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FUTURE TRENDS IN INFORMATION SECURITY ACCORDING TO ARTIFICIAL INTELLIGENCE TECHNOLOGIES

Abstract. The article is devoted to the problems of the growing role of artificial intelligence technologies and the need for legal regulation of the processes of interaction between artificial intelligence and humans, in the context of information security.

According to the author, without a full and timely regulatory regulation of the development of technological innovations that can make independent decisions, society runs the risk of suffering serious losses. Therefore, it is extremely important already now, to develop and implement for information technologies such administrative and legal regulation in which the development of technologies will not lead to risks for the society and will retain control over what is happening to the person.

The author suggests that in the future artificial intelligence is deprived of the status of a computer program or technology, and it will become an independent

subject of law, citing as an example of acquiring legal capacity by another artificial, abstract entity— the state.

The publication examines the existing attempts to form a legal framework for interaction between humans and artificial intelligence, which took place in the European Union, Japan and the PRC. This includes the precedent for recognizing artificial intelligence as an independent creative unit, which has already taken place in the Chinese city of Shenzhen, where the court ruled that some articles written using artificial intelligence are protected by copyright.

Special attention is devoted to the analysis of domestic studies of the prospects for the use of artificial intelligence and its interaction with humans. The author proposes an approach to the regulation of legal relations associated with artificial intelligence, built around the principle — technology for the benefit of a person, to respect his rights and freedoms.

The author predicts a shift in priorities in the field of information security from the protection of personal data and the security of their use, to the prevention of uncontrolled use of artificial intelligence, in the areas related to the implementation of human rights and freedoms.

Keywords: information security; Information Technology; Artificial Intelligence; legal regulation; electronic government; distance learning; human rights.

МАЙБУТНІ ТЕНДЕНЦІЇ ІНФОРМАЦІЙНОЇ БЕЗПЕКИ ВІДПОВІДНО ДО ТЕХНОЛОГІЙ ШТУЧНОГО ІНТЕЛЕКТУ

Анотація. Статтю присвячено проблематиці зростання ролі технологій штучного інтелекту та необхідності правового регулювання процесів взаємодії штучного інтелекту і людини в контексті інформаційної безпеки.

На переконання автора, без повноцінного і своєчасного нормативного регулювання розробок технологічних новацій, які зможуть приймати самостійні рішення, суспільство ризикує зазнати серйозних втрат. Тому вкрай важливо вже зараз розробити та впроваджувати для інформаційних технологій таке адміністративно-правове регулювання, в якому розвиток технологій не призведе до ризиків для суспільства і збереже за людиною контроль над тим, що відбувається.

Автор припускає, що штучний інтелект колись буде позбавлений статусу комп'ютерної програми або технології, і стане самостійним суб'єктом права, наводячи в якості прикладу набуття правоздатності іншим штучним, абстрактним утворенням — державою.

У публікації розглянуто наявні спроби формування правових рамок для взаємодії людини та штучного інтелекту, що мали місце в Європейському Союзі, Японії та КНР. У тому числі — прецедент визнання штучного інтелекту самостійною творчою одиницею, який вже мав місце у китайському місті Шеньчжень, де суд постановив, що певні статті, написані з використанням штучного інтелекту, захищені авторським правом.

Окрему увагу присвячено аналізу сучасних досліджень перспектив застосування штучного інтелекту та його взаємодії з людиною. Автором

пропонується підхід до регулювання правовідносин, пов'язаних зі штучним інтелектом.

Ключові слова: інформаційна безпека; інформаційні технології; штучний інтелект; правове регулювання; електронний уряд; дистанційне навчання; права людини.

БУДУЩИЕ ТЕНДЕНЦИИ ИНФОРМАЦИОННОЙ БЕЗОПАСНОСТИ В СООТВЕТСТВИИ С ТЕХНОЛОГИЕЙ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА

Аннотация. Статья посвящена проблематике возрастания роли технологий искусственного интеллекта и необходимости правового регулирования процессов взаимодействия искусственного интеллекта и человека в контексте информационной безопасности.

По мнению автора, без полноценного и своевременного нормативного регулирования разработок технологических новаций, которые смогут принимать самостоятельные решения, общество рискует понести серьезные потери. Поэтому крайне важно уже сейчас разработать и внедрять для информационных технологий такое административно-правовое регулирование, при котором развитие технологий не приведет к рискам для общества и сохранит за человеком контроль над происходящим.

