THE INTERSECTION OF ARTIFICIAL INTELLIGENCE AND THE LEGAL FIELD

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Abstract: *In recent times, there has been a growing interest in Artificial Intelligence (AI) due to its ability to address various real-world challenges proactively. AI has found applications in diverse sectors such as healthcare, finance, and manufacturing. However, the legal field has not fully embraced the potential of AI despite its widespread adoption in other industries. Many law firms continue to rely on outdated technologies and software, neglecting the benefits of modern technologies like AI to streamline their operations. By leveraging AI, legal professionals can automate routine tasks and allocate more time to valuable and strategic work. This paper explores the potential of AI in enhancing efficiency and effectiveness within the legal field.*

Keywords. *Artificial Intelligence (AI), Information Technology (IT), Law, Law Firm, Digital Lawyers, Machine Learning, Legal Language (Legalese).*

INTRODUCTION

As we witness today, the influence of Information Technology (IT) applications has revolutionized people's daily lives. IT has been applied in various domains to enhance convenience and efficiency. Many industries have embraced IT-based tools, applications, and software to improve their performance and quality. Among the commonly adopted technologies in different fields, Artificial Intelligence (AI) stands out as the most prevalent. This research paper explores the application of AI in the field of law and its potential to enhance competence and efficiency in legal processes. In the modern world, industries are rapidly evolving through the integration of technology. Emerging technologies such as Artificial Intelligence (AI), Augmented Reality (AR), Virtual Reality (VR), and Quantum Computing have gained traction due to their performance. AI, in particular, is a rapidly advancing internet-enabled technology that mimics human brain functions, including learning, problem-solving, and natural

language processing. With these capabilities, AI can be effectively utilized for decision-making and logical tasks. AI can be categorized into five major areas: Robotics, Expert Systems, Neural Networks, Natural Language Processing, and Fuzzy Logic. AI is a fundamental component of the progressive digital world we inhabit today. Law, with its long history spanning thousands of years, holds tremendous significance. Since the inception of human societies, law has played a crucial role in establishing discipline and ensuring safety. It is a cornerstone of rational human society. When considering the workload of lawyers, many of their tasks can be easily automated using legal technologies. AI, in particular, has the potential to replace lawyers. According to estimates by McKinsey consultancy firm, 22 percent of lawyers' jobs and 35 percent of paralegals' jobs can be automated through modern technologies [1]. While some argue that AI cannot enhance the practice of law, there are examples such as IBM Watson, the debater, and various open-source text analytic programs that demonstrate the application of AI in decision-making and analysis. Nowadays, AI technologies find applications in various domains such as healthcare, social media, manufacturing, engineering, military, and education. However, the field of law has not fully embraced AI to a significant extent. This paper discusses how AI can be utilized in the field of law and related legal work, including the potential replacement of human lawyers with AI-based digital lawyers. Additionally, it provides suggestions for future development in this area.

II. PROBLEM DESCRIPTION

The world is currently undergoing a massive technological revolution. However, some fields, including law, farming, and construction, have not fully advanced with modern technologies. Specifically, in the field of law, progress is still being made using outdated technologies. Around $600 billion of the global legal services market has yet to be affected by the technology revolution [1]. As a crucial aspect of human life, the legal industry should embrace technological advancements. Many lawyers still rely on hard files for case documentation and other record-keeping, showing a reluctance to adopt suitable software or applications for their regular work. This hinders progress in the industry and puts it behind other sectors. Similar to other fields, the legal industry should keep pace with rapid developments. Many real-world law firms still utilize underdeveloped and outdated technologies. It is essential for these firms to embrace AI and modern technological approaches to advance their practices. While some legal experts argue that law practice cannot be entirely replaced by non-human machines like robots [2], they fail to recognize the potential advancements that can be achieved through modern technological approaches. While replacing human lawyers with digital lawyers may not be feasible, law firms can readily adopt modern legal technologies for an improved experience. This will enhance the efficiency and effectiveness of lawyers

and their firms. By incorporating AI and modern technologies, human lawyers can benefit from digital lawyers, and experienced human lawyers can operate digital law firms.

