Research on Virtual Platform of Electrical Control of Mechatronics Equipment Based on VRML

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Abstract. Mechatronics specifically refers to mechatronics engineering. In order to maximize the realization of virtual platform control of mechanical and electrical equipment, according to the mainstream direction of today's society to improve the mechanical and electrical integration, but also for the training of basic mechanical and electrical personnel reform, the establishment of mechanical and electrical integration virtual platform in the context of The Times has become particularly important. Electromechanical control simulation platform is aimed at the electromechanical integration of related professional simulation training platform, it can also be secondary development, more can carry out the practical operation of the relevant theoretical knowledge of electromechanical integration. The integrable parts system is composed of integrable parts library and integrable parts combination platform. In this paper, from the establishment of mechatronics simulation platform as the starting point, from the establishment of the system to the compilation of the program to the final operation of the results, the system of the establishment of mechatronics simulation platform analysis.

Keywords: Mechatronics, Simulation Platform, Circuit Element

1. Mechanical and electrical integration
Mechatronics specifically refers to mechanical and electronic engineering. It is the product of the combination of traditional machinery and automation, the conceptual first appeared in a Japanese magazine in 1971, but also from which time, people began to study the concept of mechatronics. Since the development of modern society, mechatronics technology has become a more common technology.

2. VRML language
VRML is a kind of virtual reality modeling language, which is widely used in virtual modeling. In essence, it is an object-oriented three-dimensional modeling language. In daily life, people usually use this language for three-dimensional modeling or simulation.
3. Mechanical and electrical integration of virtual control platform

3.1. Development purposes
In order to maximize the realization of virtual platform control of mechanical and electrical equipment, according to the mainstream direction of today's society to improve the mechanical and electrical integration but also for the training of basic mechanical and electrical personnel reform, the establishment of mechanical and electrical integration virtual platform in the context of the Times has become particularly important [1,2].

(1) On the basis of the actual operation device of the electromechanical equipment system, the simulation operation software has been developed. By the mode of combining practical operation and simulation training, the professional training of basic talents is carried out, so as to improve the ability of professional talents in practical operation.

(2) Let professionals quickly have a comprehensive cognition and understanding of the equipment. The use of simulation system can maximize the various functions of the equipment to be divided into blocks, so that learners can start from the basic modules, the familiar operation of each module. After getting familiar with each module, we start to simulate the operation of the whole equipment and the possible problems during the operation, so as to improve learners' mastery of the equipment.

(3) The use of simulation system for training, one is to enable learners to conduct a thorough analysis of the problems in the operation of the practice, so as to understand the environment where such problems occur and the methods to solve them; Second, it can greatly reduce the problem of equipment wear and tear, thereby degrading the learning cost.

(4) The establishment of the simulation platform can also increase the resources of the information base, so that the problems that were not easily detected can be shown in the simulation, and the problems can be analyzed and solved, so that the simulation personnel can accumulate more experience.

3.2. Introduction to the development platform
Electromechanical control simulation platform is aimed at the electromechanical integration of related professional simulation training platform, it can also be secondary development, more can carry out the practical operation of the relevant theoretical knowledge of electromechanical integration [3]. Electromechanical control simulation platform is composed of a component library, a control object library and a simulation workspace. (Figure 1)
Figure 1. Structure of electromechanical control simulation platform

(1) Component library
The component library contains a large number of circuit components, hydraulic components and pneumatic components. Each of these different components has its own parametric characteristics [4]. Component library is an open form of warehouse, the user can use the simulation software to add components of the same type but with different attributes, and components of the same attribute and different shapes.

Circuit element
Circuit components includes many types of components: general relay, intermediate relay, current relay, voltage relay, time relay, thermal relay, contactor, button switch, universal change-over switch, fuse, liquid level sensor, solenoid valves, limit switches, solid-state relay, knife switch, PLC, all kinds of power supply, control transformer, rectifier bridge, magnetic chuck, traffic lights, and all sorts of lamps and lanterns, digital tube, all kinds of motor, etc. Among them, PLC belongs to a kind of important circuit components.

Hydraulic components include a variety of power components, control components, executive components and a variety of joints.

