BG Pulse Journal USA
ISSN:1947-2536 http://www.bgpulseusa.com/index.php/bg
BG PULSE JOURNAL

ARTIFICIAL INTELLIGENCE AND HIGHER EDUCATION: YESTERDAY, TODAY, TOMORROW

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Throughout the course of human history, taking into account their interests and needs, people have searched, worked productively, and strived to ensure that these efforts bring beneficial results in practical life. Creativity is a quality inherent in human beings. Therefore, all the blessings and achievements that have been created are the product of human activity. Artificial intelligence, as a multifaceted and effective result created through many years of trials and experiments, is now widely used in many areas of science, education, and production.

The 21st century is recognized as the age of science, technologies, digital transformations, and intellectually developed youth. In this process, the concept of artificial intelligence stands out as one of the most important technological achievements that has deeply entered almost all spheres of human life. Initially formed as a result of philosophical studies aimed at modeling human intelligence, thinking, the formation of knowledge, and the possibilities of using this knowledge, the concept of artificial intelligence, while preserving its fundamental essence, is now being widely applied in technological, practical, and social fields as well. Artificial intelligence is a set of systems that enable machines to perform thinking, learning, reasoning, and problem-solving activities characteristic of human intelligence. Artificial intelligence is finding its place not only in computer science, but also in philosophy, neurology, psychology, linguistics, informatics, education, medicine, transport, and other fields. In particular, the application of artificial intelligence technologies in modern education, healthcare, economics, and management systems is becoming highly important in optimizing human activity and finding solutions to contemporary problems.

In order to understand artificial intelligence, first of all, it is necessary to analyze and study its historical stages of formation, theoretical foundations, interdisciplinary connections, and directions of development. Although the concept of artificial intelligence first appeared in the middle of the 20th century, its roots go back to ancient Greek philosophy and mathematics, as well as to discussions and debates about the nature of human thinking. Theoretical concepts such as “logos,” “logical reasoning,” and “ways of acquiring knowledge,” put forward by ancient Greek philosophers such as Plato, Aristotle, Hippocrates, and many other thinkers, later served as a foundation for modeling artificial intelligence. By the 20th century, Alan Turing’s fundamental research, which began with the question “Can a machine think?”, became one of the most important factors that provided a scientific basis for artificial intelligence. Through the Turing test, criteria were proposed for evaluating machine activities similar to intelligence. This contributed to the formation of artificial intelligence research as an independent scientific field.

The development of artificial intelligence has proceeded gradually, and at each stage different approaches and technologies have been dominant. In particular, in the 1950s and 1960s, artificial intelligence was formed on the basis of early algorithmic approaches. During this period, the main attention was focused on symbolic logic, expert systems, and the foundations of logical reasoning.

In the 1970s and 1980s, the practical application of expert systems expanded, and systems used in the fields of medicine, engineering, and industry were developed.

By the 1990s, artificial intelligence systems based on neural networks, machine learning, and statistical models began to take shape. In particular, the development of large-scale data, or big data, and computing technologies created the basis for artificial intelligence to move to a new stage. Today, artificial intelligence technologies are being further improved through approaches such as deep learning, natural language processing, generative models, for example ChatGPT, and reinforcement learning.

The current form of artificial intelligence is manifested through multifunctional, adaptive, and highly accurate systems. It is capable not only of processing traditional information, but also of making independent decisions, forming elements of creativity, and responding in a manner appropriate to human communication. This creates a basis for viewing artificial intelligence not only as a technical tool, but also as an intellectual partner. At the same time, there are also controversial issues related to artificial intelligence, such as ethical criteria, transparency, error rates, the displacement of human labor, and the possibility of increasing social inequality. These aspects require a careful analysis of both the positive and negative sides of this technology.

It is precisely through the scientific-theoretical analysis of artificial intelligence and the study of its stages of development that we can predict the future possibilities of this technology. In this sense, an opportunity is created to consider the scientific foundations, historical formation stages, technological achievements, and current issues related to the concept of artificial intelligence.

