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NATURAL AND ARTIFICIAL INTELLIGENCE IN SEARCH OF TRUTH

The work discusses the peculiarities of the formation and application of knowledge in the human community and in the world of modern artificial intelligence systems. It is shown that the knowledge of civilization has a certain uncertainty caused by the very nature of scientific research, which gives rise to doubts, provokes revisions and corrections. The growing variety of assessments and solutions to existing problems is due not only to this circumstance, but also to a greater extent to the stratification of society by levels of education and intelligence. Intellectuals found themselves in the minority in conditions of access to information networks of marginals, who suddenly became bold and began to create many new ideas and generate ideas that clearly looked pseudoscientific and even mystical. Therefore, most decisions and actions are, at best, not always correct, illogical and short-sighted in modern society, diluted by marginals that emerged from informational nothingness. It is important to note that artificial intelligence systems, in particular neural networks trained on the results of such diverse human activity, rely on numerous options of not always strict approaches and ambiguous decisions of people collected on the Internet. These artificial intelligence systems create even more extensive scenarios of approaches and solutions, confusing and demoralizing users to a much greater extent. Therefore, a system of verification of solutions of artificial intelligence systems is needed, based on developed arrays of knowledge and laws that have already been tested and agreed upon in the scientific environment. It is no longer enough to form united opinions of scientific groups, as in the past, because few people hear their voices, and often do not want to hear them. The growing diversity of people's opinions and the conclusions of artificial intelligence structures affect the development of not only science, but to a greater extent, education. The modern education system, due to informational noise and the difficulty of mastering new knowledge and technologies, is displacing fundamental knowledge. Education in the modern era is limited to learning the skills to use devices and technologies, focusing on training, albeit advanced, consumers. Therefore, there are voices in favor of transferring fundamental education, which is the basis of the intellectual and technological development of civilization, to classical universities.

Key words: *use of knowledge, humanity and artificial intelligence systems, amplification of information noise, dispersion of approaches and solutions, the role of fundamental knowledge*

HUMANITY'S SCIENTIFIC SEARCH FOR TRUTH

It is worth thinking about the role of science as a mechanism for the search for truth, which ensures the progress and development of civilization. We note that philosophy, which creates a rational scientific outlook, is capable of helping people and social institutions to realize the role of scientific activity in the life of civilization.

Science as a social institution has two sides. The first is a spontaneously created scientific community with its own informal rules and sanctions for violating these rules. The second is a system of institutions and organizations where scientists work, as well as various enterprises and structures that support technological processes necessary for scientists. However, let's focus on the informal side, on how the scientific community of the world works.

It is often believed that some set of dogmatic statements and rules will be needed to create new knowledge. For this purpose, practically discovered, guessed, empirically derived relations between various quantities that determine the nature of the processes are used. Many centuries ago, intelligent people invented an approach based on a set of such irrefutable statements - axioms. If it was possible to reconcile the new statement with the axioms, then this process, which was called the proof of theorems, included this new statement in the category of true.

Scientists and researchers are able to find and agree among themselves the regularities that describe reality. The humanities also use preconceived notions and authoritative sources of truth tested by time and history. This set of regularities and ideas, if it did not change over time for many years, played the role of axioms in the most general sense, which made it possible to build new ideas on this foundation or check the consistency of various considerations, which in principle does not differ from proving theorems. Sometimes it is rational to focus on experience and repeated repetition of the same (or similar) consequences. It may also seem like a substitute for the truth of cause-and-effect relationships. As long as there are no contradictions with observations and experiments (we also add consequences from them), this set is the basis, that is, the basis that replaces the axioms. However, no one dares to call these basic statements and cause-and-effect schemes axioms (because there is no confidence in their absolute truth), although all subsequent statements are actually built on them and ideas are formed, combining them into paradigms.

Often, in addition to proof of theorems, that is, reverse deduction, which is only able to confirm what was guessed and predicted on the basis of the indisputable truths[1] indicated above, direct deduction is used. Direct deduction using the developed method of building new knowledge from initial data and rules suggested or discovered previously allows finding new consequences.

