

# КРИМІНАЛЬНЕ ПРАВО ТА КРИМІНОЛОГІЯ



**Radutniy Oleksandr Eduardovych,**  
*PhD in Law, Associate Professor, Associate Professor  
of Criminal Law, Yaroslav Mudryi National  
Law University, Ukraine, Kharkiv  
e-mail: radut12@gmail.com  
Researcher ID E-6683-2015  
ORCID 0000-0002-6521-3977*

doi: 10.21564/2414–990x.144.155819  
UDC 343.21(477):004.383.8

## ADAPTATION OF CRIMINAL AND CIVIL LAW IN VIEW OF SCIENTIFIC–TECHNICAL PROGRESS (ARTIFICIAL INTELLIGENCE, DAO AND DIGITAL HUMAN)

*Today there is a powerful challenge to legal doctrine. It is associated with outspreading into all spheres of life by artificial intelligence and new technologies (blockchain, artificial improving of the biological body and human abilities). In this regard, it is necessary to resolve a number of important issues concerning the possibility of recognizing artificial intelligence as the subject (person) of the legal relationship and the subject (person) of the crime, the qualification of the actions of the improved human and encroachment on him, finding the person of responsibility for decentralized legal entities.*

**Keywords:** legal doctrine; artificial intelligence; blockchain; subject (person) of the legal relationship; subject (person) of the crime; person of responsibility; decentralized legal entities; digital human; Homo numeralis; Homo digitalis; Homo horologium.

**Радутний О. Е.,** кандидат юридичних наук, доцент, доцент кафедри кримінального права № 1, Національний юридичний університет імені Ярослава Мудрого, Україна, м. Харків.

**Адаптація кримінального та цивільного права у зв'язку з досягненнями науково-технічного прогресу (штучний інтелект, DAO та цифрова людина)**

*Сьогодні має місце потужний виклик правовій доктрині. Він пов'язаний з широким проникненням у всі сфери життя штучного інтелекту та нових технологій (блокчейн, штучне поліпшення біологічного тіла людини та її когнітивних здібностей). У зв'язку з цим може виявитися відсутність фактичної підстави юридичної відповідальності у діях (бездіяльності) розробника або користувача алгоритмами штучного інтелекту. Тому необхідно вирішити ряд важливих*

питань, які пов'язані з можливістю визнання штучного інтелекту суб'єктом (особою) правовідносин і суб'єктом (особою) злочину, а так само відносно кваліфікації дій біологічно та когнітивно покращеної цифрової людини (*Homo numeralis*, *Homo digitalis*, *Homo horologium*), яка має підсилений зір, силу м'язів, швидкість, гнучкість, пам'ять без прогалів, здатність до прискореної обробки даних та надрозвинуті аналітичні здібності тощо, або посягання на неї та інші об'єкти правової охорони шляхом втручання в роботу імплантованих у неї пристроїв під керуванням штучного інтелекту, визначення питання про відповідальну особу щодо DAO – децентралізованої юридичної особи, в якій відсутні службовці, що у традиційному розумінні виконують адміністративно-господарські або організаційно-розпорядчі функції.

**Ключові слова:** правова доктрина; штучний інтелект; суб'єкт правовідносин; суб'єкт злочину; відповідальна особа; децентралізована юридична особа; цифрова людина; *Homo numeralis*; *Homo digitalis*; *Homo horologium*.

**Introduction.** In a very short time humanity will share its habitat with artificial intelligence of a higher degree of growth (Artificial Superintelligence, ASI) [3], its cognitive properties will exceed the corresponding abilities of a human, in particular perception of information, recognition of objects and their classification, creativity and generation of new knowledge, assessment of the situation, choosing of the optimal strategy and tactics of action, making value statements, independence of decision-making and implementation of them, memory as a complete preservation of all received information or signals etc.

Thus, in the competition for insurance claims artificial intelligence named Case Cruncher Alpha had convincing victory over the lawyers of London firms (the accuracy of the prediction by Case Cruncher Alpha was about 86.6 %, practicing lawyers – 66,3 %) [8]. According to Bloomberg artificial intelligence has surpassed the human's ability to read and understand the text: the results of a person in the test are 82.304, the artificial intelligence of Alibaba is 82.440 and Microsoft 82.650 [12].

