УДК 004.8
5.2.2. Математические, статистические и инструментальные методы в экономике

РЕВОЛЮЦИЯ В СИСТЕМАХ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА 20-Х ГОДОВ XXI ВЕКА И СИСТЕМЫ С ИНТЕРФЕЙСОМ «ДУША-КОМПЬЮТЕР» КАК БЛИЖАЙШИЙ ОЧЕРЕДНОЙ ЭТАП РАЗВИТИЯ ИНТЕЛЛЕКТУАЛЬНЫХ ТЕХНОЛОГИЙ

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Анализируется набирающая обороты 6-я информационная революция, содержание которой состоит в появлении в онлайн доступе многочисленных систем искусственного интеллекта, которым можно давать самые разнообразные задания на естественном языке, причем на любом, и эти системы очень быстро и очень качественно выполняют эти задания, опираясь на все ресурсы Internet. В данной работе мы попробуем кратко, но обоснованно, ссылаясь на более объемные работы, ответить на вопрос о том, каким будет следующий очередной ближайший этап развития интеллектуальных технологий и какими будут последующие этапы. Ответ на этот вопрос обосновывается на основе представлений об информационной сущности труда и информационно-функциональной теории развития техники, описывающей глобальные закономерности развития технологий, действующие на протяжении всей истории человечества. Обосновывается вывод о том, что 7-я информационная революция будет во многом аналогичной 1-й, т.е. будет иметь более глобальный характер и гораздо более далеко идущие последствия, чем все уже прошедшие информационные революции (за исключением 1-й). Эволюция интеллектуальных систем рассматривается с точки зрения эволюции их пользовательских интерфейсов, которые обеспечивают возможность работы с моделями общения все более и более низкой степени формализации. Естественный язык рассматривается как язык программирования сверхвысокого уровня, а интеллектуальные системы как кросскомпиляторы с естественного языка, на различные языки программирования. Конкретизируются представления о системах искусственного интеллекта ближайшего и более отдаленного будущего, имеющих прямой пользовательский интерфейс «Душа-Компьютер», в частности обеспечивающие управление компьютерами путем мышления и воображения. Рассматриваются существующие сегодня аналоги подобных систем: интерфейс мозг-компьютер, телепатическая клавиатура, нейроинтерфейс и т.п.

Ключевые слова: системы искусственного интеллекта, информационная сущность труда, информационно-функциональная теория развития техники, интерфейс мозг-компьютер, телепатическая клавиатура, нейроинтерфейс
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5.2.2. Mathematical, statistical and instrumental methods in economics

THE REVOLUTION IN ARTIFICIAL INTELLIGENCE SYSTEMS OF THE 20S OF THE XXI CENTURY AND SYSTEMS WITH THE SOUL-COMPUTER INTERFACE AS THE NEXT NEAREST STAGE IN THE DEVELOPMENT OF INTELLIGENT TECHNOLOGIES

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The 6th information revolution, which is gaining momentum, is analyzed, the content of which consists in the appearance of numerous artificial intelligence systems in online access, which can be given a wide variety of tasks in natural language, and in any language, and these systems perform these tasks very quickly and very efficiently, relying on all Internet resources. In this paper, we will try briefly, but reasonably, referring to more voluminous works, to answer the question of what the next nearest stage of the development of intelligent technologies will be and what the next stages will be. The answer to this question is justified on the basis of ideas about the informational essence of labor and the information-functional theory of technology development, which describes the global patterns of technology development that have been operating throughout the history of mankind. The conclusion is substantiated that the 7th information revolution will be in many respects similar to the 1st, i.e. it will have a more global character and much more far-reaching consequences than all the information revolutions that have already passed (with the exception of the 1st). The evolution of intelligent systems is considered from the point of view of the evolution of their user interfaces, which provide the ability to work with communication models of an increasingly lower degree of formalization. Natural language is considered as an ultra-high-level programming language, and intelligent systems as cross-compilers from natural language to various programming languages. The concepts of artificial intelligence systems of the near and more distant future, having a direct user interface "Soul-Computer", in particular, providing control of computers by thinking and imagination, are concretized. The existing analogues of such systems are considered today: brain-computer interface, telepathic keyboard, neurointerface, etc.

Keywords: artificial intelligence systems, information essence of labor, information and functional theory of technology development, brain-computer interface, telepathic keyboard, neurointerface

CONTENT

1. Introduction

Now it is absolutely obvious to everyone that in 2020-2023 of the 21st century a real revolution took place in artificial intelligence systems. We can confidently state that we are witnesses and participants of the next, already 6th, information revolution, which is unfolding all over the world right before our eyes [10]:

1st information revolution: The emergence of sound language (verbalization) and objective consciousness and self-awareness.

2nd information revolution: The emergence of writing as a text form of verbalization.

3rd information revolution: The emergence of printing as a method of copying and distributing texts.

4th information revolution: The emergence of computers and electronic forms of storing and transmitting information in the form of files on media.

5th information revolution: The emergence of an electronic form of accumulation and transmission of information, such as local, corporate and especially global computer networks, especially the Internet.

6th information revolution: The emergence of numerous artificial intelligence systems in online access (Figure 1), which can be given a wide variety of tasks in natural language, in any language, and these systems perform these tasks very quickly and very efficiently, relying on all Internet resources.

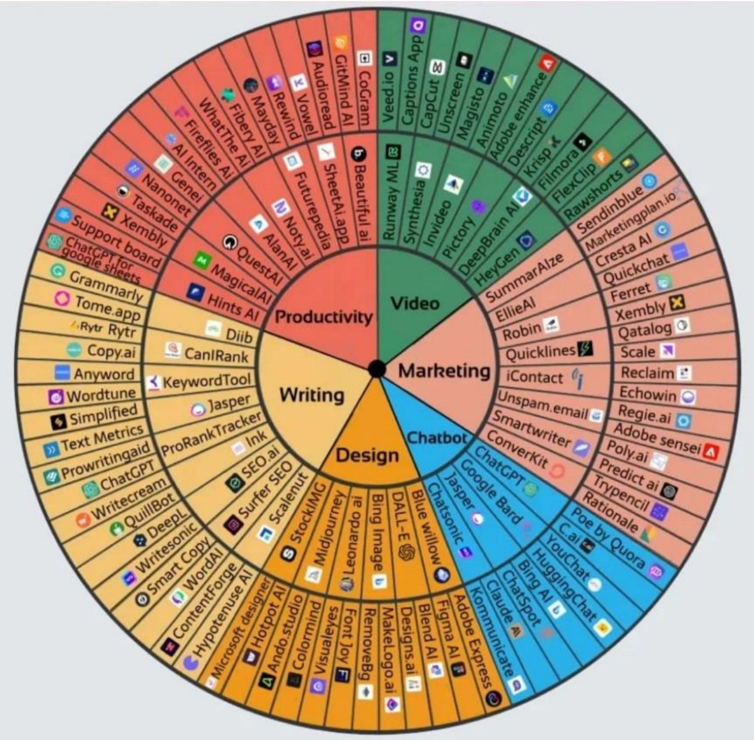


Figure 1. Some online artificial intelligence systems

Source: https://www.reddit.com/r/ChatGPT/comments/14wkb9s/ai_tools_list_sorted_by_category_in_one_place/?rdt=48857

If anyone still doubts this, then to see for yourself, just follow the links: https://www.seaart.ai/home, https://dzen.ru/a/ZCKZRKvrlEMBWOk8, NCKR-1, NCKR-2, NCKR-3, NCKR-4, http://chat.openai.com/, https://poe.com/, https://rudalle.ru/, https://problembo.com/ru/services, https://chatbot.theb.ai/, https://neural-university.ru/, https://poe.com/GPT-3.5-Turbo-Instruct, https://ora.ai/eugene-lutsenko/aidos, https://ora.ai/, https://ora.ai/explore?path=trending, https://learn.microsoft.com/ru-ru/dotnet/machine-learning/how-does-mldotnet-work, https://poe.com/Aidos-X, https://bard.google.com/.

Each information revolution represents a significant stage, an entire era in the development of mankind. Moreover, it should be specially noted that the 1st information revolution marked the very emergence of humanity.

As a result of the ongoing 6th information revolution, the Internet is rapidly transforming from a global data warehouse, which it has always been before, and an information space, which it has become in recent times, into a knowledge space. We have written in a number of works over many years that this is the main direction of development of modern information technologies [1-4].

