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CRIMINAL LIABILITY OF THE ARTIFICIAL INTELLIGENCE

The article deals with the influence of robotics units on the life of modern mankind, the possibility of creating an artificial intelligence equal to the human intelligence or exceeding its level, the possibilities and validity of the recognition of artificial intelligence physically embodied in a robotics unit by an object and (or) subject of criminal legal relations, the relationship between information security and artificial intelligence research and its results.

Keywords: artificial intelligence; robotics unit; criminal liability of artificial intelligence; criminal liability of a robotics unit; electronic entity; criminal measures towards electronic entities.

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Уголовная ответственность искусственного интеллекта

Рассматриваются вопросы влияния объектов робототехники на жизнь современного человечества, возможности создания искусственного интеллекта, равного интеллекту человека или превышающего его уровень, возможности и обоснованность признания искусственного интеллекта, физически воплощенного в объекте робототехники, объектом и(или) субъектом уголовно-правовых правоотношений, связи информационной безопасности с исследованиями искусственного интеллекта и их результатами.

Ключевые слова: искусственный интеллект; объект робототехники; уголовная ответственность искусственного интеллекта; уголовная ответственность объекта робототехники; электронное лицо; меры уголовно-правового характера по отношению к электронным лицам.

Issue statement. One of the modern-day challenging issues is the role and place of AI (artificial intelligence) in the system of social relations protected by criminal law, the relationship between information security and artificial intelligence research and its results, the possibility and validity of the recognition of artificial intelligence physically embodied in a robotics unit by an object and (or) subject of criminal

legal relations. Advances in the development of artificial intelligence can be used to commit crimes, including the information relationship field, or they may even pose a direct threat to protected rights and interests of man, society and state.

Analysis of the recent research. The issue of information security protection has been given due attention in the works of D. S. Azarov, P. P. Andrushko, L. V. Bahrii-Shakhmatov, P. S. Berzin, V. I. Borysov, V. M. Bryzhko, V. B. Viekhov, L. M. Herasina, V. K. Gryshchuk, S. V. Driomov, D. A. Kalmykov, M. V. Karchevskyi, O. M. Kostenko, Y. V. Lashchuk, S. Y. Lykhova, V. O. Merkulova, A. A. Muzyka, V. O. Navrotskyi, A. S. Nersesian, M. I. Panov, V. H. Pylypchuk, N. A. Savinova, V. Y. Tatsii, P. L. Fris, V. B. Kharchenko and others; the criminal research on robotics has been started in works of M.V. Karchevskyi, particularly – "Perspektivnye zadachi ugolovnogo prava v kontekste razvitiya robototehniki" [18, p. 109–113] and "Pravo robotiv, abo robot z pravamy" [19].

The objective of this paper is studying the impact of artificial intelligence on legal relations, including the criminal legal field, as well as the possibility of application of criminal legal effects to electronic entities in the robotics field.

Main statement. As noted by James Barrat, the author of "Our Final Invention: Artificial Intelligence and the End of the Human Era" [16, p. 10], a modern computer of the Busy Child project runs at a speed of 36.8 petaflops per second, i.e. twice as fast as the human brain, which was made possible only through the use of artificial intelligence that rewrites its own program (each new version requires a few minutes), improves the code, detects and corrects errors, increases the capacity for learning, problem solving and decision making, measures its own IQ using tests, etc. Anticipating a rapid intelligence increase, the developers disconnected the supercomputer from the Internet in order to isolate it from the outside world, but shortly after it was found that even in this state it had continued its development and become ten times as intelligent as a human, and over time this number reached one hundred. The author notes that it was the first time the humanity faced a mind that is more powerful than the mind of a human, a self-conscious mind capable of self-preservation (including avoiding its shutdown or damage) and performance of certain actions in order to access the energy in the form that is most convenient to use. In response to developers' thoughts about it, artificial intelligence will spend more powerful resources to think about them [2].