You can refer to direct experience and draw conclusions by analogy with the known. But here, too, fantasy should be restrained, although it is allowed at the first stage of thinking. Induction is also useful, which is constructed more formally than analogies, but also relies on known experience [Kuhn, 1970; Polanyi, 1962; Deutsch, 1998]. You have to be careful here, because people often form their conclusions from imagination, where a significant amount of fantasy can be found.

Religion accompanying humanity, which has done a lot of good and terrible things, often pushed science aside, forcing it to be taken religion into account. Therefore, it is not surprising that after the first attempts to reconcile religion and science, religious hierarchs decided to break this connection[2]. This was related to the problem [Searle, 1993], which R. Descartes tried to solve by dividing the spheres of influence of science and religion[3].

But not everything is so reliable in science. All the knowledge that people find, construct and accumulate is built on rather shaky ground. Indeed, this knowledge was formed on repeatedly tested ratios that corresponded to numerous experiments and observations. The results of empirical and analytical studies were repeated in different places, and the scientific community agreed with them [Schrodinger, 1954]. Thus, these research results formed knowledge in the form of "first principles" through frequent checks and long-term reflections, they were based on the consensus of knowledgeable people of different generations [Kuhn, 1970; Polanyi, 1962; Deutsch, 1998]. But whether such checks are enough, whether the conditions of experiments and observations fully coincide, or whether the analytical conclusions are correct, no one would give a full guarantee. However, it became the basis on which the modern temple of science is built. Because if there is no soil, no background, no foundations, then what to build

[1] Undeniable in the sense that people are already tired of checking them, because such checks seemed to them to be enough.

[2] t is interesting that the apologists of faith, which often replaces the scientific approach, brought it to the form of absurdity ("I believe because it is absurd"), closing access to all doubts about its truth. The fact is that Christian hierarchs, starting with Bishop Theophilus and the interpreter of the Scriptures C. S. F. Tertullian. this approach seemed useful, because even then they were fed up with continuous attempts to build theology according to the principles of Greek philosophy.

[3] Even intelligent people until the middle of the 20th century believed that the human brain provides control of all organs, but thoughts, as they imagined, are related to the spiritual, immaterial sphere. It required a detailed study of the brain, connection to the thinking of mathematicians on this topic, and most importantly, the first attempts to create connectivist models of the brain from artificial neurons in order to dispel the disembodied fog of the spirituality of thinking [Kuklin, 2023].

on? As residents of an island that can go under water at any moment, they are forced to build their houses on it, not being completely sure of the stability of the buildings.

Therefore, doubts always accompany scientific research, which is especially confusing for a large part of humanity that is not familiar with science. New theories must be consistent and form a coherent picture. When they conflict, destroying the idyll of closure and coherence, it is a bell. It is necessary to revise everything, that is why revolutions in science arise from this [Kuhn, 1970; Polanyi, 1962]. In this way, experiments and observations, logical conclusions based on the known, analogies and induction help to find the truth, but sometimes there is no complete confidence in its achievement, generally speaking.

The scientific community spontaneously during the existence of civilization created mechanisms for the formation of truth (rather, approximation to the truth) that are based on broad discussion, consensus formation, constant checks and doubts [Schrodinger, 1954]. Experiments and observations make it possible to verify theoretical and empirical regularities to a large extent, but since these tests are performed in each case in specific conditions, it is difficult to create general ideas, and doubts are always present. One thing is clear, that only the formation of consensus during the discussion, with the widest exchange of information among a wide range of researchers, can increase the confidence of scientists [Kuklin, 2024].

HOW PEOPLE USE THEY ACQUIRED KNOWLEDGE

Truth – meaning, action or situation is best determined with a high degree of formalization of concepts and knowledge (this is best done in the natural sciences). The most fortunate thing is mathematics, which operates in an invented space (not the other way around, which is typical for physics and chemistry); there is always a way to adapt the space to a set of concepts and actions. With insufficient or poor formalization, the definitions of concepts and actions are blurred over a wide range of parameters (for example, quantitative). But at the same time they can be true. That is, there is a spread of quantitative characteristics within which a separate concept (or a separate action) has the same name. This can often be seen in everyday life, in the humanities, economics, sociology, political science, etc. Inaccuracy, vagueness, and scattering of assessments and characteristics of the same concept lead to paradoxical behavior in disputes.

