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DATA PRIVACY AND ARTIFICIAL INTELLIGENCE: LEGAL RISKS AND PROTECTION IN THE AGE OF BIG DATA

Abstract: This article examines the legal aspects of data privacy (DP) protection amidst the widespread use of artificial intelligence (AI) and Big Data analytics. It analyzes key legal frameworks aimed at regulating personal data processing and enhancing personal information protection in the USA. The study notes that legislation is actively evolving to address new challenges in the digital era. It is emphasized that the use of AI creates both new opportunities for service personalization and serious privacy risks, requiring a comprehensive approach. Legal and technical measures are considered that can minimize issues, creating a safer digital environment and strengthening users' trust in digital technologies.

Key words: data privacy, DP, artificial intelligence, AI, Big Data, legal risks, information protection.

Language: English

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Introduction

The era of Big Data and the rapid development of artificial intelligence (AI) have led to significant changes in approaches to processing, storing, and using information. The digitalization of various fields – from healthcare to finance and marketing – creates new opportunities for analyzing and predicting human behavior.

The issue of DP is becoming especially relevant as machine learning methods and deep analysis algorithms enable the identification of personal data and the prediction of individual behavioral patterns, thereby posing significant risks. Existing legal regulations and DP standards often lag behind technological advancements and are not always capable of adequately protecting citizens' rights. These legal gaps create risks for data security, exacerbate issues of control over personal information processing, and increase the potential for misuse. The purpose of this article is to analyze the legal risks associated with DP in the context of active AI application and to examine current approaches to privacy protection.

Main part. The concept of privacy in the era of Big Data

A fundamental aspect of modern information security is DP, which involves ensuring control over access to and use of personal information. It means not only protection against unauthorized access, but also ensuring the user's right to manage their data, as well as minimizing possible risks associated with leakage or misuse of personal information. This concept covers a wide range of data – from identification and biometric to behavioral and financial information processed to provide a variety of services. In the context of digitalization, DP becomes especially important, since a violation of privacy can lead to serious consequences affecting both individuals and society as a whole.

According to a 2023 survey conducted among companies in the USA and the United Kingdom (UK), 7 out of 10 organizations employ a specialist responsible for implementing DP measures [1]. Nearly 60% of companies regularly train all employees on security protocols and regulatory compliance. This underscores that privacy is becoming a priority for organizations, especially amidst increasing demands for personal data protection and strict government regulations.

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The era of Big Data is transforming traditional approaches to privacy protection. **Big Data** is huge amounts of information generated as a result of extensive digital interaction and quickly processed by AI algorithms. They are based on sophisticated machine learning methods that allow you to analyze and interpret information, identify patterns and

predict. Big Data stimulates the growth of both quantitative and qualitative data processing, which leads to an increase in their sensitivity.

According to an internet user survey conducted in the USA in May 2023, about 40% of respondents expressed concerns that companies sell and individuals steal their personal data online (fig. 1).

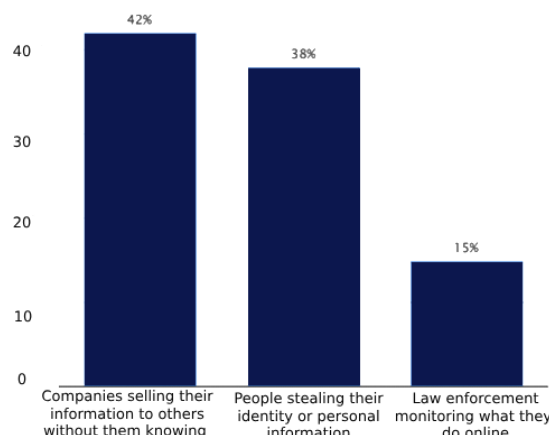


Figure 1. The most common concerns of USA adults about personal information [2].

The conclusions drawn from the survey indicate that users are increasingly concerned about the use and protection of personal data in the digital environment. The high level of distrust related to the sale of personal data by companies and the potential for information theft on the Internet underscores the importance of strengthening privacy and transparency measures. Users increasingly expect organizations to adhere to strict data protection standards and apply technologies that facilitate the secure processing and storage of information.

Artificial intelligence technologies and their impact on DP

The development of AI technology and its integration into various areas of society have

contributed to a significant increase in the amount of information processed and the potential for more accurate data analysis. According to research, the AI market will grow by more than \$184 billion in 2024, which is \$50 billion more than in 2023 [3]. The largest AI market is the USA.

Modern AI algorithms enable organizations and government entities to gather, store, and analyze vast quantities of data, recognize trends, and forecast user actions. However, it also poses new dangers for data protection due to the significant alterations in data collection and processing methods brought about by these technologies (table 1).

