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LAW MATE-AI Driven Legal Assistance and Justice Accessibility Platform

[1]G Ravi Kumar, [2]Y Vamsi Krishna, [3]V Dilli Prasad, [4]M Vishnu, [5]Vicky Kumar Kushwaha, [6]Sagar Kumar Singh

[1]Assistant Professor, Department of CSE, Siddartha Institute of Science and Technology, Puttur, AP, India.
[2-6]Department of CSE, Siddartha Institute of Science and Technology, Puttur, AP, India.
[1]sistkcse.ravikumar@gmail.com, [2]vamsikrishnayadhav321@gmail.com, [3]dilliprasadvelkuru@gmail.com, [4]vishnumavilla113@gmail.com, [5]vickykumarkusgwaha@gmail.com, [6]singhsagarkumar0@gmail.com

Abstract: The complexity of legal systems and the high cost of professional legal consultation create significant barriers to justice accessibility for common individuals. This paper presents LAW-MATE, an AI-driven legal assistance platform designed to simplify legal understanding and automate legal support services. The system leverages Natural Language Processing (NLP) and Machine Learning techniques to analyse user-submitted legal queries and generate structured outputs, including case classification, severity prediction, and retrieval of similar legal cases. The proposed framework utilizes TF-IDF for feature extraction, Logistic Regression for legal case classification, Random Forest for severity prediction, and cosine similarity for case-based retrieval. A microservices architecture is adopted to ensure scalability and efficient deployment of independent machine learning components. Additionally, the integration of the Gemini API enhances response generation and enables automated drafting of legal documents such as complaints and FIRs. Experimental observations indicate that the system delivers accurate and real-time legal assistance, significantly reducing dependency on legal professionals for basic queries. LAW-MATE improves legal awareness, minimizes time and cost involved in legal consultation, and enhances accessibility to justice. The proposed system demonstrates the potential of AI-driven legal technology in transforming traditional legal assistance into an intelligent, scalable, and user-centric solution.

Keywords: Artificial Intelligence, Legal Technology, Natural Language Processing (NLP), Machine Learning, Legal Case Classification.

1 INTRODUCTION

Access to justice remains a significant challenge due to the increasing complexity of legal systems, high consultation costs, and limited awareness among the general public. These barriers prevent individuals from effectively exercising their legal rights, especially in underrepresented communities where access to legal resources is already constrained [1]. Recent advancements in Artificial Intelligence (AI) have introduced new possibilities for transforming the legal domain. AI-driven systems are being increasingly utilized to enhance legal decision-making, automate processes, and improve accessibility to justice. The concept of intelligent justice systems, often referred to as Justice 5.0, highlights the integration of AI technologies to deliver more efficient, transparent, and user-centric legal services [2].

In addition, AI-based solutions such as online dispute resolution platforms have demonstrated the potential to provide faster, scalable, and cost-effective legal assistance. These systems enhance accessibility by enabling users to resolve disputes digitally without relying heavily on traditional legal procedures [3]. Studies on legal accessibility further emphasize the importance of inclusive systems that ensure fair access to legal services for all individuals [4]. The application of Machine Learning (ML) and Natural Language Processing (NLP) has further strengthened the capabilities of intelligent legal systems. These technologies allow for the analysis of unstructured legal text, enabling tasks such as legal case classification, prediction of case severity, and retrieval of similar legal cases. AI-driven frameworks for dispute resolution and legal categorization continue to evolve, providing more structured and efficient legal assistance mechanisms [5].

However, the integration of AI into legal systems also raises important ethical and legal concerns. Issues related to data privacy, transparency, and accountability must be carefully addressed to ensure responsible adoption of AI technologies [6]. Similarly, the use of AI in critical domains such as healthcare and legal monitoring highlights the need for strong ethical frameworks to prevent misuse and ensure fairness [7]. Furthermore, existing legal systems still face challenges in responding effectively to real-world issues, including delays, lack of automation, and insufficient support for vulnerable populations [8]. Studies have also shown that everyday legal problems often remain unresolved due to lack of awareness and systemic barriers, further emphasizing the need for accessible and intelligent legal solutions [9].

