AI POWERED LEGAL DOCUMENTATION ASSISTANT

SUBMITTED IN PARTIAL FULFILLMENT FOR THE REQUIREMENT OF THE AWARD OF DEGREE OF

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE

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May 2025

DECLARATION

We hereby declare that this submission is our own work and that, to the best of our knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

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CERTIFICATE

This is to certify that Project Report entitled "AI Powered Legal Documentation Assistant" which is submitted by in partial fulfillment of the requirement for the award of degree B. Tech. in Department of Computer Science of Dr. A.P.J. Abdul Kalam Technical University, Lucknow is a record of the candidates own work carried out by them under my supervision. The matter embodied in this report is original and has not been submitted for the award of any other degree.

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Last but not the least, we acknowledge our friends for their contribution to the completion of the project.

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ABSTRACT

In today's world almost every sector is relying on Artificial Intelligence since this makes the manual effort lowest with introducing its new features. Teaching sector, business sector, medical sector etc. Every sector is the follower of the enormous trends of AI. The legal sector highly depends on working with complex documents like drafting, reviewing, and analyzing. This becomes a time-consuming activity and can be a hurdle to humans. The hands of technologies of ai have touched the legal sector comparatively low as compared to other sectors. Maybe the complexity of the work in this sector can be the reason. This project introduces an AI-Powered Legal Documentation Assistant made with Natural Language Processing (NLP) and Machine Learning (ML) to automate legal workflows. The system comprises four modules, Automated Document Generation that will Generates documents (e.g., NDA, Partnership agreement, Employment agreement etc.) using customizable templates. Case Category module that will Analyzes the case of the user and gives the category of the case and other important information about the case. Judgement Prediction module that will Analyzes the case entered by the user and give the chances of respondent winning and petitioner winning. Chatbot will Solves the doubt of the users and make them guide through the application. The application achieved 92% accuracy in document generation and reduced manual review time by 60%. Future work includes integrating blockchain for secure document handling and improving contextual understanding using Large Language module.

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LIST OF ABBREVIATIONS

UI	User Interface
AI	Artificial Intelligence
PDF	Portable Document Format
NLP	Natural Language Processing
API	Application Programing Interface
GPT	Generative Pre-trained Transformer
BERT	Bidirectional Encoder Representations

LIST OF TABLES

SDG MAPPING

(Sustainable Development Goals Alignment)

The AI-Powered Legal Documentation Assistant contributes to multiple United Nations Sustainable Development Goals (SDGs) by addressing challenges in the legal domain through the strategic use of technology. Below is a mapping of how the project aligns with key SDGs, showcasing its broader impact on society, governance, and industry.

1. **SDG 9: Industry, Innovation, and Infrastructure**

Goal: Build suitable infrastructure to promote and sustain industrialization and faster innovation.

Justification:

This project introduces innovation to a historically trending industry, the legal sector by applying Artificial Intelligence and Natural Language Processing into daily day legal operations. It ensures the help of smart infrastructure under law categories and legal blocks, ensuring smooth workflow and reduce dependency on manual efforts by automating documentation, and legal research. The tool empowers the flexibility and technology of legal powers.

2. **SDG 8: Decent Work and Economic Growth**

Goal: Promote sustained, inclusive and sustainable economic growth full of productive employment and decent work for all.

Justification:

Automating repetitive and suitable tasks such as legal drafting allows lawyers and legal professionals to focus on higher-value hence to work more functionally. It helps to reduce costs, increase productivity, and allows small businesses to access legal resources at

reduced costs. In the long term this promotes a more efficient and goal-oriented workforce that contributes to increaing economic growth.

3. **SDG 16: Peace, Justice, and Strong Institutions**

Goal**:** Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable institutions at all levels.

Justification**:**

The most important contributions of this assistant is its potential to increase access to justice. By making legal document generation easier and more affordable, the system ensures that individuals and small organizations excluded from professional legal services can create legally valid documents with confidence. This leads to more access to legal frameworks and reinforces trust in justice.

4. **SDG 4: Quality Education**

Goal**:** Ensure inclusive and equal quality education and promote lifelong learning opportunities for all.

Justification**:**

The assistant can serve as an educational tool for law students and legal professionals. It helps them learn the structure and language of legal documents, understand clauses and explore case laws in an interactive and engaging manner. Such functionalities increases legal literacy both in academic institutions and in learning environments.

5. SDG 10: Reduced Inequalities

Goal**:** Reduce inequality within and among countries.

Justification**:**

Access to legal documentation is often restricted to those who can afford professional legal services. This tool fills the gap by offering a low-cost, reliable and user-friendly way to produce legal documents. It empowers every community, entrepreneurs, and individuals who might remain legally vulnerable hence supporting equal access to legal support systems.

CHAPTER 1

INTRODUCTION

1.1 Project Overview

The arms of AI are almost present in every sector in today's world whether it is teaching, medical, transportation and much more but the legal sector is the only one where the intent of AI is comparatively low. There are relatively more manual efforts in this sector which is a major reason why technology have not raised the components in this particular sector.

Lexaido.ai is a legal documentation assistant which provides solution for automating the generation of legal documents without any hurdle. It contains natural language processing and machine learning to analyze legal text and accordingly generate documents, and provide real-time feedback on the input text. Using artificial intelligence and natural language processing. This tool can help create legal documents, scan them for any issues and even suggest related legal preferences all this with minimal human effort. The goal is to make legal tasks at its quickest, accurate, and cost effective by using technology in a most appropriate way.

This project not only make the legal work easy but also it saves the cost of the users by reducing manual efforts. The user gets the advantage of the smooth UI on the website and with the three most useful components of document generation, chat bot and case prediction there is a better revolution in the field of legal sector.

It accepts the user input and with the help of NLP the case of the user is scanned and the category of that case is given as an output with which the user can also see the related cases on the Indian Kanoon website.

The influence of Artificial Intelligence (AI) has transcended education, healthcare, transportation, finance, and even customer relations. Today, smart algorithms undertake tasks with unprecedented speed, accuracy, and efficiency. Despite such advancements, the legal profession remains one of the last areas where the application and implementation of AI technologies has been minimal. This sector is still heavily reliant on manual processes, which in turn, limits the pace at which technology evolves in legal services. The slower pace in automation can be attributed to the complexity of legal language, the delicateness of legal matters, and the indispensability of human discretion.

One step further is Lexaido.ai, an AI legal documentation assistant aimed at automating and modernizing the legal documentation process lexically. It incorporates modern technology such as Natural Language Processing (NLP) and Machine Learning (ML) to analyse legal texts and create accurate legal documents in real-time. The system is able to understand the intricate details of legal text ensuring that the documents are not only compliant with the law but also tailored to the user's needs.

Lexaido.ai aspires to accomplish the exact opposite: eliminate nearly all human work while maximizing productivity and precision. Users are able to input legal text which the system uses to generate comprehensive legal documents like contracts, affidavits, agreements, etc. The software provides live insights and suggestions that guarantee the possibility of any legal issues being identified and remedied proactively. It provides appropriate legal clauses, preferences, and precedents to accompany a simple interface that is made for experts and non-experts alike.

Lexaido ai's adaptability offers a unique advantage that allows seamless integration into organizations. This innovation functions to aid law firms, corporations, legal advisors, and clients through automating meeting notes, simplifying complex matters into bullet points, generating and analysing contracts, affording instant summaries, and more.

Perhaps the most notable feature is how Lexaido.ai can replace lengthy processes and

workflows with speed and efficiency eliminating the cost of individual and manual legal documentation. The software ensures any potential legal problems will be flagged and fixed in advance with real-time feedback and recommendations. Further, the software will provide legal clauses, preferences, and precedents using an interface that caters to both legal practitioners and non-experts, suggesting intricate precedents to support primary arguments.

Lexaido.ai has many advantages, but one of the main ones is its ability to reduce the time and cost of manually handled legal documentation. Users experience a simple and intuitive interface on the website, enabling even novice users to navigate the platform with confidence. The platform consists of three primary features—Document Generation, Legal Chatbot, and Case Prediction—which all contribute to transforming outdated legal practices.

Document Generation: Based on user inputs, proposes relevant templates and legal clauses, while also automating the creation of the legal document.

Legal Chatbot: Imbued with the capability to respond instantly, interacts with users in natural language to answer questions pertaining to legal terms, processes, and documents, effectively acting as a legal assistant.

Foretell Case Outcomes: Uses advanced NLP techniques to perform in-depth searches and analyses of user-provided details, classify the case, and make predictions about its potential outcomes. It even links users to akin cases available on the Indian Kanoon website, which serve beneficial purposes for legal research and subsequently fine decisions.

Lexaido.ai integrates these functionalities to not just streamline the processes within the law sphere, but to also widen the availability of legal resources to the public, especially to small-scale businesses and individuals who do not have the means to hire legal professionals on retainer. This platform that immensely reduces the gap between technology and law heralds the beginning of legal innovations that are faster, increased in precision, lower in cost, as well as easily available.

Lastly, Lexaido AI represents a significant advancement over the digitization of legal matters. It paves the way for a time when artificial intelligence (AI) will not be a supplementary tool but a fundamental aspect of legal life, enabling users to arm themselves with the knowledge they need to handle legal documentation more effectively. Tools like Lexaido.ai will be crucial in ensuring that technology is applied most appropriately and efficiently as the legal profession develops, ultimately changing how justice is accessed and administered.