Table 1. Examples of AI technologies and their impact on DP [4, 5]

AI technology	Examples of use	Impact on DP
Facial recognition	Access control, security systems, online identification.	Increased risk of privacy breaches during biometric data collection.
Natural Language Processing (NLP)	Analysis of user reviews, chatbots, voice assistants.	Potential data leakage of confidential information from text and voice interactions.
Recommendation systems	Social networks, online video and content platforms.	Creation of deep behavioral profiles based on personal preferences and habits.
Predictive analytics	Financial and medical forecasts, security systems.	Potential privacy risks when analyzing and processing sensitive data.

Using AI technologies to analyze and process personal data carries both significant benefits and serious privacy risks. These technologies allow for streamlining processes, increasing the accuracy of

forecasts, and personalizing services, which improves the user experience. However, they make personal information vulnerable to unauthorized access and may lead to violations of privacy rights.

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Effective data protection in the context of AI requires both technological and legal measures that will help minimize the risks of information leakage and unauthorized use of personal data.

Legal risks and DP regulation

In Europe, the legal protection of DP is based on the **General Data Protection Regulation (GDPR)**. It came into force in 2018. The GDPR sets strict requirements for the processing of personal data. This includes mandatory consent from users to access information, transfer and correction, deletion of information. One of the key elements of the GDPR is the principle of data minimization. Companies can only collect the information that is necessary for specific purposes and are obliged to keep it secure. The GDPR provides for high fines for non-compliance. This encourages companies to comply with data protection standards and implement additional security measures. The law has a significant impact not only in the European Union but also beyond its borders, as it applies to any company processing the data of EU citizens. This makes the GDPR one of the strictest acts in the field of personal data protection.

In the USA, DP regulation is a complex structure made up of separate federal and state laws. These documents aim to protect personal information across different sectors of the economy. Unlike countries that have adopted uniform rules for all types of personal data, such as the GDPR in the European Union, the USA takes a fragmented approach. Privacy regulation depends on the nature of the data and the specific sector in which it is used. This creates certain difficulties in ensuring a uniform privacy protection system, especially in the context of the active use of AI technologies and Big Data analytics.

The **California Consumer Privacy Act (CCPA)**, passed in 2018 in California, is one of the most important laws regulating privacy protection in the USA. CCPA gives California residents extensive

rights over their personal information, such as the right to learn what data is collected about them, the right to opt out of the sale of data, and the right to request the deletion of data [6]. CCPA, like Europe's GDPR, was a groundbreaking law in the USA that significantly influenced privacy regulations across the country. In 2020, the **California Privacy Rights Act (CPRA)** strengthened the CCPA, giving greater control over data collection and processing.

At the federal level, DP is regulated by several sector-specific laws. In the financial sector, the **Gramm-Leach-Bliley Act (GLBA)** requires financial institutions to inform consumers about their privacy policies and to implement measures to protect sensitive information. In the healthcare sector, the **Health Insurance Portability and Accountability Act (HIPAA)** plays a crucial role in regulating the protection of medical data. HIPAA establishes strict standards for safeguarding medical information, especially in the context of digitalization and the adoption of electronic health records, which is essential to prevent unauthorized access to patients' personal information [7].

The **Children's Online Privacy Protection Act (COPPA)** is also significant, aimed at protecting the privacy of data for children under thirteen. COPPA requires companies to obtain parental consent for the collection and processing of children's data and provides parents with the right to access and control information collected about minor users.

One of the challenges of USA privacy legislation is the absence of a unified federal law governing the processing of all types of personal data. This leads companies to adapt to various regulatory requirements based on the type of data and the geographical location of users.

A survey conducted in 2023 showed that about 34% of organizations in the USA incur higher costs for international data transfer due to privacy requirements, but consider it acceptable (fig. 2).

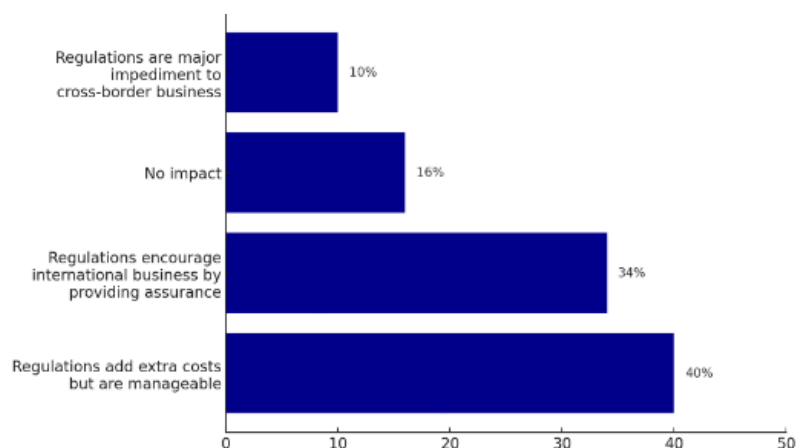


Figure 2. Impact of DP laws on the ability of organizations in the USA. to transfer information internationally [8]

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The increase in AI and Big Data analysis usage poses fresh obstacles for regulating privacy laws. Current legislation may not keep pace with fast technological advancements, leading to concerns about the potential for predicting user behavior and personal traits without their knowledge. In this context, it is becoming more and more evident that legal standards for safeguarding personal information must be reinforced.