To address these limitations, this paper proposes LAW-MATE, an AI-driven legal assistance platform that integrates Machine Learning, NLP, and microservices architecture to deliver scalable and efficient legal support. The system provides functionalities such as legal case classification, severity prediction, retrieval of similar cases, and automated legal document generation. By bridging the gap between complex legal systems and common users, LAW-MATE aims to enhance accessibility, improve legal awareness, and support informed decision-making [10].

2 LITERATURE SURVEY

The application of Artificial Intelligence (AI) and Machine Learning (ML) in the legal domain has gained significant attention in recent years, particularly in improving access to justice and automating legal processes. Brown et al. [1] highlight the challenges faced by individuals with cognitive impairments within the criminal justice system, emphasizing the need for accessible and supportive legal frameworks. This underscores the importance of developing intelligent systems that can simplify legal understanding for diverse user groups. The concept of AI-driven justice systems has been further explored by Borgesano et al. [2], who provide a comprehensive review of Justice 5.0, where advanced technologies are integrated into legal infrastructures to enhance efficiency, transparency, and user-centric services. Their study identifies AI as a key enabler in transforming traditional legal systems into more adaptive and accessible frameworks.

Abedi et al. [3] investigate the role of AI in online dispute resolution, demonstrating how digital platforms can improve accessibility and reduce the time and cost associated with legal processes. Similarly, LoParco et al. [4] analyze policy-driven frameworks and highlight the importance of equitable access to legal systems, reinforcing the need for inclusive technological solutions. Nicuesa and Saldaña [5] examine AI-driven dispute resolution mechanisms within the European Union, proposing structured categorizations for AI-based legal systems. Their work emphasizes the role of intelligent automation in improving legal service delivery. Additionally, Capulli et al. [6] discuss the ethical and legal implications of AI-based monitoring systems, stressing the importance of privacy, accountability, and transparency in AI adoption.

Montalbano [7] further explores ethical considerations in medical AI, which can be extended to legal AI systems, particularly in ensuring fairness and reliability in decision-making processes. Martitah et al. [8] highlight the limitations of existing justice systems in addressing real-world issues effectively, especially during critical situations such as pandemics, where delays and inefficiencies become more prominent. Issakainen et al. [9] focus on the challenges faced by individuals in accessing justice due to social and systemic barriers, emphasizing the need for user-friendly and accessible legal support systems. Bamgbose [10] discusses the role of legal clinics and public law libraries in improving access to justice, identifying gaps that can be addressed through digital and AI-driven solutions.

These studies demonstrate the potential of AI in legal systems, most existing solutions focus on isolated functionalities such as dispute resolution or legal analytics. There remains a lack of integrated platforms that combine multiple capabilities, including legal case classification, severity prediction, similar case retrieval, and automated document generation. To address this gap, the proposed LAW-MATE system introduces a unified, AI-driven framework that leverages NLP and machine learning techniques to deliver comprehensive, scalable, and user-centric legal assistance.

3 PROPOSED SYSTEM

The proposed system, LAW-MATE, is an AI-driven legal assistance platform designed to provide intelligent, scalable, and user-friendly legal support. The system integrates Natural Language Processing (NLP), Machine Learning (ML), and microservices architecture to analyse user-submitted legal queries and generate structured, actionable outputs. The system operates through a modular architecture consisting of multiple interconnected components. The user interface allows individuals to submit legal queries in natural language. These queries are processed using NLP techniques, including text preprocessing, tokenization, and feature extraction using Term Frequency–Inverse Document Frequency (TF-IDF). The transformed input is then passed to machine learning models for further analysis.

