



IJIRCCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 12, Issue 5, May 2024

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.379

 9940 572 462

 6381 907 438

 ijircce@gmail.com

 www.ijircce.com

AI-Powered Legal Documentation Assistant

Ayesha Siddiqua, Bi Bi Sara, Mohammad Meraj, Jeevan P,

Dr Nasreen Fathima

Student, Dept. of CSE, ATME College of Engineering, Bannur Rd-Mysuru, India

Associate Professor, Dept. of CSE, ATME College of Engineering, Bannur Rd- Mysuru, India

ABSTRACT: This study highlights how AI is transforming the legal industry, especially through the use of AI-powered tools for managing legal documents. These tools can streamline tasks such as drafting, reviewing, and managing legal documents, leading to increased efficiency and reduced costs. The report aims to democratize legal services, enhance understanding, and promote inclusivity by generating reports, responding to client requests, and translating documents. However, the study identifies several gaps in existing research, including the need for comprehensive assessments, ethical considerations, and a focus on technical aspects rather than legal expertise. The proposed strategy involves preparing data, analyzing content using natural language processing (NLP), selecting and developing models, designing user interfaces, implementing and testing, and evaluating and refining. The expected outcomes include improved efficiency, accuracy, streamlined workflows, increased accessibility, and enhanced user experience. The conclusion emphasizes the potential of AI-powered legal document management tools to revolutionize the legal industry while recognizing the challenges that must be addressed to ensure ethical and responsible usage.

KEYWORDS: Artificial Intelligence (AI), legal document, document automation, legal service, Natural Language Processing (NLP).

I. INTRODUCTION

The traditional legal world has been known for its detailed and conservative approach. However, with the advent of artificial intelligence (AI), things are changing rapidly. One significant change is the emergence of AI legal document assistants. These intelligent tools are bringing about substantial changes in the legal profession [1]-[2]. They are making processes faster and easier, and even making legal services accessible to more people. But what do they do? AI legal document assistants use natural language processing (NLP) and machine learning (ML) [3]. This allows them to automate tasks such as creating legal documents, reviewing them, and managing them. They streamline processes such as document drafting, review, and analysis. For example, they can generate standard legal documents like wills and non-disclosure agreements, saving time and resources that would otherwise be spent on manual drafting [4]-[5]. Additionally, AI assistants analyze existing documents, identifying potential risks or inconsistencies and providing insights to legal professionals. They also facilitate legal queries by quickly retrieving relevant case law and regulations from vast databases [6]. The integration of AI-powered assistants brings various benefits to both legal professionals and the public. For legal professionals, it enhances efficiency and productivity by automating tedious tasks, allowing them to allocate more time to complex legal issues and client interactions [7]-[8]. Additionally, AI helps maintain accuracy and consistency in legal documents, reducing the risk of human errors. Furthermore, they improve research capabilities, enabling faster access to relevant legal information [9]-[10]. For the public, AI-powered legal document assistants democratize and provide access to legal services by offering user-friendly platforms for creating essential legal documents independently and cost-effectively [11]. This promotes greater legal awareness and inclusion among individuals, reducing the need for expensive legal consultations for routine matters. Expanding access to legal report creation tools encourages proactive management of legal issues, contributing to overall legal awareness and empowerment in society [12]-[13]. The objectives outlined in the given details aim to utilize technology to simplify and enhance various aspects of legal processes, catering to both legal professionals and the general public [14]. Firstly, the report generation aims to create a user-friendly platform that allows individuals to create customized legal documents according to their specific needs and circumstances [15]-[16]. This objective addresses the often overwhelming and time-consuming task of drafting legal documents, which traditionally requires the assistance of legal experts. By providing a platform where users can create documents such as wills, power of attorney forms, non-disclosure agreements, and contracts without any obstacles, this objective aims to democratize access to legal services [17]. Users can input their relevant information, and the platform will generate legally valid documents tailored to their requirements, saving time and resources. Furthermore, the aim of answering user queries is to bridge the gap between legal knowledge and laypeople's understanding by providing clear and concise answers to legal inquiries in a natural