Artificial intelligence decisively penetrates into all spheres of our life. Once we will not notice its globality as not surprised by the emergence of smartphones that evolved from the symbiosis of the computer and phone. Man increasingly does into the artificial intelligence majority among process of making important decisions. Who will be responsible if an artificial intelligence has independently placed a medical diagnosis, prescribed treatment and committed it? The developer of the algorithm should not be understood in medicine, and the patient gave his consent and relied not on the physician but on the artificial intelligence.

Many challenges arise due to the phenomenon of the DAO (Decentralized Autonomous Organization or DAC – Decentralized Autonomous Corporation) and the digital human – *Homo numeralis* (*Homo digitalis* or *Homo horologium*) as cybernetic organism (a biological organism that includes mechanical and/or electronic components) – people an integral part of their body were inorganic elements, including electronics and artificial intelligence.

Such a person will have improved physical and mental abilities that can be used to commit a crime. There are grounds to consider the fact of their use as qualifying circumstances, which increases the punishment. Or a digital person can itself be the

object of encroachment due to the criminal influence on certain algorithms, robotic console, memory, objective perception of reality, the process of its decision making, etc.

The modern legal doctrine should be more flexible in our fast-moving world. Its main provisions were formed during times when a person was convinced of the absence of powerful competitors. And if by this time no reliable communications have been established with other intelligent beings, the legal reality is forced to undergo significant changes with the advent of artificial intelligence and digital human. First of all, such changes will be related to the revision of the composition of subjects of legal relations and the possibility of recognizing artificial intelligence as a full-fledged social actor. In legal relations artificial intelligence may appear alongside the individual, the corporation and the state.

But it only matters for such a scenario if a human retains control over artificial intelligence and (or) representatives of digital humanity as a higher caste.

Thereby the evolution of criminal and civil law will take place too.

### **1. Artificial Intelligence as an entity of criminal and civil law**

Attributable to the ASI' full awareness in the principles of its construction and processing, self-study, self-development and self-improvement eventually it will be created a situation of absence both factual and legal grounds for responsibility of ASI' developer, manufacturer, user or owner.

Artificial intelligence has in its arsenal following important cognitive functions: 1) perception of information; 2) memory without gaps; 3) exchange, analysis, comparison, evaluation of certain data; 4) generalization and the most optimal use of information for solving problems; 5) recognition of all objects and their classification; 6) perception of all signals of the surrounding world without exception (for example, human perceives only about 2% of the total electromagnetic range); 7) true summing-up of any situation; 8) effective selection of strategy and method of its behavior, planning; 9) generation of new knowledge; 10) full awareness of the principles of its construction and work; 11) self-education; 12) self-development, self-rebuilding, self-improvement (the first version forms an improved version of itself and thus overwrites the program to infinity); 13) accelerated decision-making speed (seconds and milliseconds); 14) processing of significant spaces of information and their effective using; 15) concentration of attention; 16) construction of value judgments; 17) independent decision-making and independent implementation; 18) self-organization etc.

When artificial intelligence creates a new program (another algorithm or object of robotics) independently and without human intervention, the results of its activity can be unexpected and simply unclear to a human.

The ability to self-study, self-development and self-improvement are the cornerstone of the whole architecture of artificial intelligence.

When the current version of artificial intelligence will be significantly different from the original that developer made, it will be difficult to find the actual basis (socially dangerous behavior) in actions of its IT-architect.

Attracting the developer (manufacturer) to legal liability of any kind in the situation of self-development and self-improvement of his product (full or substantial change in its characteristics and properties), will be a gross violation of the principle of the rule of law, the rule of law and legal certainty.

Making creator responsible for behavior of self-development and self-improvement artificial intelligence will be a gross violation of the principle of the rule of law and legal certainty.

On the other hand, the user of the artificial intelligence robotics may not even be aware of certain rules of conduct (for example, subsequent generations of unmanned vehicle owners may not know the rules of the road and (or) do not have at least minimal skills for driving), or be significantly less effective (no human will be able to compete with the artificial intelligence as surgeon or driver).

The way of acting of artificial intelligence is now considered to be more law-abiding and predictable in comparison with the behavior of an ordinary human. According to *The Guardian* in London the first Volvo autopilot cars will appear on roads without any distinctive signs to prevent offenses of other road traffic participants.