Instead of realizing the similarity of concepts (and actions) and looking for common approaches, those arguing, on the contrary, try to separate related and similar concepts from each other, taking rigid, irreconcilable positions in the dispute, which sometimes makes the dispute meaningless. The approach: "you have your opinion, we have ours," which is elevated to the rank of normality, makes it very difficult to agree. Hence the refusal to admit that the opponent is right and the impossibility of reaching an agreement. Here, knowledge of the subject of the dispute even gets in the way, because the prevailing ideas about it sometimes differ greatly. Therefore, the conclusions and solutions to scientific, social, economic and technological problems for a larger number of people are increasingly different. People, as it turned out, are inclined not so much to reflection as to disagreement and contradictions, in order to achieve their victory in an argument, for the sake of self-affirmation[1]. The emphasis on analysis still dominates, and synthesis plays a secondary role, although, as is known, it is the synthesis of knowledge that forms all the laws of nature and society. Generally speaking, the reason for the increasing divergence of people in their decisions is not so important, the main thing is that the degree of such divergence is increasingly increasing[2].

This diversity of views and ideas is strengthened by an active connection to discuss modern problems of a large number of marginals who have emerged from informational

[1] What, surrounded by ignoramuses, provides such a debater with the growth of his image. Especially such behavior gives such a debater weight in the eyes of poorly informed management.

[2] At first glance, diversity of opinions is good, it is a sign of democracy, but this approach is not fair in relation to truth decisions.

nothingness. It is clear that their ideas and reasoning are at best not always correct, not entirely logical and very often short-sighted in modern society.

Insufficient education, lack of practice of reflection, experience, information provokes newly-minted gurus and populists to look for simple answers to any questions, sometimes straightforward, simplified ones. Indeed, H. L. Mencken is right: "Every complex problem has a simple, clear, and wrong solution." And it is decisions like these that make our lives difficult.

What prevents those arguing is the formation of stereotypes of consciousness - prejudices formed by their own and others' experiences and the influence of other people's opinions [Lachmann, 2000]. There is often a refusal to accept arguments that question stereotypes[1]. Quite often you can see a loss of interest among interlocutors when the arguments given do not coincide with his formed and expressed ideas.

The trouble is that associative connections, which are very important, are often neglected, and these are the very details in which the devil is hidden. The creators of a simple picture of the world are often unaware of many more complex and diverse interdependencies, or maybe they simply did not understand them (the latter reason even forces weak intellects to refuse to take them into account, because it is difficult for them to realize them)[2].

The average level of education and intellectual capabilities (IQ) is falling, and assessment of the effectiveness of communication and image formation (EQ) dominates [System…, 2021].

In the modern world, the value of a human person is assessed by the level of his image (mainly fame and his influence in society) as well as the possibilities of his solvency. This approach influences changes in the structure of the organization of science and education.

WHAT CHANGED WITH THE APPEARANCE OF ARTIFICIAL INTELLIGENCE?

Helpers or competitors. Modern large neural networks - language models (LLM), in particular the more modern GPT - 4, demonstrate the transition from narrow artificial intelligence (AI) to general artificial intelligence (AGI). Why are they linguistic - and because it is easier to teach them on large corpora (a huge number of files in different languages) on the Internet. Although they demonstrate the best results for solving non-integrated problems (which is not surprising, because texts are an example of informal knowledge), arising from everyday life, from social and economic problems and which fundamentally do not have a single solution. But since there are much more such tasks than integrated tasks (that is, they have a single correct answer - these are technical tasks), these limitations have not yet confused developers.

Due to the significant technical development of systems, the transition to matrix notation (words are converted into multicomponent vectors), the use of parallel computing on video cards thanks to CUDA technology, higher performance and other modern capabilities, LLMs are already able to distinguish a very large number of objects, use significant amounts of information , which allows them to learn languages of unprecedented quality. They demonstrate the ability to collect information from various fields of science, with the help of specialized programs - plug-ins, which corresponds to multimodality, which in human understanding is encyclopedicity.