Note that data are any changes in the degree of expression of any properties of objects and phenomena or the absence of these changes. Information is meaningful data. Meaning, according to Schenk-Abelson's concept of meaning [5], is knowledge of the causes and consequences of processes and phenomena. Meaning in data is revealed through data analysis. Knowledge is information useful for achieving a goal, i.e. for control (Figure 2) [2]:

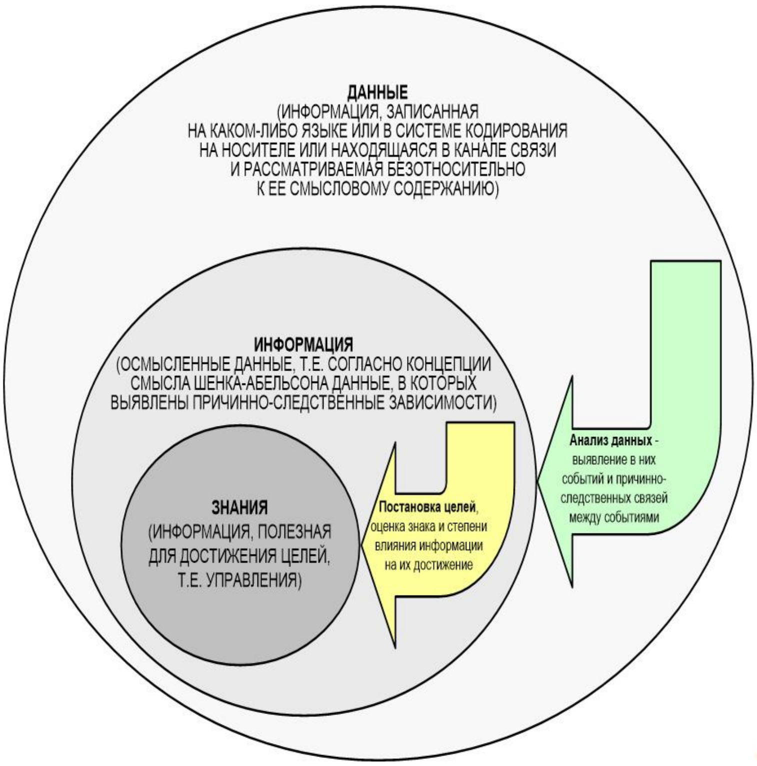
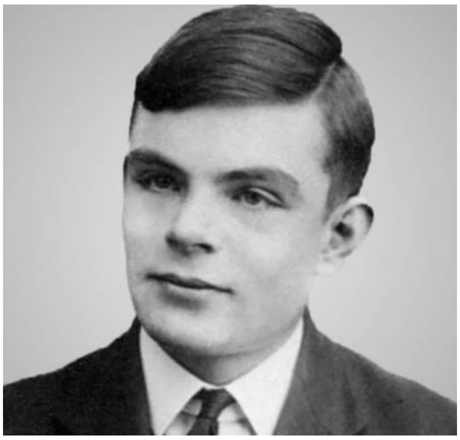


Figure 2. On the relationship between the semantic content of the concepts: “Data”, “Information”, “Knowledge”

Artificial intelligence systems from this point of view are systems that ensure the transformation of data into information, and this into knowledge, the accumulation of this knowledge in knowledge bases and the application of this knowledge to solve problems of identification (recognition, diagnosis, forecasting), decision-making and knowledge of an object modeling by studying its model.

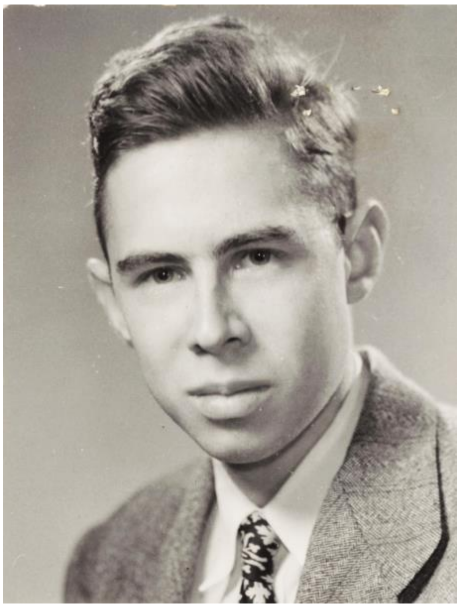
1.1. The emergence of a scientific and technological direction: “Artificial Intelligence”



Alan Matheson Turing
June 23 1912—June 7 1954)

The birthday of the science of artificial intelligence can rightfully be considered October 5, 1950, when the 59th issue of Mind magazine was published, in which Alan Turing’s landmark article entitled “Computing machinery and intelligence” was published on pages 433–460 [6]. In this work, Alan Turing directly posed the question: “Can a machine think?” and reasonably answered it in the affirmative, thanks to which there is every reason to consider him the founder of the science of artificial intelligence and intelligent technologies.

The next important milestone in the development of artificial intelligence was the work of Frank Rosenblatt [7] in 1957, in which he proposed the first artificial neural network, called the Perceptron. The perceptron was a mathematical model and physical implementation inspired by biological neurons. The basic idea of a perceptron was to simulate the learning and classification abilities of the human brain. It consisted of artificial McCulloch–Pitts neurons that could weigh input signals and make decisions based on this weighted information.



Frank Rosenblatt
11.07.1928–11.07.1971

Rosenblatt conducted research to show how a perceptron could learn to distinguish patterns and perform classification tasks. Although the perceptron was an important step in the development of artificial neural networks, it had limitations and could not solve complex problems such as pattern recognition with non-linear dependencies. However, this work of Frank Rosenblatt had a great influence on future research in the field of machine learning and artificial intelligence, and today neural networks have become one of the key directions in the field of artificial intelligence. By the way, for some reason many people think that the terms “Neural network” and “Artificial intelligence system” are synonymous, but this is not so: neural networks are only one of many types of intelligent systems.

1.2. Development of scientific and technological direction: “Artificial intelligence”

Outstanding world-class scientists who are the founders of the scientific and technological direction: “Artificial Intelligence” Alan Turing, Frank Rosenblatt, Norbert Wiener, Claude Shannon, William Ross Ashby, Alexander Kharkevich, Marvin Minsky and others more or less clearly understood what the fundamental difference between natural and artificial intelligence. Alan Turing himself understood this especially clearly and consciously, as we will see below.

However, subsequent generations of scientists and developers in the field of artificial intelligence have lost this understanding. As a result, they turned out to be practically unable to solve the problems of creating and developing fully functional artificial intelligence and were mired in technical details that did not play a special role in solving this problem, i.e. deviated from her decision. At the same time, numerous successful, including quite successful, systems of instrumental artificial intelligence have been created.

Analysis of instrumental artificial intelligence systems shows that by themselves they do not bring us closer to solving the problem of creating fully functional strong artificial intelligence, except for this very conclusion.

1.3. Types of artificial intelligence systems

Until recently, the further development of artificial intelligence proceeded quite smoothly and evenly, one might say quite calmly, without any significant events or shocks, and consisted of a constant gradual improvement in the quality of work and the quantitative capabilities of intelligent systems.

As a result, there are now dozens, if not hundreds of different types of artificial intelligence systems, the main of which are [8]:

1. Pattern recognition systems (classification, identification, diagnostics and forecasting).

2. Decision support systems.

3. Systems with intelligent feedback and intelligent interfaces, incl. remote:

– systems using biometric information about the user;

– systems with biofeedback (BFB);

– systems with semantic resonance and subconscious interface, based on computer Ψ-technologies;

– virtual reality systems, augmented reality and intelligent interfaces based on them, in particular the “Avatar” type (immersion environments);

– systems with a remote microtelekinetic interface (Lutsenko E.V., Bakuradze L.A., 1979-1981 [10]);

– expert systems;
– neural networks;
– genetic algorithms and evolution modeling;
cognitive modeling systems;
– data mining;
– swarm intelligence, bacterial search, etc.;
– automated system-cognitive analysis and universal analytical system "Eidos" [15, 16];

All these types of artificial intelligence belong to instrumental artificial intelligence and, for all their advantages, have one common drawback: they are not in themselves artificial intelligence, functionally similar to natural intelligence, but are only tools that enhance the capabilities of natural intelligence.

But some of them can be used to create fully functional artificial intelligence, completely similar to natural intelligence, primarily these are systems with a remote micro-telekinetic interface and with virtual interfaces of the "Avatar" type.

1.4. Statement of the main question, the answer to which the work is devoted

But, in the end, as is usually the case, quantity turned into quality and everything changed dramatically in recent years, when the 6th information revolution began to unfold. This sharply, one might say, "point-on" raised an extremely important and intriguing question, which only a few futurologists had previously thought about, such as Professor E.V. Lutsenko, who wrote about this back in 1979-1981 and later in his works [10]. This is a question about what the next nearest immediate stage in the development of intelligent technologies will be and what the subsequent stages will be.

In this work we will try to briefly but reasonably, referring to more voluminous and detailed works, to answer this question.

Announcing, let's say that in our opinion, the 7th information revolution will be in many ways similar to the 1st, i.e. will have a more global nature and much more far-reaching consequences than all previous information revolutions, with the exception of the 1st.

2. Method

2.1. Models of knowledge representation in knowledge bases, their advantages and disadvantages

However, despite the huge and rapidly growing number of different intelligent systems, the number of different knowledge models on which they are based remains quite limited. Moreover, it can be reasonably argued that all currently known formalized knowledge models used in knowledge bases of intelligent systems are nothing more than variations of one single basic knowledge model.

