Article

Artificial Intelligence and Robotics Led Technological Tremors: A Seismic Shift towards Digitizing the Legal Ecosystem

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Abstract: The legal ecosystem is continuously confronted with new challenges and disruptions as a result of the technological invasion initiated by cutting-edge technologies, such as Artificial Intelligence (AI) and Robotics, which have taken over the world. The amalgamation of AI-enabled mechanisms and robotics into human life has elevated significant issues. This digital juggernaut cannot stay constant by the legal landscape, and some degree of assimilation is permitted to pave the way for the efficient administration of justice. The current study is significant since there is a substantial absence of legal research into the implications of AI and robotics on legal rights, which undoubtedly impacts the legal ecosystem. In this study, we have examined the significance, progress, and challenges of integrating Robotics and AI into the legal ecosystem, as they pave way for resilient legal infrastructure. Issues such as privacy, ethical grievances, data protection, confidentiality, and integrity issues are evaluated in this study. The study reviewed existing research into AI and robotics intervention in the legal ecosystem to propose a framework for addressing the increased concerns about the implications of technological apparatus in the legal ecosystem. Finally, the study concludes with recommendations that can be adopted for future work.

Keywords: artificial intelligence (AI); robotics; legal ecosystem; infrastructure; digitalization; modernization; administration of justice

1. Introduction

Technology enables society to conduct affairs smoothly and to enhance the experience of human lives [1]. The digitalized and modernized legal ecosystem's technological underpinnings ensure expeditious facilitation of access to justice [2]. The unthinkable and unprecedented technological growth has invariable and inextricable legal complexities and reverberations. The goal to build a resilient and formidable digitalized justice and legal ecosystem found its origin in the Sustainable Development Goals (SDGs) [3], which prescribe a humanitarian imperative to fight off social fissures by the prescriptive force of Goal 9, i.e., building resilient infrastructure, sustainable industrialization, and foster innovation [4]; and Goal 16, which proposes sustainable societal development, access to justice, and building effective and accountable institutions [5]. The success of that infrastructure's development is through incorporating innovative yet disruptive technological innovations such as Artificial Intelligence (AI) and Robotics into the legal ecosystem [6]. The innovations will be bolstered if a suitable legal infrastructure is cultivated and assimilated. The legal ecosystem comprises an entire body of interconnected systems whose well-oiled performance ensures the proper functioning to achieve revitalized administration of justice. From

a litigant who goes to a lawyer to solve a legal tangle; an advocate hearing the complaint and analysing the applicable law; the processing of endless documents and precedents finding exercises; filing of cases before the jurisdictional courts; court parsing through the available texts to form an opinion; argumentations; legal assistance by research associates; case law research through high-end legal databases; judgment delivery; judgment analysis, etc.; these examples are an indeterminable chain of legal transactions that take place right from the first blush with the legal system to the end of it. The AI & Robotics led issues in the legal landscape and the consequent challenges would help the readers studiously analyse the plethora of issues brought to the forefront by the technological redevelopment of legal system and processes.

All the aforementioned facets are revamping in the face of the technological onslaught of AI and robotics [7]. The intervention of AI is paving the way for a more significant technology-driven role in the legal profession [8]. Technology is turning the status quo on its head, from robot lawyers to robot-judges to automated intelligent system analysis [9]. Role-playing by AI and robotics-led technological infrastructure can bring miraculous results in all these places and intermittent functions [10]. These technologies pave the way for concomitant legal concerns [11]. All in all, the interface of technology with the law is the precursor of a renovated, rejuvenated, and revamped legal landscape [12]. The present study reviews AI and robotics intervention research in the legal ecosystem. The efficacy of those changes, whether positive or negative, will be analysed. The research methodology adopted to carry out the present analysis is an amalgamation of descriptive and exploratory methods, given that the paper is a techno-legal study, and the descriptive and exploratory legal research methods required to carry out an effective legal review analysis have been adopted to undertake the present study. These methods would allow authors to explore and describe the prevailing issues. The idea is to understand the research examining the seismic shift that can be brought out by introducing AI and robotics in the legal landscape, its aftereffects, and prevalent concerns. On the strength of the analysis of the existing research and the issues dissected, the authors would lay out a framework of recommendations to address the prevailing concerns.

Owing to the sprawling technological tentacles making inroads in influencing and revivifying the legal landscape, the authors endeavor to make the following meaningful contributions to help address the emerging churnings, fissures, and cleavages in the system. The authors aim to lift the veil over the AI & Robotics led technological interpolations in the legal systems, which the authors would highlight in the shape of contributions. The following are the aims that the authors intend to achieve after undergoing a comprehensive review of the existing research on AI & Robotics in the legal system:

(a) The objective of the study is to understand the technological cornerstone of AI and Robotics in modernising and revolutionising the legal ecosystem.

(b) In this study, the interaction of AI and Robotics with the law, as well as the associated legal concerns about privacy, legal personhood, data protection, evidence gathering, and so on, are considered and analysed in terms of the technological implications in the legal ecosystem in order to suggest the appropriate legal transformation.

(c) In addition to this, the study identified key AI-assisted tools and tools that are playing vital role in contract drafting, vetting of contracts, case laws research, contract evaluation, rendering legal advice, etc.

The organization of the present study is carried out in the following landscape. Section 2 of the study presents an overview of the AI-enabled robotic implications in the legal ecosystem. Section 3 represents the detailed analysis of AI and the robotics-driven technological juggernaut while interacting with the legal processes and systems. Section 4 gives way to the ethical and moral questions posed by the increased robotic usage and the legal understanding of the rights and responsibilities of robotic entities. Section 5 emphasizes the capacity and potential of AI and robotics in transforming the legal apparatus. Section 6 lays out an examination of the EU law on AI systems. Section 7 is an archetype of the innumerable usufructs of technological interventions in augmenting

the legal ecosystem. Section 8 impresses the urgent and time-relevant reforms needed to keep pace with the ever-increasing digitalized environment to prepare the ground for the efficient and resilient modernization of the judicial infrastructure. Section 9 concludes the paper by stressing the major takeaways for the reader.

2. Legal Overview of AI-Driven Technological Revamp in the Legal Ecosystem

The times and tides are changing. The way society functions is changing on the strength of bleeding-edge technological interruptions happening at full throttle [13]. Given the scale and size of the revamped digital apparatus, it becomes essential to fathom the gravity of the unerasable technological implications it brings to the forefront. The onset of AI and Robotics has taken the world by storm. It has carried the country's technological prowess off its feet and revolutionized information technology's contours [14]. The inception of AI has brought a paradigm shift in how humans interact with each other and discharge their social obligations. The enthusiasm behind its increased participation in human affairs has posed some compelling legitimate concerns [15]. The heightened concerns are not assuaged but aggravated and escalated with the setting in motion of a new AI-enabled automated virtual entity, i.e., Robots. AI, coupled with Robots, proposes a new technological landscape [16]. The landscape of techno-driven human affairs where technology forms a crucial foundation of other human actions.