language format [18]-[19]. This objective recognizes the complexities of legal terminology and concepts, which can be intimidating for individuals seeking legal guidance [20]-[21]. By offering public answers to questions such as "What are the key considerations when drafting a will?" or "What are my rights as a tenant?", this objective empowers individuals to explore legal matters with greater confidence and understanding [22]. Thirdly, the aim of document translation addresses the need for accurate and reliable translation services in the legal space, particularly in multicultural and multilingual contexts [23]. Legal documents often require translation between different languages while preserving their meaning and ensuring legal validity and enforceability. This objective aims to develop technology that can facilitate seamless translation of legal documents, improving accessibility and inclusivity in legal processes [24]-[25].

II. LITERATURE REVIEW

The literature survey table encompasses various research papers that focus on applying AI and machine learning in the legal sector. The authors discuss the advantages and potential drawbacks of using AI in legal research and practice. The studies employ a range of methodologies, including qualitative methods, critical analysis, and descriptive and exploratory approaches. However, some of the studies lack a comprehensive evaluation or comparison with existing legal research methods and tools, while others do not delve deeply into the variety of technological tools and platforms available in the legal industry.

Table 1 – AI - LEGAL DOCUMENT

AUTHOR	YEAR	DISADVANTAGE	METHODOLOGY
Chay Brooks [1]	2019	Focus on benefits, not drawbacks	Qualitative methods are used.
Vijipriya RA [2]	2022	lacks other perspectives, such as interviews with legal professionals.	Critical Analysis Approach.
Suma R [3]	2022	Focus on technical aspects over legal expertise.	Reviewing and Exploration of existing research and techniques.
Sparsh Mali [4]	2022	Focus on benefits, not drawbacks.	Qualitative methods are used.
Juin-Hao Ho [5]	2020	Not have considered potential ethical, regulatory, or societal implications.	Multi-Criteria Decision Making (MCDM).
Jatinder Singh [6]	2021	Limited Scope of Analysis.	Descriptive and Exploratory Methodology.
Václav Janecek [7]	2021	It may not delve deeply into the variety of technological tools and platforms.	Critical Analysis Approach.
Jhanvi Aroraa [8]	2022	lack of comprehensive evaluation or comparison with existing legal research	Qualitative methods are used.

		methods or tools.	
Haoxi Zhong [9]	2022	Provide only a surface-level overview without delving into specific applications, challenges, or case studies.	Multi-Criteria Decision Making (MCDM).
Santhosh R [10]	2022	Limited understanding and human qualities	Critical Analysis Approach.

III. METHODOLOGY

3.1 Data Preparation

In the initial phase of developing our legal documentation assistant, we gather a wide range of legal documents from various sources and jurisdictions. These documents are necessary for the assistant to perform its job effectively, as illustrated in Fig [1]. The figure depicts a system that can automatically identify risk-related information from legal documents. The system works by first extracting paragraphs that are likely to contain risk information and then categorizing them into different risk categories. Users can review these classifications and add comments before exporting the extracted information for further analysis.