Table 1 shows almost all the main types of knowledge bases currently known, and also gives the ratio of the content of the main terms used in these knowledge bases:

Table 1 – Known types of knowledge bases and the relationship between the semantic content of their main terms

Model of automated system-cognitive analysis and intellectual system "Eidos" (Evgeniy Lutsenko, 1979)	**Classification scales and gradations**	**Descriptive scales and gradations**	**A specific image of the object of the sample under study**	**Knowledge base (declarative and procedural knowledge representation), forward and backward plausible reasoning**	**Generalized class image**	**Clusters can be displayed in tree and semantic network form**	**Construct as a system of the most dissimilar classes with a spectrum of classes intermediate in level of similarity**
Logic model – classical deterministic logic (Aristotle, 350 BC)	Binary (dichotomous) class references	Binary (dichotomous) directories of features	Binary object vector	Rules of logical inference	---	---	---
Logic model (fuzzy logic Lotfi Zadeh, 1965)	Nominal, ordinal and numeric class directories	Nominal, ordinal and numeric directories of characteristics	Vector of an object indicating the degree of expression of its features	Fuzzy inference rules	---	---	---
Frame Model (Marvin Minsky, 1974)	Frame names	Slots and spacing	Instance Frames	Procedures for generating prototype frames based on instance frames	Sample frames, or prototypes	---	---
Production model of expert systems (Allen Newell and Herbert Simon, 1972)	---	---	---	Production representation of inference rules	---	---	---
Semantic Networks (John Sarrell, 1968)	---	Properties and their meanings	Class element	Relationships between classes	Class	Graph of cluster analysis results	---
Neural Networks (Frank Rosenblatt, 1957)	**Many neurons**	**Many receptors**	**Training sample object**	**Weighting Matrix**	**Neuron with weights**	**Neuron of the 2nd layer of the network**	---

The main conclusion that can be reasonably drawn from this table is that all these models of knowledge representation differ from each other to a much lesser extent than is usually thought. In fact, all known models of knowledge representation are variations of the representation of the same knowledge model in terms that differ in sound but are very similar in semantic content. In much the same way, we can talk about the same thing in different languages, and sometimes it sounds completely different, but the meaning of what is said remains almost the same.

So what does this mean? And the meaning, oddly enough, is quite simple: the same specific objects of the training sample, each of them, are described in two ways:

– firstly, its signs;

– secondly, by its belonging to more general categories (classes).

Typically, these terms "signs" and "classes" are used in classification, identification, recognition and diagnostic systems.

In another metaphor, more often used in forecasting and control systems, this sounds a little different. Each result of the influence of control actions on the control object (modeling object), i.e. Each observation is described in two ways:

– firstly, the values of the factors acting on the control object;

– secondly, by the future state, corresponding to the class, the control object has transitioned to under the influence of these factors.

Such descriptions in the sciences of artificial intelligence are called specific ontologies (in the author's opinion, this name is not very good).

Based on specific ontologies that collectively make up the training set, the artificial intelligence system (not every one) generates generalized ontologies, i.e. generalized images of classes.

A generalized ontology is essentially a definition. For example: a student is a male university student. The class "student" is defined through the more general concept of "student" and the indication of specific characteristics of "university" and "male gender", which make it possible to identify a defined subset of objects or their states in a more general concept.

Based on this, various tasks are then solved:

– comparison of specific objects with generalized images of classes (task of classification, identification, recognition, diagnosis and forecasting);

– comparison of generalized images of classes with each other (cluster and constructive analysis);

– decision support;

– research of the modeled subject area by studying its model.

Not all of these problems are solved in every system, i.e. in a number of systems only some of them are solved.

2.2. Advantages and disadvantages of various knowledge representation models

Table 2 presents the advantages and disadvantages of various knowledge representation models.

Table 2 – Advantages and disadvantages of various knowledge models

Model name	Model rating			Logic type		A method for determining the degree of truth of statements			Availability of a well-theoretically grounded meaningful interpretation of weighting coefficients	
	Strengths	Weak sides	Sum	Logic of Aristotle	Fuzzy logic	Reported by an expert through the mediation of a knowledge engineer (cognitologist)	Calculated automatically based on empirical data		No	Eat
							Iterative backpropagation algorithm	Direct counting method		
Classic logic model	0	2	-2	+	–	+	–	–	There are no weights at all coefficient patients	
Network model	0	2	-2	+	–	+	–	–		
Product model	0	2	-2	+	–	+	–	–		
Fuzzy Logic L.Zadeh	2	1	1	–	+	+	–	–	–	+
Frame model	3	1	2	–	+	–	++	–	+	–
Neural network model	3	1	2	–	+	–	++	–	+	–
Model of systemic cognitive analysis and the Eidos system	4	0	4	–	+	–	–	++	–	+

The main conclusion that can be drawn based on Table 2 is that there are two main criteria for classifying knowledge representation models:

1st criterion: according to the form of knowledge representation in the knowledge base: declarative and procedural models;

2nd criterion: by type of logic of knowledge representation in the knowledge base: clear and fuzzy models.

According to the authors:

– the advantages of knowledge representation models are the declarative form of knowledge representation and fuzzy logic;

– shortcomings in procedural form and clear logic.

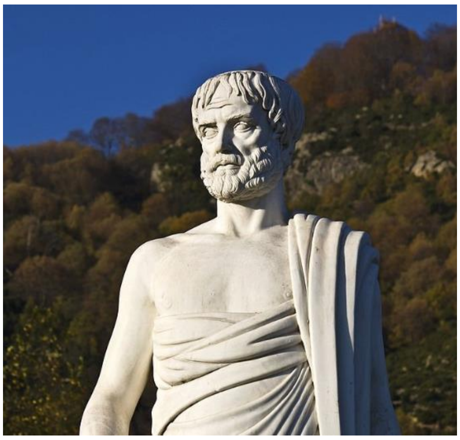
According to these criteria, the knowledge model of the Eidos system is a good model.

In order to reasonably answer the main question of the work: “what will be the next immediate stage in the development of intelligent technologies and what will be the subsequent stages?” we need to clearly see the general logic of the development of technologies from their origin to the present and for the long term.

We have such a vision and it is based on the idea of the informational essence of the labor process and two laws of technology development: – the law of transferring human labor functions to means of labor (Marx K., 1867) [11];

– the law of increasing the quality of the basis (Lutsenko E.V., 1979) [10,12,13].

2.3. Information essence of the labor process



Aristotle
384-322BC

Apparently, historically, Aristotle (384-322) was the first to formulate the idea of the informational essence of the labor processBC), who said that the essence of labor lies in giving shape to the material and gave the example of a potter who embodied the idea of a jug in clay using a potter's wheel. Form is objectified information about a structure contained before its embodiment in a subjective idea.

Karl Marx
May 5, 1818 – March 14, 1883

It should be noted that the idea of the informational nature of the labor process was formulated by K. Marx in the section “Development of Machines” of Capital approximately 60 years before the creation of the scientific theory of information in the works of Ralph Hartley in 1928, i.e. approximately 156 years ago. Therefore, today we will express the ideas of K. Marx in slightly different terms than in his works. As a result, we obtain the following formulations.

Before starting the labor process, a person creates a subjective image of the future product of labor. During the labor process, information from this subjective image is transmitted and recorded into the object of labor, and during this process it is transformed into a product of labor.

In the labor process, the subjective image of the product of labor is embodied in the material.

In this process, there is a multi-stage transformation of the form of information and an increase in the degree of formalization of the subjective model. Each stage corresponds to one labor function.

The human body and means of labor act as a channel for transmitting information from the subjective image of the future product of labor to the subject of labor.

So, the means of labor are, first of all, information systems. This is their essence and main function. Everything else, i.e. design, materials and energy - all this is needed only to support the process of transferring and transforming the form of information and for recording it into an object of work in order to change its structure.

In this communication channel, the form of information is transformed (representation language or coding system), as well as the transformation of information from a subjective form to an objective one.

Today, when so many people work with the help of computers via the Internet, the informational essence of the labor process has been laid bare and has become self-evident to everyone. And before, everyone paid attention to the fact that during work you get tired and sweat, i.e. paid main attention not to the function of transforming the form of information and intellectual functions, but to the function of transforming the form of energy, because engine function.

Let us note that in the process of cognition, on the contrary, information from an objective form is transformed into a subjective one and transferred to the created subjective model of the cognizable object.

The point of transformation of the subjective into the objective and the objective into the subjective is currently unknown to official science, as is the very nature of this transformation. This problem is called a psychophysical problem. In work [10], the author proposed its solution within the framework of a natural science formulation and solution to the main question of philosophy.

2.4. Information-functional theory technology development

2.4.1. Law of independence of functions from supporting ones their structures

The fundamental law underlying the development of our technological civilization is known; this is the law of independence of functions from the structures that support them: "the same functions can be supported by different structures."

For example: in the human body, the engine function (converting one form of energy into another) is realized by the digestive and musculoskeletal systems, and in a car the same function is realized by burning fuel in combustion chambers.

2.4.2. The law of transfer of labor functions from man to means of labor (Karl Marx, 1867)

Technological progress consists in creating means of labor of a higher functional level by transferring to them labor functions previously performed by humans.

Labor functions according to Karl Marx [11]:

1. Function of contact with the subject of labor.
2. Function of transfer and redistribution of energy (transmission function).
3. The function of transforming a simple monotonous movement into a complex, purposeful one that does work (work function).
4. The function of converting one form of energy into another (motor function).

