eISSN: 2229-3213 pISSN: 2229-3205
The Journal of Applied Science and Social Science
Volume 16,Issue 05 May, 2026

THE ROLE OF ARTIFICIAL INTELLIGENCE (AI) IN THE MODERN EDUCATION SYSTEM

Mamirov Yorkinbek Tursunalievich
Andijan State Technical Institute,
Assistant of the Department of "Technological Machines and Labor Protection"

Abstract. Features of artificial intelligence in education. Advantages and disadvantages of using artificial intelligence in education. Artificial intelligence in the pedagogical process. Main directions of applying artificial intelligence in education. Intelligent knowledge testing and evaluation systems. Prospects and risks of using artificial intelligence in education

Keywords: Artificial intelligence, hav, education, neuron

I. Opportunities of artificial intelligence in education.

The modern world is at the crossroads of the information revolution and the rapid development of technology. In this context, artificial intelligence (AI) and neural networks are becoming key tools that can transform many aspects of society, including the field of education.

Artificial intelligence (AI) is a field of computer science that deals with the creation and development of software and hardware systems that can mimic the human mind and perform tasks that typically require human mental abilities. The main goal of artificial intelligence is to create computer systems capable of analyzing data, learning from experience, making decisions, solving problems, and performing actions similar to human capabilities, but at the same time with high speed and accuracy. Artificial intelligence encompasses a wide range of technologies and techniques, including machine learning, deep learning, neural networks, natural language, computer vision, robotics, and more. It is used in medicine, finance, automotive, education, art, and many other fields. Artificial intelligence strives to learn and improve through experience, creating systems that can adapt to changing conditions and environments. An important feature of AI is its ability to process large amounts of data and find patterns within it, making it a powerful tool for analysis and forecasting.

Artificial intelligence is a branch of computer science concerned with the creation of systems and programs capable of performing tasks requiring human intelligence, such as learning, data analysis, planning, and decision-making.

The role of neural networks in education is very significant, especially in the context of personalized learning. Personalized education refers to the creation of a curriculum and techniques tailored to the individual needs and abilities of each student.

It should be noted that teachers themselves use artificial intelligence in education. Neural networks help teachers find learning materials, create topics for lessons, and provide many opportunities for use.

1. Supporting education

· Personalization of education. Artificial intelligence creates educational programs tailored to each child's level of knowledge and needs. Thus, the material is absorbed better.

· Explanations and tips. If the child has difficulty understanding the material and gives advice on completing the assignments, the assistant may write additional explanations.

• Time management. Artificial intelligence helps a child create a schedule for school, homework, and other activities.

2. Skill development

• Language skills. The neural network helps develop reading, writing, speaking, and listening skills through interactive tasks and dialogues.

• Mathematical skills. To develop mathematical literacy, they can develop auxiliary problems and exercises.

Creative abilities. Artificial intelligence supports a child's interest in art, music, and other creative fields.

3. Motivation and interest.

· Game-based approach. AI can use game elements to create an engaging learning experience that motivates the child.

· Awards and achievements . Assistant can create virtual rewards and gifts for achievements and learning progress.

4. Social adaptation

Dialogue and communication. A neural network allows a child to practice foreign language dialogues or learn the basics of politeness and communication.

· Develop emotional intelligence . With the help of AI, a child can recognize and distinguish emotions that are important for social interaction.

5. Feedback

· The AI-based assistant is capable of analyzing the child's answers, identifying and explaining errors in detail, which helps to understand the material more deeply.

6. Model study

· Moral and social lessons . Artificial intelligence can serve as a model for teaching moral and social norms.

7. Developing critical thinking.

• Analysis and evaluation. A neural network helps a child analyze information, verify facts, and develop critical thinking.

II. Main features of artificial intelligence in education.

The first attempts to use artificial intelligence for educational purposes were implemented in the 1970s through the SCHOLAR system. Today, it is called a smart education system. This type of artificial intelligence for educational purposes is one of the most widespread and practically used today.

Early experiments with speech formation show that artificial intelligence helps reduce the teacher's workload—mass testing of knowledge and quick feedback. Today, in teaching, AI expects to develop and support a flexible learning environment that not only performs simple learning tasks but also creates a unified system of recommendations and helps achieve learning outcomes, personalize the learning process, and increase growth rates. In this review, we focus on three main areas that have been researched for a long time: intelligent learning systems, dialogue-based learning systems, and automatic writing assessment. We will also briefly describe hybrid systems that have development prospects.

Intelligent educational systems.

The most widespread and long-standing area of artificial intelligence application in education. An intellectual educational system (IES) is a personalized teaching aid that organizes material according to the capabilities and needs of the student. Such systems have proven most successful in well-structured areas of knowledge, such as the exact sciences. Let's take a closer look at how smart learning systems work, as this will help us better understand the principles of how AI works. In the IntelligenceUnleashed report (oro.open.ac.uk): AnArgument for Learning within AI highlights three models of intelligent learning systems:

A model of the field of knowledge. AI needs knowledge about the subject being studied: topics, connections between them. The more rigorous and structured the subject of knowledge, the more effective AI will be. Therefore, mathematics, physics, and computer science are the most suitable subjects for organizing AI.

Student model. AI needs knowledge about the learner: information about their previous achievements, challenges they have faced, their emotional state, and level of engagement.

Pedagogical model. To work with this model, AI requires knowledge of effective learning approaches: providing feedback, evaluating, and recommending further content.

To better understand how the presented models work on it, let's sketch a typical ISO device.