III. OVERVIEW OF ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) marks a pivotal moment in the modern technological landscape. In essence, AI aims to create computer-based systems that possess human-like intelligence. John McCarthy, considered the father of AI, defines it as "the science of making machines exhibit human-like intelligence" [3]. AI draws insights from various disciplines, including Computer Science, Psychology, Biology, Mathematics, Neuron Science, and Sociology. One of the primary applications of AI is the development of expert systems capable of learning, simulating, and providing advice. Similarly, AI involves the engineering process of imbuing machines with human-like intelligence. The learning process in AI is based on experimental data and encompasses areas such as Scruffy AI, Nonsymbolic AI, and Soft Computing. AI can be categorized into two types: weak AI (narrow AI) and strong AI. Weak AI systems are designed and trained for specific tasks, with virtual assistants like "Alexa" [4] serving as examples. They are trained to recognize voice commands and perform designated functions. Strong AI systems, on the other hand, can autonomously find solutions without human intervention. They possess the ability to make judgments, plan, solve puzzles, and communicate. AI is often combined with various technologies, including Automation, Machine Learning, Machine Vision, Natural Language Processing, and Robotics. It is common for people to confuse AI, Machine Learning (ML), and Deep Learning (DL) as being synonymous, but they are distinct concepts. AI can be seen as a broad term encompassing any technique that enables machines to mimic human intelligence. Machine Learning is a subset of AI that employs complex statistical concepts to enhance system performance. Deep Learning (DL), in turn, is a subset of ML that employs algorithms [3] enabling the system to independently learn tasks such as voice and image recognition by employing multilayered neural networks and vast amounts of data.

Currently, Artificial Intelligence (AI) finds applications in numerous fields:

• The field of Medicine: ML is utilized to improve the accuracy and speed of diagnoses, surpassing human capabilities. IBM Watson [5] is an example of AI being used in healthcare. Additionally, AI is employed for patient management, responding to messages, and answering inquiries.

• Business Field: ML is employed for analytics and Customer Relationship Management (CRM) platforms. Robotic process automation is implemented to automate tedious tasks that were traditionally performed by humans.

• Education Sector: AI is employed for grading and reporting students' data, as well as tracking their progress.

• Manufacturing Sector: Industrial Robots, like Apple's Disassembly Robot "Daisy" [6], are increasingly employed to replace human workers. AI is also utilized in the manufacturing sector for recording progress data and employee information.

• AI in Finance: Personal finance applications such as Mint [7] and Turbo Tax [8] are commonly used. AI-powered applications like IBM Watson [5] can collect personal data and offer financial advice.

ARTIFICIAL INTELLIGENCE IN PRACTICE OF LAW

In the present era of advanced technologies, most industries have experienced enhanced efficiency and effectiveness. However, the field of law lags behind in terms of adopting modern technologies. Outdated systems and file handling methods are still prevalent, indicating a significant need for technological advancement in the legal sector. Artificial Intelligence (AI) can be readily applied to improve the efficiency of legal processes. Sectors such as healthcare, education, and transportation have embraced AI, incorporating it as an integral part of their operations. Therefore, the field of law should also strive for better performance by harnessing the potential of AI. AI's unparalleled ability to gather and analyze vast amounts of information is particularly well-suited for solving various legal challenges [7]. By embracing the latest technologies and AI, the entire legal industry can experience significant advancements. Within the field of law, there are numerous multidisciplinary areas, including civil law, administrative law, contract law, human rights and peace law, international law, and information technology (IT) law. AI-based modern technologies can drive the advancement of the entire legal sector. Lawyers are responsible for various tasks, including preparing legal documents (e.g., wills, deeds, contracts), providing advice to clients, interpreting laws and regulations, analyzing case outcomes, and presenting and summarizing cases [6]. With the integration of AI, these tasks can be performed with improved performance and efficiency. In the United States, law enforcement can be categorized into three major categories: federal, state, and local. In the 1980s, these institutions began adopting expert systems to enhance their performance.