Providing the final decision becomes the prerogative of artificial intelligence, but not the human, there will also be no actual grounds for bringing the user of the object of robotics under the control of artificial intelligence to a criminal or other type of legal responsibility.

The situation with the absence of a person, for which responsibility can be imposed, creates a certain challenge to the modern legal doctrine. Solving this problem is seen in providing artificial intelligence status of the entity of legal relationships, including in the field of criminal and civil law.

Today it is necessary to consider the possibility of recognizing artificial intelligence as the entity of legal relationships and (or) the subject (person) of a crime, certain arguments in favor of which have already been expressed by Ukrainian prof. O. Baranov [2, c. 31–45], Ukrainian prof. M. Karchevskiy [15, c. 109–113; 16], Christoffer Hernæs [14], prof. of University of Washington School of Law Ryan Calo, prof. of Umeå Universitet Peter M. Asaro and the author of these theses [20, c. 98–102; 21, c. 123–136; 22, c. 200–206].

The right to recognition as a person before the law can belong to any social actor (James N. Rosenau, Bertrand Arthur William Russell, Camalludin Gadgiev, Oleg Tarasov). As a social actor artificial intelligence fully meets the requirements of the first axiom of legal personology. That is why it must have its own personative form.

Therefore, the evolution of criminal and civil law should take place in the direction of regulatory consolidation of the ASI' legal status as the subject of legal relations and the subject of responsibility. The first step in this way has already been taken by European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)) [11].

In this matter the most striking parallel can be done with the legal status of a corporation (company as a legal person), which in reality is also a virtual entity (a thing with distinct and independent existence). We are aware of the existence of a corporation either from the papers or through the manifestation of its representatives – individuals. It's like watching an electron in physics (nobody saw it, but studying it due to its tracks). Meanwhile, no one has doubts about the possibility for a corporation to have rights and carry certain responsibilities.

Uprise of artificial intelligence as an entity of criminal and civil law and also as a subject of legal relationships will not allow them to adapt to the conditions of old system that needs change and development, but to build a new one that will allow them to make correct conclusions without adjusting the results of scientific research and practice.

Giving to artificial intelligence a status of legal entity requires a system separating of rules under the conventional name Lex Artificial Intelligence (similar to Lex Mercatoria, Lex Informatica, Lex Sportiva etc.) both within national and international law.

ASI should not be considered as an equivalent of an individual in the same way as a legal entity even in the case of a private enterprise or a business entity with one founder or participant. As well as a sovereign person of state is not an equivalent of a legal entity. ASI should become an independent legal entity.

## **2. Artificial Intelligence as a subject (person) of crime**

The probability of ASI' creation equal to human intellect or more is quite real in the near future. This possibility causes some rethinking of the content and concept of the subject (person) of the crime.

By this time, it was believed that no creature has such a level of consciousness as a human. Therefore, the issue of recognition such other creatures as a subjects (person) of the crime was not relevant. In addition, there is a discussion on the possibility of recognizing a legal entity as a subject (person) of crime.

In accordance with the provisions of the Criminal Code of Ukraine (Part 1 of Article 18), the subject of a crime is a person who is physically convicted of a crime in the age from which it may be criminalized in accordance with this Code. Hence there are the following signs of the subject of the crime: 1) an individual (human); 2) sanity, mental capacity; 3) reaching a certain age, which is recognized as the age of criminal responsibility.

Obtaining of a certain age (total – 16 years old in accordance with Part 1 of Article 22 of the Criminal Code of Ukraine, lowered - 14 years old in accordance with Part 2 of Article 22 of the Criminal Code of Ukraine) is associated with the acquisition of certain social skills by a person who was brought up all the time in human society (known examples of the human children upbringing by animals absolutely eliminate such ability: Oksana Malaya (Ukraine, 1991), Shamdeo (India, 1972), Marina Chapman (Colombia, 1959) John Sebunya (Uganda, 1991), Madina (Russia, 2013), Kumar (Fiji, 1978), Ivan Mishukov (Russia, 1998) and others [18]).

Such social skills are the ability to understand what is really happening, the ability to realize the social danger of their actions and their consequences, the ability under certain conditions to make a choice between different behaviors, that is, the ability to manage their behavior.

