Solving medical problems and their impact on the development of a healthy personality in a digital environment

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Abstract---The aim of scientific research is to analyze the problems of medicine and to examine the regularities of healthy personality formation in order to transit from disease to health, and this requires changes in the development of medicine. Under the conditions of digitalization, exponential increase in data and convergence of technologies, medicine must move to a new level - cell-based medicine, stem cells, the latest genome editing technology.The research methodology is based on the use of analytical, logical, historical, comparative and axiological methods, which help to reveal the problems of medicine, decoding the human genome, transplantation of many human organs, using 3D-printers. Analyses

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have shown that digital platforms are changing the way health care is being provided. This article reveals that the solution of medical problems and their impact on the formation of a healthy person in a digital environment is the convergence of sensors, networks and the individual intellect, which transforms the principles of diagnostics. This article outlines the main directions of digital technology development in medicine, which uses robotics, 3D-printing, and its implementation in medicine, demanding their further implementation–artificial intelligence, genomics, quantum computing, which change the medicines themselves. Practical value of research lies in philosophical understanding of digital technology, the use of which is necessary to identify diseases at an early stage of their emergence, for continuous monitoring and diagnostics of the human body, aimed at transition from diseases to a healthy lifestyle and a healthy personality, which requires a personal virtual therapist.

Introduction

The relevance of research on medicine is at a new stage of development, as human history is built on a new digital worldview and new breakthrough technologies, which have penetrated into medicine and represent a new medical innovation culture. Today, due to digital technology it is possible to read, write and edit the lifecode, which demonstrates the history of human innovation. Personalised genomics has been known as the medical revolution for over 10 years. According to scientists, if we understand the genome, we will understand how to optimize our self. We will be able to select the ideal food, ideal drugs and ideal exercise regime for each individual. For this reason, in 2018, the National Institute of Health and similar organizations around the world launched the All of Us project, distributing $27 million in grants for the decoding of millions of genomes, in an effort to write the human genome at zero. If they succeed, they will be able to grow organisms for transplantation and acquire weapons to fight viruses and cancer as well as cheap drugs and vaccines.

Another aim is to learn how to redesign the genome using CRISPR technology, also referred to as molecular scissors.It is too early to comment, but progress in this area is encouraging. Although not yet a big celebration, in the near future we may be able to eliminate 16 thousand diseases with the help of gene therapy or molecular scissors (Diamandis et al., 2021). Robotics. Dozens of robotic surgeons and orthopedic robots are now entering the market; there are nine different kinds of robots that specialize on problems with the spine, which will be put to work. Professional bots are being developed for almost every medical field, most of them "cobots," that is, collaborative robots that assist surgeons, not replace them. The best prospects are in autonomous robots such as STAR. Due to the army of cheap new robots that will enter the market in 2020, VERB wants to "democratize medicine", which will result in a significant reduction in the medical cost (Nikitenko, et al., 2022). Cellular medicine.

The concept of cell-based medicine emerged in the 1990s following the discovery of stem cells, which should be used in the fight against disease.The patient is implanted with living cells that affect various functions of the body: grow hair, rejuvenate tissues, kill cancer, restore damaged areas of the heart, treat autoimmune diseases, and even increase muscle mass. The human placenta contains a significant stock of stem cells, which can be used without any moral and ethical compromise. An intrinsic value. Using data and an individual intellect, you can significantly improve the process of developing the drugs. By creating two competing or aggregated neural networks, the system starts with minimal instructions, which leads to the generation of new results.

Materials and Methods

For philosophical understanding of digital technologies which are indispensable in medicine for early detection of diseases. The Data Mining plays a key role in continuous monitoring and diagnostics of the human body which is an important analytical process for data (information) research in medicine. BIG DATA plays an important role in information mining for solving medical problems, enabling the discovery of hidden patterns in order to find previously unknown information for making critical decisions. According to our opinion, the acquisition of knowledge of current medicine refers to the use of specific algorithms for obtaining patterns from the data, additional steps, such as data preparation, data selection, data cleansing, inclusion of appropriate interpretive knowledge, and proper interpretation of the results of the extraction required to ensure that useful knowledge is extracted from the data. The term "data mining" becomes a popular way of referring to "obtaining information from large databases", mining data in search of knowledge native talents (Andriukaitiene, et al., 2017).

