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Title: UDAAN - Unified Digital Acceleration for Adalats Nationwide

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SDG: 9

Introduction

UDAAN is a LegalTech initiative that focuses on injecting AI-driven innovation (SDG 9) into the Indian judicial workflow. The project aims to develop a scalable, secure platform using advanced Natural Language Processing (NLP) to automate document management and legal research, transforming the judiciary's digital infrastructure into an intelligent knowledge base.

Problem Definition

The problem is the systemic failure to convert massive, unstructured legal data into actionable intelligence. Despite the presence of digital records (NJDG), legal professionals suffer from:

Administrative Drain: Up to 30-50% of time spent on manual searching and organizing.

Technological Gap: Reliance on ineffective keyword search instead of semantic, contextual retrieval.

Result: This inefficiency exacerbates the national case backlog (over 47.87 million pending cases).

Objectives

The prototype aims to achieve three core goals:

Semantic Search: Implement a Retrieval-Augmented Generation (RAG) system using a Vector Database to enable natural language search and retrieve contextually accurate legal answers.

Workflow Automation: Automate legal document classification and Named Entity Recognition (NER) to instantly structure unstructured text, targeting 90%+ accuracy.

Productivity: Generate precise, concise case summaries, aiming to reduce manual research time by 30-50%.

Methodology

4.1 Approach: Retrieval-Augmented Generation (RAG) System

The project's strategy is a Modular, Data-Centric AI Approach centered on the Retrieval-Augmented Generation (RAG) framework. This approach addresses the intelligence gap by combining the deep semantic search capability of vector databases with the generation capabilities of Large Language Models (LLMs). The RAG model is essential to ensure the answers provided are factually grounded in the legal corpus, mitigating AI hallucination.

4.2 Procedures: The UDAAN AI Pipeline

The execution follows a three-stage AI pipeline:

Ingestion and Structuring: Documents undergo Advanced OCR, Classification, and Named Entity Recognition (NER) to extract metadata. Text is converted into embeddings (vectors) and stored in a Vector Database (e.g., Chroma/Pinecone).

Core RAG Execution: The user query is vectorized and performs a Semantic Search on the Vector Database to retrieve the most relevant document chunks (Context). The retrieved context is then passed to the LLM for accurate answer Generation.

Quality Control: A Human-in-the-Loop (HITL) process validates AI outputs where confidence is low, ensuring legal accuracy. The system is deployed using a scalable stack.

Tools used

Category	Tools & Techniques Applied
Backend & AI Core	**Python, FastAPI** (High-performance API), **Hugging Face/spaCy** (NER/Classification).
Data Intelligence	**Vector Database (Chroma/Pinecone)** (Essential for Semantic Search), **PostgreSQL** (Metadata).
Front-end & Deployment	**React.js** (UI), **AWS/Google Cloud** (Scalable Hosting), **Docker/Kubernetes** (Containerization).
Techniques	**RAG, Semantic Search, NER, Advanced OCR.**

Results and Discussions

Validation: The prototype will target at least 92% precision score in semantic retrieval and 88% accuracy in document classification in a simulated environment.

Significance: This would validates that the RAG model can provide a superior, scalable solution to overcome the data intelligence gap in the judiciary. The system's fast response time (under 3 seconds per query) meets usability requirements for critical judicial tasks.

Objective Met: when the core objective of providing contextual intelligence met, it will demonstrate a clear potential to reduce the time spent on administrative document review and directly enhance lawyer productivity.

Conclusions

The UDAAN project will successfully implement a sustainable, intelligent digital infrastructure, fulfilling the mandate of **SDG 9**. By deploying an AI-powered RAG system, it transforms judicial data into actionable insights, ensuring a **faster, more transparent, and more accessible system of justice** for the nation.

Outcome of the work

Product Development: The functional software prototype will serve as a Minimum Viable Product (MVP) for an AI-Powered Legal Case Assistant, ready for pilot testing and commercialization within legal firms or integration as a module for e-Courts Phase III.

Publication: The novel application of the RAG framework for specialized legal semantic search is suitable for submission to a conference on Legal Informatics or AI in Governance and in IEEE Access

References

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