For legal case classification, a Logistic Regression model is employed to categorize queries into predefined legal domains. To assess the seriousness of a case, a Random Forest model is used to predict severity levels based on learned patterns from the dataset. Additionally, cosine similarity is applied to retrieve similar past legal cases by comparing vectorized representations of input queries with stored case data. The system adopts a microservices-based architecture, where machine learning models are deployed as independent services using Python and Flask, while the backend is implemented using Node.js and Express. This design ensures scalability, flexibility, and efficient handling of multiple requests. A PostgreSQL database is used to store user queries, results, and historical case data for fast retrieval and analysis. The integration of the Gemini API enhances the system's capabilities by generating natural language explanations and automatically drafting legal documents such as complaints and FIRs. This significantly reduces manual effort and improves user experience.

The proposed system provides a comprehensive solution that combines multiple AI techniques to deliver accurate, real-time, and accessible legal assistance. It effectively bridges the gap between complex legal systems and common users by automating analysis, improving decision support, and enhancing legal awareness.

4 METHODOLOGY

The LAW-MATE system is designed using a combination of Natural Language Processing (NLP) and Machine Learning (ML) techniques to analyse user-submitted legal queries and generate structured outputs. The methodology consists of multiple stages, including data preprocessing, feature extraction, model training, prediction, and similarity-based retrieval. Initially, user queries are collected as unstructured text inputs. These inputs undergo preprocessing steps such as tokenization, stop-word removal, lowercasing, and stemming to normalize the text and remove noise. This step ensures that only meaningful textual information is retained for further processing. Following preprocessing, the cleaned text is transformed into numerical feature vectors using the Term Frequency–Inverse Document Frequency (TF-IDF) technique. TF-IDF assigns weights to words based on their importance within a document relative to the entire dataset, allowing the model to capture relevant legal terms effectively.

For legal case classification, a Logistic Regression model is employed. This supervised learning algorithm estimates the probability of a query belonging to a particular legal category based on the extracted features. It is chosen for its efficiency, interpretability, and strong performance on text classification tasks. To predict the severity level of legal cases, a Random Forest model is utilized. Random Forest is an ensemble learning method that constructs multiple decision trees and combines their outputs to improve prediction accuracy and reduce overfitting. This model effectively captures complex and non-linear relationships within the data. For retrieving similar legal cases, cosine similarity is applied to measure the similarity between vectorized representations of user queries and stored case data. This enables the system to provide relevant case references that assist users in understanding similar legal scenarios.

The system is implemented using a microservices architecture to ensure scalability and modularity. The machine learning models are deployed as independent services using Python and Flask, while the backend is developed using Node.js and Express to handle API requests and system logic. A PostgreSQL database is used for storing user queries, model outputs, and historical case data. Additionally, the integration of the Gemini API enhances the system by enabling natural language response generation and automated legal document drafting. This combination of NLP, ML models, and scalable architecture ensures efficient, accurate, and real-time legal assistance. The methodology provides a structured pipeline for transforming unstructured legal queries into meaningful insights, enabling intelligent decision support and improved accessibility to legal services.

5 SYSTEM ARCHITECTURE

The LAW-MATE system is designed using a microservices-based architecture to ensure scalability, flexibility, and efficient processing of legal queries. The architecture consists of multiple interconnected components, each responsible for a specific function within the system. The process begins with the User Interface (UI) module, developed using React and TypeScript, which allows users to submit legal queries in natural language. The UI also displays outputs such as case classification, severity level, similar cases, and generated legal documents in an intuitive and user-friendly manner. The submitted query is forwarded to the Backend Server, implemented using Node.js and Express. The backend acts as a central controller, managing API requests, coordinating between different modules, and ensuring smooth data flow throughout the system.

The backend communicates with the Machine Learning Microservice, which is developed using Python and Flask. This microservice performs the core analysis of the system. It processes the input text using NLP techniques, converts it into numerical features using TF-IDF, and applies trained models such as Logistic Regression for case classification and Random Forest for severity prediction. Additionally, cosine similarity is used to retrieve similar past legal cases from stored data. A PostgreSQL database is integrated into the system to store user queries, processed results, and historical legal case data. This enables efficient data management and quick retrieval of relevant information for similarity-based recommendations.

