CLAIMS

1. An object recognition method, comprising:

acquiring a real-time image where a screen comprises an object operation region;

determining, according to a mapping relationship between the real-time image and a preset standard image, image reference points that match with at least two reference origins in the real-time, wherein the reference origin is a point within the object operation region in the preset standard image; and

recognizing an object within the object operation region according to a pixel coordinate of the preset standard image and a reference pixel coordinate of the image reference point in the real-time image to obtain a target recognition result of the object,

wherein the recognizing an object within the object operation region according to a pixel coordinate of the preset standard image and a reference pixel coordinate of the image reference point in the real-time image to obtain a target recognition result of the object, comprises:

determining a linear function matching at least two of the image reference points according to the reference pixel coordinates of the at least two of the image reference points in the real-time image; and

recognizing an object within an object operation region of the real-time image according to the linear function, a pixel coordinate of the preset standard image, and the real-time image to obtain the target recognition result,

wherein the recognizing an object within an object operation region of the real-time image according to the linear function, a pixel coordinate of the preset standard image, and the real-time image to obtain the target recognition result, comprises:

inputting a pixel coordinate of the preset standard image into the linear function to obtain a to-be-compared coordinate;

numerically comparing the pixel coordinate of the preset standard image with the to-be-compared coordinate to obtain a comparison result;

recognizing an object within the object operation region in the real-time image to obtain a to-be-adjusted recognition result; and

determining an target recognition result of the object according to the comparison result and to-be-adjusted recognition result.

2. The method according to claim 1, wherein the acquiring a real-time image where a screen comprises an object operation region comprises:

acquiring an image collection apparatus that has a preset inclination angle with the object operation region; and

collecting the object operation region by adopting the image collection apparatus to obtain the real-time image.

3. The method according to claim 1 or 2, wherein before determining, according to the mapping relationship between the real-time image and a preset standard image, image reference points that match with at least two reference origins in the real-time image, the method further comprises:

determining a transformation matrix between a pixel coordinate of the real-time image and a pixel coordinate of the preset standard image; and

determining the mapping relationship according to the transformation matrix.

4. The method according to any one of claims 1 to 3, wherein the method further comprises:

determining a first collection angle of the real-time image; and

collecting the object operation region by adopting a second collection angle to obtain the preset standard image, wherein a difference between the second collection angle and the first collection angle is less than a preset angle threshold.

5. The method according to claim 3 or 4, wherein the determining a transformation matrix between a pixel coordinate of the real-time image and a pixel coordinate of the preset standard image comprises:

determining, in the preset standard image, a preset reference point and a first pixel coordinate of the preset reference point;

determining, in the real-time image, a second pixel coordinate of an image mapping point that matches the preset reference point; and

determining a transformation matrix between the first pixel coordinate and the second pixel coordinate.

6. The method according to any one of claims 3 to 5, wherein the determining, according to the mapping relationship between the real-time image and a preset standard image, image reference points that match with at least two reference origins in the real-time image comprises:

projecting each of the reference origins into the real-time image according to the mapping relationship to obtain the image reference point matching each of the reference origins.

~~7. The method according to any one of claims 1 to 6, wherein the recognizing an object within the object operation region according to a pixel coordinate of the preset standard image and a reference pixel coordinate of the image reference point in the real-time image to obtain a target recognition result of the object, comprises:~~

~~determining a linear function matching at least two of the image reference points according to the reference pixel coordinates of the at least two of the image reference points in the real-time image; and~~

~~recognizing an object within an object operation region of the real-time image according to the linear function, a pixel coordinate of the preset standard image, and the real-time image to obtain the target recognition result.~~

~~8. The method according to claim 7, wherein the recognizing an object within an object operation region of the real-time image according to the linear function, a pixel coordinate of the preset standard image, and the real-time image to obtain the target recognition result, comprises:~~

~~inputting a pixel coordinate of the preset standard image into the linear function to obtain a to-be-compared coordinate;~~

~~numerically comparing the pixel coordinate of the preset standard image with the to-be-compared coordinate to obtain a comparison result;~~

~~recognizing an object within the object operation region in the real-time image to obtain a to-be-adjusted recognition result; and~~

~~determining an target recognition result of the object according to the comparison result and to-be-adjusted recognition result.~~

~~9~~7. The method according to claim ~~8~~1, wherein in a case where the preset standard image is a top view standard image, the determining an target recognition result of the object according to the comparison result and to-be-adjusted recognition result comprises:

in a case where the comparison result represents that the pixel coordinate of the preset standard image is less than or equal to the to-be-compared coordinate, acquiring a right side view image where a screen comprises the object operation region;

recognizing the object within the object operation region in the right side view image to obtain a first recognition result; and

adjusting the to-be-adjusted recognition result according to the first recognition result to obtain the target recognition result.

