



TRANSFORMING SOCIETY: THE ROLE AND FUTURE OF ARTIFICIAL INTELLIGENCE

Svitlana Iasechko

Kharkiv National University of Internal Affairs, Ukraine and Avignon University, France

ORCID: <https://orcid.org/0000-0003-4058-9959> E-mail: iasechko.sv@gmail.com

Received: 25 October 2021 / **Revised:** 20 November 2021 / **Accepted:** 23 December 2021

DOI: <https://doi.org/10.37497/rev.artif.intell.educ.v2i00.27>





ABSTRACT

In today's world, artificial intelligence (AI) is becoming an increasingly important and influential field of research. It plays a key role in the development of technology, allowing the creation of intelligent systems and robots that can perform tasks that were once only possible for humans. In one of the facets of research in the field of AI, an important direction has been defined, which includes several main aspects. First, it is the development of formalization methods that allow presenting knowledge in a structured and logical form. This is necessary so that intelligent systems can effectively process and use this knowledge. Secondly, they are actively studying and formalizing reasoning in this direction. This includes understanding and modeling the processes of decision-making, logical thinking and information analysis. Thirdly, communication and dialogue between intelligent systems and people are explored. This is important for the development of interfaces and systems that can communicate with users in natural language and understand their needs and wishes. Fourthly, emphasis is placed on the development of algorithms to optimize the functioning of computing equipment and training of intelligent systems. This allows for improved productivity and efficiency of intelligent systems in various fields, from medicine and finance to transportation and manufacturing. In general, this line of research defines the key aspects of the development of artificial intelligence and is aimed at creating more intelligent and efficient intelligent systems that can make our lives more convenient and productive.

Keywords: Information technology. Intelligent systems. Artificial intelligence. Technological aspects.





1 INTRODUCTION

The systematic approach, which is now widely used in various fields of science and practice, has deep roots in the history of the development of human knowledge. Since ancient times, mankind has observed and analyzed the complex phenomena of the surrounding world and tried to understand their internal structure and relationships between their components.

In antiquity, philosophers such as Plato and Aristotle already expressed ideas about the integrity and unity of the world. Plato argued that there are higher laws that unite different aspects of reality into one harmonious system. Aristotle viewed the world as a collection of integral objects, where each part has its place and role.

In the Middle Ages, philosophers and scientists also used the concepts of system and integrity to understand natural and philosophical questions. For example, Pythagorean scientists developed rational methods of research and formalized thinking to analyze phenomena.

In the 18th century, the German philosopher Immanuel Kant in his work "Critique of Pure Reason" considered the question of the structure and organization of knowledge, which contributed to the development of the methodology of system analysis.

So, the systems approach has a multifaceted history and roots in various cultural and philosophical traditions. It was the result of accumulated experience and development of methods of analysis and understanding of complex systems and phenomena in the world.

The philosophy of the systems approach during its historical development reveals that the system is a special association of knowledge, which is based on a general idea or concept. It emphasizes the development and internal contradictions inherent in any system.

In the teachings of Georg Wilhelm Friedrich Hegel, the system is not a separate subject, but he follows an approach where everything is seen as a self-developing system. Hegel emphasizes that ideas and the world of ideas are integral structures consisting of different elements or moments. Each element of the system, in turn, can also be a system with its own structure and development.



In this context, the systematic approach in philosophy contributes to the understanding of both the general structure of knowledge and the development of individual components of this structure, their interaction and internal dynamics. It helps to reveal the internal logic and patterns of development of systems, which is important for the further development of scientific and philosophical concepts.

The systematic approach has deep roots in the history of philosophy and science. It reflects the philosophical understanding of the nature and organization of the world since ancient times. Ancient Greek philosophers, such as Plato and Aristotle, developed the concepts of a systematic approach to understanding the world.

Plato argued that the world consists of wholes and their parts, and each whole has its own internal unity. Aristotle added that the whole is greater than the sum of its parts, and he viewed the world as a system where all components are interdependent and interact with each other.

The systematic approach was further developed in medieval philosophy and the Renaissance, when philosophers considered objects of knowledge from the point of view of their systematic organization and interrelationship. For example, the Pythagoreans used rational methods such as proof and analysis to formalize their research.

At the beginning of the 19th century, the systematic approach became a methodological tool for the study of social and natural processes. This was reflected in the writings of Georg Hegel, who considered everything as a self-developing system. He believed that scientific knowledge should be systematic in order to achieve scientific truth.

