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LegalQuest: A Review of AI-Powered Legal Assistant App

Prajwal Dashrath Jadhav, Sanjyot Dinesh Belsare, Kapil Pramod Malpe, Abhinav Aabarao Bodakhe, Labham Ravindra Jadhav, Dr. L. K.Gautam

Student's, Department of Information and Technology, Sant Gadge Baba Amravati University, Sipna College of Engineering and Technology, Amravati

ABSTRACT:

"LegalQuest" AI-Powered Legal Document Assistant App is a step forward in automating legal document processing through Optical Character Recognition (OCR) and Artificial Intelligence (AI)-enabled summarization that streamlines complex legal text analysis. Conventional legal document review is laborious, time-consuming, and prone to human mistake, frequently entailing specialized knowledge of law. This project overcomes such challenges by creating a Flutter-developed mobile application that incorporates OCR technology to obtain text from legal documents scanned and uses the Gemini API for summarization using artificial intelligence. Not only does the app give legal document summaries in a concise and easy-to-read format, but it also allows users to engage with legal professionals for advice. Key aspects involve multilingual OCR support, real-time text extraction, and an advocate recruitment module with the ability to search, filter, and book sessions with legal professionals. The application was thoroughly tested and proved to perform well, with high accuracy in extracting text from print (95%) and handwritten documents (85%) and summarizing text effectively, retaining of important legal content and shortening document length by 50-70%. User feedback emphasized the simplicity of the app and the effectiveness of the advocate recruitment feature, users finding the summaries useful and being satisfied with the legal consultation process. Future development will focus on extending multilingual OCR functionality, enhancing legal text interpretation, and adding an AI-based legal consultation chatbot. Overall, the LegalQuest App simplifies legal document processing, making it more accessible, efficient, and affordable for individuals and businesses.

Keywords: AI-Legal Assistant, Legal document Summary, Hire Lawyer, Smart Legal App.

Introduction:

Legal documents form the foundation of contemporary legal and business practices, regulating agreements, rules, contracts, and litigation processes. Legal documents are critical in ensuring compliance with the law and safeguarding the rights of individuals and entities. Legal documents are, however, typified by their technicality, length, and usage of technical jargon, making them hard to understand without the expertise of a professional lawyer. This complexity causes serious challenges for both legal experts and non-professionals, as legal document summarization and analysis by hand are time-consuming, resource-demanding, and subject to human mistake. The conventional legal document handling process is through manual review, where legal experts take extensive time to extract useful information, deduce legal clauses, and summarize material. The exercise is not just tiresome but also costly, as it demands expert legal expertise. For those lacking legal education, it can be daunting to read these documents, usually requiring external help, and this only serves to further elevate costs and waiting times. Also, inefficient access to legal practitioners worsens the situation since persons and organizations lack timely and cheap access to proper legal advice. With the speedy development of Artificial Intelligence (AI) and Optical Character Recognition (OCR) technologies, there are increasingly better chances for automating and streamlining legal document processing. The OCR technology allows for the scanning of printed or handwritten legal documents into machine-readable formats, avoiding the necessity of manual transcriptions. At the same time, AI-driven summarization mechanisms allow users to pull out essential details from documents in a concise and meaningful manner. These technological advancements can transform the legal profession by minimizing the time and effort needed for document analysis, enhancing accuracy, and providing legal services to a wider population.[1]

This paper provides an in-depth review of the "LegalQuest: AI-Powered Legal Document Assistant App", a Flutter-based mobile app intended to solve the problems of legal document processing. The app includes OCR technology to pull out text from legal documents scanned and utilizes the Gemini API for AI-powered summarization, allowing users to easily grasp legally complex texts. The app also has a legal aid module where users can connect with professional legal advisors for consultation, overcoming the distance between people and legal services. By integrating document scanning through OCR-based document scanning, legal consultation services through AI-powered summarization, and integrated legal document management, the app hopes to establish a streamlined, user-friendly platform that makes it easy for individuals and enterprises alike to handle legal documents.[2]

The subsequent parts of the review paper will discuss the aims, methods, and rollout of the LegalQuest App, as well as a test of its performance and feedback from users. In addition, the paper will present the limitations and challenges of the existing system and suggest future developments to enhance

its functionality and accessibility. Through this review, we hope to underscore the revolutionary power of AI and OCR technologies in the legal sector and their ability to make legal services more efficient, accurate, and accessible to everyone.

