

Artificial Intelligence in Legal Research: Mechanisms and Challenges

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Abstract: Legal research has been greatly enhanced owing to the introduction of AI technologies that aid in accessing legislation, case law, and legal literature and analyzing legal information and generating relevant conclusions. Thus, the efficiency, effectiveness, and accuracy of legal research become better while at the same time saving time and efforts.

However, there are some difficulties in the application of AI in legal research, and they concern algorithmic biases as well as privacy and confidentiality issues related to legal information. Therefore, legal researchers have to apply AI technologies as an assistant only and examine the outcomes of their work critically, as well as follow legal and ethical standards that guarantee accuracy and quality of legal research.

Keywords: Artificial Intelligence; Legal Research; Digital Transformation; Legal Information; Machine Learning.

1. INTRODUCTION

The introduction of artificial intelligence is among the biggest technological changes impacting academic and professional sectors, such as legal research. The application of AI involves the implementation of machine learning and natural language processing techniques, helping to speed up the search for sources and references in legal research, such as legislation, legal doctrine, and judicial decision-making. These technologies also enable effective analysis of legal materials, as well as the extraction and identification of information, producing trustworthy results, which increases the quality of scholarly studies. This is especially true considering the drawbacks of conventional research techniques, such as difficulty to cover all the sources due to their high number and the need for much time and effort.

Nevertheless, the use of advanced AI technologies poses several problems. First of all, due to the nature of legal research, which presupposes high precision, legal reasoning,

and interpretation, there appear doubts about the accuracy and validity of information provided by AI and its possible mistakes in analysis and interpretation.

In this study, an attempt will be made to analyze how artificial intelligence may be used for conducting legal research and how it helps in enhancing legal scholarship. Besides, an effort will be made to analyze the main problems faced by the legal researchers and some appropriate steps will be taken to ensure the optimal use of artificial intelligence in conducting legal research.

Therefore, in this study, the following research question will be addressed:

What is the contribution of the integration of artificial intelligence towards advancing legal research?

To answer the above research question, this study follows a descriptive-analytical method and is divided into the following sections:

- Mechanisms for Using Artificial Intelligence in Legal Research.
- Problems in Using Artificial Intelligence in Legal Research.

2. Mechanisms for Using Artificial Intelligence in Legal Research

Artificial intelligence may be used at different stages of legal research including the collection and analysis of legal information and writing of legal research.

2.1 Mechanisms of Applying Artificial Intelligence in Collecting and Analyzing Legal Information

Finding and collecting legal documents was a time-consuming task for legal researchers before. But now that there is artificial intelligence, researchers can collect all possible legal sources and references and access relevant legal information on their research topics within seconds thanks to complete legal databases¹. With AI, researchers can find and sort legal materials, categorize them in terms of relevancy and up-to-dateness, and produce brief outlines of separate sources. Thus, AI makes it possible to conduct legal research in a more efficient way without being overloaded with excessive legal information².

A smart legal platform for conducting legal research is one of the major examples of the application of AI in legal research. Smart legal research platforms use natural language

¹ Zeinab Dheif Allah, "Artificial Intelligence and the Law," *Journal of Law and Environmental Sciences*, Vol. 2, No. 3, 2023, p. 380.

² Tafari Zakaria, "Ethical and Value-Based Standards for the Use of Artificial Intelligence in Scientific Research: A Field Study on a Sample of Algerian Students," *Al-Mi'yar Journal*, Vol. 9, No. 1, 2024, p. 1007.

processing, machine learning¹, and big data analytics to check large volumes of legislation, judgments, and doctrine in a short while. These legal documents are categorized based on their subject matter and the contents analyzed and relevant results obtained.

Notable AI-based legal research tools include:

LEXIS+ (LexisNexis): As one of the most sophisticated legal research tools in the market, this tool gives access to legal literature, legal journals, regulations, and all other legal materials. The tool utilizes artificial intelligence in understanding legal texts and providing relevant and precise answers to users.

Westlaw Edge: Designed to analyze judicial decisions, legal memoranda, and case law while identifying relevant judicial precedents. Its Quick Check feature recommends relevant legal sources and flags unreliable or weak references. The KeyCite Overruling Risk feature enables researchers to determine whether cited precedents have been overruled or otherwise weakened, while Statutes Compare identifies and compares amendments made to statutory provisions with their previous versions.

CoCounsel: An advanced AI-powered legal research assistant that employs sophisticated algorithms to search legal databases efficiently. It facilitates the retrieval and analysis of legal authorities, suggests relevant references, proposes revisions, and generates responses to legal questions.

Harvey AI: An AI legal assistant capable of recommending legal references, analyzing legal texts and contracts, and providing answers to legal questions.