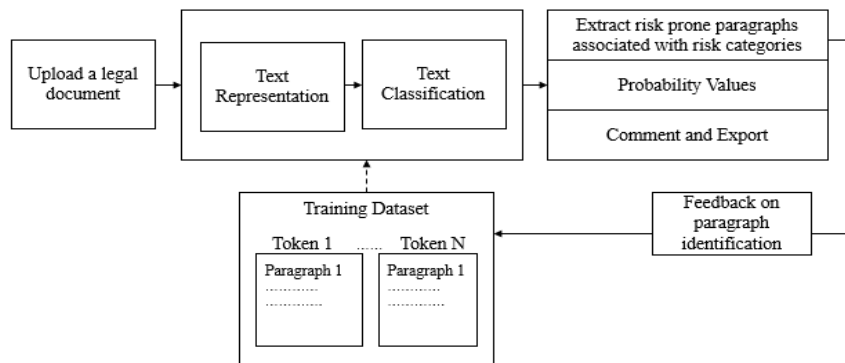


Fig 1 – Data Preparation

3.2 Text Analysis

Natural Language Processing (NLP) is a powerful tool that simplifies tasks and enhances understanding within the legal framework. It can shorten lengthy legal documents into concise summaries, extract key information such as names and dates, and categorize papers for more efficient processing. NLP can also identify important details like the names of individuals and organizations, predict outcomes of legal cases based on past data, answer legal questions quickly, simplify complex legal language, create new documents, and even translate content into different languages. In Figure [2], the diagram outlines the steps involved in semantic search. Firstly, data is extracted from various sources and divided into logical pieces. Each piece is then converted into an embedding, which is essentially a code that captures its meaning, using NLP. These embeddings are then used to construct a unique record that enables efficient search based on meaning, rather than just keywords. When a user enters an address, it is also converted into an embedding using NLP. This address embedding is then compared to the document embeddings in the index to find the best matches. Finally, the most relevant documents are delivered to the user, ranked by their importance. The system may tap into a database or use a large language model to improve and refine the results, and potentially provide a more natural response in a human-like language.

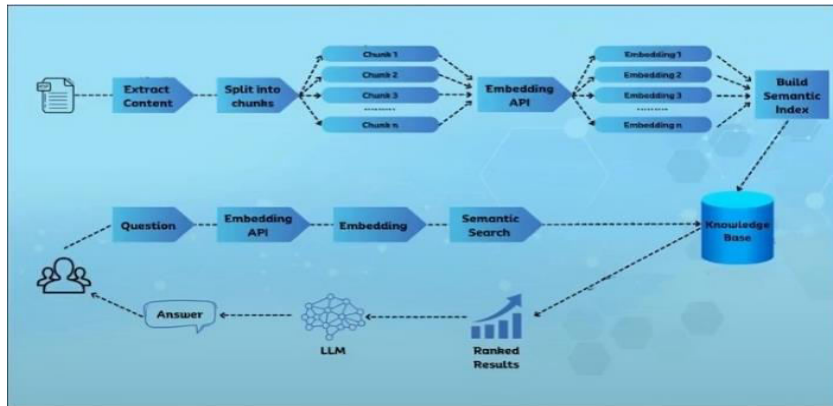


Fig 2 – Text Analysis

3.3 Model Selection and Development

We determine the specific tasks that a legal assistant should perform, such as generating documents, answering questions, or translating. To create documents and answer questions, we utilize Natural Language Processing (NLP) models like transformers. However, for document translation, we need machine translation models. Finally, we train and adjust these models using the legal data we have gathered. This ensures that they are trained and tested on the appropriate materials and perform well in legal tasks.

3.4 User Interface Design

When designing the client interface for our trusted partner, our main objective is to create something simple and intuitive for people to use. This means ensuring that clients can easily select what they want the partner to do, such as creating a document, searching for an address, or translating something. We should also ensure that clients can provide the assistant with the information it needs to do its work correctly. Once the partner has completed its task, clients should be able to easily access what it has generated, whether that's a report, a response, or translated content. Importantly, we should ensure that the interface works well for everyone, including people with different abilities and levels of tech knowledge.

IV. IMPLEMENTATION AND TESTING

After planning the client interface, the next step is to integrate everything and make it functional. This involves writing the code that connects our prepared AI models to the client interface and the back-end systems. However, before releasing it to users, we need to thoroughly test everything. This means making sure that all the features and components of the system work correctly using functionality testing, ensuring people can use it effectively with usability testing, and understanding how fast and accurate the system is with performance testing.

In Figure [3], we can see the internal workings of an address-replying system. The process starts with the user posing an address. The system then analyzes the address, breaks it down into key components, and reads the text it will search for answers. Next, it matches the processed address to the text, potentially using advanced techniques. If a match is found, the system extracts the reply from that location. The system may use this interaction to train itself for future accuracy. Finally, the reply is displayed to the user, often followed by a confidence score indicating how sure the system is about its response.

