Second International Conference on Smart Computing and Communication for Sustainable Convergence (ISCCSC 2025)

AI Based Legal Reference and Case Retrieval System

Aparna Nath A S[1] Kavya Kundar[2] Adyatha S A[3] Lalana A[4] Kiran Raj K M[5]

[1,2,3,4]Alva's Institute of Engineering and Technology, Department of Computer Science and Engineering (Data Science), Moodbidri-574225, Mangalore, Karnataka, India. [5] Alva's Institute of Engineering and Technology, Department of Artificial Intelligence and Machine Learning, Moodbidri-574225, Mangalore, Karnataka, India.,

4alds08@gmail.com, kundarkavya214@gmail.com, adyathasa5@gmail.com, lalanaaruna13@gmail.com, kiranraj@aiet.org.in

Abstract.

Students, Citizens and even Professionals can find accessing legal information to be a very stressful, Confusing, Time-Consuming task when they do not have quick access to legal expertise. To help alleviate these Challenges, this project provides an AI-Based Legal Reference and Case Retrieval System that utilises a Natural Language Interface to eliminate the traditional Format of how Legal Research is conducted. Users can simply ask a question and the System will apply a range of advanced AI functionalities, such as semantic search and large language models (LLMs) to provide fast, accurate contextual legal information to user instantly. The System also features two utilitarian tools: a Complaint PDF Generator that will generate a legal complaint from user's text input, and a Complaint PDF Summarizer to highlight the most important legal information in an uploaded complaint PDF. The developed system, which was built using Flask, ReactJS, ReportLab, and PyPDF2, helps reduce tedious, hard work for attorneys, as well as provides better access and understanding of the law for attorneys, students, and the general public. In conclusion, the project demonstrates that with the help of artificial intelligence (AI), it is possible to improve traditional legal assistance methods, increase the speed and specificity of the service, and provide more individuals with access to this type of information.

Keywords. Artificial Intelligence (AI), Legal Research System, Large Language Models (LLMs), Natural Language Interface, Legal Document Automation, Complaint PDF Generator, Complaint Summarizer, Flask, ReactJS, ReportLab, PyPDF2.

1. INTRODUCTION

Legal research is an important element in understanding statutes, case law and judicial reasoning; however, for many people, the legal research process can feel overwhelming and time consuming. Traditionally, legal research has been conducted through the manual review of long documents, through the use of various databases, by adopting technical

legal language, and poses a large barrier for many students, citizens and professionals attempting to obtain timely and reliable legal information. While the legal resources have transitioned into a more digital format and created more access to legal information, digitalizing legal resources has also created more challenges for interpreters and users of legal resources to interpret and locate relevant legal information. With advancements in digital governance, there is an increased demand for automated legal assistance which will serve the same purpose where citizens are looking for quick answers without consulting a lawyer. Many individuals do not understand legal language, or what they need to do to file a complaint, which delays or leads to mistakes in the required forms. The proposed system will work for lawyers by automating the generation of complaints, providing legal issues to consider, and summarizing the findings almost instantaneously, but it will also serve non-legally trained people with an ability to proceed with a legal matter in a more informed, engaged manner, and thus promote a much wider awareness of the public to legal matters, and its reduce reliance on legally trained intermediaries for basic forms of legal information.

2. LITERATURE REVIEW

The technology of automated summary creation has progressed from rudimentary extractive methods to highly sophisticated neural-based summarization systems customised to the complexities of the legal field [1]. The evolution in legal AI systems clearly affirms distinct movement towards hybrid retrieval architectures, generative reasoning capabilities, and scalable deployment models that consider and address challenges within the domain [2]. Optimizing Legal Text Summarization through Dynamic RAG demonstrates a RAG jointly selecting top-3 legal context and dynamically creating an accurate and faithful summary of the law [3]. It is also possible to employ dense passage retrieval with a KoBERT model trained on legal text and a generative LLM to retrieve legal cases and provide explanations [4,5]. Retrieval-Augmented Generation (RAG) powered chatbot that uses FAISS for vector retrieval and prompt-tuning in order to provide accurate answers for complex legal questions while attempting to improve legal literacy [6].

