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DI TECHNOLOGIJŲ RETROSPEKTYVIOSIOS PRIGIMTIES ŠIUOLAIKINIAME GLOBALIAME PASAULYJE LOGINĖ-FILOSOFINĖ REINTERPRETACIJA

Logical-Philosophical Reinterpretation of Retrospective Nature of AI Technology in the Modern Globalized World

SUMMARY

The article presents a logical-philosophical reinterpretation of the retrospective nature of artificial intelligence technology in the modern globalized world through the prism of the disclosure of each individual link of the triad. The origin, formation, and further development of the notion of "intelligence" can be traced within the framework of the link "historical retrospective of the evolution and development of the notion of "intelligence", where we can talk about representatives of the genus *Homo* (from *Homo Habilis*, *Homo Sapiens* to *Homo Sapiens Sapiens*), whose thinking evolution took place due to the improvement of work tools at each separate stage. The link "philosophical conception of intelligence" made it possible to trace the difference between natural intelligence and artificial intelligence: if natural intelligence is connected with the spiritual world of a human being (*Homo Sapiens*), which is determined by its natural "substrate", then artificial intelligence is related to the study of the tasks of the human mind intelligent, which are completely separate and related to the creation of systems of "machine" text recognition, its translation into different languages. The link "modern logical-philosophical reinterpretation of the retrospective of artificial intelligence" is the process of transferring natural reality (neural networks of a human being (*Homo Sapiens*) to artificial reality (neural networks of an artificial human being (*Artificial Homo Sapiens*). In addition, an attempt was made to present a hypothetical methodological algorithm of artificial intelligence engineering, which consists of three stages: if the first stage is aimed at describing each component of the triad "brain – thinking / cognitive abilities / consciousness – intelligence", characteristic of *Homo Sapiens*, the second stage is aimed at analyzing the work of any robot for the presence of biological, semiotic and other systems in it, which are an imitation of "neural networks" and "mental models", then the third stage is to simulate weak and strong intelligence.

RAKTAŽODŽIAI: intelektas, dirbtinis intelektas, technologija, retrospektyva, loginė-filosofinė reinterpretacija.
KEY WORDS: intelligence, artificial intelligence, technology, retrospective, logical-philosophical reinterpretation.

SANTRAUKA

Straipsnyje pateikiama loginė-filosofinė dirbtinio intelekto (DI) technologijų retrospektyviosios prigimties šiuolaikiniame globaliame pasaulyje reinterpretacija per kiekvienos atskiros triados grandies atskleidimo prizmę. „Intelekto“ sąvokos kilmę, formavimąsi ir tolesnę raidą galima atsekti pagal ryšį „istorinė „intelekto” sąvokos raidos ir plėtojimosi retrospektyva”, kuri įgalina kalbėti apie *Homo* genties atstovus (nuo *Homo* Habilis, *Homo Sapiens* iki *Homo Sapiens Sapiens*), kurių mąstymo evoliucija vyko dėl darbo įrankių tobulinimo kiekvienu atskiru tarpsniu. Sąsaja „filosofinė intelekto samprata“ leido atsekti skirtumą tarp natūralaus ir dirbtinio intelekto: natūralus intelektas susijęs su žmogaus (*Homo Sapiens*) dvasiniu pasauliu, kurį lemia jo gamtinis „substratas“, o dirbtinis intelektas siejamas su žmogaus proto protingų uždavinių tyrimu, kurie yra visiškai atskiri ir susiję su „mašininio“ teksto atpažinimo, jo vertimo į įvairias kalbas sistemų kūrimu. Sąsaja „šiuolaikinė loginė-filosofinė dirbtinio intelekto retrospektyvos reinterpretacija“ yra natūralios tikrovės (žmogaus, *Homo Sapien*s, neuroninių tinklų) perkėlimo į dirbtinę tikrovę (dirbtinio žmogaus, *Artificial Homo Sapiens*, neuroninius tinklus) procesas. Be to, bandyta pateikti hipotetinį dirbtinio intelekto inžinerijos metodologinį algoritmą, kurį sudaro trys etapai: pirmuoju etapu siekiama aprašyti kiekvieną *Homo Sapiens* būdingos triados „smegenys – mąstymas / kognityviniai gebėjimai / sąmonė – intelektas“ komponentą, antruoju etapu siekiama išanalizuoti bet kurio roboto darbą dėl biologinių, semiotinių ir kitų sistemų, kurios yra „neuroninių tinklų“ ir „mentalinių modelių“ imitacija, trečiuoju etapu imituojamas silpnas ir stiprus intelektas.