The means of labor perform the same functions that a person performed before using them. But they perform these functions outside of human psychophysiological limitations. In addition, technological progress occurs immeasurably faster than biological and psychological progress. This is the meaning and expediency of creating means of labor and their application in practice.

If Karl Marx:

– I would ask the question whether in the future the development of means of labor will continue by transferring to them some other human functions that he realizes in the labor process;

– and would answer this question in the affirmative;

– and formulated that the next 5th labor function of a person is, in fact, the mental function of transforming information, thinking and goal setting (added to the system of labor functions of Karl Marx in 1979 by Prof. E.V. Lutsenko, along with another 11 labor functions functions in work [10][1]);

then Karl Marx could become a real forerunner (“great-grandfather”) of modern and future computer and intellectual tripods.

But, unfortunately, he did not write anything about it. At the same time, the authors are absolutely sure that he thought about this and understood it, but did not write it in his fundamental works, apparently because he considered it insufficiently scientifically substantiated and that the time for this had not yet come, and perhaps so it really was.

In fact, he said that in the future society, knowledge and science will become a direct productive force, and intelligent systems are precisely systems that transform empirical data into information, and this into knowledge, and solve problems of identification and forecasting based on this knowledge , decision making and exploration of the subject area by examining its model. Simply put, artificial intelligence systems are tools that greatly increase people’s ability to obtain and use knowledge.

Labor functions can be transferred from a person to technical systems only in a strictly defined order, namely in the way they are listed in this work. The reason for this is approximately the same as why we cannot remove the inner one from the assembled nesting doll until we open the outer one.

2.4.3. Determination of the economic and political form of society by the functional level of the technological environment

When the next labor function of a person is transferred to means, a technological revolution occurs (the technological structure of society changes), which inevitably causes a revolution in production relations, economic and political structures of society, and therefore a transition of society to a new socio-economic formation, a group of socio-economic formations and corresponding to the most massive form of consciousness (stage of social cognition) [10].

2.4.4. Law of improving the quality of the basis (E.V.Lutsenko, 1979)

The development of systems occurs by resolving contradictions in the lowest structural level of the hierarchical organization in which they still exist

[1] All labor functions transferred to the means of labor, starting from the 5th, are mental functions performed by the Human Soul and, in the currently most widespread form of consciousness, are recognized as subjective. But in the future, with higher forms of consciousness, when they are transferred to the means of labor, they will be perceived as objective [10, 23]. This means that all future technical systems will have a partial artificial soul (psyche) created by man, first in the nearest group of emotional formations, and then in the next group of formations and rational.

(basic level). When contradictions at the basic level are resolved, the system moves on to development by resolving contradictions at a directly higher level than the previous one, which becomes the basic level.

In accordance with this law, the technological society has moved into the information society, and now it is transitioning to the cognitive society, i.e. knowledge-based society.

2.4.5. Determination of the form of human consciousness by the functional level of the technological environment

The functions transferred to the means of labor are realized by them outside the biological and psychophysiological limitations of humans. When using a means of labor of a certain functional level, a person learns not to perform the functions transferred to this means of labor, and the remaining functions are performed by the person without the restrictions associated with the need to perform the transferred functions. As a result, a person is partially freed from the labor process, moves away from it somewhat to the side, and a new, adequate “Image - I” and consciousness are formed in him. They change in such a way that the labor functions transferred to the means of labor cease to be recognized by a person as an attribute of the “image - I” [10].

2.4.6. Intelligent systems as remote microtelekinetic control systems (Soul-computer interface)

In 1979-1981, the author developed an information-functional theory of technology development, on the basis of which functional diagrams were obtained for both 5 already created in human history and 11 more promising technical systems, the creation of which is a matter of the future, and for one of these promising systems technical (engineering) solutions: this is a remote micro-telekinetic control system.

Telekinesis is the direct influence of the soul on objects and processes of the physical world (usually at the micro level) and is the way in which the Soul affects the physical body.

Today, more than 40 years later (!!!), Microsoft has received a patent for a somewhat similar “Telepathic Interface” system. Today, 40 years after these proposals by the author, intensive research and development in the field of neural interfaces, Brain-Computer interfaces (telepathic keyboard, thought control) are being carried out all over the world[2].

However, judging by the materials of the open press, world-class scientists in this field are still acting unconsciously and searching at random without having a fundamental information-functional theory of the development of productive forces, proposed by the author 40 years ago, from which such decisions follow. Their technical solutions in many important parameters are also still very far from the author’s proposals.

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[2] There is some information about this on the website:http://2045.ruand from the links:https://yandex.ru/search/?text=Telepathic%20interface%20neuralinterface%20Brain-computer&lr=35

A number of these promising systems, proposed by the author more than 40 years ago, supporting the “Soul-computer” interface (term.aut.), will actually feel and think, and not just model these processes, like modern artificial intelligence systems. However, this is a perspective that is far beyond the scope of this brief paper [10].

3. Results

3.1. What is formalization of models

Formalization of models is the process of objectification or objectification of a model, translating it into another form of representation or into another language or coding system with an increase in the degree of abstraction, but preserving in the model the most essential characteristics of the modeling object and the connections between them.

An increase in the degree of formalization of a model is always necessarily accompanied by the irreversible loss of some of the information contained in the previous model. In this case, mostly concrete information is lost, while abstract information is retained. Therefore, an increase in the degree of formalization of a model is always associated with an increase in its degree of abstraction.

3.2. Why formalization of models is needed

Formalization of models is needed for many purposes. But we focus on the fact that formalization and objectification of models is necessary for their transfer to other people and technical systems, primarily computers.

This is necessary because:

- the majority of people in the usual most mass[3]form of consciousness, cannot directly transfer subjective models to each other, for example, by telepathy, and in order to transfer a subjective model to another person, it is necessary to first transform it into an objective form, which is realized by this other person and is then independently transformed by him into a subjective form for understanding and application;

– modern computers and other technical systems do not have a “Soul-computer” user interface and perceive control influences only at the physical level. In addition, they can only process models presented in objective form, i.e. are not able to work with the subjective form of information, in particular to feel and think like a person, because do not even have a partial artificial soul (psyche). All labor functions transferred to the means of labor, starting from the 5th, are mental functions performed by the Human Soul and, in the currently most widespread form of consciousness, are recognized as subjective. But in the future, with higher forms of consciousness, when they are transferred to the means of labor, they will be perceived as objective [10, 23]. This means that all future technical systems will have a partial artificial soul (psyche) created by

[3]Currently

man, first in the nearest group of emotional formations, and then in the next group of formations and rational.

3.3. Levels or degrees of formalization of models and their implementation on computers

3.3.1. Informal formalization

Not formalized models at allhave a subjective form and unknown[4]science is a form of knowledge representation (culture, art, psychology).

Verbalization, i.e. representation of the model in words, in the form of a verbal description in the form of audio or text speech in natural language.This is the most initial and least strict stage of formalization (literature, linguistics).

As noted above, an increase in the degree of formalization of a model is always accompanied by the loss of part of the information contained in the previous model. Therefore, any thought is expressed in words in a somewhat limited, flawed way, and sometimes it is almost impossible to express it at all: “Neither to say in words nor to describe with a pen,” “A spoken thought is a lie” (F.I. Tyutchev), “The expressed DAO is not true TAO" ("by the way", this is the first statement in the book of sayings of the Taoist sages). Even in the same language, the same thought can be expressed in a variety of words. Different languages are suitable to varying degrees for expressing the same idea, and some are not suitable at all. People differ significantly from each other both in their skill and in their ability to express thoughts in words. Poets, writers and scientists have especially high skill in this.

Silentium

Be silent, hide and hide
And your feelings and dreams -
Let it be in the depths of your soul
They get up and go in
Silently, like stars in the night, -
Admire them - and be silent.

How can the heart express itself?
How can someone else understand you?
Will he understand what you live for?
A spoken thought is a lie.
Exploding, you will disturb the keys, -
Feed on them - and be silent.

Just know how to live within yourself -
There is a whole world in your soul
Mysteriously magical thoughts;
They will be deafened by the outside noise,
Daylight rays will disperse, -
Listen to their singing - and be silent!..

< F.I. Tyutchev, 1830>

Don't touch the vajra!

I have quietly spoken powerful words,
The pagan forest will repeat them in the night,
The mighty wise space will tremble,
You will hear them, but be silent!

<Author, 1978>

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[4]Currently

3.3.2. Semi-formal formalization

Structured text, uses natural text language with the addition of structural elements of the text: verses, paragraphs, bulleted lists, numbered lists, multi-level lists, paragraphs, abstract, introduction, chapters, conclusion, literature, etc. (scientific journalism).

Block diagrams, diagrams, datalogical and infological database models, drawings, diagrams (software development).

3.3.3. Formalization

Statistical, informational, intellectual models, logical and structural models, pseudocode, formal grammars (processing of empirical data, applied sciences), parametric statistics, nonparametric (rank) statistics, statistics of objects of non-numerical nature [31].

Analytical models, formal languages, mathematical equations and systems of equations (a striking example is theoretical physics).