System approach has become an integral part of modern sciences, including physics, biology, ecology, sociology and others. It helps to understand complex systems, their interaction and functioning. Also, the system approach has become an important tool for solving organizational and management tasks in the modern world.

Therefore, the systematic approach reflects the philosophical and scientific understanding of the nature and organization of the world, from ancient times to the present, and plays an important role in the development of science and solving complex tasks of modern society.



2 METHODS

The systems approach is a fundamental research tool used in various scientific disciplines to analyze and understand complex systems. This approach creates a basis for formulating and solving problems that concern systems consisting of a large number of interconnected elements.

In a philosophical and methodological context, a systematic approach contributes to the development of a theory of knowledge, which helps to define general conceptual categories and provides a holistic understanding of the world of nature, society and man. It provides a framework for analyzing the integration of different aspects of knowledge.

In psychology, a systematic approach helps to study the relationship between various aspects of mental activity and to understand the structure and functions of the psyche. He also emphasizes the importance of adequate representation of reality in the mind and anticipatory understanding of the consequences of actions.

In biology, a systemic approach is used to analyze homeostasis processes that regulate the functioning of living organisms and ensure their stability in changing environmental conditions.

In engineering and technology, the systems approach plays an important role in the design and management of complex systems. It helps to see the system as a whole structure with interconnected components and defines regularities that help its functioning.

In modern research, the systems approach has received a new impetus thanks to synergistics, which studies the self-organization of complex systems. This allows us to better understand how such systems develop new properties that are not inherent to individual elements. Applying a systems approach contributes to the expansion of our knowledge and new approaches to the study and management of various systems that surround us.

The systems approach is an important conceptual tool in many fields of science and technology. It contributes to the understanding and analysis of different kinds of systems, be they natural, social, technical or otherwise. Systems are considered as complex structures consisting of various elements or components that interact with each other and the external environment.



An important aspect of the system approach is the understanding of the system as a whole, where the interaction between its constituent elements creates new properties and functionality. This approach allows better analysis and understanding of complex systems, where individual elements affect each other and the entire object as a whole.

The ontological approach to systems theory indicates that systems exist objectively, independently of the observer, and have their own internal structure and logic of functioning. This contributes to the development of the theory of cognition and helps to understand both nature and society from the point of view of systemic relationships and properties.

Psychological and biological approaches to systems theory indicate that systems can be applied to analyze and understand the functions and properties of the human mind, behavior, and biological processes. The principles of homeostasis and self-organization become key to understanding living systems.

The design-technological approach emphasizes the application of a system approach in the design and construction of complex systems and objects. The isomorphism of laws and structures indicates that the same principles can be applied in different areas, which facilitates the development of new technologies and systems.

The systems approach becomes especially relevant in today's world, where complex systems dominate in many fields, such as information technology, ecology, social sciences, and others. It allows you to effectively analyze and manage these systems, providing a better understanding and use of their potential.

Communication in the system approach plays an important role and can be considered from different points of view. First, it can reflect the nature of the system's interaction with other systems or the environment. In this context, communication can be one-way, when information is transferred from one system to others without feedback, or mutual, when systems exchange information in both directions.

Secondly, communication can also be classified according to the degree of certainty. It can be probabilistic, when the outcome of communication depends on random factors, or deterministic, when the outcome can be predicted with precision.





Research using feedback involves performing a number of operations, such as comparing input and output data, identifying inconsistencies, correcting and making decisions based on the analysis of these differences.

Finally, the system has its own properties that reflect its efficiency and capacity for development. The effectiveness of the system is determined by the extent to which it achieves the planned results and tasks. Scalability refers to the changes and improvements that can occur during the operation of a system while maintaining its integrity and stability.

The organizational unity of the system is determined by its structure and relationships between parts. Functionality is revealed through the interaction of the system with the environment. Structuredness indicates how orderly the parts of the system are and how they are related to each other. The behavior of the system depends on external influences and can be stable or adaptive. The growth property shows how much the system can grow and acquire new states.

Systems can be classified according to various characteristics, such as the nature of interaction with the environment (open, closed, combined systems), complexity (simple and complex systems), functionality (universal and specialized systems), type of behavior (decisive, predictive, self-organizing), and others. Depending on these features, systems can exhibit different properties and behavioral properties.

Also, systems can be classified as real (natural and artificial) and abstract, which is the result of thinking. Real systems include natural and man-made systems that can be physical or social in nature. Abstract systems are created for modeling and analysis of various phenomena and processes.