Through Figure 1, the authors have highlighted the consequences of AI & Robotics in the legal landscape and the concomitant issues.
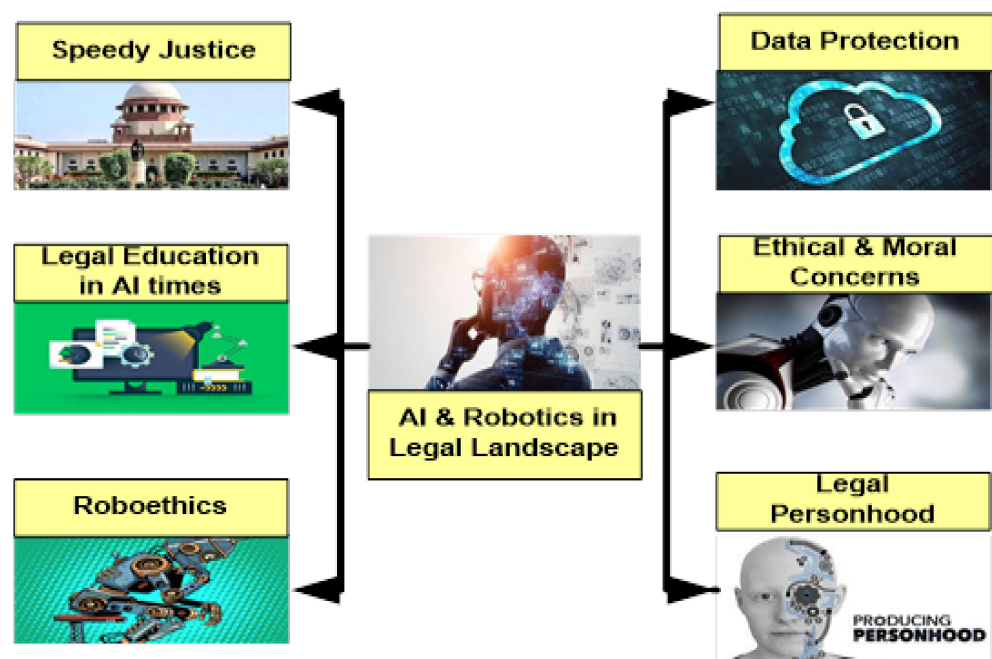

Figure 1. Concerns posed by AI & Robotics.

The enthusiastic use of technological apparatus sits well with the principles of digitalization and modernization. The amplified use of technologies in human interactions and social transactions automatically invites desirable legal interventions. Without further ado, it becomes pertinent to analyse the implications of technological intercalations in the legal ecosystem. The concerns about data protection [17], right to privacy [18], ethical and moral grievances regarding the robot's usage [19], evidence gathering [20], robot lawyers [21], Robo ethics [22], and future of legal education [23], speedy justice [24], legal personhood of robots [25], automated AI-enabled legal systems [26], etc. are paramount in understanding the constant dialogue between the ever-growing technology-driven apparatus and the corresponding legal developments.

AI represents the humanlike abilities of the machine to appreciate the problem, process the same, and propose an efficient solution [27]. Unlike humans, the work is done by a technologically bolstered system to carry out the actions intelligently [28]. To what extent AI systems replicate degrees of human intelligence and understanding is a matter yet to be seen, but the doubts are plenty [29]. Robotics is the augmented version of AI-backed technological growth where technology is presented in the shape of artificially intelligent automated machine-like manifestations [30]. They have brought a paradigm shift in how we view and acknowledge the role-playing of technologies in society. Robotics is said to be able to fill human shoes and take over certain areas of human activities. Legal eyebrows are bound to be raised concerning the human-robotics interplay in the ongoing technological juggernaut. Figure 2 illustrate an AI framework to enumerate AI's use in multifarious places. It comprises a list of AI's offshoot technologies and related applications. The figure manifests a collection of technologies and apps through which the legal ecosystem is amplified in the face of digitalization and modernization.
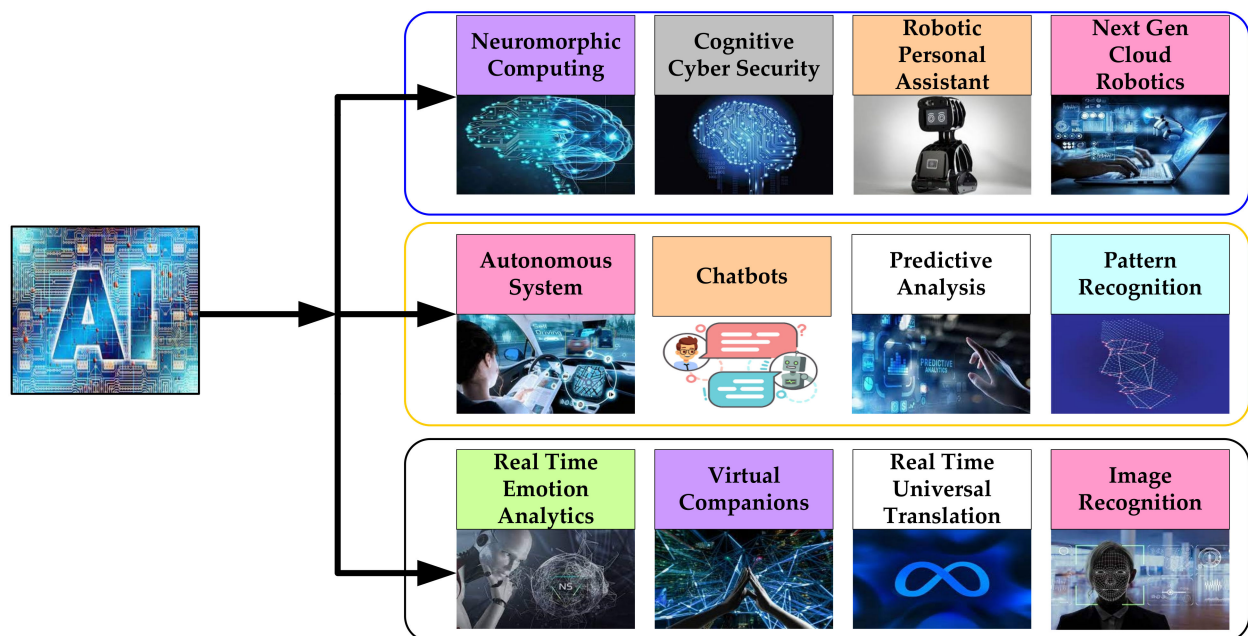

Figure 2. Framework encompassing AI-linked technologies and usages.

