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Steam Education in the Form of a Robotics Module by Means of Artificial Intelligence

Yunusova Gulshod Nazikhovna
Namangan State University, Department of "Digital Educational Technologies" of Namangan State University

Abstract: *This article reveals aspects of the definition of educational robotics and artificial intelligence, defines the application of robotics and artificial intelligence. Identifies the main aspects of the application of computer programs of artificial intelligence in robotics, in the use of robots, gives general outlines of such training, which provides training in several areas at once. STEAM education includes training in the module of educational robotics through information intelligence, with its practical application in robotics.*

Keywords: *STEAM Education, robotics, AI, artificial intelligence, interdisciplinary abilities, augmented reality (AR) and virtual reality (VR) applications.*

Introduction

As is known, education includes scientific innovations, which entail new technologies, design and graphics, new programming languages, market demands for the creation of various robots, improving human life, creating various modern conveniences at work and at home, and the creation of such technologies certainly requires knowledge in engineering, robotics, mathematics, programming and robotics.

The development of STEM education with the development of artificial intelligence (AI) and related fields such as Big Data, Data Analytics, Data Science, Machine Learning, Virtual Reality, Augmented Virtual Reality and others leads to a number of changes in the field of education. Some of them are:

Personalized learning. AI is able to give tasks based on the needs and level of knowledge of students.

Research and innovation. Supercomputers and machine learning algorithms have the ability to analyze large amounts of data, can find hidden patterns. This can serve as a reason for the development of new technologies and research methods.

Improved educational materials. With the help of AI, interactive and adaptive educational materials can be created. For example, with the help of training programs, you can create educational games, simulations that will help to present the study material in a more interesting way.

Reducing knowledge gaps. AI, having studied the weaknesses of students in studying materials or having analyzed the test results, can identify topics that students have mastered poorly and, based on this, can give them additional tasks. This will help to study the subject more deeply.

Changes in the roles of teachers. The teacher from the teacher-transmitter of knowledge goes into the coordinator of training, in which the student is based on AI. But the development of AI in training leads to a number of problems that require their solution:

1) ensuring transparency and fairness of algorithms;

2) introduces new prospects and risks in the field of training. 3) the use of AI in training requires a balance between automation and human skills, strict control and ensuring the ethics and safety of implementation.

Literature review and methodology

We have reviewed the literature in this area and started our research, as a result of which we offer literature for review, which shows the growth of STEAM[3],[4],[7],[9],[11],[12] learning due to the development of information technology, as well as artificial intelligence, the use of various chat bots is growing, Chat 4.5 | Midjourney, Chat GPT Generator, ChatGpt | Neural Network, Raqamli| ChatGPT [1],[2],[3].[4],[6],[7],[8],[9],[10]. We have analyzed the existing literature and have written textbooks, manuals, articles during our research that show the growth and influence of information technology in the field of STEAM[1],[2],[3],[4],[5],[6],[7],[8],[9],[10],[11]. Determining the level of connection between the growth of information technology and computer programs, the level of growth of the emergence and implementation of chat bots and applications, AI systems in education, especially in training. As a result of our research into STEAM learning in continuous learning, we have identified weak points that are subject to computerization, and we propose to teach them using computer game programs that we have created. As a result of our research, on STEAM training in continuous learning, we have identified weak points that are subject to computerization, and we propose to teach them using computer game programs that we have created. We propose to conduct training using digital technologies [2],[3],[4],[5],[6],[7],[10],[11],[12],[13],[14],[15],[16],[17]. We have determined the level of significance of the digital platforms being created, various electronic resources for training, determined that training with the help of chat bots from an early age, the use of digital platforms and technologies increases the level of knowledge in the field of STEAM [4],[5],[9],[11],[12],[13], helps at the junction of several sciences and areas to understand the significance of certain topics, based on scientific nature, technical application [2],[3],[4],[5],[14],[15],[16],[17],[18],[19]. The STEAM training includes a robotics training [18],[19],module, which includes the creation of robots, programming their movements, using various sensors and detectors, and using artificial intelligence [16],[17],[18],[19],[20]. The combination of educational robotics and AI technologies is the way to form future inventors. Students can learn robotics and AI together, here they also learn programming, which results in an innovation, a robot is designed. Students can thus temper their abilities and knowledge in this training for their future career [17],[18],[19], [20].