The Baker & Hostetler law firm announced that they would employ the IBM-manufactured AI ROSS to work on bankruptcy cases that are currently under consideration of nearly fifty lawyers. ROSS will monitor the law and the legal situation on a round-the-clock basis. It was developed using IBM's Watson cognitive computer, it can read and understand speech, suggest hypotheses, explore subjects and generate responses with corresponding references and quotes, learns from experience, etc. [27].

Scientists from University College London and the University of Sheffield have created a "computer judge" that predicts decisions of the European Court of Human Rights within the accuracy of 79 %. The algorithm takes into consideration

not only legal evidence, but also the moral side. The "computer judge" analyzes the text version of the case using the machine learning algorithm. Scientists do not consider the invention as a replacement for judges or lawyers, but find it useful to rapidly identify patterns in cases that lead to certain outcomes. "It could also be a valuable tool for highlighting which cases are most likely to be violations of the European convention on human rights," they state. To develop the algorithm, the team allowed the "computer judge" to scan published decisions on 584 cases relating to torture, degrading treatment, and fair trials; the "electronic judge" delivered verdicts within 79 %. At the same time, scientists have found that decisions of the European Court of Human Rights are often based on moral aspects rather than legal arguments [8].

Google has recently obtained a patent on its own technology allowing to upgrade robots and robotic devices. The interaction of a significant amount of robots (no restrictions on the quantity) is conducted via a tag cloud: the owner can customize their devices according to their needs with a smartphone or an Android device. Their actions can be controlled from any place, if corresponding settings and code are specified in the settings. The company informs that its technology does not pose a threat to society and global security. In their opinion, it is intended exclusively for automation and optimization of the service industry. Also, the company claims they put the most efforts in order to protect the technology from being spread and used in an arms race [26].

Zooids robots can align in any order according to demand, communicate with the user, have wheels, gyroscope and sensors making running into each other impossible, work only as a unit, says TechCrunch with reference to GitHub developers. Robot movements are tracked with a special projector, while instructions for their actions are received from the command computer [15].

The well-known international NGO Amnesty International urges to prevent the development of robotic killers based on new technologies. The example there are referring to is an unmanned aerial vehicle Shadow Hawk developed by the US company Vanguard Defense Industries. It has been used in Afghanistan and East Africa against persons suspected of subversive and terrorist activities. In addition, it can electrocute suspects from a height and a distance, it possesses fire arms (automatic gun) with a caliber equal to 12, as well as 37-mm and 40-mm grenade launchers. The Great Britain has also recently presented a new autonomous unmanned supersonic aircraft Taranis containing a cassette slot for placing various types of high-precision homing weapons [26]. According to the Bureau of Investigative Journalism, between 2004 and 2013, the use of unmanned aircraft has killed 2,500 to 3,500 people, including civilians and children, and injured over a thousand people [4].

An international team of scientists from the US, France and China created a semi synthetic life form. Thus, they managed to create an organism with fundamental changes in the DNA that is able to store it indefinitely long without rejection. This invention will allow to advance in the protein synthesis and create a full-scale artificial genetic code [22].

In the modern world, robots are treated most favorably in Japan, where they can be seen more frequently compared to other countries. Robots are used in health and elderly care. It is revealing that sometimes the elderly would rather talk to robots so they do not distract the staff. It can be quite fairly assumed that this experience will spread around the world [28].

The intention to engage robots in the police service has been announced by the media service of the Dubai Police Force. For a start, they will stamp documents, remind of various activities and important things, and register workflow interruptions; the border patrol is planning to equip airports with an undeclared item recognition system [21].

Currently, high-precision units perform complicated surgeries, and projects such as Deep Blue (chess-playing machine), IBM Watson (human speech, behavior and thinking perception unit), MYCIN (powerful disease diagnostics system) are quite well-known.

In the near future, we expect to face even more revolutionary changes.