3. The Symbiotic Interface of AI & Robotics with Law

The technological reach is growing by leaps and bounds. The disruptive state-of-the-art technologies have turned the entire legal field on its head. It becomes germane to reassess the importance of the role of law as the rule of law in the digital world [31]. The effect, influence, and reverberations of AI and Robotic in law are profound and pose many questions about their positions and role-playing in society [32]. Robotics has brought to the forefront a formidable dimension of AI by creating an automated artificial agent. With this rapid growth of AI, it is not erroneous to expect the development of artificial moral agents propounding roboethics where they behave as sentient and rational beings [33].

A variety of legal issues have emerged, and legal interventions have been made in some of these cases. Consequently, the ever-developing jurisprudence of robotics may also undergo legal and philosophical transitions. The concept of robotic rights as being alive in the artificial sense would need to be emphasized [34]. The remarkable development of AI & Robotics can potentially revamp the status quo. The interpolations of robots in human affairs in various circumstances have posed challenges and concerns regarding their invasion and usufruct. Due to robotic development and its incredible penetration into human affairs, one is compelled to ponder the regulatory setup of robots. The question of the regulatory

regime on robots is pertinent and requires cogitated contemplation to eschew any dangers that emanate from its pervasive use [35]. The compelling argument for regulating robots also germinates from the factum of the philosophical paradigm of roboethics. Roboethics represent figments of responsibility, which means legal answerability. Roboethics is the route to ensure committed and enforced accountability [36]. Given the scale and size of the challenges posed at the behest of AI and robotics, the law schools which form the edifice of legal education and introduce courses on legal education to shore up efforts for a better and instructive insight into the advancement and performance of the technology in today's setup [37].

In Figure 3, the authors exemplify how a robot lawyer will perform in the technological ecosystem and the roles discharged. The legal profession encompasses a plethora of plausible legal routes flowing out from a legal cause: nature of argumentations, counselling clients, legal documentation, etc., all of which can be bettered and smoothly transacted with the application of AI to reach automated document drafting [38,39]. This will escalate the speed at which the wheels of justice move. Therefore, the present demands require a dedicated strategy wherein the cleavage between the ever-growing technologies and the commensurate legal reinforcement can be narrowed down. It forms a template to bridge the gap between law and robotics [40]. The proposition of increasing AI's role in legal discipline cannot be disregarded because the legal profession is burdened under the enormous weight of a voluminous paper trail. With increasing AI intervention, the legal profession will undergo a complete revamp giving way to speedy justice and sharpened legal advice. The onset of AI-driven lawyers is imminent [41].
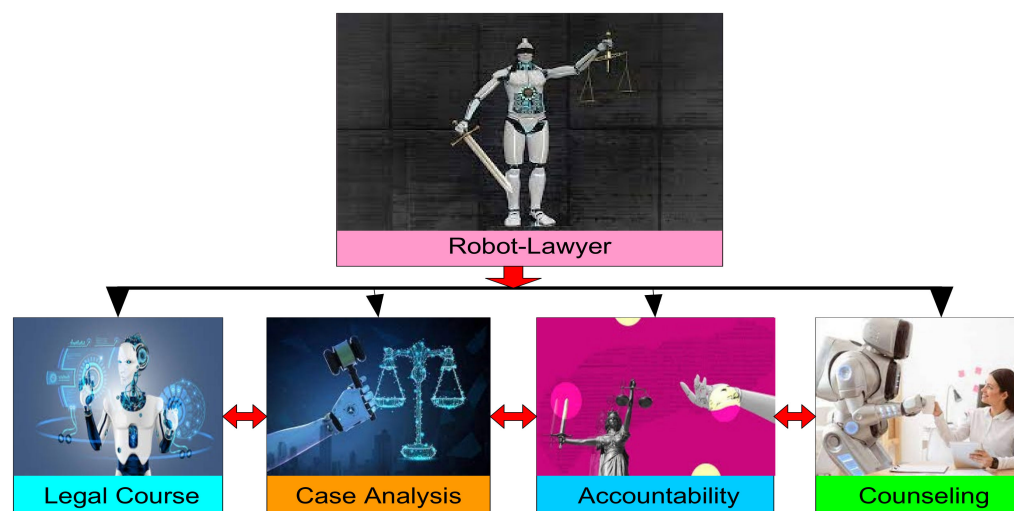

Figure 3. AI-enabled Robotic Lawyer revamping the Legal Landscape.

Considering the aforesaid, it is safe to suggest that AI's intervention has transformed the legal profession. Thus, it is imperative to engage in legal dissection about the kind of legal standards, soft or hard, that are required to pace the legal solutions in conjunction with the speed and pace at which technologies are revolutionizing [42]. AI's intervention in law augurs the necessary ready-made remedy to help facilitate the ease of access to justice by building sustainable and reliable free legal advice rendering systems [43]. Every country has a free legal advice rendering mechanism, and AI-implemented devices and tools could contribute significantly to many ways to give a fillip to the speedy administration of justice. The role of a lawyer in the legal profession shall stand the onset of any efficient technological apparatus. However, the routine and boilerplate work bordering on technical functions can be replaced by a sophisticated integrated network of AI-driven technologies [44].

The practical intervention of AI in the legal sector, given the unavoidable legal implications, will be necessary to be addressed going forward. Cass Sunstein claims in his report that "at the present state of the art AI cannot engage in analogical reasoning or legal

reasoning", which means that until significant advancements in technology are made [45], AI is not expected to have much of an effect on the actual practice of law [46]. The main reason is that high-order cognitions such as those needed for legal practice are still beyond the capabilities of current AI technology [47]. Unfortunately, current AI algorithms still fail to imitate most human intellectual skills, holding back progress in cognitive processes such as analogical reasoning, the foundation of legal practice [48]. The viewpoint has some validity, but the conclusion is overly generalised. Current AI technology still has an impact and provides technological inability to match human-level reasoning for specific categories of legal tasks. Non-cognitive AI techniques have been successfully applied outside the legal field to various functions once thought to require human intelligence, such as language translation. Artificial intelligence (AI) algorithms use pattern recognition and infer the rules from data to create computer models of complex phenomena. In addition, the paper delves into how such algorithms may change law practice. Artificial intelligence (AI)-enabled software improves the speed and accuracy of legal document analysis. In certain situations, machines can analyse documents and flag useful ones. Once a document has been marked as relevant, it can be used to help find other documents that also fit the criteria. Problems that may arise while working with these documents can be resolved much more quickly by machines than humans [49]. They save time and effort by sending suspicious documents to be reviewed by a human being rather than returning them for further processing. The use of AI and ML is allowing us to complete legal research faster and more thoroughly.

