The Potential of AI in the Judiciary of Serbia

Dušan Kuzmanović
Sector for assuring quality of regulation and services
Republic Secretariat for Public Policies
Belgrade, Republic of Serbia
dusan.kuzmanovic@rsjp.gov.rs

Ana Đilas
eJustice Department
Ministry of Justice
Belgrade, Republic of Serbia
ana.djilas@mpravde.gov.rs

***Abstract*— This paper analyzes the potential integration of AI-based tools into the functioning of the judiciary in Serbia. It focuses on existing AI projects within the legal system, experiences from other countries judicial systems. The paper examines the challenges and limitations associated with implementing AI technologies, as well as the potential benefits for increasing efficiency, transparency, and access to justice. The aim is to provide a general overview of currently available solutions and to suggest guidelines for the future development and application of AI in the Serbian judiciary.**

Keywords—eJustice, CyberJustice, AI, Judical reform, eGovernment.

I. INTRODUCTION

The current digital transformation in the judiciary of Serbia has yielded the greatest results in electronic data, information, and document exchange, as well as in the digitization of specific tasks through specialized web applications[1]. This has achieved the basic objectives outlined in regulations and strategic documents in this area. The trend was focused on developing centralized systems for courts and public prosecutor's offices, as well as on connecting legacy decentralized systems to establish interoperability among them and with other e-Government systems

In European countries, AI solutions have been implemented in various segments of the judiciary's work, demonstrating significant results in terms of speeding up procedures and enhancing the values of legal systems. The paper will present examples of such tools, recommendations for selecting processes to be enhanced, pioneering steps in the Serbian judiciary, and anticipated challenges. Common AI-assisted processes for case processing, searching court decisions, and related anonymization of personal data within those decisions will be presented. One tool that appears to be the most promising solution in the judiciary (OLGA) will be highlighted. Concrete challenges in AI implementation will also be presented through a case of 'predictive justice' in traffic violation cases that was prototyped in Serbia.

New ICT capabilities are more powerful compared to web services, SQL databases, and electronic certificates etc., and they undoubtedly hold the potentials for change if the appropriate areas of application are recognized.

For the purposes of this paper, we will adhere to the definition of AI as outlined in the EU AI Act[1], as we consider it a practical and appropriate description for the domain characterized by strict formality rooted in regulations. The EU AI Act defines[2] an AI system as a machine-based system designed to operate with varying levels of autonomy, which may demonstrate adaptiveness after deployment. Such a system, for explicit or implicit objectives, infers from the input it receives how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments.

This definition encompasses various types of AI tools currently present in software used in the judiciary across European countries. The Advisory Board on Artificial Intelligence (AIAB[3]) of the European Commission for the Efficiency of Justice (CEPEJ[4]) categorized these tools into the following groups: Document search, review and large-scale discovery; Online Dispute Resolution; Prediction of litigation outcomes; Decision support; Anonymization and pseudonymization; Triaging, allocation, and workflow automation; Recording, transcription, and translation; and Information and assistance services[2].

II. MASS CLAIMS (USE CASE – OLGA[5])

Mass claims are complex legal proceedings involving a large number of similar claims or issues, often related to product compliance or broad business practices. In legal terms, among numerous claims, there is the same or similar factual or legal basis. internationally, such mass claims are well known in connection with environmental catastrophes, such as the mass lawsuit against Shell in the Netherlands. In Serbia, the most current disputes are related to bank loans denominated in Swiss francs.

OLGA (OberLandesGerichts-Assistent / Regional Court Assistant) is an AI tool designed to assist with appeals in diesel emissions cases. The Dieselgate scandal refers to fraud involving manipulation of vehicle emission tests. This incident had significant legal consequences, including environmental fines and obligations to compensate vehicle

[1] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024
[2] Article 3, paragraph 1, item 1)
[3] The CEPEJ Artificial Intelligence Advisory Body (AIAB) provides expert advice on Artificial Intelligence (AI) related issues in the judicial environment
[4] The CEPEJ will have, among other duties, the task of continuing the on-going reflexion about the potential offered by new information technologies (IT) to improve the efficiency of justice.
[5] Presented during regional workshop entitled "Advancing the HJPC BiH regional ICT (information and communication technologies) Hub initiative through CEPEJ Cyberjustice tools and good practices" on 16 and 17 April on Jahorina (Sarajevo), Bosnia and Herzegovina.

owners. Consequently, many similar cases emerged, known as mass claims. Mass claims are an ideal use case for AI, as they free individuals from repetitive tasks while providing machines with vast amounts of data for learning. Initially, courts often rejected these claims; however, upon appeal, they were recognized, leading the courts that accepted the claims to start receiving a massive influx of cases.

