ONTOLOGICAL PROBLEMS IN THE ASPECT OF THE AUTONOMY OF LEARNING PROCESSES AND SELF-LEARNING OF ARTIFICIAL INTELLIGENCE SYSTEMS

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Abstract

This paper examines the main problems encountered in efforts to create general or strong artificial intelligence systems. One of these fundamental problems is solving the problem of automating the processes of constructing ontologies as a necessary condition for understanding the world on the part of an artificial intelligent system. Currently, there appear to be two interrelated problems in this area. Firstly, we are talking about the predominance of ideas of correlationism in modern philosophy. Secondly, there is a clear predominance of attempts to solve epistemological problems within the framework of one – connectionist approach. The goals of this study are to clarify the essence of the problems that exist today and propose one of the possible ways to solve this problem within the framework of the current state of affairs.

Keywords: Artificial intelligence, machine intelligence, hybrid artificial intelligence, philosophy of technology, symbolic methods, correlationism, epistemological realism, ontology, metaphysics.

Article

Before proceeding directly to the analysis of ontological problems, in our opinion, it is necessary to briefly focus on the analysis of the current situation.

First of all, we are talking about the hopes placed on large language models (LLM). Specifically, on the claims about the effects of emergences [6] as effects leading to the occurrence of new knowledge in the broad sense of the word. Google researchers are drawing the "Google tree" that should clearly demonstrate the occurrence of new opportunities as the number of LLM parameters increases.

However, not all researchers share this point of view [10]. In our opinion, such statements should be interpreted rather as the appearance of unexpected results that lie outside the logic of the most anticipated answers. And by itself, the belief in the occurrence of such effects - perhaps not always explicitly - is based both on behaviorist concepts and on the ideas of Wittgenstein from the period of the "Logical and Philosophical Treatise." In addition, many issues of ontological and epistemological problems are not taken into account. A more detailed discussion of the above-mentioned problems, at least their key aspects, is the purpose of this paper.

The reason for this state of affairs lies not so much in the shortcomings of a particular method and the associated mathematical apparatus, as in the insufficient problematization of this issue in order to further philosophical understanding of these issues. In our opinion, the essence of the problem should be formulated as follows:

Is there a possibility of achieving complete autonomy of the processes of conceptualization of notions (constituents) of ontologies, symbolization as a necessary condition for understanding the world in conditions limited only by the processes of self-learning?

It should be noted that to solve the problem we have posed, it is not always necessary to find a specific practical solution, a mathematical function, or something similar. In our case, clarifying the issue itself can be a significant step towards solving it.

In our opinion, two theses should be considered as starting points, which, if necessary, will determine the course of further research:

First, the thesis that there is no acceptable theory of consciousness, the technical implementation of which would enable machine intelligence to acquire at least artificial features. An example illustrating this situation can be Facebook's attempts to train a neural network on samples of three different types [16], or research in the field of joint use of neural networks and decision trees [20; 38].

Secondly, the thesis about the instrumental definition of modern technology [22]. In our opinion, modern technology, no matter how "intelligent" it may be, remains at hand to man. From its very beginning, the philosophy of technology has defined technical objects as human means or activities, whether it is Ernst Kapp's "organ projection" or "a certain kind of human activity" [40]. This leads to the ready-to-hand that Martin

Heidegger [39] defined as the way a tool exists, in which it reveals itself to be itself. Only in so far as the means have this "being-in-itself" and not just happens, is it in the broadest sense convenient at one's disposal.

Thus, the very way in which a technical object exists, as it originally existed not as an independent entity, but as an improvised entity, puts AI in a position dependent on humans in the broadest sense of the word. In a sense, the works of Ernst Kapp, Martin Heidegger, Gilbert Simondon [32] and Bernard Stigler [13] serve as confirmation of this thesis. However, these works mainly speak about only one side of the problem of ready-to-hand: ready-to-hand is related not to the internal imperfections of certain methods, but to the very position occupied by technology as such from a sociocultural point of view. The boundaries ready-to-hand in these works are determined, on the one hand, by the very way in which the technique originated, and, on the other, by the freedom to replace human labor, as well as in decision-making to the extent that the person himself gives it to the technique.

In the future, understanding the nature of ready-to-hand will be important for the subsequent search for those limits in which processes are possible:

1) conceptualization of notions;
2) the genesis of new symbols;
3) the creation of new rules.

In the cancers of this study, we will be primarily interested in finding answers to questions 1 and 2.

Further, it is necessary to clarify the understanding of the essence of cognitive (symbolic) and connectionist methods themselves.

