

The Impact of Using Artificial Intelligence Techniques on Judicial Procedures

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Abstract

Artificial intelligence (AI) is considered a vital element in the roadmap of human development, scientific achievement, and technological advancement. This study shows that AI is no longer merely a marginal technical means in the judicial environment; rather, it has become an active factor reshaping the features of contemporary justice. It is regarded as an effective tool for increasing the efficiency and effectiveness of judicial work. Its integration into litigation procedures has facilitated the faster resolution of cases and the simplification of procedures, thus making the judicial system more efficient and reducing the number of cases pending hearing, owing to its ability to analyze data and support precise and effective decision-making. However, this technological transformation is not without legal and ethical challenges. The most prominent of these include the risks of algorithmic bias, the difficulty of interpreting automated decisions, the absence of a comprehensive legislative framework, the challenge of determining legal liability in harm caused by intelligent systems, and the insufficient qualifications of judicial personnel.

The study reached a set of recommendations, the most notable of which is that legislators should enact specific legislation governing judicial artificial intelligence. Such legislation should include clear provisions regulating its scope of use in litigation procedures and defining the controls and responsibilities of judges, programmers, and operators. It should also emphasize that the judge remains the ultimate authority in decision-making and incorporate binding provisions to protect personal data and confidentiality.

Furthermore, artificial intelligence should remain a supportive tool in the hands of the judge rather than a substitute, ensuring that judicial decisions integrate human legal reasoning with technical precision, thereby preserving the essence of justice and enhancing public trust in the judicial system.

Keywords: Artificial Intelligence, Judicial Procedures, Intelligent Systems, Judicial System, Judicial Decision-making

Implications and Contributions Statement

This study contributes to the legal field by analyzing the impact of artificial intelligence on judicial procedures and highlighting both its benefits and associated risks. It provides a comprehensive

legal perspective on the integration of AI in judicial systems and offers practical recommendations for developing regulatory frameworks that ensure fairness, transparency, and efficiency.

Introduction

The rapid pace of technological development represents a new paradigm for human life, a veritable technological revolution that is transforming the landscape of humanity. Interacting with this technology has become imperative to its rapid spread and integration into all fields. Indeed, every aspect of life now requires reliance on it.

Artificial intelligence (AI) has significantly facilitated and simplified life, permeating all spheres and becoming an indispensable part of our existence. This has led public administrations to utilize AI to predict and address emerging problems.

In the judicial field, AI has also been adopted, playing a major role in transforming litigation methods and approaches to handling legal cases. Technology has become an integral part of the judicial system, not only in case management but also in the very core of procedures that were traditionally performed manually and slowly.

Artificial intelligence (AI) has brought about a radical and rapid transformation in litigation procedures by introducing advanced smart tools that enhance the efficiency and accuracy of legal processes. AI-powered judicial platforms have become an integral part of modern litigation, enabling the analysis and classification of massive amounts of documents and data in a short time, thus reducing the costs, effort, and time traditionally associated with these tasks (1).

Similarly, AI contributes to simplifying legal research by automating the collection and extraction of case law and relevant legislation. This enhances the accuracy and efficiency of legal tasks and reduces reliance on manual research and analysis. Furthermore, AI-enhanced contract analysis tools are crucial in litigation procedures, particularly during the due diligence phase. These tools allow legal practitioners to quickly and effectively identify key clauses and potential legal risks within contracts (2).

Many countries are moving towards integrating smart tools into their judicial structures to improve efficiency and reduce the burden on courts. Technological systems have been adopted in areas related to case registration, distribution, session scheduling, and the monitoring of proceedings, in an effort to overcome the challenges associated with case backlogs and delays in adjudication (3).

The fast-changing technological development has radically altered the design of judicial systems in all parts of the world. One of the most dramatic of such changes has been in artificial intelligence, and it has changed the way litigation is conducted and the manner in which legal cases are handled. Technology has penetrated the judicial scene not only to handle cases but even to form the core of processes previously executed manually and at a slow pace (4). This has therefore necessitated the need to rethink the litigation system with regard to these technological advancements (4).