Typical statistical methods work well with small sets of data, modern databases can contain millions of rows and tens of columns. Scalability is a huge problem in the medical data industry. Another technical problem is the development of models that can better analyze the data, reveal nonlinear relationships and interactions between elements. It may be necessary to develop special tools for data mining to solve the problems associated with websites. The benefit of data analytics has been limited because the knowledge of computer scientists in data analytics is an approach to data analytics. The convergence of knowledge bases is a factor in the development of innovations in the field of medicine. This suggests that physicians today should turn to knowledge of computing technology, as in the past, data science turned to mathematics (Oleksenko, et,al. 2019).

Data Science methods in medicine for solving medical problems and revealing patterns of shaping healthy individuals, and for this purpose medical development must be changed: 1) basic information; 2) data overprocessing; 3) least squares method; 4) method of principal components; 5) method of independent components; 6)soft calculations in data processing; 6) clustering methods; 7) decision trees; 8) vector reference method; 9) associative rules; 10) ranking in information retrieval; 11) time series; 12) visualization of rich data, 13) analysis of social networks; 14) recommending systems (Nikitenko, et al., 2021). If the goal of the medical field is to use data to solve problems, then we need to dispense with a clear dependence on data models and use a diverse set of tools.

Under "data science" we mean practically everything that has to do with data: The most important part is the application of data, which results in a new form of competition based on the widespread use of data analytics and fact-based decision-making (Appello, 2019).

Instead of competing on traditional factors, companies are starting to use statistical and quantitative analysis and forecasting as the main elements of competition (Dmytrenko et al., 2021). Analytics as a competitive advantage acts as a new science for competition. (Trusova et al., 2021). Data Science requires a sufficient number of highly skilled data scientists to develop and improve the profile of medical professionals. These are data scientists, database and software engineers, subject matter experts, and expert observers who are critical to the successful management of digital data collections. Unlike the natural and social sciences, data science deals with data in the cyber universe as an object of its research. The skills, role and structure of the data scientists - an assessment of current practices and the needs of the future - are scientists who work where the research takes place, in data centres, in close collaboration with the data creators (Voronkova, et al., 2017).

An additional critical factor is the ability to understand the data itself and to derive value from it. These skills - the ability to access, understand and communicate information derived from data analysis - are extremely important. Health care workers should be able to access data independently and understand it. Training the next generation in the art of data reasoning is essential for the success of management, economics, science, partnerships, projects, agencies, businesses, medicine. Scientists need to apply new methods of data science in order to understand the universe and the need to create an entirely new field, which combines the skills and talents of the most often disparate fields of knowledge - computer science, mathematics, statistics, data mining, graphic design, information visualization, and human-computer interaction. There was a new kind of specialists - data scientist, which combines the skills of the programmer, statistician, interviewer, to produce preserved under the mountains of data (Kyrychenko, M., et al., 2021).

They are interdisciplinary in nature, can solve all aspects of the problem from the collection of raw data - from processing to the formulation of conclusions. Thus, we note that such new categories of informatics, such as Data Mining plays a great role as the main method of seeking new information, which would be a growth of new knowledge in the field of medicine. This is particularly crucial in order to develop new areas of medical science such as genomics, device intelligence, cellular medicine, robotics, and drug discovery. If we combine the progress of Alpha Fold of Gan Insilico and add long term breakthroughs in quantum computing, we shall approach a world where custom-designed drugs will become reality rather than science fiction. Predictive methods use advanced technology and sophisticated algorithms of machine learning data, which allows not only determining the level of risk, but even predicting it and carrying out interventions aimed at more profound determinants (Kunderevych, et al., 2022).