Results and Discussions

Such training brings with it the development of the following abilities of students:

1. Development of interdisciplinary abilities

The junction of educational robotics and artificial intelligence technologies promotes the integration of science, technology, engineering, arts and mathematics (STEM) disciplines for students' innovative intelligence.

2. Personalized learning experience

AI technology enables educational robots to provide special educational content and feedback based on students' performance and interests, increasing student engagement and increasing their interest.

3. Development of the spirit of practice and experimentation

The combination of educational robots with AI technology helps students learn skills in programming, electronics, mechatronics, mechanical design in practice, teaches them how to do data analysis, helps them perform tasks in practice.

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Let's find out what the strategy of effective integration of educational programs on robotics and AI leads to1. First, it is project-based learning (PBL)ю

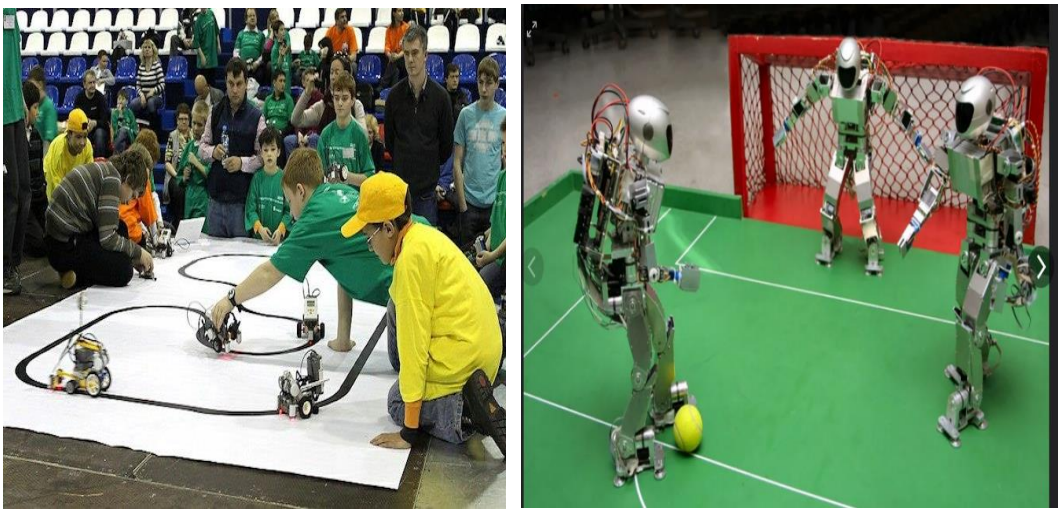

Figure 1. a), b). Robotics and artificial intelligence competition.

1. Project-Based Learning (PBL)

Through hands-on projects, such as building AI-powered robots, students can learn about AI and robotics in action and develop their ability to solve real-world problems.

With the help of practical projects, you can study the creation of robots that are controlled by artificial intelligence. The process from creating a robot to setting it in motion is an interesting process in which you can practically see the process of creating at least a simple robot and the process of its movement, voice recognition, etc. This way you can teach students practical skills.

2. Interdisciplinary cooperation

Integrating education in the field of artificial intelligence and robotics into various disciplines such as mathematics, natural sciences and art, design and graphics helps develop their integrative skills and innovative intelligence.

3. Changes in the roles of teachers

Students learn independently in such a learning environment. Teachers help them learn in the TongjiNews.com environment. They become learning facilitators.

Let's look at the latest trends in the integration of robotics and artificial intelligence technologies

1. Promotion of open source technologies

In this aspect, experiments and innovations are accelerated by exchanging data and models. There is a convergence of educational robotics and artificial intelligence technologies.

2. Augmented reality (AR) and virtual reality (VR) applications

The fusion of educational robotics and artificial intelligence technologies with the introduction of augmented and virtual reality technologies provides an immersive learning process.

In the future, educational robots will be partners in various fields for humans.

Figure 2. a), b), c). Robotics and artificial intelligence competition.

Conclusion

Our research continues to improve these technologies, and in the future, the integration of artificial intelligence and robotics will develop even more, improving our interaction with the computer and expanding this potential in various fields. The convergence of educational robotics and AI technologies opens up new opportunities for future IT professionals. Through education, students can learn AI and robotics in a practical way.

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