Автор предполагает, что со временем искусственный интеллект, лишившись статуса компьютерной программы или технологии, станет самостоятельным субъектом права, приводя в качестве примера приобретения правоспособности другим искусственным, абстрактным образованием — государством.

В публикации рассмотрены имеющиеся попытки формирования правовых рамок для взаимодействия человека и искусственного интеллекта, имевшие место в Европейском Союзе, Японии и КНР. В том числе — прецедент признания искусственного интеллекта самостоятельной творческой единицей, который уже имел место в китайском городе Шэньчжэнь, где суд постановил, что некоторые статьи, написанные с использованием искусственного интеллекта, защищены авторским правом.

Отдельное внимание посвящено анализу отечественных исследований перспектив применения искусственного интеллекта и его взаимодействия с человеком. Автором предлагается подход к регулированию правоотношений, связанных с искусственным интеллектом, построенный вокруг принципа — технологии на благо человека, для соблюдения его прав и свобод.

Автор прогнозирует смещение приоритетов в сфере информационной безопасности от защиты персональных данных и безопасности их использования к недопущению бесконтрольного использования искусственного интеллекта в сферах, связанных с реализацией прав и свобод человека.

Ключевые слова: информационная безопасность; информационные технологии; искусственный интеллект; правовое регулирование; электронное правительство; дистанционное обучение; права человека.

Problem statement. The total informatization of modern society, accompanied by the mass introduction of the latest information processing and telecommunications systems, carries, in addition to unprecedented opportunities, many threats due not only to the nature of computer intelligent systems, but also the lack of proper regulation of their activities. Previously, the concept of "artificial intelligence" has evoked associations with science fiction novels and cinema, however, today everyone is somehow faced with the use of intelligent systems for finding content and processing arrays of information in everyday life. At the same time, the answer to the question — can artificial intelligence have its own consciousness? This question is especially acute in the context that the nature of "consciousness" has not been fully explored and is not unambiguously defined. Studies of the problems of consciousness reach the depths of the centuries, originating in ancient philosophical discussions and later attempts to understand whether the mind can be explained by physical laws. In the twenties of the XXI century, we perceive artificial intelligence rather as an algorithm that is able to summarize and process an array of information, to form predictions about unknown facts. However, in some cases, when obtaining useful conclusions, we understand that the program is able to readjust to new algorithms [1].

Analysis of recent research and publications. Such scientists as: Kryvetsky O., Androschuk G., Romanenko E., Zhukova I., Davydova I., Nekrasov V. and others have made a significant contribution to the study of the peculiarities of artificial intelligence technologies in the context of information security.

The purpose of the article is to investigate the growing role of artificial intelligence technologies and the need for legal regulation of the processes of interaction between artificial intelligence and humans, in the context of information security.

Presentation of the main material. The total informatization of the modern society, accompanied by the mass introduction of the latest information processing and telecommunications systems, carries, in addition to unprecedented opportunities, many threats due not only to the nature of computer intelligent systems, but also the lack of proper regulation of their activities.

Previously, the concept of "artificial intelligence" has evoked associations with science fiction and cinema, however, today everyone is somehow faced with the use of intelligent systems for finding content and processing arrays of information in everyday life. At the same time, the answer to the question is still in doubt — can artificial intelligence have its own consciousness? This question is especially acute in the context of the fact that the nature of "consciousness" has not been fully explored and is not unambiguously defined. Studies of the problems of consciousness reach the depths of the centuries, originating in ancient philosophical discussions and later attempts to understand whether the mind can be explained by physical laws. In the twenties of the 21st century, we perceive artificial intelligence rather as an algorithm that can summarize and process an array of information, to form predictions about unknown facts. However, in some cases, when obtain-

ing useful conclusions, we understand that the program can reconfigure to new algorithms [1].

It has not been news for a long time that innovations in the field of information technology and information security are increasingly giving artificial (electronic) intelligence signs of legal autonomy, freedom of choice and even creativity. Therefore, in our opinion, human relationships with media, databases, and in the future — and with artificial intelligence, should be regulated by administrative and legal means within the institute of information security. Competition for supremacy in information technology and artificial intelligence is projected to be one of the key processes for all highly developed countries for at least the next ten years. And although this period seems small, even by the standards of our fast-paced time, the leaders of this process will probably be determined soon enough. However, not only innovations and achievements in the field of artificial intelligence will be an integral feature of leadership. Its most important component will remain the provision of information security of the mankind and the possibility of legal implementation of innovations in all the spheres of economy and public life.