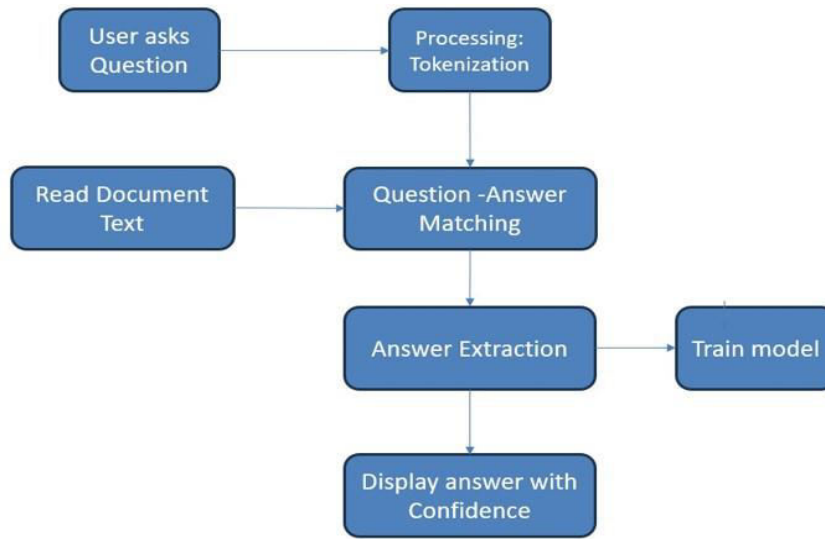


Fig 3 – Implementation

4.1 Evaluation and Iteration

Once our legal assistant is operational, we will evaluate its performance by measuring its accuracy, completeness of its answers, and user satisfaction. However, we will not solely rely on numbers to determine its effectiveness. We will also gather feedback from users to identify areas of improvement. Based on their feedback, we will make necessary changes to the system by adjusting the training data, retraining the AI models, or enhancing the user interface. The ultimate goal is to continuously enhance the performance of our legal assistant. Utilizing and implementing this model has several benefits –

Improved Efficiency and Accuracy:

- **Automated Document Review:** AI can analyze vast amounts of legal text, identifying potential risks, inconsistencies, and clauses requiring attention much faster than humans. This frees up lawyers for higher-level tasks requiring judgment and strategy.
- **Enhanced Search Capabilities:** AI-powered search goes beyond keyword matching. It can understand the context and intent of legal documents, enabling users to find relevant information quickly and easily.
- **Reduced Errors:** AI can flag potential errors in grammar, formatting, or legal citations, minimizing the risk of mistakes slipping through the cracks.

Streamlined Workflows:

- **Intelligent Document Drafting:** AI assistants can suggest boilerplate language, populate templates based on user input, and even generate first drafts of specific legal documents, saving lawyers significant time.
- **Automated Legal Research:** AI can sift through legal databases and case law, identifying relevant precedents and statutes based on the context of a user's query.

Increased Accessibility:

- **Democratization of Legal Services:** AI assistants can provide basic legal guidance and document generation to individuals and small businesses who may be unable to afford traditional legal counsel.
- **Multilingual Support:** AI can translate legal documents and provide legal information in multiple languages, improving access to justice for a broader audience.
- **24/7 Availability:** AI assistants are never on vacation or off the clock. They can provide legal guidance and support anytime, anywhere.

V. RESULT

The image below displays the homepage web user interface created using HTML, CSS, JavaScript, and Bootstrap. The layout of the homepage is well-organized, with a clear navigation bar at the top, a prominent header, and sections for featured content, recent posts, and a call-to-action button. The use of Bootstrap has enabled the creation of a responsive design that is optimized for different screen sizes. The color scheme and typography are consistent throughout the page, making it visually appealing and easy to read. Overall, the homepage appears well-designed and user-friendly