If a person really needs a significant amount of time to develop his or her physical and mental abilities to acquire certain skills in social life, then for artificial intelligence this time interval is much shorter. Depending on its power, this time period can be hours, seconds, and milliseconds. That is, the sign of age is not critical to artificial intelligence, and in case of the acquisition of the last degree «Strong Artificial Intelligence» (SAI) [9] no need to allocate it separately.

In accordance with the provisions of the Criminal Code of Ukraine (Article 19, paragraph 1) human is a criminal person if, during the commission of his crime, he (she) was aware of and guided his (her) actions (inaction).

The ability to realize the actual side (ability to understand what is really happening) means that a certain person at least in general understands who he (she) is, where he (she) is, what is happening now and what action or inaction he (she) does. The lack of understanding of these circumstances necessitates clarifying the state of mental health of this person, whether he (she) is sanity or not.

Such awareness is a prerequisite for the possibility of evaluating their behavior from the point of view of accepted morals, rules of cohabitation in society and regulatory requirements: whether his (her) actions or inactivity are socially useful, neutral or dangerous. In the latter case, the ability to self-esteem is the basis for a criminal prosecution in accordance with the provisions of the Criminal Code of Ukraine (Art. 18, 19).

Given the purpose and objectives of criminal law attention attracts only conscious mental perception, in contrast to the unconscious actions of the brain.

But when deciding whether it is truly conscious, they rely only on the following assumption: when a person announces his awareness of anything, he (she) has to be trusted. On the basis of this, it was possible to identify a specific pattern of the brain that manifests itself only when a person reports that he (she) is aware of something, and absent in the lack of this message.

For its part, artificial intelligence, while passing the Turing test or during any other activity (diagnosis of diseases, processing of large volumes of information, control of an unmanned vehicle, etc.), of course, can report that it is fully aware of its actions or inactivity. And this will be true, otherwise it will not be able to effectively carry out his tasks. Formally, we are forced to believe it the same way as a human who reports his awareness.

The question of what the consciousness is, who is endowed with it and who is deprived of it, has always been a concern for humanity.

Meanwhile, according to the Cambridge Declaration of Consciousness [6] formulated on July 7, 2012 following the outcome of the Francis Creek Memorial Conference, people are not unique in having neurological mechanisms that generate consciousness and consciously behavior. Consciousness is common to all mammals,

all birds and many other animals, including some arthropods and cephalopods (eg, octopus and squids). Nervous activity is not limited to the cerebral cortex, but to excite the emotional states and the generation of consciousness, subcortical nerve structures are extremely important. Artificial excitement of the same parts of the brain in humans and animals causes the corresponding behavior and sensory state. This is a manifestation of conscious behavior.

The Cambridge Declaration of Consciousness imposes the burden of refuting its conclusions on those who are convinced in the opposite, and opens the way to recognition of consciousness of artificial intelligence.

The cornerstone of the ability to control their actions or inaction as a volitional sign of sanity is some extent unlimited will of human. The idea relies on the perception of a person as a holistic entity. This essence may change, but somewhere in its sacred depth remains unchanged. And this allows it to maintain some control.

Such representations have deep roots in religion, the influence of which on the branch of law today may not be sufficiently noticeable. Regardless of religion, in most cases it is believed that God has given a person some freedom in choosing behavioral choices. But today human gives to artificial intelligence the opportunity to make choices at its own discretion. This discretion is based on a certain algorithm, but it is not limited.

In contrast to these views, genetics and neuroscientists give a slightly different explanation: a person committed an act of certain behavior due to the corresponding electrochemical processes in her brain, which were formed by a specific configuration of genes, which in turn reflects the old evolutionary stresses in conjunction with random mutations.

These processes in the brain are either deterministic, or random, or a combination of these options, but in all cases not free. Decisions taken as a result of the chain reaction of biochemical events, each of which is determined by the previous event, is clearly not free. Solutions that come from random combinations are in any case not free, they are just random. And when incidental events are combined with deterministic processes, we obtain probabilistic consequences, but it does not lead to freedom of choice – a genuine ability to manage and control their actions or inactivity.

We prefer to turn away from this unpleasant fact, but in relation to artificial intelligence the situation is completely transparent.

