

The practical path of robot education in application-oriented undergraduate colleges

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Abstract: With the rapid development of science and technology, robot technology has become an important part of today's world. Since the birth of the first robot in the late 1950s, robot technology has been developing rapidly, becoming an important symbol to measure the level of science and technology of a country and the modernization and informationization of the national economy. At the same time, with the continuous development of robot technology, its application in the field of education has gradually been paid attention to. Especially in applied undergraduate colleges and universities, robot education has become a new way of education, which is of great significance for improving students' practical ability and innovative spirit. This paper will discuss the implementation status of robot education in applied undergraduate colleges and universities, in order to provide reference for the development of related fields.

Key words: Robot education; Application-oriented undergraduate colleges; Practice path

Introduction: Since the 20th century, robots, as one of the greatest inventions of mankind, have made remarkable progress. At present, robot technology has become one of the international focus on development and extensive research subjects. In 2015, China issued the "Made in China 2025" national strategic plan, which specifies that lethal robots will be one of the key areas of development in China. In the "Made in China 2025" issued by the state in 2016, robots are also listed as a priority area of national development. Faced with the booming development of the burgeoning robot field, application-oriented undergraduate colleges and universities, as the cradle of application-oriented talent training and the base of innovative education, will play an important role in China's innovation development and high-tech field. At present, some applied undergraduate colleges have set up robot-related colleges, and through associations, competitions and other ways to enhance the interest of college students in robot education. However, there are still serious deficiencies in the practical ability and innovative consciousness of college students, and there are still many problems to be solved in classroom teaching. Therefore, it is of great practical significance for the practice and exploration of robot education in application-oriented undergraduate colleges.

I. Existing problems of robot education in applied undergraduate colleges and universities

1. The curriculum is out of step with the actual demand

In the current field of robot education, the curriculum of many application-oriented undergraduate colleges still stays in the traditional teaching mode, paying too much attention to basic knowledge such as theoretical learning and programming languages, but ignoring actual operation and practice. This disconnect results in students being unable to truly understand and master robot technology, and unable to meet the society's urgent demand for robot technology talents. This phenomenon is like a "short board", which seriously restricts the growth and development of students in the field of robotics. Some universities still use old teaching materials and outdated technology, which makes it impossible for students to integrate their knowledge with practical work needs. This disconnect not only makes students feel confused and helpless in their studies, but also makes them face many difficulties in their future careers. Therefore, reforming the curriculum and strengthening practical teaching are the key to solving the problem of "short board" in the field of robot education.

2. Lack of teaching staff

Robotics is an interdisciplinary field that requires teachers with a wealth of knowledge and skills. However, many applied undergraduate colleges currently lack teachers with relevant background and practical experience. This is like a "defect", which makes the quality of robot education can not be guaranteed. In the pursuit of excellence, excellent teachers are a key factor in the growth of students, and their guidance and guidance are crucial in cultivating students' abilities and qualities.

The lack of teachers with rich experience and professional knowledge prevents students from receiving adequate guidance and assistance in their learning process. This not only affects the learning effect of students, but also restricts their development potential in the field of robotics. Therefore, strengthening the construction of the teaching staff and improving the professional quality and teaching ability of teachers are the key to promote the development of robot education.

3. The experimental equipment is backward

Due to the limitations of funds and technology, the experimental equipment of many application-oriented undergraduate colleges and universities has fallen behind The Times and cannot meet the needs of robot education. This situation is like a "bottleneck", preventing students from accessing and learning the latest robot technology and equipment. Advanced experimental equipment can provide students with better practice opportunities, help them better master robot technology, and lay a solid foundation for future career development.

II. The practical path of robot education in application-oriented undergraduate colleges

1. Clear teaching objectives

Before the implementation of robot education, it is first necessary to clarify the teaching objectives to ensure that the entire education process has a clear direction and purpose. These goals should not only include training students to master advanced robotics, but also

emphasize understanding the basic principles of how robots work, as well as cultivating their ability to design and develop innovative robot applications.

In order to make the teaching objectives more specific and clear, these objectives can be further refined, such as: Mastering advanced robotics: Students should be able to be familiar with and master the latest robotics technologies, including machine learning, deep learning, computer vision, etc., in order to be able to apply these technologies to practical operations; Understanding the basic principles of how robots work: Students should be able to understand the basic construction of robots, how they work, and the functions of various sensors and actuators. This helps students better understand the behavior and performance of the robot, so that it can be better controlled and applied; Design and development of innovative robot applications: Students should have innovative thinking and practical operation ability, and be able to design and develop innovative robot applications according to actual needs. This requires them not only to master the theoretical knowledge of robotics, but also to have the ability to transform the theoretical knowledge into practical applications; By clarifying these specific teaching objectives, they can provide clear guidance for subsequent teaching activities. For example, what teaching content and methods should be chosen to help students master these skills and abilities, how to evaluate their learning outcomes, etc. This will ensure that the entire robot education process has a clear direction and purpose, so that teaching goals can be better achieved.