The system is designed to streamline the analysis and grouping of appeals within the judiciary. When a complaint is filed, the input data includes various details such as case number, type of appeal, legal designations, and a description of the case. The system leverages this information to identify relevant keywords or tags associated with specific topics, such as "emissions," "scandal," "VW," or "engines." This is how AI tool classifies cases by comparing them to previously decided appeals to help judges make preliminary assessments. Using text analysis and natural language processing techniques, OLGA continuously groups similar appeals into clusters based on content and tags. When cases share common elements, the system automatically assigns them to the same group, enabling efficient management of large volumes of related cases and faster decision-making. This is particularly important for the following reasons: rapid identification of related appeals enables courts to handle large cases more efficiently, avoiding repeated processing of the same issues in different cases. Prioritizing the resolution of connected appeals accelerates the entire justice process, especially in high-profile cases where the number of appeals is enormous, and where the judiciary and prosecutors are especially motivated to pursue claims and rights.

Within OLGA, algorithms operate based on predefined rules established through collaboration with legal experts and developers, and these rules are regularly updated. This allows for automated classification of appeals, for example, recognizing when descriptions contain certain key terms and categorizing them accordingly. The approach highlights the importance of domain knowledge not only in traditional rule-based systems but also in the development of advanced AI models like large language models (LLMs).

Facts that need to be identified in every individual case include details such as the vehicle model, year of manufacture, mileage, and purchase price, as these circumstances influence the court's decision. To access these, a judge must review extensive documentation, which constitutes the case files and can consist of up to a hundred pages. Naturally, with the development of legal tech tools, such submissions prepared by lawyers have become more voluminous. OLGA extracts these details directly from electronically submitted pleadings. Thus, AI is used for what is called 'Digging for data diamonds is tedious,' which refers to the painstaking process of finding valuable, useful, and key information within a forest of data—an effort that, while demanding, is essential for making informed decisions and managing complex cases efficiently.

There is no risk of influencing the court's decision-making, which is otherwise a significant concern in judiciary. Since the tool is assistive, it does not interfere with the decision process itself. Instead, it helps judges identify similar cases through classification and categorization, thereby indirectly promoting consistency in legal practice. This prevents situations where individuals in virtually identical circumstances would receive completely different outcomes in court.

In Serbia, mass claims, such as disputes related to discrimination in the payment of wartime allowances to reservists, have been addressed through the implementation of template decision-making. The idea is that within a text editor—used in the context of an application for data processing available in courts—drafting of decision templates would automatically utilize data from the case, such as participants, amounts, and other relevant information. These data are stored as metadata, making them ready for automatic retrieval from the database into draft decisions.

In contrast, text processing tools like OLGA offer broader possibilities. The authors consider OLGA a kind of proof of concept (PoC) for this approach. Courts express the challenges of managing large-scale mass claim cases, such as bankruptcy proceedings of large companies, which due to employee salary demands, often significantly burden smaller courts in the locations where these companies are based. Additionally, disputes arising from bank loans denominated in Swiss francs are frequently mentioned in media.

III. Legal Issues

Legal issues related to AI are numerous and ongoing, but for the purposes of this paper, we focus only on the most important legal provisions found in the key legislative acts. These rules are designed to protect the most significant interests at risk, ensuring that the fundamental rights and values are adequately safeguarded in the context of AI deployment.

Authors in this field observe that the current regulation of the internet has primarily served to limit risks exported to Europe, especially from the USA, but the emergence of AI web tools further complicates the situation[3]. In this context, it is noted that a promising plan for the development of European AI tools is the increase in the number of AI factories[6].