INTRODUCTION

In 1956, J. McCarthy proposed the terminological concept of *artificial intelligence* (AI), which until now continues to be perceived simultaneously as the science and technology of creating intelligent machines, especially intelligent computer programs (McCarthy, Hayes, 1969; McCarthy, 1986, 2007). The emergence of this phenomenon is not accidental, but, most likely, it is necessary and obvious in the context of the urgent challenges that continue to arise in the modern globalized world of constant wars, disasters, pandemics, etc.

AI continues to be considered in the context of science and technology in the study of intelligent systems. Therefore, perceiving AI as an object of science, it is worth mentioning the work “Artificial Intelligence: A Modern Approach” written by Russell and Norvig, specialists in the computing. It is considered to be a classic manual for AI courses in the USA, in which AI is defined as:

> the science of agents that perceive its environment through sensors and acts upon that environment through effectors. (Russell, Norvig, 2010: 6).

And speaking of AI as an object of technology, it is worth recalling the words of Belda, who thinks about the areas of application of AI:

> AI has gradually entered our lives. Sooner or later, the day will come when there will be systems that have the same level of creativity, feeling, and emotional intelligence as humans. The day that happens, we will know that we are not alone. (Belda, 2020: 9).

Such a statement of the problem led scholars of various fields to study one of the key components of AI, i.e., the concept of “intelligence”, the ability of abstract thinking, as one of the most im-

portant essential properties of a human being (*Homo Sapiens*), from the standpoint of *a logical-philosophical approach* (Wittgenstein, 1922).

Logical-philosophical ideas about the intellect, the subject, and the nature of intellectual activity were formed during a long historical period. However, the fragmentedness of many studies on the problems of intelligence, which mainly present such traditional philosophical concepts as "intuition", "mind", and less often – "common sense", demonstrate the lack or difficulty in defining and knowing the concept of "intelligence" in its entirety (Peev, 2019).

Common sense, as an integral property of the human mind, was also of interest to the philosophers of Ancient Greece. Thus, Plato presented it as a prerequisite for any thinking in general, without connecting it to the forms of self-expression of an individual person. In the dialogue "Protagoras", Socrates asks the interlocutor: "Does to have common sense mean, in your opinion, to understand well?" (Plato, 1968: 219).

The purpose of the article is to present a logical-philosophical reinterpretation of the retrospective nature of artificial intelligence technology in the modern globalized world, with special attention to the deepening of each link of the triad: "a historical retrospective nature of the evolution and development of the concept of "intelligence" – a philosophical idea of intelligence – a modern logical-philosophical reinterpretation of the retrospective nature of artificial intelligence", as well as the presentation of a hypothetical methodological algorithm of artificial intelligence engineering.

HISTORICAL RETROSPECTIVE OF EVOLUTION AND DEVELOPMENT OF THE NOTION OF "INTELLIGENCE"

The historical retrospective nature of the evolution and development of the concept of "intelligence" relates to the process of "intellectual human evolution", i.e., with the formation of various representatives of the genus *Homo*: from *Homo Habilis* to *Homo Sapiens*, and, more precisely, to *Homo Sapiens Sapiens* as human-like creatures who, probably could think, because they had to survive in various extremely difficult living conditions. By the way, the *Homo* component itself already suggests that these creatures, which had a certain similarity with *Homo Sapiens* and *Homo Sapiens Sapiens*, could perform various intellectual actions.

Zubov predicted that the first genus *Homo* (approximately 2.4 to 2.0 million years ago) could have originated on the territory of the African continent, which is called the Cradle of Humankind (today these are the territories of Kenya and Ethiopia, partly of Tanzania) (Zubov, 2011: 22). This position is confirmed by the anthropological and archaeological studies of the late 20th and early 21st centuries (Anton et al. 2000; Eswaran et al. 2005). In this context the following triad may be formulated to trace the evolution and development of the concept of "intellect": "cerebral cortex (brain) – cognitive abilities (thinking) – intellectual activity (intelligence)".

