Emergent Engineering Construction of Comprehensive Training Platform for Industrial Robot Specialty

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Abstract: Developing industrial robot technology is an inevitable trend in the new economic situation, which poses a challenge to the talent training in industrial robot direction. Based on the composition of industrial robot courses and the needs of the industry, this paper puts forward the plan of building a practical training platform for the configuration of enterprise production lines and designs a comprehensive practical training platform system for emergent engineering courses. Taking the course of 'robot technology' as an example, the paper expounds the method of combining the relevant process design and practical training courses to maximize the use of the comprehensive training platform.

1. Introduction

Robot is the core research field and typical representative of intelligent equipment. The development of manufacturing industry in China is inseparable from the development of industrial robots. The promotion and application of industrial robots in the industrial field will improve the automation and intelligence level of the industrial manufacturing process, reduce the impact of the rising labor cost and the reduction of population dividend on the industrial competitiveness, improve the production efficiency and product quality, reduce the production cost and resource consumption, ensure the safety of production, and maintain and enhance the international competitiveness of China's industry. Therefore, it is an urgent task for our country to carry out the training of Applied Talents in the direction of industrial robots.

2. Professional Course Requirements

Facing the equipment manufacturing industry, industrial robot technology is a new and high technology, which is composed of machinery, computer, cybernetics, mechanism science, information and sensing technology, artificial intelligence, bionics and other disciplines. It is a comprehensive technology of many disciplines. It's course teaching mode aims at combining theory with practice. The core of the courses related to industrial robots is to make students understand the types and classification methods of robots, the composition of robots, the main technical parameters and application directions of industrial robots. Students need to master the description and main design methods of the robot motion system, the expression methods and three expressions of space points and surfaces, the basic concepts and calculation methods of the homogeneous coordinate transformation, the establishment methods of the robot kinematics equation, the basic principles and algorithms of the inverse kinematics solution of the robot, etc. Therefore, the experiments of this major are mainly to study robot kinematics, robot dynamics, robot control, industrial robot operation, off-line programming and virtual simulation technology, the application of industrial robots in various industries and the system integration of robot workstations. Through experimental training, students can be engaged in industrial robot operation, industrial robot system integration, industrial robot system application development, industrial robot offline simulation and other work after graduation.

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Figure 1 Construction Machinery

Figure 2 Food Inspection

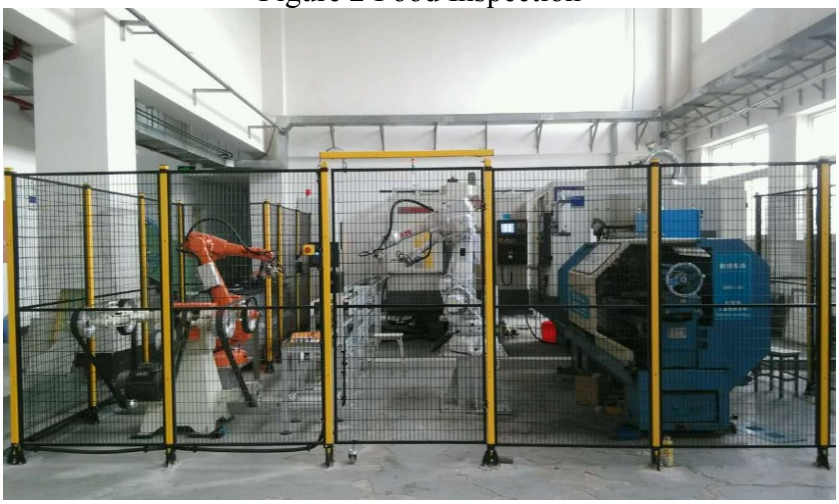

Figure 3 NC Machining

As shown in Figure 1 to Figure 3, according to the requirements of professional courses, combined with the needs of the industry, an industrial robot equipment platform is built to meet the needs of engineering machinery, food detection, numerical control processing and other fields. Combined with the realization of the experiment process, the practice and teaching course supports every link of industrial robot basic knowledge, operation and application, integrated development and application, configuration and debugging, applied scientific research professional knowledge and application main line. The main line of professional knowledge of the course system conforms to the application and development status of industrial robots and meets the requirements of professional knowledge in the field of industrial robots. In the process of experimental training,

students can integrate industry experience, project practice and operation training, so as to comprehensively promote the development of practical teaching ability of industrial robot course.

