

UDC 342.5

DOI: <http://doi.org/10.5281/zenodo.10870779>

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ARTIFICIAL INTELLIGENCE AS A FACTOR IN THE DIGITAL TRANSFORMATION OF THE JUSTICE SYSTEM

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ШТУЧНИЙ ІНТЕЛЕКТ ЯК ЧИННИК ЦИФРОВОЇ ТРАНСФОРМАЦІЇ СУДОВОЇ СИСТЕМИ

АНОТАЦІЇ (ABSTRACTS), КЛЮЧОВІ СЛОВА (KEY WORDS)

Problem statement. Artificial intelligence (AI) has become one of the greatest achievements of modern technological progress and the foundation for the creation of electronic justice. Many advanced countries around the world are already using it to optimize their judicial systems. Ukrainian justice is at the initial stage of digital transformation and requires the introduction of the latest information technologies (IT). An urgent scientific problem is to analyze the advantages and challenges of applying AI technologies to increase the efficiency, transparency and accessibility of justice. **The purpose** of the work is to study the possibilities of implementing artificial intelligence in justice and to identify key perspectives and challenges associated with the use of AI algorithms in the judicial system of Ukraine in the context of its integration with the European Union. **Methods.** The work uses the comparison method – to analyze the level of development and efficiency of justice systems and to assess the availability of legal remedies in different countries of the world; the method of systematic literature review – to analyze the literature on the effectiveness of implementing AI tools in the judicial system; the method of legal expert analysis – to analyze the legislative norms on security, confidentiality and ethical use of data science tools in the legal field; the method of system dynamics – to study the possible consequences of introducing new technologies into the justice system; the formal-logical method – to analyze the legal framework of the EU and Ukraine regarding the use of artificial intelligence. **Results.** It has been studied that AI technologies can simplify access to justice, increase its transparency and efficiency by automating routine processes, analyzing large data sets and supporting decision-making. The existence of threats of bias and discrimination of artificial intelligence algorithms has been argued. The necessity of balancing technological progress with respect for ethical norms and human rights has been substantiated. The current state of implementation of e-justice and AI in Ukraine has been analyzed. It is proposed to implement effective mechanisms for regulating digital transformation in the legal system of Ukraine, as provided for by EU legislation. **Conclusions.** The analysis of existing scientific approaches to defining the concept of "artificial intelligence" and the tasks solved by AI-based systems in justice has been carried out. The features of information and legal support and international experience in the use of AI in

the judicial systems of the world, in particular in the EU, have been studied. It has been established that even progressive states use AI algorithms for information support of court proceedings cautiously and partially due to the lack of a legislative framework and existing risks of bias and non-compliance with human rights. It is noted that the integration of AI tools into the judicial system of Ukraine, taking into account European experience, should become a priority of the digital transformation of justice. The use of AI provides undeniable advantages for increasing the efficiency and accessibility of judicial proceedings. However, there are risks that its conclusions may be biased or discriminatory. For the effective and safe use of artificial intelligence in the judicial system, it is necessary to develop a legislative framework for its regulation.

Keywords: *judicial system; justice; artificial intelligence; e-court, digital transformation; European integration; information and legal support; data confidentiality; information support; legislative framework*

Постановка проблеми. Штучний інтелект (ШІ) став одним із найбільших надбань сучасного технологічного прогресу і підґрунтям для створення електронного судочинства. Багато передових країн світу вже використовують його для оптимізації своєї судової системи. Українське правосуддя знаходиться на початковому етапі цифрової трансформації та потребує впровадження новітніх інформаційних технологій (ІТ). Актуальною науковою проблемою є аналіз переваг та викликів застосування технологій ШІ для підвищення ефективності, прозорості та доступності правосуддя.

Метою роботи є дослідження можливостей впровадження штучного інтелекту в правосудді та визначення ключових перспектив і викликів, пов'язаних із використанням алгоритмів ШІ в судовій системі України в контексті її інтеграції з Європейським Союзом. **Методи.** У роботі використано метод порівняння – для аналізу рівня розвитку й ефективності систем правосуддя та оцінювання доступності засобів правового захисту у різних країнах світу; метод систематичного огляду літератури – для аналізу літератури з питань ефективності впровадження інструментів ШІ в судову систему; метод правового експертного аналізу – для аналізу законодавчих норм щодо безпеки, конфіденційності та етичного використання інструментів науки про дані в юридичній сфері; метод системної динаміки – для дослідження можливих наслідків впровадження нових технологій у системі правосуддя; формально-логічний метод – для проведення аналізу нормативно-правової бази ЄС та України щодо застосування штучного інтелекту. **Результати.** Досліджено, що технології ШІ можуть спростити доступ до правосуддя, підвищити його прозорість та ефективність за рахунок автоматизації рутинних процесів, аналізу великих масивів даних та підтримки ухвалення рішень.