The evolution process of the cerebral cortex (brain) (Kapranov, 2017: 62–66) is associated with a gradual increase in its size in various representatives of the genus *Homo*: from 500–800 cm^3 (650 cm^3 on average) in *Homo Habilis*, 775 cm^3 in *Homo Rudolfensis* (775 cm^3), 880 cm^3 (or from 750 to 1250 cm^3) in *Homo Erectus* (*Ergaster*) to 1400–1600 cm^3 in *Homo Neanderthalensis*. If the latter is compared with the size of the brain of Homo Sapiens, then it even slightly exceeds the average size – 1350–1400 cm^3.

The evolution process of cognitive abilities (thinking) is associated with the manufacture of stone tools, from primitive to more advanced ones. It is suggested that *Homo Habilis* may have been the first to start making stone tools – the Olduvai / Pebble culture artifacts (about 2.6–1.8 million years ago). By the way, it is the first technology that launched the Stone Age (Bordes, 1968). For example, if the Olduvai chopper can be made in about 10 blows, then the Acheulian chopper requires 60, and for the manufacture of Upper Palaeolithic tools, it is necessary to make more than two hundred blows, divided into 10–11 different operations.

Homo Habilis started making stone tools due to the presence of *a highly developed brain* (Zubov, 2011: 28–29). In this context, it is worth mentioning Turner's opinion:

> biologically, a human being during the period of his / her existence was not a narrowly specialized creature, because this was facilitated by a special form of his / her evolution, which probably allowed to preserve to a certain extent the morphophysiological "neutrality", in which the stone industry played a considerable role. (Turner, 1997: 7–21).

The above-mentioned makes it possible to assume that the intellectual evolution of representatives of the genus *Homo* has mainly the character of neuroevolution, i.e. the evolution of the neural systems of the brain, during which natural selection follows the cognitive functions of the brain since the corresponding selective advantages [...] contribute to the adaptation and survival of people. In this context, Merkulov emphasized that:

> Neuroevolution is closely interconnected with the cognitive evolution of human populations, i.e. with the evolution of their cognitive abilities, with adaptively valuable changes in the work of the cognitive system, in the processes of processing cognitive information, in dominant cognitive types of thinking, etc. (Merkulov, 2005: 12).

The preliminary conclusion regarding the historical retrospective of the evolution and development of the notion of "intelligence" testifies to the long process of formation of the phenomenon of "intelligence": from the evolution process of the cerebral cortex (brain) in various representatives of the genus *Homo* (*Homo Habilis*, *Homo Rudolfensis*, *Homo Erectus* (*Ergaster*), *Homo Neanderthalensis*, etc.) to the evolution process of neural systems of the brain, which led to the improvement of cognitive abilities (thinking) (from the manufacture of primitive stone tools to more advanced ones). Thus, it gave an impetus to the formation of the concept of the phenomenon of "intellect", which also testified to the process of "intellectual human evolution".

PHILOSOPHICAL IDEA OF INTELLIGENCE

Today, the notion of "intelligence" as a component represented in "natural intelligence" inherent in *Homo Sapiens*, and "artificial intelligence" inherent in artificially intelligent machines, systems, etc. means the *ability to think abstractly*. It is one of the most important essential properties of *Homo Sapiens*, which can reflect and think. The following trend was noticed: the intelligence as a structure firstly was fixed in *Homo sapiens* or its ancestors (*Homo Habilis*, *Homo Rudolfensis*, *Homo Erectus* (*Ergaster*), *Homo Neanderthalensis*, etc.) (see the previous point) and, based on them, was later transformed into an artificial (sometimes virtual) environment (electronic, computer, etc.), which led to emergence of the notion of *artificial intelligence*.

Pushkaryov notes that:

> […] the intelligent is arranged in such a way that it becomes possible to fulfil human volitional impulses. Free will is what promotes and at the same time inhibits the development of artificial intelligence (Pushkaryov, 2016: 32).

The following question arises: why is this happening and what is behind it? We will try to provide comments.