1.2 Project Category

Creating an ai assistant that allows users to easily handle the legal cases with our website is the goal of a Legal AI assistant project. This demonstrates building a user- friendly interface with technologies like NLP and ml so that the correct interpretation of the words can be achieved for the accurate results. NLP stands for natural language processing which helps to break down the sentences into smaller parts and analyzing them briefly to give better results. The project aims to satisfy all the legal demands of the user from generating documents to reviewing the legal cases. It covers several important use cases like document generation, giving suggestions over the legal case and predicting the chances of risk in the case of the user.

1.3 Motivation

- Time Constraints: Lawyers spend 20–30% of their time drafting documents, which can be reduced. If the manual work can be reduced it makes legal services become more cost effective, especially helpful for small businesses and individuals.

- Cost Reduction: Legal services generally demand high operational costs due to manual tasks. Automation can reduce legal operational costs by up to 40% which results in making legal aid more affordable.

- Accuracy: Human errors in legal documentation, such as missed clauses, or incorrect

legal references are the major cause of disputes and prosecution of about 15% which can be minimized using AI by continuously applying rules and demanding potential issues.

1.4 Objectives

This project was designed with three main goals in mind:

- Create a system capable of generating legal documents. The idea is to use pre-set templates and fill the important places with the user inputs accordingly. The manual efforts in generating documents is very high according to the normal trends.

- Use NLP to understand and highlight important clauses, spot potential legal risks, and ensure documents meet compliance standards.

- Include a smart research module that can find and suggest relevant laws and past judgments, saving the user from trouble of manual legal research.

1.5 Structure of Report

In Chapter 1, we provide a perfect overview of our assistant project, providing its objectives and significance. We guided the project's aim to develop an efficient Ai legal assistant and make its potential impact on user satisfaction

In Chapter 2, The literature review dives into existing research and study legal ai assistant. We analyze the evolution of artificial intelligence in the legal sector, discussing advancements, user experiences, and security and privacy concerns.

In Chapter 3, it outlines our proposed ai assistant, detailing its functionalities and the technologies utilized for its implementation. We elucidate the system's capabilities and

how it addresses user requirements.

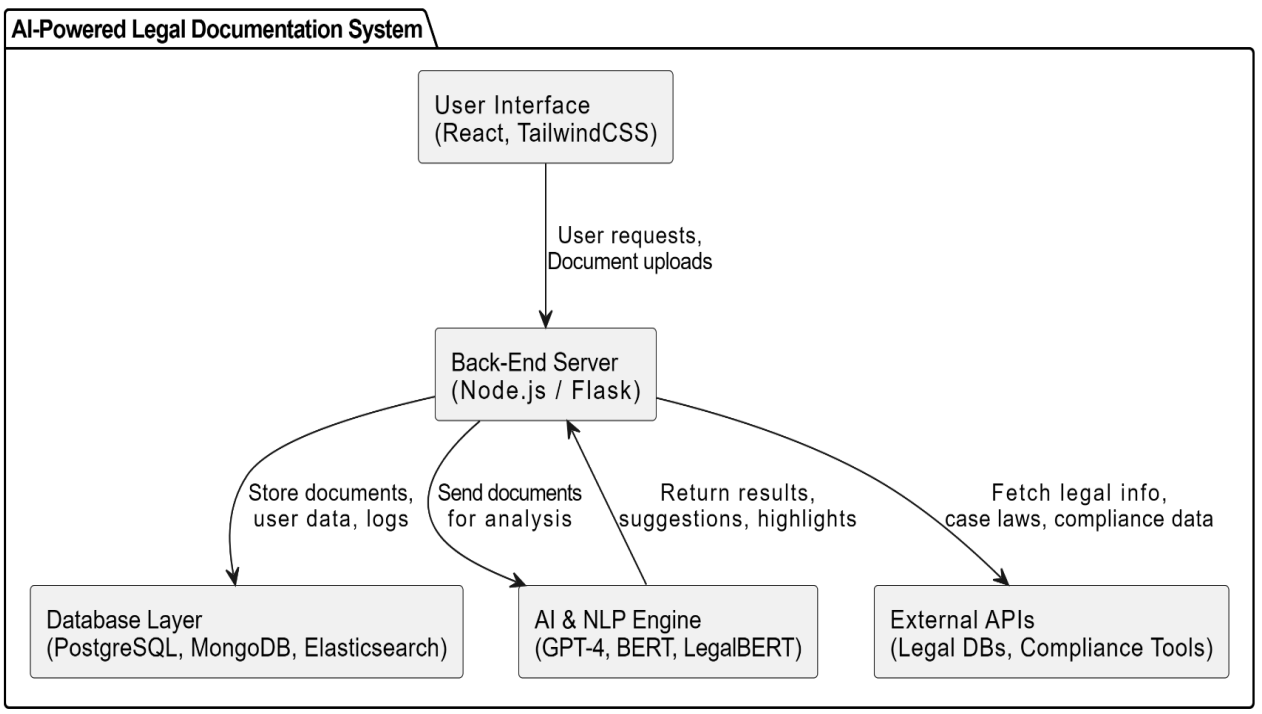


Fig. 1.1 System architecture diagram

In Chapter 4, we conduct a feasibility study of our proposed system and provide detailed requirement specification. We discuss the important terms and conditions which make the ai assistant impactful.

In Chapter 5, In this section, we present an idea of the languages, tools, and technologies used for implementing the legal ai assistant system. We dive into the libraries and algorithms utilized, offering information about the implementation process and component modules.

In Chapter 6, This chapter focuses on testing techniques and methodologies utilized to ensure the functionality and reliability of our ai assistant. We discuss different types of testing with the help of real-world test cases along with details of the test environment.

In Chapter 7, Here, we are trying to provide a summary of different modules which are the part of the ai legal assistant and discuss the outcomes of the project. We analyze the results, use their implications, and offer information into the findings.

In Chapter 8, In conclusion, we submerged the project's objectives, achievements, and contributions. We followed the important insights, discussed potential future applications for the project, and calculated the significance of our work.

In Chapter 9, The references section includes address of relevant research papers, articles, and sources used in this report, ensuring transparency and academic integrity.

CHAPTER 2

LITERATURE REVIEW

2.1 Reference Analysis

- **Katz, D. M. et al. (2017). "Predicting Supreme Court Decisions." PLoS ONE**.

This research that used to analyze whether or not machine learning was able to accurately projects the results of U.S. Supreme Court cases. Based on a general data set of majorly two centuries, the authors developed a prediction model taking into consideration legal, procedural, and biographical factors. It clearly proved that the model hit a 70.2% accuracy rate in case outcome prediction and 71.9% in justice vote prediction, demonstrating the future projection of AI applications in legal prediction and judicial analytics.

- **Chalkidis, I. (2020). "Legal-BERT: A NLP Model for Legal Text." EMNLP.**

The objective of this paper was to develop a type of neural network architecture that leverages self-attention to understand and generate text, particularly in natural language processing (NLP) tasks trained on legal corporation, referred to as Legal-BERT. The model was developed to overcome general NLP models in a range of legal tasks like classification and named entity prediction. The research concluded that Legal-BERT performed significantly better on legal datasets as compared to general purpose models, highlighting the importance of domain special NLP tools in the legal sector.

- LawGeex. (2018). "AI vs. Lawyers in Contract Review." LawGeex Report.

This report analyzed the efficiency and accuracy of an AI feature in analyzing legal contracts as compared to expert human lawyers. The aim was to test AI's capabilities in real-world legal document demonstration and analysis. The study concluded that the AI system achieved 94% accuracy in reviewing contracts, whose as the average lawyer

accuracy of 85%, while completing the task competitively quicker , also displaying AI's promise in routine legal review processes.

- **Susskind, R. (2020). Online Courts and the Future of Justice. Oxford University Press.**

  This data interspted how digital technologies, such as AI, may reshape judicial systems and enhance access to justice by means of online courts. The aim was to evaluate the promise and hurdles of digital systems of justice. Susskind concluded that online courts had great potential to save costs, streamline processes, and render justice more accessible but also happend against hasty implementing in order to preserve fairness and confidence in legal institutions.

- **Ruhl, J. B., & Katz, D. M. (2015). "Measuring, Monitoring, and Managing Legal Complexity." Iowa Law Review, 101, 191–244.**

  In this article, It examined how legal complexity can be measured and managed using computational models. We aimed to explain how to measure legal system complexity while suggesting processes to manage complexity. The authors concluded using network modeling and analysis to measure legal complexity could provide policy makers and professionals in the legal community with an agenda for replacing redundant laws and improving the efficiency of the legal system.

- **LawGeex. (2018). Comparative Study of AI versus Human Lawyers in Reviewing Contracts. LawGeex Report.**

  This follow-up study confirmed prior studies by examining AI's accuracy and speed compared to lawyers involved in a structured content review task. The aim was to confirm AI's ability: These were tested across many contract types and conditions. The results were consistent with previous studies, with AI demonstrating accuracy and speed, as well as further confirmation that legal work of a repeating nature can be automated.

- **Russell, S., & Norvig, P. (2020). Artificial Intelligence: A Modern Approach (4th ed.). Pearson Education.**

  This introdion text aims to provide a wide-range brief of AI that has both theoretical and practical implications for intelligent systems. This book was not written specifically for legal usages, however, the AI frameworks, algorithms, and problem-solving strategies presented in this book are theoretical underpinnings and components of legal AI software. The concluding remark also indicated that there are many frameworks or models for AI to be adapted to many industries – law included – if the objective is clearly articulated and appropriate domain-specific data is included.