HeinOnline: A complete legal research platform which allows users to find various legal references.

PaperBrain: An AI-supported academic research platform which allows users to fast identify and understand and arrange academic references through AI-generated summaries and analytical information².

These AI-based tools use Natural Language Processing to understand researchers' questions which they use to perform instant searches through large legal databases for finding and studying judicial decisions and statutory laws and other legal documents that relate to the research subject.

¹ Azzedine Haddou, *The Use of Artificial Intelligence in Scientific Research: The Humanities and Social Sciences as a Model Towards Sustainable and Responsible Integration*, Jeel Scientific Research Center, No. 108, 2024, p. 9.

² Ahmed Maher Mohamed El-Kebir Ahmed and Hijazi Yassin Ali Hussein, "The Use of Artificial Intelligence Tools in Scientific Research," *Arab International Journal of Information Technology and Data*, Vol. 3, No. 4, 2023, p. 62.

AI technologies help legal researchers to discover relevant prior studies rapidly and systematically, categorize, evaluate, and summarize the retrieved literature and build their own digital libraries for future use. This greatly assists identifying new legal developments and principles.

2.2 Mechanisms for Employing Artificial Intelligence in Scholarly Legal Writing

Scholarly legal writing is one of the most demanding phases within legal research, it really takes a lot of time and effort, plus clarity, precision, and a firm level of legal reasoning, along with careful critical review of legal sources and their references. Because of that, legal researchers are more and more turning to artificial intelligence (AI) tools so they can streamline, and in a way ease, the academic drafting process.

In practice, AI- assisted scholarly writing tends to show a few main benefits, such as:

Speed: AI applications, notably ChatGPT, can draft a coherent passage within a matter of seconds, and then it is easier to keep moving.

Creativity: AI systems can propose various draft options, they provide feedback and workable suggestions on what the researcher wrote, and they also help fix spelling, plus grammar related mistakes¹.

AI powered writing tools kind of make it easier to draft and polish legal research, mainly by producing linguistically structured text and helping researchers arrange and present legal arguments in a more coherent way. They also assist with academic referencing, like when the system automatically links in text citations back to their original sources. On top of that, AI based plagiarism detection software helps researchers steer clear of academic misconduct by checking submitted manuscripts against huge databases, and yeah that matters. One of the most commonly used tools is Turnitin, which is used a lot by universities and peer reviewed journals to spot plagiarism. Lately, the software has improved so it can paragraph that was generated by artificial intelligence too, and this supports researchers in making sure citations are actually correct while also keeping academic integrity and scholarly ethics intact².

Besides that, AI applications can offer automatic spelling and grammar correction, provide solid translation services, and support the generation of tables that match research data. They then also help with analysis and interpretation within a short period, in a kind of faster cycle than usual, or at least that's the intent³.

Among the most prominent AI assisted writing and research tools are as follows:

¹SEBTI Siham, Abbas Mounir, "The Use of Artificial Intelligence in Scientific Research and Its Contribution to Achieving Sustainable Development," *Annals of the University of Algiers 1*, Vol. 38, No. 3, 2024, p. 111.

² Sirine Hadjer Zaabata and Omar Sebbagh, "The Use of Artificial Intelligence Tools in Scientific Research in the Fields of Social Sciences and Humanities: Advantages and Limitations," *Journal of Human Sciences*, Vol. 34, No. 3, 2023, p. 156.

³ Ahmed Maher Mohamed El-Kebir Ahmed and Hijazi Yassin Ali Hussein, op cit., p. 63.

ChatGPT: One of the most widely used AI applications, it helps researchers through basically all stages of scientific research, and especially while writing.

Zotero: Aids with research management, also with organizing and formatting bibliographic references.

Mendeley: Generates and arranges bibliographic references automatically, which feels like a time saver.

Jasper AI: Often assists with summarizing documents and writing academic content in English, using something close to natural phrasing.

Grammarly: Improves linguistic quality, plus readability for English language academic writing.

QuillBot and Wordtune: They rewrite, and they sometimes make academic paragraphs simpler.

Compose: Another AI assisted writing and editing tool.

Corrector App: Detects and fixes typographical errors, spelling issues, and grammatical errors, pretty straightforward.

EndNote: A full featured reference management system, used for organizing citations and bibliographies.

Now, advanced AI models made by OpenAI and Google DeepMind are some of the prominent technologies that support text analysis and also push scientific research forward. OpenAI's generative AI models use deep learning methods to generate linguistically accurate, high-quality text, and this can support compliance with the usual conventions of academic writing while reducing the time and effort it takes during writing legal research, or so the pitch goes.

In a similar way, Google DeepMind contributes to the analysis of academic texts with smart text analysis technologies. These can extract specific information, analyze research data, and pick out key ideas more efficiently. As a result, scientific research productivity improves and gets a bit faster¹.

