

E-Portal for Case Management using Artificial Intelligence

Under the guidance of Author A prof Dr. Shanmugarathinam G, Author B Prof. Srinivas Mishra, School of Computer Science and Engineering, Presidency University

Nikhil M, School of Computer Science and Engineering, Presidency University

Harish G bagasar, School of Computer Science and Engineering, Presidency University

Siri R Shetty, School of Computer Science and Engineering, Presidency University

Abstract the legal sector in India continues to grapple with extensive manual processing of complex and unstructured legal documents. The e-Portal for Case Management using Artificial Intelligence (AI) is a proposed system designed to automate legal document analysis, extraction of relevant events, and classification of case files. This paper presents the design, methodology, and implementation of a case management platform leveraging Natural Language Processing (NLP), Machine Learning (ML), and modern web technologies to streamline legal workflows. The system aims to assist lawyers, judges, and legal researchers in reviewing judgments, hearings, and petitions more efficiently. It supports event extraction, timeline creation, document summarization, and semantic search powered by vector embeddings. The solution enhances accessibility, accuracy, and decision-making in the Indian judiciary by providing a centralized, intelligent portal. Our findings show significant time savings, higher document interpretation accuracy, and better support for case tracking across jurisdictions.

Index Terms: Legal AI, Case Management System, NLP, Document Summarization, Indian Judiciary, Semantic Search, Automation.

1. Introduction

Traditional legal document handling in Indian courts is plagued by inconsistencies, unstructured formats, and significant backlog. Lawyers and clerks spend hours sifting through court judgments, orders, and filings to identify critical facts and legal outcomes.

This project proposes the development of an AI-powered e-Portal for Case Management that automates the extraction of legal events such as case filings, hearings, and judgments. With NLP at its core, the system transforms scanned and digital case texts into structured, searchable information.

The solution is user-centric, designed to provide legal professionals with natural language querying, smart filtering, and real-time access to case data. This paper outlines the research foundation, development methodology, technical architecture, and results observed from initial deployment tests.

2. Related Work

2.1 Digital Legal Management Systems

Abdul-Kader & Woods (2015) developed a system for digitally managing court cases. Similarly, Yuan & Wang (2018) explored web-based platforms that facilitated court scheduling and tracking.

2.2 AI in Legal Case Summarization

Legal-BERT and related transformer models have demonstrated success in summarizing legal text (Chalkidis et al., 2017). Bhattacharya et al. (2019) highlighted the importance of rhetorical role identification for effective summarization.

2.3 Event Extraction and Case Timeline Tools

Systems like Juris-Miner (IIIT-H) provide early frameworks for Indian legal document modeling, but they lack scalability and contextual understanding. Our work builds upon these by integrating scalable NLP tools and vector search for deeper legal document comprehension.

3. Proposed Methodology

The solution is divided into modular stages:

3.1 Data Acquisition & Cleaning

Documents were sourced from Indian Kanoon and JUDIS. OCR tools converted scanned judgments into editable text. Preprocessing included tokenization, POS tagging, and section segmentation.

3.2 NLP and Event Extraction

We fine-tuned Legal-BERT and spaCy pipelines to extract entities (judge, petitioner, court) and procedural events (filing, hearing, verdict). Event timelines were created using temporal tagging and dependency parsing.

3.3 Vector Search Indexing

Each chunk of text was embedded using Sentence Transformers, and stored in FAISS for real-time semantic search.

3.4 Web Interface

Built using Streamlit, the frontend allows users to upload documents, query data, and view extracted summaries. FastAPI handles backend operations and serves the NLP models.

3.5 Document Summarization

Both extractive and abstractive summaries are generated using transformer-based models, making it easier to review 20+ page judgments seconds.

4. Implementation and Results

4.1 System Architecture

Frontend: Streamlit

Backend: FastAPI with Dockerized services

NLP Models: Legal-BERT, spaCy

Database: PostgreSQL

Indexing: FAISS for similarity-based search

4.2 Performance Metrics

Metric	Result
Event Extraction Accuracy	~87%
Query Response Time	~1.2 seconds
Summarization Time	~2.5 seconds
User Satisfaction (pilot)	↑ 30% vs. manual

4.3 Key Features

Case timeline generation

Legal entity recognition (judge, plaintiff, acts)

Natural language question-answering

Role-based access (intern, lawyer, judge)

Secure PDF storage and encryption

4.4 Deployment Insights

Deployed on AWS EC2 with scalable architecture. Docker ensures modular microservices. Monitoring via Grafana confirms uptime >99%.

5. Prototype

The e-Portal for Case Management represents a leap forward in legal technology, reducing reliance on manual processes while improving access to legal insights. By leveraging NLP and ML, the system accelerates case analysis, promotes transparency, and supports informed legal decisions.

