International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 10 Issue: 07 | July 2023 www.irjet.net p-ISSN: 2395-0072

The Role of AI Technology for Legal Research and Decision Making

Md. Shahin Kabir[1], Mohammad Nazmul Alam[2]

[1]Assistant Professor, Department of Law, Raffles University, Neemrana, Rajasthan, India
[2]Assistant Professor, Faculty of Computing, Guru Kashi University, Talwandi Sabo, Bathinda, India

---

Abstract - *This paper examines the evolving role of Artificial Intelligence (AI) technology in the field of law, specifically focusing on legal research and decision making. AI has emerged as a transformative tool in various industries, and the legal profession is no exception. The paper explores the potential benefits of AI technology in legal research, such as enhanced efficiency and comprehensive results. It also highlights the role of AI in document analysis, predictive analytics, and legal decision making, emphasizing the need for human oversight. However, the paper also acknowledges the challenges and ethical considerations associated with AI implementation, including transparency, bias, and privacy concerns. By understanding these dynamics, the legal profession can leverage AI technology effectively while ensuring responsible and ethical use.*

Keyword: **Artificial Intelligence, Legal research, Decision making, Machine learning, Expert systems.**

I. INTRODUCTION

Artificial intelligence (AI) has become increasingly prevalent in various industries, and the legal profession is no exception. In recent years, the use of machine learning (ML) and natural language processing (NLP) has gained significant attention for its potential to enhance legal researchwith various applications ranging from legal research, document review, predictive analytics, and decision-making. The objective of this research paper is to analyze the impact of machine learning, expert systems, and natural language processing on legal research and decision-making. The paper aims to explore the potential benefits and drawbacks of these technologies in the legal profession and its implications for lawyers, clients, and the legal system as a whole.

II. LITERATURE REVIEW

AI refers to the ability of machines to perform tasks that typically require human intelligence, such as reasoning, learning, and perception. Machine learning is a type of AI that enables machines to learn and improve their performance without being explicitly programmed. NLP is a subset of AI that focuses on the interaction between computers and natural human language.

Previous research has demonstrated the potential of AI to revolutionize the legal profession. For example, a study by Katz et al. (2017) used machine learning algorithms to predict the outcomes of Supreme Court cases, achieving an accuracy rate of 70.2%. Another study by Aletras et al. (2016) used NLP to predict the decisions of the European Court of Human Rights, achieving an accuracy rate of 79%.

However, there are also critiques of the use of AI in the legal profession. Some argue that the use of AI could lead to the replacement of human lawyers and judges, while others raise concerns about bias in AI algorithms and the potential for errors in decision-making.

III. AI IN LEGAL RESEARCH AND DECISION-MAKING

Legal research involves the process of finding relevant legal information to support legal arguments and decisions. Traditionally, legal research has been performed manually by human lawyers, which can be time-consuming and prone to errors. The use of AI, particularly machine learning and NLP, has the potential to enhance legal research by automating some of the processes and improving the accuracy and efficiency of results.

AI tools used in legal research include legal research databases, document review software, and chatbots that can answer legal questions. For example, ROSS Intelligence is an AI-powered legal research tool that uses NLP to understand natural language questions and provide relevant legal information.

Legal decision-making involves the process of interpreting and applying the law to specific cases. Traditionally, legal decision-making has been performed by human judges and lawyers, based on their interpretation of legal statutes and case law. The use of AI, particularly machine learning, has the potential to enhance legal decision-making by providing insights and predictions based on large amounts of legal data.

AI tools used in legal decision-making include predictive analytics software and decision support systems. For example, Lex Machina is an AI-powered decision support tool that uses machine learning to analyze legal data and provide insights into trends and patterns. Some of the AI applications for legal systems are explained below:

1) Due Diligence: The process of due diligence, which involves verifying facts and figures and thoroughly assessing legal situations, is a crucial task performed by lawyers on behalf of their clients. It enables lawyers to provide intelligent advice on available options and recommended actions. However, traditional due diligence can be time-consuming and tedious, leaving room for errors and inaccuracies, especially during spot checks.

Recognizing the challenges faced by lawyers, several software companies have emerged with innovative solutions to enhance the due diligence process. These companies leverage artificial intelligence (AI) and machine learning technologies to automate and streamline various aspects of due diligence, ultimately improving accuracy and efficiency.

2) Kira Systems: Founded by Noah Waisberg, a former M&A lawyer, Kira Systems offers software that performs accurate due diligence contract reviews. It employs advanced algorithms to search, highlight, and extract relevant content for analysis. Team members can easily access the extracted information and cross-reference it with the original source. Kira Systems claims that its software can expedite the process by up to 40% for first-time users and up to 90% for experienced users.