AI has an overwhelming reverberation on the legal profession consisting of lawyers, arguments, and law enforcement by developing case-finding tools for argumentation analysis or a sentence-based technique [50]. This will have an unavoidable effect on law enforcement. The domain of law enforcement believes in intelligent governance. Thus, in the modern day and age, intelligent law enforcement would see the light of day if the time-relevant technological tools were intercalated to gird up the diverse techniques to counter the onerous legal tasks [51].

4. Ethical Sword of Damocles Hanging over the Incorporation of Robots and AI Technologies

Modern-day technologies are bursting at the seams. The intervention of the leviathan technological landscape has not left any portion of human life untouched. Given the immensity and enormity, the legal tremors are inevitable and far-reaching. With the suggestions of AI-driven technologies undertaking legal transformation, an impending existential shift requires perspicacious anatomy and legal contemplation [52]. If robots are introduced into the legal landscape, they will invariably become rights-possessing entities. Therefore, it becomes essential to crystallize standards on the responsibilities bordering on sentience and rationality expected to be discharged by the robots [53]. There are discussions encircling the accountability of robots.

But to start with, those responsibilities can be expected to be imposed upon humans. If by any argumentative imagination, they are to be treated to humans likewise, then the compelling question to be answered is the human rights of robots [54]. With the far-reaching and pervasive remit of robotic technology in every domain of human action, it becomes pertinent to pose concerns about the morality and ethical plinth juxtaposing the technological invasion. The ethics of robotics is an immediate concern [55]. The predicament is that the fact that words such as 'dignity', 'conscience', and 'rationality', which compose the bedrock of the Universal Declaration of Human Rights when it applies to a human being, could be applicable when an intelligent robot steps into the footsteps of a human being giving way to same tasks as otherwise discharged by a human [56].

The omnipotent concerns hovering over the legal status of artificially intelligent robotic automated beings, which are changing the social landscape, warrant a deep and detailed introspection. How far the conferment of human rights on robots is possible will depend on the degree of assimilation of humanlike capabilities by the robots [57]. Human rights protected by law enforcement versus robot rights become the narrative going

ahead [58]. There are questions about legal propriety and ethical righteousness governing the inception of increased robotic usage in human affairs [59]. Security concerns are forever associated with robotics; thus, it is essential to address the apprehensions about the socially responsible characteristics of automated intelligent beings [60]. The onset of robots laden with artificially intelligent practices smoothening human affairs is well-accepted. Thus, it becomes essential to undertake an ethical analysis of robot companions [61]. Robo-ethics deliberations are the need of the hour. Robo-ethics will comprise the necessary ethical contemplations and deliberations to regulate the performance, usage, and interventions made on the robotic-led front in multitudinous human affairs. If human beings are to commit a crime against anyone, the victim can retribute by launching a prosecution. It is about time to emphasize the issues of the enormous retribution gap and the resulting legal vacuum to ventilate those grievances if robots become part of our lives [62]. It raises concerns about regulation and ethical qualms about artificially conscious robots [63].

5. AI and Robotics Propelled Technological Impetus Compelling the Transformation of the Legal Ecosystem and Landscape

The legal apparatus addresses the challenges of the times. Denials and abdication of duties in the face of unceasing technological growth cannot be sustained. AI and robot-driven technologies have posed enormous and burdensome legal challenges that require an effective answer [64]. European Parliament attempted to develop a tangible legal framework to articulate the civil law resolution to respond to the present-day techno-posed challenges [65]. The inception of a la mode technologies such as AI and robotics has an indelible and unavoidable effect on how legal institutions behave and operate, i.e., the entire legal services ecosystem [66].

With all the growth in robotics, concerns have occupied the centerstage. The clamour call for cybersecurity recognizes the impediments surfaced by the exponential development of robotics networks [67]. Amongst the significant issues containing far-reaching legal implications due to the onset of AI-driven techno-driven apparatus, a spate of problems that ranks right on the top is the case-law finding system, the necessity for a transnational law, the right to self-determination, data protection, competition laws, and absence of regulatory framework [68]. With the rapid growth of technologies and the digitalized world setting in, the working of the high-end law firms responsible for catering to legal affairs will undergo a revamp, and the replacement of lawyers by robots may be disrupting the legal field [69]. This opens a gateway of discussion for the introduction of robots discharging duties of lawyers in law firms. Thus, germinating the idea of office robots [70]. The AI-enabled robot lawyers have questions about trust and faith that bedevils its usage in the legal industry. If it is adopted, the system's integrity needs to be reassured [71]. A legal AI bot may appear to be a long shot, but its actual development and implementation may help reduce the processual clutter that elongates the legal processes. The efficacy of legal AI bots in legal advisory institutions may make things easy for the users, i.e., clients or litigants in a legal setup [72].

AI-driven systems' efficacy in titivating judicial efficiency and productivity is highly celebrated. The incorporation of AI tools stands the test of objectivity and ensures excellent protection of the right of the parties [73]. Judicial decision-making is a delicate task; replacing the same with robo-judges in its entirety seems fallacious. However, there are various layers while discharging various judicial duties where the intervention of AI, i.e., partial automation, may help expedite the performance of the judges [74]. Legal education needs to revamp in the age of digitalization and modernization. The AI techniques can be aptly subjected to use to educate people on law and jurisprudence by enabling the existence of machine-readable law [75]. It will genuinely reform the Legal tech market.

Law enforcement agencies can use advanced technologies to gather digital evidence and ensure a watertight chain of custody by effectively ensuring confidentiality and integrity and by identifying the criminals, among many other uses [76]. The need for surveillance to provide a sanitized digital environment in the digitalized times can be

sternly effectuated by a full-throated use of technologies [77]. Technological enthusiasts have expressed their joy and jubilation over AI-laden technologies to pave the way for robot judges and robo-administrators to democratize legal services, thus making the legal landscape more efficient, predictable, socially controlled, and away from arbitrariness [78]. The corollary question of accountability transpires naturally in the realm of rights and duties. The question of the responsibility of robots necessitates a debate on the personhood of the robots. This question becomes imperative on the back of an AI robot named Sophia, given citizenship [79]. Granting legal personhood is an important legal issue that also stems from the emergent concerns about the questions of liabilities in the legal sense of the actions of robots [80]. The AI-backed system has transformed how the justice delivery system will work in days and years. Algorithmic decision-making, AI-powered predictive outcomes, augmented intelligence, pre-judgment analysis using AI-supported tools to have the robo-judges, and the reach of technology may restructure the justice system [81]. AI-driven robotic innovations have the potential to behave like watch guards, i.e., robot eyewitnesses [82]. The concerns about data collection undertaken by the robots and the ways and means to regulate the same to avoid any data leakages are paramount. All these challenges emanate from the concept of privacy, a right allowing an individual to remain the master of one's data [83].

