IMPLEMENTING ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS IN THE EDUCATIONAL PROCESS OF THE INSTITUTE OF ART AND CULTURE

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Abstract

This article examines the possibilities and prospects for introducing artificial intelligence and neural networks into the educational process of art and culture institutions. The potential for using neural networks in educational processes to create an interactive and personalized learning environment, develop creative processes, and preserve cultural heritage is analyzed. Methods of using neural networks in education, their positive and negative aspects, as well as scientific and pedagogical approaches to the implementation of these technologies in the field of art and culture have been studied. The article demonstrates the possibilities of modernizing the educational process and raising creativity to a new level.

Keywords: Artificial intelligence, neural networks, musical creativity, technology, visual arts, cultural heritage.

Introduction

Today, artificial intelligence (AI) technologies are widely used in various spheres of life. In the field of education, the application of AI and neural networks is opening up great opportunities. Especially for higher education institutions in the field of art and culture, these technologies serve as an important tool for developing creative processes. This article discusses the application of AI and neural networks in the educational process and their significance in institutions of art and culture.

When analyzing methods of utilizing artificial intelligence in education, neural networks, which are a part of AI (artificial intelligence), are primarily considered. Habibulin Irek Raisovich, in his article "The Urgency of Using Neural Networks for Educational Purposes," states: "Initially, neural networks were used to analyze large volumes of data and to solve problems of classification and clustering." However, with the development of technology and the increase in computing device power, neural networks have become a promising tool in educational processes [2].

Neural networks can be categorized based on the types of end products they create. Each type is designed to solve specific problems. Among them, we can highlight data compression, image recognition, speech and handwriting recognition, text and image generation, machine translation, question-answering systems (chatbots), face editing, and others. The listed capabilities of neural networks demonstrate that their application in the field of education has great potential for widespread use. It is important to remember that such active and widespread use of neural networks in this area can have both positive and negative aspects.

The following positive examples can be cited when considering the possibilities of using neural networks by students and teachers:

✓ neural networks help teachers reduce the time spent checking students' work (i.e., significantly saving teacher resources by automating repeated processes);

✓ neural networks can be used to create personalized learning materials tailored to the needs and level of knowledge of each student;

✓ can make lessons more interactive;

✓ the neural network can create visual and illustrative materials on the topic under study (for example, visualization of the text of a poem);

✓ using a neural network, it is possible to organize classroom discussions using the created texts for analysis and error detection;

✓ the basic skill required is to send the right request to the network, that is, to set the right task and analyze the result.

However, there are also negative aspects of using neural networks in the educational process:

✓ The data privacy problem: Using neural networks may require the collection and analysis of large amounts of students' personal data, which may compromise their privacy and security.

✓ The risk of developing technology dependence, manifested in the active use of neural networks by students for preparing homework, taking exams, and writing diplomas, issues of responsibility for generated content and its consequences, issues of preparing homework, taking exams, writing diplomas, issues of responsibility for generated content and its consequences.

Overall, AI technologies can be effective in improving the educational process in the following areas:[3]

1. Ensuring an individualized approach: using AI, educational programs are developed in accordance with the students' abilities and level of mastery. For example, based on neural networks, educational materials can be adapted to the student's learning pace.

2. Automation of creative processes: Neural networks help create musical compositions, works of visual art, or dramatic works. This creates conditions for the further development of students' creativity.

What are neural networks and creative processes? Neural networks are artificial models that simulate the activity of biological neurons, through which large volumes of data can be processed and analyzed. Neural networks in institutions of art and culture can be used in the following areas:

Musical creativity: It is possible to create musical compositions based on neural networks, analyze existing works, and determine their stylistic uniqueness. Neural networks are systems similar to the workings of the human brain, in which millions of virtual neurons are used to process data and make independent decisions. When creating musical compositions, neural networks are used to study existing musical databases and create new music.

Neyron tarmoqlar asosida musiqa yaratish jarayonida quyidagi texnologiyalar keng qo'llaniladi:

• **RNN (Recurrent Neural Networks):** Neural networks of this type specialize in studying time-dependent sequences. They are used to analyze the sequence of notes and create new music.

LSTM (Long Short-Term Memory): Strong in the study of long-term connections and used to understand repetition and complex patterns in music.

• **Transformer models:** Powerful in creating music, generating sequences taking into account the long context.

• **GAN (Generative Adversarial Networks):** This technology is used to create realistic and creative musical pieces.

The following platforms and tools are widely used to create music based on neural networks:

• **Magenta (Google):** With open source code, used for music and other creative projects.

• **OpenAI MuseNet:** A powerful model that can create multi-style music.

• **AIVA (Artificial Intelligence Virtual Artist):** specializes in creating professional-level musical compositions.

The creation of musical compositions based on neural networks expands not only technological but also creative possibilities. These technologies help composers and musicians create new ideas, as well as bring innovations to the music industry. In the future, music created on the basis of artificial intelligence is expected to increase its importance as a harmonious form of art and technology.

• **Visual Arts:** By teaching machines, you can create illustrations that fit different styles and trends. This serves as a source of new creative ideas for students. In this article, we will discuss the use of neural networks in visual arts, its possibilities and limitations. In the field of visual arts, neural networks are widely used in the following areas:

• **Stil transferi (Style Transfer):** With the help of neural networks, one can apply a different art style to a photo. For example, recreating a simple photograph in Van Gogh's Starry Night style.

• **Automation of painting:** Algorithms help you draw a variety of drawings or finish sketches.

• **Image restoration:** Neural networks are used to restore images with old, broken, or missing parts.

The practical application of neural networks in visual arts:

1. Painting and design: Neural networks serve as a tool for artists to enrich the creative process. Artificial intelligence programs such as DALL-E or Midjourney can create high-quality images in a short period of time.

2. Restoration: Museums and archives use neural networks to restore old works of art. For example, processes for restoring colored or partially lost images.

3. Animation: With the help of neural networks, it is possible to move static images or turn them into animation.

4. Creating photorealistic images: Neural networks are becoming the primary means of creating realistic images and visual effects in computer graphics.

In visual arts, neural networks are fundamentally changing the ways in which art is created and processed. Artists and designers are exploring new frontiers of creativity using this technology. However, it is only when used in conjunction with a person's emotional and cultural approach that this technology enriches and improves art.

Conservation of cultural heritage: With the help of artificial intelligence and neural networks, the possibilities of digitization, restoration and archiving of ancient works of art will expand.

The application of AI technologies in institutions of art and culture leads to the creation of an opportunity for interactive and personalized learning for students.   Neural networks also elevate creative processes to a new level, allowing students to further develop their abilities. By acquiring skills in working with artificial intelligence and neural networks, students will be competitive in the modern labor market.

Conclusion. Therefore, it can be concluded that there are both positive examples of using neural networks in education today and negative ones that require time and experience to solve. Since

progress has not stopped and artificial intelligence is already being used in many spheres of life, the use of neural networks in the educational process seems to be a promising direction. To further improve it, it is necessary to take into account existing shortcomings, gradually adapt and eliminate them, as well as ensure the active development of the listed advantages.

Artificial intelligence and neural networks have the potential to fundamentally change the educational process of art and culture institutions. These technologies are an important tool for developing students' creative potential, improving the quality and effectiveness of education. In the future, new innovative approaches in the field of art and culture will emerge through the widespread introduction of these technologies into the educational process.

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