The Law on Personal Data Protection in Serbia, which among other things regulates the rights of individuals regarding the processing of their personal data, the rights of data subjects, and the obligations of data controllers and processors, contains specific rules pertaining to automated individual decision-making. The authors are of the opinion that in the absence of other regulations, this law represents the general rule in our legal system. Articles 38 and 39

[6] https://digital-strategy.ec.europa.eu/en/factpages/ai-continent-action-plan

primarily prohibit decisions from being made solely through automation. Data subjects have the right not to be subject to decisions entirely based on automated processing, including profiling, if such decisions produce legal effects for them or significantly influence their legal status. This establishes a clear boundary that the output generated by the AI—that is, the token—cannot qualify as a decision that directly affects an individual's or group's legal rights, obligations, or interests.

Under the European Union's AI Act, AI systems are classified into different risk categories, with those used in the justice sector typically falling into higher-risk groups. Specifically, AI applications in judicial contexts are generally regarded as high-risk and thus subject to stricter compliance with technical and organizational requirements aimed at ensuring safety, transparency, and the protection of fundamental rights. According to Article 6 and Annex III of the regulation, high-risk AI systems must meet rigorous standards related to technical robustness, data governance, human oversight, and risk management. This regulation mandates that such systems operate reliably and ethically within the judicial domain, subject to comprehensive conformity assessments before deployment. Although this act is not part of the Serbian legal framework, it will undoubtedly influence both the creation of similar regulations and the interpretation of existing norms. Certainly, the current Law on Information Security already establishes a strict regime for ICT systems of courts, which are designated as systems of particular importance under the legal regime.

The European Commission's 2021 Proposal for a Regulation of the European Parliament and of the Council laying down harmonized rules on artificial intelligence (EU AI Act which is now in force), advocated for a balanced approach to AI regulation that encourages responsible development and deployment of AI systems. Based on this act, the professional IT community supported the principle of "Regulate FOR AI, not just regulate AI." This principle emphasizes that regulation should be proactive and supportive, aiming to foster ethical, safe, and innovative AI development. Instead of merely imposing restrictions, policies should facilitate responsible growth, align AI progress with societal values, and promote beneficial applications. Such an approach ensures that regulations act as enablers of innovation and safeguard public interests, rather than serving solely as barriers. Therefore, it can be expected that certain groups, primarily IT investors, will advocate future regulations that favor the affirmation of AI. This is important for fostering innovation, especially considering the negative phenomenon of "special interests in the domain," which refers to specific groups or lobbyists that seek to protect their interests within a particular sector or profession. For example, in the medical field, certain lobbying groups might attempt to divert, halt, or slow down the development and adoption of new technologies. In the judiciary, participants might oppose AI tools if they perceive that these technologies threaten their competitive advantages or established positions.

This brief analysis of the legal framework points to the following: an appropriate solution for the judiciary is one that does not make decisions independently but can serve as an assistive tool in the decision-making process, leaving the final ruling to humans. One of the main challenges in implementing AI as a Decision Support System (DSS) is the need for a high-quality database. Such a database must contain adequate metadata (or material for their extraction) and ensure that the data used is both complete and accurate. We consider the use of AI and its ability to learn from complete and accurate data as a matter of ethics, since failing to ensure these prerequisites would be irresponsible and could lead to the deployment of unreliable or biased tools.

Furthermore, strict information security standards are achieved through consistent application of rules and practices outlined by the Law on Information Security, which aligns with the EU's NIS2 Directive.

IV. BIAS CHALLENGE

Due to the risks associated with discrimination and the violations of rights it entails, the issue of bias in AI has become a widespread concern. It is closely related to the legal question of discrimination, as bias can lead to unjust outcomes. The topic gained significant attention when it was recognized that bias was neither adequately identified nor addressed during the development and testing phases of AI systems, subsequently manifesting in the production environment. This risk has also been acknowledged in the above-mentioned acts of the Council of Europe. Therefore, ethics that ensure the representativeness of training data through careful selection and sampling is emphasized, alongside systems' ability to recognize patterns accurately without falling into overfitting, error propagation, or data dredging etc. Furthermore, understanding factors beyond purely technical considerations is important, a perspective supported by the National Institute of Standards and Technology (NIST) within the U.S. Department of Commerce. NIST has recognized the importance of a socio-technical approach to addressing bias, including the acknowledgment of human biases that can influence data collection, system design, and decision-making processes.