The concept of the symbolic approach itself is based on two concepts:

First, the concepts of symbolic methods and computer algebra. Unlike numerical methods, which deal directly with the processing of calculations, symbolic methods operate with equalities and formulas as sequences of symbols. An example is, for example, rules for simplifying expressions, substituting some expressions into others.

Secondly, based on the theses of the Newell-Simon hypothesis [9], as a set of methods for symbolic representation of problem solving, similar to how the human brain does. With the light hand of John Hoagland [5], this approach was called "good old-Fashioned artificial intelligence" or GOFAI ("Good Old-Fashioned Artificial Intelligence").

The last significant achievements in the field of symbolic methods can be considered the rapid growth of expert systems at the end of the 20th century [43]. In Russia, this is V.K. Finn's DSM-method [36].

Unfortunately, today there is a serious decline in interest in symbolic methods due to the presence of serious limitations. And first of all, this is a problem that was voiced back in 1973 in the Lighthill report as the problem of the "combinatorial explosion" [7].

Some hope for a return of interest in symbolic methods is given by the emergence of such methods as RAG (Retrieval Augmented Generation) in the context of large language models [1, 15].

The main point of criticism of symbolic methods can be summarized in several points [25]. First of all, we are talking about:

a) the underdevelopment of the mathematical apparatus itself;
b) the problem of logical behaviorism [11];
c) the problem of "mental reproduction in computational processes" [44];
d) criticism of the classical rationality model as presented by Searle [31] (for example, the question of the boundary between rational and irrational and ways to implement it in the form of rules, or the need for consistency of initial assumptions and unambiguity of goals, etc.);
e) the problem of creativity [27], in our case, first of all, it is a question of on the problem of generating new rules and ontogenesis, in particular.

No less unresolved problems exist within research programs in the field of connectionist methods. Despite the obvious successes of neural networks in the field of pattern recognition and automatic text translation, it is not necessary to talk about the sufficiency of connectionist methods for creating strong AI systems. One of the main disadvantages in this area, in addition to the typical symbolic methods, are:

a) the lack of technical ability to represent knowledge structures and model reasoning;

b) the problem of explainability of the obtained results [3];

c) the problem of the insufficiency of induction as a tool for generating new hypotheses [34, 35].

Thus, it is not possible to solve the problem formulated above in the case of connectionist methods alone. Therefore, we will build the long-range course of our reasoning based on symbolic, as well as hybrid (human-machine) models.

Based on the definition of symbolic methods, the question of symbols inevitably arises: their genesis as a necessary condition for understanding their way of existence. It seems to us that the existence of symbolic methods is possible primarily within the framework of certain ontologies, as well as in the combination of metaphysics-ontology-symbol.

Speaking about ontology and its connection with metaphysics, Heidegger says that everything should start with the question of being: "The fundamental ontology is the metaphysics of human existence (Dasain), necessary for the realization of metaphysics itself" [41]. Being the idea of substantiating metaphysics as such, in his understanding, ontology is a kind of "outline plan" of the building of metaphysics, primarily setting the internal limitations of metaphysics itself.

The beginning of the 21st century attempted to make significant adjustments to the understanding of ontological issues and their relationship to metaphysics, which could be summarized under the general term "correlationalism" and the not always successfully opposing "speculative realism". First of all, we are talking about the works of such authors as Quentin Meillassoux and Graeme Harman.

The obvious pressure on philosophy from both experimental sciences and the state of "post-truth," which Harman drew attention to, led to a large number of attempts to revise the position of the subject, and Kant's "thing-in-itself." The result of this was, for example, attempts to get rid of the factuality of the subject-object correlation, substituting the concept of the Absolute for Meillassoux [29; 37]. To this should be added attempts to declare independence of existence of things, leaving us only "broken" and "distorted" Harman's things [42].

In our opinion, this state of affairs does not add to the understanding of the problems facing metaphysics. And by themselves, attempts to exclude the subject or redefine some ideas only provide an opportunity to eliminate the problem itself, but in no way brings it closer to its solution, and above all, the problem of realism.

It is worth considering the ideas of Alain Badiou and Ray Brassier separately. Badiou put forward the idea of rejecting existence as one, as many-without-one, which leads to the existence of only regional ontologies [21]. In addition, Badiou insists on the presence of axiomatization as necessary. In particular, Dolmanov cites Badiou's words [21]:

"... the one and many is not a "unity of opposites," since the first is not, while the second is the very form of any presentation of existence. Axiomatization is required so that, given the implicit rule of counting, much is generated without a concept, that is, without the assumption of being alone."

It is important to note that with all this, the subject still has the right to choose the relationships of elements and events "at his own risk" [21].