3) LEVERTON: LEVERTON, an offshoot of the German Institute for Artificial Intelligence, specializes in AI-powered data extraction, document management, and lease compilation for real estate transactions. Its cloud-based tool can swiftly read contracts in 20 languages, extracting vital information such as payable rent, maintenance costs, and expiration dates. By organizing this data into a convenient spreadsheet format, LEVERTON significantly simplifies the due diligence process.

4) eBrevia: eBrevia was founded by Ned Gannon and Adam Nguyen, who experienced the challenges of reviewing multiple contracts as junior associates. Their startup, in collaboration with Columbia University, harnesses natural language processing and machine learning to extract relevant textual data from legal contracts and other documents. Lawyers can customize the software to extract specific information, which is then converted into searchable text. The extracted documents are summarized into comprehensive reports that can be shared and downloaded in various formats. eBrevia claims to analyze over 50 documents in under a minute, surpassing the accuracy of manual reviews by 10%.

5) JPMorgan: JPMorgan developed in-house legal technology tools, including COIN (Contract Intelligence), an AI program that can extract 150 attributes from 12,000 commercial credit agreements and contracts in a matter of seconds. This automation saves the equivalent of 36,000 hours of manual work annually for the bank's lawyers and loan officers.

6) ThoughtRiver: ThoughtRiver focuses on risk management by handling contract reviews, portfolio assessments, and investigations. Its Fathom Contextual Interpretation Engine, developed in collaboration with machine learning experts at Cambridge University, automates the summary of high-volume contract reviews. Users can explore content extracts and gain insights into clause meanings provided by the AI. The system also automatically flags risky contracts.

7) LawGeex: LawGeex employs machine learning, text analytics, statistical benchmarks, and legal expertise to validate contracts based on predefined policies. If a contract fails to meet the standards, the AI suggests edits and approvals. The company claims that its software can reduce costs by 90% and contract review time by 80%, although detailed case studies supporting these claims are not readily available. Deloitte and Sears are among the current customers of LawGeex.

8) Legal Robot: San Francisco-based Legal Robot offers Contract Analytics, a software solution that converts legal content into a numerical format. It uses machine learning and AI to raise issues within the document. While still in beta, Legal Robot aims to provide lawyers with advanced analytical capabilities.

9) Ross Intelligence: ROSS Intelligence supports lawyers in their legal research endeavors by offering natural language search capabilities that allow lawyers to ask questions and receive relevant information, including recommended readings, related case law, and secondary resources. The software uses machine learning algorithms to analyze vast amounts of legal data and improve its responses over time. BakerHostetler, a law firm with a long-standing history, has embraced ROSS Intelligence in its bankruptcy department to navigate through 27 terabytes of data effectively. By searching through billions of documents, ROSS quickly provides accurate answers and references, enhancing the firm's operations.

10)Casetext:: Casetext offers CARA, a powerful tool that enables lawyers to anticipate opposing counsel's arguments by finding previously used legal opinions. Lawyers can also identify cases that have been negatively treated or flagged as unreliable. Casetext has gained recognition among prominent law firms such as DLA Piper and Ogletree Deakins, who have become their clients.

These innovative AI companies are transforming the due diligence process, empowering lawyers to work more efficiently, reduce errors, and enhance their overall decision-making capabilities. By automating various tasks, extracting relevant data, and providing comprehensive

analysis, these technologies are reshaping the legal landscape and making due diligence more accurate, faster, and cost-effective. As the field of AI continues to advance, we can expect further advancements and wider adoption of these technologies within the legal profession.

A. Machine learning and legal research

Machine learning is a subset of AI that enables computer systems to learn and improve from experience without explicit programming. In the legal profession, machine learning algorithms can be trained to analyze vast amounts of legal data, including case law, statutes, and regulations. Machine learning algorithms can be used to assist lawyers in legal research by identifying relevant cases, extracting legal principles, and predicting the outcome of a case based on the facts and legal arguments presented.

One example of machine learning in legal research is the use of predictive analytics software. Predictive analytics software can analyze historical case law data to identify patterns, correlations, and trends. This information can help lawyers to predict the outcome of a case and develop more effective legal strategies. For example, a lawyer defending a client in a patent infringement case can use predictive analytics to determine the likelihood of success based on the judge's past decisions in similar cases.

B. Expert systems and decision making

Expert systems are computer programs designed to mimic the decision-making capabilities of human experts. In the legal profession, expert systems can be used to assist lawyers in making legal decisions by analyzing legal data and providing recommendations based on predefined rules and knowledge bases.