~~10~~8. The method according to claim ~~8~~1, wherein in a case where the preset standard image is a top view standard image, the determining an target recognition result of the object according to the comparison result and to-be-adjusted recognition result comprises:

in a case where the comparison result represents that the pixel coordinate of the preset standard image is greater than or equal to the to-be-compared coordinate, acquiring a left side view image where a screen comprises the object operation region;

recognizing the object within the object operation region in the left side view image to obtain a second recognition result; and

adjusting the to-be-adjusted recognition result according to the second recognition result to obtain the target recognition result.

~~11~~9. An object recognition apparatus, comprising:

an acquisition module, configured to acquire a real-time image where a screen comprises an object operation region;

a determination module, configured to determine, according to the mapping relationship between the real-time image and a preset standard image, image reference points that match with at least two reference origins in the real-time image, wherein the reference origin is a point within the object operation region in the preset standard image; and

a recognition module, configured to recognize an object within the object operation region according to a pixel coordinate of the preset standard image and a reference pixel

coordinate of the image reference point in the real-time image to obtain a target recognition result of the object,

wherein the recognition module comprises a function determination sub-module and a recognition sub-module,

wherein the function determination sub-module is configured to:

determine a linear function matching at least two of the image reference points according to the reference pixel coordinates of the at least two of the image reference points in the real-time image;

wherein the recognition sub-module is configured to:

recognize an object within an object operation region of the real-time image according to the linear function, a pixel coordinate of the preset standard image, and the real-time image to obtain the target recognition result,

wherein the recognition sub-module comprises an input sub-unit, a comparison sub-unit, a recognition sub-unit, and a determination sub-unit, wherein

the input sub-unit is configured to input a pixel coordinate of the preset standard image into the linear function to obtain a to-be-compared coordinate;

the comparison sub-unit is configured to numerically compare the pixel coordinate of the preset standard image with the to-be-compared coordinate to obtain a comparison result;

the recognition sub-unit is configured to recognize an object within the object operation region in the real-time image to obtain a to-be-adjusted recognition result; and

the determination sub-unit is configured to determine a target recognition result of the object according to the comparison result and to-be-adjusted recognition result.

~~12~~10. The object recognition apparatus according to claim ~~11~~9, wherein the acquisition module is further configured to:

acquire an image collection apparatus that has a preset inclination angle with the object operation region; and

collect the object operation region by adopting the image collection apparatus to obtain the real-time image.

~~13~~11. The object recognition apparatus according to claim ~~11~~ 9 or ~~12~~10, wherein the object recognition apparatus further comprises a mapping determination module, and the mapping determination module is configured to:

determine a transformation matrix between a pixel coordinate of the real-time image and a pixel coordinate of the preset standard image; and

determine the mapping relationship according to the transformation matrix.

~~14~~12. The object recognition apparatus according to any one of claims ~~11~~ 9 to ~~13~~11, wherein the object recognition apparatus further comprises a standard image acquisition module, and the standard image acquisition module is configured to:

determine a first collection angle of the real-time image; and

collect the object operation region by adopting a second collection angle to obtain the preset standard image, wherein the difference between the second collection angle and the first collection angle is less than a preset angle threshold.

~~15~~13. The object recognition apparatus according to claim ~~13~~ 11 or ~~14~~12, wherein the mapping determination module comprises a pixel coordinate sub-module and a matrix determination sub-module,

wherein the pixel coordinate sub-module is configured to:

determine a preset reference point and a first pixel coordinate of the preset reference point in the preset standard image; and

determine a second pixel coordinate of an image mapping point that matches the preset reference point in the real-time image;

wherein the matrix determination sub-module is configured to determine the transformation matrix between the first pixel coordinate and the second pixel coordinate.

~~16~~14. The object recognition apparatus according to any one of claims ~~13~~ 11 to ~~15~~13, wherein the determination module is further configured to project each of the reference origins into the real-time image according to the mapping relationship to obtain the image reference point matching each of the reference origins.

~~17. The object recognition apparatus according to any one of claims 11 to 16, wherein the recognition module comprises a function determination sub-module and a recognition sub-module,~~

~~wherein the function determination sub-module is configured to:~~

~~determine a linear function matching at least two of the image reference points according to the reference pixel coordinates of the at least two of the image reference points in the real-time image;~~

~~wherein the recognition sub-module is configured to:~~

~~recognize an object within an object operation region of the real-time image according to the linear function, a pixel coordinate of the preset standard image, and the real-time image to obtain the target recognition result.~~

~~18~~15. A computer device, wherein the computer device comprises a memory storing computer-executable instructions thereon and a processor, when the processor runs the computer-executable instructions stored on the memory, the object recognition method according to any one of claims 1 to ~~10~~ 8 can be implemented.

~~19~~16. A computer storage medium, wherein computer-executable instructions are stored on the computer storage medium, and after the computer-executable instructions are executed, the object recognition method according to any one of claims 1 to ~~10~~ 8 can be implemented.

~~20~~17. A computer program product, comprising computer readable codes, wherein when the computer readable codes run in a device, a processor in the device executes instructions for implementing the steps in the method according to any one of claims 1 to ~~10~~8.