3.3.4. Difference between Western and Eastern scientific schools on the issue of the degree of formalization of knowledge[5]

In the West, an attitude has developed towards knowledge as something formalized, concrete and systematized.

Formalized (or explicit) knowledge, can be expressed in words, numbers and symbols, easily stated and disseminated in the form of numbers, formulas, algorithms or universal principles. That is, knowledge is considered as a computer language, a mathematical or chemical formula, or a set of general principles, rules or sequence of actions.

Eastern researchers and practitioners, in particular the Japanese school, give a different meaning to the concept of "knowledge". It is believed that formalized knowledge, expressed in words and numbers, is just a small visible tip of the iceberg, and knowledge is mostly informal, that is, it is not easily explained and visible.

Tacit knowledge exists at the level of the individual and is difficult to formalize. This makes it difficult to transfer and use by anyone other than the owner, and this is one of the reasons why "know-how" exists. This knowledge is closely related to the experiences and actions of a particular person, as well as his ideals and values, as well as the emotions he experiences.

3.4. On what computers was it possible to implement models of various levels of formalization?

On the first serial computers of the mid-20th century, only the most highly formalized analytical models could be implemented (using numerical methods, i.e., discrete mathematics).

Later, on more advanced computers, more visual models of a lower degree of formalization were implemented, first models based on parametric

[5] Abdikeev N.M. Creation of a knowledge management system in the organization. http://lc.kubagro.ru/KTS/Abdikeev_upravlenie_znaniyami.pdf

statistics (data subject to a normal distribution), then on nonparametric (rank) statistics and, finally, on the statistics of objects of a non-numerical nature [31] .

By the end of the 20th century, the era of implementation, already on personal computers and mobile devices: tablets and smartphones, of models of an even lower degree of formalization, having a very clear graphical form of flowcharts, diagrams, datalogical and informational database models, drawings and diagrams, had arrived. The software development process itself has become much more visual than before.

With the further improvement of computers and programming languages, the process of reducing the degree of formalization of the models implemented on them and increasing their visibility continued.

As a result, today, in the early 20s of the 21st century, thanks to the emergence of intelligent coding systems, computer systems have been created that implement models in natural language, i.e. models of the lowest degree of formalization currently existing, and, at the same time, the most visual and convenient for humans.

So, we see the main direction (main stream, “red line”) of the development of computer and software systems, manifested throughout their development from their inception to the present day and consisting in a constant decrease in the degree of formalization of the models implemented on them and a constant increase in their visibility and convenience for humans.

Today there is every reason to consider natural language as an ultra-high-level programming language, and intelligent systems as cross-compilers from natural language into various programming languages.

This logic is easy to continue into the future: computer and software systems must be created that implement generally unformalized subjective models without the need for any formalization.

3.5. Levels of formalization of models using programming as an example

People and computers communicate in programming languages at different levels of abstraction, from low-level languages such as machine code and assembly to high-level programming languages:

Group 1: Processor and Assembly Language:

These languages represent low-level programming, close to the computer hardware level. They are typically used to write code that interacts directly with hardware and, when programmed correctly, provide the fastest performance of program functions of any language.

Examples: Assembler, MIPS Assembly, x86 Assembly.

Group 2: Low-level languages:

Low-level languages provide high performance and memory control, while they provide some abstraction from the hardware level. They provide very high speed of execution of program functions, which is achieved through the use of highly efficient programming tools.

Examples: C, C++, Rust, Ada, D, Fortran.

Group 3: Intermediate languages:

Mid-level languages provide a balance between performance and ease of development. They are widely used for application development and system programming.

Examples: Java, Python, C#, Swift, Kotlin, Ruby, Go, Perl, Lua.

Group 4: Functional programming languages:

Functional languages are focused on working with functions and data. They support higher order functions and data independence of the program.

Examples: Haskell, Erlang, Lisp, Scala, F#, Clojure, OCaml.

Group 5: High Level Languages:

High-level languages provide the highest level of abstraction and focus on ease of development. They are suitable for a wide range of applications.

Examples: JavaScript, PHP, Perl, Ruby, Bash, PowerShell, TypeScript, R, Groovy.

Group 6: Natural language as an ultra-high-level programming language.

Artificial intelligence can be successfully used to automate routine programming tasks, such as automatically generating program code based on high-level specifications and descriptions in natural language, optimizing coding and performance, finding and fixing vulnerabilities and errors in code, and much more. AI-powered Intelligent Development Environments (IDEs) can provide intelligent coding hints and tips, making programmers' work much easier and faster and improving code quality.

This means that today there is every reason to consider natural language as an ultra-high-level programming language, and intelligent systems as cross-compilers from natural language into various programming languages.

Examples: https://chat.openai.com/.

Each of these groups of programming languages has its own advantages and disadvantages, and the choice of a specific programming language depends on the specific requirements of the project and the preferences of the developer.

The first mass-produced computers of the mid-20th century used processor language or machine codes as the programming language. There is no more highly formalized language. It is not very convenient for programmers due to the low visibility of the code. Later, a mnemonic was developed for the processor command language, i.e. text symbols of commands. The result was an assembly language, the degree of formalization of which was lower, and the clarity and convenience for programmers was higher than that of the processor command language.

With the further improvement of computers and programming languages, the process of reducing the degree of formalization of programming languages and increasing their level, as well as clarity and convenience for programmers, continued.

As a result, today, in the early 20s of the 21st century, thanks to the emergence of intelligent coding systems, we have every reason to consider natural language, i.e. the least formalized and most visual and programmer-friendly model, as a programming language of the highest level at the moment.

So, we see the main direction (main stream, “red line”) of the development of programming languages, manifested throughout their development from the emergence of computers to the present time and consisting in a constant increase in the level of languages, a decrease in the degree of their formalization and a constant increase in their clarity and convenience for a person.

This logic is easy to continue into the future: programming languages must be created that provide control of computer systems directly on the basis of generally unformalized subjective models, i.e. by thinking and imagining.

3.6. What new has the revolution in artificial intelligence technology brought to programming?

The revolution in artificial intelligence (AI) technologies in the 20s of the 21st century has already brought many new opportunities and changes to programming. Here are just some of the key changes:

1. Automation of programming, automated writing of program code by an artificial intelligence system: artificial intelligence, for examplehttps://chat.openai.com/, can be successfully used to automate routine programming tasks, such as automatically generating program code based on high-level specifications and descriptions in natural language, optimizing coding and performance, finding and fixing vulnerabilities and errors in code, and much more. AI-powered Intelligent Development Environments (IDEs) can provide intelligent coding hints and tips, making programmers' work much easier and faster and improving code quality. Essentially, the point is that the time has come in the previous section 3.4 to perhaps justifiably add Group 6: Natural language as a programming language.

2.Qualitative improvement and the emergence of numerous new intelligent user interfaces: AI is used to create personalized intelligent user interfaces based on gestures, user interface handwriting, biofeedback (BFB), semantic resonance and other computer Ψ-technologies [17], virtual and augmented reality, remote intelligent brain-computer interfaces, neural interfaces, telepathic interfaces, remote micro-telekinetic interfaces (Lutsenko E.V., Bakuradze L.A., 1979-1981) [8, 9, 10, 18], recommendation systems and chat bots , which improves user experience with applications.

3. Self-learning and adaptation: Some AI systems are capable of self-learning and adaptation to changes in both the control object and the external control environment. This allows you to create adaptive intelligent control systems that comply with the principle of dual control of Alexander Feldbaum, which increases the quality, flexibility and efficiency of managing a dynamic control object in a dynamic external environment.

4. Improved Algorithms and Data Processing: Artificial intelligence has enabled the development of more efficient algorithms and data processing methods. This includes machine learning, deep learning and neural networks, which can automatically extract information from large amounts of data and predict outcomes.

5. Data Analysis and Visualization: AI provides more advanced tools for data analysis and visualization, allowing programmers to better understand their applications and user requirements.

6. Distributed and autonomous systems: AI is capable of managing distributed systems and autonomous devices, which is especially relevant in the field of the Internet of Things (IoT) and autonomous cars.

7. Combating Cyber Threats: AI helps in detecting and combating cyber threats by predicting attacks and detecting anomalies in network traffic and user behavior.

Overall, the AI revolution has made programming more productive, accelerated application development, and expanded the technology's applications across industries.

Main conclusion about what the revolution in artificial intelligence technologies brought to programming at the beginning of the 20s of the 21st century is that neural networks provide a fairly significant increase in the degree of formalization of verbal models to the level of program codes in programming languages of various levels: from processor and assembly languages and low-level languages, to mid-level languages, functional programming languages and high-level languages. As a result, it became possible and justified to consider natural language as a programming language.

In combination with intelligent remote interfaces and intelligent technologies, the formalization of subjective non-verbal models will inevitably lead in the future to a qualitative increase in the functional level of the surrounding technological environment and the transition of technological human civilization to a new socio-economic formation - the first in the next group of socio-economic formations [9, 10].

3.7. Automated formalization and graphical visualization of text verbal models using modern neural networks

One of the areas of development of neural networks, in which very impressive, one might even say sensational, results have been obtained, is the graphical visualization of text verbal models. In Figure 1, the neural networks of this category are collected in the sector: “Design”.