Аргументовано існування загроз упередженості та дискримінації алгоритмів штучного інтелекту. Обґрунтовано необхідність збалансування технологічного прогресу із дотриманням етичних норм та прав людини. Проаналізовано поточний стан впровадження електронного правосуддя та ШІ в Україні. Запропоновано імплементувати у правову систему України ефективні механізми регулювання цифрової трансформації, передбачені законодавством ЄС.

Висновки. Проведено аналіз існуючих наукових підходів до визначення поняття "штучний інтелект" та завдань, які вирішують системи на основі ШІ у правосудді. Досліджено особливості інформаційно-правового забезпечення та міжнародний досвід використання ШІ у судових системах країн світу, зокрема в ЄС. Встановлено, що навіть прогресивні держави використовують алгоритми ШІ для інформаційної підтримки судових процесів обережно та частково через відсутність законодавчої бази та існуючі ризики щодо упередженості та дотримання прав людини. Зазначено, що інтеграція інструментів ШІ в судову систему України з урахуванням європейського досвіду має стати пріоритетом цифрової трансформації правосуддя. Використання ШІ надає беззаперечні переваги для підвищення ефективності та доступності правосуддя. Однак існують ризики, що його висновки можуть бути упередженими або дискримінаційними. Для ефективного та безпечного використання штучного інтелекту у судовій системі необхідно розробити законодавчі бази для його регулювання.

Ключові слова: *судова система; правосуддя; штучний інтелект; електронний суд; цифрова трансформація; євроінтеграція; інформаційно-правове забезпечення; конфіденційність даних; інформаційна підтримка; законодавча база*

Problem statement

Justice has always been an exclusively "human" prerogative, but the era of technological innovation has led to the need for digital transformation of the judicial system. The introduction of innovative IT in the activities of the judicial system is already a widely recognized necessity. However, justice in different countries of the world is at different stages of development and efficiency. Almost 250 million people live in extreme injustice, including slavery, and 1.5 billion people around the world

do not have access to justice and cannot resolve current legal issues. Proper access to justice is not provided not only in most poor countries. In some of the richest and most developed countries, legal remedies are often inaccessible due to high costs, complexity and lengthy trial duration [1].

Digital technologies, such as AI, big data and machine learning can simplify access to justice, increase its transparency and efficiency [2]. E-justice can be used to guarantee the protection of human rights, the rule of law and social justice [3].

Particularly relevant is the introduction of innovative IT tools in the justice system of the European Union, where coherent cooperation in the field of justice between member states is crucial for ensuring the effective functioning of the justice system [4]. For Ukraine, the issue of digital transformation of the judicial system became urgent after the full-scale invasion of Russia. The mass forced immigration of Ukrainians to the European Union countries and the direct neighborhood of a number of EU states with Ukraine exacerbated the need to adapt the information support of Ukraine's judicial system to EU standards and legislation and integrate the digital judicial systems of the European Union and Ukraine [5]. The adoption of effective judicial decisions on war crimes committed by Russians, which fall under various legal frameworks of international humanitarian law, national legislation of Ukraine and international judicial bodies, is a debatable issue. Establishing the fact of war crimes and punishing them is a complex task that often requires not only interaction between the international community and judicial bodies, but also reliable information support using the latest information analysis tools, such as big data and AI [6].

Artificial intelligence is one of the promising advanced information technologies that can make justice more efficient. The modern judicial system requires high-quality analysis of huge amounts of information from various sources. AI can, based on the analysis of facts, identify interdependencies, patterns and trends in large and complex data sets and provide reliable information support for making well-founded judicial decisions. The integration of information technologies into the legal systems of countries around the world can increase the efficiency, accessibility, consistency and effectiveness of judicial decisions. However, it is important to balance technological progress with legislative norms regarding the security, confidentiality and ethical use of data science tools in the legal field.

The *purpose* of the article is to explore the possibilities of using AI-based systems in justice, identify the main prospects and problems of implementing AI algorithms in the judicial system of Ukraine in the context of European integration processes.