- **LeewayHertz. (n.d.). AI for Legal Research: Applications, Benefits, Tools and Development.**

  This article examined the uses of AI in legal research with the objective of bringing out its revolutionary capability to make research more efficient. It covered tools such as NLP-based case summarization, automated citation analysis, and legal chatbots. The conclusion highlighted that AI drastically cuts down research time, enhances legal decision-making, and enables both legal professionals and laymen with greater access to legal information.

- **Dyrsmid, L. (December 17, 2024). Traditional Workflow Automation vs. AI: 3 Key Differences. Flowster.**

  The traditional workflow automation was contrasted with AI automation in terms of learning ability, adaptability, and decision- making in the article. The purpose was to highlight the reason AI is an upgrade to automate rules-based and intricate processes like the ones found within the legal field. The conclusion reached was that since AI learns and improves over time from experiences in data, it holds an edge as a strategic tool against stiff conventional automation, particularly for ever-changing, detail-rich disciplines such as the law.

OpenAI. (2025). Pyramid diagram showing frontend and backend technologies such as HTML, CSS, Flask, and ML

This graphical section clearly show to simplify the tech stack helping AI-powered apps, detailed how frontend tech interfaces with backend systems driven by ML models. While essentially a teaching tool, the diagram came to the a conclusion that the construction of strong legal AI platforms entails the co llaboration o f UI/UX design, web frameworks such as Flask, and potent ML models to provide intelligent legal services efficiently.

- **NonDisclosureAgreement.com. (n.d.). Non-Disclosure Agreement (NDA) Template**
  .

  This resource show a standard template for an NDA to assist users in creating enforceable confidentiality agreements. The goal was to make the draft process easy for users who do not have experience to legal language. The conclusion defines that template-based tools are able to democratize legal document creation and, when integrated with AI, can further adopt documents to precise user inputs and legal frameworks.

- **LegalTemplates. (n.d.). Free Employment Contract Templates | Create Online.**

  This site provided costemizable employment contract templates that were used to help users create compliant and detailed employment contracts. This aim was to lower legal problems for individuals and small businesses. The conclusion noted that accessible legal templates, particularly those used by AI, can offer fast, precise, and legally valid solutions without the necessity of a lawyer.

- **Signaturely. (n.d.). Intellectual Property Agreement Template.**

  This software offered templates for intellectual property (IP) contracts, analyzing entrepreneurs and creators in protecting their rights. The goal was to make the legal rocess involved in IP protection easier. The conclusion validates the use of digital and AI- based platforms to make IP contracts more easily useable and comprehensible, especially for laymen.

- **LegalTemplates. (n.d.). Free Partnership Agreement Template**

  This paper provided partnership agreement templates that were used to formalize business relationships and obligations. The aim was to promote clear communication and legal certered among partners. The conclusion highlighted the usefulness of pre-defined legal templates in minimizing errors and the potential of collaborating them with AI to personalize and verify inputs for greater legal accuracy.

2.1 Role of AI in Legal Practice

- Contract Analysis: Tools like Law Geex use Machine Learning methodologies to analyze legal documents with 94% accuracy, reducing manual effort. This is the major advancement considering the length of data and complexity handled daily.

- Legal Research: AI Powered platforms like ROSS Intelligence use NLP to retrieve case laws in seconds, improving efficiency related to time taken. This is the major advancement from traditional legal research.

- Predictive Analytics: Models predict case outcomes using historical data (Katz et al., 2017) and arguments. These models are helpful in adjusting strategy and risk assessment.

- In the most of the sectors the impact of ai results in as a saucerful outcome with great results because of the powerful gathering of information of artificial intelligence, the legal sector is fully compatible with the contribution of ai.

- The legal sector is responsible for the high efforts in the field of judiciary which results in the increasing cost and less involvement of the society. Artificial Intelligence works as a aid in this sector by creating the cost effective solutions.

2.2 Research Gaps

- Limited contextual understanding of legal jargon. While AI has made significant impact in language comprehension, archaic phrases and complex legal logic remains as a challenge.

- Lack of real-time compliance updates in existing tools. Many existing AI tools depends on predefined rule sets or databases that do not automatically upgrade with changes in laws or new court rules.

- Lack of Personalization. Current platforms does not fully account for the differences of jurisdiction, cultural nuances or personalized contract preferences. This leads to the demand for AI systems that can easily adapt.

- Understanding User Differences. We need to learn about how people from different backgrounds and places the proper information about the legal steps don’t have that has to be followed the legal case.

- Less Manual Efforts. The legal ai assistant ensures that every single step of a legal procedural case can be resolved by the least manual efforts with the help of the modules.

CHAPTER 3

PROPOSED SYSTEM

3.1 System Architecture

The system architecture consists of four modules:

- Automated Document Generation: Generates legal documents (e.g., NDA, Employment Contract, Lease Agreement) using templates and structured user inputs.

- NLP Engine: This module applies to NLP technique to parse legal documents, identify clauses, extracts legal attributes and outline potential risks or missing elements in the documents.

- Contract Review Module: This module matches the legal documents with the standard compliance checklists and identifies the mistakes such as missing arbitration clauses or non-standard termination periods.

- Legal Research Module: This module helps the system to fetch similar case laws, legal definitions and updates by searching external legal databases.

- Conclusively these modules works as a system which can stand as an efficient solution for the problems occurring in the legal sets of cases and act as a hurdle for the local person.

3.2 Module-Wise Workflow

1. Document Generation:
    - Users begin with selecting a specific type of legal document from the list of templates (e.g. NDA).

- The next step will be input necessary information such as party names, dates, jurisdiction, and optional clauses.

- The system fills the document dynamically and suggests some edits or additions based on common legal patterns.
- A document is generated in PDF or word format, ready for download.

2 Contract Review

- The generated document then passed with the clause analyzer.
- NLP engine identifies the presence and quality like standard clauses of confidentiality and arbitration.
- Risk and missing clauses are outlined with tooltips or suggestions offered for improvement.

3 Legal Research

- Users can select a highlighted clause and request further legal backing.
- The system can access external databases (e.g., Indian Kanoon) to find relevant case laws, articles and statutes.
- Summarized results are displayed with proper citations for the help of the user with recommending the suitable insights for the case.
- Users then can easily get the notification for that , I will surely help the user with this module.

Fig 3.1 DFD level 0

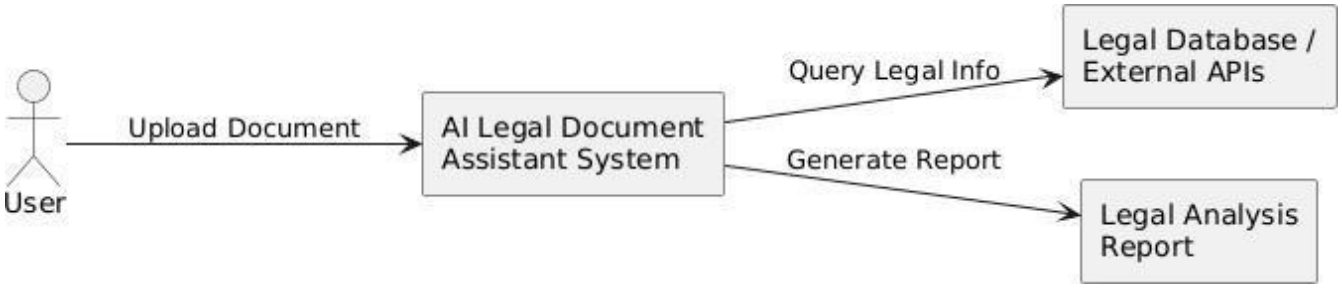
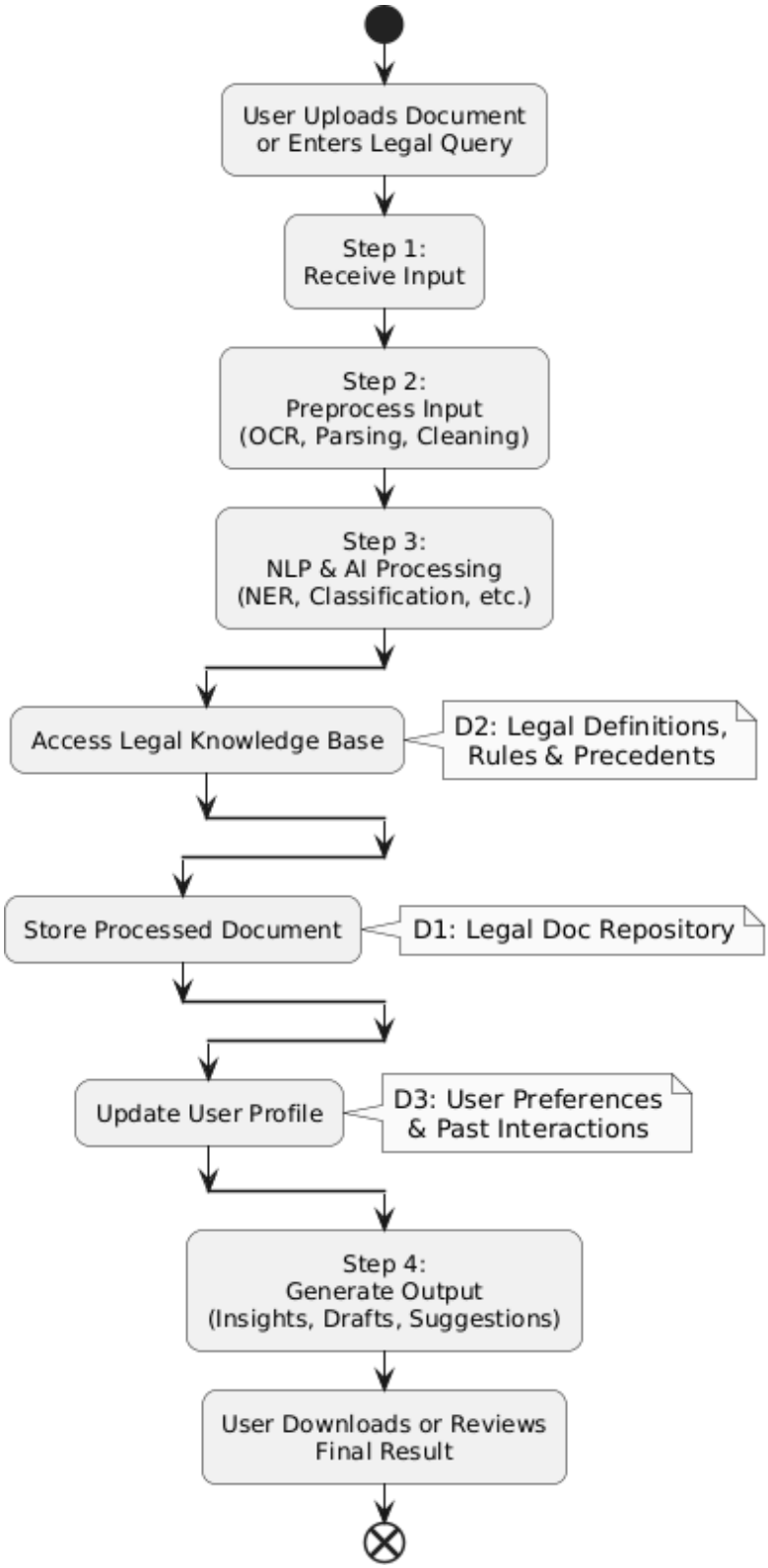


