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Research Article

TECHNOLOGIES AND ALGORITHMS FOR USING ARTIFICIAL INTELLIGENCE IN EDUCATION

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ABSTRACT

The use of artificial intelligence in education represents a significant step in the evolution of educational technologies, providing new opportunities for personalized learning, improved quality of educational processes and more efficient management of educational institutions.

KEYWORDS

Supervised Learning, unsupervised learning, reinforcement learning, deep learning, neural networks, decision trees, support vector machines (svm), k-nearest neighbors (knn).

INTRODUCTION

The development of artificial intelligence (AI) and its implementation in the field of education is becoming widespread. Experts agree that AI will lead to significant transformations in industries related to intellectual activity, which include education.

The education sector, unlike business, has its own specifics for the integration of AI technologies. The main goal of introducing AI into educational processes is not to obtain an economic effect, but to improve the quality of education, which is difficult to measure using a system of objective indicators.

At the same time, the use of artificial intelligence is not only equipping classes and auditoriums with appropriate equipment, but also a change in the educational paradigm. As AI solutions are introduced, traditional classes will be replaced by multi-format project-based learning.

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The role of the teacher will also change. His importance as a mentor will increase, motivating students to work independently, teaching them how to work with information, and finding new solutions. This is due to the fact that artificial intelligence in education is based on the use of a variety of applications, including intelligent mentors, functions of personal and prompt feedback, and monitoring progress in learning.

Artificial intelligence (AI) is used in education for:

Personalization of learning: AI can help teachers create personalized learning plans for each student based on their individual needs and abilities.

Automate routine tasks: AI can help teachers free up valuable time by automating routine tasks such as grading tests, grading papers, and preparing teaching materials.

Data analysis: AI can analyze learning data, helping teachers identify areas where students need additional support and suggesting strategies to improve learning. This will make it possible to predict educational results.

Development of new teaching methods: AI can help teachers develop and test new teaching methods based on the analysis of large amounts of data. Where human attention may fail, AI will work strictly according to the algorithm, without missing anything.

Improving access to education: AI can help teachers create innovative resources that make education accessible to all students.

The power of AI can also be used to provide tailored support and increase awareness of knowledge gaps, allowing educators to leverage personalized and adaptive learning technologies. AI enables algorithm-based decision making that evaluates complex skills and knowledge in real time.

In addition, educational systems based on artificial intelligence are able to analyze the dynamics of classroom activities and student engagement, which makes it possible to quickly identify underperforming students and eliminate gaps in knowledge.

The following technologies, which until recently seemed like a distant future, are already being used in the educational sphere.

Implementation of adaptive learning. Adaptive learning presupposes a form of organizing the educational process in which the skills, interests and other individual characteristics of students are taken into account as much as possible. The construction of adaptive educational models is carried out using technologies based on AI and machine learning, which make it possible to analyze the results of mastering an educational program by a student or schoolchild and adjust it for each student.

AI-powered gamification. Using artificial intelligence algorithms, personalized games can be created that help speed up the learning process. This makes learning more fun and promotes better learning. First of all, gamification in education is used to increase student motivation. It also helps to achieve higher concentration, interest in the material being studied and retention of attention throughout the lesson.

Introduction of intelligent robotics into education. Robots in the learning process can be used to solve a variety of problems - from programming to designing and conducting experiments. This helps students develop problem-solving, creativity and teamwork skills. Students get the opportunity to apply their

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acquired knowledge and skills in practice, as well as develop creative and engineering thought.

Generative artificial intelligence. Over the past year, the popularity of this AI technology has grown rapidly. In education, generative AI is also used to improve the educational process. For example, a chatbot is able to answer students' questions, and neural networks help analyze the results of classes, select topics and materials for new ones, and tell speakers which programs require adjustments. AI also helps in the administrative work of teachers.

Currently, three modern artificial intelligence algorithms are actually used in teaching:

- Ensembles of algorithms based on logic of varying degrees of complexity. It is this AI that is responsible for constructing individual learning paths or analyzing the effectiveness of a lesson plan.
- Pre-trained neural networks, which are created to solve one specific problem and trained on a large amount of data. Such neural networks may, for example, be responsible for automatically understanding language or recognizing emotions on students' faces.
- Neural networks that belong to the field of shadow deep learning. In this case, the pretrained neural network is additionally trained on a smaller amount of data and adapted to solve a narrower problem. For example, when a language neural network is specialized in checking open tasks for a particular course.

The results of the study show that today the education sector is at an early stage of introducing AI technologies. On the one hand, in terms of investment opportunities in AI technologies and attracting specialized specialists, it is inferior to the leading segments of the economy: banks, trade, telecommunications. On the other hand, educational institutions have a special need for the use of AI, since this field of activity is directly related to information and its processing.

You need to use AI where you can see and understand how it made this or that decision and why it did so. Indeed, in educational projects, especially those aimed at children and adolescents, errors or incorrect interpretation of data can lead to serious consequences for a person's fate.

Artificial intelligence allows not only to conduct an in-depth analysis of the interaction between the student and the system, but also provides an accurate assessment of the current state and contributes to the construction of an individual learning trajectory depending on the person's demonstrated abilities.

The capabilities of artificial intelligence in the field of analysis and forecasting are used for:

- analyzing the interaction between a teacher and a student;
- forming an individual educational trajectory for a student;
- assessing the current progress of students;
- monitoring the educational activities of both students and teachers.

Thus, the use of artificial intelligence solves one of the problems of education - universality, allowing you to change approaches to learning, offering different learning options depending on the individual characteristics of each student. Features of AI in education are the use of key models: pedagogical,

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educational (various educational platforms, systems, training simulators, etc.), student model.

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