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Research and Implementation of Cooperative Control between Robot and Stand

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Abstract. As robot application technology widely and advanced skills, robot assembly, welding, spraying and other work is farther, more and more sophisticated machine makes its internal parts becomes more and more complex, application independent positioner is also more and more broad, independent robot and positioner combination, also widely used in many fields of industry, agriculture, education, health care etc.

1. Introduction

With the progress of the times, the field of robot applications more and more widely, now, for human service robot not only more and more intelligent, and applications are more and more, the robot is not what happens in industrial production, and independent positioner with the application is more and more widely used in industrial robots, has as an integral part of the automatic production line, with the function of independent Postioner rapid development, also greatly expand the flexibility of the robot in the industrial work and variability.

2. The robot and the independent position

With the robot is more and more applied in welding, spraying, assembly and other industrial fields, related parts of the complexity and the degree of precision is increasing, the independent variable bit machine utilization rate is also grow with each passing day, there are two main types of robot and positioner coordination, is a step by step motion mode, common applications. Mainly in the robot and the independent variable bit machine does not need coordination and movement; another mode called synchronous motion mode, the application mode usually requires two synchronous linkage. In this paper, second kinds of models are discussed, and the research and implementation of the cooperative control of the robot and the robot are presented.

Robot control system is a relatively complex system, the independent positioner also has its own independent work flexible procedures, comparatively speaking, independent robot and positioner has its own advantages richly endowed by nature in the work together, if can be independent and positioner the robot can improve, in education, industry, agriculture, construction, and environmental protection in the future exhibition fist, the robot has its own unique advantages in the aspect of work, especially intelligent robot can properly deal with emergency events in the work, can make up the independent variable non intelligence lack of independent positioner with precision work precision, the complex system is decomposed into several easy processing small module, module of each robot are small Corresponding to a simple small interface in the external independent positioner, neglected or simplified internal behavior to a certain extent, this research has focused on the definition of a related and practical platform for the basic program. In the robot's huge database, there will inevitably be some errors, if the robot can skillfully apply the accuracy of the independent positioning machine to work, then it can be very good to avoid this error.

3. The research and implementation of cooperative control of robot and independent position machine

First of all, the commercialization of robot system mostly adopts special controller closed structure, and usually use the upper control computer is a professional computer, off-line programming tools are also professional language of robot servo control using professional controller and control algorithm fixed in CPU, this system is closed once at work in the event of fault or error, it is difficult to modify or repair, in addition, the commercialization of the robot without networking, however modern research and development check robot controller open more urgent requirements, has gradually become the focus of research, at present, the research work of the open robot has been mainly focused on the positioning of the robot structure system part, modularization and standardization of interfaces, improve the software code complex Usability. Maintainability, accuracy and readability of the program, to provide users with more convenient language description and task instructions, as well as the process environment, etc.. Limited to the "special robot, special robot language, special microprocessor" closed structure, has the specific function of controller structure period closed, suitable for a certain environment, not easy to expand and improve the system, for example, the robot controller of goods is not open, it's difficult for users according to their own needs the procedures and instructions to modify and expand the content.

In such a robot program under the premise, it is difficult to separate robot and positioner coordination work and application development, fixed instruction mode makes the robot can well coordinate independent positioner work in all areas of work are not the same, the user or the use of difficult unit according to their special units the fixed instruction of the robot changes and additions, and a set of related functions, and independent positioner and sophisticated precision instruments, not allowed in a tiny bit errors in the work, if the machine instruction error, or previous instruction in some special circumstances, such as electromagnetic interference. Signal interference or lightning interference under the deviation or change, then the independent positioner will command error of the robot to coordinate work, if you encounter To special units of special types of work, such as blasting, liquefied petroleum gas plant, these deviations are related to the quality and progress of the entire work, and even the safety of the lives and property of the staff. But only unilateral request to change the program of instructions closed robot and related procedures is not enough, also need the independent positioner to take a series of corresponding measures, safety first, production second, independent positioner should be able to automatically put the robot off when the wrong instruction appears related to emergency situations, or spontaneous trigger alarms let the whole work system, the leading and dominant position is not entirely on the robot body, coordinate the work should be like humans work together as a party, if there are problems or errors, the other party will never turn a blind eye.

So they need to realize the open robot, if can realize the openness of the robot, as long as the user can in accordance with the relevant principles according to their own needs to change instruction, know the robot work, then the robot can and independent positioner to coordinate related work; the open robot controller hardware platform is can be divided into two categories: one is based on the computer system and bus system based on VME bus, a computer bus system with a series of points, such as low cost, good openness, perfect software development environment and rich software resources and large database, there is good communication function, users can be achieved to coordinate the work of independent robot and positioner through these aspects, from the current point of view, is the most suitable for the future development.

4. Concluding remarks

To coordinate the work of independent positioner and robot has not only the human vision, we have the ability to achieve it, to improve and apply it, it can improve the overall level of development in various fields, open the computer can bring different effects to the robot instruction, coordinate the work and can not content with staying where one is. Independent positioner more perfect. Although

the robot and positioner coordination has a bright future, but there are many, the perfect place for a day, we need to do is in the practice of exploration and development, to provide better real-time processing ability of machine work for the robot and the independent variable, provides a convenient software development environment and so on, with the solution this series of problems, cooperative robot system and independent positioner will achieve good results.

References

[1] Sun Bin, Yang Ruqing, review of open robot controller [J], robotics, 2013
[2] Zhou Xuecai, Li Weiping,, open robot and its general control system, [J] robot, 2014
[3] Fan Yong, Tan min, robot control system and its status quo [J] robot, 2013
[4] Sun Disheng, Wang Yan, robot control technology [J] robot 2014
[5] Li Kaisheng, Zhang Huihui et al. Development of robot control system and its research [M] robot, 2015
[6] Xu Hua, Jia Peifa, open architecture and robot control software architecture [J] robotics, 2013