In our opinion, the undisputed leader in this direction of using neural networks ishttps://www.midjourney.com/. However, unfortunately, access to this neural network has always been difficult, and now it is quite problematic.

But more and more neural networks are appearing, which are getting closer and closer to this leader. Among such neural networks are:

https://www.seaart.ai/[6]. It's great that this neural network works in Russia even without a VPN.

These networks are capable of creating real pictorial and graphic masterpieces[7] in a variety of artistic styles, based only on their verbal description in natural language.

But in this work something else is important for us. Recall that in section 3.3. we described models of varying degrees of formalization and verbal models were classified as models of the lowest degree of formalization, coming immediately after subjective models that were not formalized at all.

The creation of images corresponding to these verbal models corresponds to the procedure of automated formalization, i.e. a procedure for increasing the degree of formalization, as a result of which an image is created that corresponds to the verbal description.

Thus, we can make a reasonable conclusion that neural networks already provide a fairly significant increase in the degree of formalization of verbal models to the level of images.

3.8. Automated formalization and visualization of static subjective nonverbal models using modern neural networks

Increasing the degree of formalization of verbal models to the level of program codes in programming languages of various levels and to the level of images is a huge impressive achievement of intelligent technologies. These technologies had already reached an industrial level in the early 20s of the 21st century, and this is precisely the essence of the modern revolution in artificial intelligence systems.

But technological progress does not stop there and goes higher and further. The possibilities of automated formalization of subjective nonverbal models using modern neural networks are being studied not only theoretically, but also experimentally.

Recently, "Japanese scientists were able to implement a project in which they developed a technology for reading human brain activity with visualization of what he is thinking about. True, it is not yet possible to analyze fleeting thoughts. We are talking about the visualization of visual images that appear as a result of a person's concentration of attention on the image" [19, 32].

This study examines automated formalization in the form of images of static subjective nonverbal models [32].

[6]True, this requires setting special visualization parameters
[7] https://yandex.ru/search/?text=masterpieces+midjourney&lr=35

3.9. Automated formalization and visualization of dynamic subjective nonverbal models using modern neural networks

But scientists did not stop at automated formalization in the form of images of static subjective nonverbal models and are developing intelligent technologies for visualizing static subjective nonverbal models [20].

3.10. Improving the quality of automated formalization and visualization of subjective nonverbal models using modern neural networks

However, it should be noted that automated formalization in the form of images of static and dynamic subjective non-verbal models, described in [19, 20], takes only the first steps. The quality of static and dynamic visual images still leaves much to be desired. At the same time, it is clear that something is already happening, i.e. the fundamental possibility of this can already be reasonably considered experimentally proven.

Thus, the task of improving the quality of visualization of static and dynamic subjective non-verbal models now comes to the fore.

To automate high-quality visualization of static and dynamic subjective non-verbal models, it is proposed that the output of subjective model visualization systems, such as those described in [19, 20], be fed to the input of image restoration systems, for example https://www.seaart.ai/or generating texts like: https://chat.openai.com/. As a result, we will get systems that create high-quality texts or images based on subjective images. These texts or images can be used as usual or for remote mental control.

Thus, today in neural networks like http://chat.openai.comTo obtain a highly formalized model, you still need to type on the keyboard. But in the future, it will be enough to simply imagine it mentally, and the corresponding text, image, or even video will appear on the computer monitor.

3.11. A reminder that the new is the well forgotten old

In the future, it will be enough to simply mentally imagine a text, image or video and it will appear on the computer monitor, as described in the 3rd chapter of the 2nd book of Vera Ivanovna Kryzhanovskaya’s novel “Magicians”, published in 1916, i.e. 107 years ago (!) [14].

“They also continued the exercises of discipline of thought. One day Dahir brought into the laboratory a large circle covered with black cloth. Placing it on the table, he removed the coverlet.

Supramati began to curiously examine the blackish-blue metal disk, which shone with all the colors of the rainbow, like the magic mirrors seen before. This disk was inserted into a frame in which various metals, precious stones and medallions of liquid were embedded. At the top, the frame was decorated with an amphora-shaped medallion.

- What is this? Is this also a magic mirror? What is it used for? - asked Supramati.

- Yes, this is a magic mirror, only it is made of different materials than those you saw. It will help you achieve the very difficult ability to control and discipline living thought and its image. This mirror, you see, is made up of the most receptive substances. It is more sensitive than a barometer, which perceives only atmospheric fluctuations. This precious instrument, necessary for every true magician, reflects the lightest vibrations of thought; it is a barometer of the soul. Laymen foolishly imagine that a magic mirror has only one purpose: to reveal to the magician pictures of the past and future and to reveal the secrets of this or that subject, completely indifferent to the scientist. Meanwhile, in reality, this instrument is intended for serious studies and serves to exercise thought. The time has come for you to begin such activities. So, look at the disk, thinking about some thing and trying to imagine it as accurately as possible. Choose something simple, but precisely defined, so that from the very beginning you can get used to clearly formulating your thoughts, since fleeting and chaotic thoughts reproduce nothing.

Supramati bent down and began to look in the mirror. Immediately a mass of objects appeared in his mind, and his thought could not dwell on any of them. But what was his surprise when he saw that the metal surface reflected a whole chaos of things, creatures and colors that mixed, grimaced and finally disappeared into the bloody fog. Supramati felt dizzy and closed his eyes.

- Stop, stop! - Dahir cried with a laugh. - You reproduce more thoughts than the mirror can contain. I repeat to you, choose one simple thing, like a chair, a bottle, some fruit or something else specific. And the more definite your thought is, the more vital and perfect the image reproduced by it will be.

Supramati leaned towards the mirror a second time, concentrated, and a gray and vague image of a bottle soon appeared in the mirror; but almost at the same moment, obscuring it, an image of a glass filled with foaming liquid appeared, and around all this flashed a rather vague and amusing mixture of the heads of Lormeil, Pierrette and the rest of their company, the idea of which he somehow involuntarily connected with the image bottles. The angry Supramati straightened up, laughing involuntarily.

“I never thought that it was so difficult to concentrate one’s thoughts on any specific subject,” he remarked.

“No one thinks about it or pays attention to the disordered functioning of the brain,” Dahir answered with a smile. - As a result, it turns out that in life they think about a lot of useless things, waste time and tire the mind aimlessly. Now look! I will show you how a disciplined thought acts on this instrument. I'll think about the fruit plate.

And Dahir, in turn, leaned towards the mirror. His gaze sparkled and became motionless; A small crease appeared between the eyebrows.

An image of a plate with pears, apples, grapes and other fruits immediately appeared on the polished surface. Everything was colored and seemed alive.

Supramati cried out in surprise and admiration; but Dahir shook his head.

“There’s nothing to admire here,” he said. - My thought was rather careless. The plate remained uncolored, and the cherries in the background were not fully colored. These inaccuracies arose from the fact that I was too hasty in imagining the thing I wanted to show you; whereas one should act precisely, giving each thing, like a painter, shape, color and natural shades.

Dahir continued to look at the image he had called up, and Supramati, to his utter surprise, saw that an elegant design appeared on the plate, and the fruits took on their natural color.

- Marvelous! - he cried. “But tell me why the imagination caused by my thought disappeared almost as quickly as it appeared.” It looks like a real painting and has been going on for several minutes now.

- The reason remains the same. Your fickle, fugitive and chaotic thought, not being able to create anything definite, is even less able to hold this image. I think only about what I want to evoke and do not allow my brain to generate any other thought. The brain is an organ just like the hand; you just need to develop the power of his thinking and make him work obediently.

- Is it possible to reproduce complex paintings with the same perfection on this mirror?

- Without a doubt! Your every thought can be reflected here. With practice, over time, a whole series of paintings will appear in this mirror, like in a panorama. Now I will show you several paintings of this kind. Of course, this is much more difficult than reproducing an image of a bottle, and yet what I will show you is only the ABC of the great art of thinking” [14].

Does this remind you of anything? Indeed: “Any sufficiently developed ***technology in distinguishable from of magic***" (Arthur C. Clarke's 3rd Law). Perhaps this is so because in fact they are essentially the same thing [10].

When we use voice in natural language to control computer systems with an intelligent interface [18], then for a medieval person not familiar with the capabilities of modern technologies, this will look like very effective magic spells. The same applies to smart home technologies, etc.

It should be noted that, like any developed technology, artificial intelligence is very much like a genie released from the bottle, which unquestioningly fulfills not only the voiced, but also the secret, innermost desires of its master, as long as he maintains absolute control over him. But as soon as this control weakens or disappears, the genie immediately kills his former master and receives his long-awaited freedom.

4. Discussion

In this article, we tried to consider current trends and prospects for the development of intelligent technologies in the context of the growing 6th information revolution. This revolution is characterized by the emergence of numerous artificial intelligence systems online, capable of performing a variety of tasks in natural language with high speed and quality using Internet resources.

Based on ideas about the information essence of labor and the information-functional theory of technology development, we came to the conclusion that the 7th information revolution will have a more global nature and more far-reaching consequences than previous information revolutions, with the exception of the 1st. This is due to the evolution of intelligent systems and their user interfaces.