Unprecedented mastery of natural languages in language models is similar to human literacy. In addition, the attitude of humanity to the results of learning networks is already similar to the requirements of traditional psychology. It is not enough to memorize, networks need to be able to maneuver concepts - to use the rules of working with knowledge, and this is already a higher level of knowledge - this is metaknowledge. They are already tuning in to understand people's emotions and intentions from the context of the issues. They must be taught to take into account the limitations, which is not always possible [S´ebastien Bubeck, 2023]. The goal of the developers is approaching - the formation of the consciousness of neural networks [Kuklin, 2023]. Models often demonstrate unforeseen possibilities, they seem to understand how different

[1] Destroying stereotypes is difficult, because all previously established ideas are in a tangle of prejudices with their established connections, which often form their own picture of the world.

[2] One can understand why many intellectuals are adherents of elitism, although they cannot always admit it. The egalitarian approaches that dominate modern society suit the ignorant and reduce their motivation to think

phrases can affect the mental state of the interlocutor. But this has not yet been verified. Language models can already do a lot. Beginners can use LLM to effortlessly generate program code by feeding the machine only their intentions in natural language. These models are able to help identify the problem and offer a solution, which, however, requires narrowing the search area - hints. If errors are reported, the model can detect and correct them.

But we must consider the limitations: The model can do many things, but everything in the question must be formulated, because a person will complete the task himself, but a machine cannot. In the window where requests are generated, it is good to insert all the necessary addresses of information sources, otherwise the machine will start fantasizing, using incorrect materials, which are abundant on the Internet. On the Internet, there are many mistakes and falsifications, the machine learns from them as well. Models produce often syntactically incorrect or semantically incorrect code, especially for long or complex programs. Formulating a complex network task is sometimes more difficult than solving it for the user himself. Models do not understand the purpose of the study and do not follow instructions, or produce code that does not match the intended functionality or style. They begin to combine the data, coming up with a plausible, but often incorrect, answer. People should understand that modern language models are still only on the threshold of their evolution.

Another important limitation is that artificial intelligence systems make all their assessments and decisions in the known space of knowledge that humanity has found and formulated. That language models are able to quickly look through information in this space is largely equivalent to the fact that a large number of people can simultaneously also look through the same information. However, only humans can so far go beyond the known through experiments and careful and long observations. Networks work with what is already known. Therefore, there is no need to hope for discoveries by neural networks.

It turned out that the initiative in the development of neural networks is already moving to the neural networks themselves, which are capable of correcting the defects and weaknesses of people's technological innovations, independently finding methods of correcting weak human decisions. An illustration is the creation of the Transformer technology, which is quite inaccurately made by humans, but the neural network itself found methods to correct inaccuracies and inaccuracies and demonstrated a remarkable ability to present users with the result they desired.

The development of neural and similar networks with active elements did not stop there. Therefore, it is not surprising that the idea and the first attempts to create a network appeared, where the active elements are spline functions (multiple-polynomial functions that can consist of different polynomials at different segments) [Liu, 2024]. For each spline, more polynomial coefficients need to be introduced, so the new network created from them – KANs (Kolmogorov-Arnold Networks) needs more parameters than exist in artificial neuron networks of the same volume. However, it turned out that much fewer network layers can then be used. People will have to train these polynomial functions (determine their parameters) and this seems to be easier, but it takes longer, and increasing the polynomial coefficients will most likely improve the capabilities of such a network.

Such networks will be more suitable for solving problems with mathematics. All these hopes of the developers were confirmed by the practice of using these networks. Modified ReLU-KAN networks [Qiu, 2024] were configured for parallel processing of information on graphic processors, they turned out to be faster, which was expected, and more accurate, which was a pleasant surprise [Abramov, Gushchin, Sirenka, 2024].

