

CLAIMS

1. A method for controlling a warehouse robot, comprising:

obtaining a container scheduling instruction of a first target container, wherein the container scheduling instruction comprises a container type of the first target container;

determining a container pose recognition algorithm according to the container type of the first target container, and recognizing pose information of the first target container based on the container pose recognition algorithm; and

controlling the warehouse robot to pick up the first target container according to the pose information;

wherein the determining the container pose recognition algorithm according to the container type of the first target container comprises:

pre-establishing a correspondence between each container type and each container pose recognition algorithm; and

determining the container pose recognition algorithm for the first target container according to the correspondence and the container type of the first target container.

2. The method according to claim 1, wherein according to a surface feature, the container types are divided into at least one of the following: a smooth surface type, a concave and convex surface type, and an identifier-pattern-on-surface type, wherein a container of smooth surface type means that the surface of the container has no identifier pattern, and no concave or convex; or

according to a size feature, the container types are divided into at least one of the following: large containers, standard containers, and small containers; or

according to a material feature, the container types are divided into at least one of the following: paper containers and plastic containers.

3. The method according to claim 2, wherein the determining the container pose recognition algorithm according to the container type comprises:

determining that the container pose recognition algorithm for the first target container is a smooth surface type pose recognition algorithm when the container type of the first target container is the smooth surface type; and

accordingly, the recognizing pose information of the first target container based on the smooth surface type pose recognition algorithm comprises:

obtaining a point cloud image and a preset reference image of the first target container;

registering the point cloud image and the preset reference image; and

determining the pose information of the first target container according to a registering result.

4. The method according to claim 2, wherein the determining the container pose recognition algorithm according to the container type of the first target container, and recognizing pose information of the first target container based on the container pose recognition algorithm comprises:

determining that the container pose recognition algorithm for the first target container is a concave and convex type pose recognition algorithm when the container type of the first target container is the concave and convex surface type; and

accordingly, the recognizing pose information of the first target container based on the concave and convex type pose recognition algorithm comprises:

recognizing concave and convex parts of a surface of the first target container; and

determining the pose information of the first target container according to physical information of the concave and convex parts, wherein the physical information comprises one or more of length, width, height, depth, angle, and contour of the concave and convex parts, and the number of concave and convex parts.

5. The method according to claim 2, wherein the determining the container pose recognition algorithm according to the container type of the first target container, and recognizing pose information of the first target container based on the container pose recognition algorithm comprises:

determining that the container pose recognition algorithm for the first target container is an identifier-on-surface type pose recognition algorithm when the container type of the first target container is the identifier-pattern-on-surface type; and

accordingly, the recognizing pose information of the first target container based on the identifier-on-surface type pose recognition algorithm comprises:

recognizing an identifier pattern of the first target container; and

determining the pose information of the first target container according to pose of the identifier pattern.

6. The method according to any one of claims 2 to 5, wherein after the obtaining the container scheduling instruction of the first target container, the method further comprises:

obtaining an image of the first target container;

recognizing a color and/or texture of the first target container according to the image of the first target container; and

determining the container type of the first target container is the paper container or a

plastic container according to the color and/or texture of the first target container.

7. The method according to any one of claims 1 to 6, wherein before the recognizing pose information of the first target container based on the container pose recognition algorithm, the method further comprises:

recognizing warehouse location identification information of a target warehouse location corresponding to the first target container; and

accordingly, the recognizing pose information of the first target container based on the container pose recognition algorithm comprises:

if the warehouse location identification information is successfully recognized, recognizing the pose information of the first target container based on the container pose recognition algorithm.

8. The method according to any one of claims 1 to 7, wherein the container scheduling instruction further comprises container position information of the first target container, and before the determining a container pose recognition algorithm according to the container type of the first target container, the method further comprises:

moving the warehouse robot to a target position and moving a pickup apparatus of the warehouse robot to a set height according to the container position information.

9. The method according to claim 8, further comprising:

after moving the pickup apparatus of the warehouse robot to the set height, rotating the pickup apparatus of the warehouse robot to a direction facing the first target container, or during a process of moving the pickup apparatus of the warehouse robot to the set height, rotating the pickup apparatus to a direction facing the first target container.