FIg 3.2 Flow chart



CHAPTER 4

REQUIREMENT ANALYSIS

4.1 Feasibility Study

The feasibility study can help you determine whether or not you should proceed with your project. It is essential to evaluate cost and benefit. It is essential to evaluate the cost and benefit of the proposed system. Three types of feasibility studies are taken into consideration.

a) **Technical feasibility:** It includes finding out technologies for the project, both hardware and software. For virtual assistants, users must have a microphone to convey their message and a speaker to listen when the system speaks. These are very cheap nowadays and everyone generally possesses them. Besides, the system needs an internet connection. While using, make sure you have a steady internet connection. It is also not an issue in this era where almost every home or office has Wi-Fi.

b) **Operational feasibility:** It is the ease and simplicity of operation of the proposed system. The system does not require any special skill set for users to operate it. It is designed to be used by almost everyone. Kids who still don't know how to write can read out problems for the system and get answers.

c) **Economic feasibility:** Here, we find the total cost and benefit of the proposed system over the current system. For this project, the main cost is documentation cost. Users also would have to pay for a microphone and speakers. Again, they are cheap and available. As far as maintenance is concerned, it won't cost too much.

4.2 Functional Requirements

- Generate legal documents from templates.The system must allow users to create legal documents by choosing from a range of predefined templates and filling out important inputs.

- The platform should use models like NLP to outline clauses subclauses from the document. Each clause must analyze for potential legal risks and missed out elements that ensures compliance

- User Friendly Interface. The interface must be intuitive, supporting guided from- filling, rich text editing, and AI suggested modifications. A good user user UI ensures smooth functioning.

- User inputs the case with which he wants the prediction is to be passed the input is parsed and break down with different words and with the help of nlp the word wil be aligned with the dataset containing the case categories.

- For the document generation part the user have to fill the necessary details that asre required legally in the type of document requested from the user.

- The system should be able to predict the closest and accurate case category and also the case prediction should be according to the deep study of the case entered by the user

- The chatbot should answer each and every type of questions entered by the user for seamless user interaction.

4.3 Technical Specifications

- Frontend: Built using Reac.js, offering a dynamic and responsive UI for real time interactions.

- Backend: Developed in Python (Flask) for managing server side operations, including processing requests, integrating AI models, and managing the database interactions.

- ML model: Usage of NLP model for scanning the input and the set of operations can be performed for the execution.

- Deployment: The system is hosted on Streamlit for the smooth integration with the ml models.

- Chatbot: The chatbot introduced in the website is built with the help of api key of the gemini open source ai.

CHAPTER 5

IMPLEMENTATION

5.1 Introduction Tools and Technologies

Python

Python is an OOPs (Object Oriented Programming) based, high-level, interpreted programming language. It is a robust, highly useful language focused on rapid application development (RAD). Python helps in the easy writing and execution of codes. Python can implement the same logic with as much as 1/5th of code as compared to other OOP languages. Python provides a huge list of benefits to all. The usage of Python is such that it cannot be limited to only one activity. Its growing popularity has allowed it to enter into some of the most popular and complex processes like Artificial Intelligence (AI), Machine Learning (ML), natural language processing, data science, etc. Python has a lot of libraries for every need of this project.

Flask

Flask is a lightweight WSGI web application framework. It provides flexibility to easily communicate between the backend and frontend part of the web application. It handles the server side logic and API creation enabling smooth interaction between the request from the server and client. The use of this framework in this project is to handle routing server side logic. The user will choose the type of template for the document generation then the request will be send to the server and the response accordingly wil be transferred to the user in the form of the document creation form,

NLP

NLP is a field of machine learning which provides a wide range of operations on the textual data. It provides alignment of the data according to the data set with best quality of components libraries. The aim of using NLP in this project is to recognize the textual input of the user so that the correct alignment of pre placed case categories can be achieved with the input case.

Stream lit

Stream lit is a open source platform where data driven web applications can be deployed. It enables python applications to turn into web apps that can be accessed from anywhere with minimal lines of code. One of the most special feature of this framework is that it does not require knowledge of frontend technologies like HTML, CSS, or JavaScript. Its special feature is to convert ml models directly into web applications with giving customization options for the web app.

Google Document Studio

It is a tool that allows users to generate and automate document creation with the help of Google sheets and google docs. The feature of automation helps the users to create the legal documents with the least manual effort as they have to fill only the important information written in the document. This Information will be filled by the user with the help of google form.

5.2 Dataset Description

- Source: Publicly available datasets including government contract reports, open-source legal platforms and case files.
- Volume of legal documents were collected, covering various types such as NDAs, employment agreements, lease contracts and vendor agreements.

