching error information of the feature point pair subset;

the calibrating a second image pair according to the first optimization fundamental matrix comprises:

in response to the mapping cost information satisfying a predetermined threshold condition, calibrating the second image pair according to the first optimization fundamental matrix.

12. The method according to claim 11, further comprising:

in response to the mapping cost information not satisfying the predetermined threshold condition, obtaining a second optimization fundamental matrix corresponding to the second image pair; and

performing calibration on the second image pair according to the second optimization fundamental matrix.

13. The method according to claim 12, wherein the obtaining a second optimization fundamental matrix corresponding to the second image pair comprises:

performing feature matching on the second image pair to obtain the second feature point pair set of the second image pair;

obtaining multiple different second fundamental matrices of the second image pair according to the second feature point pair set and the stored at least one feature point pair satisfying the predetermined matching condition, and obtaining each of multiple pieces of the second image deformation information corresponding to a respective one of the multiple different second fundamental matrices; and

determining the second optimization fundamental matrix from the multiple different second fundamental matrices at least according to the second image deformation information.

14. The method according to claim 13, further comprising:

updating the stored first optimization fundamental matrix by using the second optimization fundamental matrix; and/or

updating the stored information of the at least one feature point pair by using information of at least one feature point pair satisfying the predetermined matching condition and being in the second feature point pair set .

15. The method according to any one of claims 1 to 14, further comprising:

photographing, by a device having two cameras, an image pair.

16. The method according to claim 15, wherein the device having two cameras comprises: a dual-camera mobile terminal, dual-camera smart glasses, a dual-camera robot, a dual-camera unmanned aerial vehicle, or a dual-camera unmanned vehicle.

17. The method according to claim 1, comprising:

performing application processing based on the calibrated first image pair, wherein the application processing comprises at least one of the following: three-dimensional reconstruction processing, image blurring processing, depth of field calculation, or augmented reality processing.

18. A dual-view angle image calibration apparatus, comprising:

a feature matching module, configured to perform feature matching on a first image pair to obtain a first feature point pair set, wherein the first image pair comprises two images respectively photographed corresponding to two different view angles of a same scene;

a first obtaining module, configured to obtain multiple different first fundamental matrices of the first image pair at least according to the first feature point pair set, and obtain first image deformation information indicating relative

deformation between the first image pair after mapping transformation is performed through the multiple different first fundamental matrices and the first image pair before the mapping transformation is performed;

a first determining module, configured to determine a first optimization fundamental matrix from the multiple different first fundamental matrices at least according to the first image deformation information; and

a first calibrating module, configured to calibrate the first image pair according to the first optimization fundamental matrix.

19. A non-transitory computer readable storage medium having computer program instructions stored thereon, wherein execution of the instructions by a processor causes the processor to perform:

performing feature matching on a first image pair to obtain a first feature point pair set, wherein the first image pair comprises two images respectively photographed corresponding to two different view angles of a same scene;

obtaining multiple different first fundamental matrices of the first image pair at least according to the first feature point pair set;

obtaining first image deformation information indicating relative deformation between the first image pair after mapping transformation is performed through the multiple different first fundamental matrices and the first image pair before the mapping transformation is performed;

determining a first optimization fundamental matrix from the multiple different first fundamental matrices at least according to the first image deformation information; and

calibrating the first image pair according to the first optimization fundamental matrix.

20. An electronic device, comprising a processor and a memory;

the memory is configured to store at least one executable instruction, wherein execution of the at least one executable instruction enables the processor to execute the following operations:

performing feature matching on a first image pair to obtain a first feature point pair set, wherein the first image pair comprises two images respectively photographed corresponding to two different view angles of a same scene;

obtaining multiple different first fundamental matrices of the first image pair at least according to the first feature point pair set;

obtaining first image deformation information indicating relative deformation between the first image pair after mapping transformation is performed through the multiple different first fundamental matrices and the first image pair before the mapping transformation is performed;

determining a first optimization fundamental matrix from the multiple different first fundamental matrices at least according to the first image deformation information; and

calibrating the first image pair according to the first optimization fundamental matrix.