The answer to these and other questions lies in the plane of the other two notions – "common sense" and "mind". Thus, in contrast to "common sense", the formation of the notions of "mind" and "consciousness" in connection with the intellectual activity of a person covers a much more significant period of the history of philosophy. Socrates' philosophy became an important stage in the conceptual formation of the concepts of mind and consciousness. In determining the role of the mind, Socrates believed that one should not act according to habit, dogma, or spontaneously, guided by feelings, but always try to understand the deeper reasons for one's behaviour. This is the position of Plato, his student, in an in-depth study of this issue. It was Plato who first put a person before the fact that intellectual activity in the field of concepts, in the higher world – the world of ideas – requires a special, highest degree of thinking – the mind (Plato, 1986: 296–329). The orientation of the mind to the knowledge of ideas did not cancel, in Plato's view, the positive role of consciousness; the latter plays an important role in practical activities. In Plato, the notion of consciousness is formed and developed, which cannot be said about his notion of mind, ideas about it are only beginning to form, and it is included in thinking in the form of separate elements and prerequisites. The thinking appears as a pure activity of the mind, free from the distortions of reality presented to the mind by the senses. The mind occupies an intermediate position between the mind and the senses. Sensory knowledge is based on reflection. Aristotle not only largely shared Plato's views on the meaning of conceptual thinking, but he gave an even greater role to concepts in cognition. For Aristotle, intelligent people are not those who act, but those who possess knowledge: therefore, great knowledge is possessed by "the one who most possesses knowledge in a general form" (Aristotle, 1989: 21).

From Aristotle's point of view, possession of knowledge is a property of a more perfect ability of thinking, and mind. The mind's object in cognition is various causes and beginnings, which it has investigated with more or less completeness and precision. Another thing is the mind. Aristotle clearly distinguished it from reason and sensuality; senses perceive individual things; the mind belongs to everything that is known only externally. The mind can accept the object of its thought, its essence and reality, holding them, possessing them, it seems to merge with what is thought of them as if they are present in the object of their thought. According to Aristotle, the mind is the most adequate thinking ability, which allows one to see the essence of things in their true form (see Aristotle, 1989).

In Philosophical Encyclopaedic Dictionary (ed. Shynkaruk), the following definition for *intelligence* of given:

> The term "Intelligence" is a Latin translation from ancient Greek of the notion of nous (mind) and in its meaning is close to it. This notion has a significant role in the history of philosophy, especially European philosophy. The very emergence of the European cultural tradition is connected with the distinction between chaos and Cosmos, Cosmos and Logos, Apollonian and Dionysian principles. (Philosophical Encyclopedic Dictionary, 2002: 245).

It is not obvious that there is the notion of Latin nous (mind) is mentioned, because it is defined as follows:

> notion developed in the history of philosophy to indicate qualitative features of thinking at certain stages of existence or logical development. *Pythagoras'* opinion is typical: the human soul is divided into three parts: the mind, reason and passion. Mind and passion are also in living beings, and reason – only in man. The latter meant thinking as the ability to judge, draw conclusions, and think. In contrast to reason, reason in ancient philosophy has a great ontological burden. Under the guise of logos (*Heraclitus*), nous (*Anaxagoras*), the thinking of thinking, or the form of forms (*Aristotle*), it appears as the driving force of all reality. In Neoplatonism, the mind occupies a certain place in the hierarchy, which is entrusted to the One: the one, mind, soul, *Cosmos*, matter. Stoics distinguish between two principles of reality: the active – mind, or God, and the passive – matter. (Philosophical Encyclopaedic Dictionary, 2002: 555).

All in all, we can assume that *the intelligence* is closely connected with the notion of *mind* as an ability to depict the mental efforts in the form of such functions as: abstraction, comparison, ability of judgment, inference.

THE STATUS OF NATURAL INTELLIGENCE: A PHILOSOPHICAL RETROSPECTIVE NATURE

To determine the status of the natural intelligence of a human being (*Homo sapiens*) means to understand the principles of organization of his / her cerebral cortex, which contains hundreds of billions of neurons. In this context, it is worth mentioning about short-term and long-term memory, within which data is

accumulated from the surrounding world. Pushkarev explains this with the help of the notion of *information*:

> Information comes, first of all, to the retina of the eye. But the very ways to process information sometimes turn out to be damaged, and reflexively the person himself / herself makes the right decisions. Although he / she cannot explain them himself / herself. (Pushkaryov, 2016: 87).

A human being (*Homo Sapiens*) as a natural being cannot always reflect the world as it becomes under the influence of scientific and technological progress. The diverse world of the spirituality of an intelligent person operates precisely through the perception of reality. However, the meaning of life is not always exhausted by discursive and logical thinking. The very limits of this thinking are set by human nature. Although the spiritual world of a person is determined by its natural "substrate", the forms of consciousness themselves are far from isolated from the system of their "carrier". It is aimed at revealing the "figurative-aesthetic" action, at the visuality of experiencing the uniqueness of one's being, which, in turn, arises in relation to the ways of satisfying human needs in the moral world. And this world is revealed, first of all, through art, the main purpose of which is to represent the very feelings of life, the adequate expression of which can be fully claimed by science.