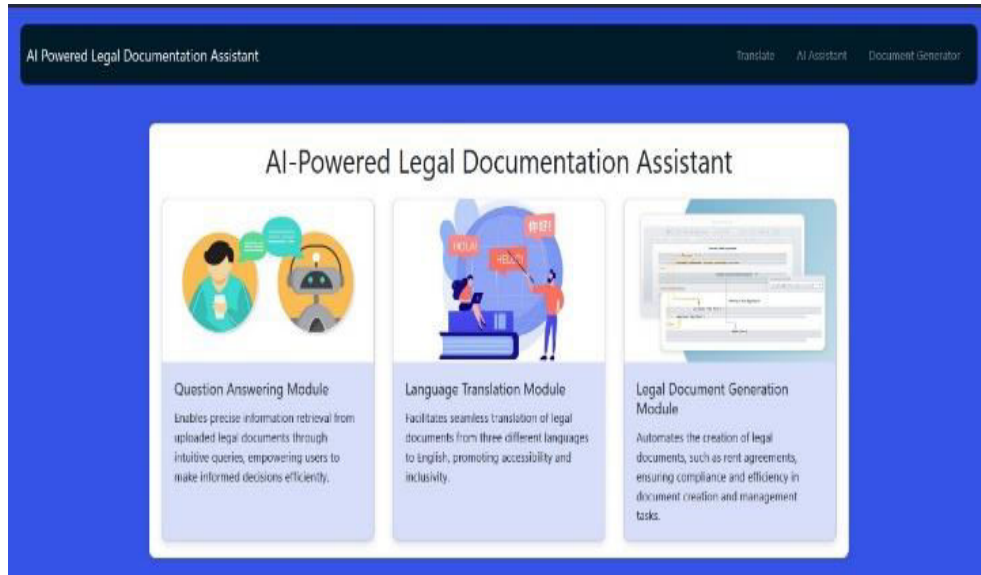


Fig 4 – Home Page

The below figure shows an interface for legal assistants, where users can ask questions related to the law. To generate descriptions related to the law using LLAMA-2, BERT and the Hugging Face Transformers library, you need to start by loading the pre-trained BERT model for sequence-to-sequence tasks and the tokenizer for the BERT model. After that, define a function that takes a query as input, tokenizes it, generates a sequence of tokens using the BERT model, and decodes the generated sequence into text. Finally, call the function with a law-related query to generate the description.

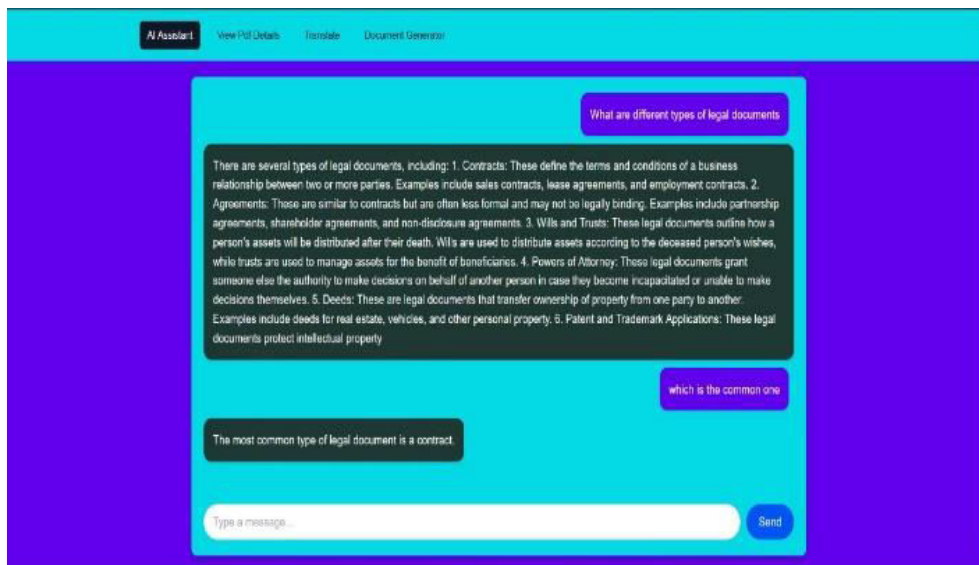


Fig 5 – Legal Assistant Enquiry

The image presented below displays a user interface for uploading a legal document in PDF format, which can be translated using the Language Translation Module. This module is designed to aid in the translation of legal documents from various languages to English, which in turn helps improve accessibility and understanding. It utilizes translation APIs or machine learning models that specialize in multilingual translation, thereby ensuring that users are able to comprehend documents written in foreign languages.

