

# DEVELOPMENT OF PROFESSIONAL CONSCIOUSNESS OF A DOCTOR AND ARTIFICIAL INTELLIGENCE: PROBLEMS OF INTERACTION

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**Abstract.** *In modern conditions of the development of digital medicine, the growth in the volume of medical data and technological innovations in the field of medical science, the value of artificial intelligence is determined not only by new solutions, but also by new opportunities, prospects for preserving the life and health of the population. In the article, the author explores the problem of developing the professional consciousness of a medical worker in connection with the widespread introduction of AI (artificial intelligence). There is a high assessment of the work of AI in medical practice, but in certain areas, the unique capabilities of natural intelligence in assessing the psycho-emotional and cognitive status of the patient, in achieving understanding on the part of the patient and other reflexive capabilities that are extremely important in medical practice are emphasized. The author removes the question of the threat of artificial intelligence replacing the work of a doctor, since it is more likely today that AI will participate in the status of an assistant consultant.*

*The subject of the article is the author determining the influence of artificial intelligence on the professional consciousness and practical activity of a doctor.*

*The object of the study is modern information technology solutions and natural intelligence.*

*The purpose of the article: to determine how the professional consciousness of a medical worker is developing today in connection with the widespread introduction of AI.*

**Keywords:** *artificial intelligence, natural intelligence, medical worker.*

Modern society is developing in conditions of increasing informatization using various information and communication technologies, in conditions of rapidly changing science and technology. Already today, generations born in the conditions of artificial intelligence live and study. “The science called artificial intelligence is part of the complex of computer sciences, and the technologies created on its basis belong to modern technologies.” [8,130] New programs offer to significantly make a person’s life easier in various sectors and thereby influence public consciousness and encourage people to change their lives, professional and domestic. Today, AI systems perform many specific types of work better than humans, even with a high level of knowledge and professional experience. Thus, in the field of medical diagnostics, the superiority of artificial intelligence over natural intelligence is obvious; the risk of errors is reduced by approximately 70% when a so-called “medical doctor” is included in the work [11,121-122]

Personalized treatment, disease prediction, development of new drugs, robotic surgery, etc., this is not a complete list of successful achievements of AI in medicine.

Its effectiveness at the present stage has been proven by the wide distribution of various programs: these are smart solutions in assessing the patient’s condition, in collecting information

and making a diagnosis, processing a huge amount of information related to the medical history, with research data, and all this in a very short time; in developing a picture of genetic analysis and genetic therapy, selection of medications and assessment of their effectiveness in the treatment process, and much more, which opens up broad opportunities for medicine in order to realize a healthy life and longevity of a person.

Today, various programs and applications for mobile devices are successfully operating and improving in different countries of the world, for example, the Enlitic program combines the capabilities of deep machine learning and big data analysis systems; a service for computer analysis of medical images in the field of pulmonology, provided by Zebra Medical Vision; the NeuroLex.co program allows you to record mental abnormalities when analyzing voice data; The AtomNet program helps develop drugs; MedyMatch Technology program helps to correctly diagnose a stroke, etc. The benefits of AI in medicine today are clearly demonstrated in the reduction of mortality rates, reduction in the number of medical errors, reduction in medical costs, high development of invasive surgery, etc. [11,124] Despite the obvious success of introducing AI into medical practice and medical science, the number of risks increases and security decreases (for example, preventing the selfish use of confidential information), the need to strengthen oversight of the work of AI, the low level of trust in new programs (how they were created, what have the tests been completed?) and constantly discussed forecasts about how much AI will replace a medical worker and what is the likelihood of removing a person from this sphere completely. Today, the future development of medicine is being actively discussed on the principle that “a doctor with artificial intelligence will replace a doctor without artificial intelligence.” [1] In connection with the emergence of coronavirus infection and the introduction of pandemic restrictions, telemedicine received a powerful impetus for development, but also caused many complaints from medical workers, since this format of work excludes the personal perception of the patient, his psycho-emotional state, and the assessment of physiological criteria perceived visually doctor. And of course, a doctor has, in addition to professional qualities, moral and ethical qualities, empathy and awareness of the social conditions of society. The author does not pose in this article the task of future scientific forecasting, based on the successes and disadvantages of introducing AI into medicine, but today, according to the assessments of medical workers, it is clear that natural intelligence has unique capabilities in assessing the psycho-emotional and cognitive status of the patient, in discussing possible treatment alternatives, in achieving understanding on the part of the patient and his adherence to this therapy and other cognitive and reflexive capabilities that are extremely important in medical practice. [4,157] Based on the above, the author sets the task of finding out how the consciousness of a medical worker is developing today in connection with the widespread introduction of AI, what is the professional workload on a doctor today, who is a modern doctor who makes responsible professional decisions, along with a modern machine, what are the conditions in Russia today training for the development of digital healthcare and, in general, for innovation in medicine.

Federal Law in Russia No. 123-FZ, under artificial intelligence, provides for a set of technological solutions that allow simulating human cognitive functions (including self-learning and searching for solutions without a predetermined algorithm). [10] These technology solutions include information and communications infrastructures and software. These include information and telecommunication systems, and possible other technical processes and services for data processing and finding solutions. The purpose of developing these programs should be to obtain

information, when performing specific tasks, comparable, at a minimum, to the results of human intellectual activity. Scientific publications in Russia about the essence of artificial intelligence, its significance and future development are extremely relevant today and their number is only increasing, and the scope of study is expanding. So, in recent years, the main understanding of artificial intelligence is related to the fact that it is a set of technologies, mostly related to information, based on the ability to study data, produce ready-made solutions, and analyze information already received by the machine. [9,28] As the applications of artificial intelligence are constantly expanding, modern authors increasingly believe that they are heterogeneous “systems with capabilities that we traditionally associate with human intelligence, language understanding, learning, reasoning and problem solving.” [3,54] [6,9] In medical practice and medical science, artificial intelligence today offers new solutions that require close attention and constant verification of their viability, and not only because these technologies are directly related to human health and life, but also because the future of human civilization depends on it.

