Basic Concepts and Definitions in Educational Robotics

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ABSTRACT

This article provides an overview of the basic concepts and definitions in educational robotics. The article provides examples of the use of basic concepts in practical training, and also discusses trends and prospects for the development of educational robotics. The results obtained can be useful both for researchers and teachers, and for practitioners in the field of educational technologies and robotics.

Keywords: robot, educational robotics, technical skills, robot programming, sensors, actuators, engineering design

INTRODUCTION

Modern education has become an integral part of the digital age, where technology plays a key role in developing skills and knowledge among students. One of the most important areas that combines technological progress and the educational process is educational robotics. Robotics in the context of education is becoming a powerful tool for developing technical skills, logical thinking and creativity in students. Consideration of these concepts will allow readers to better understand the essence and basic principles of educational robotics, as well as understand how these concepts can be applied in educational practice.

MATERIAL AND RESEARCH METHODS

There is a lot of research going on in the field of educational robotics covering various aspects of the field. Research on the effectiveness of using robots in teaching to develop technical skills among students of different ages and levels of training is considered in the works of Vyazov S.Ya., Kalyagina O.Yu., Slezin K.A. [1], Ospennikova E.V., Ershova M.G. [2].

Knowledge of the basics of robotics should become a basic element of youth education and be included in the content of the curriculum of all pedagogical universities in the areas of physics, mathematics and computer science.

Corresponding decisions at the state level are already being taken in a number of countries in the world community. Thus, for the educational systems of the USA and Great Britain, the priority tasks are to prepare students of pedagogical universities in the field of computer science and robotics, and to develop their readiness to carry out various technical projects [4].

In the education system of Uzbekistan, competitive and competitive robotics is mainly developed, thematic events are organized, in which only schoolchildren and students who are passionate about technical creativity take part. So far, only in certain universities in some regions of Uzbekistan courses in educational robotics are included in the curriculum. As a rule, these are elective courses or additional subjects [5].

RESEARCH RESULTS AND DISCUSSION

Educational robotics is a teaching method that uses robots to assist in the learning of knowledge and skills. It is aimed at developing

students' professional competence, logical thinking, creative approach to problem solving, teamwork and programming skills.

In educational robotics, there are a number of core concepts that play a key role in understanding the field. A robot, in the context of educational robotics, is a device capable of interacting with its environment and performing tasks for educational purposes. Educational robotics is a field of study that uses robots to develop skills in students such as technical thinking, programming, engineering principles, etc. Devices that allow robots to obtain information about their environment such as distance, color, sound, light and other parameters are called sensors. The concept of an actuator hides a mechanism whose main task is to transfer forces from the control device to the actuator. Actuators differ from each other in the way they transmit energy. The controlled object can be driven by rotating or linear action [6].

Technical skills, in turn, include the ability to program robots, work with electronics and mechanics, as well as analytical thinking and problem solving. Robot programming means creating software code to control the robot's actions, including goal setting, action algorithms, and data processing. Specific learning tasks or projects that students complete with the help of robots to develop their skills and knowledge are the tasks of educational robotics. In engineering design, computer-aided design (CAD) technologies are used, which make it possible to design hardware and software parts of products containing electronic, mechanical, optical and mixed components. Computer-aided design (CAD) involves the use of computer technology and software to create, edit, analyze and optimize engineering designs [3]. All these concepts and definitions are the basis for understanding and applying educational robotics in modern education, and also determine the directions of development and innovation in this area.

Educational robotics provides students with ample opportunities for development and self-realization. Coding is a key skill for the future, and learning to code with robots makes the process fun and accessible. The knowledge and skills gained in educational robotics can provide a great start to a future career in information technology or robotics. Many educational robotics projects require teamwork, which allows students to develop teamwork, communication, and negotiation skills.

When choosing an educational set in the field of robotics, you should pay attention to the level of complexity of the course, the availability of training materials and the possibility of expanding knowledge.

Educational methods in robotics reflect a variety of approaches to learning using robots, such as problem-based learning, project activities, game techniques, etc. Trends and prospects for the development of educational robotics include the introduction of new technologies, the development of interactive teaching methods, and improving the availability of educational resources and increasing the efficiency of learning through the use of robotics [5].

CONCLUSION

Educational robotics is an exciting and innovative way of learning that helps students develop a variety of skills, including technical skills. Mastering the basic concepts and principles of learning in the field of robotics opens up a fascinating world of technology and opportunities for creative development.

Educational robotics is an important and promising field of education that plays a key role in developing technical skills and creative thinking among students.

Analysis of concepts such as robot, educational robotics, technical skills and programming allows you to better understand the essence and features of educational robotics. Definitions of key terms such as sensors and actuators, engineering design, educational methods and development trends are the basis for the successful implementation of robotics in the educational process.

Future research and development in the field of educational robotics could focus on optimizing educational methods, creating innovative teaching materials, and developing interactive educational platforms using robots. The introduction of modern technologies and the active use of robotics in education will

effectively prepare students of pedagogical universities for the challenges of the modern world, including the need for highly qualified specialists in the field of engineering, information technology, science and technology. The development of technical skills and robot programming skills contributes not only to the formation of professional competence in future specialists, but also to training in critical thinking, analytical skills and solving complex problems.

However, the introduction of robotics into education also presents a number of challenges to educators and educational institutions. These challenges include the need to train qualified teachers, ensure availability of necessary equipment and technical support, and develop quality curricula and methodologies. Despite these difficulties, the use of modern technologies and robotics in education opens up new opportunities for developing the educational environment and preparing students for the demands of the modern world.

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