Thus, the philosopher provides some grounds for giving greater legitimacy to regional ontologies, justifying the possibility of their independent existence.

In his work Concepts and Objects, Brassier sharply criticizes the ideas of correlationism that are widely recognized today, the main sources of which he considers Johann Gottlieb Fichte, Bruno Latour, Theodor Adorno, Louis Althusser, Gilles Deleuze and even Harman. The bottom line, in his opinion, is that [18]:

"... it is impossible for a correlationist to separate the subjective from the objective <...> Ultimately, correlationism is not a definite philosophical doctrine, but a vague and very versatile strategy for deflating traditional metaphysical and epistemological issues by reducing the problematic of "being" and "knowledge" to a mix of cultural form, political struggle and social practice."

The philosopher sees a way out of this situation in the need to "re-establish the primacy of the epistemology-metaphysics bundle" [18]. In his opinion, the discrepancy between the real and the real object in scientific representation is not a problem, but rather is the inner essence of the process of scientific knowledge, which forces us to make adjustments to existing theories, ensuring their development.

Developing the philosopher's thought, from our point of view, Isaac Asimov's Three Laws of Robotics could be enriched with the Fourth and fifth laws:

Law 4. The search for inconsistencies between the established structure of the conceptual model of an object and the (empirical) information obtained with the help of sensors is the main source of obtaining new knowledge about the world around us.

Law 5. The conclusions reached and new knowledge about the world around them should not contradict the knowledge received directly from a Person to the extent that it does not contradict the first Three laws.

Even without going so far ahead and without claiming to create new laws of robotics, in the framework of this study it is important to emphasize the philosopher's idea that attempts to eliminate ontology from metaphysics are at least premature.

The same ambiguity exists with respect to the metaphysics-symbol bundle. No matter how obvious it may seem at first glance, the question of symbolism within metaphysics is also not a matter of general agreement: "... metaphysics is a science that seeks to free itself from symbols," writes Henri Bergson in his article "Introduction to Metaphysics" [17]. The philosopher justifies this by the fact that true knowledge, by its nature intuitively, is able to transport us inside an object in order to merge with the "inexpressible" that is in the object. The role of symbols, by necessity, is reduced to an auxiliary role: "they tell me only about what brings her [essence] closer to others, and does not belong to her proper self" [17]. Signs, being "partial designations" and not "real parts", have meaning only within the analytical functions of positive science. True knowledge has an intuitive character, possessing simplicity, integrity and represents something "absolute, seen from the inside." Karen Svasyan writes that Bergson would certainly agree with Hans Feichinger in defining the symbol as fiction, although with some reservations [30]:

"... if for Feichinger fiction is the alpha and omega of our mental life, then Bergson sees it as an aberration of the spirit cultivated by science; the task of philosophy is to break out of the network of fictitious symbolic thought patterns and achieve the absolute."

A.V. Smirnov also points out about the relativity of the sign (and the meaning in general) and its existence only within the context [33]. This, in his opinion, is the main reason for the many problems of machine translation from one language to another.

Ernst Kassirer held a completely opposite point of view. Spencer's empirical methodism and Bergson's intuitive methodism are rejected from the threshold by him as "contradictio in adjecto" [30]. As an illustrative example, the philosopher suggests imagining an irrational or transcendental number. How, in what way, is it possible to philosophize over concrete facts without having ideas? As arguments that could be made by the Cashier, K.A. Svasyan suggests the following quote from the philosopher [2]:

"History itself would disappear into an infinite mass of disparate facts if it did not have a common structural scheme that allows it to classify, organize and organize these facts."

Thus, symbolism can be considered an integral part of metaphysics, and the study of the genesis of symbolic systems is directly related to the issues of metaphysics.

Since its inception, Aristotle's metaphysics has consistently provoked a number of discussions between rationalists and empiricists. As you know, one of the main stumbling blocks is the question of skepticism about realism in terms of the reliability of scientific knowledge. At its initial stage, starting from Modern times, this question was more or less unambiguous and had an objective character, which was eventually fixed by Christian Wolf as a taxonomy [22]. The concept of Aristotle was based on realism, which reinforces the thesis of the objectivity of statements about the world. Such a formulation of the problem could largely satisfy supporters of artificial intelligence, as it would give every reason to give an objective and real status to supporters of the formal logical approach in building ontologies.