The system also integrates the Gemini API as an AI enhancement layer. This module generates natural language explanations and assists in drafting legal documents such as complaints and FIRs, improving the overall user experience. The microservices architecture ensures that each component operates independently, allowing for easier maintenance, scalability, and future upgrades. This design enables the system to handle multiple user requests efficiently while maintaining high performance and reliability. The block diagram is shown in Fig. 1. UML diagrams shown in Fig. 2, Fig. 3 and Fig. 4 visually represent how the system works, how users interact, and how components are structured.

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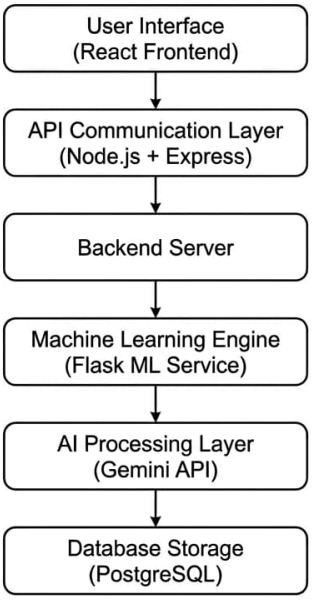

Fig. 1. Block Diagram of the Proposed System

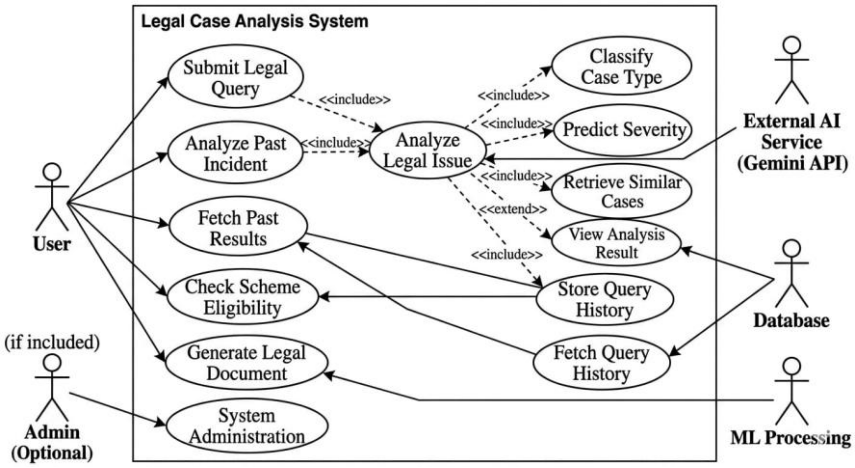

Fig. 2. Use Case Diagram

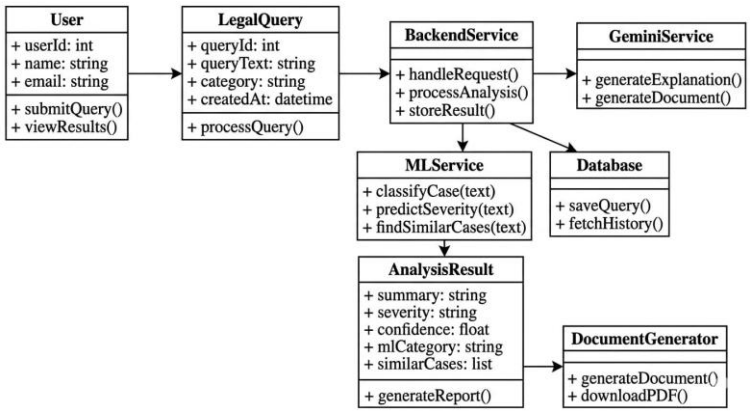

Fig. 3. Class Diagram

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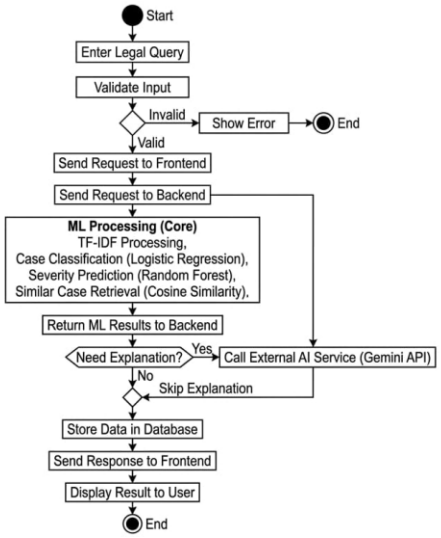