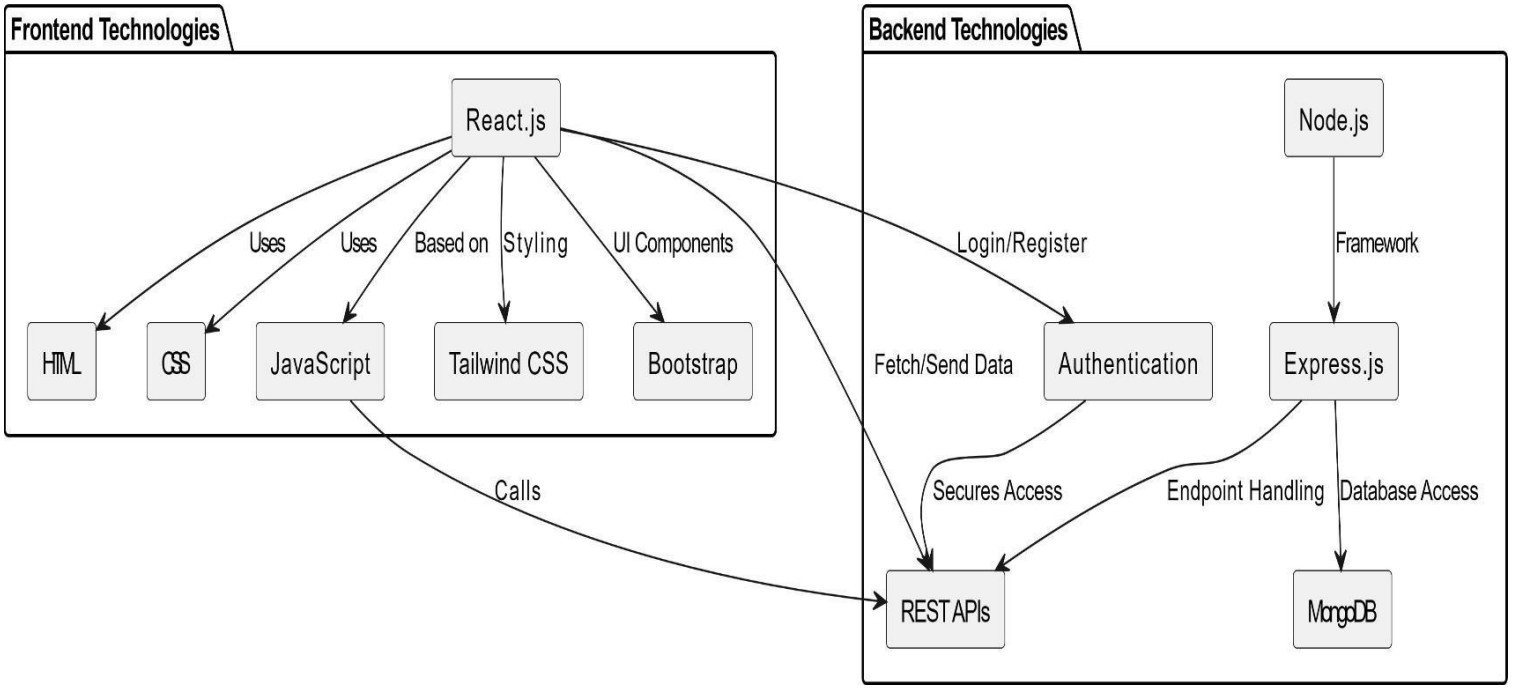
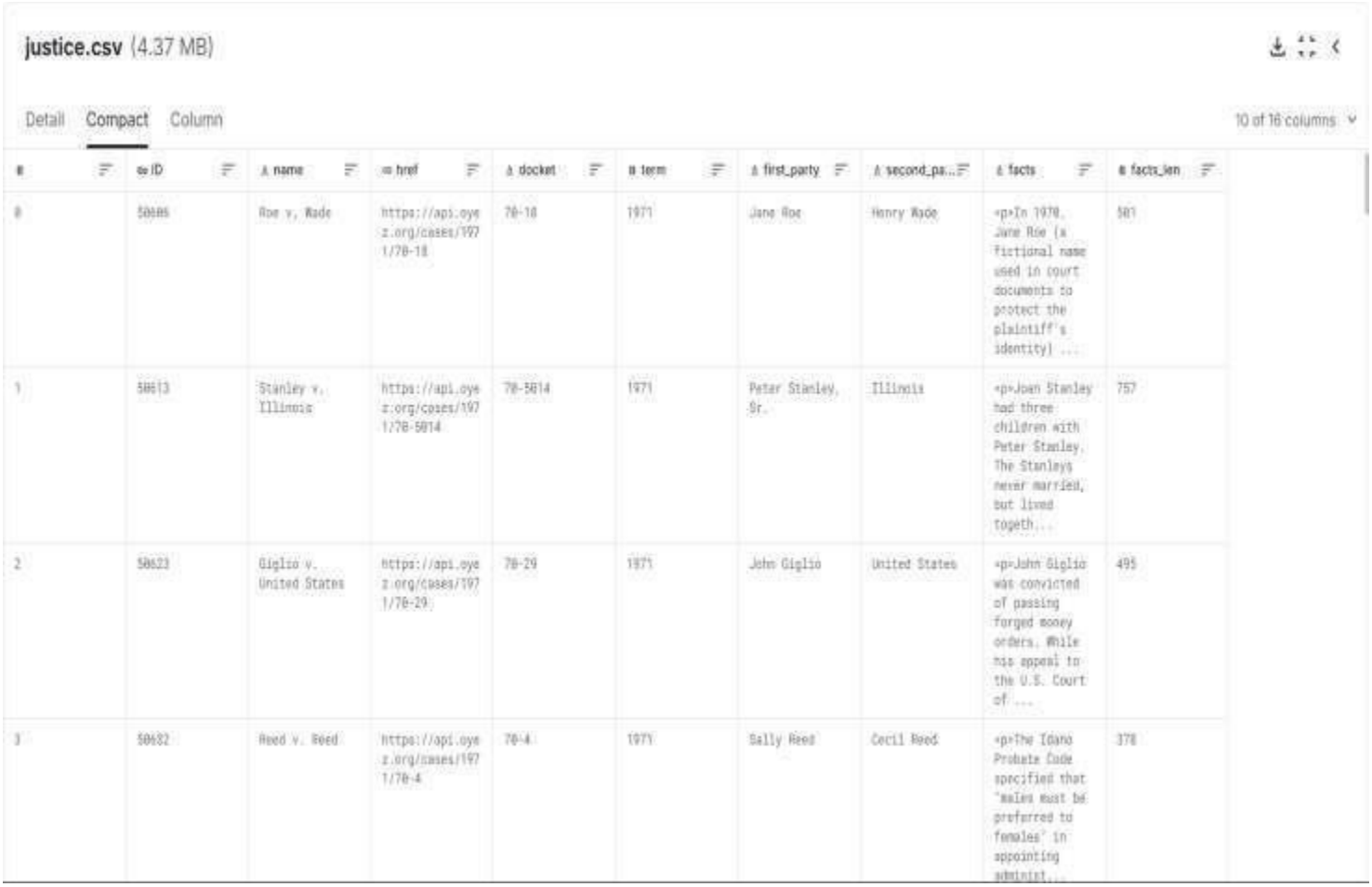


Fig. 5.1 DFD LEVEL 2

- For the judgement prediction model the dataset contains 3304 cases from the Supreme Court of the United States from 1955 to 2021.
-
- Each case has the case's identifiers as well as the facts of the case and the decision outcome. Other related datasets rarely included the facts of the case which could prove to be helpful in natural language processing applications.

- One potential use case of this dataset is determining the outcome of a case using its facts.

- The one of set of this implementation image is shown in the same chapter, that can easily be able to show the


justice.csv (4.37 MB)

Detail Compact Column

10 of 16 columns

#	ID	name	href	docket	term	first_party	second_pa...	facts	facts_len
0	50685	Roe v. Wade	https://api.oyez.org/cases/1971/70-18	70-18	1971	Jane Roe	Henry Wade	<p>In 1970, Jane Roe (a fictional name used in court documents to protect the plaintiff's identity) ...	581
1	50613	Stanley v. Illinois	https://api.oyez.org/cases/1971/70-5014	70-5014	1971	Peter Stanley, Sr.	Illinois	<p>Joan Stanley had three children with Peter Stanley. The Stanleys never married, but lived togeth...	757
2	50623	Giglio v. United States	https://api.oyez.org/cases/1971/70-29	70-29	1971	John Giglio	United States	<p>John Giglio was convicted of passing forged money orders. While his appeal to the U.S. Court of ...	495
3	50632	Reed v. Reed	https://api.oyez.org/cases/1971/70-4	70-4	1971	Sally Reed	Cecil Reed	<p>The Idaho Probate Code specified that "males must be preferred to females" in appointing administ...	378

Fig.5.2 Data set Structure

CHAPTER 6

TESTING AND MAINTENANCE

6.1 Testing Techniques & Test cases Used

We are using an iterative testing approach to make sure our project works well. This means we test it in small steps (a particular module), starting with checking if each part works on its own. Then, we see how different parts work together. We keep testing as we make changes and add new things. This way, we make sure our project is always working well, even after modification.

Unit Testing

Unit testing involves individual components or modules of the voice assistant software in isolation. Each unit, such as a function or method, is tested independently to ensure its correctness and functionality. For example, we can perform unit testing on the case category judgement module to verify that it accurately find the category of the case.

Table 6.1 Unit testing

Case	Description
1	Test the case category module with an actual legal case and verify accurate category.
2	Test the case category module with such an example having two categories in common.
3	Integrate Case category module with Judgement prediction module to verify correct execution.
4	Test case category module with various types of cases belonging to different categories.

Integration Testing

Integration testing verifies the interactions and interfaces between different components or modules of the voice assistant system. It ensures seamless communication and data exchange between modules. For example, we can perform integration testing between the Case category prediction and the judgement prediction module to ensure that recognized commands are correctly processed and executed.

Table 6.2 Integration Testing

Test Case	Description
1	Integrate case category prediction module with judgement prediction module and test with simple example to verify correct execution.
2	Test integration with complex inputs involving more words and hard English words to verify the correct execution.

Functional Testing

Functional testing ensures the ai legal assistant accurately responds to user commands and meets functional requirements.

Table 6.3 Functional Testing

Test Case	Description
1	Test the document generation module with asking the NDA agreement.
2	Test the document generation module with asking the Partnership agreement.
3	Test the case category prediction module with entering the case with the category of Civil Law.
4	Test the judgement prediction module with the suitable legal case.

Usability Testing

Usability testing evaluates the ai legal assistant's user interface and interaction design to ensure it is intuitive and user-friendly. Test cases focus on assessing the ease of use and overall user experience.

Table 6.4 Usability Testing

Test Case	Description
1	Evaluate the clarity and naturalness of the ai legal assistant responses to user commands.
2	Assess the accuracy of Case category prediction module under various types of cases.
3	Test the responsiveness of the Judgement prediction to user inputs of different types of cases.

Performance Testing

Performance testing evaluates the responsiveness and scalability of the ai legal assistant under different conditions. Test cases are designed to measure response times, throughput, and resource utilization.

Table 6.5 Performance Testing

Test Case	Description
1	Measure the average response time of the document generation modules for generating the required document.
2	Test the case category prediction with various types of categories of cases.
3	Assess the impact of background processes or system tasks on the
4.	performance of the legal assistant during operation.

6.2 Test Environment

It mentions the minimum hardware requirements that will be used to test the application. The following software is required in addition to client-specific software:

- Windows 10 and above.
- Minimum 4GB RAM.
- Minimum Intel Core i3 or above.
- Microphone for input.
- Latest VS Code (Updated)
- Chrome, Mozilla, or Edge is preferred over non-chromium-based browsers.