The theoretical ideas, technological approaches, interdisciplinary integration processes, and the interaction of humanity with artificial intelligence in the formation of artificial intelligence are being studied. In addition, the current and prospective stages of artificial intelligence development, their impact on society and the education sector, as well as the importance of artificial intelligence literacy for the modern person are discussed. This serves to develop the ability to fully understand artificial intelligence technologies, use them, and manage them. It is also necessary to provide a broad understanding of artificial intelligence, to analyze the stages it has passed through, and to evaluate its current role. Taking into account the fact that artificial intelligence technologies are increasingly penetrating society, the education system, and scientific and technical fields, this technology requires a scientific and systematic approach. As a result, a student or researcher gains not only a technical understanding of artificial intelligence, but also broader and deeper knowledge from historical-cultural, ethical, social, and humanistic points of view. After all, artificial intelligence is not only a scientific and technical phenomenon that determines the foundation of the future, but also a new direction in society's conscious and responsible decision-making.

Today, artificial intelligence is bringing about significant changes not only in the development of technologies, but also in the economic, social, and cultural structure of society. This technology is mainly implemented by modeling the human ability to think and solve problems in computers and other electronic systems. The main idea behind the development of artificial intelligence is to improve the ability of machines and systems to learn and make decisions. Initially, artificial intelligence was aimed at increasing the ability of machines to perform simple tasks, but now it has reached a level where it can perform much more complex tasks compared with human intelligence.

This further expands the scope of artificial intelligence and makes it possible to use it widely in various fields.

If we briefly examine the history of the development of artificial intelligence, its main stages can be classified and summarized as follows:

In the early period, namely in the 1950s and 1960s, the main focus of artificial intelligence technologies was on the ability of machines to draw logical conclusions. Alan Turing's question "Can a machine think?" became the first scientific work that developed an important theoretical basis related to artificial intelligence. During this period, the main task of artificial intelligence was to solve certain logical problems automatically.

In the 1970s and 1980s, the development and practical application of expert systems further advanced artificial intelligence. Through automated systems used in medicine, industry, and engineering, machines learned to demonstrate higher efficiency than humans in certain tasks.

In the 1990s, artificial intelligence began to move to a new stage. In particular, the development of machine learning and neural network technologies made artificial intelligence systems much more complex. During this period, statistical methods and big data technologies played a central role in the development of artificial intelligence. Through machine learning methods, systems began to learn from previous experience and make decisions in new situations.

The subsequent development of artificial intelligence is associated with the advancement of deep learning technology in the early 2010s. This technology provided machines, especially systems based on neural networks, with the opportunity to effectively perform a number of complex tasks through new approaches. For example, the efficiency of artificial intelligence significantly increased in areas such as natural language processing, image recognition, and automatic translation. Today, one of the most important directions in the development of artificial intelligence is natural language processing, such as the functioning of chatbots and automatic translation systems. Artificial intelligence systems have gained the ability to communicate in human natural language, analyze texts, retrieve information, and process data effectively. As a result, artificial intelligence systems have occupied an important place not only in scientific research and industry, but also in our daily lives. For example, automatic translation systems such as Google Translate, voice assistants such as Apple Siri and Amazon Alexa, and artificial intelligence systems used on social networks such as Facebook and Twitter have become widespread. All of these examples show how artificial intelligence systems are influencing everyday life.

If we look at the practical application of artificial intelligence, we can see that it has a special place in the field of education. Artificial intelligence helps enrich the educational process with innovative methods. For example, the automatic adaptation of educational materials based on students' individual needs is of great importance in optimizing their learning process. In addition, interactive educational programs created on the basis of artificial intelligence help students understand complex issues and create opportunities for them to develop independent work skills and competencies. At the same time, artificial intelligence systems also create opportunities for teachers to assess students, automatically analyze tests, and monitor results in real time. Artificial

intelligence is also demonstrating its significant importance in the field of medicine. With the help of artificial intelligence, it is possible to analyze medical images, detect diseases at an early stage, improve treatment methods, and enhance the decision-making process of doctors. Artificial intelligence systems used in medicine, such as robotic surgeons and automated diagnostic systems, are capable of performing complex procedures accurately and safely. This not only makes the work of doctors easier, but also increases the possibility of saving patients' lives. Artificial intelligence is also causing serious changes in the economy. For example, with the help of automated systems, production processes can become more efficient, errors can be reduced, and costs can decrease. The introduction of artificial intelligence helps accelerate the digital transformation of the economy. This creates opportunities for the emergence of new jobs, the optimization of production processes, and the appearance of new services.