Future Enhancements:

Support for Indian regional languages (Hindi, Tamil, Kannada)

Integration with e-Courts and SCC Online

Predictive analytics for case outcomes

Visualization tools (Gantt charts for hearings)

Human-in-the-loop annotation supportThe platform serves as a scalable, intelligent backbone for legal informatics in India, aligned with Digital India and e-Governance goals.

Fig 5.1.1 ePortal for case management Website

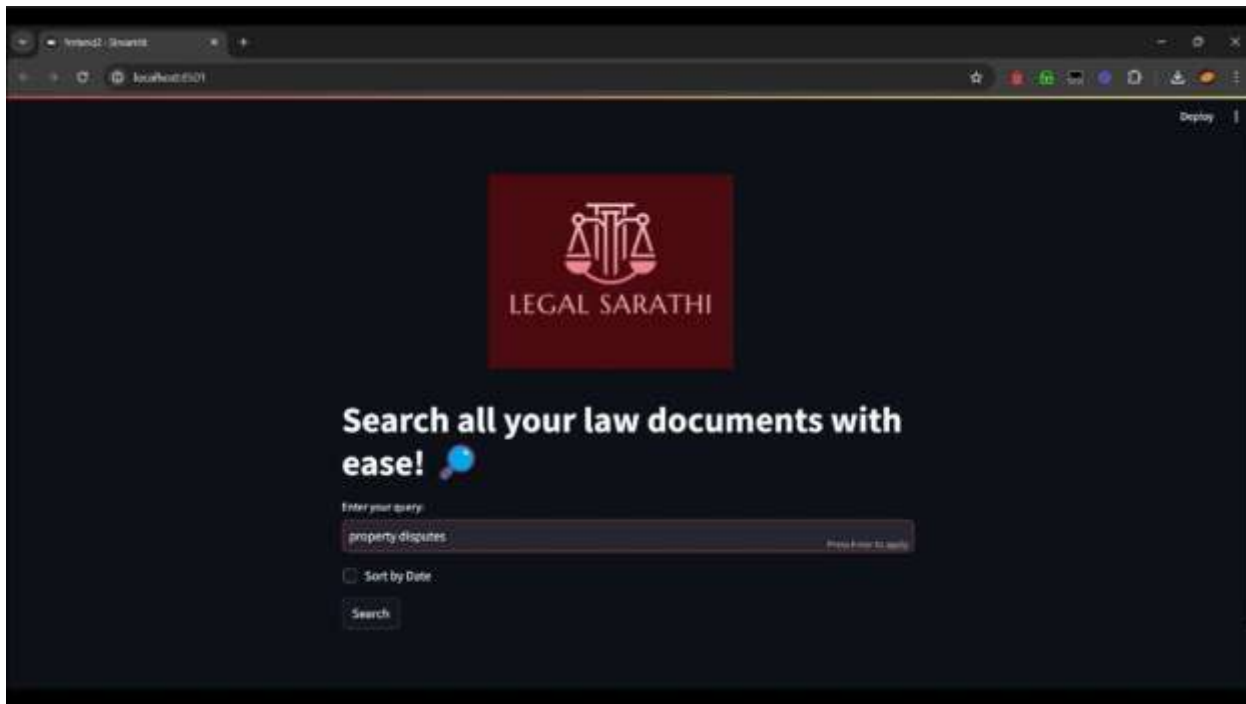


Fig 5.1.2 Obtained search result

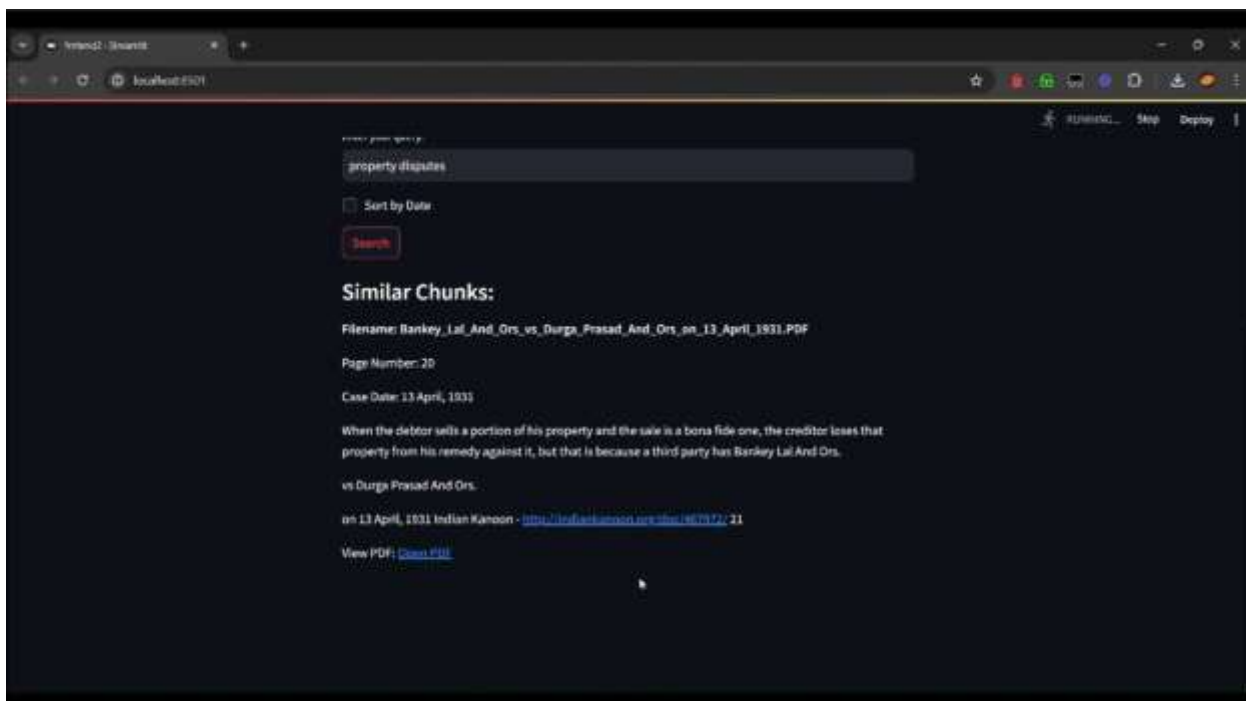


Fig 5.2.3 Detailed document pdf

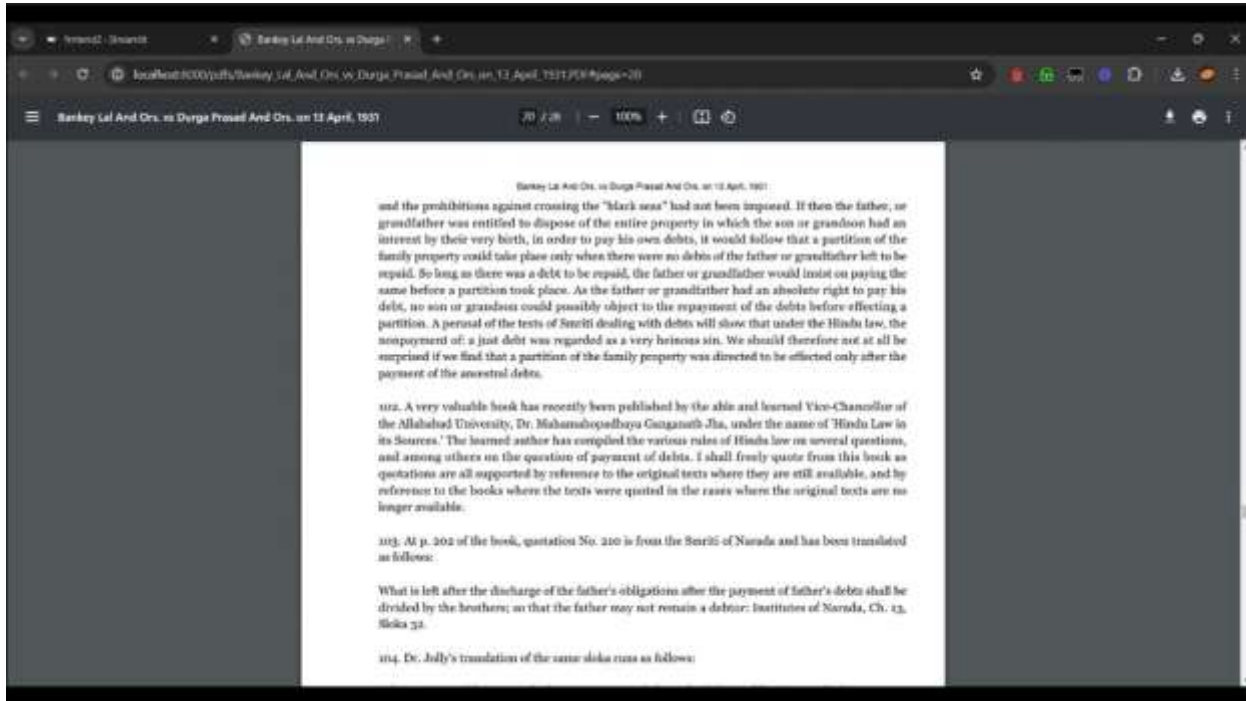
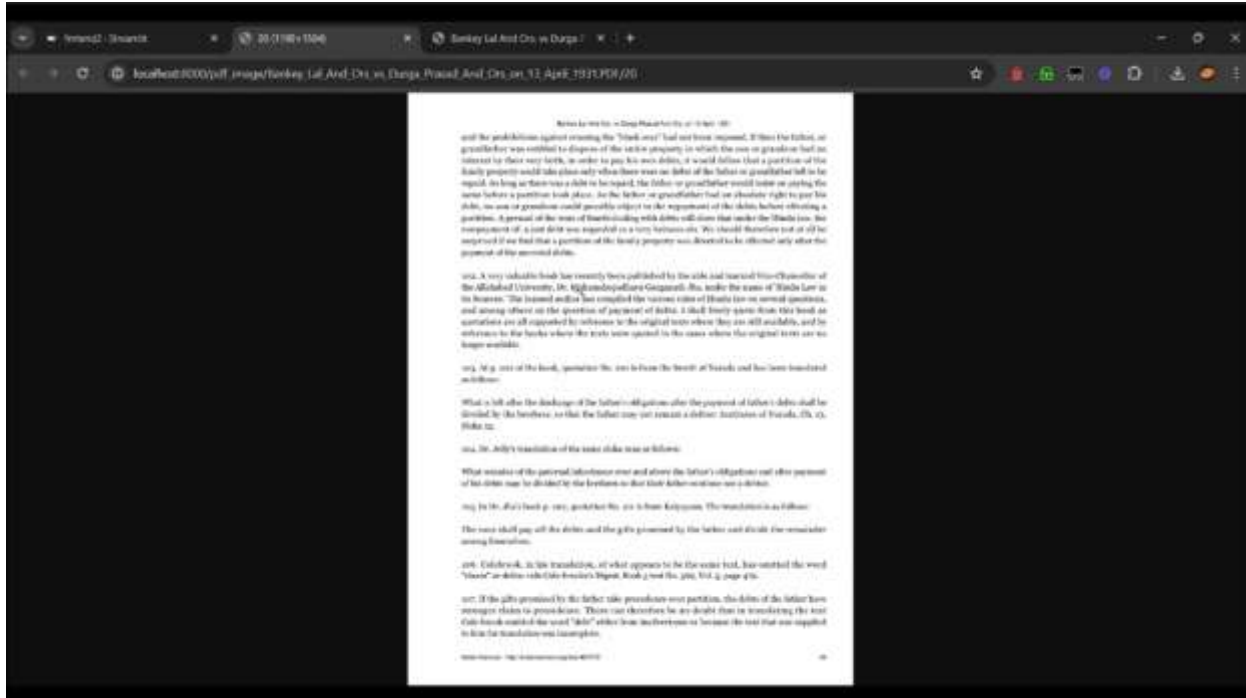


Fig 5.2.2 Other document



6. Conclusion and Future Scope

The development of an E-Portal for Case Management using AI represents a significant advancement in the efficiency, transparency, and accessibility of legal and administrative processes. By integrating artificial intelligence, the portal can automate routine tasks such as