In this context, it is also worth mentioning about the cultural tradition with which the "natural" intelligence is connected. It can transform any "abstractions" into something soulful and valuable, understandable and meaningful, where a human being (*Homo Sapiens*) finds himself / herself in the field of his / her ideas. By the way his / her intellectual activity is almost never interrupted in its connection with creativity, but on the contrary, it is filled with the spirit of "art". Although it turns out to be very distant from the beginning of the game, it always "illuminates" the material-event vision of the world, which turns a human being into a spiritual being.

We are convinced that the short-term and long-term memory of a human being (*Homo Sapiens*) is formed, firstly, with the help of information that comes from the surrounding world, and, secondly, with the help of cultural being.

In the process of learning about the surrounding world, the human being himself / herself stands outside the boundaries of everything already known. One can recognize something external. The inner faces the difficulties of cognition. Since the human race definitely wants to make an artificial human being, we need to separately characterize artificial intelligence and how it differs from natural intelligence, precisely that which a human being (*Homo Sapiens*) has.

Thus, globalization challenges began to be solved with the help of AI, i.e., a programme that is part of a computer, endowed with intelligence, capable of performing creative functions that are traditionally considered a human prerogative.

Such a formulation of the problem requires a logical and philosophical reinterpretation of the "matrix" of AI technology, i.e. the reconstruction of the architectural matrix with the fixation of signs of natural reality, inherent in the "intelligence" of a human being (*Homo Sapiens*).

THE STATUS OF AI: A PHILOSOPHICAL RETROSPECTIVE NATURE

Scholars in various scientific fields (from *cognitology* (Darai, Singh, Biswas, 2010, etc.) to *philosophy* (Burkhard, 2013)) tried to compare the work of the brain of a human being (*Homo Sapiens*) and the "brain" of an artificial human being (*Artificial Homo Sapiens*) (e.g., robots Eric, Sophia, etc.). The main goal was to substantiate the architecture (i.e., the main components) of the matrix of artificial intelligence, algorithms, and principles of its work, and ultimately – to reconstruct a software configuration that captures a set of features of natural reality in the form of artificial reality, thus representing an identical / exact copy (as close as possible to 100%) of natural intelligence.

Of course, it was not so easy to do this, but we managed to get some results, which we will try to dwell on in detail. What is most important to the status of artificial intelligence? The first is to solve the problem of "strong" artificial intelligence, i.e., to carry out its deep reconstruction.

The notion of MIND turned out to be important for understanding the work of natural and artificial intelligence. It is immediately worth noting that if for natural intelligence mind is considered to be the most intelligent activity of a human being (*Homo Sapiens*), then for artificial intelligence mind is not exhausted and it is possible to state the necessity of forming such theoretical programmes so that their formation and functioning could be qualified as reasonable (when identification of identical behavioural repertoires in humans) (Ratti, 2015).

The philosophical retrospective of the formation of artificial intelligence relates to the study of the very tasks of the mind of a human being (*Homo Sapiens*). These tasks are often completely separate and are related to the creation of systems of "machine" text recognition, its translation into different languages; then the tasks of production and reproduction of artificial intelligence are related to the problems of "recognition" of existing images.

HYPOTHETICAL METHODOLOGICAL ALGORITHM OF AI ENGINEERING AS TRANSFER PROCESS FROM NATURAL REALITY TO ARTIFICIAL REALITY

The main purpose of a hypothetical methodological algorithm for artificial intelligence engineering deals with the transfer process of natural reality to of artificial reality. This transfer occurs in one direction: from a human being (*Homo Sapiens*) to an artificial human being (*Artificial Homo Sapiens*).

The first stage is a philosophical study of each component in the following triad: "brain – thinking / cognitive abilities / consciousness – intelligence", which are directly typical for a human being (*Homo Sapiens*).

The study of the brain the first link of the triad involves: 1) the study of the

work of the human brain, i.e. the work of "neural networks": when hundreds of billions of neurons are responsible for long-term and short-term memory; 2) the study of the structure of a separate neuron, which shows the possibility of creating mathematical models for mental activity; 3) the analysis of the "axon" structure, which helps to identify the elements of signal propagation.