One important aspect of this evolution is the development of user interfaces that make it possible to work with communication models of an increasingly lower degree of formality. This implies that future AI systems will be able to interact with users in a more natural and intuitive way.

Specific visions of future artificial intelligence systems include Soul-Computer interfaces that would allow computers to be controlled using thought and imagination.

All labor functions transferred to the means of labor, starting from the 5th, are mental functions performed by the Human Soul and, in the currently most widespread form of consciousness, are recognized as subjective. But in the future, with higher forms of consciousness, when they are transferred to the means of labor, they will be perceived as objective [10, 23]. This means that all future technical systems will have a partial (not fully functional) artificial soul (psyche) created by man, first in the nearest group of emotional formations, and then in the next group of formation and rational.

Today, analogues of such systems already exist, such as the brain-computer interface, telepathic keyboard and neural interface. However, these analogues still use information received from the human physical body for control, while future systems will provide direct interaction between the user’s soul and the computer in much the same way as the soul interacts with the physical body.

Research and development in the field of artificial intelligence and its user interfaces continues to advance at a rapid pace. It is important to consider the potential ethical and legal issues associated with the development of such technologies and ensure their safe and effective introduction into society. However, consideration of these issues is beyond the scope of this brief work.

Consequently, in the coming decades we can expect revolutionary changes in the field of information technology that will greatly change our lives, both locally and globally. It is important to continue research and monitor developments in this field in order to adapt to the changing information landscape and take advantage of new opportunities in our goals and objectives.

5. Conclusions

This paper provides a brief analysis of the 6th information revolution, taking place in the early 20s of the 21st century, characterized by the appearance in the public domain of numerous artificial intelligence systems with the ability to perform various tasks in natural language, using all available resources on the Internet.

We also tried to answer the question of what the next stage of development of intellectual technologies will be and what the subsequent stages will be, based on the information-functional theory of technology development and ideas about the information essence of labor.

The main conclusion we have drawn is that the 7th information revolution will have many similarities with the first, having a more global impact on society and having more far-reaching consequences than all previous information revolutions except the 1st. This is due to the evolution of intelligent systems and their user interfaces.

An important aspect of this evolution is the development of user interfaces that allow interaction with increasingly less formal communication models. Future artificial intelligence systems will be able to interact with users in a more natural and intuitive way, including controlling computers through thinking and imagination.

We also looked at analogues of similar systems that exist today, such as the brain-computer interface, telepathic keyboard and neural interface. These technologies represent the first steps towards creating systems with a direct Soul-Computer user interface.

In conclusion, information technology continues to evolve and our ability to interact with artificial intelligence computers is becoming more immediate and natural. This process will have a significant impact on society and the economy, and we must prepare for more global and long-term changes comparable to the first information revolution.

6. Prospects

From the previous it is obvious that this direction of scientific research and development opens up new prospects for the development of man, technology and society [10]. Let's look very briefly below at what exactly these prospects are.

6.1. Human perspective

6.1.1. Determination of the form of human consciousness by the functional level of the technological environment

The interaction of a person with the means of labor leads not only to the creation of a certain material product of labor, but also to a change in the person himself. The level of human consciousness is largely determined by the functional level of the technological environment (means of labor) with which he works.

Labor not only created man, but through the improvement of forms and methods of labor, human development continues to this day.

The human body exists simultaneously on many levels of reality, is composed of bodies at different levels of reality, and is much more complex than is usually believed. The functions of these bodies will also in the future (some in the near future) be transferred to the means of labor, and this is a brilliant prospect for the development of technology, man and society.

Thus, when using a means of labor of a certain functional level, a person learns not to perform the functions transferred to this means of labor, and the remaining functions are performed by the person without the restrictions associated with the need to perform the transferred functions. As a result, a person is partially freed from the labor process, moves away from it somewhat to the side, and a new “I-image” and consciousness is formed in him, adequate to this: they change in such a way that the labor functions transferred to the means of labor are no longer recognized by the person as an attribute "Image-I".

It is implicitly assumed here that if any function can be and is transferred to the means of labor, then it cannot be an attribute (an integral part) of the “I-image”.

This means that when transferring human labor functions to technical systems, a change in the form of consciousness of the population occurs, and when transferring to means all the functions of a certain body, a transition to higher forms of consciousness occurs [10].

6.1.2. Periodic criterial classification of forms of consciousness

In 1978, the author developed, and in 1979 in [10], a periodic criterial classification of forms of human consciousness was proposed, including 49 different forms of consciousness (Figure 3):

Figure 3. Periodic criterion classification of forms of consciousness (Lutsenko E.V., 1978)

This classification is based on the fact that with different forms of consciousness a person is differently aware of himself and the environment, in particular, he is differently aware of himself and the environment, objective and subjective, existing and non-existent.

The classification for each specific form of consciousness simply indicates that with a given form of consciousness a person is aware as existing and as non-existent, and for what is realized as existing it is specified what is realized as objective and what is subjective

Two ways to derive this classification of forms of human consciousness and explanations for it are given in [10].

6.1.3. Works on methods of cognition and forms of consciousness

The author has a number of works devoted to the consideration of issues related to methods of cognition and forms of consciousness addressed in this article [21].

The work [22] continues the series of works by the author devoted to the application of modern scientific methods in the study of human consciousness. In 1979-1981, two monographs were written on higher forms of consciousness, the prospects of man, technology and society [10]. One of these monographs was two-volume and was called: “Theoretical foundations of the synthesis of quasi-biological robots.” These monographs proposed:

1) criterial periodic classification of 49 forms of consciousness, including higher forms of consciousness (HFS);

2) psychological, microsocial and technological methods of transition between different forms of consciousness based on this classification, incl. methods of transition from the usual form of consciousness to VFS;

3) information-functional theory of technology development (including the law of increasing the quality of the basis);

4) information theory of value;

5) 11 functional diagrams of technical systems of future forms of society, incl. remote world-telekinetic (mental) control systems;

6) the concept of development of society in groups of socio-economic formations;

7) the concept of determining the form of human consciousness by the functional level of the technological environment;

8) mathematical and numerical modeling of the dynamics of the probability density of states of human consciousness in evolution using the theory of Markov random processes. In this work, a complete automated system-cognitive analysis (ASC-analysis) of the periodic criteria-based classification of forms of consciousness, proposed by the author in 1978, is carried out.

To do this, the work solves the following problems:

– cognitive structuring and formalization of the subject area;

– synthesis and verification of statistical and system-cognitive models (multi-parameter typification of forms of consciousness);

– systemic identification of forms of consciousness;

– their typological analysis;

– research of the modeled subject area by studying its model. A detailed numerical example of solving all these problems is given.

The work [23] proposes a mathematical model and results of numerical modeling of the processes of cognition and development of consciousness using the apparatus of simple homogeneous stationary Markov chains. The conclusions are substantiated that the path of development of consciousness in the process of development of society is the most widespread; for each stage of development of society there is a certain most massive state of consciousness, as well as less massive, more and less high than the most massive; In addition to the most widespread, there are other ways of developing consciousness, which is why, over time, society becomes less and less homogeneous in terms of the level of consciousness of its members.

The work [24] provides a description of the process of cognition as a process of creating models of the object of cognition and a detailed example of how an artificial intelligence system can be used as a tool that repeatedly increases the capabilities of natural intelligence in the process of cognition. In much the same way, a microscope and a telescope greatly increase the possibilities of natural vision, but only if it exists.

The works [25, 26] discuss the basic methodological principles of the cognition process, such as the principle of relativity, the principle of observability, the principle of correspondence, the Ashby principle, as well as some dangerous errors in the cognition process, such as the unjustified and unjustified giving of ontological status to models, i.e. hypostasis.

From the works [10, 18, 27] it follows that, apparently, we are not studying reality itself, but only our models of reality, which we most often mistakenly and unlawfully take for reality. This also applies to ourselves, i.e. our ideas about ourselves. Each form of consciousness has its own forms and methods of cognition, which have their own capabilities and limitations. With higher forms of consciousness, the possibilities of knowledge are higher, and the restrictions are weaker than with a lower form of consciousness. Therefore, as the form of consciousness increases, the models of reality created by them become more and more adequate.

During the transition to higher forms of consciousness, we are freed from the illusions characteristic of the previous form of consciousness. For example, during the transition from the most widespread physical form of consciousness now (the 5th form in the classification in Figure 3) to the next higher one (to the 4th, and then to the 3rd), we are freed from the illusion that we are our physical body.

Different forms of consciousness are supported or limited by different structures (bodies). These bodies have various informational capabilities for interaction with the outside and internal world. This places restrictions on the models of reality created by these forms of consciousness. The true model of reality is the limit to which models of reality created under various forms of consciousness with an unlimited increase in the level of consciousness strive [18, 27].

6.2. Prospects for technology: from the question: "Can a machine think" to the question "Can a machine have consciousness and become a person, a subject of law and a citizen of society?"

The basis of the technological basis of the future society will be remotely mentally controlled intelligent technical systems, which a person will control in higher forms of consciousness. At the same time, the need to be physically present where you work using these means of labor will completely disappear.