10. The method according to any one of claims 1 to 9, wherein the controlling the warehouse robot to pick up the first target container according to the pose information comprises:

determining a position relation between the pickup apparatus of the warehouse robot and the first target container according to the pose information;

moving and/or rotating the warehouse robot according to the position relation; and

controlling the pickup apparatus of the warehouse robot to pick up the first target container.

11. The method according to claim 10, wherein the container type of the first target container is the paper container, and the controlling a pickup apparatus of the warehouse robot to pick up the first target container comprises:

obtaining a paper container pickup instruction;

controlling the pickup apparatus of the warehouse robot to pick up the first target container

according to the paper container pickup instruction;

the paper container pickup instruction includes a pickup instruction of a first stage and a pickup instruction of a second stage; a pickup speed of the pickup instruction of the first stage is less than a pickup speed of the pickup instruction of the second stage; the first stage corresponds to a stage when the pickup apparatus does not touch the first target container; and the second stage corresponds to a stage when the pickup apparatus touches the first target container.

12. The method according to claim 10, wherein the pose information comprises a distance between the first target container and the warehouse robot and size information and pose position information of the first target container; the container scheduling instruction further comprises a standard size of the first target container; and the determining a position relation between the pickup apparatus of the warehouse robot and the first target container according to the pose information comprises:

determining whether the first target container exists according to the distance;

if yes, determining whether the first target container is valid according to the standard size and the size information of the first target container; and

if yes, determining a position relation between the pickup apparatus of the warehouse robot and the first target container according to the pose information.

13. The method according to any one of claims 10 to 12, wherein after the moving and/or rotating the warehouse robot according to the position relation, the method further comprises:

obtaining a pickup distance between the warehouse robot and the first target container;

determining whether the pickup distance meets a pickup condition of the warehouse robot; and

if yes, controlling the pickup apparatus of the warehouse robot to pick up the first target container.

14. The method according to any one of claims 1 to 13, further comprising:

obtaining a container storage instruction of a second target container, wherein the container storage instruction comprises a warehouse location position of a storage warehouse location corresponding to the second target container, and the second target container is located on the pickup apparatus of the warehouse robot;

moving the warehouse robot to a storage position of the second target container according to the warehouse location position;

obtaining a warehouse location identification information of the storage warehouse location;

determining a second position relation between the warehouse robot and the storage warehouse location according to the warehouse location identification information of the storage warehouse location;

moving and/or rotating the warehouse robot according to the second position relation;
determining whether a third container exists on the storage warehouse location; and
if not, storing the second target container on the storage warehouse location.

15. An apparatus for controlling a warehouse robot, comprising:

a scheduling instruction obtaining module, configured to obtain a container scheduling instruction of a first target container, wherein the container scheduling instruction comprises a container type of the first target container;

a container pose recognition module, configured to determine a container pose recognition algorithm according to the container type of the first target container, and recognize pose information of the first target container based on the container pose recognition algorithm; and

a container pickup module, configured to control the warehouse robot to pick up the first target container according to the pose information;

wherein the container pose recognition module comprises:

a correspondence establishing unit, configured to pre-establish a correspondence between each container type and each container pose recognition algorithm;

a pose recognition algorithm determining unit, configured to determine the container pose recognition algorithm for the first target container according to the correspondence and the container type of the first target container; and

a container pose recognition unit, configured to recognize the pose information of the first target container based on the container pose recognition algorithm.

16. A warehouse robot, comprising a memory and at least one processor;

the memory storing a computer-executable instruction;

the at least one processor executing the computer-executable instruction stored in the memory, so that the at least one processor executes the warehouse robot control method according to any one of claims 1 to 14.

17. A warehouse system, comprising a warehouse robot according to claim 16, goods shelves, and a warehouse management module, wherein

the warehouse robot is connected to the warehouse management module to be moved to a target container, according to an instruction of the warehouse management module, and pick up and/or store a target container, wherein the target container is placed on the goods shelf.

18. A computer-readable storage medium, having a computer-executable instruction

stored therein, wherein the computer-executable instruction, when executed by a processor, implements the warehouse robot control method according to any one of claims 1 to 14.

19. A computer program product, comprising a computer program, wherein the computer program, when executed by a processor, implements the warehouse robot control method according to any one of claims 1 to 14.