Mobile Robot Computer Simulation System

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Abstract. The constant development of science and technology, mobile simulation robot become one of the people of tea after a meal, want the simulation robot to human operation level, premise condition clearly understand the principle of the simulation robot, and the mobile robot simulation system the required functionality, and after understanding we should how to realize the function of them. In this paper, the principle, function and realization of the mobile robot simulation system are designed.

Keywords: Mobile Robots, Simulation Systems, Computer Technology

1. Introduction
With the help of the technology era, artificial robots have gradually become a hot topic. This topic continues to ferment, at the same time, more and more people began to pay attention to this ranks. However, with the deepening of Su Zihè's research and development and the continuous breakthrough of various technologies, people have gradually found that the design and development of the simulation system, the core of the simulation robot, has become particularly difficult. In particular, it is still a difficult problem to make the robot reach the operation level of human beings [1]. The reason is that robots do not have the unique action and thinking judgment abilities of human beings, which also leads to the fact that most of the robots developed today are only used for a certain pure purpose. Therefore, if you want to develop and design a more simulation robot, solving the simulation system is the first problem.

2. The system principle of mobile simulation robot
In a large range, the simulation system of mobile robot is generally divided into two kinds: physical simulation and computer simulation. The simulation system of the physical robot is generally composed of a group of small machine parts that really exist. Through the coordination of the algorithm setting of the computer system and the related programs designed, the simulation behavior of some specific targets can be realized eventually. The simulation system of the physical robot is generally more complex, and the investment during the development period is large. Even if there is enough investment, the function of the physical structure of the physical robot is still difficult to meet the requirements. However, the advantage of physical robot is that it can use the existing technology and materials to design and develop some robots with specific functions [2]. Although there are many limitations in power and function, it can still play its functions in some specific directions of use. Generally speaking, computer simulation requires several computers to cooperate with each other. A
The complete system can be built by simulating the real environment and some special situations that the robot may encounter. In this part, the simulation of the real environment and the training of special circumstances are relatively easy. This effect can be achieved only by using the sensors on the robot to carry out the actual simulation of some real environments. Through the unified collection and analysis of these data, these functions are developed into system programs. With the help of the computer, the robot can autonomously make reasonable judgments in this environment and complete the established goals.

3. Overview of mobile robot simulation system

In order for a mobile robot to complete some specific functions, its simulation system must have some basic functions, summarized as follows: (Figure 1).

![Figure 1. Basic functions of the simulation system](image)

3.1. Construction function of the model

In the simulation system of a mobile robot, it is very important to build the model of the real environment, the model of some problems encountered by the robot in the real environment and the model of the sensor used by the robot [3]. Different models are used to solve problems encountered by the robot in the real working environment, which determines the degree of simulation of the robot. Therefore, in the simulation system to achieve the above effect and can be more comprehensive to complete the established goal is a simulation system should have the basic conditions.

3.2. Dynamic simulation function

In real life, the robots we need and make need to adapt to different tasks in different environments. Although the simulation function of the simulation system can simulate the behavior of the robot in some unique environment to a large extent in advance, the uncertainty in the real environment determines that the robot simulation system must have the dynamic simulation function [4]. This function enables the robot to autonomously carry out some necessary operations to complete the established goals in the real environment as the environment constantly changes and the task difficulty increases. This function of the simulation system can be very good in the robot task for the dynamic elements of the relationship and influence of a reasonable judgment, so as to make effective actions. Therefore, the realization of dynamic simulation function is an important part of robot simulation system.

3.3. Self-analysis function

The most important reason why mobile robot can carry out some autonomous behaviors is that there is a set of unique algorithms in the simulation system, which can make the robot make reasonable actions at the appropriate time [5]. Then in the real world, this kind of method for independent action
to rely on the robot is the need to continuously improve, that is, to say, this algorithm in practice need to continue to the ego of the system were analyzed, collect the data and information necessary to ensure the next to the adjustment of the algorithm through the system to achieve more efficient work of the robot. Especially when the robot is working in some extreme situations, such data need to be collected, sorted and analyzed to analyze the strain capacity of the robot in extreme situations and the working efficiency of the robot simulation system. Therefore, the self-analysis function of the simulation system is also very important for mobile robots.