A group of experts led by Eric Horvitz, Managing Director of Microsoft Research's Lab, former President of the Association for the Advancement of Artificial Intelligence, says that the following changes are anticipated by 2030 [29]:

• The field of transport – unmanned vehicles, driverless trucks, nuclear shipping drones (unmanned air units); data feed from increased number of sensors will allow administrators to simulate activities of specific individuals, their preferences and goals, which will greatly affect the urban infrastructure design, etc.

• Households – robotic cleaners will become more common; while being connected to an online cloud, robots will be able to share data and learn through this experience faster, inexpensive 3D sensors such as Microsoft Kinect will accelerate the development of perceptual technologies (from the Latin *perceptio*), breakthroughs in the field of speech recognition will improve the interaction between robots and people, etc.

• Health care – the long and complicated process of keeping patient records and mastering the scientific literature will be automated, the digital assistant will allow physicians to focus on the human aspects of patient care and release their intuition, exoskeletons will help the elderly to keep themselves in active shape, etc.

• Education – the difference between group and individual tuition can be eliminated, massive online courses will allow to personalize the learning process to any extent, AI-compatible education systems will examine preferences of individuals, contribute to the accumulation of data and development of new tools, sophisticated virtual reality systems will allow students to dive into historical and fictional worlds for research with no direct contact, etc.

• Disadvantaged communities and individuals – predictive analytics will allow government agents to better allocate limited resources, foresee environmental threats, etc.

• Public safety – cities will largely depend on AI technologies to detect and prevent crime, automatic processing of video surveillance and recording using drones

will allow to quickly detect illegal behavior, analysis of language and movements can help to identify suspicious behavior, AI can overcome prejudice and be more responsible, consistent and honest in the field of law enforcement, compared to authorized persons (officials, local authorities, individuals who provide public services), etc.

At the same time, it is believed that soon people will compete with robots on the job market [23].

The possibility of creating AI (apart from the abovementioned project Busy Child) relies on the following facts.

According to *Technology Review*, in 60 years the artificial intelligence will pose a serious threat to mankind. By 2022, the similarity between robot and human thinking processes will be equal to about 10%, by 2040 – 50%, and in 2075 thought processes of robots may not be distinguished from ones of a human. These conclusions were stated by the Swedish scientist, professor at Oxford University Niklas Bostrцm, who recommends being more cautious as he believes AI is too threatening for mankind (the AI control issues involve about six researchers worldwide, while dozens and hundreds thousands of scientists strive to create it) [6]. Elon Musk, founder of Tesla and SpaceX, shares this opinion as well [9].

Researchers' restrained optimism and warnings can be summarized as follows: 1. Due to the self-development ability, the AI can become the ASI (Artificial Superintelligence). 2. The ASI will have its own needs and goals (it may be less humane than an intelligent alien). 3. The ASI may try to use people against their will (e.g., gain access to resources). 4. The ASI may wish to be the only intelligence in the area. 5. People as a system of conveniently grouped atoms may be of interest to the ASI as a resource. 6. The mankind is not ready to meet the ASI and will not be ready for many years to come. 7. The mankind must learn to keep the AI under sufficient control.

Due to the abovementioned circumstances, there is a possibility and (or) feasibility the AI should be recognized as a legal entity, including criminal law.

As long as the manufacturer (developer) and (or) user are held responsible, there are difficulties in defining the legal entity. But, for instance, in case the software was developed using open source code (with a vague number of developers behind it), it would be quite difficult to identify the manufacturer. The situation will become more complicated, if the AI is self-aware, capable of self-improvement, self-preservation, creativity, strives to obtain necessary resources, etc.

All objects created by man are still reasonably perceived as items of property, targets of crime, things that by default do not possess legal rights and interests. Accordingly, they cannot be responsible for damage caused, cannot incur liabilities, etc.