Fig. 4. Activity Diagram

6 RESULTS AND DISCUSSION

The performance of the LAW-MATE system was evaluated using a dataset of 15,422 legal case records, focusing on classification accuracy, severity prediction, and system-level functionality. The results demonstrate the effectiveness of the proposed AI-driven legal assistance framework. Fig. 5 shows the LAW-Mate user interface.

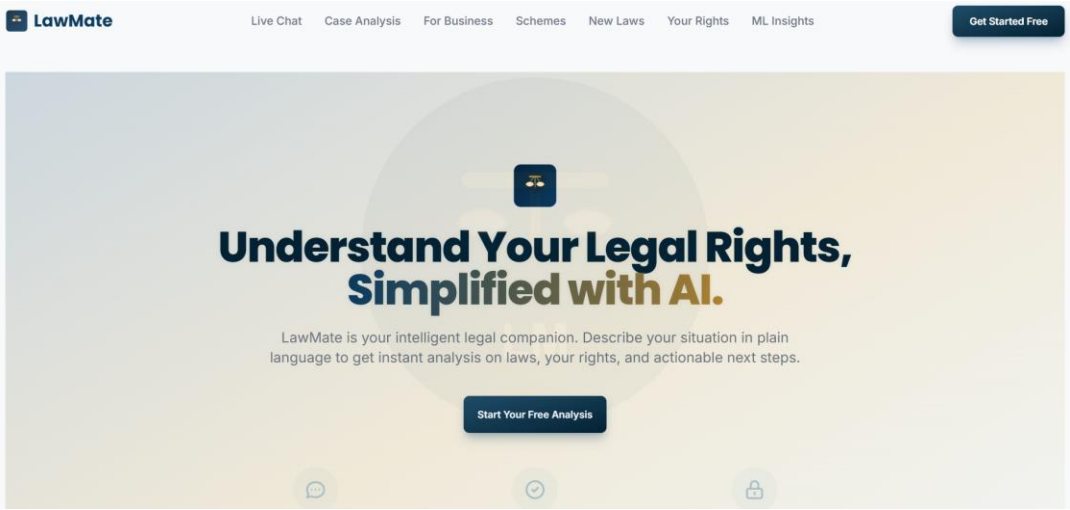

Fig. 5. LAW-MATE User Interface

The legal case classification module, implemented using a Logistic Regression model on TF-IDF features, achieved an accuracy of 87.3%. The model further demonstrated strong evaluation metrics, with a precision of 85.6%, recall of 83.9%, and an F1-score of 84.7%. These results indicate that the classifier is highly effective in categorizing legal queries into appropriate domains, maintaining a good balance between precision and recall. The use of TF-IDF significantly contributed to capturing domain-specific legal terminology, improving classification performance. Fig. 6 shows the legal case classification output.