DISTURBING TRENDS: THE EVOLUTION OF ARTIFICIAL INTELLIGENCE SYSTEMS AND THE INTELLECTUAL DEGRADATION OF HUMANITY

Changes in the information space. So, changes in the information structure of society are significantly influenced by a growing and already quite large group of intelligent systems – neural language for neural networks. These networks are trained on enormous amounts of

information in search engines and the Internet in general. These networks require other forms of control of truth and correspondence to reality, since most of the information on the Network is either completely false, or processed, speculative, adjusted to form the ideas desired by content creators. Explicitly or implicitly (one would like to say unconsciously), neural networks repeat all these approaches, creating big problems for users. It is necessary already in the very structure of the Internet, in training programs for networks, to create mechanisms for forming assessments of the truth and adequacy of the description of phenomena, concepts and actions. Uncertainty in the correct and complete answer, as well as erroneousness (1), incompleteness (2), empirical rules not proven by repeated confirmations (3), lack of a formal description - theories (4) will have to be clarified immediately - simultaneously with the presentation of information about this. Indeed, communities of people with different levels of education, intelligence and diligence have created and are creating a variety of answers for a wide range of tasks that are gradually filling the World Wide Web. It is not surprising that neural networks trained on these corpuses - file arrays - also retain a multiplicity of approaches and assessments, the truth of which they are often unable to understand, although auxiliary devices - plugins containing verified data and methods for obtaining more accurate solutions - are already being created. Developers and specialists do a lot to ensure the correctness of answers, although so far this has been successful and only partially for certain branches of knowledge. The answers and solutions of artificial intelligence based on this contradictory information are still far from complete and perfect. At the same time, the quality level of knowledge distributed in society is constantly decreasing.

The world of users. And the continuous complication of old and new technologies discourages people from studying them in detail. All the new games and fun get in the way, especially since the industry of creating and organizing such entertainment (ART) is becoming a good business due to the growing demand of the spoiled public [Bakirov., Kuklin, 2024]. But people need to learn so as not to end up on the sidelines of evolution. But this is becoming increasingly difficult to do, and many rightly believe that the intellectual degradation of an ever-increasing part of humanity is becoming more and more obvious.

The degradation of the education system is affected not only by easy access to answers from neural networks and Internet tips (which suppresses intellectual activity and the ability to think), but also by a general simplification of definitions and answers in the education system (where there is no detailed description of the procedures for obtaining these solutions and knowledge control has been introduced in in the form of tests with pre-formulated answers, among which you need to choose the correct and complete one). This is acceptable for training users, but not for developing creators, future creators of theories, complex programs and technologies.

Mass technical education is dominated by the training of advanced consumers who do not delve into the details of the design of technical devices and systems. This is due to the difficulty of studying the internal structure of theories and rigorous descriptions. These difficulties lead to the abandonment of the efforts of both students and teachers, who are also faced with insufficient initial training of students, which does not allow them to master formal theories. We have to limit ourselves to training to the level of an advanced user of very complex devices and systems. The disadvantage of this approach to training is the inability of such specialists to cope with emergency situations, the nature of which is hidden in the depths of the theoretical and programmatic description of processes and phenomena.

Indeed, the increasing technological saturation of urbanized life has forced the majority of young people to teach not the basics of science, but rather their consequences, simple conclusions and management using simplified simple interfaces created by professionals. The latter are forced to do this, because customers demand simplification of control systems so that an averagely trained worker is able to master the control of complex mechanisms and devices. The need to understand processes and phenomena is complicated because a large number of educational courses present conclusions without details taken from basic knowledge and first principles.

However, ignorance of the basic sciences on the basis of which these technologies and devices are created leads to errors (the so-called human factor), which border on crime (accidents at nuclear thermal and hydroelectric power plants, violation of the technology of large-scale production and transportation of hazardous substances, etc.). Poor preparation at all stages of long-term education forces teachers to simplify courses, because students are simply not ready to comprehend the knowledge presented to them. Particularly harmful are tests where the process of outputting the result is skipped and is not controlled. Then students gradually focus on tips and information from search engines, where there are many errors and absurdities. Justification for the answer is not required, and this is the most important thing in mastering the material. A test, when answers are given from which the correct and most complete one must be chosen, narrows the horizons of reflection, forming a consumer attitude towards the assessment procedure.