3. METHODOLOGY

The proposed system architecture as shown in Figure 3.1 is built around three main layers: the React frontend, the Flask backend, and the Gemini Large Language Model (LLM). The React frontend acts as the user-facing interface, allowing users to either upload complaint PDFs for summarisation or enter text to generate a new complaint document. The application receives various types of user input (i.e. files uploaded, text typed in by users, and results either viewed or downloaded). The application interacts with a remote application (i.e. the back end) using a series of http post requests to transmit user data to the server and to receive a response.

In addition to validating incoming input, the Flask back end extracts text from PDF files using the python library "PyPDF2", builds prompt structure to be sent to the Gemini LLM, and retrieves output from the Gemini LLM. The back end has several major functions, including a prompt-building function, a JSON formatting function, an LLM request/response handler, and a ReportLab-based PDF generator. After Gemini processes

the prompt and returns the output (i.e. a summary or formatted legal complaint), the back end post-processes the response, creates a new object representing the final output, and sends that new object to the front end of the application. As such, these three layers of the application (the front end, back end, and LLM) comprise a modular, scalable and efficient structure for processing complex legal complaint documents.

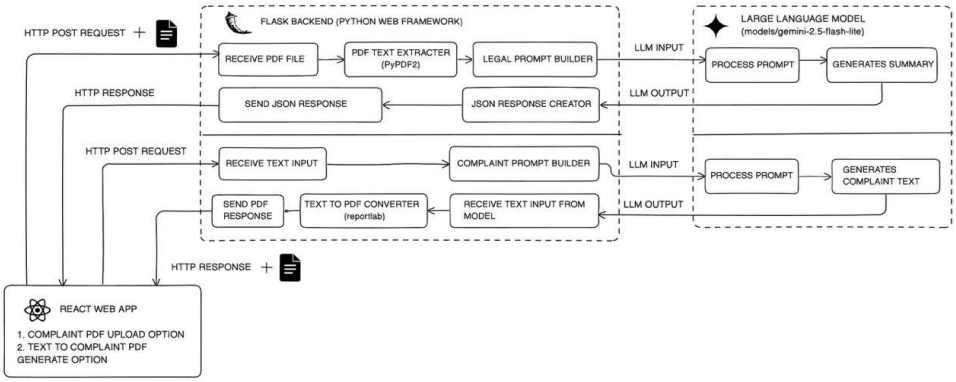

Figure 3. 1 System Architecture

4. RESULT ANALYSIS

The system has been designed as a complement to legal professionals and does not replace them, it does provide a mechanism to reduce the amount of time spent preparing basic forms and to increase the level of access for users to legal information, as well as to streamline the preparation of basic legal documents. The overall results of the research indicate that the systems' automated aids will be valuable time-savers and resources for completing legal-related work that generally takes time and expertise to complete. Based on the results of this study, there is a sound basis for the system to be integrated into legal help desks, educational institutions, and other administrative processes.