In the field of machine learning, as a subfield of AI characterized by modeling rather than explicit coding danger of bias is particularly pronounced, given that models are created based on large datasets containing patterns.

According to the International Standards Organization (ISO), bias is generally defined as a deviation of a reference value from the truth. This raises pertinent questions: What constitutes "truth," and what is free from bias? Additionally, it prompts inquiry into which biases are acceptable, given that from a cognitive perspective, bias is a fast mode of drawing conclusions about phenomena.

While the topic of bias in AI systems extends beyond the scope of this work, it is evident that addressing this challenge requires a comprehensive and ongoing approach. Continuous evaluation and validation of models using diverse and representative datasets are fundamental to effectively identifying and mitigating bias. It is equally important to implement targeted measures throughout the entire

development process to promote fairness. Additionally, integrating ethical considerations and establishing clear standards for acceptable levels of bias are essential components of responsible AI development. Transparency in decision-making processes and clarity regarding training data further contribute to building trust and accountability. Only through these coordinated efforts can we move toward the development of AI systems that are fair, ethical, and dependable.

V. Advantages of Legal Language for Artificial Intelligence

Research into the application of informatics in processing legal texts in Serbia is not terra incognita[4]. The potential for text search, information extraction, automatic correction, translation, and reasoning has been recognized, primarily to facilitate the retrieval of relevant legal provisions, support drafting in accordance with formal legal rules and norms and analyze and build legal arguments. The language of legislation is characterized by a precisely defined logical structure, as legal texts are divided into articles, paragraphs, and points. Nomotechnics[7] demands such division into classification units, sometimes referred to as the 'logical layout. Larger legal documents include broader units such as parts, chapters, sections, and subsections.

What might initially appear as a simple (formal) structure can, in fact, be more complex due to the inherited complexity of natural language, since laws and individual judicial decisions are permeated with the flexibility of natural expression. This is precisely where Natural Language Processing (NLP) techniques present significant potential, as they can help navigate and address these linguistic complexities effectively.

Syntax in legal texts allows for easy identification and extraction of organizational units such as articles and sections, which NLP can effectively leverage for navigation and filtering. Semantics, however, poses greater challenges, as it requires understanding the legal content, the meaning of norms, and the relationships between legal provisions. This is a complex process that NLP models are continuously developing and improving.

Task for the software AI solution is to extract linguistic information from legal formulations, including decisions (judgments and rulings) and regulations (laws and bylaws). This involves automatically identifying and extracting relevant language elements such as legal terms, definitions, obligations, rights, conditions, and relationships expressed within the texts.

In the context of NLP, this means the system should analyze legal documents and identify key language components—such as specific legal phrases, terminology, and contextual relationships—so that complex legal formulations can be broken down into structured, machine-readable data. This allows for better understanding, analysis, and utilization of legal texts by automated systems, ultimately aiding in tasks like legal research, decision support, or information retrieval.

Large Language Models (LLMs), such as ChatGPT and Claude, further enhance this process by providing a deeper understanding and more accurate extraction of linguistic information from legal texts. After initial NLP techniques identify key terms and relationships, these LLMs can analyze complex legal formulations, interpret context, and extract relevant data with high precision. For example, they can recognize obligations outlined in a law, identify the parties involved in a judgment, or summarize the reasoning behind a decision. This layered approach—beginning with NLP and advancing with LLMs—enables automated systems to accurately convert complex legal language into structured, actionable information, greatly facilitating legal research, case analysis, and decision support.

VI. Case Law Data base AI Enhancement

The use of information technologies, as one of the early encounters with legal science[5], involved data processing from extensive collections of significant judicial decisions (case law). In the legal domain, legal certainty is threatened if courts, in cases of identical factual and legal circumstances, issue significantly different rulings—especially within the same courts or types of courts based on jurisdiction. Public electronic databases of case law therefore serve to ensure transparency, standardize judicial practice, and facilitate access to justice.