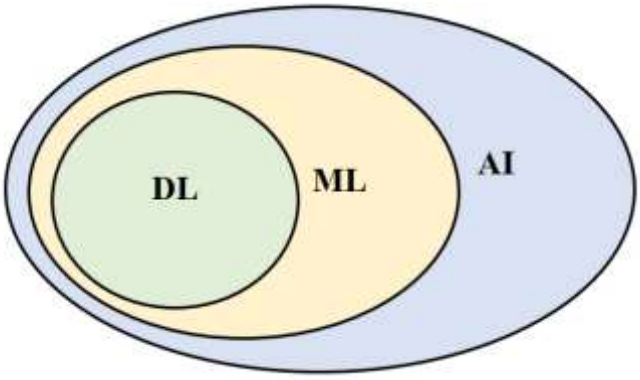

FIGURE 1. Difference between Artificial Intelligence (AI), Machine Learning (ML), Deep Learning (DL)

When integrating AI and modern technologies into the field of law, there are two primary areas that require investigation [11]. The first area is practical work on intelligent legal information systems, which possess features such as continuous regressive chaining implication, user interaction through questioning, and generation of recommended solutions based on supporting legal rules [11]. The second area is theoretical work on computational models of legal reasoning, which encompasses legal reasoning and argumentation [7]. Dr. L. Thorne McCarty's research in 1990 identified knowledge representation as the most significant challenge in both areas. A simplified solution can be achieved by developing a model of prototypical reasoning that avoids or minimizes this problem [7]. Despite some legal experts arguing that AI lacks reasoning abilities and cannot be involved in law enforcement, the existence of established AI bots like IBM Watson, Robot Lawyer Lisa, and DoNotPay demonstrates that AI systems can indeed perform legal reasoning. This will have a significant impact on how lawyers and judges reason in the future [6]. In various industries, contracts are essential for engaging with partners, traders, and sellers. Traditionally, tasks related to contract law, such as handling, analyzing, and preparing agreements, are carried out by human lawyers. However, many business owners prefer to minimize costs by avoiding external law firms for these services. Additionally, lawyers may struggle with large contracts that span numerous pages, leading to potential misunderstandings and negative outcomes for clients. By utilizing an AI lawyer, contract-related work can be conducted more efficiently and cost-effectively. In 2018, LawGeex trained an AI lawyer specifically for contracting purposes, with a focus on Nondisclosure Agreements (NDAs), which form the basis of most commercial agreements. The AI achieved a 94% accuracy rate, surpassing the average result of the twenty experienced human lawyers who participated in the test [1]. LawGeex employed custom-built machine learning and deep learning technology to develop this AI, which can handle various types of contracts, from software agreements to services agreements and purchase orders. Training an AI lawyer is akin to training a new lawyer, as experience in diverse scenarios is crucial for developing a deep understanding of legal practice [1]. According to Grant Gulovsen, a 15-year-experienced lawyer who participated in the LawGeex test, AI systems of this nature are beneficial for freeing up expert lawyers to focus on higher-level tasks, eliminating the need to hire paralegals for support [1]. AI technology can be further advanced through a combination of supervised and unsupervised learning techniques, allowing the system to learn legal linguistics and enhance issue spotting capabilities. The presence of human law experts remains necessary for training digital lawyers, ensuring that the introduction of digital lawyers does not pose a risk. Collaborating with digital lawyers enables human lawyers to improve their understanding and proficiency in IT and modern technologies.

According to lawyers who participated in the LawGeex test, this experience helped broaden their perspective on how technology can empower the legal profession[1]. The integration of AI and law has the potential to enhance efficiency and reduce costs throughout the legal industry. According to Altman Weil's 2018 Law Firms in Transition survey, only 19% of the 398 registered law firms have implemented systematic process re-engineering. However, those firms that have embraced this transformation have seen a 43% improvement in their performance compared to other firms [6]. Digital lawyers are advantageous in terms of time and cost savings for their clients. Unlike many human lawyers, they do not engage in practices that waste clients' time and money. They do not prioritize cases by pushing them to the bottom of the to-do list. Additionally, they do not conduct meetings with clients while constantly watching the clock. Therefore, the level of efficiency exhibited by digital lawyers surpasses that of human lawyers.