Without full-fledged and timely regulatory regulation of the development of technological innovations that can make independent decisions, society risks getting hit in the back by the results of their own hands. Therefore, it is extremely important now to think and provide for information technology such administrative and legal regulation in which the development of technology will not lead to risks for the society and will retain human control over what is happening.

Artificial intelligence is now perceived as an unprecedented technological breakthrough, as a technology that can radically change our lives. However, it is worth remembering that such technologies have already occurred in human history. Electricity, radio, telephone, car, plane made revolutionary breakthroughs on a global scale, and each such technology was accompanied by public fears associated with the spread of the unknown and poorly understood.

The first striking example of a change in the public attitudes to the consequences of scientific progress is "The Locomotive Act", passed by the British Parliament in 1865. This law, among other things, ordered that in front of each self-propelled railless vehicle, which we now call a car, a man with a red flag or lantern walk at a distance of 55 meters to warn of danger, and the crew must have at least two drivers [2]. It is quite difficult to imagine such a procedure of road transport movement in the modern world because modern people perceive cars as commonplace, not noticing them and not distinguishing them from the usual surrounding world. So, it is easy to predict that the change in perception, like the differences in today's attitude to cars from what took place in the 19th century, awaits us in the context of information technology and artificial intelligence. Although we are sure that all the changes will be quite comfortable if the process of implementing artificial intelligence technologies is accompanied by some administrative and legal regulation of standards and rules of conduct, which

should turn it into a routine, which we will not notice either.

The legislation of individual states and supranational entities already has the first rules governing the relationship between information technology and artificial intelligence. So, recently, in 2017, the European Union adopted a Resolution "Civil Law for Robotics". This document, which contains more than a hundred items, administers aspects of robotics and artificial intelligence. Specifically, it is proposed to consolidate the legal basis for the use of artificial intelligence and the introduction of a pan-European system for the registration of smart cars, for example with road transport. In addition, it is planned to legally regulate the processes of robotization of the human body [3–4]. Thus, we can talk about laying the foundations of the legal basis not only for artificial intelligence but also for cyborgization.

Japan and PRC are not lagging behind in the study area. In particular, in Japan, back in 2016, at a meeting of the State Commission on Intellectual Law, it was decided to begin developing regulations on copyright protection for creative products created by artificial intelligence [3]. An equally striking case occurred in the Chinese city of Shenzhen, where artificial intelligence was recognized as an independent creative unit. There, the court ruled that certain articles written using artificial intelligence were protected by copyright. Of course, the court's decision concerned the specific texts of Tencent, which publishes software content in the field of business and finance. The company went to court after one of the online platforms posted on its website the text Tencent generated using artificial intelligence. The court ruled that the wording of the material and the expressions used were original and classified it as a written work protected by copyright. It is possible that this case will set a precedent for the world legal community.

Unfortunately, Eastern European society has not yet come to the need to regulate this area of activity. Works created by artificial intelligence, for example in Ukraine, are not yet literally recognized as created, because, according to current legislation, copyright can only apply to a living person. At the same time, much research is already devoted to the opportunities and risks of implementing artificial intelligence in existing areas of law, such as personal data law, intellectual property protection or antitrust law. In addition, the domestic scientific community is paying more and more attention to the implementation of e-government, which over time, one way or another, will be intertwined with the technology of artificial intelligence. Back in 2016, "e-government" was proposed to mean a way of organizing government through local information networks and segments of the global information network, which ensures the functioning of certain services in real time and makes everyday communication as simple and accessible as possible with the official institutions [6]. Gradually moving from theory to practice of lawmaking and law enforcement, many Ukrainian experts are working on the formation of legal relations in the field of artificial intelligence. Some developments have already been implemented, such as electronic digital signature, profile identifi-

cation or personal verification. Discussions are underway on the creation of electronic voting systems and the digital economy. According to the purpose, artificial intelligence will be legalized in various sectors of the economy and social sphere, and the adopted administrative and legal principles should insure society against many predicted risks [7–9].

