

CLAIMS

1. A matching method, comprising:

obtaining a to-be-matched image;

extracting at least one to-be-matched feature point from the to-be-matched image;

performing, for one of at least one reference image, matching between the at least one to-be-matched feature point and at least one reference feature point extracted from the reference image to obtain a distance set corresponding to the reference image, wherein the distance set corresponding to the reference image comprises a set of distances composed of distances between the at least one to-be-matched feature point and the at least one reference feature point, one reference image comprises an image of a standard sample, and different reference images comprise different standard samples; and

determining, based on the distance set corresponding to each reference image, whether the to-be-matched image matches each reference image,

wherein determining, based on the distance set corresponding to each reference image, whether the to-be-matched image matches each reference image comprises:

determining a minimum distance from the distance set corresponding to each reference image, and calculating, in response to the minimum distance being less than or equal to a preset threshold, an average distance of all distances in the distance set corresponding to each reference image; and

determining a target reference image matching the to-be-matched image from each reference image based on the average distance of the distance set corresponding to each reference image, wherein the target reference image is a reference image, corresponding to the distance set with the minimum average distance, in the at least one reference image.

2. The method according to claim 1, ~~wherein determining, based on the distance set corresponding to each reference image, whether the to-be-matched image matches each reference image comprises~~further comprising:

~~determining a minimum distance from the distance set corresponding to each reference image; and~~

determining, in response to the minimum distance being greater than a preset threshold, that the matching between the to-be-matched image and each reference image fails.

~~3. The method according to claim 1, wherein determining, based on the distance set corresponding to each reference image, whether the to-be-matched image matches each reference image comprises:~~

~~determining a minimum distance from the distance set corresponding to each reference image, and calculating, in response to the minimum distance being less than or equal to a preset threshold, an average distance of the distance set corresponding to each reference image; and~~

~~determining a target reference image matching the to-be-matched image from each reference image based on the average distance of the distance set corresponding to each reference image, wherein the target reference image is a reference image, corresponding to the distance set with the minimum average distance, in the at least one reference image.~~

43. The method according to claim 1, wherein performing, for the one reference image, matching between the at least one to-be-matched feature point and the at least one reference feature point extracted from the reference image to obtain the distance set corresponding to the reference image comprises:

performing matching between the at least one to-be-matched feature point and the at least one reference feature point extracted from the reference image to obtain a first matching point pair set;

selecting a preset number of the first matching point pairs from the first matching point pair set for combination, to obtain at least one first matching point pair combination, wherein each of the at least one first matching point pair combination comprises the preset number of the first matching point pairs;

determining a homography matrix corresponding to the first matching point pair set according to each of the at least one first matching point pair combination, the homography matrix representing coordinate mapping transformation between the to-be-matched feature point and the reference feature point in the first matching point pair set;

filtrating a second matching point pair set with a matching error less than a preset error threshold, from the first matching point pair set according to the homography matrix; and

taking a distance between the to-be-matched feature point and the reference feature point comprised in each matching point pair in the second matching point pair set as the distance set corresponding to the reference image.

54. The method according to claim 43, wherein performing matching between the at least one to-be-matched feature point and the at least one reference feature point extracted from the reference image to obtain the first matching point pair set comprises:

combining each of the at least one to-be-matched feature point with each of the at least one reference feature point extracted from the reference image one by one to obtain at least one feature point pair;

calculating a feature value distance from the to-be-matched feature point to the reference feature point in each feature point pair to obtain the feature value distance of each feature point pair; and

constituting the first matching point pair set by using at least one feature point pair of which the feature value distance is less than a preset distance threshold.

65. The method according to claim 43, wherein filtrating the second matching point pair set with the matching error less than the preset error threshold, from the first matching point pair set according to the homography matrix comprises:

determining a matching error of each first matching point pair in the first matching point pair set based on the first matching point pair set and the homography matrix; and

determining, based on the matching error of each first matching point pair, at least one first matching point pair of which the matching error is less than the preset error threshold, from the first matching point pair set to constitute the second matching point pair set.

76. The method according to claim 1, wherein extracting the at least one to-be-matched feature point from the to-be-matched image comprises:

selecting at least one original pixel point from the to-be-matched image, wherein in a preset range of one of the selected at least one original pixel point, a preset number of target pixel points with grayscale values different from a grayscale value of the selected original pixel point exist; and

extracting a feature for the target pixel points of the one selected original pixel point to obtain the to-be-matched feature point.

87. A matching apparatus, comprising an obtaining unit, an extracting unit, a matching unit, and a determining unit, wherein

the obtaining unit is configured to obtain a to-be-matched image;

the extracting unit is configured to extract at least one to-be-matched feature point from the to-be-matched image;

the matching unit is configured to perform, for one of at least one reference image, matching between the at least one to-be-matched feature point and at least one reference feature point extracted from the reference image to obtain a distance set corresponding to the reference image, wherein the distance set corresponding to the reference image comprises a set of distances composed of distances between the at least one to-be-matched feature point and the at least one reference feature point, one reference image comprises an image of a standard sample, and different reference images comprise different standard samples; and

the determining unit is configured to determine, based on the distance set corresponding to each reference image, whether the to-be-matched image matches each reference image,

wherein the determining unit comprises:

a third determining subunit, configured to determine the minimum distance from the distance set corresponding to each reference image, and calculate, in response to the minimum distance being less than or equal to the preset threshold, an average distance of all distances in the distance set corresponding to each reference image; and

a fourth determining subunit, configured to determine a target reference image matching the to-be-matched image from each reference image based on the average distance of the distance set corresponding to each reference image, wherein the target reference image is a reference image corresponding to the distance set with the minimum average distance in the at least one reference image.