The need and effectiveness of implementing AI tools in the activities of courts is no longer in doubt in broad scientific circles. However, the bias of predictions by AI-based algorithms, the ethics and legality of their use for information support of courts remain debatable. V. Turkanova studied the use of AI to develop tools for analyzing large data sets in order to identify stable patterns in the functioning of

the judicial system [5]. A. Saud determined the responsibility for criminal activities committed by machines with artificial intelligence support, and studied the means of protection that could override their criminal liability [7]. F. Dakalbab et al. investigated artificial intelligence strategies in crime forecasting [8]. G. van Dijck identified and applied the relevant rules of the proposed AI Act regarding quantitative risk assessment of recidivism [9]. S. Greenstein considered artificial intelligence technology in relation to the rule of law, emphasizing the rule of law as a mechanism for human prosperity. He explored the extent to which artificial intelligence undermines the rule of law in a technocratic society [3]. A. Završnik studied the problems of automation in the field of justice and analyzed the clash between artificial intelligence systems and the law, considering case law and analyzing some human rights violations [10]. M. Medvedeva et al. explored the possibilities of automatic prediction of court decisions. They identified the differences between identifying outcomes, categorizing judgments based on outcomes, and predicting outcomes [11]. In Ukraine, research on developing effective AI algorithms for information support of court decisions is only at an initial stage [12-14] and requires additional comprehensive analysis.

A set of scientific methods was used for the study, in particular general philosophical, general scientific, interdisciplinary and special legal approaches. The methodological basis is the dialectical method of scientific cognition. The formal-logical method was applied in the analysis of the regulatory framework of the EU and Ukraine regarding the use of artificial intelligence. The theoretical basis of the research is predominantly the scientific works and conclusions of leading foreign experts devoted to the study of the problems of the functioning of artificial intelligence in the activities of judicial bodies. The normative basis of this research includes acts of the European Parliament, recommendations of the European Commission, normative legal acts of European countries, international organizations, current laws and other normative legal acts of Ukraine that regulate social and legal relations arising in connection with the use of artificial intelligence.

AI tools in the digital transformation of justice systems

An integral component of modern society is an effective system of human rights protection and implementation of the principles of international law, regulated by the Universal Declaration of Human Rights [15] and the European Convention on

Human Rights [16]. Every democratic state must ensure the effective functioning of human rights protection mechanisms, adherence to standards of such protection, and guarantee equal and transparent access to justice for all. An effective tool for ensuring such access can be the digital transformation of the justice system. In many leading countries of the world, particularly in the USA and the EU, the latest information technologies play a crucial role in modernizing and increasing the efficiency of judicial systems [5, 17]. However, there is a constant need for coherence in working with large, complex and unstructured data sets. The use of AI in electronic judicial systems can simplify the exchange of operational information, ensure interaction between existing systems and standards in different states.

According to Wikipedia, "intelligence is the ability to perceive, synthesize and infer information demonstrated by machines, as opposed to intelligence displayed by non-human animals or humans" [18]. The concept of "artificial intelligence" is debatable and has many different definitions. In particular, it is defined as "the simulation of human intelligence processes by machines, especially computer systems" [19], and "the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings" [20]. In a broad sense, this concept is interpreted as a set of scientific methods and techniques for modeling human cognitive abilities. AI imitates the work of the human brain and is capable of self-learning from previous examples. For a better analysis of judicial practice and predicting results using AI-based systems, large arrays of open data in the field of justice are required [21]. The introduction of a unified electronic document management system for the justice system can simplify access to such information [22, 23].

Artificial intelligence tools can be used to effectively implement digital transformation of the justice system. They are capable of automating routine daily tasks such as searching for useful information in large data sets, drafting procedural documents, and analyzing court decisions. Chatbots and other AI-based systems can be used as virtual assistants to provide legal advice to citizens. In the United States, there is already a practice of using various applications such as "chatbots" or "robot lawyers" that provide legal information support to citizens or legal professionals [24]. AI-based applications can provide electronic document management in courts, and automatically generate drafts of legal

documents, regulations, lawsuits, etc. based on templates [25]. They are successfully used for effective analysis of large data sets to identify patterns and trends in legal data, and predict probabilistic outcomes of possible decisions in a current case based on analysis of previous court decisions [17, 26]. AI systems can search for legal precedents, identify biases, and analyze court decisions in similar cases [27]. AI is used to assess the risks of making various judicial decisions and determine the chances of winning in court [28]. AI systems are already actively used in the legal field to improve efficiency and optimize judicial decision-making processes. The proper use of AI technologies can significantly accelerate digital transformation in the field of justice, but it is necessary to take into account all possible risks and ethical issues [10].