An extremely important area, where, in our opinion, sooner or later will find the application of artificial intelligence technology, is distance learning, including - with the use of virtual reality technologies. Recently, due to the introduction of quarantine restrictions in dozens of countries aimed at counteracting the spread of coronavirus COVID-19, there is a high activity not only in the use of distance learning in parallel with stationary, but also full, even temporary, transition to lectures, seminars, tests, passing exams, including state exams, remotely, using computer tools [10].

Accordingly, more and more attention of the scientists is paid to the peculiarities of the adaptation of augmented reality technologies in academic disciplines for students of different educational institutions. We are talking about the feasibility of applying an integrated approach in the training of future professionals of the new technological era. At the same time, according to researchers, the use of augmented reality technologies increases the motivation to learn, increases the level of assimilation of information due to the diversity and interactivity of its visual presentation [11].

Many researchers are currently discussing the usefulness of Block Chain technology used in cryptocurrency trading in various areas of management. From the point of view of information security, this technology is just a treasure. The easiest way to use it soon, we see the use of electronic election technology. Thanks to this technology, every step of the election process and voting will have to be coded. In this case, information security will be provided by encoding the same order of each operation and each element in the chain of events. As a result, an attempt to change one of the links in this chain is sure to change the code of the element, and this will cause the failure of the entire program, which will immediately detect intentional interference.

Another unique quality for information security is Block Chain technology in the sense that all participants in the process, in our case — voting, are sent a complete copy of the entire chain of events with the specified encoding. Therefore, everyone will be able to check the compliance of the results with the process and the results. Thus, thanks to the dual control of technology, it is possible to achieve the ideal of information security, i.e. a process that cannot be forged or artificially altered. However, the use of such technologies requires some change in the administrative and legal regulation of the information security in these areas of the legal field [12].

In addition, it should be noted that the Beijing authorities have announced the introduction of blockchain technology in 140 government services. According to them, the use of distributed registry technology has helped reduce costs by 40 % and is a breakthrough that could not be achieved with the use

of traditional information transmission systems.

"Blockchain is a breakthrough in data exchange that is difficult to implement in the traditional way. Storing electronic certificates on a blockchain increases reliability, efficiency and simplifies the data verification process", said Chinese officials. The Chinese government also noted that services that use the blockchain are divided into 3 categories. Firstly, data exchange and transmission; secondly, their joint processing and, thirdly, storage of electronic licenses and certificates [12].

As an example, a Chinese official named the base for real estate registration. It contains 11 sectors, which include the Municipal Planning Commission, the Commission for Housing and Rural Development, the Tax Bureau, the Public Security Bureau, and others.

Expert forecasts on the volume of investments in this area can be considered as additional evidence of the importance of the problem of artificial intelligence. Currently, experts note that the turnover of investment in artificial intelligence technology is growing annually and by 2024 could reach almost $ 140 billion. In China alone, the budget for the implementation of artificial intelligence technology development strategy until 2030 is $ 150 billion [13].

At the end of June 2020, the Italian Banking Association (IBA), which consists of more than 700 banks, announced that its members are ready to test the digital euro, which it wrote on its official website. Participation in related projects and pilot programs will help accelerate the introduction of a digital currency supported by the European Central Bank [17].

During the investment boom, issues of protection of the human rights and freedoms, as well as information security come to the fore. It is, first, about inadmissibility of use of developments for the purpose of intentional harm to the citizens and legal entities. Therefore, the author proposes a stimulating approach to the regulation of these relations, built around the principle — technology for the benefit of man, to respect these rights and freedoms. If at present in the field of information security the priority is the protection of personal data and the security of their use, then in the future the emphasis will shift to preventing the uncontrolled use of artificial intelligence associated with the realization of human rights and freedoms.

At the same time, as we have already noted, in addition to impressive prospects, artificial intelligence technologies pose several potential threats. According to a 2019 report by Nathan Benaich and Jan Hogarth, entitled "Harmful Use of Artificial Intelligence", intelligent systems may well serve criminals and terrorists. Both scientists and developers must take this into account and prevent the possible use of their work to the detriment of the society. Appropriate restrictions at the legislative level should be established as a primary preventive measure [14].