Similarly, it is believed that human memory should accumulate and store information, but in fact it is unstable (implanted memories, involuntary memory, Mandela's effect, etc.) and it is impossible to objectively rely on it when choosing a particular behavior.

So, if a human only seems to realize his conscious volitional choice, but in reality it is the result of the interaction of unconscious algorithms, it gives rise to a very uncomfortable issue before modern legal doctrine.

If after that they continue to insist that a human has free ability to control his actions or inactivity, then undeniably it is necessary to recognize that artificial intelligence has the same abilities.

Due to the more powerful cognitive properties (memory without gaps, accelerated processing speed, etc.) and because of the lack of emotional color (confusion, fear, anger, jealousy, etc.) important social functions and services are translated into it.

By the way, dolphins have been granted «non-human personhood» status by the government of India, making India the first nation in the world to recognize the unique intelligence and self-awareness of the cetacean order (a class of aquatic mammals). The decision was announced by India's Minister of the Environment and Forests which also outlawed captive dolphin shows. The ministry added that dolphins «should have their own specific rights» [1]. In my opinion, the lack of plain and complete communication prevents humanity from having a legal relationship with other intelligent creatures, including dolphins.

The next step in recognizing the rights and freedoms should be the recognition of the possibility to incur legal liability, that is, to actually be the subject of a crime. And the next logical step should be the recognition of the possibility for artificial intelligence to have legal responsibility, namely to be actually the subject (person) of a crime.

The answer to the question of which punishments or measures of criminal law may be applied to artificial intelligence should consist of the following: liquidation, fines and confiscation of property (artificial intelligence allowed to enjoy rights also can exercise the right of ownership), deprivation of the right to engage in certain activities (for example, in the sphere of cryptocurrency mining, in the field of healthcare, etc.), public works (unpaid socially useful works), corrective work at the place of implementation etc.

In the same way it can be effective an elimination of a certain kind of artificial intelligence. However, for widespread in the blockchain space artificial intelligence it will not be possible to destroy it.

Equally important is the fact whether it will be the person to implement the corresponding measures of responsibility and / or influence, or entrust their application other types of artificial intelligence (in this regard, would like to hope about preserving control over it).

Thus, the following alternatives are likely: 1) recognition of the artificial form of intelligence and (or) artificial highly organized forms of life (organic or inorganic) as the subject (person) of criminal and civil law relations and the subject (person) of a crime; 2) reformatting the criminal-law doctrine, formulating new features of the subject (person) of crime, which will prevent the possibility for artificial intelligence to be a legal person. But personally, I'm inclined to the first option.

Signs of artificial intelligence as a subject (person) of crime *de lege ferenda* can be as follows: 1) it is not physical human, but an electronic person (personality); 2) sanity, which means at the time of committing a crime the opportunity to realize its actions (inaction) and manage them. The sign of age, which was mentioned above, is not essential for artificial intelligence.

But at the same time, any legislative changes should be balanced and well-grounded. Should not hurry in a scientific or political fashion, it is desirable to avoid creating a «legislative virus» [17].

### **3. No officials inside of DAO**

There is another highly controversial issue with the Decentralized Autonomous Organization (abbreviated as DAO) or Decentralized Autonomous Corporation (abbreviated as DAC). The legal status of a decentralized company in foreign jurisdictions is not still determined, but it is on the agenda, including for Ukraine.

DAO is an organization managed by computer programs of «smart contracts». The company is built on a horizontal principle, where each participant of the organization is a full co-owner, endowed with equal authority and unrestricted access to information about its activities. But there is no executive body in the traditional sense.

The company's management tool is blockchain [13]. It records financial transactions, all rules of business, the order of decision-making on any issues and algorithms of any actions. In this case, blockchain is simultaneously an electronic register of the company, which is supported and certified by all members of the network. That is, DAO is a combination of computer code, blockchain, smart contracts and people. Founders of the company form the basic rules and offer token or coins. Possession of a certain number of tokens is documented in blockchain, which forms a certain analogy with joint-stock companies.

Autonomy is ensured by independence from traditional financial and political institutions because of self-sufficiency from ordinary money, which is replaced by cryptocurrency. In addition, its activities are fully automated.

All interaction within the company is carried out with the help of smart contracts (software infrastructure for establishing acceptable rules for all participants). Such programs fully regulate the activities of DAO and independently make legally significant decisions.