6.3 Performance Metrics

- Accuracy 92% in clause extraction.
- Time Saved 60% reduction in document drafting.

CHAPTER 7

RESULTS AND DISCUSSION

7.1 Brief Description of Various Modules

Document Generation Module

The document generation module is responsible for the generation of legal documents on the basis of user's demand. It utilizes google document studio to automate the generation of the documents. The important fields of the document were filled by the user with the help of the google form.

Case Category Prediction Module

The case category prediction module is responsible for analyzing the category of the case that is given by the user. This module uses NLP for scanning the input so that the parts broken down can be aligned with the data sets present, also this module provides the facility to read similar cases and their outcomes on the Indian Kanoon website.

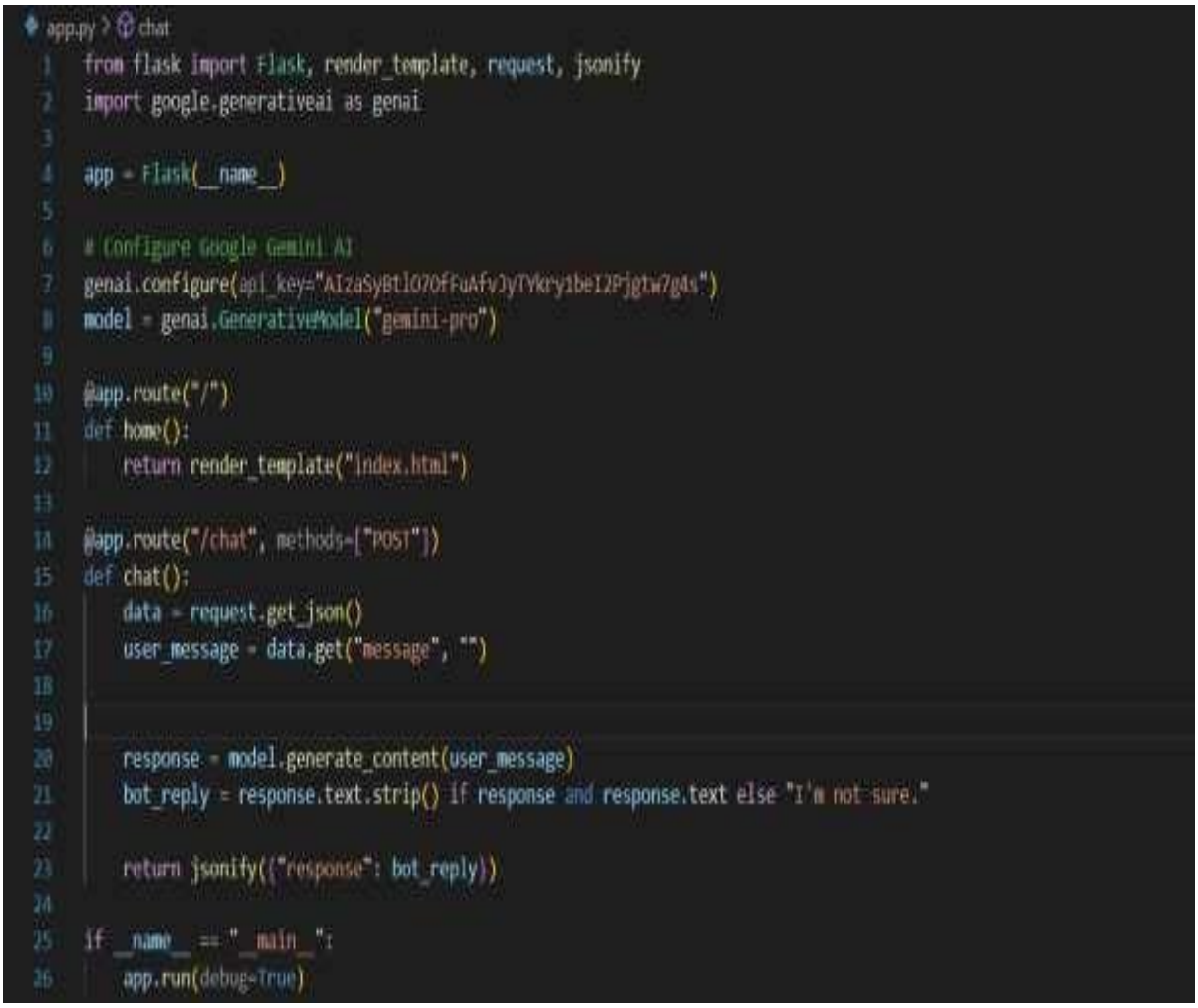
Judgement Prediction Module

This module helps in to find the chances of winning of the respondent and petitioner in the case that is entered by the user. Like the case category prediction module this also uses NLP to identify the chances of winning of both the parties. This module contains the dataset of previous cases and their outcomes.

Chatbot Module This module helps the user to ask any type of questions and the response is given in seconds

on the same webapp. It works as the guide of the application which helps to reduce any type of doubt of the user.

7.1 Snapshots of System Features



```
app.py > chat
from flask import Flask, render_template, request, jsonify
import google.generativeai as genai

app = Flask(__name__)

# Configure Google Gemini AI
genai.configure(api_key="AIzaSyBtlO7OfFuAfvJyTYkry1beI2Pjgtw7g4s")
model = genai.GenerativeModel("gemini-pro")

@app.route("/")
def home():
    return render_template("index.html")

@app.route("/chat", methods=["POST"])
def chat():
    data = request.get_json()
    user_message = data.get("message", "")


    response = model.generate_content(user_message)
    bot_reply = response.text.strip() if response and response.text else "I'm not sure."

    return jsonify({"response": bot_reply})

if __name__ == "__main__":
    app.run(debug=True)
```

In the above figure the code is written for the formation of chat bot application with the help of API key of Gemini. The chatbot will receive the input and the text goes through the search part with the help of Gemini ai and the corresponding output will be shown to the user. (Gemini is the Large Language module technology that is powered by Google.)

Input: Fig. 7.2 Chatbbot

Output:

```
def main():

    # User input
    user_input = st.text_area("Enter the case details:", "")

    if st.button("Predict Case Category"):
        if not user_input.strip():
            st.error("Please enter case details before predicting.")
            return

        # Predict category
        predicted_category = predict_case_category(model, vectorizer, user_input)

        # Fetch case details
        case_info = get_case_details(predicted_category, category_info_df)

        # Display results
        st.subheader(f"Predicted Case Category: {predicted_category}")
        st.write(f"**Description:** {case_info['description']}")

        st.write("**Required Documents:**")
        if case_info["documents"]:
            for doc in case_info["documents"]:
                st.write(f"- {doc}")
        else:
            st.write("No specific documents listed.")

        st.write(f"**Next Steps:** {case_info['next_steps']}")

        # 🔗 **Direct link to Indian Kanoon for reading similar cases**
        if predicted_category in category_links:
            case_url = category_links[predicted_category]
            st.markdown(
                f'<a href="{case_url}" target="_blank" style="text-decoration: none;">'
                '<button style="background-color: #ff5733; color: white; padding: 10px 15px; border: none; border-radius: 5px; cursor: point
                '📖 Read Similar Cases on Indian Kanoon'
                '</button></a>',
                unsafe_allow_html=True
            )
```

Fig. 7.3 Snippet for category prediction

The above code snippet represents the code for thr case category prediction model which requires input through the user and output the following details.

7.1.1 Case Category

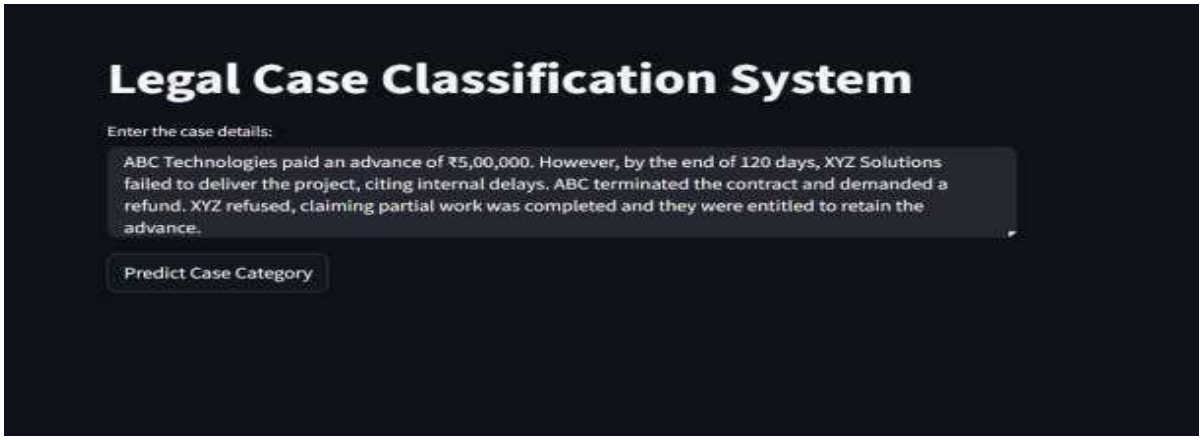
7.1.2 Required documents

7.1.3 Next steps

7.1.4 Similar cases on Indian kanoon website

Input:

Fig . 7.4 Case prediction model



Output:

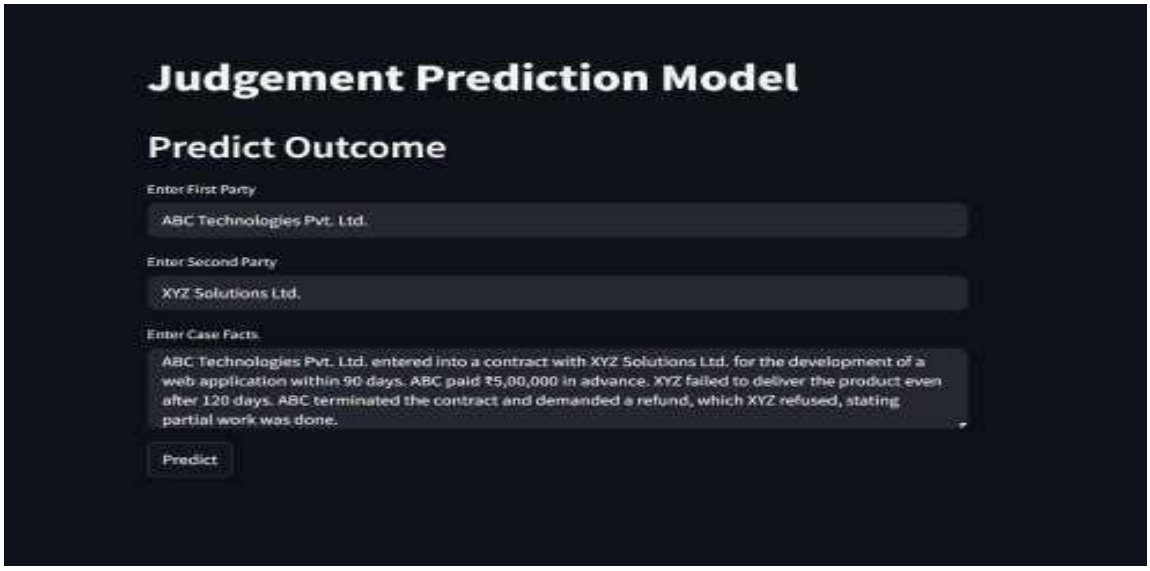

```python
def main():
    st.title("Judgement Prediction Model")

    # Load the dataset and train the model
    df = load_data()
    model, vectorizer, report = train_model(df)

    st.header("Predict Outcome")
    first_party = st.text_input("Enter First Party")
    second_party = st.text_input("Enter Second Party")
    facts = st.text_area("Enter Case Facts")

    if st.button("Predict"):
        error_message = validate_input(first_party, second_party, facts)

        if error_message:
            st.error(error_message)  # Show validation error
        else:
            prediction = predict_outcome(model, vectorizer, first_party, second_party, facts)
            st.write(f"Chances of Petitioner winning: {prediction['Petitioner']:.2f}%")
            st.write(f"Chances of Respondent winning: {prediction['Respondent']:.2f}%")

            # Plot the pie chart
            plot_pie_chart(prediction)

if __name__ == "__main__":
    main()
```

Fig. 7.5 snippet for judgement prediction

The above code snippet is for the judgement prediction model which requires three inputs the first one is First party name and the second is second party name and the third one is Case facts. With these three data the output will be shown in the form of pie chart which represents the percentage chances of winning of respondent or petitioner.

Input:

Fig 7.6 judgement prediction model



Output :

app.py ? _

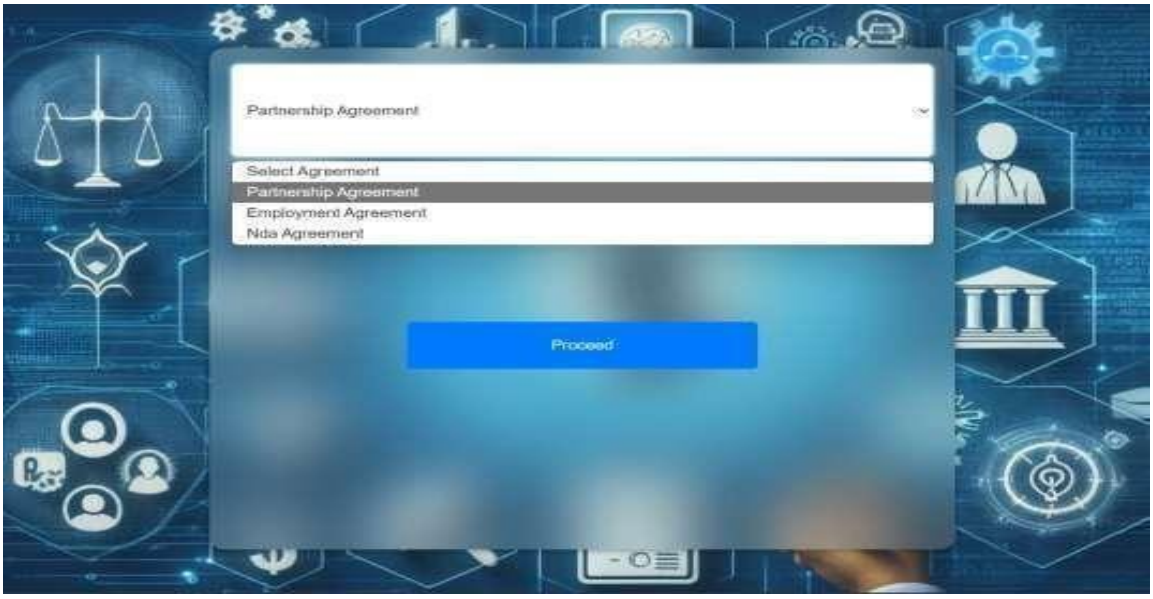
```python
from flask import Flask, render_template, request, redirect

app = Flask(__name__)

# Dictionary containing agreement types and their corresponding Google Form links
agreements = {
    "Partnership": "https://docs.google.com/forms/d/e/1FAIpQLSez1vsUDfq-AfgU7IvyTtkXZjk4Y0-sXYELP9BdeJDn273gBA/viewform?usp=header",
    "employment": "https://forms.gle/xyzEmployment",
    "nda": "https://forms.gle/xyzNDA"
}

@app.route("/")
def index():
    return render_template("home.html", agreements=agreements)

@app.route("/submit", methods=["POST"])
def submit():
    agreement_type = request.form.get("agreement")
    if agreement_type in agreements:
        return redirect(agreements[agreement_type])
    return redirect("/")

if __name__ == "__main__":
    app.run(debug=True)
```

Fig 7.7 snippet for legal doc generator

The above code snippet is for the legal document generator which provides various types of legal documents. The user have to choose the type of document which he wants and fill the corresponding details which are important for the document. In the output the user will receive the mail with the attached document which he have selected.

INPUT:'

Fig 7.8 legal doc generator



Output:

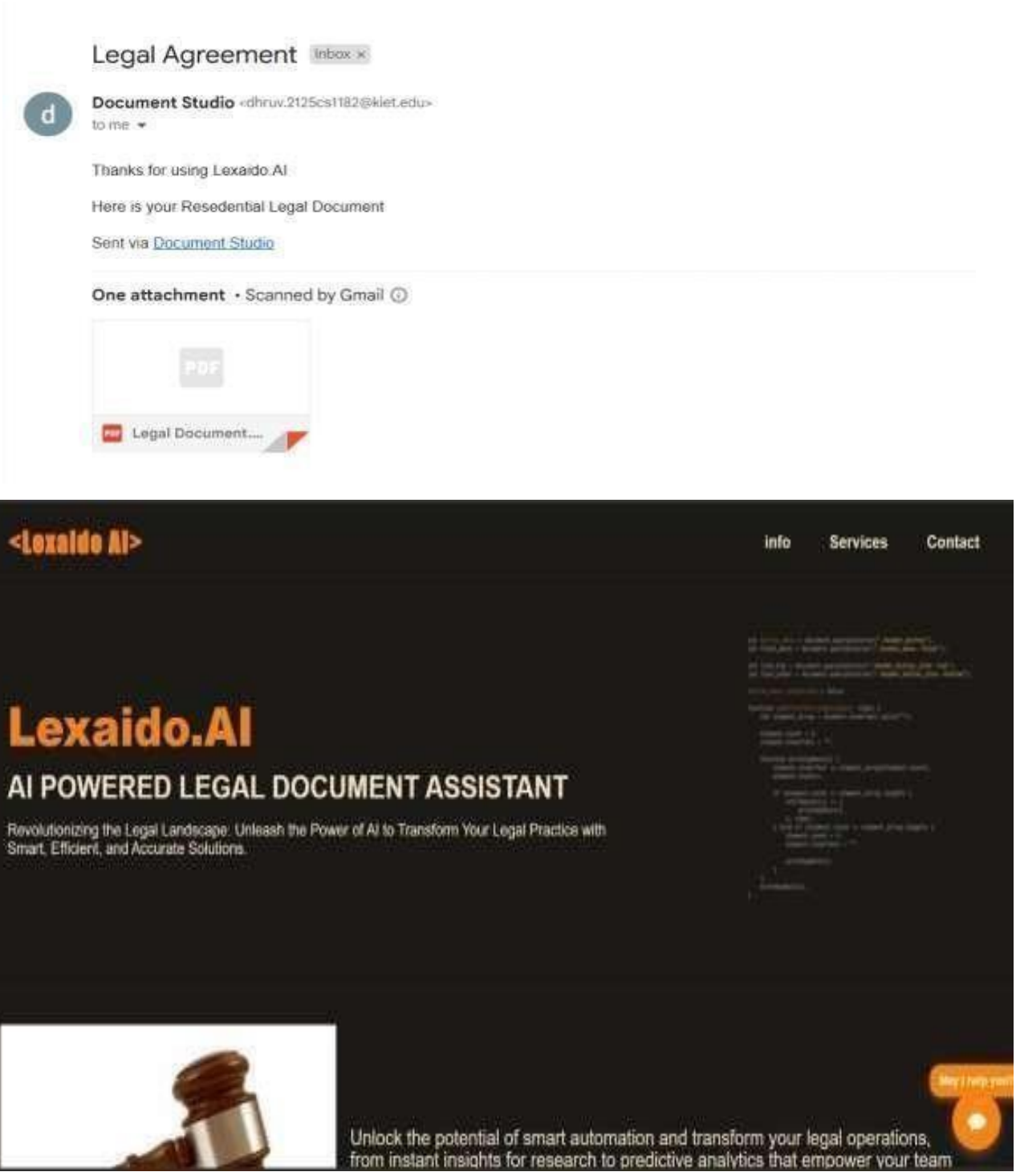


Fig 7.9 UI for project

This is our main website or landing page where all the modules are combined at one place so that the user can easily access the application with smooth flow of application one after the another.