The use of machine learning algorithms and NLP makes it possible for researchers to conduct an automated analysis and interpretation of legal texts by means of establishing implicit connections, extraction of information, identification of new research topics,

¹ Abdelmalek Yahia and Rawya Dilemi, "Prospects of Artificial Intelligence in Academic Publishing and the Analysis of Scientific Research," *Al-Jami' Journal of Psychological Studies and Educational Sciences*, Vol. 9, No. 2, 2024, p. 310.

and determination of research gaps that were not covered before. In addition, it promotes interdisciplinary research and collaboration within academia¹.

In addition, artificial intelligence is used to enhance the academic publication process through such specific applications as proofreading and plagiarism detection².

3. Challenges in Using Artificial Intelligence in Legal Research

There are several challenges in using artificial intelligence in legal research which can have negative effects on the quality and credibility of legal scholarship if technologies are not used carefully. They include:

3.1 Legal and Ethical Challenges

Some of the biggest challenges related to using artificial intelligence in legal research have a legal and ethical nature. They are concerned with academic integrity, intellectual property rights, and confidentiality of legal information.

3.1.1 Academic Scientific Integrity

In 2020, ESRC and Oxfam pointed out integrity and transparency among the essential principles of scientific research. One of the crucial demands of scholarly research is the principle of academic integrity according to which the scholars must provide proper attribution of the information to the initial source. Thus, legal researchers are obliged to check the veracity of the information as well as of the sources used³.

The overwhelming quantity of information accessible in the rapidly developing digital environment – usually characterized by the absence of any control or restrictions on its use – makes academic fraud more likely, including both intentional and unintentional plagiarism⁴.

Consequently, full reliance on AI technology in producing academic works can be regarded as academic plagiarism since the scholars can copy the text without mentioning the AI generator, or the AI tool can create the text using the sources which have not been cited. Even more importantly, AI technology may fabricate the citations and the legal references.

Therefore, researchers using artificial intelligence technology must strictly conform to the principles of academic integrity and follow the ethical standards of scientific

¹ Abdelmalek Yahia and Rawya Dilemi, *op cit.*, p. 311.

² *Ibid.*, p. 309.

³ Merah Ali, *Methodology of Legal Thinking*, Office des Publications Universitaires (OPU), Algeria, 2004, p. 63.
See also: Abdullah bin Mohammed Ali Al-Zahrani, "Ethical Values and Regulatory Principles Governing the Use of Artificial Intelligence in Scientific Research," *Journal of Artificial Intelligence and Information Security*, Vol. 2, No. 4, p. 11.

⁴ El Khamessa Ramadan and Al-Ayeb Meriem, "Academic Plagiarism in the Digital Environment," *Bibliophilia Journal for Library and Information Studies*, Vol. 5, No. 13, 2023, p. 102.

See also: Abdelkader Al-Sheikhli, *Legal Research Methodology*, Majdalawi Publishing House, Amman, 1982, p. 66.

research. Artificial intelligence should only be used as an aid to research but never as a replacement for one's independent thinking and analysis. these technologies must be applied in a responsible, ethical manner, and in accordance with the principles of academic integrity¹.

3.1.2 Privacy and Protection of Personal Data

Privacy and personal data security is one of the key issues that should be considered by legal scholars while using artificial intelligence technologies. Confidential legal data may accidentally appear in public domain if they are used in the process of training of AI without permission of data subjects. Moreover, AI programs can store copies of uploaded documents or data in order to further process or enhance their model. In this way, the confidentiality principle can be violated.

3.1.3 Transparency and Credibility

Transparency and credibility can be called major challenges of artificial intelligence usage in academic publishing. First and foremost, it is necessary to pay attention to the neutrality and explainability of the algorithms used. It is known that many artificial intelligence systems function as black boxes, so it is very hard to understand the logic of decision-making related to evaluation of manuscripts, legal analysis or detection of plagiarism.

Accordingly, the AI-based algorithms should have a sufficient level of transparency for independent consideration and evaluation of these algorithms by scholars, reviewers, and academic institutions. However, it is necessary to strike a balance between the use of AI tools that speed up language proofreading, legal research, and data analysis and the preservation of such core components of scientific inquiry as originality, innovations, critical thinking, hypothesis development, legal reasoning, and research findings interpretation, which should remain within the researcher's sole responsibility².

Additionally, the excessive use of artificial intelligence can weaken the role of researchers in research and lead to the deterioration of such researcher's qualities as originality, creativity, and logical thinking because it is much easier to get summaries and research content prepared with the assistance of AI. Therefore, the use of artificial intelligence ought to be complimentary to, but not a substitute for, the knowledge of human beings³.