What is Judicial Artificial Intelligence

The concept of judicial artificial intelligence refers to the ability of computer systems to perform tasks considered human-like intelligence. Therefore, the scope of judicial work includes the use of artificial intelligence in the field of law and justice. For example, artificial intelligence can help analyze legal data and provide useful legal information, making it an important tool for improving the efficiency of litigation procedures. Based on the above, we will study the concept of judicial artificial intelligence, its application requirements, its characteristics, how it guides lawyers and judges in decision-making, improves legal research processes, and provides intelligent legal support.

The Concept of Judicial Artificial Intelligence and Its Application Requirements

The use and integration of artificial intelligence in various industries have become increasingly important and play a significant role, especially after the developments the country is undergoing. Therefore, in this section, we will address the concept of artificial intelligence and its types as follows:

Artificial intelligence is considered a branch of computer science and one of the fundamental pillars of the technology industry in the modern era. Therefore, artificial intelligence can be defined as the theory of developing computer systems capable of performing tasks that require human intelligence, such as visual perception, speech recognition, decision-making, and translation into different languages (5).

Artificial intelligence can be defined as the attempt to make a computer or programmed machine resemble a human in its thinking, behavior, problem-solving, and daily life. This is achieved

through studies conducted on humans, from which results are drawn to explain human behavior and then applied to machines. Ultimately, it is about enabling machines to perform actions that can be described as more intelligent than those performed by humans (6).

In the legal field, a single, comprehensive definition is difficult to establish. Most definitions, and others, include the use of artificial intelligence technologies for data analysis and final decision-making without human intervention at every step of the judicial process.

Others have described it as the application of predictive features and analytical capacities of computer or machine systems, and simulation of human conduct, in the examination of judicial information accessible within operating systems in judicial systems (7).

Nonetheless, judicial artificial intelligence can be defined as the use of intelligent systems in litigation to assist hearing cases, adjudicate disputes, and enforce judgments, to achieve faster case resolution and facilitate procedures for litigants.

Requirements for the Use of Artificial Intelligence Technologies in Litigation Procedures:

To ensure the efficiency and security of court Procedures, a set of legislative and technical requirements must be considered to enable the benefit of proper implementation of artificial intelligence.

- **Legislative Requirements:** The enactment of specific legislation governing judicial AI, including clear provisions that regulate and permit its use in litigation procedures, while defining its scope, controls, and the responsibilities of judges, programmers, and operators. Courts cannot adopt such technologies without an appropriate legal framework that authorizes their use (8).
- **Technical and Human Requirements:** These include the availability of technical infrastructure, such as devices and systems, as well as qualified personnel capable of operating AI-supported judicial platforms. Such personnel must possess sufficient knowledge and expertise in intelligent tools (8).

Characteristics of Artificial Intelligence in the Judicial Field

Artificial intelligence possesses a set of characteristics, the most important of which are:

1. Increased Business Efficiency: This means that artificial intelligence technology analyzes laws and legislation and deals with multifaceted issues such as financial and accounting claims, thus saving the effort and time required to read large case files. It analyzes this information and presents results to the court without the need for extensive analytical effort (9).

2. Overcoming Complex Problems: Artificial intelligence is capable of addressing complex problems faced by the system through the use of its applications, such as pattern-based information processing, data identification, and the provision of answers. Among the issues that AI technologies can handle are data analysis, the derivation of judicial decisions, and the provision of effective and systematic solutions to legal problems (8).

3. Making Smarter Decisions: AI platforms can identify trends, analyze data, and integrate information through predictive analytics. This contributes to improving the quality of judicial decision-making (9).

Research Problem

The problem lies in the following: What is the impact of using artificial intelligence (AI) technologies on litigation procedures, and to what extent do they contribute to enhancing justice, expediting case resolution, and facilitating access to justice? Furthermore, what is their effect on litigation guarantees such as integrity, impartiality, transparency, and the right to defense, or do they pose a threat to these fundamental principles?