6. Examination of the EU Law on AI & Corresponding Legal Concerns

At this juncture, it becomes crucial to examine the European Parliament's resolution and its critical efficacy in regulating artificially intelligent acts. On 21 April 2021, the European Commission presented a time-relevant proposal for 'laying down harmonized rules on AI' under the Artificially Intelligent Act (AIA) [84]. The rules were pertinent, considering AI-laden systems proposed a wide array of legal and ethical challenges. Technology assimilation can fundamentally challenge people's life, health, and property. Considering the widespread ramifications of AI and AIA, the cherished rights of the people run the risk of violation. Among the pressing concerns for breach, a few include the rights of human dignity, self-determination, privacy, personal data protection, and freedom of speech and expression, which is a constitutional guarantee also enshrined under Article 19 of the International Convention of Civil and Political Rights, but freedom to engage in assembly, right to receive a fair trial, and ensure access to effective judicial remedies, etc. are being challenged with the onslaught of AI and AIA. The right suffers the risk of infraction due to opacity, complexity, data dependency, and autonomous behavior [85].

Considering the magnitude of the challenges posed, the European Commission had to bring forth a slew of rules governing the usage of AI and ensuring the fixation of responsibilities for AIA within an established legal framework. The AIA recognizes the difference between 'AI' and 'AI systems.' It then goes on to ban certain specific AIA practices, including subliminal manipulation under Article 5(1)(a) and (b) [86], social scoring under Article 5(1)(c) [87], remote biometric identification [88] and categorization under Article 5(1)(d) [89], and exploitation of vulnerabilities.

It is vital to set out compensatory mechanisms to address the possible violation of rights. Still, AIA does not contain any provision for liability to pay damages incurred by AI systems [90]. Moreover, the AIA does not discuss harmonizing itself with EU Data Protection Law [91]. Firstly, the AIA has intended to recognize a wide array of challenges, but the AIA is conspicuously silent on individual rights. It appreciates the concerns posed by AI to fundamental rights but does not provide a legislative framework through which individuals can seek effective redressal for the same. The AIA draft doesn't envisage any robust machinery against AI-driven decision-making. The second notable gap is that AIA envisions the creation of the European AI board. Still, it does not confer any power on the board to ensure strict compliance with the rules engrafted under AIA. The third gap concerns human oversight sketched under Article 14 of AIA, but the AIA does not narrate when, how, and at what stage human oversight is required. It also fails to consider that

human oversight may not fully understand the capacities and limitations of a high-risk AI system.

7. Beneficial Manifestations of AI & Robotics in Augmenting Legal Apparatus

The judicial wisdom warrants recognizing the technological tremors of the times and correspondingly amending the law to answer those urgent concerns. The legal benefits are apparent due to the enormous effect and influence launched by the outbreak of state-of-the-art technological apparatus. The AI-driven system can help achieve the speedy disposal of cases through a dispute resolution mechanism [92]. The entire robotic apparatus may come in handy as the automated intelligent systems today can make offers, accept bids, indulge in negotiations, crack deals, and engage in contract drafting, thus paving the way for legal involvement and new emerging frontiers of legal responsibility [93]. The efficient implementation of a robust AI-based system is poised to achieve the principle of speedy justice. This cherished virtue remarkably demonstrates the benefitting value of leading-edge technologies [94].

The legal arena is known for the eternal documentation entailed in every process. Implementing AI-based tools may prepare the ground for the introduction of robot lawyers, which can analyse and assess legal documentation [95]. One of the critical roles played by a lawyer in the entire legal landscape is hearing the litigants' grievances and proposing a plausible course of action to follow. The robot lawyers are being discussed and contemplated. Nevertheless, the concern that comes to the forefront is its efficacy when conferring privileged legal advice, an archetype of rationality, integrity, and confidentiality, on the strength of artificial legal intelligence [96]. The incorporation of AI-backed robot lawyers poses two challenging questions of 'perceived use' and 'trust', the two attributes forming the edifice of the advocacy profession [97]. Traditional law firms are revamping given disruptive legal technologies, which encourages a firm with a high-competitive advantage. The legal tech market makes a compelling case for new business and delivery models that focus on cutting-edge technologies [98]. Given the enormous usage of the techno-driven apparatus, market players such as law schools entrenched in legal education are undertaking a techno-accepting and digital-confirming makeover by overwhelmingly overhauling their system and going for AI-driven digitalization [99].

In Figure 4, the authors stress the increasing role-playing by the robotic lawyer in the coming days and the capacities the robotic entities possess. A robot lawyer can help render legal advice, provide curated legal documentation, and undertake contract drafting, and a high-end robot also helps in negotiations. The figure exemplifies the variety of legal assistance a robot can make in a legal system.

To better understand and appreciate the manifest changes the technological AI-laden apparatus has brought to the legal forefront, it is apposite to examine the efficacy of the legal technology applications in their interaction with the legal system. The use of AI has profound implications for the practice of law and the methods by which it is conducted. Machine learning algorithms can boost the efficiency of lawyers. The following table is inspired by a paper [100] that enumerates AI-laden tools' application in undertaking works associated with the legal industry. As per the authors, these apps are bringing about a seismic shift in the legal industry to comprehensively revamp how the legal ecosystem operates in the rapidly penetrating technology-ridden times. The analysis from Table 1 will help the readers understand the percolation of legal tech applications in present-day legal research.
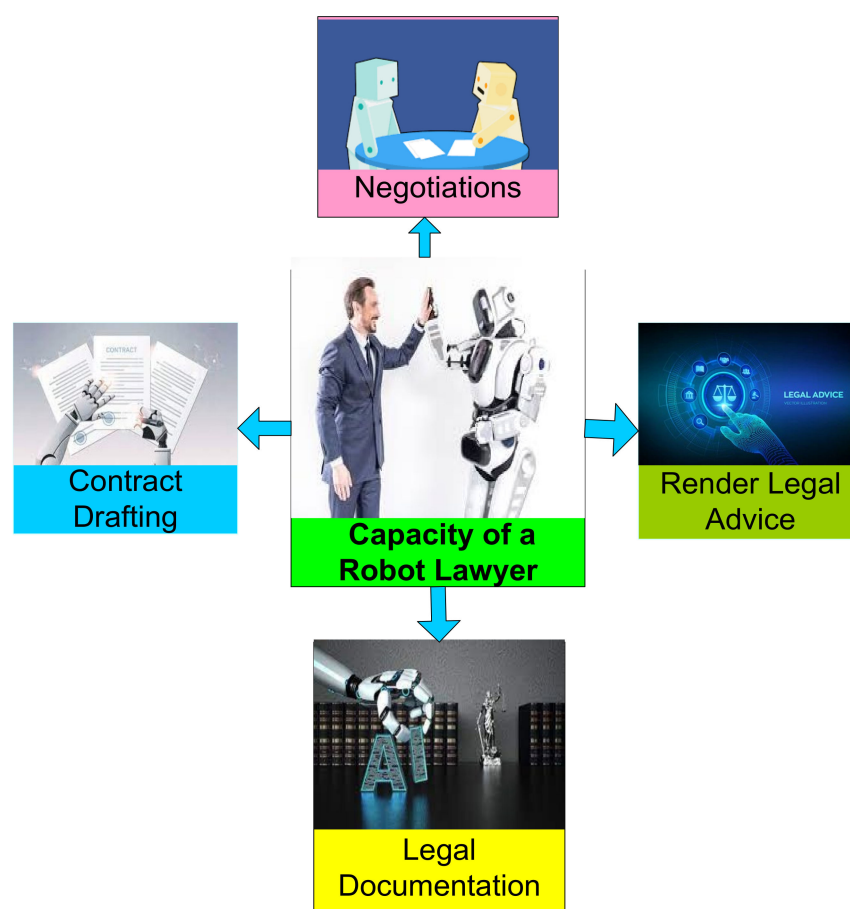
Figure 4. The capacity of a Robot Lawyer.