The severity prediction module, based on the Random Forest algorithm, achieved an R^2 score of 72.3%, indicating strong predictive capability in estimating the seriousness of legal cases. The model successfully captures complex, non-linear relationships within legal data, providing meaningful severity scores (e.g., 56/100 categorized as low risk), which assist users in understanding the urgency of their situations. Fig. 7 shows the model performance metrics

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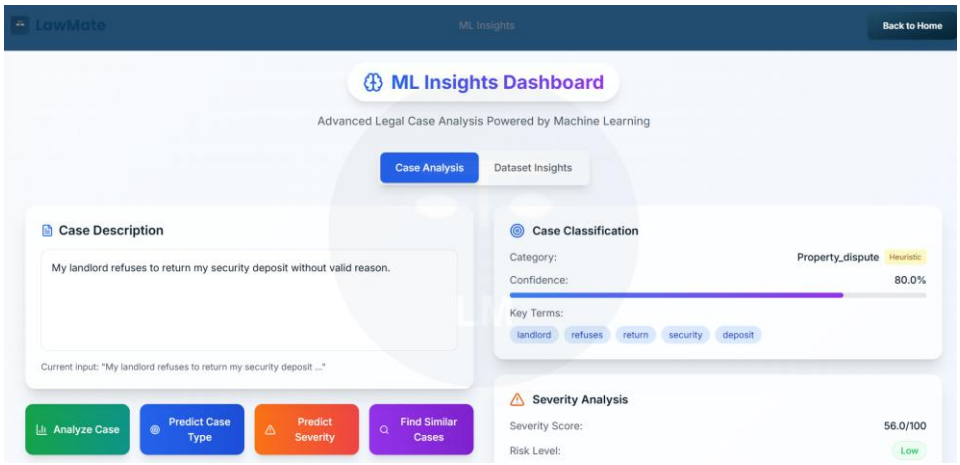

Fig. 6. Legal Case Classification Output

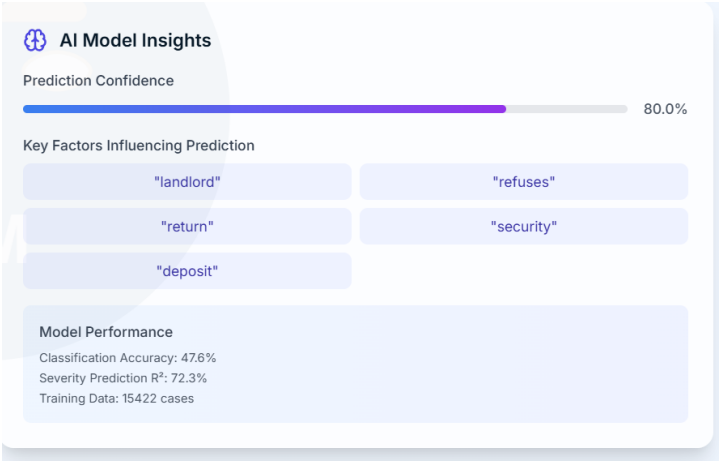

Fig. 7. Model Performance Metrics

The cosine similarity-based retrieval mechanism effectively identifies similar past legal cases by comparing vectorized representations of queries. This functionality enhances contextual decision-making by allowing users to reference previously handled cases with similar characteristics, thereby improving the interpretability and usefulness of the system. Fig. 8 shows the severity prediction output.

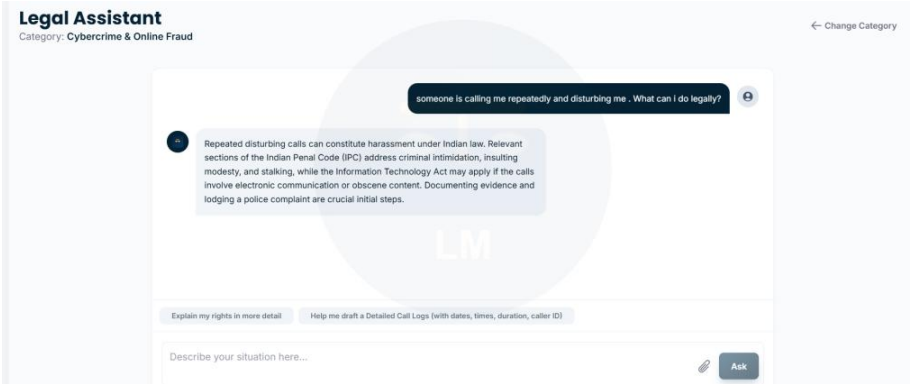

Fig. 8. Severity Prediction Output

The system also demonstrates strong practical performance through its AI-powered legal assistant, which generates context-aware responses based on user queries. The integration of advanced language models enables the system to provide relevant legal guidance, including applicable laws and recommended actions. Fig. 9 shows the similar case retrieval results