International experience in using artificial intelligence in the judiciary

AI tools are already being successfully used to implement the digital transformation of justice systems in many progressive countries around the world [29]. Advanced practices of the USA, China, Canada, Austria, Great Britain, Singapore and other countries are evidence of the effectiveness of implementing innovative AI-based IT solutions for successful digital transformation of the justice system. Proper administration of justice is a key function of a modern democratic society. However, even in highly technological countries, judicial bodies lag behind several years in the implementation of innovative technologies compared to other elements of the law enforcement system. This is due to conservative thinking, imperfect infrastructure and financial constraints [1].

The phenomenon of AI provokes many controversies regarding its legitimacy in the judicial system. Article 6 of the European Convention for the Protection of Human Rights and Fundamental Freedoms (Convention) enshrines the right to have cases heard by an independent and impartial tribunal [16]. However, neither Article 6 nor the comments thereto directly prohibit the use of AI, nor does it state that justice is administered solely by a human judge. There has not yet been any practice of the European Court of Human Rights regarding a violation of Article 6 of the Convention due to the use of AI in decision-making. Article 92 of the Basic Law of France clarifies this norm of the Convention and enshrines that justice is administered by judges, and judicial power is vested in them [30]. Article

127 of the Constitution of Ukraine sets out a similar legal position [31]. Therefore, artificial intelligence cannot replace judges, but nothing prohibits optimizing the work of a judge and court by involving AI.

The most progressive in using AI-based systems in justice today are the United States of America. They mainly use AI technologies to provide information support for court proceedings in civil and criminal cases [32]. Scientists from the Stanford Computational Policy Lab have created an algorithm that assists the judge in choosing a precautionary measure for the defendant: detention or bail. Based on the analysis of about 100,000 procedural documents related to the choice of precautionary measures, it was found that some judges in 90 % of cases allow citizens to be released on bail, while others only in 50 %. The proposed algorithm makes it possible to fairly assess the risks and keep significantly fewer people in custody without endangering the public.

The United States of America is a leader in implementing artificial intelligence systems in the judicial system. They mainly use AI to provide information support for court proceedings in civil and criminal cases [21]. Scientists from the Stanford Computational Policy Lab have developed an algorithm that provides judges with information support in making decisions on precautionary measures, namely detention or release on bail. By analyzing data on 100,000 court decisions, they found a significant divergence in judges' approaches. This algorithm allows for an objective assessment of risks, keeping significantly fewer people in custody while not posing a threat to society [32]. In 2016, the Wisconsin Supreme Court allowed the use of the Compas (Correctional Offender Management Profiling for Alternative Sanctions) risk assessment algorithm for recidivism in judicial decision-making [33]. However, it turned out that this algorithm has cognitive biases regarding race and ethnicity [34]. The AI-based Legal Robot system performs precedent searches and analysis of court decisions. The United States is testing the world's first unbiased legal robot LISA, which can assist in finding a compromise solution when concluding legal agreements [27]. The AI-based legal assistant Casetext can verify and analyze legal documents, check the relevance of documents to a specific legal issue [17]. Large US law firms use the AI-based Luminance program to analyze contracts and identify risks [25]. IBM has created one of the first virtual legal assistants, ROSS, based on AI to help lawyers search for legal information [35]. For the

automatic drafting and verification of legal contracts, US lawyers use the AI-based service LawGeex [36]. AI is being increasingly implemented in the American legal system, although there are concerns about the bias and transparency of algorithms.

China is a competitor to the US for global leadership in the field of artificial intelligence and technologies. Since 2017, China has had an online court in the form of a mobile app as part of the main Chinese WeChat program. The courtroom has been replaced by a video chat, and the judges by an avatar powered by AI. China's intelligent courts have already heard about 119,000 cases and rendered decisions on 88,000 cases. The digital court is empowered to hear disputes in the fields of copyright, online business disputes, and violations in e-commerce [37]. China has developed an AI-powered software system called Shenjian that reviews and analyzes court documents. This system can scan legal briefs and identify logical inconsistencies or contradictions in the arguments. It also compares submitted evidence against a database to detect potential tampering. Shenjian assists judges in efficiently reviewing case materials and helps improve consistency in rulings. The development of this AI tool demonstrates China's advances in applying artificial intelligence to streamline and enhance judicial processes. An AI-based chatbot developed by the Supreme People's Court of China serves as an intelligent assistant to judges and provides them with legal consultations. The oral court decision system uses AI-based speech recognition and synthesis technology to create an audio recording of the court's oral verdict. China is also developing machine learning algorithms that can predict a court's verdict based on an analysis of the case circumstances [28]. China is actively implementing AI in its judicial system, but there are concerns about excessive control and surveillance by the state.