The following table is the manifestation of the different applications used by companies across the globe that are using artificial intelligence for running their operations. Tools such as CaseIQ, Evisort, Hyperlex, etc., help considerably in contract creation and analysis. Contract creation is a sine qua non for ensuring legal rights and obligations. These artificially intelligent applications are revamping the way the legal industry is functioning. There are applications such as eBrevia for providing due diligence and Canvass AI for undertaking analytics and predictions. COMPASS algorithm is being rigorously used to canvass and map out the possible crimes that can be committed. Likewise, a variety of AI-induced applications are covering the field.

Table 1. AI-assisted technology platforms in Legal Industry & their purposes.

Company	Tools	Description
CasaMine [101]	CaseIQ	CaseMine is a platform for legal research and analysis based on the NCR. It uses AI to help find links between case laws. It helps to search for more than just keywords. The CaseIQ software is a "virtual legal research assistant" that automatically looks at the language of the brief and feeds it into a complex algorithm that predicts what might be missing from the brief or what other arguments could be made. CaseIQ gives suggestions in acts, keywords, or essential court cases to make the research more thorough and in-depth.

Table 1. *Cont.*

Company	Tools	Description
Canvass Analytics [102]	Canvass AI Platform	This tool helps industries grow by using analytics and predictions to help people make decisions based on data from operations. As a result, it improves the system's programs for making things, keeping them in good shape, and managing energy.
eBrevia, Inc. [103]	eBrevia	In eBrevia, AI combines Machine Learning and Natural Language Processing to pull out relevant information from legal contracts and other documents. This makes due diligence and lease abstraction much faster and more accurate, which helps lawyers with their analysis.
Equivant (formerly Northpointe) [104]	COMPAS Algorithm	It's an algorithm for gauging how likely it is that the defendant will conduct further crimes. Using a secret algorithm gives the inmate the specific guidance they need, which may include details about the Case that will be relevant at the sentence.
Everlaw [105]	Everlaw	Everlaw is a cloud-based technology in the electronic discovery that offers full lifecycle assistance. It helps establish scenes, evaluate evidence, and structure arguments. The software can use as many as 109 languages to translate documents.
Evisort [106]	Evisort	Evisort accelerates contract creation and management with NLP. AI-powered data search. It extracts contract data to simplify data collecting. Evisort tracks contract renewal and approval to improve workflow accountability. The software has a sophisticated text search and auto-alerts of important dates to prevent unnecessary costs or missed chances.
Hyperlex [107]	Hyperlex	Hyperlex monitors and manages contracts. From creativity to discussions, it helps. Comparisons help negotiate the best deal. Hyperlex simplifies contract validation by digitizing it. It sets expiry reminders. The programme analyses a contract's clauses and language to prevent disagreement.
JPMorgan [108]	COIN	JPMorgan uses machine learning to automate its law firms. JPMorgan announced it has created and deployed COIN, which automates contract document evaluation. First, the corporation used the tool to analyse its credit contracts. Image recognition software identifies agreement patterns. The software evaluates contracts that took lawyers 360,000 h in s. The algorithm is more accurate than humans. COIN enhances contract review accuracy. Therefore, the bank's investment in technology is also about quality.
Kira Systems [109]	Kira	By tracking the files of attorneys and judges, this site gives a better idea of who stands a better chance of winning the Case.
LawGeex [110]	LawGeex	LawGeex asserts that its software can validate contracts by determining whether or not they adhere to previously established guidelines. If they do not meet the requirements, the AI will offer suggestions for revision and acceptance. According to the organization, this is accomplished through a combination of machine learning, text analytics, statistical benchmarks, and the legal expertise of lawyers.
LexisNexis Legal & Professional [111]	Lexis Nexis Verdict and Settlement Analyser	Predicting and assessing success rates and modified case strategies help reduce error rates, improving the results of legal actions.