98. The apparatus according to claim 87, wherein the determining unit further comprises a first determining subunit and a second determining subunit, wherein

~~the first determining subunit is configured to determine a minimum distance from the distance set corresponding to each reference image; and~~

the second determining subunit is configured to determine, in response to the minimum distance being greater than ~~a~~ the preset threshold, that the matching between the to-be-matched image and each reference image fails.

~~10. The apparatus according to claim 9, wherein the determining unit further comprises a third determining subunit and a fourth determining subunit, wherein~~

~~the third determining subunit is configured to determine the minimum distance from the distance set corresponding to each reference image, and calculate, in response to the minimum distance being less than or equal to the preset threshold, an average distance of the~~

~~distance set corresponding to each reference image; and~~

~~the fourth determining subunit is configured to determine a target reference image matching the to-be-matched image from each reference image based on the average distance of the distance set corresponding to each reference image, wherein the target reference image is a reference image corresponding to the distance set with the minimum average distance in the at least one reference image.~~

~~449.~~ The apparatus according to claim ~~87~~, wherein the matching unit comprises a first matching subunit, a first combining unit, a fifth determining subunit, a filtrating unit, and a sixth determining subunit, wherein

the first matching subunit is configured to perform matching between the at least one to-be-matched feature point and the at least one reference feature point extracted from the reference image to obtain a first matching point pair set;

the first combining unit is configured to select a preset number of the first matching point pairs from the first matching point pair set for combination, to obtain at least one first matching point pair combination, wherein each of the at least one first matching point pair combination comprises the preset number of the first matching point pairs;

the fifth determining subunit is configured to determine a homography matrix corresponding to the first matching point pair set according to each of the at least one first matching point pair combination, the homography matrix representing coordinate mapping transformation between the to-be-matched feature point and the reference feature point in the first matching point pair set;

the filtrating unit is configured to filtrating a second matching point pair set with a matching error less than a preset error threshold, from the first matching point pair set according to the homography matrix; and

the sixth determining subunit is configured to take a distance between the to-be-matched feature point and the reference feature point comprised in each matching point pair in the second matching point pair set as the distance set corresponding to the reference image.

~~4210.~~ The apparatus according to claim ~~449~~, wherein the first matching subunit comprises a second combining unit, a calculating unit, and a constituting unit, wherein

the second combining unit is configured to combine each of the at least one to-be-matched feature point with each of the at least one reference feature point extracted

from the reference image one by one to obtain at least one feature point pair;

the calculating unit is configured to calculate a feature value distance from the to-be-matched feature point to the reference feature point in each feature point pair to obtain the feature value distance of each feature point pair; and

the constituting unit is configured to constitute the first matching point pair set by using at least one feature point pair of which the feature value distance is less than a preset distance threshold.

4311. The apparatus according to claim **449**, wherein the filtrating unit comprises the fifth determining subunit and the sixth determining subunit, wherein

the fifth determining subunit is configured to determine a matching error of each first matching point pair in the first matching point pair set based on the first matching point pair set and the homography matrix; and

the sixth determining subunit is configured to determine, based on the matching error of each first matching point pair, at least one first matching point pair of which the matching errors is less than the preset error threshold, from the first matching point pair set to constitute the second matching point pair set.

4412. The apparatus according to claim **87**, wherein the extracting unit comprises a selecting unit and a feature extracting unit, wherein

the selecting unit is configured to select at least one original pixel point from the to-be-matched image, wherein in a preset range of one of the selected at least one original pixel point, a preset number of target pixel points with grayscale values different from a grayscale value of the selected original pixel point exist; and

the feature extracting unit is configured to extract a feature for the target pixel points of the one selected original pixel point to obtain the to-be-matched feature point.

4513. An electronic device, comprising a processor, a memory, and a communication bus, wherein

the memory is configured to communicate with the processor through the communication bus, and store one or more programs executable by the processor, and

the processor is configured to execute the one or more programs to implement a matching method, the method comprising:

obtaining a to-be-matched image;

extracting at least one to-be-matched feature point from the to-be-matched image;

performing, for one of at least one reference image, matching between the at least one to-be-matched feature point and at least one reference feature point extracted from the reference image to obtain a distance set corresponding to the reference image, wherein the distance set corresponding to the reference image comprises a set of distances composed of distances between the at least one to-be-matched feature point and the at least one reference feature point, one reference image comprises an image of a standard sample, and different reference images comprise different standard samples; and

determining, based on the distance set corresponding to each reference image, whether the to-be-matched image matches each reference image,

wherein determining, based on the distance set corresponding to each reference image, whether the to-be-matched image matches each reference image comprises:

determining a minimum distance from the distance set corresponding to each reference image, and calculating, in response to the minimum distance being less than or equal to a preset threshold, an average distance of all distances in the distance set corresponding to each reference image; and

determining a target reference image matching the to-be-matched image from each reference image based on the average distance of the distance set corresponding to each reference image, wherein the target reference image is a reference image, corresponding to the distance set with the minimum average distance, in the at least one reference image.

~~16~~14. A computer-readable storage medium, having stored thereon computer-readable instructions that, when being executed by one or more processors, cause the processor to implement the method according to any one of claims 1 to ~~7~~6.

~~17~~15. A computer program, comprising computer-readable codes, wherein execution of the computer-readable codes by a computer causes the computer to execute the method according to any one of claims 1 to ~~7~~6.