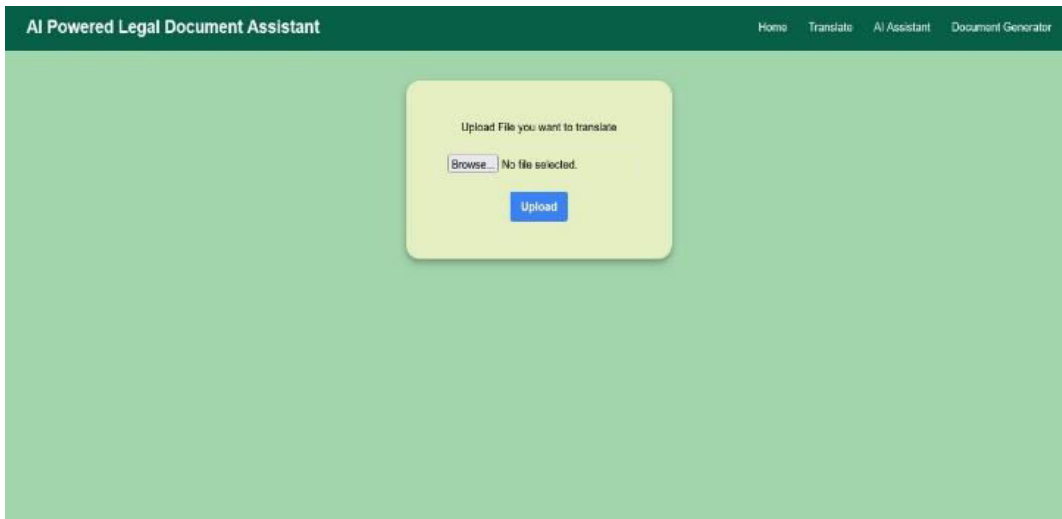


Fig 6 – Uploading Document

The following image shows a user interface that has been designed to offer an overview of an uploaded legal document. The interface uses natural language processing techniques to identify and highlight important information from the document, such as legal concepts, entities, and relationships. The layout of the interface is clear and well-organized, with various sections allocated for displaying the document's metadata, including the title, date, and other pertinent details. Additionally, there are sections dedicated to displaying the extracted legal concepts, entities, and relationships.