LIMITATIONS TO THE STUDY

In today's world, there is a growing trend towards increased autonomy through the use of AI and complementary modern technologies. As a result, the field of law also needs to progress in parallel. This study explores the application of AI in the legal field to maximize efficiency. While the notion of replacing lawyers with AI may seem plausible, there are barriers that hinder the implementation of this concept. One such barrier is the lack of existing computational language models that can properly understand Technical Legal Language, making it difficult to train an AI model in this domain [1]. Additionally, the rapid pace of technological advancement may not be easily embraced by the general public, as humans typically comprehend new concepts in a linear manner. Therefore, gaining widespread acceptance for new technological legal concepts like "Robot Lawyers" is not straightforward. The practical work of a lawyer can be highly complex, involving the processing of intricate circumstances, consideration of relevant background information, and the ability to provide the best guidance to clients. Lawyers also excel at filtering out irrelevant details and leveraging their experience and general knowledge of the world and human activities. These tasks pose significant challenges for AI systems to effectively emulate. It is generally difficult for a Robot Lawyer to possess the same level of experience as a seasoned human lawyer or replicate their creative, imaginative, and innovative ideas using current technologies. Moreover, clients often expect a higher level of trust and a close personal relationship with their lawyer. Moreover, the emotional intelligence and personal interaction of lawyers play a crucial role in satisfying most clients [8]. Incorporating emotional intelligence into AI systems is essential, but current technological capabilities do not allow for the effective replication of a robot with comparable emotional intelligence to humans. In practical terms, the "Court Room

Appearance" holds significance for a lawyer. Effective advocacy typically relies on strong emotional engagement and advanced decision-making based on the specific circumstances. However, there is no existing technology that can accurately recognize and respond to the full spectrum of human emotions [18]. While utilizing legal technologies and Robot Lawyers can lead to cost savings for clients, it is important to consider the practical aspects. The development cost of an AI lawyer is not necessarily cheaper, which may result in higher charges for clients than anticipated.

FUTURE DIRECTIONS OF ARTIFICIAL INTELLIGENCE AND PRACTICE OF LAW

This section provides a classification of methods to enhance AI-based systems and applications, offering valuable insights for further research. In today's rapidly evolving technological landscape, especially in the field of Computer Technology, it is foreseeable that AI can be readily applied. The field of law can greatly benefit from the advancements in AI and modern technologies, utilizing AI-based lawyers such as "Robot Lawyer - Lisa" [7] and "IBM Watson" [5] across various legal services. The implementation of sophisticated expert systems can significantly improve efficiency in the industry, granting law firms a competitive edge. The traditional approach to handling contracts often leaves attorneys bored, fatigued, and demotivated, with the potential for errors when dealing with extensive pages of contracts. Entrusting contract handling and maintenance to a proficient digital lawyer like "LawGeex AI" [1] can provide valuable support to human lawyers, freeing up their time for higher-level tasks and reducing the need for paralegal assistance. Incorporating AI aspects into law practice management software can optimize performance, facilitating case management and customer details handling. By leveraging AI-based software, law firms can enhance their processes compared to traditional file management systems. Despite the significance and influence of AI as a technology, a lack of awareness remains a major constraint. Therefore, it is advisable to familiarize people with AI by integrating these technologies into everyday life, particularly through user-friendly mobile applications like the recent example of the iOS Robot Lawyer application, "DoNotPay" [9].

CONCLUSION

This study explores the application of Artificial Intelligence (AI) in the field of law, aiming to provide an accessible, efficient, and effective service. While AI and complementary technologies have greatly advanced sectors such as education, medicine, and business, the field of law has seen limited development in incorporating these modern technologies. Many lawyers still rely on outdated methods, using physical files and manual processes, while the utilization of legal software remains uncommon. Moreover, the cognitive tasks of reasoning and argumentation are

predominantly handled by human lawyers. However, an enhanced AI lawyer can swiftly analyze facts, make accurate decisions, and provide reasoning within seconds. AI technologies can also be applied to the analysis of legal documents and contracts. This report not only discusses the potential for AI to replace legal practice, but also introduces complementary technologies such as Machine Learning (ML) and Deep Learning (DL). It is important to note that ML, DL, and AI are distinct concepts, with ML and DL being subsets of AI, and DL being a subset of ML. Although there are challenges to consider in replacing lawyers with AI, such as the complexity of training AI in Technical Legal Language (Legalese) and the lack of accountability in machine-performed work, these limitations can be overcome with the rapid development of modern technologies in the future. It is evident that AI technologies have the potential to effectively and efficiently replace various tasks currently performed by lawyers.

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