(2) Construction of control system
Electromechanical integration simulation system of the workspace is a control system to control the operation of the platform, users can choose the existing components in the repository for reasonable components in the workspace, then use the appropriate wire or pipe for these selection has good components to connect, eventually form a control system, so that the work area has the function of simulation run [5,6].

There are several characteristics in the system establishment:
(1) Random construction of the control system
The control system can be set up at will. That is to say, no matter whether the components we select are correct or whether the circuits we use are correctly connected to the components, the simulation system we set up can achieve the operation effect. However, due to the unreasonable nature of the selected components and the incorrect connection, the result of the system operation is also chaotic. Therefore, a haptically built system can work, but the results are not what we want. This
problem is due to a software element to the selection and calculation of the connection line in real time, on the basis of the various components of properties and components connection line, even if we set up the system of unreasonable, the software will still be running results are given, and according to the results of visual processing.

(2) PLC liberalization programming
In this software has PLC component simulation program editor, in this editor, the user can freely carry on PLC programming [7]. After importing the program compiled by the user, the software will run the system built by the user based on the programming instructions entered by the user as the guide, so as to show the final results in front of the user.

Hybrid construction of mechanical and electrical components
In the process of system construction, we can call all components from the component library to use, that is to say, we can mix and match electric furnace components, hydraulic components and pneumatic components to complete the system construction at the same time. In reality, a reasonable system operation is a link formed by the above three components, such a system can be called the real mechatronics control system. (Figure 2)

![Figure 2. Characteristics of the control system](image)

(3) Control object library
In general, we will divide the object system under control into three categories: general control object, ordinary machine tool and flexible production line [8]. These control objects are all described by plane or three-dimensional images. And these control objects can be controlled by the user’s own control system to run.

3.3. Mechatronics integrative parts system
The so-called integrable parts system is composed of integrable parts library and integrable parts combination platform. This paper will analyze the existing integrable parts system, and then imagine a integrable parts system in the aspect of mechatronics.

(1) Multimedia integrable ware composite platform
PowerPoint issued by Microsoft is undoubtedly one of the best multimedia integration platform available today. PPT and use frequency is in the position in daily life, whether in the regular meeting or in the current popular online education in the classroom, it makes the use of the past is black and white pattern become more rich color, PPT can be very clever add text language, image and audio video combined into a platform, and put them in the form of a novel show in front of everyone's eyes. For the media integration platform, the PPT issued by Microsoft is undoubtedly a good platform to use.

However, Microsoft did not create a multimedia integrable ware library for our mechatronics major [9,10]. Due to the large number of objects used in the multimedia integrable ware library and the high
professional requirements, PPT is not the most ideal integrable ware platform for us.

(2) Mechatronics professional integrable parts platform

In the previous description of the article, we can clearly understand that the essence of the software is an integrable ware system in the field of mechatronics, and the component library is an integrable ware library, and the workspace is an integrable ware combination platform. The system we built to visualize the objects we control has also become a part of an integrable component platform.

The PPT software issued by Microsoft is combined with the software we use, so as to realize the establishment of the integrable ware library. First of all, we need to edit the parameters of the components we contact from our usual training cognition, and then form a fixed component matching like PPT template. Next, we use the components we edit to build the system, so that we can complete the reasonable construction of the system. Next, on the programming, we use the VRLM language for reasonable program compilation, in the system we have established above the simulation control operation, so that can be perfect to complete the simulation platform construction and use.

4. Conclusion

Mechatronics simulation platform construction, can be divided into several parts. The construction of the system is the most critical, although the construction of the system has enough randomness, but the purpose of our construction of the system is to be able to smoothly let the software run, so as to get a reasonable result. The most important point of system construction is the establishment and use of integrable ware library. For the establishment of integrable ware library, we can refer to the formation mode of PPT to rationalize various components and form component blocks. When building the system, we can call them at will without establishing the basic link. Using VRLM language programming, run on the basis of the established system so as to get the visual results. In this paper, from the establishment of mechatronics simulation platform as the starting point, from the establishment of the system to the compilation of the program to the final operation of the results, the system of the establishment of mechatronics simulation platform analysis.

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