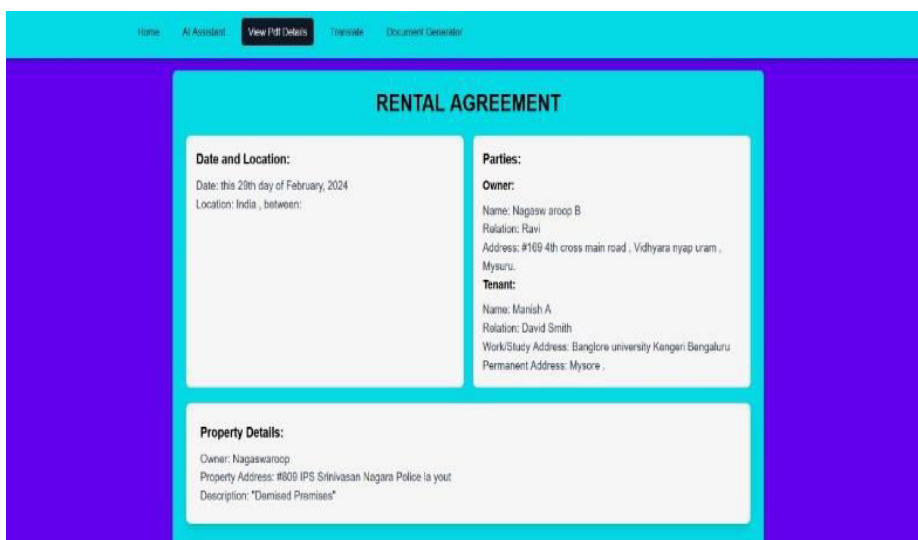
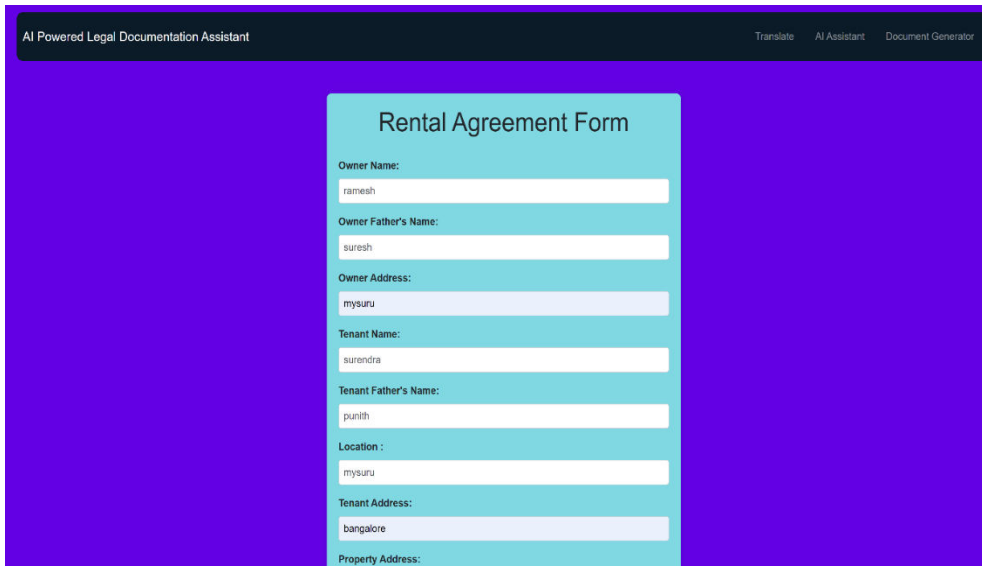


Fig 7 – Document Overview

The image below showcases a user-friendly web interface that helps generate legal documents. This module automates the creation of legal documents like rent agreements, using user-provided information and preferences. The interface provides customizable templates, adhering to predefined legal standards, to streamline the document creation process,

ensuring compliance and efficiency. The primary goal of this interface is to offer users a seamless and efficient experience while uploading legal documents.



The screenshot displays a web interface titled "AI Powered Legal Documentation Assistant". At the top right, there are links for "Translate", "AI Assistant", and "Document Generator". The main content is a "Rental Agreement Form" with the following fields and values:

- Owner Name: ramesh
- Owner Father's Name: suresh
- Owner Address: mysuru
- Tenant Name: surendra
- Tenant Father's Name: purith
- Location: mysuru
- Tenant Address: bangalore
- Property Address: (empty)

Fig 8 – Legal Document Generator

VI. CONCLUSION

AI-powered legal document assistants offer an exciting future for the legal industry, providing streamlined processes, increased access to legal information, and enhanced efficiency in managing crucial legal matters. The potential of this technology is immense, but it comes with its own set of challenges. Issues such as bias, ethical considerations, data privacy, overreliance, and limited understanding must be addressed to ensure effective implementation. By fostering human-AI collaboration, prioritizing transparency, and continuously adapting to the evolving legal landscape, AI-powered legal document assistants can become indispensable tools for legal professionals and the public. They can improve efficiency, accuracy, and inclusivity while addressing current drawbacks like lost documents, time-consuming retrieval, security risks, version control issues, inefficient collaboration, and limited search functionality. These advancements will revolutionize the legal industry, making it more efficient and accessible for all.