Table 1. *Cont.*

Company	Tools	Description
Legal Robot [112]	Legal Robot	Contract Analytics is a San Francisco-based AI firm Legal Robot's response to the expanding field of contract evaluation software. The company claims its beta software can use machine learning and AI to convert legal content into numerical form and flag errors directly on the document.
Legal Risk Management AI [113]	30-min Case Evaluator	This platform helps lawyers create Bots that automate the conversation and draft legal information of lawyer and client, and it also helps with guidance in the legal field and advice, making legal service more seamless.
Legal Geek [114]	Legal Geek	By automating the contract review process, Legal Geek gives lawyers more time to close better deals and build strong businesses. It helps solve problems by cutting down on time and money and providing up-to-date legal support, such as reviewing and writing contracts.
Luminance [115]	Luminance	An inconsistency in the provided document can be identified with the help of a pattern recognition algorithm. To identify potential danger in any of the scenarios described in the set of documents and to identify the occurrence of similar problems, sophisticated statistical probability analysis is performed. The Luminance technology sifts through contracts and legal documents, extracting the most relevant and salient details. In particular, it does not require training to read papers written in any language.
Leverton [116]	Leverton	Leverton is an AI-based law company primarily concentrating on the documentation associated with substantial real estate holdings. Because it is a platform for data extraction, it extracts all pertinent data, manages documents for reasoning-based decision-making, and uncovers and analyses data. This program, hosted on the cloud, can quickly scan contracts in twenty different languages.
Lex Machina, Inc. [117]	Lex Machina	It is helpful for quickly estimating the financial value of a case and the risks involved from both parties' points of view during the litigation process. The program can examine arguments from both sides of a case by simulating jury instructions. When both the plaintiff and the defendant have less evidence to work with, the tool can be invaluable in hastening the process of reaching a mutually agreeable settlement out of court. If you need to examine a personal injury case, this edition is the one to choose.
Nearlaw.com [118]	NearLaw	AI is used to help lawyers, law firms, and companies find cases with the help of NearLaw. It figures out how vital Case Ranking is by using NLP technology. Most programming is done with Python, and the tech stack is built with Ruby. The tech team has also made a model only used for legal documents, judgments acts, and statutes.
Pensieve [119]	Mitra	Pensieve runs an AI-powered legal research platform called Mitra. It uses AI and Natural Language Processing to make law firms more efficient and has also been turned into an accelerator program.
Premonition [120]	Premonition AI	Lex machine, a subsidiary of LexisNexis, is a platform that offers data modeling services and predicts case outcomes using data collected from prior proceedings.

Table 1. *Cont.*

Company	Tools	Description
Rocket Lawyer Inc. [121]	Rocket Lawyer	Rocket Lawyer is an online legal technology company that offers services such as estate plans, reviewing legal documents, and checking your legal health. The site also has a list of lawyers that people and small businesses can call to discuss legal issues. It gives account holders access to online legal forms and helps with articles. It also offers consumers and businesses access to lawyers who can look over their legal documents, answer questions, and do other legal work.
Ross Intelligence [122]	Ross Intelligence	ROSS Intelligence develops AI-powered products for lawyers. Every lawsuit needs legal research. Links, cases, and material can overwhelm lawyers with limited research time. Lawyers can use ROSS Intelligence's natural language search to get reading recommendations, case law, and secondary resources.
SpotDraft [123]	SpotDraft	SpotDraft is an AI-powered platform where clients can write and sign contracts, send automated reminders, payments, and more. It can look at legal documents and tell users where they need to negotiate.
Thomson Reuters Westlaw [124]	Westlaw Case Evaluator	Cases, court records, rulings, and agreement tendencies are analysed and estimated using the program. The ability to negotiate and reach an agreement is also provided.

8. Recommendations

Based on the analysis of the issues encompassing the AI-enabled technological apparatus and robotic-led digital upturn, the following are the recommendations to address the legitimate concerns highlighted all-throughout the study. Figure 5 depicts an attempt to illustrate the future AI and robotics scenario. A time when the entire legal system will incorporate necessary reforms and form a strong legal framework. In fact, this would transform it into a digitised and modernised legal ecosystem. A system in which modern-day technological issues are legally addressed. The recommendations are summarised below:

(a)   Legal Infrastructure

The techno-driven growth is here to stay. The challenges emanating from leading-edge technological apparatuses warrant dedicated efforts on the part of the legal apparatus to bring forth suitable legal changes to shore up the legal infrastructure. The extant legal infrastructure needs to be revamped to give way to the intervention of technologies to assist the legal apparatus. If the legislative wisdom recognizes that legal-techno amalgamation offers the panacea to fight the vulnerabilities and challenges emanating from the virtual ecosystem, the system shall stand the onset of AI-driven technologies. Thus, the law should adopt AI and robotics as a tool wherever necessary to help assist the structural values of the legislative apparatus to render efficacious, vibrant, constructive, and progressive administration of justice. As mentioned in the paper, the legal industry has already adopted tools and instruments to dispense legal tasks such as contract drafting, analysis, culling out case laws, etc. Advanced AI systems are yet to be tested and analysed. The legal industry is still at the bottom of the beginning of AI-laden tools. The Legal tech industry has received a significant boost and momentum after the successful operation of the already existing apps. Nevertheless, the development of future tools, or the expansion of the existing tools, must keep in mind the challenges of civil rights, enforcement, and practical difficulties to ensure the legal infrastructure is developed corresponding to ease of doing business.
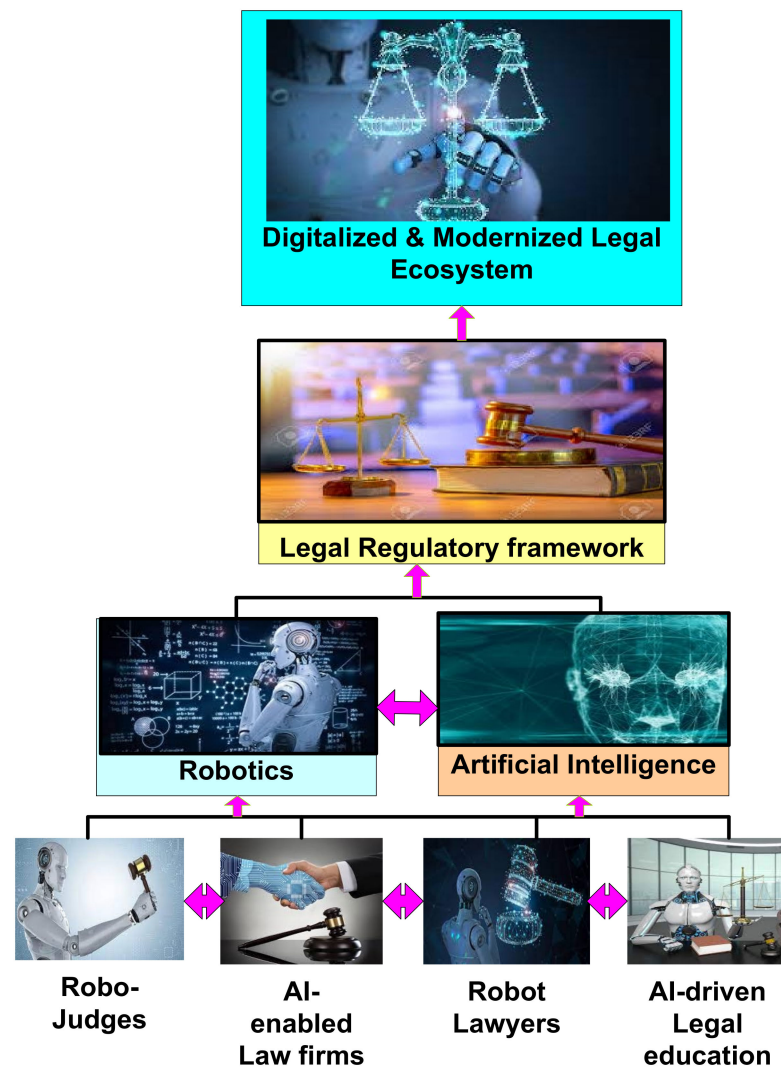
Figure 5. Digitized & modernized legal ecosystem.