Since the works of Hume, Descartes, and Kant, the question of the need for a critical rethink of views on rationalism has become acute. The question of the need for a critical rethinking of the main tenets of classical metaphysics has clearly arisen. The appearance of the psychic as phenomenal acts in Descartes' works, reinforced by criticism of Kant's classical metaphysics, eventually led to the understanding that "the connection between subject and object is mediated by phenomenal givens" [22]. It is important to note that the phenomenological nature of acts of perception and the related statement of their subjectivity have significantly influenced the proponents of empiricism. In particular, according to Cassirer, empiricism does not take into account the fact that a single perception exists solely "by virtue of its belonging to the self <...> does not arise retroactively from the combination of many perceptions, but is initially present in each of them" [30].

Unfortunately, another attempt to bring realism back, made by such philosophers as Saul Kripke, Hilary Putnam and Ray Brassier, did not fully solve the problem. The reason for this is the lack of justification for the need for external objects as such. Here it is impossible not to agree with the idea of D.V. Ivanov [22]:

"In order to substantiate the possibility of full-fledged realism, it is necessary not only to show the dependence of mental representations on external, contingent situations in the world, but also to clarify the nature of conceptual cognition."

As noted above, we still do not have a satisfactory concept explaining how the world and consciousness coexist. And one of the key problems directly related to the topic of this study is the vicious circle formed by Kant's idea that [23]:

"…intuition and concepts form the elements of all our cognition, so that neither concepts without a certain kind of intuition corresponding to them, nor contemplation without concepts can give knowledge.".

One of the recent attempts to overcome the problem is the research of John McDowell [8]. McDowell's concept is based on two main principles.

Firstly, that our experience does not have rational concepts. Therefore, our a priori rationalities mediate our relationship with the world.

Secondly, by appealing to the "second nature" of G.-H. Gadamer, the philosopher, speaks of language as an external world that also conceptualizes our thinking, bringing its own rationality to it in an unconditional form.

As it is easy to see, the influence of analytical philosophy can be easily traced in this.

However, according to the majority of researchers such as S. Glendinning and M. de Gainesford [22], Hubert Dreyfus [12], such concepts are not sufficiently convincing. Thus, Glendinning and de Gainesford point out that the distinction between the perception of the object itself and the visibility of the object is ignored. Dreyfus, in turn, says that the "mental" is what gives rise to concepts. Hilary Putnam was also critical of McDowell's ideas. McDowell's theory does not solve the problem of rationality, and the ideas he puts forward can rather be attributed to hidden idealism.

One more problem should be added to this - qualia. Just as Putnam proposed experiments with the "Earth Twin" and "Brains in a barrel," perhaps the same experiment should be done with the "Human Twin" and the "Machine in a barrel." The essence of the experiment could be defined as follows:

How can qualia exist based on those technical capabilities for observing the world around us, such as video cameras, microphones, tactile sensors, etc.? What could be the metaphysics and ontology of beings endowed with other qualia, but technically understandable to us, while possessing intelligence?

The same idea, although it is not a complete solution to the problem, is suggested by Kant's statement, quoted by Heidegger [41] to illustrate the "method of natural scientists":

"The light was revealed to "them " that reason penetrates only into what it carries out according to its own project, that it, with the principles of its judgments, in accordance with constant laws, must precede nature and force it to answer its questions, and not follow it as if on cue." The "pre-sketched plan" of nature generally establishes for the first time the initial existential composition (Seinsverfassung) of existence, with which any investigating inquiry must relate."

However, even without analyzing the qualia problem, the state of affairs in the field of ontology construction remains far from its solution. This is confirmed by the entire history of the development of formal ontologies from the moment of their origin (as concepts in the works of such philosophers as Edmund Husserl) to the present day. The term "formal ontology" itself first appeared in Husserel's works in 1901 in Logical Studies. According to V.L. Vasyukov, Husserl does not use any formal apparatus, his works are rather "an analysis in order to clarify intuitive foundations and concepts" [19]. Today, there are several concepts of ontologies, and not all of them have a Husserelian nature. Among them, V.L. Vasiliev identifies several such concepts. First of all, we are talking about the Brentano's tradition, defined by him as "the descriptive ontology of consciousness - the ontology of mental structures" [ibid.]. Supporters of this tradition are Edmund Husserl, Kazimierz Tvardowski and a number of other researchers. The main premise of this approach is the thesis about the existence of a taxonomy of various kinds of constituents and various forms of their relationships. Brentano himself distinguished three types of ontologies: 1) the ontology of things, 2) the ontology of the state of affairs, 3) the ontology of assessments. Later, this concept was expanded by Twardowski to the understanding that things can be real and unreal, possible or not: but they are all objects of our mental acts. To this should be added Husserl's concept of regional ontologies. The "non-Husserl" [19] concept of formal ontologies by Nino Coquiarella. The main meaning of his concept is that formal ontology should study "logical characteristics of predications, quantification of variables and various theories of universals" [19]. In other words, to study all the "ways" and categories of existence of various kinds of universals. A special place in this list is occupied by Stanislav Lesnevsky's ontology, which is at the same time a logical system of formal ontology. The "hybrid" nature of such ontologies "can be considered as a kind of formal ontology systems in which the characterization of