1. The 1950s. The first ideas and concepts of artificial intelligence had not yet fully taken shape. During this period, scientific research based on mathematics, logic, and computer technologies began. Programs such as Alan Turing's "Turing test" helped create the main theory of artificial intelligence.

2. The 1950s and 1960s. During this period, major achievements appeared in the field of artificial intelligence. In 1956, at the Dartmouth Conference, the term "artificial intelligence" was introduced. During this period, the creation of the first theoretical developments of artificial intelligence began.

3. The 1970s and 1980s. Expert systems and rule-based systems were created and began to be used in many practical areas. During this period, interest in applying artificial intelligence in real life increased.

4. The 1990s and 2000s. The development of the Internet and the possibilities of analyzing large amounts of data helped artificial intelligence technologies move to a new stage. Technologies such as machine learning and natural language processing began to be widely used.

5. From the 2010s to the present day. The development of deep learning and neural networks has brought artificial intelligence to new achievements. It has been widely applied in areas such as automatic translation, facial recognition, speech recognition, and vehicle control. At present, the next stage in the development of artificial intelligence technologies includes technologies that have not yet been fully mastered, but are expected to become highly important in the future. For example, concepts such as strong artificial intelligence, or AGI, Artificial General Intelligence, and artificial consciousness are becoming central topics of scientific discussion. These technologies are aimed at reproducing all intellectual abilities of humans, and there are several scientific views on how they may develop in the future. At the same time, broad discussions are being held about the social impact of artificial intelligence and its ethical, political, and economic aspects. Issues such as the displacement of human labor, failure to comply with ethical standards, errors, and security problems are constantly being subjected to scientific and technological analysis. Artificial intelligence is a technology that occupies an important place in the development of the modern world. Its stages of development and areas of application are capable of fundamentally changing society, the economy, as well as secondary and higher education systems. At the same time, it is important to study and find solutions to the ethical and social issues related to the development of

artificial intelligence. While this technology may create new opportunities for humanity in the future, it also requires a cautious approach. The development of artificial intelligence technologies, especially in the fields of production and the economy, is being studied in greater depth. These technologies make it possible to automate production processes, increase production efficiency, and reduce errors. With the help of machine learning, deep learning, and analytical systems, the production sector is reaching new heights. Artificial intelligence also significantly accelerates production processes through industrial robots and automation systems, and as a result, costs decrease. Such systems are capable of working with high efficiency and accuracy, minimizing human errors, ensuring the safety of the production environment, and replacing physical workers with safe, precise, and highly efficient technologies. In addition, the use of artificial intelligence accelerates the digital transformation of the economy. Through the use of digital technologies, artificial intelligence, and big data, businesses, economic systems, and public administration are improved. For example, with the help of artificial intelligence, enterprises and companies gain opportunities to predict market demand in advance, develop marketing strategies, and communicate effectively with customers. This increases competitiveness and creates the possibility of quickly adapting to market needs. One of the main factors of economic growth is the correct and effective introduction of artificial intelligence technologies. At the same time, along with the widespread implementation of artificial intelligence, the ethical, social, and political aspects of this technology are also being seriously discussed. Along with the continuous development of artificial intelligence, the prevention of its ethical problems, errors, and security risks is becoming an important issue. In particular, the decision-making process of machines and their impact on human life are widely discussed. Artificial intelligence systems usually do not follow ethical norms or do not understand them correctly, which may lead to automatic decisions and errors. In addition, it is important to take security measures to prevent the undesirable consequences of artificial intelligence systems. For example, in some cases, the operation of artificial intelligence systems may lead to violations of people's rights or discrimination. For instance, autocratic decisions may be made against certain ethnic groups, gender groups, or age groups. In conclusion, it should be emphasized that in order to prevent these issues, artificial intelligence systems must be based on clear and fair criteria.

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