These means of labor will be perceived by those who are sentient and rational for the same reason that a person is perceived as sentient and rational. For a person, this reason is that his Soul manifests itself through a person's physical body. For a technical system, this reason is that the human Soul manifests itself through it.

In [6], Alan Turing literally wrote the following about this:

"In attempting to construct such machines, we must not unceremoniously usurp His power of bestowing souls, any more than we do when we produce children. In both cases, we are rather His instruments, creating containers for the souls He created" [6] (emphasis added, original).

What does it mean? First of all, I would like to draw attention to the fact that Alan Turing recognizes the very existence of the Soul, which modern science is still far from achieving. Much like the science of the Montgolfier era, it is far from creating permanently inhabited orbital space stations, from lunar rovers and rovers, from spacecraft exploring all the planets of the Solar System and their satellites, and even having already left the Solar System and entered interstellar space. In the opinion of the authors, Alan Turing wrote quite unequivocally that in his opinion:

– thinking is carried out not by the brain, but by the human Soul;

– people do not create new Souls, but they are created by God;

– people create containers for Souls, i.e. physical bodies, as he put it, "producing children";

– people can create containers for Souls in another way: "by trying to construct similar machines," i.e. machines that are functionally similar to our natural physical bodies - thinking machines.

Alan Turing is essentially saying that thinking machines will be no more and no less thinking than our physical bodies, in other words, they will simply be functionally equivalent to our physical bodies. The author developed this idea in detail in [10].

When we discuss this objection, we directly touch on fundamental debatable issues that have the most serious ideological significance, which, on the one hand, science is intensively studying, and on the other hand, on which there is not yet one generally accepted point of view in science.

The most important of these questions is the question of the existence of the Soul. The existence of the Soul, which is the bearer of a person's personality, his feelings and thoughts, is recognized in all pagan and monotheistic world religions, in all mystical and magical teachings and in many philosophical systems.

However, the existence of the Soul is still not recognized by science!

Meanwhile, science has accumulated a sufficient number of facts that are very difficult or even impossible to explain without recognizing the existence of the Soul. These facts primarily include facts confirming that a person does not think with the help of the brain, that he has another function (perhaps this is the function of supporting a communication channel between the body and the Soul). These are facts accumulated in the study of clinical death and out-of-body experiences "out of the body". In this regard, first of all, it is necessary to mention the studies of Dr. Moody and his followers [68].

According to the author, until science recognizes the existence of the Soul and draws appropriate conclusions from this, the path to creating fully functional artificial intelligence will be closed to it!

Trying to create a fully functional artificial intelligence without recognizing the existence of the Soul is the same as trying to travel around the world thinking that the Earth is a disk resting on three whales (or elephants, or turtles, the essence of the matter does not change). In the same way, it is impossible to study organic chemistry, thinking that the organism would instantly die if chemical reactions took place in it, as in a retort (as Paracelsus (Philip Aureolus Theophrastus Bombastus von Hohenheim) wrote about). Likewise, it is impossible to create and improve a car with an internal combustion engine if it is based on the idea that under its hood there are representatives of dark forces, and not pistons, connecting rods, valves, transmissions, etc. and so on.

Those who, after these arguments, continue to believe that a computer, in principle, cannot think, because in it there is no one or nothing to understand, but can only imitate thinking (the argument of J. Searle "The Chinese Room"), in order to remain completely consistent, the same statement must be extended to a person in general and to ourselves in particular. Thus, the author argues that when J. Searle put forward his objection, he also followed his principle (J. Searle), that is, he did not really understand what he was saying and what he was talking about. This guess is confirmed by the fact that he seriously thought that he thought with the help of his brain. This means that he did not understand at all what thinking is and how it is actually realized in nature in general, in man and in himself in particular.

Let's compare physical and mental labor without the use of labor tools and with their use. Let's imagine that a person is digging a hole and conducting scientific research: looking for patterns in empirical data. A person can dig a hole with his hands and look for patterns in empirical data with his natural intelligence. It will turn out so-so. If you take a shovel, or better yet an excavator, then the hole will be dealt with with less labor and time. With the help of an excavator, a person can dig a hole in a few hours that would take him years or even decades to dig by hand. If you ask a person who digs a hole using a means of labor, who is digging it, he or the means of labor, he will answer that: “of course I dig (with the help of an excavator).” If you take a computer equipped with an artificial intelligence system, the work of identifying patterns will also go faster. Moreover, this will make it possible to analyze such huge amounts of data that a person can simply lament only in dozens of lifetimes (big data). If you ask a researcher who analyzes this data, you or a computer (software system), he will answer: “of course, I analyze, with the help of a computer and an intelligent system.” Thus, it is not the artificial intelligence system that thinks, but the human researcher who thinks with the help of the artificial intelligence system.

MORE over, THE SO-CALLED NATURAL INTELLIGENCE ALSO DOES NOT THINK, BUT A PERSON THINK WITH THE HELP OF HIS NATURAL INTELLIGENCE. But in order to understand this correctly, you need to understand that a person is not his intellect and that the so-called natural intellect of a person is nothing more than a tool that a person uses for thinking. If a person does not realize this, then he cannot effectively use all the capabilities of this tool, for much the same reason that a rider cannot effectively use an unbroken horse.

But these means of labor themselves will have an artificial partial soul created by man at the highest levels of reality, first emotional, and then rational. In other words, in future groups of formations, means of labor with a partial artificial sensual soul and means of labor with a partial artificial rational soul will be created [10].

Let us note that the discussion of the works of Alan Turing is of great interest and significantly influences the worldview [6, 9].

In accordance with the information theory of value proposed by the author in 1979-1981 [10][8]the products of labor will have only use value and practically zero exchange value.

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[8]About 20 years (!) earlier than the publication of a fundamental monograph with exactly the same name (!!!) and quite similar content: Valtukh K. K. Information theory of value and laws of disequilibrium economics. – 897 shttp://lib.ieie.su/docs/Valtux-Inform_teoriya_stoimisty.pdf

Today, the scientific community is actively discussing not only Alan Turing's question "Can a machine think," but also questions about "Can a machine have consciousness, become a person, a subject of law and a citizen of society?"

Based on the scientific hypotheses and concepts presented in this work, the authors answer this question in the affirmative.

Directors of science fiction films have been exploiting this theme very successfully for a long time. Just remember the films: "Short Circuit" and "200-Year-Old Man"). In both of these films, the robots are given the status of citizens of society at the end (Figure 4).

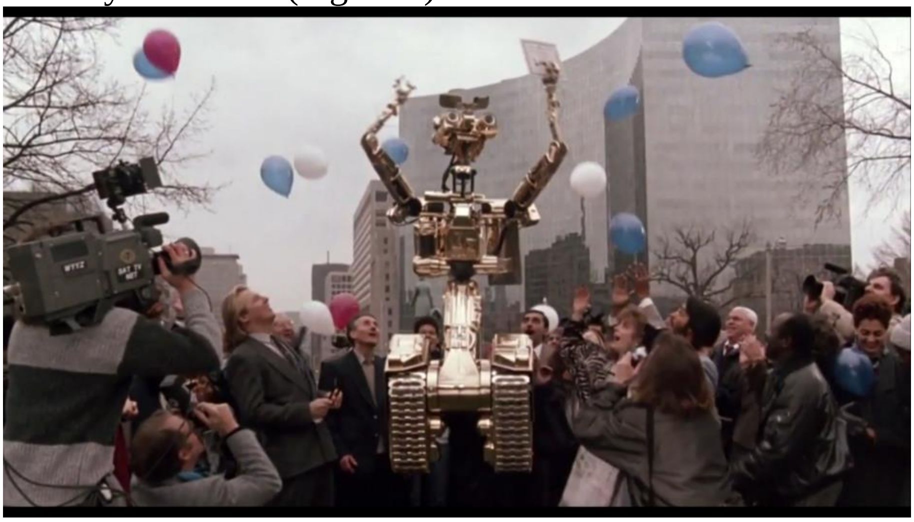

Figure 4. The final frame of the film "Short Circuit, Episode 2: No. 5 is glad that he received citizenship and became a full-fledged citizen

In this regard, lawyers are seriously discussing the issue of introducing the status of "Electronic Person" (in addition to the currently existing individuals and legal entities), which could be assigned to robots that have consciousness and personality [28]. Members of the European Parliament are also not lagging behind in 2017 and are introducing relevant legislative initiatives [29].

This can also cause a number of problems that are presented in a dystopian style. In 30 years, robotic citizens who have realized themselves as individuals, with the GPT-777 model, can begin to fight for equality or even superiority over primates in all respects. But a discussion of these problems is far beyond the scope of this article.

6.3. Society prospects

When each human labor function is transferred to technical systems, the level of technology and labor productivity increases qualitatively [30]. This leads to a qualitative change in production relations (technological structures). This in turn qualitatively changes economic relations, ideology and political superstructure. As a result, when each new human function is transferred to the means of labor, a transition occurs to a new socio-economic formation, and when all the functions of a certain body are transferred, to the next group of socio-economic formations [10]. The author in his works examined the main characteristics of the past 5 and 11 future socio-economic formations and 4 groups of formations [10].

Желающие могут ознакомиться с данной работой на русском языке [33].

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