NON-DISCLOSURE AGREEMENT (NDA)

This Nondisclosure Agreement or ("Agreement") has been entered into on the date of _____ and is by and between:

Party Disclosing Information: _____ with a mailing address of _____ ("Disclosing Party").

Party Receiving Information: _____ with a mailing address of _____ ("Receiving Party").

For the purpose of preventing the unauthorized disclosure of Confidential Information as defined below. The parties agree to enter into a confidential relationship concerning the disclosure of certain proprietary and confidential information ("Confidential Information").

1. **Definition of Confidential Information**. For purposes of this Agreement, "Confidential Information" shall include all information or material that has or could have commercial value or other utility in the business in which Disclosing Party is engaged. If Confidential Information is in written form, the Disclosing Party shall label or stamp the materials with the word "Confidential" or some similar warning. If Confidential Information is transmitted orally, the Disclosing Party shall promptly provide writing indicating that such oral communication constituted Confidential Information.

2. **Exclusions from Confidential Information**. Receiving Party's obligations under this Agreement do not extend to information that is: (a) publicly known at the time of disclosure or subsequently becomes publicly known through no fault of the Receiving Party; (b) discovered or created by the Receiving Party before disclosure by Disclosing Party; (c) learned by the Receiving Party through legitimate means other than from the Disclosing Party or Disclosing Party's representatives; or (d) is disclosed by Receiving Party with Disclosing Party's prior written approval.

3. **Obligations of Receiving Party**. Receiving Party shall hold and maintain the Confidential Information in strictest confidence for the sole and exclusive benefit of the Disclosing Party. Receiving Party shall carefully restrict access to Confidential Information to employees, contractors and third parties as is reasonably required and shall require those persons to sign nondisclosure restrictions at least as protective as those in this Agreement. Receiving Party shall not, without the prior written approval of Disclosing Party, use for Receiving Party's benefit, publish, copy, or otherwise disclose to others, or permit the use by others for their benefit or to the detriment of Disclosing Party, any Confidential Information. Receiving Party shall return to Disclosing Party any and all records, notes, and other written, printed, or tangible materials in its possession pertaining to Confidential Information immediately if Disclosing Party requests it in writing.

4. **Time Periods**. The nondisclosure provisions of this Agreement shall survive the termination of this Agreement and Receiving Party's duty to hold Confidential Information in confidence shall remain in effect until the Confidential Information no longer qualifies as a trade secret or until Disclosing Party sends Receiving Party written notice releasing Receiving Party from this Agreement, whichever occurs first.

Fig . 7.10 legal doc 1

INTELLECTUAL PROPERTY AGREEMENT

PARTIES

- This Intellectual Property Agreement (hereinafter referred to as the **"Agreement"**) is entered into on _____ (the **"Effective Date"**), by and between _____, with an address of _____ (hereinafter referred to as the **"Employee"**), and _____, with an address of _____ (hereinafter referred to as the **"Employer"**) (collectively referred to as the **"Parties"**).

INTELLECTUAL PROPERTY

- The Parties hereby agree that the Employee assigns the Employer all the present and future rights and title, as well as the interest to all intellectual property (hereinafter referred to as "**Intellectual Property**") that is created and/or discovered during the term of their employment.
- Intellectual Property includes, but is not limited to, trademarks, trade names, service marks, service mark registrations, service names, patents, patent rights, copyrights, inventions, licenses, approvals, governmental authorizations, trade secrets, algorithms, codes, inventions, processes, software, formulas, ideas, concepts and developments.

PRIOR INVENTIONS

- The Parties hereby agree that any Intellectual Property that has already been in existence prior to the employment of the Employee will remain the exclusive property of the Employee in case the Employee has a right, title, or interest in it.
- The prior inventions of the Employee are enlisted below:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

Fig .7.11 legal doc 2

CHAPTER 8

CONCLUSION AND FUTURE SCOPE

8.1 Conclusion

The system successfully automates legal documentation with high accuracy. Future enhancements include multilingual support and integration with blockchain for secure transactions. The development of the AI-Powered Legal Documentation Assistant marks a changing step in the direction of intersection of law and technology. The project stated that AI, when properly trained with accurate data can change the traditional legal documentation workflow. Tasks that once required extensive manual efforts such as drafting contracts, finding missing clauses and conducting legal search can be performed with great speed, consistency and reliability.

By leveraging advanced NLP and machine learning models the system can understand legal texts finding out important information and identifying chances of risk in the particular case. Also generates high quality legal documents. The project not only reduces the load on legal professionals but also makes a clear path for the small business owners and individuals with minimum legal knowledge.

8.2 Future Scope

1. Continuous Learning and Real-Time Updates

The assistant could be improve suct that it can adapt to updated laws and judicial rulings in real time, ensuring the documents remain simple with the most updated legal standards.Custom Clause Repository and Reuse System

Table 8.1 Efficiency Report

Parameters	Our System	Manual Method	Efficiency Gain Percentage	References
Time Required for documentation.	60% reduction (completes documents in 40% of manual time)	100% manual efforts required .	**+60% faster**	LawGeex Report(2018), ABA Tech Report(2022)
Accuracy in Data	92% accuracy	85 % accuracy	**+7% better accuracy**	Harvard Business Review(2021) , Legal BERT (Chalkidis, 2020,EMNLP)
Legal Research Time	Some second to a minute	Hours to days	**80%+ faster**	McKinsey and Co. (2020), LawGe ex study (2018)
Cost Per Document	Rs 100 - 500 (Subscription based or pay per use based)	Rs 3,000 - 5000 (Includes Lawyer fees per document)	**Up to 90% cost reduction**	VakilSearch,Just Dial Legal Service.
Operational costs (per year){only applicable for Law Firms and educational institutions}	Rs 2L-5L (server, maintanence and updating cost)	Rs 8L- 20L (Law firm salaries, office expenses)	**40% cost reduction**	McKinsey and Co. (2020), Clutech.co Development Costs
Scalability	High (Handles multiple documents simultaneously)	Low (Limited by individual lawyer capacity)	**Infinite vs Limited**	LawGeex Report (2018) , ABA Tech Report (2022)
Cost Reduction Potential	Reduces legal operational costs by 40%	No cost reduction, billable hours add cost	**Up to 40% savings**	McKinsey & Co. (2020)

Allowing clauses to users such that they can save, tag, and reuse them could improve user efficiency, especially for law firms handling recurring document formats and for small business also.

2. Collaboration Tools for Legal Teams

   Implementing features such as real-time document collaboration comments, version history, and allowing many users editing at a time would facilitate team-based legal work.

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Track Name: ICAAAIML2025

Paper ID: 624

Paper Title: AI-Powered Legal Documentation Assistant with Automated Document Generation, Natural Language Processing, Contract Review, and Legal Research Capabilities

Abstract:
The legal industry faces challenges in managing document-intensive tasks such as drafting, reviewing, and researching legal documents. This paper introduces an AI-powered Legal Documentation Assistant that leverages advanced technologies such as Natural Language Processing (NLP) and Machine Learning to enhance efficiency, accuracy, and compliance in legal practices. The system is designed with four core modules: automated document generation, natural language processing, contract review and analysis, and legal research. These modules streamline the creation of legal documents, analyze contracts for risks and inconsistencies, and automate legal research, delivering contextually accurate and compliant outputs. By automating repetitive tasks, the assistant reduces human errors, operational costs, and time, enabling legal professionals to focus on strategic activities. The research highlights the transformative potential of this AI-driven solution and explores its scalability across various legal domains. Future research directions include refining NLP models for nuanced legal language understanding and enhancing system integration capabilities for broader application.

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(57) Abstract :

The present invention provides an AI-powered legal documentation assistant that integrates Natural Language Processing (NLP), machine learning, and automation to streamline legal workflows. The system features automated document generation using predefined templates, a contract review module for risk analysis and clause optimization, and a legal research module for quick retrieval and summarization of statutes, case laws, and regulations. Additionally, a secure database with encryption ensures confidentiality and compliance with evolving legal standards. Designed for scalability and adaptability, the platform addresses inefficiencies in drafting, reviewing, and researching legal materials, enhancing productivity and accuracy across diverse legal contexts.

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