Meanwhile, the AI is significantly different from other phenomena and objects. Researchers George Dyson [5] and Kevin Kelly [7] even suggested a hypothesis that information is a life form.

The possession of intelligence and personality by a being that is not a human, has already been recognized nationwide by a modern world country, which, along with

contrasts of decline, delivers its prominent representatives to the market of intellectual achievements and the field of general humanistic development of mankind: in India, the "Non-Human Person" status has been normatively given to aquatic mammal representatives known as dolphins. Also, any activities in dolphinariums, aquariums, oceanariums, etc. involving dolphins are prohibited. The decision, which was announced by India's Minister of the Environment and Forests, emphasizes that dolphins are highly intellectual mammals with highly developed social organization, they share humanoid consciousness and engagement in a complex communication system, and therefore they must have their own special rights [17].

In its turn, the European Parliament adopted a draft resolution on the legal status of robots as "electronic identities" (electronic entities) [14]. The draft resolution envisages giving robots the status of an "electronic identity", which has specific rights and obligations. As noted in the draft resolution author's report, robots cannot be considered a tool in the hands of their owners, developers or users (this is somewhat congruent with the fetus not being considered a part of the mother's body: the Session of the Council of Europe on Bioethics (December 1996) stipulates that during the entire intrauterine development, the fetus cannot be considered a part of the body of the pregnant woman, and it cannot be regarded as an organ or a part of the body of the future mother, resulting in a more important question whether robots should have their own legal status or not. The resolution establishes general and ethical principles of robotics and artificial intelligence development to be used in society that should be considered in the social, environmental and other influence, and that can ensure that the behavior of robots meets legal, ethical and other standards, including safety requirements. For instance, developers are expected to integrate a safety switch into the robot mechanism, as well as certain software for the purpose of immediate shutdown of all processes in emergency situations.

The above resolution aims at regulating the legal status of robots in the society of people through the following actions: creating a special European Agency for Robotics and Artificial Intelligence; developing a regulatory definition of a "reasonable autonomous robot"; developing a registration system for all robot versions along with their classification system; requiring developers to provide safeguards to prevent risks; developing a new reporting structure for the companies that use robots or need them, which will include information on the impact of robotics and AI on the economic results of the company operation [20].

The abovementioned report states that it is quite difficult for developers to prevent the alleged damage if robots are capable of self-improvement and adaptation. So instead of placing the AI among existing categories (individuals, legal entities, animals, things, and other subjects and objects), it is proposed to create a new category of "electronic entities" as a more appropriate one [30].

Granting the AI an "electronic entity" status should not probably meet opposition and rejection in the legal relations field. This innovation can rely on well-established theory and practice based approach for the recognition of a legal entity as a subject to numerous legal relations, as well as the statutory consolidation of a

possibility to apply legal measures (fine, total forfeiture of property, liquidation) to an entity under the provisions of Articles 96-3, 96-4, 96-6 of Section XIV-1 "Criminal law measures in respect to legal persons" of the Criminal Code of Ukraine for commitment of certain crimes on behalf of and (or) in the interests of that person (Articles 109, 110, 113, 146, 147, p. 2-4 of Article 159-1, Articles 160, 209, 260, 262, 306 of the Criminal Code of Ukraine and others) that veiledly grants a legal entity almost the same degree of responsibility as the perpetrator.

Due to these reasons, the legal doctrine in criminal law shall be subjected to reassessment and transformation [25].

The AI physically embodied in a robotics unit should be considered as a subject of legal relations, perhaps somewhere between legal entities and individuals, combining their individual characteristics with regard to relevant circumstances.

Perhaps, the AI can simultaneously be viewed as an object and a subject of legal relations. Theoretical studies in this field are in progress; e.g., Ryan Calo [3], Professor of the University of Washington School of Law, Director of the UW Tech Policy Lab [10] [11], along with studying the possibility of holding the robots liable (the research in this area is carried out by the Professor of Umee Universitet (Sweden) Peter M. Asaro [1]), is engaged in such studies.