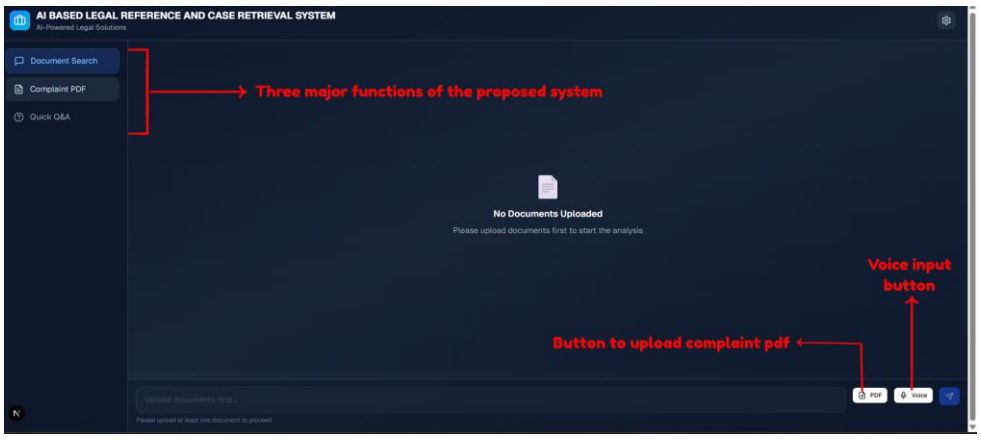

Figure 4. 1 Frontend of Application

5. CONCLUSION

The AI Legal Reference and Case Retrieval Systems demonstrates how innovative AI solutions, such as Retrieval Augmented Generation (RAG), can vastly enhance legal research capabilities. Systems such as this use true legal documentation to ground and validate their generative answer results, thereby limiting generative answer "hallucinations," and, therefore, improving accuracy and relevancy of the response to context. Furthermore, this type of system also allows the end-user (trained and non-trained) many options to access legal information since it can assist in both the Generation of structured PDF complaints and the summarization of legal documentation.

6. REFERENCES

[1] Nithya, M., Harini, S., Kavyadharshini, S., & Srinidhi, K. (2024, December). AI-Driven Legal Automation to Enhance Legal Processes with Natural Language Processing. In *2024 International Conference on IoT Based Control Networks and Intelligent Systems (ICICNIS)* (pp. 1246-1253). IEEE.

[2] Athul, S., Saxena, A., Mahajan, J., Panikulangara, L., Kulkarni, S., & Bang, S. (2024, March). LegalMind System and the LLM-based Legal Judgment Query System. In *2024 International Conference on Trends in Quantum Computing and Emerging Business Technologies* (pp. 1-5). IEEE.

[3] Bhavishya, B., Shukla, A., & Aggarwal, M. (2025, February). Automating Legal Expertise: A Rule-Based Approach to Legal Reasoning Systems. In *2025 2nd International Conference on Computational Intelligence, Communication Technology and Networking (CICTN)* (pp. 868-872). IEEE.

[4] Tu, H., & Cong, W. (2022, September). Analysis of intelligent application technology of rule of law in the era of wisdom of law. In *2022 International Conference on Cloud Computing, Big Data Applications and Software Engineering (CBASE)* (pp. 214-219). IEEE.

[5] Park, Y. C., Lee, H., & Lee, J. (2025, January). Justice AI: Legal Case Retrieval Using Dense Passage Retrieval. In *2025 IEEE International Conference on Consumer Electronics (ICCE)* (pp. 1-6). IEEE.

[6] Panchal, D., Gole, A., Narute, V., & Joshi, R. (2025). LawPal: a retrieval augmented generation based system for enhanced legal accessibility in India. *arXiv preprint arXiv:2502.16573*.

Biographies

Aparna Nath A S is currently pursuing a Bachelor's degree in Computer Science and Engineering (Data Science) at Alva's Institute of Engineering and Technology (AIET), affiliated with Visvesvaraya Technological University (VTU) in Karnataka. Her academic journey reflects a strong interest in core and emerging domains such as Artificial Intelligence and Machine Learning, Natural Language Processing and Deep Learning.

Kavya Kundar is currently pursuing a Bachelor's degree in Computer Science and Engineering (Data Science) at Alva's Institute of Engineering and Technology (AIET), affiliated with Visvesvaraya Technological University (VTU) in Karnataka. Her academic journey reflects interest in emerging domains such as Machine Learning, Natural Language Processing and Data Science.

Adyatha S A is currently pursuing a Bachelor's degree in Computer Science and Engineering (Data Science) at Alva's Institute of Engineering and Technology (AIET), affiliated with Visvesvaraya Technological University (VTU) in Karnataka. Her academic journey reflects interest in emerging domains such as Artificial Intelligence, Machine Learning and Web technologies.

Lalana A is currently pursuing a Bachelor's degree in Computer Science and Engineering (Data Science) at Alva's Institute of Engineering and Technology (AIET), affiliated with Visvesvaraya Technological University (VTU) in Karnataka. Her academic journey reflects interest in emerging domains such as Gen AI, Web technologies and Machine Learning.

Kiran Raj K M is currently working as a Assistant Professor in the Department of Artificial Intelligence and Machine Learning at Alva's Institute of Engineering and Technology (AIET), He has completed his B.E in Information Science and Engineering from SIT Mangalore and MTech in Computer Science and Engineering from MVJ Bangalore. He has published five national and three international papers in reputed journal.