Research Significance

This study's importance stems from the nature of its topic, which arises amid the significant changes taking place worldwide in digital justice, specifically regarding the incorporation of artificial intelligence (AI) technologies within the legal system. It is now crucial to methodically and scientifically examine the expanding impact of intelligent algorithms in case management, evidence analysis, and the provision of legal recommendations to identify potential advantages as well as potential risks. This study's significance is theoretical as well because it adds to the body of current legal literature by offering a thorough examination of the connection between contemporary technology and conventional notions of justice, emphasizing the legal and

Research Objectives

1. This study aims to define the concept and characteristics of artificial intelligence.
2. It seeks to clarify the effectiveness of applying artificial intelligence to litigation procedures.
3. It aims to identify the purpose of using artificial intelligence applications in litigation procedures.
4. It highlights the advantages and disadvantages of using artificial intelligence in judicial work, in terms of both efficiency and associated challenges.
5. It analyzes the impact of artificial intelligence on the course of judicial proceedings and the quality of judicial decisions.

Materials and Methods

The researchers adopted a descriptive-analytical approach by examining artificial intelligence and its application to litigation procedures, as well as analyzing various international legislative frameworks, **to identify** gaps in existing legal systems.

Research Plan

- 1. The Nature of Judicial Artificial Intelligence**
 - The concept of judicial artificial intelligence and the requirements for its application
 - The characteristics of judicial artificial intelligence
- 2. Regulations Governing the Use of Artificial Intelligence in Judicial Work, Its Advantages, Disadvantages, and Implications**
 - **Controls on the use of artificial intelligence technology**
 - **The effects of using artificial intelligence technology in judicial work**

Result

The Impact of Using Artificial Intelligence in Judicial Work

The findings of this study indicate that artificial intelligence technologies have a significant impact on judicial procedures, contributing to increased efficiency, reduced human error, and faster case resolution.

1. Legal Information and Claims Organization: Artificial intelligence systems are used to process court files and documents sent to court by litigants in an efficient way. To illustrate this, in the United States, the Discovery system is employed to analyze electronically typed information, categorize it, and connect it to pertinent cases. Such systems will also remove procedural problems with the case before the court, saving more time and effort than would be spent on traditional manual research and enabling judges to concentrate on the essence of the argument (10).
2. Providing legal advice and predicting case outcomes: Intelligent systems provide advanced estimates of potential case outcomes, helping parties make informed legal decisions before a verdict is issued. For example, American academics developed software programs that can predict the outcome of cases before the Supreme Court with up to 70% accuracy. In Europe, a similar program was designed for the European Court of Human Rights, which analyzes the presented facts and relies on previous rulings to reach accurate conclusions. These applications enhance individuals' ability to resolve disputes amicably and avoid future conflicts whenever possible (14).
3. Improving efficiency in simple cases and low-value financial claims: Artificial intelligence technologies enable the swift and accurate application of judicial procedures in routine cases, such as traffic violations, small financial claims, and some minor labor disputes. For example, some European courts have adopted smart programs for handling traffic violations where data is collected and processed electronically to issue decisions without the need for direct judicial intervention. These systems also help in analyzing case law to apply it to similar future cases, ensuring consistency in decisions and enhancing legal certainty for the parties involved (15).
4. Supporting Complex Judicial Decision-Making: Artificial intelligence can support judges in complex cases by providing in-depth analyses of the facts and linking them to case law, highlighting the key legal elements that must be considered. This role remains complementary to the human judge, enabling them to rely on accurate and consistent data to make fair and balanced decisions, without excluding the human element or judicial discretion, which represents the essence of justice (16).

It is worth noting the most prominent advantages and disadvantages of artificial intelligence in judicial work, which can be summarized as follows:

- **The Positive Impacts of Artificial Intelligence Technologies in the Judiciary**

1. **Expediting the adjudication of cases, particularly routine ones:** Artificial intelligence is considered an effective tool for accelerating judicial procedures, especially in routine cases such as traffic violations or minor financial disputes. For instance, in the United Arab Emirates, intelligent systems are used to analyze simple cases, which helps reduce the burden on courts and expedite the resolution of cases (17).
2. **Enhancing the accuracy of judgments and reducing human error:** Artificial intelligence contributes to improving the accuracy of judicial decisions through comprehensive analysis of legal data and judicial precedents. In the United Arab Emirates, AI is utilized in developing specialized language models such as “AraLegal-BERT,” which are employed to analyze legal texts in Arabic, thereby assisting judges and lawyers in making well-informed decisions (18).
3. **Enhancing legal transparency and the ability to review decisions:** Artificial intelligence technologies enhance legal transparency by documenting all stages of data processing and decision-making procedures. In Jordan, digital systems are used to document judicial procedures, enabling concerned parties to review decisions and verify their accuracy (17).
4. **Facilitating access to justice and remote court services:** Smart systems contribute to improving access to justice by providing remote court services. In Qatar, artificial intelligence technologies are used in investigation sessions, where extracted information is converted into written text, making it easier to access remotely (18).
5. **Supporting judicial decision-making based on a comprehensive analysis of legal data and precedents:** Artificial intelligence assists judges in making decisions based on a comprehensive analysis of legal data. In Qatar, AI is used to develop models for predicting case outcomes, helping judges and lawyers analyze cases more effectively.

