

Efficiency of Using Artificial Intelligence Technologies in the Educational Process

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Abstract: The effectiveness of the use of artificial intelligence technologies is included in the information systems used in the educational process. The content, models and capabilities of artificial intelligence technologies used in information systems are presented in detail.

Keywords: Education, information system, artificial intelligence, intelligent algorithms, machine learning, neural networks.

The use of artificial intelligence technologies in the educational process serves to improve the quality of education and reduce the human factor in the assessment of student performance. Currently, it is urgent to develop intellectual algorithms for evaluating students on the basis of multi-factor rating, i.e. on educational, scientific and practical activities. As a result of the student's educational, scientific and practical activities, artificial intelligence algorithms allow determining the student's further activities. In addition, predictive intelligent algorithms provide an opportunity to analyze the quality indicators of taught subjects. Artificial intelligence and machine learning also offer a wide range of opportunities for businesses to improve their operations and increase their revenues. Artificial intelligence models include techniques and algorithms used to teach computers to process and analyze data, just like humans. All machine learning models aim to learn a certain function (f) that provides the most accurate correlation between input values (x) and output values (y).

$$Y = f(X) \quad (1)$$

Basically the most common case is when we have data on X and Y parameter and we can build an AI model to provide the best correlation between these values. In these processes, the result cannot be 100% accurate, otherwise it would be a simple mathematical calculation without requiring machine learning. Instead, the function f we teach can be used to predict the new (y) using the new (x), allowing for predictive analysis. The composition of artificial intelligence can be illustrated by Figure 1.

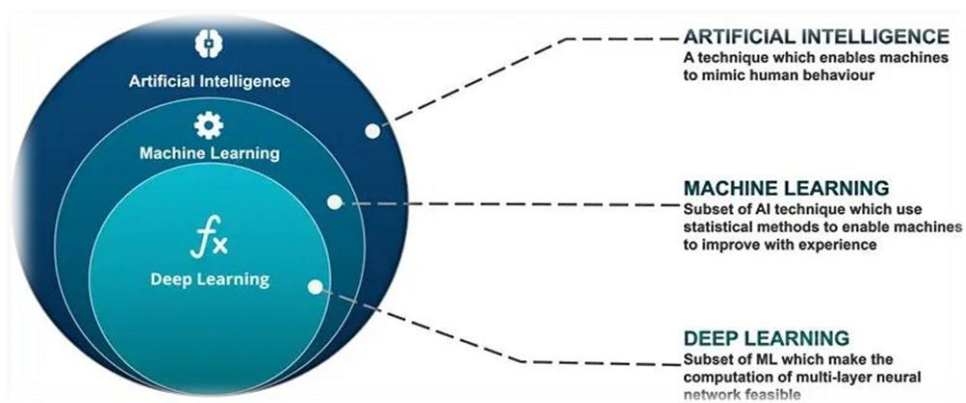


Figure 1. Content of artificial intelligence technology

Different AI models achieve this result by using different approaches. There are many types of artificial intelligence models, and we will look at the most popular ones, but before we do, we need to look at the different types of machine learning. There are three main types of machine learning:

- Controlled;
- Unsupervised;
- Semi controlled.

Supervised machine learning. In a supervised learning model, a person trains the algorithm, or teaches it what to look for.

Artificial intelligence models built with supervised learning are often used to perform predictive analytics. These models use past decisions made by subject matter experts to predict future decisions the expert may make.

In an unsupervised learning model, software trains algorithms. In some cases, the teaching method used by the curriculum does not mimic that of humans, but they are not necessarily the same teaching method.

Artificial intelligence models based on unsupervised learning are often used to perform descriptive analysis. These tasks include content summarization, content classification, and content extraction.

Semi-supervised learning models combine parts of both of the previous models we discussed. In a semi-supervised learning environment, a human performs part of the training and the software is designed to manage the rest based on the initial training performed by the human. Because semi-supervised training AI models are somewhat generalized from both training methods, they are capable of performing both predictive and descriptive analysis tasks, depending on the intended purpose.

Currently, there are various AI models and all of them differ from each other in some ways, these models are listed below.

- Linear regression;
- Logistic regression;
- Decision trees;
- Random forest;
- Neural networks;
- Deep Neural Networks.

On the basis of the above-mentioned models, the possibility of intellectual analysis of information contained in information systems in the educational process is created. It serves to increase the quality indicators of the educational process based on the intellectual analysis of the information contained in the information systems used in the educational process.

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