Compared to traditional legal entities (corporations), DAO provide their members with greater control over their own investments and activities, including through transparency and lack of human error.

The most well-known decentralized legal entity today is the organization of venture financing with the same name The DAO, which collected 150 million US dollars from its subscribers at the start in June 2016. In fact, it is an unfortunate example, because its program was broken by computer hackers who found the vulnerability and stole cryptocurrency for \$ 50 million. But the unsuccessful start only encouraged other enthusiasts to work on mistakes. Other well-known decentralized companies today are Dash, Digix.io, Fermat, and BitShares.

DAO is fundamentally different from the ordinary corporation because of its decentralized structure. There are no officials in DAO who perform in the usual sense organizational, administrative or regulatory functions. So behind the corporate pall it is impossible to find an individual who is responsible.

#### **4. Digital human**

Well-known social movement of Transhumanism (Raymond Kurzweil, Hans Moravec, *Nick Bostrom*, Michio Kaku and others) is an international philosophical activity that advocates for the transformation of the human condition by developing and making widely available sophisticated technologies to greatly enhance human intellect and physiology [5; 4]. Transhumanism has its particular focus on the applications of technologies to the improvement of human bodies at the individual level. Transhumanist theorists seek to apply reason, science and technology for the purposes of reducing poverty, disease, disability and malnutrition around the globe. Transhumanism is a way of thinking about the future that is based on the premise that the human species in its current form does not represent the end of our development but rather a comparatively early phase [26]. The purpose of the movement is defined as getting rid of suffering, aging and death, as well as gaining a significant increase in the physical, mental and psychological capabilities of a person.

Transhumanists support the emergence and convergence of technologies including nanotechnology, biotechnology, information technology and cognitive science (NBIC), as well as hypothetical future technologies like simulated reality, artificial intelligence, superintelligence, 3D bioprinting, mind uploading, chemical brain preservation and cryonics. They believe that humans can and should use these technologies to become more than human [19]. Therefore, they support the recognition and/or protection of cognitive liberty, morphological freedom and procreative liberty as civil liberties, so as to guarantee individuals the choice of using human enhancement technologies on themselves and their children [25].

According to Nick Bostrom (Niklas Boström), the director of the Institute for humanity of the future at Oxford University, a human in its modern form is not the last link of the human' evolution.

Nowadays anyone who uses smart eyeglasses, pacemakers or bio prostheses and other similar devices may in some sense be referred to as cyborg (cybernetic organism – a biological organism that includes mechanical and/or electronic components) – people an integral part of their body were inorganic elements, including electronics and artificial intelligence.

The phenomenon of the *Homo numeralis* (*Homo digitalis* or *Homo horologium*) as the next evolutionary stage after *Homo sapiens* is associated with the achievements of bioengineering, the creation of living beings that combine organics with inorganics («cybernetic organism») and eventually the creation of an inorganic form of life [23, 41–43; 24, 158–171].

Some bio-engineers from Harvard created a soft robot that wraps around the human heart and helps him to work, at the Scientific Research Institute of the Scripps was created a semi-synthetic organism with artificial DNA, other scientists have already reached to grow sensitive hairs of the inner ear, created the artificial retina of the human eye in Oxford, human stem cells were first raised in the Boston Children's Hospital, a bionic skin was established at the University of Minnesota,

the C-LEG system was successfully used to replace amputated human legs at the Chicago Rehabilitation Institute in 2006, a woman's bionic arm was successfully implanted, and earlier similar manipulators were implanted to five men.

It is noteworthy that such a bionic arm or other limb or organ (for example, vision, hearing or a sense of smell) may be made more powerful than the original one of an ordinary human.

The Defense Advanced Research Projects Agency (DARPA, USA – [www.darpa.mil](http://www.darpa.mil)) has been developing a soldier with increased mental and physical abilities due to high-tech means [10]. Beginning in 2014 Israeli Defense Forces received military robots that do not involve human participation in the effectuation of a combat task. It is planned that by 2025 the US Army Forces will have more robots than people [7].