AI algorithms process data from three models. The processing results are presented in the learner's interface in the form of personalized educational content (text, sound, video, animation, tasks). As soon as the learner begins to interact with the content, it leaves a digital trace, which is also analyzed using AI methods. The results of the digital trace analysis serve as a basis for reflection and new adaptation of the educational content.

During this process, large volumes of data are collected, which are cyclically used by the system for dynamic optimization and self-improvement. The cycle repeats until the learner achieves an educational outcome or learns an entire area of scientific knowledge.

Dialogue-based education systems Let's return to the pioneer of AI in education - the SCHOLAR program. 50 years ago, in addition to providing a personalized learning experience and feedback on natural language, this system also supported communication with learners on the subject of the lesson. Thus, this program serves as a prototype not only for intelligent educational systems but also for dialogue-based educational systems.

Such systems are built according to the same scheme as intelligent educational systems— they are based on a pedagogical model, a learner model, and a knowledge sphere model. However, the difference is that such systems do not provide tailored educational content, but instead simulate a dialogue with learners to find the right solution, assess knowledge and determine its level, and reinforce the topic. To do this, technologies such as response classification, semantic analysis, parsing, and natural speech generation are used.

Examples

AutoTutor is a conversational environment that simulates the educational dialogue between the teacher and the student during the step-by-step execution of online assignments. The goal of the program is to facilitate in-depth study of the topic.

Watson Repetitor is a dialogue-based educational system developed by Pearson and IBM for universities. The program suggests additional materials, tracks progress, and adapts the interview based on responses.

University development 20.35, which answers students' questions based on neural network ensembles. Deep Tech Fake lets you add an image of a teacher's face to a 3D doll to simulate a presence effect. The launch of the pilot version of the project is scheduled for the end of 2022.

AI prospects in education:

Improving access to education: Artificial intelligence will help expand access to education, especially in remote or low-income areas where teachers may have limited resources. AI technologies can provide educational resources and services online, making education more accessible for everyone.

Improving the quality of education: AI helps improve the quality of education by offering a personalized learning approach tailored to the needs of each learner. AI systems can analyze learning activity data and offer recommendations and feedback, leading to more efficient learning and better results.

Optimizing the teacher's role: AI does not replace the teacher's role, but optimizes it. Teachers can use AI technologies to automate assessment, analyze data, and support personalized learning. This frees teachers from routine tasks and allows them to focus on higher-level tasks such as course development, individual guidance, and student motivation.

Development of new educational approaches:

AI helps develop new educational approaches, such as adaptive learning, where educational programs can change and adapt to the needs of learners in real time. Artificial intelligence can also support the development of innovative teaching methods such as game technologies, virtual

reality, and simulations, which can offer learners unique and immersive ways to learn. reality and simulations, which offer learners unique and engaging ways to learn. For example, a product like Carnegie Education is powered by artificial intelligence, and the website states: "No learner learns the same way." Carnegie Education Carnegie Mellon University built on decades of research and has become a recognized leader in educational technology, leveraging artificial intelligence, formative assessment, and adaptive learning to provide innovative solutions to the most challenging educational challenges.

Supporting inclusive education: AI helps create an inclusive learning environment by offering different ways to present information and adapting educational materials to meet the needs of different learners, including children with special educational needs. AI can also support tracking and evaluating learners' progress by offering additional resources and support to those in difficult situations.

Google is in inclusive learning with experience maintenance tools. Experiments with Google (Experiments with Google) is a service created by Google that includes a set of tools to help children with disabilities engage in creativity. Most importantly, you do not need additional expensive equipment to work with them. All you need is a computer or tablet connected to the Internet and a webcam. At the same time, access to many of the service's tools is absolutely free.

Improving education system management: AI can be used to analyze data and identify patterns that help improve education system management processes. Data analysis helps make more informed decisions, optimize resource allocation, and evaluate the effectiveness of educational programs.

Predicting and preventing problems: AI can be used to predict problems that may arise in the learning process, such as dropout, academic failure, or learning difficulties. Based on data analysis, AI systems can provide recommendations on how to prevent such problems and provide additional resources or assistance to those at risk.

III. Advantages and disadvantages of using artificial intelligence in education.

The use of artificial intelligence in education has the following advantages:

Allows you to personalize your learning. As discussed above, artificial intelligence can analyze data about each learner, such as speed and learning ability, and offer personalized instructions tailored to each learner's needs, ensuring maximum learning and growth for each learner.

It allows for the automation and improvement of the learning process. AI can automate a number of routine tasks, such as checking assignments and evaluating the correctness of answers, allowing teachers to focus on more meaningful tasks, such as providing individualized support to students or developing new educational programs.

Conclusion

Through the application of artificial intelligence in education, it is advisable to rely on approaches in three areas: big data, computer calculations, and educational values. Transparency is very important for this: artificial intelligence should be used where we can see how and why a particular decision was made. It is very important that our choices and mistakes, and our emotions, help make education more effective, help us realize our potential, and help us become happier people. It is necessary to maintain a balance between the involvement of neural networks in the learning process and the sufficient presence of people in it.

Literatures

1. Khamidov A. Design of agricultural machinery. Tashkent, 1994. P. 245.
2. Khudayarov B.M., Dzhabriev A.N. "Fundamentals of Agricultural Engineering" Publishing House "IJOD-PRESS." - Тошкент, 2020. P. 145.

3. Адилов Т.Т. Разработка и обоснование параметров защитных устройств к агрегату для междурядной обработки хлопчатника: Автореф. дисс. ...канд. техн. наук. - Тошкент, 2017.
4. Adjustment and efficient operation of cotton and grain farming machinery. - Тошкент, 2020. – 200 p.