

CLAIMS

1. An image processing method, comprising:

determining a first reference surface on which a virtual object is placed based on an
5 image collected by an image collection device;

acquiring a to-be-placed virtual object and pose information of the image collection
device relative to the first reference surface, wherein the pose information is a translation
amount and a rotation amount of the image collection device relative to the first reference
surface in a world coordinate system;

10 determining a display size of the to-be-placed virtual object based on the pose
information; and

rendering the to-be-placed virtual object onto the image according to the display size.

2. The method of claim 1, wherein determining the display size of the to-be-placed virtual
15 object based on the pose information comprises:

determining an included angle between a second reference surface on which the image
collection device is located and the first reference surface based on the pose information; and

determining the display size of the to-be-placed virtual object based on the included
angle.

20 3. The method of claim 2, wherein determining the included angle between the second
reference surface on which the image collection device is located and the first reference
surface based on the pose information comprises:

determining first coordinate information of the image collection device in a first
25 coordinate system based on the pose information, wherein the first coordinate system is a
coordinate system established based on the first reference surface;

acquiring second coordinate information of an intersection point of a straight line and
the first reference surface, wherein the straight line passes through an optical center of a lens
in the image collection device and is perpendicular to the second reference surface; and

30 determining the included angle between the first reference surface and the second
reference surface based on the first coordinate information and the second coordinate
information.

4. The method of claim 2, wherein determining the display size of the to-be-placed virtual object based on the included angle comprises:

acquiring a correspondence between one or more display sizes and one or more angles;
and

5 determining the display size of the to-be-placed virtual object based on the correspondence and the included angle.

5. The method of claim 3, further comprising:

determining a placement area of the to-be-placed virtual object on the first reference
10 surface based on the second coordinate information and the display size of the to-be-placed virtual object;

wherein rendering the to-be-placed virtual object onto the image according to the display size comprises:

rendering the to-be-placed virtual object onto the image according to the display size
15 based on the placement area of the virtual object on the first reference surface.

6. The method of claim 5, further comprising:

determining a boundary of the first reference surface; and

in response to determining that the placement area of the to-be-placed virtual object on
20 the first reference surface exceeds the boundary of the first reference surface, rendering the to-be-placed virtual object onto the image according to preset first color information to prompt that the to-be-placed virtual object exceeds the boundary.

7. An image processing apparatus, comprising:

25 a first determining module, configured to determine a first reference surface on which a virtual object is placed based on an image collected by an image collection device;

a first acquiring module, configured to acquire a to-be-placed virtual object and pose information of the image collection device relative to the first reference surface, wherein the pose information is a translation amount and a rotation amount of the image collection device
30 relative to the first reference surface in a world coordinate system;

a second determining module, configured to determine a display size of the to-be-placed virtual object based on the pose information; and

a first rendering module, configured to render the to-be-placed virtual object onto the first reference surface of the image according to the display size.

8. The apparatus of claim 7, wherein the second determining module comprises:

a first determining portion, configured to determine an included angle between a second reference surface on which the image collection device is located and the first reference surface based on the pose information; and

a second determining portion, configured to determine the display size of the to-be-placed virtual object based on the included angle.

9. The apparatus of claim 8, wherein the first determining portion comprises:

a first determining sub-portion, configured to determine first coordinate information of the image collection device in a first coordinate system based on the pose information, wherein the first coordinate system is a coordinate system established based on the first reference surface;

a first acquiring sub-portion, configured to acquire second coordinate information of an intersection point of a straight line and the first reference surface, wherein the straight line passes through an optical center of a lens in the image collection device and is perpendicular to the second reference surface; and

a second determining sub-portion, configured to determine the included angle between the first reference surface and the second reference surface based on the first coordinate information and the second coordinate information.

10. The apparatus of claim 8, wherein the second determining portion comprises:

a second acquiring sub-portion, configured to acquire a correspondence between one or more display sizes and one or more angles; and

a third determining sub-portion, configured to determine the display size of the to-be-placed virtual object based on the correspondence and the included angle.

11. The apparatus of claim 9, further comprising:

a third determining module, configured to determine a placement area of the to-be-placed virtual object on the first reference surface based on the second coordinate information and the display size of the to-be-placed virtual object;

wherein the first rendering module comprises:

a rendering portion, configured to render the to-be-placed virtual object onto the image according to the display size based on the placement area of the virtual object on the first

reference surface.

12. The apparatus of any one of claims 7 to 11, further comprising:

5 a fourth determining module, configured to determine a boundary of the first reference surface; and

10 a second rendering module, configured to, in response to determining that the placement area of the to-be-placed virtual object on the first reference surface exceeds the boundary of the first reference surface, render the to-be-placed virtual object onto the image according to preset first color information to prompt that the to-be-placed virtual object exceeds the boundary.

13. An image processing device, comprising: a memory, a communication bus and a processor, wherein

15 the memory is configured to store an image processing program;

the communication bus is configured to realize connection communication between the processor and the memory; and

the processor is configured to execute the image processing program stored in the memory to implement the method for image processing according to any one of claims 1 to 6.

20 14. A storage medium, having stored an image processing program thereon, wherein the image processing program, when being executed by a processor, causes the processor to implement the operations of the image processing method according to any one of claims 1 to 6.

25 15. A computer program, comprising a computer-readable code that, when run in an electronic device, causes a processor in the electronic device implements the operations of the image processing method according to any one of claims 1 to 6.