document classification, case tracking, scheduling, and even preliminary legal analysis. This not only reduces human error and workload but also ensures faster resolution of

cases. The platform enhances communication between stakeholders and provides real-time updates and insights, making case handling more streamlined and data-driven.

Overall, the AI-driven case management portal bridges the gap between traditional systems and the growing demand for digital transformation in the legal and administrative domains. It provides a scalable and user-friendly solution to improve overall service delivery and stakeholder satisfaction.

Future Scope

1. **Integration of Predictive Analytics:** Future versions of the portal can include AI models that predict case outcomes based on historical data, helping users make informed decisions.
2. **Natural Language Processing (NLP) Enhancements:** Improved NLP capabilities can allow the system to better understand legal language, summarize documents, and interact with users through more intuitive chatbots.
3. **Blockchain Integration:** To ensure data integrity, privacy, and transparent logging of all actions within the portal, blockchain technology can be integrated for tamper-proof record-keeping.
4. **Multilingual Support:** Expanding the portal to support multiple languages will increase accessibility for users from diverse linguistic backgrounds.
5. **Mobile App Development:** A mobile-friendly version or dedicated app can ensure users can manage cases on the go, further improving convenience and adoption.
6. **Inter-agency Collaboration:** Future development could enable seamless integration with other government or legal databases, facilitating better data sharing and coordination.
7. **AI-based Legal Assistants:** Incorporating AI-driven virtual legal advisors to guide users through legal procedures and documentation could enhance the portal's usability, especially for those without legal expertise.

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