

WHAT IS CLAIMED IS:

1. A method of calibrating a moving region of a guide robot, wherein the guide robot comprises a signal receiving unit for receiving a movement instruction, a controller and a light emitting module, and the method comprises:

a1. detecting and receiving, by the signal receiving unit, the movement instruction;

a2. determining, by the controller, region calibration parameters corresponding to the received movement instruction according to a predetermined mapping relation between the movement instruction and the region calibration parameters, wherein the region calibration parameters include a pending moving region of the guide robot, a light display parameter in the pending moving region, and a driving parameter corresponding to the pending moving region and the light display parameter;

a3. driving, by the controller, the light emitting module to carry out light display calibration in the pending moving region according to the determined region calibration parameters;

wherein the step a2 comprises: determining a moving prewarning region according to the region calibration parameters corresponding to the received movement instruction, and detecting whether an obstacle exists within a preset size range on a movement path corresponding to the movement instruction or not, wherein the pending moving region includes a normally-on warning region and a maximum warning region, and the moving prewarning region is an annular region surrounded by the normally-on warning region and the maximum warning region; and determining, by the controller, region calibration parameters of the light emitting module in the determined moving prewarning region according to an obstacle detection result;

wherein the step of determining, by the controller, the region calibration parameters of the light emitting module in the moving prewarning region according to the obstacle detection result comprises: detecting, by a provided distance sensor, a distance d between the obstacle and the robot in real time or regularly; and determining the region calibration parameters of the light emitting module in the moving prewarning region according to the relationship among the distance d , a minimum warning distance $d_{\min}$ between the obstacle and the normally-on warning region, and a maximum warning distance $d_{\max}$ between the obstacle and the maximum warning region, as well as a current speed v of the robot.

2. The method of calibrating the moving region of the guide robot of claim 1, wherein before the step a1, the method of calibrating the moving region further comprises:

obtaining, by the controller, preset normally-on warning region parameters, wherein the normally-on warning region parameters include a normally-on warning region, a light display parameter in the normally-on warning region, and a driving parameter corresponding to the normally-on warning region and the light display parameter in the normally-on warning region, and the normally-on warning region is a region surrounding the guide robot;

driving, by the controller, the light emitting module to carry out light display calibration in the normally-on warning region according to the obtained normally-on warning region parameters.

3. The method of calibrating the moving region of the guide robot of claim 1, wherein the step of determining, by the controller, the region calibration parameters of

the light emitting module in the moving prewarning region according to the obstacle detection result further comprises:

if the detected distance d is shorter than or equal to the minimum warning distance $d_{\min}$ between the obstacle and the normally-on warning region, determining the region calibration parameters as predetermined first region calibration parameters;

if the detected distance d is longer than the minimum warning distance $d_{\min}$ between the obstacle and the normally-on warning region, and shorter than or equal to the maximum warning distance $d_{\max}$ between the obstacle and the maximum warning region, detecting the current speed v of the robot, calculating current warning parameters according to the detected distance d and the current speed v of the robot based on a preset first warning parameter formula, and determining second region calibration parameters corresponding to the calculated warning parameters as the region calibration parameters according to a predetermined mapping relation between the warning parameter and the region calibration parameter;

if the detected distance d is longer than the maximum warning distance $d_{\max}$ between the obstacle and the maximum warning region, detecting the current speed v of the robot, determining the maximum design speed $v_{\max}$ of the robot, calculating current warning parameters according to the current speed v and the maximum design speed $v_{\max}$ of the robot based on a preset second warning parameter formula, and determining third region calibration parameters corresponding to the calculated warning parameters as the region calibration parameters according to a predetermined mapping relation between the warning parameter and the region calibration parameter.