The status and role of artificial intelligence in medicine at the present stage in Russia is expressed in the duality of the development of this process. On the one hand, scientific publications and theoretical developments multiply every year, hundreds of new startups appear on the market with the possibility of implementation in order to simplify and help the doctor, and on the other hand, only a small proportion of developments today are successfully working in medical practice. The main reasons for the current situation are the lack of correspondence with reality, significant technical shortcomings and the conservatism of medical workers, and of course, low funding, which is mainly provided by the state today.

In modern conditions of information technology development, the growth in the volume of medical data, the growing need for healthcare to reduce costs, as well as the success of automating the management of electronic resources and image analysis for diagnosis, is causing an increase in the global market for artificial intelligence technologies used in healthcare.

Thus, according to Research And Markets, the global market volume reached \$4.2 billion at the end of 2020, and sales of medical AI solutions are expected to increase by at least 40% annually until 2025. Consequently, the Russian medical AI market accounts for approximately 4.2% of the global market volume for sales of all AI solutions, so in 2019 the volume was estimated at 100–250 million rubles. and in 2020 it already reached \$291 million, i.e. about 22.3 billion rubles [5]

The low volume of use of AI in Russian medicine is associated with low popularity among the population: more than half (52%) of respondents have never used medical applications to track their health, and 48% believe that the technology can be relied on partially, and only 3% completely trust the modern algorithm. [7]

The attitude of a modern medical worker in Russia today can be analyzed not only by their use of digital technologies and the volume of investments, but also by surveys conducted among doctors. Many studies today show a fairly high level of trust in AI in medicine, and this is primarily due to the ability to quickly analyze huge volumes of clinically significant data in real time (79%), especially since there is a constant increase in the volume of medical data, so in 2020 volume doubled every 73 days.

Doctor's awareness of artificial intelligence and its capabilities in medicine is relatively low, so more than 40% of practicing doctors are familiar with AI, and more than 36% of doctors have already heard about new opportunities, but have not yet used them in their practice. [2,29]

Conducted by us a survey of doctors working in Krasnodar on the basis of the Kuban Medical Institute and doctors working in the Novomed and Mirodent clinics in Novorosiysk, with at least five years of experience, showed that more than 40% often use AI in their work, while 60% of routine work is performed by artificial intelligence for the doctor, and doctors' trust in the quality of AI work is quite high.

It should be noted that this applies only to the field of disease diagnosis and organizational optimization processes. Krasnodar doctors would least like to see the work of AI in the field of oncology, angiosurgery, neurology and psychology, which also confirms the question of whether the scope of application of AI in medicine should be expanded; more than 80% believe that this is necessary only in certain industries. Regarding the need to increase government funding for the implementation of AI in medicine, about half of those surveyed believe that yes, there is such a need, but the remaining half find it difficult to answer this question due to the difficulty of predicting the future development of AI in medical practice.

Of particular relevance is the question of whether AI can replace or displace doctors? Such concerns, according to the author, are theoretically possible, but so far there are no practical grounds for this. Thus, 87% of them do not expect that AI will be able to completely replace them in the foreseeable future. Our study also confirms this, the majority of respondents believe that AI will not replace them in the future and will become a useful tool. A more likely option, according to experts, will be the participation of AI in medicine in the status of an assistant or consultant, which will significantly reduce the burden on doctors, for example, radiologists, laboratory specialists, and will save resources of the healthcare system in Russia.

Assessing the role of AI in medicine and its effectiveness for the future development of Russian society depends on a number of conditions, among which the most important are new technological discoveries and the subjective factor (doctor and patient). But today we understand that AI is just coming into our lives and medicine, and it depends only on the person what role and limits of functioning will be determined by artificial intelligence in the future. A modern doctor in Russia can no longer refuse the help of AI in his work, but the share of his participation should be determined only by the doctor himself. And at the same time, this participation depends not only on real opportunities (clinic equipment, access to new techno-information resources, etc.), but also on the qualifications of the doctor, his practical readiness to use new technologies based on AI. So today in Russia, this educational training is carried out by: Moscow Institute of Physics and Technology (MIPT), offering programs in machine learning and artificial intelligence; National Research University Higher School of Economics offers programs in data analysis, machine learning and artificial intelligence; St. Petersburg State University offers courses in machine learning and artificial intelligence as part of its technical programs; ITMO University (St. Petersburg) specializes in information technology and offers programs in machine learning and artificial intelligence.

The development of modern civilization is impossible without the participation of artificial intelligence, and in medicine this is always a new solution, new opportunities and new prospects for preserving the life and health of the population. But today it is already obvious that the status of artificial intelligence in medicine should be under the strict control of a person, namely a medical worker, all developments of AI in the healthcare system should be with the participation of a doctor, with further regulation of ethical and legal problems in this area. And I really want to

believe that a modern doctor, unlike AI, has a powerful humanistic constant, that the doctor's decision will be competent and a priority.

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