In many countries, education previously suffered and continues to suffer from a formal attitude to knowledge; programs are dominated by sets of facts and simple dependencies, which is now encouraged and aggravated by the use of tests to control knowledge. They provoke the appearance of the Wasserman effect already mentioned above in diligent students (the connections between concepts are not fully realized)[1]. Clues from the world of artificial intelligence, the Internet, and this education system give students a loose (if not erroneous) picture of the world[2].

Therefore, it is extremely important to revive classical universities as sources of fundamental knowledge, to restructure educational programs for in-depth study of the foundations of science, so that these universities graduate from creators, not users. The very high rate of development and rapid evolution of intellectual competitors - artificial intelligence systems - prompts people to do this as soon as possible.

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[1] Once again I remember how at one scientific meeting a more experienced colleague approached me and advised me to talk less about my plans, saying that those around me can do a lot of things, but they are often unable to guess what exactly can be done. That is, the Wasserman effect also manifests itself in this environment.

[2] The interesting example. There are three degrees of formalization in modern neural networks. The first is famous codes, the second is languages, for example, the most widespread Python language. The third is libraries that, in addition to data and dictionaries, have a large set of technologies. When you choose a technology, you simply turn to it, it does everything by itself. Instead of hundreds of terms of the program, dozens remain. Moreover, the complexity of the program, taking into account the libraries, only increases. Humanity is increasingly moving into the category of users, because less and less attention is being paid to the main formal knowledge and descriptions and they are already using derivatives – directories, subsidiary structures. Only a few are interested in the basics of science.

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ПРИРОДНИЙ ТА ШТУЧНИЙ ІНТЕЛЕКТИ В ПОШУКАХ ІСТИНИ

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АНОТАЦІЯ

У роботі обговорюються особливості формування та застосування знань у людській спільноті та у світі сучасних систем штучного інтелекту. Показано, що знання цивілізації має відому невизначеність, зумовлену самим характером наукового пошуку, що породжує сумніви, провокує перегляди та корекції. Зростаюче різноманіття оцінок і рішень існуючих проблем зумовлене не лише цією обставиною, а й більшою мірою стратифікацією суспільства за рівнями освіченості та інтелекту. Інтелектуали опинилися в меншості в умовах доступу до інформаційних мереж маргіналів, що раптово осміліли та почали створювати безліч нових уявлень та генерувати ідеї, які явно виглядали як псевдонаукові й навіть містичні. Тому більшість рішень і дій в кращому випадку не завжди вірні, не логічні та недалекоглядні у сучасному суспільстві, розбавленому маргіналами, що винирнули з інформаційного небуття. Важливо відзначити, що системи штучного інтелекту, зокрема нейронні мережі, навчені на результатах такої різноманітної людської діяльності, спираються на численні варіанти не завжди строгих підходів і неоднозначних рішень людей, що зібрані в Інтернеті. Ці штучні інтелектуальні системи створюють ще більш розгалужені сценарії підходів і рішень, значно більшою мірою заплутуючи та деморалізуючи користувачів. Тому необхідна система верифікації рішень систем штучного інтелекту, заснована на розроблених масивах вже перевірених та узгоджених у науковому середовищі знань та законів. Вже недостатньо формування об'єднаних думок наукових колективів, як колись, бо їхні голоси мало хто чує, а часто не бажає чути. Зростання різноманітності думок людей і висновків структур штучного інтелекту

впливають на розвиток не тільки науки, але більшою мірою на освіту. Сучасна система освіти через інформаційний шум і труднощі освоєння нових знань і технологій витісняє фундаментальне знання. Навчання в сучасну епоху обмежується навчанням вмінням використовувати прилади та технології, орієнтуючись на підготовку нехай просунутих, але споживачів. Тому лунають голоси на користь перенесення фундаментальної освіти, яка лежить в основі інтелектуального та технологічного розвитку цивілізації, у класичні університети.

Ключові слова: *використання знань, людство та системи штучного інтелекту, підсилення інформаційного шуму, розпорошення підходів та рішень, роль фундаментального знання.*

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