One example of an expert system in the legal profession is the use of decision support systems (DSS). DSS can assist lawyers in making complex legal decisions by analyzing legal data, providing recommendations, and evaluating the potential outcomes of different legal strategies. DSS can also help lawyers to identify potential risks and develop contingency plans.

C. Natural Language and document review

Natural language processing (NLP) is a subset of AI that enables computers to understand, interpret, and generate human language. In the legal profession, NLP can be used to assist lawyers in document review by analyzing legal documents, identifying key concepts, and extracting relevant information.

One example of NLP in the legal profession is the use of eDiscovery software. eDiscovery software can analyze large volumes of legal documents, including emails, contracts, and court transcripts. The software can identify relevant documents and extract key information, such as dates, names, and events. This information can help lawyers to prepare for trial, assess the strength of their case, and identify potential evidence.

IV. Benefits and Drawbacks of AI in the Legal Profession

The use of AI in the legal profession has the potential to offer numerous benefits, including increased efficiency, accuracy, and cost savings. AI can assist lawyers in performing repetitive and time-consuming tasks, such as legal research and document review, allowing them to focus on more complex legal tasks.

However, the use of AI in the legal profession also raises several concerns. One of the main concerns is the potential for bias in AI algorithms. AI algorithms can only be as unbiased as the data they are trained on. If the training data contains biases, the AI algorithm will replicate those biases, leading to potential discrimination in legal decision-making.

Another concern is the potential for AI to replace human lawyers. While AI can assist lawyers in performing tasks more efficiently, it cannot replace human judgment, empathy, and ethical considerations. The legal profession requires a human touch, particularly in cases where legal decisions have significant social and economic implications.

V. Ethical and Legal Considerations

The use of AI in the legal profession raises various ethical and legal considerations. Ethical concerns include the potential for bias in AI algorithms, the potential for errors in decision-making, and the impact on the job market for human lawyers and judges. Legal issues include liability for errors made by AI systems, the need for regulations and standards for AI in the legal profession, and the potential for AI to undermine legal principles such as fairness and justice.

VI. Future Implications

The use of AI in the legal profession is still in its early stages, and there is much potential for further development and refinement. As AI technology continues to evolve, it is likely that its impact on the legal profession will only increase. However, it is important to carefully consider the ethical and legal implications of AI in the legal profession and to ensure that it is used in a responsible and transparent manner.

VII. CONCLUSION

In conclusion, this paper has analyzed the impact of artificial intelligence on the legal profession, with a focus on legal research and decision-making. The use of AI, particularly machine learning and natural language processing, has the potential to enhance the efficiency and accuracy of legal research and decision-making. However, there are also ethical and legal considerations that must be carefully considered to ensure that AI is used in a responsible and transparent manner. As AI technology continues to evolve, it is likely that its impact on the legal profession will only increase, and it is crucial to carefully monitor and regulate its use to ensure that it serves the interests of justice.

REFERENCES

[1] N. Aletras, D. Tsarapatsanis, D. Preoţiuc-Pietro, and V. Lampos, "Predicting judicial decisions of the European Court of Human Rights: A natural language processing perspective," PeerJ Computer Science, vol. 2, p. e93, 2016.

[2] D. M. Katz, M. J. Bommarito II, and J. Blackman, "Predicting the Behavior of the Supreme Court of the United States: A General Approach," PloS one, vol. 12, no. 4, p. e0174698, 2017.

[3] Lex Machina, "Lex Machina: Legal analytics and data-driven insights," Lexmachina.com, 2023. [Online]. Available: https://lexmachina.com/. [Accessed: Apr. 24, 2023].

[4] ROSS Intelligence, "ROSS Intelligence: Legal research powered by artificial intelligence," Rossintelligence.com, 2023. [Online]. Available: https://www.rossintelligence.com/. [Accessed: Apr. 24, 2023].

[5] https://emerj.com/ai-sector-overviews/ai-in-law-legal-practice-current-applications/

[6] Loureiro, S. M. C., Guerreiro, J., & Tussyadiah, I. (2021). Artificial intelligence in business: State of the art and future research agenda. *Journal of Business Research*, *129*, 911–926. https://doi.org/10.1016/j.jbusres.2020.11.001

[7] Susskind, R. E. (1986). EXPERT SYSTEMS IN LAW: A JURISPRUDENTIAL APPROACH TO ARTIFICIAL INTELLIGENCE AND LEGAL REASONING. *The Modern Law Review*, *49*(2), 168–194. https://doi.org/10.1111/j.1468-2230.1986.tb01683.x