REFERENCES

1. G. HP. Bhattacharya, K. Ghosh, S. Ghosh, A. Pal, P. Mehta, A. Bhattacharya, P. Majumder, Overview of the Fire 2020 AILA track: Artificial Intelligence for Legal Assistance. In Proc. Of FIRE 2020 - Forum for Information Retrieval Evaluation, Hyderabad, India, December 16-20,2020.
2. Alarie, Benjamin, et al. "How Artificial Intelligence will Affect the Practice of Law." University of Toronto Law Journal, vol. 68, no. 1, 2018, pp. 106-24.
3. Hemlata Sharma, Aakanksha. "Artificial Intelligence and Law: An Effective and Efficient Instrument".2021 9th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO). 10.1109/ICRITO51393.2021.9596503.
4. P. Bhattacharya, K. Ghosh, S. Ghosh, A. Pal, P. Mehta, A. Bhattacharya, P. Majumder, Overview of the Fire 2019 AILA track: Artificial Intelligence for Legal Assistance. In Proc. Of FIRE 2019 - Forum for Information Retrieval Evaluation, Kolkata, India, December 12-15, 2019.Rayo EA (2017) AI in law and legal practice—a comprehensive view of 35 current applications' tech emergence, November 29, 2017.
5. Riya Sil and Abhishek Roy. "A Novel Approach on Argument-based Legal Prediction Model using Machine Learning". Proceedings of the International Conference on Smart Electronics and Communication (ICOSEC 2020). 10.1109/ICOSEC49089.2020.
6. V Gokul Pillai and Lekshmi R Chandran. "Verdict Prediction for Indian Courts Using Bag of Words and Convolutional Neural Network". Proceedings of the Third International Conference on Smart Systems and Inventive Technology (ICSSIT 2020).

7. Vishu Madaan, Subratho Kumar Das, Prateek Agrawal, Charu Gupta, and Dhruv Goel. "Fusion of ML models to Identify Sexual Harassment Cases".2021 International Conference on Computing Sciences (ICCS). 10.1109/ICCS54944.2021.00058'
8. Flora Amato, Antonino Mazzeo, Antonio Penta and Antonio Picariello. "Using NLP and Ontologies for Notary Document Management Systems".2008 19th International Workshop on Database and Expert Systems Applications. 10.1109/DEXA.2008.86.
9. Suncana Roksandic, Nikola Protrka and Marc Engelhart. "Trustworthy Artificial Intelligence and its use by Law Enforcement Authorities: where do we stand?" 2022 45th Jubilee International Convention on Information, Communication and Electronic Technology (MIPRO). 10.23919/MIPRO55190.2022.9803606.
10. Ilias Chalkidis, Manos Fergadiotis, Prodromos Malakasiotis, Nikolaos Aletras, and Ion Androutsopoulos. 2020. LEGAL-BERT: The Muppets straight out of Law School. In Proc. of EMNLP.
11. Jacob Devlin et al. 2019. BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding. In Proc. of NAACL.
12. Akash Kumar, Aniket Verma, Gandhali Shinde, Yash Sukhdev and Nidhi Lal. "Crime Prediction Using K-Nearest Neighboring Algorithm".2020 International Conference on Emerging Trends in Information Technology and Engineering (ic-ETITE). 10.1109/ic-ETITE47903.2020.155
13. Saqeeb Abdullah, Farah Idid Nibir, Suraiya Salam, Akash Dey, Md Ashraful Alam and Md Tanzim Reza. "Intelligent Crime Investigation Assistance Using Machine Learning Classifiers on Crime and Victim Information".2020 23rd International Conference on Computer and Information Technology (ICCIT). 10.1109/ICCIT51783.2020.9392668
14. Marijn Schraagen, Floris Bex. "Extraction of Semantic Relations in Noisy User-Generated Law Enforcement Data".2019 IEEE 13th International Conference on Semantic Computing (ICSC). 10.1109/ICOSC.2019.8665497
15. Jishitha Kuppala, K. Kalyana Srinivas, P. Anudeep, R. Sravanth Kumar and P. A Harsha Vardhini. "Benefits of Artificial Intelligence in the Legal System and Law Enforcement".2022 International Mobile and Embedded Technology Conference (MECON). 10.1109/MECON53876.2022.9752352.



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



SJIF Scientific Journal Impact Factor



निस्कयर
NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING



9940 572 462



6381 907 438



ijircce@gmail.com



www.ijircce.com

Scan to save the contact details