- **Potential Negative Impacts of Artificial Intelligence Technologies in the Judiciary**

1. **Risk of Bias if Input Data is Unbalanced or Biased:** Biased data may lead to unfair outcomes. It is emphasized that balanced and unbiased data must be used in the development of AI systems to ensure justice.

2. **Potential Violation of Privacy and Personal Data Protection if Robust Security Systems are Not in Place:** Protecting personal data is of paramount importance. In Jordan, strict laws are in place to protect personal data, and the need to secure intelligent systems to guarantee privacy is emphasized (19).
3. **Over-Reliance on Technology May Reduce the Role of Human Understanding and Judicial Reasoning:** Despite the benefits of artificial intelligence, over-reliance on it may reduce the judge's role in interpreting laws and assessing facts. In Jordan, it is emphasized that the judge must remain the final decision-maker, while utilizing AI technologies as an aid (19).
4. **Legal and ethical challenges related to liability for decisions issued by intelligent systems:**

Significant concerns arise regarding liability for decisions generated by intelligent systems, particularly in the absence of a clear legal framework regulating such responsibility. In Jordan, there is currently no comprehensive legislation that defines liability for the use of artificial intelligence within the judiciary, creating uncertainty as to whether responsibility lies with the developer, the operator, or the judicial authority.
5. **Difficulty in interpreting automated decisions and ensuring their legal and social acceptance:**

Individuals may encounter challenges in understanding decisions produced by intelligent systems, especially when such decisions rely on complex algorithms. Therefore, these decisions must be transparent, interpretable, and accessible to all concerned parties to ensure both their legal validity and social acceptance.

Discussion

The results of this study demonstrate that the integration of artificial intelligence in judicial procedures offers significant benefits in terms of efficiency and accuracy. However, these findings also raise important legal and ethical considerations that must be addressed through appropriate regulatory frameworks.

Regulations for the Use of Artificial Intelligence in Judicial Work, Its Advantages, Disadvantages, and Impacts

Today, artificial intelligence represents one of the most prominent technologies that has reshaped the concepts of judicial work and legal services, due to its ability to **analyze data, expedite procedures, and contribute to accurate and effective decision-making**. As the use of this technology expands within the judicial system, it has become essential to establish **clear regulations** that govern its utilization, **ensuring** a balance between technological autonomy and the role of the human judge, while protecting the rights of all parties.

From this perspective, discussing the advantages and disadvantages of artificial intelligence becomes crucial, as it helps **identify appropriate areas of application** and avoid potential risks, **thereby enabling** the judiciary to make the most of this modern technology without compromising the principles of justice and transparency.

Based on the above, this study will examine:

1. **The regulations governing the use of artificial intelligence** in judicial work.
2. **The impacts of using artificial intelligence** on judicial procedures and the quality of rulings.

Regulations on Artificial Intelligence within the Judiciary

A set of basic principles should be followed to make sure that courts use the use of artificial intelligence technology effectively and safely. These rules ensure transparency and integrity of judicial proceedings, safeguard individual rights, and ensure that all parties are equal in presenting their substantive claims and defenses. Such a lack of guidelines would result in undesirable human rights ramifications in case the technology is applied in a way that does not necessarily adhere to foundational legal standards and human rights. The significance of this commitment could be illustrated through the experience of applying artificial intelligence to the sphere of medicine, where smart systems have also helped in monitoring those who have been infected with the coronavirus and their contacts. Such systems rely on information from various sources, including geolocation, credit cards, and transportation systems, which demonstrates how artificial intelligence can process a large and intricate amount of information with great precision.