Results and Discussions

Digitalization of the health system and its impact on a healthy person

Digital health involves a wide range of technologies enabling the operation of standardized systems to improve services and health outcomes, using robotics solutions, telemetry, telemedicine, which allow quantification of a number of indicators, integration and interpretation of data. Functional integration of information systems and their components is the key to complete integration of health data (Dixon, 2021). Numerous data producers and users operate health information systems. Ensuring the interoperability of different types of data requires their normalization - a common set of assumptions about the structure and exchange of data, which takes into account the convergence of low technical and non-technical factors, such as governance and visibility, legal mandates, participation in the global economy, appropriate use of information and communication technologies, interest synergy strategies, and adequate supply of skilled human resources.

The EU countries have the world's highest rate of digital services implementation, universal access to high-speed Internet, and advanced digital skills and digital literacy of their populations, create new models for delivering health services and new opportunities for involving people in managing their own health and well-being (Samodryn, et al., 2021). Digitalization of the health system is the most effective way to ensure the sustainability of health services, which includes five main areas: 1) Recruiting the individual as an active partner, e.g. through notification of treatment results by the patient; 2) Ensuring timely knowledge - reliable data on the individual will be available at any time when needed, through the provision of coordinated support using integrated information systems; 3) Prevention - early and targeted treatment; 4) Reliable and protected data management - "needed data at the right time in the right hands" - based on cooperation in the field of security and data protection and determination of the required level of protection for digital solutions based on risk assessment; 5) Progress and general structural elements - establishment of an ecosystem of common services and components of a single national infrastructure for hospitals, general practitioners and municipalities (Hlebova, et al.,2021).

The Digital Revolution in Health programme is an ambitious, strategic, scientific programme being implemented in most EU countries, exploring the potential for the creation of a tailor-made eco-system for health services using state-of-the-art data management models. It is based on the prospect of a complete renewal of the health care system, enabling citizens to control and manage their personal data. Disadvantages at the moment include inadequate legislative and regulatory frameworks, fragmented data that is not systematically processed, and a business environment that would allow for efficient data sharing and use. The My Data system is designed for the management and processing of personal data and aims to shift the focus of data management to the benefit of people by integrating personal data into a kind of resource that can be accessed and controlled by individuals (Voronkova, 2022).

Application of artificial intelligence in the healthcare system

The use of artificial intelligence tools in the healthcare sector is especially relevant in the conditions of continuous digitization of all types of medical information. Artificial intelligence can be used to support decision-making in medicine everywhere and at low cost (Altrade, Dagogo, 2021). However, the complexity of artificial intelligence algorithms creates difficulties in determining optimal solutions based on these technologies and in analyzing their strengths and weaknesses, which is crucial for the distribution of responsibilities and building trust. The following three principles for the use of artificial intelligence in health care were formulated: 1) creation of standards and regulations to support the use of artificial intelligence in the health care system is of great importance and requires a change in the mechanisms for the development and application of regulatory acts; 2) one should actively work on demonstrating the practical application of artificial intelligence in health care; 3) it is necessary to ensure an inclusive approach to artificial intelligence in health care, which involves the participation of medical professionals, patients and the public (Kevin, 2018).

Artificial intelligence should be applied in such a way as to provide equal benefits to all population groups. The development of artificial intelligence tools for use in health care must be carried out using objective standards and on a strong ethical basis. Artificial intelligence is already widely used in various fields of health care, but there is a relative lack of scientific evidence of the effectiveness of such tools. The AI market may have good opportunities to sell products, but there is still insufficient knowledge of how health data is traditionally evaluated, rarely realizing the complexities that arise in the delivery of health care. At the University of Oxford, the United Kingdom runs a program called Deep Medicine, which studies the possibilities of artificial intelligence technologies when used in the health care system (Bostrom, 2020). There are a number of examples of successful use of artificial intelligence in the professional development of medical professionals, when the main paradigm is "man and machine" and not "man against machine". It is important to focus on identifying those problems in the field of health care, the solution of which can contribute to the application of artificial intelligence. The National Health Service (NHS), England, is using artificial intelligence as one of a set of tools to enable people to participate in managing their health and care, using digital services that respond to needs, focusing on prevention and have an individual character (Mokliuk, et al., 2022). Today's readily available digital devices are built with many built-in technologies that the user is not aware of, so there is a danger that artificial intelligence will be used in a covert manner in health care. In order for digitalization to be effective, it is necessary not only to transform healthcare and facilitate the delivery of medical care, but also to change people's attitudes so that they accept this transition with approval. The health care landscape and investment structure is changing, and new tools will appear in the health care system in the next few years (Gemel, 2021).