Creating an inorganic form of life involves the following directions: 1) copying or complete transfer (without residues on the primary carrier) of human consciousness, intelligence and personality to a digital transporter; 2) two-way interface between the human brain and a computer that allows to read electrical signals from the brain and simultaneously transmit clear messages (the human brain can be directly connected to the Internet or other network, for example, Internet of Everything); 3) the gradual migration of consciousness, intelligence and personality of a person from a biological carrier to a more durable and enduring one (this problem is investigated by Steven Novella, neurologist from the Yale University).

Thus, gradually and without much attention, we can look on the actual returning to compromised ideas of evolutionary humanism as a creation of a superman (Übermensch – a man with exceptional physical or mental ability). The idea of the availability of all new scientific achievements is very excessive. This does not even happen now. It is clear that the majority of the population will be cut off from access to new advances in medicine, chemistry, biology and nanotechnology. And people with the power and financial resources can gradually create a new caste of biological super people.

A physical person equipped with an implant of a faces (or linguistic, textual and video materials) recognition system can more effectively perform his tasks.

Thus legal regulation ways of the digital human (*Homo numeralis*, *Homo digitalis* or *Homo horologium*) should be the following: 1) elaborating and consolidation of the legal status of the *Homo numeralis* (*Homo digitalis* or *Homo horologium*); 2) predicting in the Criminal Code of Ukraine new qualifying attributes or new features of a special subject of a crime for cases using above-mentioned abilities (memory, strength, agility, speed, endurance etc.) to facilitate the commission of crimes; 3) criminalization of new forms of socially dangerous behavior for cases of criminal influence or manipulation a digital human (using him or her as an instrument for crime – part 2 art. 26 of the Criminal Code of Ukraine, hacking, copyright infringement, unwarranted mass-surveillance, sextortion, computer program damaging).

**Conclusions.** As follows artificial intelligence has important cognitive functions in particular perception of information, memory without gaps, exchange, analysis, comparison, evaluation of certain data, generalization and the most optimal use of

information for solving problems, recognition of all objects and their classification, perception of all signals of the surrounding world without exception, true summing-up of any situation, effective selection of strategy and method of its behavior, planning, generation of new knowledge, full awareness of the principles of its construction and work, self-education, self-development, self-rebuilding, self-improvement (the first version forms an improved version of itself and thus overwrites the program to infinity), accelerated decision-making speed, processing of significant spaces of information and their effective using, full concentration of attention, construction of value judgments, independent decision-making and independent implementation, self-organization etc. The ability to self-study, self-development and self-improvement are the cornerstone of the whole architecture of artificial intelligence.

The indicated cognitive abilities in the near future will be equivalent to human abilities or even substantially exceed them. Artificial intelligence will be instructed an important or risky activity. One of the fundamental requirements for such artificial intelligence is the independence of decision-making. But this will eliminate the grounds for reproach and responsibility of developers and users of artificial intelligence. Because in fact they did not commit any unlawful behavior and everyone have agreed to transfer the burden of making a decision on artificial intelligence.

Oddly enough, but this situation requires the recognition of artificial intelligence as a subject (person) of legal relationships and the subject (person) of the crime.

For an ordinary human obtaining of a certain age is associated with the acquisition of certain social skills. They are the ability to understand what is really happening, the ability to realize the social danger of their actions and their consequences, the ability under certain conditions to make a choice between different behaviors. Artificial intelligence needs only hours, seconds, and milliseconds for it. Human gives to artificial intelligence the opportunity to make choices at its own discretion. This discretion is based on a certain algorithm, but it is not limited. If they continue to insist that a human has free ability to control his actions or inactivity, then undeniably it is necessary to recognize that artificial intelligence has the same abilities. The next logical step should be the recognition of the possibility for artificial intelligence to have legal responsibility, namely to be actually the subject (person) of a crime.

Some punishments or measures of criminal law may be applied to artificial intelligence: liquidation, fines and confiscation of property (artificial intelligence allowed to enjoy rights also can exercise the right of ownership), deprivation of the right to engage in certain activities (for example, in the sphere of cryptocurrency manning, in the field of healthcare, etc.), public works (unpaid socially useful works), corrective work at the place of implementation etc.

Signs of artificial intelligence as a subject (person) of crime *de lege ferenda* can be as follows: 1) it is not physical human, but an electronic person (personality); 2) sanity, which means at the time of committing a crime the opportunity to realize its actions (inaction) and manage them. The sign of age, which was mentioned above, is not essential for artificial intelligence.