Hence, the European Charter of Ethics on the Use of Artificial Intelligence in the Judiciary outlines a set of ethical standards necessary for employing this technology in the justice system. Adopted by the Justice Committee of the Council of Europe in December 2018 and subsequently adopted by the European Commission for the Efficiency of Justice (CEPEJ), the Charter includes several key guidelines, among them:

1. **Respect for Fundamental Rights:** AI systems that are used in courts should respect fundamental rights, such as the right to a fair trial within a reasonable period and the independence of the judiciary system without outside interference. Such systems must not affect the speed of case disposition at the cost of justice or the right to counsel. Furthermore, AI applications should ensure equality before the digital adjudicator, according to the norms set by the international treaties and conventions.
2. **Equality and Non-Discrimination:** AI should not be used in judicial or arbitral processes that lead to discrimination on an unlawful basis, through race, religion, socioeconomic status, or gender. The system must enable those concerned to present arguments and evidence to a fair hearing by all sides, thus upholding the principle of equal treatment as it would before a human judge and in accordance with constitutional provisions and international human rights documents.
3. **Quality and Information Security:** The AI systems of the Judges should be based on a reliable and secure technological infrastructure against unauthorized access and data leaks. Law and social science scholars, as well as judges and lawyers, should be actively involved in the development of machine learning models to ensure that they are in alignment with real-life situations and the complexity of the judicial procedures. This cooperative design will guarantee the reliability, accuracy, and effectiveness of AI outputs to inform judicial decision-making (10).
4. **Privacy and Data Protection:** Data protection and privacy are the key requirements in the application of AI in judicial decision-making. The data given by the parties should be properly saved and manipulated, and should not be accessed and altered by third parties according to the relevant national and international laws of data protection (11).
5. **Transparency and Impartiality:** The treatment of information about the case should be correct, legible, and subject to audit, and all the involved options and results should be available to all. This will provide a balance between the protection of the intellectual

property and the principles of fairness and transparency. Furthermore, human judges should reserve the right to consider the AI-based decisions under the legal mistake situation and preserve the integrity of the final verdict (12).

6. User Control of the System: It should be independent, unbiased, and fair when dealing with AI systems, and judges, investigators, or litigants are users of the system. AI as a decision-maker should not work autonomously; complete dependability on the system without human control can lead to inaccurate results. An example in point is the erroneous decision in more than two thousand cases of child support in the UK due to technical errors in AI-assisted cases (13).
7. Processing Legal Information: Legal data should be correct, organized, and processed electronically because mistakes in input data can lead to inaccurate court rulings and lower the efficiency of the system. AI systems must possess enough precedents and previous cases to form contextual cognition and make sound decisions. However, human intervention is also necessary to check the results, to make sure that they correspond to the justice of reality, and to avoid possible mistakes (12).

The laws that regulate the application of artificial intelligence (AI) to the judicial system are essential in ensuring the efficiency of the given technology and its safeguarding against possible threats. These rules not only pertain to the organization of the work of the intelligent systems, but they also protect basic individual rights, promote equality before the law, and ensure the objectivity and fairness of the court. Moreover, these regulations underline the importance of developing a unified approach towards human experience and technology, which means that the human factor will always remain the major part of the decision-making process, whereas smart systems will help in accelerating and speeding up the process of solving the simple and routine cases. Hence, these ethical and legal principles can be followed to the letter, ensuring that there is a balance between taking advantage of the opportunities offered by AI and maintaining human rights and improving the justice system in the courts, which are technological innovations without undermining the basic principles of the law.

The legal framework that regulates the application of artificial intelligence in the judicial system is one of the essential premises of both the efficiency of the said technology and its safety in the face of possible risks. It is not only the organization of the work of intelligent systems but also a broader scope of its responsibilities, namely, ensuring the safety of the basic rights of individuals,

equality in relationships, and openness and fairness to the judicial process. The same regulations also point to the need to combine the human factor and the technological ones, where the human factor is still the primary part and final decision-maker, and intelligent systems help to increase the speed and efficiency of dealing with simple and regular cases. As a result, the strict conformance to these ethical and legal requirements can be the guarantee to harmonize the advantages of artificial intelligence and the right to personal safety, human rights, and the propagation of justice in the courts, which is the development of technologies without violating fundamental legal principles.

