LegalMind – An Intelligent Legal Case Analysis Tool for the Indian Law

ABSTRACT

The Indian judicial system is burdened with over 51 million pending cases (as of 2023), leading to severe delays in justice delivery. Legal professionals struggle with time-intensive legal research, case interpretation, and inconsistencies in judgments, making the process inefficient. Traditional legal research methods rely heavily on manual analysis, which is prone to human error, subjectivity, and a lack of scalability, necessitating an automated, intelligent solution that enhances legal decision-making.

Existing AI-based legal solutions face multiple challenges that hinder their effectiveness. Case-based reasoning (CBR) models are constrained by value-driven biases, keyword-based search lacks contextual understanding, and analogy-making neural networks struggle with complex legal interpretations. Chatbot-based legal assistants often fail to adapt dynamically, and legal text summarization techniques still face precision and coherence issues, limiting their reliability in legal decision-making.

LegalMind is an AI-powered legal document analysis system designed to automate legal text summarization, judgment prediction, and statute violation detection. The system leverages the Llama Index for document chunking and indexing, ensuring efficient retrieval and processing of legal texts. A Groq model, coupled with HuggingFaceEmbedding, enables deep semantic understanding, allowing for accurate contextual analysis of legal documents. LegalMind generates structured legal summaries, predicts probable judgments with confidence scores, and identifies violated statutes along with applicable penalties. The final results are compiled into detailed PDF reports using FPDF, enhancing accessibility for legal professionals. To ensure precision and relevance in summarization, LegalMind evaluates outputs using multiple performance metrics, including compression ratio, unique word ratio, cosine similarity, readability scores (Flesch-Kincaid, Gunning Fog, SMOG), entity coverage, and sentence compression ratio.Unique 3d Knowledge Graph is generated based on the case file utilizing clustering. By integrating cutting-edge LLMs, Clustiering, NLP techniques, and legal knowledge retrieval frameworks, LegalMind overcomes the limitations of existing AI-based legal solutions. It offers a more accurate, bias-reduced, and scalable approach to legal research, reducing manual effort, improving decision-making accuracy, and ultimately accelerating justice delivery.

References

[1] Kuppala, J., Srinivas, K.K., Anudeep, P., Kumar, R.S. and Vardhini, P.H., 2022, March. Benefits of artificial intelligence in the legal system and law enforcement. In 2022 International Mobile and Embedded Technology Conference (MECON) (pp. 221-225). IEEE.

[2] Theresa, M.J. and Raj, V.J., 2011, March. Analogy making in criminal law with neural network. In 2011 International Conference on Emerging Trends in Electrical and Computer Technology (pp. 772-775). IEEE.

[3] G. Prakash, M. S. Mehta, N. M. Veerapa, D. R. Ramani and D. Tejas, "Cytocol — Online Law System," 2023 International Conference on Circuit Power and Computing Technologies (ICCPCT), Kollam, India, 2023, pp. 96-100, doi: 10.1109/ICCPCT58313.2023.10244948

[4] L. P. Gorlamudiveti and S. G. Sethu, "Role of Artificial Intelligence in the Indian Judicial System," 2023 International Conference on Computational Intelligence and Knowledge Economy (ICCIKE), Dubai, United Arab Emirates, 2023, pp. 305-310, doi: 10.1109/ICCIKE58312.2023.10131795..

[5] Matthies, C., Dobrigkeit, F. and Hesse, G., 2019, May. An additional set of (automated) eyes: chatbots for agile retrospectives. In 2019 IEEE/ACM 1st international workshop on bots in software engineering (BotSE) (pp. 34-37). IEEE.

[6] Kumar, H. and Jayanth, P., 2024, July. Large Language Models for Indian Legal Text Summarisation. In 2024 IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT) (pp. 1-5). IEEE.

[7] Kalpana, R.A., Karunya, S. and Rashmi, R., 2023, December. Legal Solutions-Intelligent Chatbot using Machine Learning. In 2023 Intelligent Computing and Control for Engineering and Business Systems (ICCEBS) (pp. 1-6). IEEE.

[8] Ciupe, A., Mititica, D.F., Meza, S. and Orza, B., 2019, April. Learning agile with intelligent conversational agents. In 2019 IEEE global engineering education conference (EDUCON) (pp. 1100-1107). IEEE.

[9] Cui, J., Shen, X. and Wen, S., 2023. A survey on legal judgment prediction: Datasets, metrics, models and challenges. IEEE Access.

[10] Wyawahare, M., Roy, S. and Zanwar, S., 2024, March. Generative vs Intent-based Chatbot for Judicial Advice. In 2024 IEEE International Conference on Interdisciplinary Approaches in Technology and Management for Social Innovation (IATMSI) (Vol. 2, pp. 1-6). IEEE.

[11] Jain, N. and Goel, G., 2020, June. An Approach to Get Legal Assistance Using Artificial Intelligence. In 2020 8th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions)(ICRITO) (pp. 768-771). IEEE.

[12] Pandit, K. and Mahajan, R., 2024, June. Cloud and AI Fusion: Revolutionizing Electronic Evidence Admissibility in the Digital Age. In 2024 16th International Conference on Electronics, Computers and Artificial Intelligence (ECAI) (pp. 1-5). IEEE.

[13] Dai, Z. and Callan, J., 2019, July. Deeper text understanding for IR with contextual neural language modeling. In Proceedings of the 42nd international ACM SIGIR conference on research and development in information retrieval (pp. 985-988).

[14] Gupta, V. and Lehal, G.S., 2010. A survey of text summarization extractive techniques. Journal of emerging technologies in web intelligence, 2(3), pp.258-268.

[15] Wan, H., 2023, June. A Novel Deep Information Search Algorithm for Legal Case Text Recommendation System. In 2023 8th International Conference on Communication and Electronics Systems (ICCES) (pp. 1744-1749). IEEE.