¹ Sawsen Lounanessa, "Trends Among Algerian Researchers Regarding the Use of Artificial Intelligence Technologies in Scientific Research," *Al-Risalah Journal for Human Studies and Research*, Vol. 9, No. 3, 2024, p. 518.

² Abdelmalek Yahia and Rawya Dilemi, op cit., p. 313.

³ Ben Cheikh Naoui, "The Role of Artificial Intelligence in Harnessing Scientific Research for Sustainable Development," *Journal of Law and Environmental Sciences*, Vol. 2, No. 2, p. 1098.

3.2 Technical Challenges

The use of artificial intelligence in legal research also faces several technical problems that will negatively impact the quality of the research results. These problems include the following:

3.2.1 Algorithmic Bias

Algorithmic bias is described as the act of discrimination and preference towards certain characteristics or traits through the use of results produced by an artificial intelligence program that leads to the discrimination against individuals according to some particular characteristic or trait. Algorithmic bias usually occurs due to the use of biased data in the training process of AI. Bias normally develops where AI models are trained using data that already has existing biases, partial information, or discrimination, hence perpetuating these biases through the output generated by the AI systems¹. Therefore, the validity and neutrality of AI-produced analyses of law are not always assured, especially when the decision-making process depends on complex and obscure algorithms trained on unbalanced, biased, or incomplete data sets.

3.2.2 Misinformation and AI Hallucinations

AI technologies could produce false and misleading information based on different factors. These include reliance on sources whose information is not sufficiently verified, erroneous machine translations that alter the actual legal meaning, or out-of-date information that does not capture. The problem is especially prominent in the field of law because legislation and court rulings are constantly changing. In this regard, the use of AI software like ChatGPT, which is the most common AI tool among scientists, uses the information available until a certain point in time².

Moreover, AI technology is fundamentally constrained by its inability to properly understand the wider context of law within which legal texts exist. AI systems lack the capability to grasp the historic, social, political, or economic conditions that prevailed during the time the legislature was enacted, nor the legislative intentions behind the act or the intricacies involved in interpretation of jurisprudence. Generative AI technologies have the potential to generate content that sounds highly plausible and legitimate, but is logically flawed or factually wrong. The gravity of this issue is that they are able to generate highly persuasive yet completely fabricated facts, such as fictitious legal authorities, citations, hyperlinks, and people altogether. This issue is known as AI hallucinations and constitutes one of the major threats posed by generative AI.

¹ Mahmoud Salama Al-Sharif, "The Criminalization of Algorithmic Bias," *Al-Zaytoonah University of Jordan Journal for Legal Studies*, Special Issue, 2024, pp. 842–843.

² Haissam Nasreddine, "Research Ethics in the Age of Artificial Intelligence: ChatGPT and the Problem of Academic Plagiarism," *Qabas Journal for Humanities and Social Studies*, Vol. 8, No. 1, 2024, p. 1180.

Probably, one of the most common examples highlighting the risks of this issue pertains to a lawyer who used ChatGPT in preparing a legal submission. The artificial intelligence generated fictional facts and citations that were not even real in existence.

In this regard, Shane Orlick, the Head of AI Content Generation at Jasper, very accurately pointed out:

4- Conclusion

The use of artificial intelligence in legal scientific research has become absolutely necessary. At present, legal researchers use a variety of AI technologies as assistive tools in conducting and writing scientific articles. The application of these technologies greatly increases the speed and efficiency of the search, organization, and analysis of sources and references in the process of conducting legal research. However, their efficiency will be determined by their ethical application along with strict compliance with the principles of academic and professional integrity, which will ensure the quality, credibility, and reliability of scientific research.

Concluding from the above analysis, the study derives the following findings:

- Artificial intelligence is a key factor that greatly boosts the accessibility of legal information, as well as helps analyze legal texts, court rulings, and other legal documents.
- AI technology contributes greatly to increasing the effectiveness of the work of researchers who are working on their legal projects.
- The application of artificial intelligence in legal research poses a number of legal and ethical issues, primarily those associated with academic integrity, confidentiality, and privacy issues.
- However, there are certain technical issues associated with AI usage, such as inaccuracies and misrepresentation of the information, AI hallucinations, and algorithmic bias.

Considering the aforementioned results, the following recommendations have been suggested:

- Raise awareness about artificial intelligence and the ways in which it is used in legal research through training and workshops targeted at students and researchers in law with special attention to the proper and responsible use of artificial intelligence technologies.
- Create comprehensive legislation and ethical standards for the use of artificial intelligence in legal research.
- Do not depend too much or even exclusively on artificial intelligence.

- Never engage in any academic misconduct such as plagiarism and fabrication made possible by artificial intelligence.

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