At present, attempts to administratively regulate the relationship between man and artificial intelligence exist only at the level of a superficial discussion of their further implementation. But soon we will have to interact much more, especially — if artificial intelligence acquires all the features of the subject, including freedom of choice

and creativity. A proven way is to inscribe the relationship associated with artificial intelligence in the legal field. It does not really matter how it develops in this field. The main thing is the availability of flexibility and timely change of the proposed norms. But the administrative and legal field needs to be adjusted now, and the cases of the use of artificial intelligence suggest directions for its further improvement.

Until now, the relationship between society and artificial intelligence coexist according to the rules of Nash equilibrium. When each party is unable to learn about the intentions of the opponent and agree with each other, both choose not the most favourable option for themselves, or frankly less destructive. This position was discovered and described through mathematical laws by the American mathematician John Nash, for which he received the Nobel Prize in Economics in 1994. [15]

It is possible that artificial intelligence will one day be deprived of the status of a computer program or technology and will become an independent subject of law. Legal science has already faced similar issues when an inanimate phenomenon for the sake of general convenience was recognized as legal. The most famous example is the recognition of the state as a legal entity. This definition is accepted almost invariably throughout the world, it has become commonplace, and no one is surprised that such an abstract phenomenon as a state that has neither its own will nor nature — has legal capacity.

Also, in the future, the question of the need to regulate human interaction with artificial intelligence will inevitably arise. Such a process has already begun at the interstate level. The already mentioned draft code of ethics for artificial intelligence, prepared in the European Union in 2017, states that artificial intelligence should serve a just society, support fundamental human rights, not limit human autonomy and in general, work for positive change in the society. At the same time, civilian control over the relevant data must be maintained. Lawyers should create administrative and legal mechanisms that will guarantee the responsibility and accountability of all artificial intelligence systems and their activities. And these are only the first requirements to the regulatory framework for the regulation of these relations. When and how these ethical norms will be implemented, we will see [4, 16]. However, the topic of information security and responsibility for the actions of artificial intelligence systems is already quite relevant today. Responsibility is a component of the institute of information security, which is responsible for legal personality.

Even now, harming an individual or a legal entity during the operation of artificial intelligence systems is not unrealistic. The first simple example is easy to imagine. An unmanned vehicle knocks down a person who was crossing the street at a pedestrian crossing. Who is responsible for the damage in this case? After all, both the owner of the drone and its manufacturer can be considered as such. In other cases, after the investigation, the software developer, licensee, or technical or software support engineer responsible for setting up and running the program will be blamed. The question then arises — under what conditions can liability be imposed on each of these entities? Who

will be responsible for information security breaches or the consequences of simple hacker attacks? Perhaps in such cases the practice of prosecuting the owners of high-risk vehicles will be applied? Now, the answers to these questions are not yet clear and raise new issues that need to be addressed, including in law and jurisprudence.

So, there are a lot of problems that the spread of artificial intelligence technologies will cause. Therefore, as never before, we should go beyond classical scientific trends and create interdisciplinary areas of research. It is important not to be afraid to look for solutions for them, combining the efforts of legal scholars and experts in various fields of knowledge.

Conclusions. The growing role of artificial intelligence technologies and awareness of this process leads to increasing competition for supremacy in this field among the most developed countries. Not only innovations and achievements in the field of artificial intelligence will be an integral feature of the leadership. Its most important component will remain the provision of information security of the mankind and the possibility of legal implementation of innovations in all the spheres of economy and public life. Without full-fledged and timely administrative and legal regulation of the development of technological innovations that will be able to make independent decisions, society risks serious losses. Therefore, it is extremely important now to develop and implement for information technology such administrative and legal regulation, in which the development of technology will not lead to risks for the society and will retain human control over what is happening.

It is likely that artificial intelligence will one day be deprived of the status of a computer program or technology and will become an independent subject of law. There are attempts to form a legal framework for human interaction and artificial intelligence. Back in 2017, the European Union prepared a draft set of ethical rules for artificial intelligence, according to which the key goals of artificial intelligence are: service to a just society, support for fundamental human rights, a ban on restricting human autonomy and more.

The author proposes a stimulating approach to the regulation of legal relations related to artificial intelligence, built around the principle — technology for the benefit of man, to respect his rights and freedoms. If now in the field of information security the priority is the protection of personal data and security of their use, then in the future we predict a shift in emphasis to prevent the uncontrolled use of artificial intelligence in areas related to the realization of human rights and freedoms.

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