4. A guide robot, comprising a shell, a controller, a memory and a light emitting module arranged on the shell, wherein the light emitting module is electrically connected with the controller; the controller has a signal input end for receiving a movement instruction; the guide robot further comprises a moving region calibration program which is stored in the memory, and may be operated on the controller; and the moving region calibration program is executed by the controller to implement the following steps:

a1. detecting and receiving the movement instruction;

a2. determining region calibration parameters corresponding to the received movement instruction according to a predetermined mapping relation between the movement instruction and the region calibration parameters, wherein the region calibration parameters include a pending moving region of the guide robot, a light display parameter in the pending moving region, and a driving parameter corresponding to the pending moving region and the light display parameter;

a3. driving the light emitting module to carry out light display calibration in the pending moving region according to the determined region calibration parameters;

wherein the step a2 comprises: determining a moving prewarning region according to the region calibration parameters corresponding to the received movement instruction, and detecting whether an obstacle exists within a preset size range on a movement path corresponding to the movement instruction or not, wherein the pending moving region includes a normally-on warning region and a maximum warning region, and the moving prewarning region is an annular region surrounded by the normally-on warning region and the maximum warning region; and determining,

by the controller, region calibration parameters of the light emitting module in the determined moving prewarning region according to an obstacle detection result;

wherein the step of determining, by the controller, the region calibration parameters of the light emitting module in the moving prewarning region according to the obstacle detection result comprises: detecting, by a provided distance sensor, a distance d between the obstacle and the robot in real time or regularly; and determining the region calibration parameters of the light emitting module in the moving prewarning region according to the relationship among the distance d , a minimum warning distance $d_{\min}$ between the obstacle and the normally-on warning region, and a maximum warning distance $d_{\max}$ between the obstacle and the maximum warning region, as well as a current speed v of the robot.

5. The guide robot of claim 4, wherein the controller is also used for executing the moving region calibration program to implement the following steps before the step a1:

obtaining preset normally-on warning region parameters, wherein the normally-on warning region parameters include a normally-on warning region, a light display parameter in the normally-on warning region, and a driving parameter corresponding to the normally-on warning region and the light display parameter in the normally-on warning region, and the normally-on warning region is a region surrounding the guide robot;

driving the light emitting module to carry out light display calibration in the normally-on warning region according to the obtained normally-on warning region parameters.

6. The guide robot of claim 4, wherein the step of determining the region calibration parameter of the light emitting module in the moving prewarning region according to the obstacle detection result further comprises:

if the detected distance d is shorter than or equal to the minimum warning distance $d_{\min}$ between the obstacle and the normally-on warning region, determining the region calibration parameters as predetermined first region calibration parameters;

if the detected distance d is longer than the minimum warning distance $d_{\min}$ between the obstacle and the normally-on warning region, and shorter than or equal to the maximum warning distance $d_{\max}$ between the obstacle and the maximum warning region, detecting the current speed v of the robot, calculating current warning parameters according to the detected distance d and the current speed v of the robot based on a preset first warning parameter formula, and determining second region calibration parameters corresponding to the calculated warning parameters as the region calibration parameters according to a predetermined mapping relation between the warning parameter and the region calibration parameter;

if the detected distance d is longer than the maximum warning distance $d_{\max}$ between the obstacle and the maximum warning region, detecting the current speed v of the robot, determining the maximum design speed $v_{\max}$ of the robot, calculating current warning parameters according to the current speed v and the maximum design speed $v_{\max}$ of the robot based on a preset second warning parameter formula, and determining third region calibration parameters corresponding to the calculated warning parameters as the region calibration parameters according to a predetermined mapping relation between the warning parameter and the region calibration parameter.

7. The guide robot of any one of claims 4 to 6, wherein the light emitting module is arranged on the outer surface of a chassis of the shell.

8. The guide robot of claim 7, wherein the light emitting module comprises a plurality of LED annular light bars which are axially arranged in a spacing manner; and the outer ring walls of the LED annular light bars are luminous surfaces, and tilt downwards.

9. The guide robot of claim 8, wherein the light emitting module also comprises a plurality of laser devices which are distributed on the chassis along the LED annular light bars in a spacing manner.

10. The guide robot of claim 9, wherein the controller comprises a main controller and a 51 single-chip microcomputer; the LED annular light bars are connected with a first group of parallel I/O ports of the 51 single-chip microcomputer; the laser devices are connected with a second group of parallel I/O ports of the 51 single-chip microcomputer; and the signal output end of the main controller is connected with a serial I/O port of the 51 single-chip microcomputer.