American privacy legislation continues to evolve. Several USA states have enacted their own privacy laws similar to the CCPA, such as **Virginia Consumer Data Protection Act (VCDPA)** and **Colorado's Privacy Act**. These laws grant users the rights to access, correct, and delete their data, as well as the ability to restrict the processing of personal data. In 2024, Maryland signed two laws aimed at more effectively protecting personal data online from large tech companies. The **Maryland Online Data Privacy Act (MODPA)** imposes obligations on businesses to safeguard personal information and provides consumers with greater control over their data, including the right to opt out of personal data processing for targeted advertising and data sales.

In the USA, legal standards for data privacy are actively being developed to meet the demands of the

digital age. Raising employee awareness is essential for their effective implementation. Training for employees enhances the safety culture within companies and ensures that organizations meet regulatory obligations.

Data privacy protection: technical measures

To ensure the security of personal information, both legal measures and technical measures are necessary to minimize the risks of loss of confidentiality and protect the rights of users.

Encryption protects data during transmission or storage and prevents unauthorized individuals from accessing sensitive information. **Anonymization and pseudonymization** both involve removing or changing identifiers to prevent data from being linked to a specific user. These methods reduce the likelihood of sensitive information being compromised and enhance the security of personal data against cyber intruders.

According to a global survey conducted between November 2022 and January 2023, 70% of participants had implemented measures to protect their online identities. One of the most common methods was **multi-factor authentication**, which was enabled by 30% of participants (figure 3).

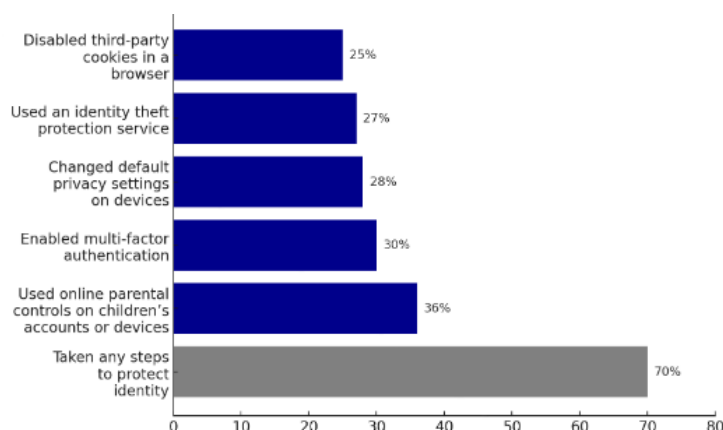


Figure 3. Steps taken by global internet users to protect their personal information online [9]

Utilizing multiple authentication factors is a successful way to safeguard data access, mandating users to offer extra confirmation of identity, thereby increasing security and impeding unauthorized access, regardless of password knowledge. It enhances the security of both users' personal data and corporate information as a whole.

Data access management and auditing is also a key technical area. Modern security systems allow you to set access rights for each user, restricting access to data only to those who are directly involved in working with them. Automation of audit and access monitoring ensures timely detection of unauthorized entry attempts and incident response. Such measures create conditions for safer work with information,

since the possibility of compromising it becomes noticeably lower.

Thus, DP protection requires a comprehensive approach, including both legal measures and technical methods. The use of modern technologies to ensure data security, along with compliance with strict standards of protection and awareness-raising of employees, minimizes the risks of leakage and unauthorized use of information, creating a secure digital environment.

Conclusion

The use of AI and Big Data has led to significant shifts in how personal information is processed and safeguarded. Modern advancements enable the gathering and examination of vast data quantities,

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enhancing service excellence yet introducing fresh privacy hazards. Incorporating AI into data management necessitates heightened security and the implementation of legal and technical safeguards.

Legislation adopted in Europe and the USA, contribute to data protection, but the continued growth of AI capabilities highlights the need to develop more

adaptable legal norms. An integrated approach combining transparent privacy policies, technological innovations and legal regulation will ensure more reliable data protection, minimizing the risks of data leakage and misuse, and will be an important step towards creating a secure digital environment.

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