[8] Cohen, M. C., Dahan, S., Khern-am-nuai, W., Shimao, H., & Touboul, J. (2023). The use of AI in legal systems: determining independent contractor vs. employee status. *Artificial Intelligence and Law*. https://doi.org/10.1007/s10506-023-09353-y

[9] Aslan, O., & Samet, R. (2020). A Comprehensive Review on Malware Detection Approaches. In *IEEE Access* (Vol. 8, pp. 6249–6271). Institute of Electrical and Electronics Engineers Inc. https://doi.org/10.1109/ACCESS.2019.2963724

[10] Verheij, B. (2020). Artificial intelligence as law: Presidential address to the seventeenth international conference on artificial intelligence and law. In *Artificial Intelligence and Law* (Vol. 28, Issue 2, pp. 181–206). Springer. https://doi.org/10.1007/s10506-020-09266-0

[11] Verheij, B. (2020). Artificial intelligence as law: Presidential address to the seventeenth international conference on artificial intelligence and law. In *Artificial Intelligence and Law* (Vol. 28, Issue 2, pp. 181–206). Springer. https://doi.org/10.1007/s10506-020-09266-0

[12] Popple, J. (1991). *Legal expert systems: The inadequacy of a rule-based approach*.

[13] Institute of Justice, N. (n.d.). *Solicitation: Expert Systems Technologies for Criminal Justice Applications Eligibility*.

[14] Alam, M. N., Kaur, K., Kabir, M. S., Susmi, N. H., & Hussain, S. (2023). UNCOVERING CONSUMER SENTIMENTS AND DINING PREFERENCES: A LEGAL AND ETHICAL CONSIDERATION TO MACHINE LEARNING-BASED SENTIMENT ANALYSIS OF ONLINE RESTAURANT REVIEWS. *International Journal of Creative Research Thoughts*, *11*(5)

[15] Alam, M. N., Singh, V., Kaur, M. R., & Kabir, M. S. (2023). Big Data: An overview with Legal Aspects and Future Prospects. *Journal of Emeging Technologies and Innovative Research*, *10*(5).

[16] Alam, M. N., & Kabir, M. S. (2023, May). Forensics in the Internet of Things: Application Specific Investigation Model, Challenges and Future Directions. In *2023 4th International Conference for Emerging Technology (INCET)* (pp. 1-6). IEEE.

[17] Alam, M. N., Kaur, M., & Kabir, M. S. (2023). Explainable AI in Healthcare: Enhancing Transparency and Trust upon Legal and Ethical Consideration.

[????] Kabir, M. S., & Alam, M. N. (2023). IoT, Big Data and AI Applications in the Law Enforcement and Legal System: A Review.

[19] Alam, M. N., Kaur, B., & Kabir, M. S. (1994). Tracing the Historical Progression and Analyzing the Broader Implications of IoT: Opportunities and Challenges with Two Case Studies. *networks (eg, 4G, 5G)*, *7*, 8.

[20] Kabir, M. S., &Yeasmin, S. M.Causes of Delay in Civil Litigation in Bangladesh (December 2018). IOSR Journal Of Humanities And Social Science (IOSR-JHSS), Volume 23, Issue 12, Ver. 6, Page 42-46, Available at SSRN: https://ssrn.com/abstract=4488230

[21] Yeasmin, S. M., & Kabir, S. (2019). International Conventions and Family Laws in Bangladesh with Reference to Islamic Legal Principles. International Journal of Research in Social Sciences, Year: 2019, Volume: 9, Issue: 2,page: 22-31.

[22] Manish Paul, Ammar Younas, Kabir Shahin. (2020). Contextualizing alternate dispute resolution: an agile approach to resolve disputes in infrastructure projects. Society and innovation,Year 2020/11/18, Volume1, Issue2, Pages:104-116.

[23] Sumi, E. J., & Alam, M. N. (2023). Comparative Analysis of Golden Visa and Work Visa Programs for Citizenship in Portugal: A Study on Eligibility Requirements, Benefits, and Differences.

[????] Alam, M. N., Paul, S. P., & Chowdhury, S. (2013). Security engineering towards building a secure software. International Journal of Computer Applications, 81(6).

[25] Alam, M. N., Hossain, S., & Alam, K. N. E. (2015). Use case application in requirements analysis using secure tropos to umlsec-security issues. International Journal of Computer Applications, 109(4), 21-25.

[26] Alam, M. N., Hossain, M. F., & Ali, M. C. (2023). The Mediating Effect of Job Satisfaction on Technology Law Compliance: A Study of Employee Perceptions in the Digital Era. International Journal For Multidisciplinary Research, 5(4), DOI: 10.36948/ijfmr.2023.v05i04.4656