When studying the thinking / cognitive abilities / consciousness of a human being (*Homo Sapiens*), it is necessary to try to derive the so-called "mental models", which Kenneth the Scottish psychologist once spoke about in his work "The Nature of Explanation" in 1943 (Kenneth, 1943). He suggested that the brain creates "scale models of reality" and uses them to anticipate future events. Thus, *mental models* are based on previous experience, ideas, strategies, ways of understanding that exist in the mind of a human being and guide his / her actions.

The third component is the intelligent or mind, which is consistent with the concept of *the noosphere* (from the ancient Greek νοῦς "mind" + σφαῖρα "ball"; literally "sphere of the mind") as a sphere of interaction between society and nature, the highest stage of the evolution of the biosphere, within which reasonable human activity becomes the determining factor in development (this sphere is also referred to by the terms "anthroposphere").

Buryk tries to recall the words of Vernadsky:

> in the biosphere there is a great geological, perhaps cosmic force, the planetary action of which is usually not taken into account in ideas about the cosmos [...]. This force is the mind of a person, his / her striving and organized will as a social being. (Buryak, 2010).

The second stage is the philosophical study of an artificial human being (*Artificial Homo Sapiens*).

Firstly, the main attention should be focused on the consideration of various traditional approaches regarding the development of AI: 1) semiotic modelling of AI, i.e. the creation of expert systems, knowledge bases and inference systems that simulate high-level mental processes: thinking, reasoning, speech, emotions, creativity and etc.; 2) biological modelling of AI, i.e. the study of neural networks and evolutionary calculations that model intelligent behaviour based on biological elements; 3) Turing test and intuitive approach; 4) symbolic modelling of mental processes; and innovative approaches related to the study of problems associated with 1) bringing specialized AI systems closer to human capabilities, their integration, which is inherent in human nature (improvement of intelligence); 2) with the creation of AI, which represents the integration of already created AI systems into a single system capable of solving the problems of mankind.

Secondly, the study of biometrics methods that use methods of recognizing people by physical or behavioural features and biometric authentication systems: on the one hand, unimodal, i.e., those that use only one behavioural feature (verbal or non-verbal) of a human

being, and on the other hand, multimodal, i.e., those that use a combination of various unimodal behavioural characteristics of a human being.

The third stage is an attempt to model two types of the theory of AI: either strong AI (universal AI, or AI of the human mind) is the "machine analogue of the human mind", then weak AI is the programmes that are supposed to push "to help people in their intellectual activity". Otherwise, it seems that a weak AI can make a narrow spectrum of the day, and that one cannot reach the equal of a strong AI, which is created to understand the natural language so by itself, like a person has grown up in understanding.

CONCLUSIONS

It should be stated that the logical-philosophical reinterpretation of the retrospective nature of artificial intelligence technology in the modern globalized world is the elaboration of the notion of "intelligence" through the prism of the triad: "the historical retrospective nature of the evolution and development of the notion of "intelligence" – the philosophical concept of intelligence – the modern logical-philosophical reinterpretation of the retrospective nature of artificial intelligence". It was noticed that if the historical retrospective nature of the evolution and development of the notion of "intelligence" demonstrates the beginning of the origin of the notion of "intelligence" even among representatives of the genus *Homo* (e.g., *Homo Habilis*, *Homo Rudolfensis*, *Homo Erectus* (*Ergaster*), *Homo Neanderthalensis*, etc.) due to evolution of cognitive abilities (thinking); the philosophical idea of the intelligence is a discursive and logical thinking, addressed to the cultural tradition; then the modern logical-philosophical reinterpretation of the retrospective nature of AI is directly related to the mental activity of a human being, in particular, his / her strong intelligence, which was transformed into the plane of AI, at the same time confirming the stage of development of an artificial "brain" with intellectual (mental) models, etc.

Considering all the above-mentioned positions, we have developed a hypothetical methodological algorithm for artificial intelligence engineering, which consists in the transfer of natural mechanisms to the plane of artificial reality. It consists of three stages: if the first stage is aimed at describing each component of the triad "brain – thinking / cognitive abilities / consciousness – intelligence", characteristic of Homo Sapiens, the second stage is aimed at analysing the work of any robot for the presence of biological, semiotic and other systems in it, which are an imitation of "neural networks" and "mental models", then the third stage is to simulate weak and strong intelligence.

Prospects for further research lie in a deep analysis of the work of robotics to clarify common and different architectural characteristics, as well as matrices regarding the organization of a human being (*Homo Sapiens*) and an artificial human being (*Artificial Homo Sapiens*).

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