2. Improve the curriculum

In order to achieve the teaching goal, applied undergraduate colleges need to build a comprehensive and perfect robot course system. This course system should cover many aspects of the course content, such as the basic knowledge of robot, robot control technology, robot programming technology and so on. These contents should not only contain rich theoretical knowledge, but also be closely combined with practical application to provide enough practical opportunities for students to ensure that they can truly understand and master these knowledge.

In terms of basic knowledge of robots, students need to understand the basic concepts, classification, application scenarios of robots, etc. In addition, students need to master the basic composition, working principle and common components such as sensors and actuators of robots. This knowledge can help students build an overall understanding of the robot and lay the foundation for further in-depth study.

In terms of robot control technology, students need to learn how to achieve precise control of robots through hardware and software. This includes understanding the kinematics and dynamics principles of the robot, and mastering the technology of motion planning and path planning of the robot. At the same time, it is also necessary to learn how to achieve functions such as remote control and autonomous navigation of the robot through programming.

In terms of robot programming technology, students need to master at least one mainstream programming language, such as Python, C++, etc. At the same time, students also need to understand the development framework of robots and commonly used library functions. Through programming practice, students can learn how to write high-quality code to achieve a variety of complex functions, laying a solid foundation for the subsequent practical application.

In order to ensure that students can truly understand and master these knowledge, the principle of combining theoretical teaching with practical application needs to be fully considered in the curriculum setting. In addition to traditional classroom teaching, it is also necessary to introduce practical links such as experiments and course design to give students more opportunities to practice. At the same time, through cooperation with enterprises, practical cases and practical projects can be introduced, so that students can better understand the application and demand of robots in actual production, and improve their practical ability and comprehensive quality.

3. Build a teaching team

The importance of robot education is self-evident, and it requires a team of highly qualified teachers to ensure the quality of teaching. These teachers should not only have solid knowledge and practical experience in robotics technology, but also master educational theory and practical skills so that they can effectively pass on knowledge to students. In order to ensure the high quality of the teacher team, the teaching level and professionalism of teachers can be improved by introducing teachers with rich experience and professional skills, or organizing existing teachers for professional training and refresher courses. These measures can ensure that the team of teachers constantly update their knowledge and improve their skill level to adapt to the changing trend of robotics technology development. In addition, the team of teachers also needs to have good innovation ability and teamwork spirit. Only in this way can they cope with various complex teaching challenges and provide better educational services to students. At the same time, schools can further improve the overall quality of the teaching team by establishing a sound incentive mechanism and evaluation mechanism to attract and retain excellent teachers.

4. Integrate teaching resources

The importance of robot education lies in its ability to make full use of various teaching resources, including laboratories, practice bases, libraries, etc. on campus, as well as enterprises and scientific research institutions off campus. Through cooperation with enterprises and scientific research institutions, we can share resources, complement each other's advantages, and improve the quality of education. In addition, robot education can also provide more practical opportunities and employment channels for students through school-enterprise cooperation and school-school cooperation. These ways of cooperation can promote the integration of industry, university and research, promote the innovation and development of robot technology, and at the same time provide students with better career development opportunities and enhance their employment competitiveness.

5. Carry out practical activities

In the field of robot education, practice is a crucial part of improving students' practical ability and innovation awareness. In order to enable students to better apply what they have learned and improve their learning interest and enthusiasm, practical activities such as robot

competitions and robot social service projects are very necessary.

By participating in robotics competitions, students are exposed to a variety of different robotics technologies and learn how to apply theoretical knowledge to practical operations. This not only deepens their understanding of robotics, but also helps them to discover new problems and come up with new solutions. At the same time, robot competitions can also cultivate students' teamwork spirit and sense of competition, laying a solid foundation for their future career development.

Robot social service projects, meanwhile, can help students apply what they have learned to practical scenarios and improve their practical ability and sense of innovation. For example, students can participate in community service projects, using robot technology to provide various services to community residents, such as cleaning and nursing. Through such projects, students can apply the robot technology they have learned to real life, while also improving their sense of social responsibility and citizenship.

Robot education has been widely paid attention to and implemented in application-oriented undergraduate colleges. By integrating robot technology into the curriculum system, organizing students to participate in competitions, setting up robot LABS and carrying out school-enterprise cooperation, students' comprehensive quality has been improved, and more opportunities have been provided for their future development. However, despite certain achievements in robot education, there are still some problems that need to be solved. For example, it is necessary to further improve curriculum and textbook construction, improve teachers' professionalism and technical level, as well as strengthen laboratory construction and equipment maintenance. Looking forward to the future, with the continuous development of robot technology and the state's emphasis on scientific and technological innovation education, robot education will play a more important role in application-oriented undergraduate colleges. At the same time, with the in-depth promotion of school-enterprise cooperation and the combination of industry-university-research, robot education will pay more attention to the cultivation of practice and application ability, and provide more support and help for students' future employment and development.

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