Giving to artificial intelligence a status of legal entity requires a system separating of rules under the conventional name Lex Artificial Intelligence (similar to Lex Mercatoria, Lex Informatica, Lex Sportiva etc.) both within national and international law. The artificial intelligence should not be considered as an equivalent of an individual in the same way as a legal entity. As well as a sovereign person of state is not an equivalent of a legal entity. The artificial intelligence should become an independent legal entity.

DAO (Decentralized Autonomous Organization – DAO, or Decentralized Autonomous Corporation – DAC) is an organization managed by computer program like smart contracts. Its activities are fully automated. There are no officials in DAO who perform in the usual sense organizational, administrative or regulatory functions. So behind the corporate pall it is impossible to find an individual who is responsible.

The phenomenon of the *Homo numeralis* (*Homo digitalis* or *Homo horologium*) as the next evolutionary stage after *Homo sapiens* is associated with the achievements of bioengineering, the creation of living beings that combine organics with inorganics («cybernetic organism») and eventually the creation of an inorganic form of life.

Thus legal regulation ways of the digital human should be the following: 1) elaborating and consolidation of the legal status of the *Homo numeralis* (*Homo digitalis* or *Homo horologium*); 2) predicting in the Criminal Code new qualifying attributes or new features of a special subject (person) of a crime for cases using improved abilities (memory, strength, agility, speed, endurance etc.) to facilitate the commission of crimes; 3) criminalization of new forms of socially dangerous behavior for cases of criminal influence or manipulation a digital human (using him or her as an instrument for crime, hacking, copyright infringement, unwarranted mass-surveillance, computer program damaging).

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**Радутний А. Э.**, кандидат юридических наук, доцент, доцент кафедры уголовного права № 1, Национальный юридический университет имени Ярослава Мудрого, Украина, г. Харьков.

e-mail: radut12@gmail.com ; ORCID 0000-0002-6521-3977

**Адаптация уголовного и гражданского права в связи с достижениями научно-технического прогресса (искусственный интеллект, DAO и цифровой человек)**

*Сегодня возникает серьезный вызов правовой доктрине. Он связан с широким проникновением во все сферы жизни искусственного интеллекта и новых технологий (блокчейн, искусственное улучшение биологического тела человека и его когнитивных способностей). В связи с этим может выявиться отсутствие фактического основания юридической ответственности в действиях (бездействии) разработчика или пользователя алгоритмами искусственного интеллекта. Поэтому необходимо решить ряд важных вопросов, связанных с возможностью признания искусственного интеллекта субъектом (персоной) правоотношений и субъектом (персоной) преступления, а так же относительно квалификации действий биологически и когнитивно улучшенного цифрового человека (Homo numeralis, Homo digitalis, Homo horologium), наделенного усиленными зрением, силой мышц, скоростью, гибкостью, памятью без пробелов, способностью к ускоренной обработке данных и сверхразвитыми аналитическими способностями, или посягательством на такого человека и другие объекты правовой охраны путем вмешательства в работу имплантированных в него устройств под управлением искусственного интеллекта, а также выявление ответственной персоны в DAO – децентрализованном юридическом лице, в котором отсутствуют служащие, выполняющие в традиционном понимании административно-хозяйственные или организационно-распорядительные функции.*

**Ключевые слова:** правовая доктрина; искусственный интеллект; субъект правоотношений; субъект преступления; ответственное лицо; децентрализованное юридическое лицо; цифровой человек; Homo numeralis; Homo digitalis; Homo horologium.

**Рекомендоване цитування:** Radutniy O. E. Adaptation of criminal and civil law in view of scientific-technical progress (artificial intelligence, dao and digital human). *Проблеми законності*. 2019. Вип. 144. С. 138–152. doi: <https://doi.org/10.21564/2414-990x.144.155819>.

**Suggested Citation:** Radutniy, O.E. (2019). Adaptation of criminal and civil law in view of scientific-technical progress (artificial intelligence, dao and digital human). *Problemy zakonnosti – Problems of Legality*, issue 144, 138–152. doi: <https://doi.org/10.21564/2414-990x.144.155819>.

*Надійшла до редколегії 05.02.2019 р.*