3.4. Good connection to external mechanical system

The simulation system of the robot is the core of the robot, but if the robot wants to complete the necessary work, it still needs the reasonable link and match of the simulation system and the external mechanical system to be able to control the actual operation of the robot by the simulation system [6]. Therefore, a good mobile robot not only needs to have excellent simulation system, but also a good link between external simulation system and external mechanical system is very important. Under the support of an excellent simulation system, with a good mechanical system, only in this way can we develop a highly practical mobile robot [7-8].

4. Realization of mobile robot simulation system

We design in mobile robot simulation system, simulation system software is mainly can be divided into two parts of the server software and client software, on the basis of the two different parts can complete different function of the robot, can in order to determine the internal structure of the different of what is going to happen and the function module (Figure 2).

![Figure 2. The Implementation of the mobile robot simulation system](image)

4.1. Server software architecture

The server side is mainly for the purpose of allowing the client to complete some work through the specified menu or the specified icon on the display window.

Establishment of external environment model: customers can draw the shape of some obstacles and other relevant parameters on the display, so as to establish the model of obstacles. In this link, the customer can modify the parameters of the obstacle according to their own needs, so that the system can build the model according to their own needs for all the information of the obstacle [9]. Moreover, this system also supports the customer to be able to add obstacles to the virtual environment in real time, so the establishment of the external environment model becomes particularly simple and practical.

Setting of assigned tasks: customers can set task objectives in the menu in advance according to their own needs when using the robot simulation system for actual work. This task goal can be either sent to individual robot or group, and how to complete these established task goals is left to the client software for self-judgment and execution.

4.2. Client software architecture

From the design essence, the software structure of the client side and the server side are essentially the same, but because of the different functions needed to play, the purpose of use is also different, so there are still some differences in the differentiation of the specific modules of the two sides.
Model-related parameter editing: This function was supposed to be implemented on the server side, but was moved to the client side to make it easier for the client to adjust the model while they were using it.

System control algorithm selection: in the system, because of the specific use of the environment in different reasons, so according to different occasions to design different algorithms [10]. In the actual use of the process, the user can first choose the appropriate algorithm to control the system, in specific cases, the customer can also according to the needs of the relevant parameters of the system to adjust appropriately, so as to meet some special needs.

Data recording: Although in the beginning of design has been set up under the condition of a variety of different use function, but the situation in real environment is a multilateral, so the system to add the function of real-time data transmission, customers in the use of mobile robot for the specific work, the system will automatically to record the related environmental data and model data, And after the permission of the customer, these data can be transmitted to the server, so as to improve a good reference for the upgrade of the product.

5. Conclusion
Mobile robot is very practical in real life, the reason lies in the design of computer simulation system of mobile robot is humanized enough. The core point of mobile robot lies in the design of its computer simulation system. Only by truly mastering this technology can we make super simulation robot. For the design of the simulation system, many basic functions need to be satisfied. For example, its model building function allows the robot to use relevant data to build a reasonable model. The dynamic simulation function enables the robot to judge the scene in real time according to the real environment of the scene in actual use, so as to make the most effective operation; The self-analysis function allows the robot to make a reasonable judgment on its own condition and analyze relevant parameters applicable to the current environment while working. The design of the simulation system is not only to be able to meet some basic functions, its ultimate goal is to develop the robot to be similar to the human thinking and judgment ability. We believe that in the near future, we will be able to achieve such a goal. Starting from the design of mobile robot, this paper deeply analyzes the principle and implementation of the computer simulation system, which is the core of mobile robot, and adds a strength for the realization of artificial intelligence.

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