The researchers argue that artificial intelligence technologies constitute a strategic tool for enhancing judicial efficiency by organizing legal information, providing advisory support, predicting case outcomes, and expediting the resolution of routine disputes. Nevertheless, the integration of such technologies must be accompanied by continuous human oversight, with strict adherence to fundamental rights, principles of transparency, and data protection. This approach ensures that the judiciary remains fair, effective, and capable of delivering justice in a balanced and equitable manner.

Conclusion

Based on the foregoing discussion of the previous sections, which addressed the concept of judicial artificial intelligence, its requirements, the implications of its use in judicial work, as well as the regulatory controls governing its application, the researchers have reached the following findings and recommendations:

Findings:

1. A significant positive impact of artificial intelligence has been observed in accelerating litigation procedures and reducing the burden on courts. The study shows that AI contributes to automating routine tasks (such as case registration and notification of litigants), thereby enhancing the efficiency of the judicial system and reducing case backlogs. This necessitates strengthening the judicial digital infrastructure through the establishment of secure, unified platforms linked to centralized databases that support the effective functioning of intelligent systems.

2. The use of artificial intelligence accelerates litigation procedures and reduces the time, effort, and costs required to resolve disputes, which positively reflects on litigation processes and contributes to the stability of the judiciary.
3. The primary objective of adopting artificial intelligence lies in creating an integrated system of legal and judicial information that enables judges and lawyers to access and utilize such information efficiently. This is particularly important as traditional access to such information is time-consuming, leading to repeated adjournments and accumulation of cases.
4. Artificial intelligence can be effectively utilized in simple and routine cases. The study demonstrates that disputes of a routine nature (such as traffic violations and minor financial claims) can be resolved electronically with speed and accuracy.
5. There is difficulty in determining legal liability for decisions supported by artificial intelligence, as no clear legal provisions currently specify responsibility in cases of errors resulting from the use of intelligent systems, which may adversely affect litigants' rights.
6. Ethical challenges arise concerning neutrality and transparency, as well as the potential reduction of the human dimension in the administration of justice, thereby limiting human reasoning and judicial discretion.
7. The use of artificial intelligence in litigation procedures may contribute to increased unemployment due to the replacement of certain roles, particularly legal researchers and assistants.
8. There is a weakness in the legal protection of data used within intelligent systems. The study indicates that the absence of specific legal provisions governing the protection of judicial digital data may expose it to breaches or misuse. This requires the inclusion of binding legal rules to ensure data protection and confidentiality, along with sanctions for violations.

Recommendations:

1. Enacting a dedicated legal framework for judicial artificial intelligence that clearly regulates its scope of use in litigation procedures, defines its controls, and specifies the responsibilities of judges, programmers, and operators, while maintaining the judge as the final authority in decision-making.

2. Strengthening the judicial digital infrastructure through the establishment of secure, unified judicial platforms connected to centralized databases of legislation and case law, thereby enhancing the efficiency of intelligent systems and accelerating dispute resolution.
3. Establishing legal requirements that mandate artificial intelligence systems to produce outputs that are explainable and understandable to judges and litigants. Any decision that is not legally or technically explainable should not be considered valid to ensure transparency and fairness.
4. Clearly defining legal liability for decisions and errors resulting from the use of intelligent systems, whereby the programmer or operator bears responsibility in cases of negligence or technical defects, while the judge remains responsible for the final decision.
5. Implementing artificial intelligence gradually, starting with simple and routine cases (such as traffic violations and minor claims), followed by expansion based on periodic evaluation of its effectiveness and compatibility with the judicial system.
6. Precisely regulating liability for damages resulting from artificial intelligence, whereby the programmer or provider bears civil or criminal responsibility in cases of negligence or programming defects, while maintaining the judge as the final decision-maker. The legislation may include explicit provisions defining the distribution of responsibility among the concerned parties.
7. Establishing the principle of transparency and mandatory explainability of automated decisions through clear legal provisions, to prevent algorithmic bias and ensure confidence in digital judicial outcomes.

Acknowledgments

The authors would like to express their sincere appreciation to all individuals who contributed to the completion of this research.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this research.

Funding

This research received no external funding.

Ethics Statement

This study does not involve human participants or animal subjects.

Author Contributions

All authors contributed equally to the conception, design, analysis, and writing of this manuscript.

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