In European judicial systems, the use of artificial intelligence algorithms remains predominantly a private sector initiative and is rarely integrated into state policy [38]. In France, criminal liability has recently been introduced for analyzing case law, which allows one to predict a particular judge's decision in a case. These legislative changes were adopted under pressure from the judiciary, which argued that such analysis violates judges' personal rights by using their decisions to study behavioral patterns. In December 2018, the European Com-

mission for the Efficiency of Justice (CEPEJ) of the Council of Europe adopted the first European guidelines outlining ethical principles for the use of artificial intelligence in judicial systems. The Charter provides a set of guiding principles for policy-makers, legislators, and legal professionals to follow when addressing the rapid advancement of AI in national justice systems [39].

Austria has recently launched an online case management portal that provides comprehensive services. At the process support level, users can access digital payment reminders, view court case files and messages, complete forms for civil and criminal procedures, and make inquiries to various registers. The portal also has a chatbot for legal inquiries and self-service legal information, providing substantive law solutions. Additionally, a specialized agency uses an expert system to generate passenger claims for later adjudication, potentially leading to legally binding outcomes. At the infrastructure level, Austria enables video and remote hearings, justice-related e-learning, and free online access to vast numbers of court decisions through their legal information system [1].

The United Kingdom has demonstrated the most ambitious digital justice reform. Since 2016, the United Kingdom has been undertaking the Her Majesty's Courts and Tribunals Service (HMCTS) Reform Programme, investing more than 1 billion pounds (EUR 1.2 billion) into 50+ projects to improve efficiency and provide a vast variety of new, user-friendly digital services. The reform is directed at improving access to justice and operational excellence in the entire court system, stretching from consumers and victims of crimes to families and commercial businesses. The reform is intended to transform the United Kingdom's justice system into a user-centric, future-ready version of itself [1].

The "White Paper on Artificial Intelligence: A European approach to excellence and trust" outlines changes that will promote the reliable and safe development of AI in Europe, based on respect for the values and rights of EU citizens. The book states that artificial intelligence should work for the benefit of people and society [40].

The prerequisite for the introduction of AI in Ukraine is the launch of the Unified Judicial Information and Telecommunication System (UJITS). The system provides for completely paperless office work through the use of electronic digital signatures and electronic document management, the creation of personal accounts for the purpose of taking any procedural actions, improving the Uni-

fied State Register of Court Decisions by adding a system of hyperlinks to the legal positions of the Supreme Court, which will allow the algorithm to select a relevant Supreme Court decision for a specific case and construct a draft decision without human participation [41]. In the future, minor disputes may be resolved using the AI system online, which will significantly unload the courts. The E-Court subsystem is currently operating in test mode. It allows you to independently submit a comprehensive list of claims, track the progress of the case, submit procedural documents, pay the court fee and control incoming claims against you, and all these actions are carried out online. However, the full implementation of UJITS is an issue of more than one year. For now, only certain modules are operating in some courts, and electronic claims still need to be duplicated in paper form. This is caused by a number of problems, but with the government's active policy of digital transformation, rapid development in this area and further effective and transparent operation of Ukrainian courts can be expected [22]. In Ukraine, there are certain steps being taken towards the integration of AI in the field of justice, although they are still at an early stage.

From October 18, 2023, mandatory registration and submission of documents to the court through the Electronic Cabinet was introduced for a wide range of participants in the process [42]. This raises the issue of introducing remote justice, returning to the idea of the "cloud" architecture of UJITS and the use of artificial intelligence. Such technologies can provide continuous access to the court when normal operation is impossible, which Ukrainian courts faced during the pandemic and full-scale invasion. It was important for Ukraine to adopt the European Commission for the Efficiency of Justice's European Ethical Charter on the Use of Artificial Intelligence in Judicial Systems and Their Environment [43]. Its adoption regulated the issue of AI implementation and facilitated the integration of IT into the justice system of Ukraine.