3. Training Platform Construction

Taking the core course "robotics" as an example, through the practical training in the laboratory and practice base outside the school, the students are trained in the aspects of motion simulation design, structure design, production line management, equipment maintenance, etc., so that they can skillfully use various methods to complete the design of industrial robot parts, skillfully create the assembly model of industrial robot, and skillfully create industrial robot model engineering drawing; be able to complete the design change of industrial robot model; be able to exchange data with other software tools; be able to build and manage model library. Through practical operation, students can understand the mechanical structure and electrical control components of industrial robots, and can skillfully carry out teaching programming, signal configuration and basic maintenance. The specific contents include overview of industrial robot system, basic operation knowledge, teaching programming, I / O signal configuration, hardware foundation and maintenance, etc. Finally, the mathematical design process is realized to create conditions for the integration of intelligent manufacturing system. Students can study in the industrial robot laboratory, intelligent manufacturing numerical control processing laboratory, robot comprehensive training workstation, intelligent manufacturing comprehensive training base and other places. They can combine the basic concept, basic structure and industrial application of industrial robots. The course knowledge points include industrial robot mechanical structure, industrial robot sensor technology application, control technology and programming Basic theory of technology. On this basis, students' learning interest and learning methods for professional skills of industrial robot industry can be cultivated, so as to achieve the cross integration of traditional mechanical courses and new subject knowledge points, and realize the upgrading of course system.

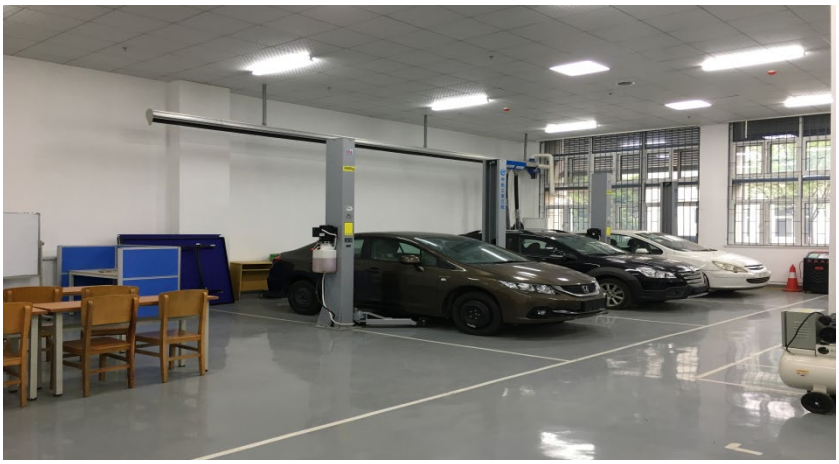

Figure 4 Practical Teaching Area

The professional direction of industrial robot is based on the robot teaching and training center, with the industrial robot as the main object. In the process of understanding and learning the structural principle of industrial robot and integrating with peripheral equipment, students form a systematic understanding by combining the teacher's lectures, so as to make a comprehensive understanding of the mechanical, circuit, signal, detection, control, software and system courses they have learned , combine theory with practice, establish the concept of industrial automation equipment and automation system, understand and learn relevant theoretical knowledge, and closely integrate theoretical knowledge with actual engineering entities. On this basis, the relevant curriculum design and directional training courses, matching with the corresponding teaching materials and technical services, truly combined with the school's teaching work, to maximize the role of the training base.

Figure 5 Practice Platform

Figure 6 Teaching and Training Center

4. Conclusion

The application of robot technology is more and more extensive, and the demand of robot engineer is increasing. In order to meet the needs of the market and deliver qualified professional talents to enterprises, this paper, based on the requirements of new engineering for application-oriented talents, proposes to start from the construction of comprehensive training platform in the direction of industrial robotics, closely follow the needs of the new economy, and set up relevant teaching and training modules, so that students can truly master theoretical knowledge and practical skills in the direction of industrial robotics, which lays a solid foundation for their employment.

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