Conclusion

Data plays a big role in medicine. Data can be involved in the creative search for solutions to medical problems, empowering others to work with digital data, and

contribute to the development of database technology. In the conditions of digitization, training of new specialists competent in solving complex and dynamic problems of digital data preservation, sustainable access, reuse and repurposing of data should be promoted. The ability to mine data, understand it, process it, extract value from it, transfer it is an important skill in the coming decades, because now we really have virtually free, ubiquitous data. Technological advances contribute to the development of this concept, which is based on an expanded collection of personal data on health and lifestyle, extensive use of big data and improved analytics will allow for a more in-depth understanding of relevant processes in a short period of time. In this way, it is possible to predict events with unprecedented accuracy, determine the behaviour that should be unique and take action before risk factors arise. The aim is to provide practical opportunities for people to access and use personal information and to support health-care professionals in the development of new services based on this data. Currently, great efforts are being made in the countries to implement an international automated data exchange. The focus should be on solving current problems at the country level. The assessment of the readiness of the health sector to implement a piecemeal approach is based on three key aspects: national readiness; country ownership; and stakeholder coordination. The WHO is in the process of developing a conceptual framework for developing core capacities and classifying levels of readiness for artificial intelligence and encouraging countries to consider them.

References

Altrade, Dagogo (2021). From Einstein to artificial intelligence: science and technology that changed the world / trans. from English I. Wozniak. Kharkiv: Vivat. 368.

Andriukaitiene, Regina, Voronkova, Valentyna, Kyvliuk, Olga, Maksimenyuk, Marina and Aita, Sakun (2017). Theoretical insights into expression of leadership competencies in the process of management. Problems and Perspectives in Management, 15(1-1). 220-226.

Appello, Jürgen (2019). Management 3.0. Agile management. Leadership and team management. Kharkiv: Morning: Fabula. 432.

Bostrom, Nick (2020). Superintelligence. Strategies and dangers of smart machines development / translated from English by Anton Yashchuk, Antonina Yashchuk. Kyiv: Our format. 408.

Diamandis, Peter & Kotler, Stevens (2021). The future is closer than it seems. How technology is changing business, industry and our lives / trans. from English Dmitry Kozhedub. Kyiv: Laboratory. 320.

Dixon, Patrick (2021). The future of (almost) everything. How will the world change over the next hundred years / trans. from English I. Wozniak. Kharkiv: Vivat. 432. DOI https://doi.org/10.26661/hst-2020-7-84-03

Dmytrenko, M., Nesterenko, S., Oleksenko, R., Yeremenko, L., & Vasylchenko, O. (2021). Management of corporate responsibility in the business environment: Socio-psychological aspect. Periodicals of Engineering and Natural Sciences (PEN), 9(4), 323-346.

Gemel, Gary & Zamnini, Michele (2021). Anthropocracy. Creating companies in which people – are above all / trans. from English Dmitry Kozhedub. Kyiv. 336.

Hlebova, N., Oleksenko, K., Oleksenko, R., & Afanasieva, L. (2021). Subjunctive

aspects of sociological support of the modern teacher formation process in the development context of the new Ukrainian school system. Linguistics and Culture Review, 5(S1), 439-450.

Kevin, Kelly (2018). Inevitable. 12 technologis that shape ur future / trans. from English Natalia Valevskaya. Kyiv: Our format, 304.