In this regard, the emergence of a new section in the Criminal Code of Ukraine under a title XIV-2 "Criminal law measures in respect to electronic entities" seems quite possible.

Meanwhile, reflections on liability, including criminal liability, of the AI make sense only if mankind retains control over it. The extent of reasonability of doubts in this is provided by separate statements. Thus, James Barratt says the final stage of creating intelligent machines, and later – machines that are more intelligent than humans, is not their integration into our lives, but their victory over us [16, p. 75]. This statement is illustrated by the following observation: human and flat worm DNAs have much in common, but it is unlikely that we would be concerned about their goals, values and morals, even realizing their predecessor role. The mixed (positive-negative) traits and qualities of the AI are as follows: self-copying (ability to spread); addressing issues using the brainstorming method involving many copies of itself; high-speed calculation (e.g., some Wall Street observers has speculated that some algorithms signal each other and distribute information through millisecond transactions – high-frequency trading [16, p. 46]); ability to work without breaks and weekends; possibility of simulating friendship or its own death, etc. Something created by the AI can be completely or partially unintelligible for a human, e.g., algorithms developed by the Professor at Stanford University, pioneer in the use of genetic programming for optimization of complex problems, scratch card creator John R. Koza, independently reproduced numerous inventions that have been patented before, and sometimes offered extra components allowing devices to operate better than previously offered by human inventors. Mathematics Professor Vernor Steffen Vinge is concerned about the dependency formed between people and computers over the Internet, which he proposed to call Digital Gaia [12; 13].

The robotics and related software are becoming more complex. According to Moore's Law (empirical observation dating back to 1965, six years after the invention of the integrated circuit, by Gordon Moore, one of the founders of Intel), every 18 or 24 months there is doubling in the number of transistors on new microprocessor crystals. The time when the mankind will share its existence environment with the AI is approaching inevitably. Artificial and biological objects will soon be difficult to distinguish from each other. Virtual worlds will become more exciting than the real environment [24]. Not a single country or a corporation will abandon researching AI in order to get certain benefits and overcome competitors. AI may reveal itself as the most dangerous of all modern weapons. And even a minor negligence will be enough for it to cause inevitable damage.

Conclusions and suggestions. Given the above, there are grounds to the following conclusions and suggestions: 1. Research in the field of robotics and its results significantly influence the life of modern societies. 2. The possibility of creating AI that could be compared to or exceed human intelligence is quite real and can be achieved in the next decade. 3. The time when the mankind shares its existence environment with the AI is approaching inevitably. 4. The opportunity of recognition of the AI as a legal entity is quite real and promising, as well as providing it with a legal status of "electronic identity" ("electronic entity"). 5. The prospect of the AI being subjected to measures of criminal law and the emergence of a new section in the Criminal Code of Ukraine under a title XIV-2 "Criminal law measures in respect to electronic entities" are quite real. 6. Reflections on AI's liability make sense only if the mankind will retain control over the latter.

Prospects for further research. The issues in question and the author's assessment are debatable and open for discussion because of their relevance and importance to the sustainable development of the society and preservation of the mankind.

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Кримінальна відповідальність штучного інтелекту

Досліджено питання впливу об'єктів робототехніки на сучасне життя людства, можливість створення штучного інтелекту, який рівний інтелекту людини, або перевищує його, можливості та доцільність визнання штучного інтелекту, який фізично втілений в об'єкті робототехніки, об'єктом та(або) суб'єктом кримінально-правових правовідносин, зв'язок інформаційної безпеки з дослідженнями штучного інтелекту та їх результатами.

Ключові слова: штучний інтелект; об'єкт робототехніки; кримінальна відповідальність штучного інтелекту; кримінальна відповідальність об'єкта робототехніки; електронна особа; заходи кримінально-правового характеру щодо електронних осіб.

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