ontological concepts presupposes neither set-theoretic nor mereological terms, but only terms of the calculus of names (in E. Slupetsky's terminology)" [19]. Thus, the common problem among all these approaches remains, at least, the open question of the mechanisms of building ontologies, and at most, the question of the very nature of the emergence of knowledge, its reliability. These approaches almost completely leave the question of the nature of the genesis of conceptual concepts and related symbols outside the boundaries of research.

In our opinion, whether explicit or implicit, as of today, they all reserve the right of primacy in this matter.

Therefore, we return to the problem of correlationism as a starting point. First of all, we are talking about the need to answer questions about whether identity and differences in an object are identity and difference in concepts. Brassier calls this the danger of moving from correlationism to the idea of conceptual idealism [18]. The philosopher, relying on David Stove, sees the root of the evil in this matter in the incorrect and ambiguous usage of "things", which comes from Dorge Berkeley and his 23rd paragraph of the "Treatise on the Principles of Human Cognition" [18]: "... this is possible due to the ambiguity of the word "things": comprehended and perceived things (that is, objects, ideata) and things as such, simpliciter (that is, physical objects). It is this distinction that Berkeley is trying to destroy. But he cannot reject it from the very beginning without resorting to petitio principii. The denial of this distinction and the metaphysical assertion that there are only consciousnesses and their objects should be the consequences of Berkeley's reasoning, and not his premises." Thus, in his opinion, there is a substitution of concepts on the part of Berkeley. The resulting idealistic premise, called "Pearl" by Stove [14], sounds like [18]: "One cannot know reality independent of reason without knowing it. Therefore, it is impossible to know reality independent of reason." However, as Brassier notes, independence and inaccessibility are completely different concepts. The existence of something independent of us does not lead to unknowability in any way. In turn, this statement opens up the possibility of understanding how concepts and real objects can coexist with each other. From this we can draw a number of conclusions that may be of interest for solving the problem we have posed. As a starting point for this, we will need the following theses of the philosopher [18]:

1) The statement that if something cannot be assumed without the conditions of its positing does not make true the fact that a word (name) cannot be relied upon as non-posable (unless there is a condition for the correct use of the concept associated with it). At the same time, the very concept corresponding to this word, of course, requires the conditions of its positing.
2) The concept has meaning solely due to the mental activity of a person. The word itself may exist without a concept, but the concept certainly needs a name.
3) The referent itself existed before we thought of it and gave it a name, existed and will continue to exist after the last bearer of this name and the associated concept disappears. "The difference between the quantity of things and the fact of their existence is not conceptual" [18]. This also leads to Berkeley's mistake in identifying physical objects with experiences.
4) The solution to the problem of objective synthesis "essentially consists in how to resolve the issue of the relationship between conceptual thought and non-conceptual reality. But just because we have a concept of difference between Saturn [concept] and Saturn [word], it does not follow that this difference is a conceptual difference: the concept of difference is a conceptual difference."

Based on them, let us draw the following conclusions:

Firstly, that the naming process is a free, contingent act. By itself, naming by, for example, machine intelligence does not pose any danger. Of course, it is necessary to take into account the rules of word formation and usage in various languages. Continuing the story that has already been started in the spirit of the laws of robotics, one could propose the 6th Law of robotics.:

Law 6: "In accordance with the rules of the 5th Law (see the laws proposed by the author above), the robot has the right to name new concepts, in accordance with the rules established by the language in which the naming process takes place."

Secondly, as mentioned above, legitimizing the gap between the real and the objective of an object in representation in the form of certain ontologies is acceptable (at least in the technical aspect). Recognizing this necessarily leads to the realizability, at least theoretically, of the task of forming new concepts, such as fixing the fact of a gap. Thirdly, the need to return to anthropocentric principles as a limiting factor in the process of the genesis of new knowledge from machine intelligence from axiological, praxeological, etc. points of view. In terms of the laws of robotics, this could sound like the 7th Law:

Law 7: "The robot must obtain human approval regarding the correctness of names; if there is disagreement, the robot must accept the human's point of view."

Fourthly, it is necessary to concentrate practical (technical) efforts on building hybrid, human-machine systems; to study the mechanisms of possible ways of communication and information exchange, in which it is a person in the interests of machine intelligence who is the metaphysical basis without which it is impossible to provide the tasks of understanding the world with artificial intelligent systems.

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