All these classifications help to understand the variety of systems and their main characteristics, which allows to study them and develop intelligent systems.

3 RESULTS AND DISCUSSION

From the above, several conclusions can be drawn regarding the relevance and directions of research in the field of intelligent systems. Among the tasks that are currently being studied in the field of "Intelligent Systems" and are of a theoretical and practical nature, the following can be distinguished:





The problem of the synthesis of the goal and the mechanism of interaction of the components of the goal, since the goal also affects the structure of the system.

The problem of determining (detecting) the critical potential for such a set of target components, when achieving the goal becomes possible.

Development of the theory of intelligent control and theoretical understanding of purposeful systems.

Search and creation of adequate mathematical models that reflect living nature based on theories of information processes and management.

Development of models such as program action model and action receiver model and their practical implementation in intelligent systems.

These tasks reflect important aspects of research in the field of intelligent systems and their focus on the development and improvement of these systems.

4 CONCLUSION

An analysis of different philosophical concepts, theories of artificial intelligence and different approaches to defining and understanding artificial intelligence shows that there is no consensus on what it is. This becomes known due to the lack of a clear definition of the features of the human mind and a clear understanding of the nature of intelligence, which also complicates the definition of artificial intelligence.

Despite the difference in approaches, it is possible to distinguish common features that are characteristic of many of them. The general idea is that artificial intelligence is a system that models the processes of decision-making and solving various tasks, similar to human intelligence, but it is done differently than in humans. The main areas of development of artificial intelligence include:

Heuristic (informational) - development of programs for solving computing problems by intelligent systems.

Bionics - the study of human mental processes when solving tasks, the construction of artificial neural networks similar to the human nervous system.

Evolutionary - creation and cultivation of intellectual programs capable of self-learning.



In general, the main directions of research in the field of intelligent systems include the study of the human brain, the development of intelligent systems based on computer technologies, as well as the creation of intelligent systems with interactive characteristics for interaction with people.

After analyzing research in the field of artificial intelligence, it became clear that the main focus is on the following areas: the creation of methods for mathematical expression, generalization, division into categories and representation of knowledge; study and mathematical modeling of thinking processes; analysis of communication and interaction between intelligent systems and people; development of algorithms for the operation of computing equipment and training of intelligent systems.

REFERENCES

Ashby, W.R. (1941). *The origin of adaptation*. British Library, London. URL: http://www.gstatic.com/generate_204http://www.gstatic.com/generate_204http://www.gstatic.com/generate_204. Access date: June 11, 2021.

Condillac, E. B. (1805). *Logic or mental science: Guiding to the Attainment of Truth*. URL: <http://wiki.kneu.edu.ua/HistOfEcoTeor>. Access date: March 11, 2021.

Hegel, G. W. F. (1927). *Sämtliche Werke. Jubiläumsausgabe*, hg. H. Glockner, 36 Bd. - Stuttgart. URL: https://shron1.chtyvo.org.ua/Zavidniak_Bohdan/Teoditseia_Georha_Vilhelma_Fridrikha_Hegelia.pdf. Access date: June 11, 2021.

Iasechko, M., Shelukhin, O., & Maranov, A. (2021). Evaluation of the Use of Inertial Navigation Systems to Improve the Accuracy of Object Navigation. *International Journal Of Computer Science And Network Security*, 21(3), 71-75. URL: http://paper.ijcsns.org/07_book/202103/20210310.pdf. Access date: March 30, 2021.

Iasechko, M., Iasechko, S., & Smyrnova, I. (2021). Aspectos pedagogicos do autodesenvolvimento de alunos de educação a distancia na Ucrânia. *Laplage Em Revista*, 7(Extra-B), 316-323. URL: <https://doi.org/10.24115/S2446-622020217Extra-B929p.316-323>. Access date: June 11, 2021.

Kant, I. (1910). *Achievements of metaphysics. On the form and principles of the sensible and intelligible world; II. The successes of metaphysics*, 41-119. URL: <http://kant-online.ru/o-kante/bibliografiya/trudy-kanta>. Access date: March 11, 2021.

Silva, A. de O., & Janes, D. dos S. (2020). Exploring the Role of Artificial Intelligence in Education: A Comprehensive Perspective. *Review of Artificial Intelligence in Education*, 1(00), e05. <https://doi.org/10.37497/rev.artif.intell.education.v1i00.5>