(b)　　Regulatory framework

　　If the aforesaid suggestion is to see the light of day, it becomes imperative and unavoidable to set the law apparent on the roles and responsibilities assigned to an AI-enabled automated intelligent robot. The convergence of AI and Robots is essential in activities such as evidence gathering, digital evidence analysis, automated case analysis, robot lawyers, case-finding artificially intelligent apparatus, etc. Given its importance, it becomes essential to answer the elephant in the room and suggest a comprehensive regulatory framework. While designing an ironclad framework that could withstand technological pressures, the law will have to clear the air around the legal personhood of robots. The roles and responsibilities in case of violation of rights will need a civil law framework. This ensures accountability in the entire structure, enhancing the claim for a rapid upturn of the techno-driven venture. In essence, the regulatory framework is quintessential if the AI techno-movement is to have its sway over the legal ecosystem to alleviate the processual hassles and achieve speedy justice. The existing EU AIA is a good attempt. Still, the loopholes highlighted by the authors in the paper given there is an absence of a legislative framework on how the violation of individual rights through AI-driven action be compensated. The European AI board needs to be vested with enforcement powers; otherwise, it becomes a paper tiger that only barks but do not bite. These are the areas where the regulatory framework needs to be remarkably strengthened in the face of AI & robotics-driven times.

(c)   Law firms & Lawyers

The first blush of interaction of a litigant with the justice system happens through lawyers and law firms. Law firms and lawyers cannot afford to undertake an insular and parochial approach. There is plenty of work associated with a lawyer, right from entertaining a litigant, parsing through paper trails, drafting standard form contracts, application of laws on a given set of facts, case law finder, legal research, etc., which can appositely be taken care by an AI-enabled system. A legal AI-enabled bot can be developed through which a litigant can do the boilerplate works by himself. This will save time and necessitate lawyers' intervention on issues of greater importance. AI-enabled techniques can do the case law finding or drafting of routine contracts.

(d)   Robot lawyers & Robo ethics

A lawyer is an officer of the court. The lawyer represents a vital cog in the wheel of the administration of justice in a well-entrenched legal ecosystem. There is a complete panoply of works that robot lawyers can discharge. For vetting documents, analysis of opinions, the similarity of case laws, boilerplate contract drafting, attending to the litigant's concerns, etc., there are all works that can be discharged by robot lawyers laced with AI-enabled technologies. However, certain enumerated principles of robo ethics should set out the modalities and framework within which the robot lawyers will operate. Given the intelligence of the robotic systems, the concerns of rationality, integrity, and confidentiality of legal processes no longer offer a vociferous opposition. Robo-lawyers can take the help of legal tech tools to ensure the preliminary, mundane, routine, and paper-centric works can be done before the physical participation of a lawyer is required. As EU AIA law suggests, human oversight is significant and cannot be made a frivolity. However, there lies a considerable amount of work where ethical concerns are not involved, and even an intelligent machine or system can discharge the duties. With this, the efficacy of the legal system would enhance. Access to justice would get massive momentum. Ordinary legal works could be availed by the litigants from the comforts of their houses, and the cases involving advocacy and lawyering prudence would only require physical intervention. This physical and digital coexistence must be adopted as the spirit of today's times, where a lawyer in person in a courtroom and a robo-lawyer can befriend each other to advance the cause of justice. This will encourage the legal industry to go ahead with the spirit of coexistence and not discordance.

(e)   Legal Education

Legal education is disseminated by various stakeholders, from law students, advocates who sculpt law through razor-sharp arguments, judges who, through judicial pronouncements, help the law grow and develop, and academicians who engage in research and undertake legal teaching and training. However, the most significant stakeholder in legal education is the law students. Law schools play a crucial role in ensuring the candidates paving their way into the legal landscape are equipped with technological know-how. If the digitalization, modernization, and virtualization of legal services are to be achieved, legal education would require to be revamped to assimilate AI-enabled education and robotics to overhaul the legal education ecosystem and engage in law teaching. There are technological developments whereby machines can read the codified laws, which could be used in teaching legal principles in the simplest way possible [125]. The technologies are so sophisticated that they could even decipher and fathom the unwritten laws and uncodified principles by analysing court-rendered judicial pronouncements [126]. The automated analysis of legal texts, case compilations, etc., will help a judge ascertain the principles previously applied by the courts in dealing with similarly situated questions. This will enable speedy judgment delivery as the time consumed in physically parsing through texts and case compilations to arrive at judgment will be considerably reduced. Thus, the role of AI in predictive analysis helps boost essential services in the legal system. The same would also allow law students to prepare for moot court competitions.

If the moot proposition could be analysed through an artificially intelligent apparatus which could tell which legal enactment would be applicable in a given situation, which provisions of the legal enactment govern the legal propositions, what are the previously rendered opinions on similarly situated facts, etc. Until now, law students have manually undertaken these activities, but the blessing of state-of-the-art technology would revamp the existing ways. Due to this, a teacher would be technologically empowered to interpolate technological tools to enhance legal research and academic contributions. Thus, it is worthwhile to encourage technological interventions to augment and revitalize the ways to impart and engage in legal education. In reality, AI will only aid and assist as human interventions shall always play a crucial role in imparting legal knowledge, the core art of law. Technological tools can, at best, play the role of assisting aids but will never be able to replace the physical stakeholders in teaching, disseminating, and imparting legal education.

9. Conclusions

The resilience of any system lies in its flexibility and capacity to adapt to changing times. In current scenario, Industry 4.0 technologies has showed its significant impact on meeting the resilient infrastructure with sustainability. The objective of the study is to understand the technological cornerstone of AI and Robotics in modernising and revolutionising the legal ecosystem. In this study, the interaction of AI and Robotics with the law, as well as the associated legal concerns about privacy, legal personhood, data protection, evidence gathering, and so on, are considered and analysed in terms of the technological implications in the legal ecosystem in order to suggest the appropriate legal transformation. In addition to this, the study identified key AI-assisted tools and tools that are playing vital role in contract drafting, vetting of contracts, case laws research, contract evaluation, rendering legal advice, etc. Likewise, the lawmakers have given commensurate importance by rising to the occasion; more specifically, the EU, which is carrying the baton to initiate a slew of time-necessary reforms to ensure the AI-robotics led arena does not go unregulated, and there lies continued accountability of AI systems and AIA. Finally, the study discussed the recommendations that can assist future research.

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