AI facilitates the rapid analysis of large volumes of data, particularly case law, enabling legal professionals to quickly review relevant judicial decisions and legal regulations through advanced algorithms. This technology streamlines repetitive tasks like case law research and document review, freeing up lawyers to concentrate on more complex and strategic aspects of their work.

The need for such processing has historically been even more critical in common law legal systems like those of the United States, Canada, and the United Kingdom, where individual court decisions—essentially their legal reasoning—serve as formal sources of law for future cases. Additionally, these jurisdictions operate in the global language of English and belong to regions with highly developed legal service markets, further highlighting the importance of advanced AI tools in legal practice.

In Serbia such project was initiated in 2019, Ministry of Justice began work on developing and implementing a sophisticated search feature into the existing Judicial Practice Portal[8]. This search module was designed to enable more precise and relevant results when querying unstructured content, especially for complex searches involving multiple

[7] Set of methodologies, principles, and techniques for drafting, structuring, and organizing laws and legal texts.

[8] Available at https://www.sudskapraksa.sud.rs/sudska-praksa

criteria and nuanced queries. It allows for contextual search of keywords and related taxonomies, significantly improving the accuracy and usefulness of search outcomes.

A module for advanced search was developed in collaboration with external partners[9]. However, there were notable challenges related to the specific linguistic features of the Serbian language, which complicated the implementation and optimization of the system. Additionally, one of the hardware limitations associated with the file system on the servers hosting this database restricted extensive usage. To fully utilize the system's capacity and realize its potential, these hardware constraints must be overcome.

Additionally, there are examples of good solutions for anonymization of personal data, which can be applied in judicial practice. Public databases of court decisions must contain anonymized data to protect privacy. In Serbia, the number of court decisions available in the internal database accessible to judges is significantly larger than those available publicly, primarily due to the slow, manual process of anonymizing decisions by the courts. Among the solutions recognized by the aforementioned AIAB as having significant potential is the ANOM system, which has been implemented in Switzerland[6]. It is based on neural learning techniques. The Swiss Federal Supreme Court relies on that system which combines different traditional computational methods with human experts[7].

Most European countries require the anonymization of publicly released court decisions[8], and IT systems that automate this process are widely used[9]. Within the region, Slovenia has reported to CEPEJ that it utilizes a tool that implements AI for this purpose.

In Serbia, an attempt was made to implement automatic anonymization through the aforementioned advanced search tool for court practice. The first step involved an automatic search of publicly available decisions to verify whether any private data remained in some of them.

The authors believe that, when enriching the analysis of case law with AI, factors such as the scope of the database, the age of decisions, the legal status of decisions, and others factors should be taken into account. Traditionally, only those decisions that courts deem relevant to a specific area are incorporated into the case law database. Including all decisions would likely diminish the quality of the rationale, as judges in current process selectively choose decisions of relevance. Additionally, decisions should be entered within a timeframe close to the time of tool usage to reflect current legal practice. It is evident that data quality is more important than quantity. Furthermore, machine-readable data must be available indicating whether the decisions used by the tool have been annulled or affirmed by higher instances. There is also potential for different operational modes of the tool: from quick superficial searches to more advanced "deep learning" analyses, which would enable the examination of a larger set of decisions, covering broader time periods, legal institutes, court origins, and other factors.

VII. Other use cases

During 2018-2020, the Ministry of Justice of the Republic of Serbia, in collaboration with external partners, was involved in developing an auxiliary tool for misdemeanor court judges to assist in drafting judgments related to traffic violations. This area has been identified as a typical case, considering that the misconducts are highly measurable (mainly speed violations), there is a comprehensive database (metadata on violations and previous sanctions), and intervention is justified due to issues related to the statute of limitations in prosecution. This project was presented in a specially dedicated paper prepared by the authors of this article.