Krishnayana, I. P. A., Suparta, I. N., & Inggriati, N. W. T. (2019). Impact of application of law no 16/2006 about fisheries and forestry agricultural extension system toward to performance of agricultural extension workers. International Journal of Life Sciences, 3(2), 14–23. https://doi.org/10.29332/ijls.v3n2.295

Krisnanda, P. H., & Surya, I. B. K. (2019). Effect of emotional and spiritual intelligence on transformational leadership and impact on employee performance. International Research Journal of Management, IT and Social Sciences, 6(3), 70-82. https://doi.org/10.21744/irjmis.v6n3.634

Kunderevych, Olena, Bogonis, Petro, Kliuchko, Yuliia, Chukhrai, Liubov, & Sinenko, Oksana (2022). Educational Information Technologies in Pandemic: Advantages and Disadvantages. International Journal of Health Sciences. 61-67.

Kyrychenko, M., Nikitenko, V., Voronkova, V., Harbar, H., & Fursin, A. (2021). The search for new forms of personal expression in the era of postmodernism. Amazonia Investiga. 10 (42), 248-254.

Mokliuk, Mykola, Popova, Olha, Soroka, Maryna, Babchenko, Yanina, & Ivashchenko Irina (2022). Internet Technology as One of Distance Education during Pandemic. International Journal of Health Sciences. Available online at www.sciencescholar.us Vol. 6 No. 1, April 2022, pages: 11-20. e-ISSN: 2550-696X, p-ISSN: 2550-6978. https://doi.org/10.53730/ijhs.v6n1.2981

Nikitenko, Vitalina A., Voronkova,Valentyna H., Andriukaitiene, Regina & Oleksenko, Roman I. (2021). The crisis of the metaphysical foundations of human existence as a global problem of post-modernity and the ways of managerial solutions Propósitos y Representaciones Jan. Vol. 9, SPE 1. e928 ISSN 2307-7999 Special Number: Educational practices and teacher training e-ISSN 2310-4635

Nikitenko, Vitalina, Voronkova, Valentyna, Shapurov Olexandr, Ryzhova Iryna, & Oleksenko Roman (2022). The Influence of Digital Creative Technologies on the Development of Education and Medicine International Journal of Health Sciences. Vol. 6.(2), 699-708.

Oleksenko Roman, Voronkova Valentina & Nikitenko Vitalina (2019). Examination of digital reality as a factor in achieving the stability of society in stochasticity (uncertainty, instability, bifurcation) conditions. Quarterly German scientific / popular science bulletin "Results of the scientists' work: sociology, criminology, philosophy and political science. Volume 1 No. 4. 2019. 1-10.

Samodryn, A., Moskalyk, H., Oleksenko, R., Khavina, I., & Leushyna, O. (2021). Formation of V. Vernadsky's noospheric ideas as the basis of the educational pedagogical policy strategy. Linguistics and Culture Review, 5(S1), 978-996. https://doi.org/10.21744/lingcure.v5nS1.1475

Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2022). Post-pandemic health and its sustainability: Educational situation. International Journal of Health Sciences, 6(1), i-v. https://doi.org/10.53730/ijhs.v6n1.5949

Trusova, N. V., Oleksenko, R. I., Kalchenko, S. V., Yeremenko, D. V., Pasieka, S. R., & Moroz, S. A. (2021). Managing the intellectual potential in the business-

network of innovative digital technologies. Studies of Applied Economics, 39(5).

Voronkova, Valentina & Kyvliuk Olga (2017). Philosophical reflection smart-society as a new model of the information society and its impact on the education of the XXI century. Future Human Image. 2017. Future Human Image, Vol 7. 154-163.

Voronkova, Valentyna, Nikitenko, Vitalina, Bilohur, Vlada, Oleksenko, Roman, & Butchenko, Taras (2022). The conceptualization of smart-philosophy as a post-modern project of non-linear pattern development of the XXI century. Cuestiones Políticas, Vol.40, No 73. 527-538.