11. The guide robot of claim 4, wherein a plurality of sensors distributed along the circumferential direction of the shell are also arranged on the shell; and the sensors are electrically connected with the controller, and are used for detecting whether an obstacle exists in a corresponding region around the shell or not, and feeding detection results back to the controller.

12. The guide robot of claim 10, wherein a plurality of sensors distributed along the circumferential direction of the shell are also arranged on the shell; and the sensors are electrically connected with the controller, and are used for detecting

whether an obstacle exists in a corresponding region around the shell or not, and feeding detection results back to the controller.

13. A computer readable storage medium, wherein the computer storage medium is applied to a guide robot, and stores a moving region calibration program; and the moving region calibration program is executed by a controller to implement the following steps:

a1. detecting and receiving the movement instruction;

a2. determining region calibration parameters corresponding to the received movement instruction according to a predetermined mapping relation between the movement instruction and the region calibration parameters, wherein the region calibration parameters include a pending moving region of the guide robot, a light display parameter in the pending moving region, and a driving parameter corresponding to the pending moving region and the light display parameter;

a3. driving the light emitting module to carry out light display calibration in the pending moving region according to the determined region calibration parameters;

wherein the step a2 comprises: determining a moving prewarning region according to the region calibration parameters corresponding to the received movement instruction, and detecting whether an obstacle exists within a preset size range on a movement path corresponding to the movement instruction or not, wherein the pending moving region includes a normally-on warning region and a maximum warning region, and the moving prewarning region is an annular region surrounded by the normally-on warning region and the maximum warning region; and determining, by the controller, region calibration parameters of the light emitting module in the determined moving prewarning region according to an obstacle detection result;

wherein the step of determining, by the controller, the region calibration parameters of the light emitting module in the moving prewarning region according to the obstacle detection result comprises: detecting, by a provided distance sensor, a distance d between the obstacle and the robot in real time or regularly; and determining the region calibration parameters of the light emitting module in the moving prewarning region according to the relationship among the distance d , a minimum warning distance $d_{\min}$ between the obstacle and the normally-on warning region, and a maximum warning distance $d_{\max}$ between the obstacle and the maximum warning region, as well as a current speed v of the robot.

14. The computer readable storage medium of claim 13, wherein the moving region calibration program is executed to further implement the following steps:

obtaining preset normally-on warning region parameters, wherein the normally-on warning region parameters include a normally-on warning region, a light display parameter in the normally-on warning region, and a driving parameter corresponding to the normally-on warning region and the light display parameter in the normally-on warning region, and the normally-on warning region is a region surrounding the guide robot;

driving the light emitting module to carry out light display calibration in the normally-on warning region according to the obtained normally-on warning region parameters.

15. The computer readable storage medium of claim 13, wherein the step of determining the region calibration parameters of the light emitting module in the moving prewarning region according to the obstacle detection result further comprises:

if the detected distance d is shorter than or equal to the minimum warning distance $d_{\min}$ between the obstacle and the normally-on warning region, determining the region calibration parameters as predetermined first region calibration parameters;

if the detected distance d is longer than the minimum warning distance $d_{\min}$ between the obstacle and the normally-on warning region, and shorter than or equal to the maximum warning distance $d_{\max}$ between the obstacle and the maximum warning region, detecting the current speed v of the robot, calculating current warning parameters according to the detected distance d and the current speed v of the robot based on a preset first warning parameter formula, and determining second region calibration parameters corresponding to the calculated warning parameters as the region calibration parameters according to a predetermined mapping relation between the warning parameter and the region calibration parameter;

if the detected distance d is longer than the maximum warning distance $d_{\max}$ between the obstacle and the maximum warning region, detecting the current speed v of the robot, determining the maximum design speed $v_{\max}$ of the robot, calculating current warning parameters according to the current speed v and the maximum design speed $v_{\max}$ of the robot based on a preset second warning parameter formula, and determining third region calibration parameters corresponding to the calculated warning parameters as the region calibration parameters according to a predetermined mapping relation between the warning parameter and the region calibration parameter.