When it comes to other AI solutions in courts in the region, initiatives and projects related to the use of AI in speech-to-text conversion are present in the Republic of Slovenia and the Republic of Croatia. In Serbia, although appropriate solutions for the Serbian language and Cyrillic script exist[10], implementation of such tools has not been pursued. The value of these tools lies in their ability to create transcripts of hearings and other actions. A solution recognized as promising is *Textualization[6]*, which has been implemented in the Kingdom of Spain. This initiative is based on neuronal learning techniques for the faithful transcription of videos recorded during court hearings and depositions. In addition, it automatically generates text, taking as a source the videos recorded during hearings and depositions[11].

The Republic of Albania has established a strategic partnership with OpenAI aimed at translating numerous EU regulations. Regarding these forms of language processing, they could reduce translation costs, primarily because languages of national minorities are in official use in Serbian courts, and because there are not enough court interpreters for some minor Asian languages, while proceedings relate to deprivation of liberty (illegal border crossings) need them, especially for courts near border. The issue with migrants is being addressed through video conferencing with court interpreters for some languages.

VIII. Conclusion

We believe that when working within this domain, humans should not be excluded from the decision-making cycle or process. This means that in some systems or processes, humans need to remain involved due to the importance of their responsibility, ethical considerations, key decision-making, or maintaining control over the technology. This principle applies when it comes to judging in the narrower sense, that is, the exercise of free judicial conviction

[9] Solution was based on IBM Watson® Explorer oneWEX

regarding the assessment of evidence, selection of the type and severity of sanctions, and the application of judicial reasoning. However, when it comes to court tasks in a broader sense, such as classifying cases, organizing materials, and similar activities. AI should be utilized to free up time, energy, and focus, allowing for higher quality decisions.

REFERENCES

[1] A. Đilas and D. Kuzmanovic, "Digital Transformation in the Judiciary," 2023. Accessed: Aug. 08, 2023. [Online]. Available: https://www.ebt.rs/journals/index.php/conf-proc/article/view/187

[2] Advisory Board On Artificial Intelligence, "1st AIAB Report on the use of Artificial Intelligence (AI) in the Iudiciary based on the information contained in the Resource Centre on Cyberjustice and AI," Strasbourg, Feb. 2025. [Online]. Available: https://www.coe.int/en/web/cepej/resource-centre-on-cyberjustice-and-ai

[3] Popović Dušan, Krivokapić Đorđe, Ružić Nevena, and Stojković Miloš, *Legal Regulation of the Internet in Serbia*. Beograd: Clio, 2023.

[4] N. Vasiljević, "*Automatic processing of legal texts in the Serbian language*," PhD dissertation, 2014.

[5] Lilić Stevan, *Legal Informatics: Introduction to the Application of Law*. 2006.

[6] Advisory Board On Artificial Intelligence, "Reflections of the AIAB on the use of Artificial Intelligence in Judicial Systems," no. CEPEJ-AIAB (2025)1Rev5, p. 11, Jan. 2025, Accessed: Jun. 14, 2025. [Online]. Available: https://rm.coe.int/cepej-aiab-2025-1rev5-en-reflections-of-the-aiab-on-the-use-of-artific/1680b42a56

[7] J. Niklaus, R. Mamié, M. Stürmer, D. Brunner, and M. Gygli, "Automatic Anonymization of Swiss Federal Supreme Court Rulings," Oct. 2023, [Online]. Available: http://arxiv.org/abs/2310.04632

[8] R. and D. Directorate-General for Library, "Anonymity of the parties on the publication of court decisions," Brussels, Mar. 2017.

[9] K. Terzidou, "Automated Anonymization of Court Decisions," in *19th International Conference on Artificial Intelligence and Law, ICAIL 2023 - Proceedings of the Conference*, Association for Computing Machinery, Inc, Jun. 2023, pp. 297–305. doi: 10.1145/3594536.3595151.

[10] Intermex, "Newton Dictate 5.0." Accessed: Aug. 31, 2023. [Online]. Available: http://intermex.rs/wp-content/uploads/2019/03/NOVI-FLAJER-A4-2-Newton-Dictate-5.0-NOVO.pdf

[11] Ministerio De Justicia Gobierno De Espana / Ministry of Justice of Kingdom of Spain, "Digital Transformation Projects in the Justice Sector," Oct. 2023.