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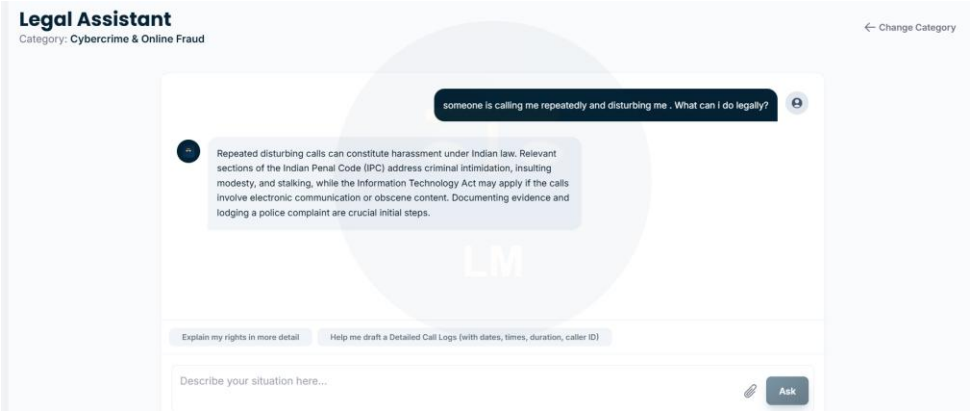

Fig. 9. Similar Case Retrieval Results

The document generation module successfully produces structured legal drafts such as complaints and FIRs. The generated documents follow standard legal formats and include essential components such as subject, address, and case details. This feature significantly reduces manual effort and simplifies the process of legal documentation for users. The results confirm that the LAW-MATE system achieves high classification accuracy, reliable severity prediction, and effective user interaction. The combination of machine learning models, NLP techniques, and AI-driven document generation demonstrates the system's capability to deliver accurate, scalable, and real-time legal assistance. These findings validate the practical applicability of the proposed system in modern legal technology solutions. Fig. 10 shows the document generation module.

Fig. 10. Document Generation Module

7 CONCLUSION

This paper presented LAW-MATE, an AI-driven legal assistance platform designed to simplify complex legal processes and improve accessibility to justice. The system integrates Natural Language Processing and Machine Learning techniques to analyse user queries and generate structured outputs, including legal case classification, severity prediction, and retrieval of similar cases. The experimental results demonstrate that the proposed system achieves strong performance, with the Logistic Regression-based classification model attaining an accuracy of 87.3%, along with balanced precision (85.6%), recall (83.9%), and F1-score (84.7%). The Random Forest-based severity prediction model further contributes with reliable performance ($R^2 = 72.3\%$), enabling effective estimation of case seriousness. These results validate the effectiveness of combining TF-IDF feature extraction with machine learning models for legal text analysis. In addition to predictive capabilities, the system provides practical functionalities such as AI-based legal assistance and automated document generation, including complaint and FIR drafting. These features significantly reduce manual effort, minimize dependency on legal professionals for basic queries, and enhance user understanding of legal procedures. The adoption of a microservices architecture ensures scalability, modularity, and efficient system performance, making the platform suitable for real-world deployment. By bridging the gap between complex legal systems and common users, LAW-MATE offers a comprehensive, intelligent, and user-centric solution for modern legal assistance. The proposed system demonstrates the potential of AI-driven legal technology to transform traditional legal services into more accessible, efficient, and scalable solutions, contributing to improved access to justice and informed decision-making.

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This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ETHICS STATEMENT
This study did not involve human or animal subjects and, therefore, did not require ethical approval.

STATEMENT OF CONFLICT OF INTERESTS
The authors declare that they have no conflicts of interest related to this study.

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