The use of artificial intelligence provides undeniable advantages for the successful digital transformation of the judicial system. However, there are significant risks of biased and discriminatory conclusions provided by artificial intelligence. The uniqueness of modern data processing lies in the fact that it does not attempt to reproduce the human model of cognition, but creates contextual statistics based on data, without taking into account the possibility of false analogies with previous con-

clusions. In addition, there is a real risk that the algorithm may provide biased and discriminatory conclusions [44]. Each decision must be justified. However, programs that use AI do not reveal the entire analysis process, but only the result. Therefore, neither the defendant, nor the public, nor even the judge have the opportunity to see on what decision-making process this forecast is based. This secrecy exists, on the one hand, due to the existing patent rights of the developers of these programs, who risk plagiarism, and on the other hand, due to the black box problem, in which even the patent owners are unable to fully understand the decision-making mechanisms. Companies that develop AI-based systems do not disclose the details of how the algorithms work, as such information is confidential. When using such systems, a reasonable balance is needed between ensuring the patent rights of developers and the fundamental rights of individuals whose information is processed by AI algorithms.

Artificial intelligence opens up new opportunities for the digital transformation of justice systems and can significantly increase their efficiency. Technologically advanced progressive countries are already successfully implementing AI tools for automating routine processes, finding precedents, analyzing big data, and generating documents. This simplifies access to justice and optimizes judicial decision-making, but it is necessary to adhere to the ethical prerequisites for the functioning of artificial intelligence in the judicial system and reliably assess the risks of biased and discriminatory conclusions of artificial intelligence. In Europe and around the world, the justice of the future, predictive justice, and artificial intelligence are at the forefront of debates on reforming the functioning of judicial systems. However, this is not a panacea for increasing the productivity and relevance of justice. In its opinion of December 2023, the European Network of Councils for the Judiciary stated that "artificial intelligence and technologies can greatly assist judges in their work, but cannot replace them" [45]. In Ukraine, the launch of UJITS creates the prerequisites for the integration of AI in judicial proceedings. However, several challenges need to be overcome: ensuring transparency of algorithms,

avoiding discrimination and bias of AI, and balancing human rights and the trade secrets of developers. The prudent implementation of AI tools in the Ukrainian judicial system, taking into account European experience, should be a priority of digital transformation. This will increase trust in the courts and make justice more accessible and effective.

Conclusion

1. An analysis of existing scientific approaches to defining the concept of "artificial intelligence" and the tasks that artificial intelligence-based systems solve in the judiciary has been conducted.

2. The peculiarities of information and legal support and international experience in using AI in the judicial systems of countries around the world, particularly in the EU, have been investigated. It has been established that even progressive states use AI algorithms for informational support of judicial processes cautiously and partially due to the lack of a legislative framework and existing risks regarding bias and respect for human rights.

3. It is noted that the integration of AI tools into the judicial system of Ukraine, taking into account European experience, should become a priority of the digital transformation of justice.

4. The use of artificial intelligence provides undeniable advantages for increasing the efficiency and accessibility of legal proceedings. However, there are risks that its conclusions may be biased or discriminatory. For the effective and safe use of artificial intelligence in the judicial system, it is necessary to develop a legislative framework for its regulation.

Competing interests

The authors declare no conflict of interest.

Acknowledgement

The research was carried out in accordance with the plan of research works of the Educational and Scientific Institute of Law of the National University of Water and Environmental Engineering and the Research Institute of Private Law and Entrepreneurship named after Academician F.H. Burchak of the National Academy of Legal Sciences of Ukraine.

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ІНФОРМАЦІЯ ПРО СТАТТЮ (ARTICLE INFO)

Published in:
Форум права: 78 pp. 106–115 (1).

Related identifiers:
10.5281/zenodo.10870779

http://forumprava.pp.ua/files/106-115-2024-1-FP-Teremetskyi,Kovalchuk_13.pdf

http://nbuv.gov.ua/UJRN/FP_index.htm_2024_1_13.pdf

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Received: 14.02.2024

Accepted: 11.03.2024

Published: 13.03.2024

Available online: 13.03.2024

Cite as:

Teremetskyi, V. I., & Kovalchuk, O. Ya. (2024). Artificial Intelligence as a Factor in the Digital Transformation of the Justice System. *Форум Права*, 78(1), 106–115. <http://doi.org/10.5281/zenodo.10870779>

Teremetskyi, V. I., & Kovalchuk, O. Ya. (2024). Artificial Intelligence as a Factor in the Digital Transformation of the Justice System. *Forum Prava*, 78(1), 106–115. <http://doi.org/10.5281/zenodo.10870779>