Literature Survey:

OCR technology is pivotal for digitizing legal documents, enabling automation and reducing manual transcription efforts. Smith [2] provides a comprehensive overview of the Tesseract OCR Engine, an open-source tool widely adopted for converting scanned images into machine-readable text. The study details Tesseract's architecture, emphasizing its ability to handle printed text with high accuracy while noting challenges with complex layouts and handwritten scripts. This aligns with the app's use of Tesseract for text extraction, offering a benchmark for evaluating OCR performance in legal contexts where document quality varies. Smith's work underscores the importance of preprocessing techniques to enhance accuracy, a critical consideration for the app's OCR module.[2]

Kumar et al. (2023) present LegaiDoc Scan, a mobile-based OCR system for contract extraction that achieves 92% accuracy on standard documents but faces challenges with handwritten text. The IEEE Student Conference paper demonstrates how mobile optimization and legal-specific NLP improve contract processing, though highlights needs for better non-standard document handling (Kumar et al., 2023, IEEE Student Conference).[8]

ETH Zurich's 2022 SwissText Conference paper provides a rigorous analysis of OCR errors in legal documents, benchmarking major engines and proposing correction techniques that improve accuracy by 8-12%. The research particularly notes challenges with legal jargon and non-standard formats (ETH Zurich, 2022, SwissText Conference).[9]

NUS LawTech's 2021 technical report surveys user experiences with legal AI tools, finding that while 68% of practitioners find AI helpful for document review, trust remains limited due to explainability concerns. The study emphasizes the need for confidence indicators and audit trails in legal AI systems (NUS LawTech, 2021, NUS Technical Report.[11]

Methodology:

The LegalQuest App implementation includes the incorporation of numerous noteworthy technologies and modules to streamline legal document processing, improve user experience, and deliver instant access to legal experts. Following is a detailed breakdown of the implementation process, including the utilization of the Gemini 1.5 Pro API for summarization, as well as the workflow of the system and noteworthy features.

1. Frontend Implementation: Flutter Framework

The frontend of the application is created with Flutter, a cross-platform development framework that guarantees compatibility with both Android and iOS platforms. Flutter supports a rich UI and smooth execution, allowing users to use the app with ease. The frontend features include cross-platform compatibility, a user-friendly interface, camera and file upload support, real-time display of text processing, an advocate hiring module, and secure user login. The frontend communicates with the backend and API services to render a seamless, interactive, and responsive user experience.

2. Backend Implementation: Supabase & Dart

The backend manages data, user authentication, document storage, and advocate information management. It is implemented using Supabase for real-time database features and Dart for streamlined API request handling. Major pieces of the backend are Supabase Authentication for safe user sign-up/sign-in, Supabase Database for saving user profiles and scanned documents, Cloud Storage for processing uploaded files, and an Advocate Database for processing legal professional records. The backend provides scalability, security, and real-time data sync, giving a solid base for the app's functionality.

3. API Integration: Gemini 1.5 Pro API for Summarization

The Gemini 1.5 Pro API, which is created by Google, is used in the application to enable AI-based document summarization and key point extraction. The API processes text extracted from OCR, extracts important legal clauses, and creates structured summaries for better comprehension. The most important features of the Gemini 1.5 Pro API are AI-based summarization, legal clause extraction, natural language processing (NLP) for proper understanding of legal jargon, multilingual support, and contextual understanding. The process includes extracting the text through OCR, passing it to the Gemini API for summarization, and presenting the user with the summary for inspection. The integration greatly increases the capacity of the app to shorten lengthy legal documents, allowing them to be understood by people not trained in law.Identification.

Workflow of Gemini 1.5 Pro API Integration:

- The OCR module extracts text from scanned legal documents.

- The extracted text is sent to the Gemini 1.5 Pro API for summarization.

- The API processes the text, identifies key legal clauses, and generates a structured summary.

- The summarized text is returned to the app and displayed to the user for review.

- The Gemini 1.5 Pro API significantly enhances the app's ability to simplify complex legal documents, making them accessible to non-legal professionals.

4. Database Design

The database is designed to manage user data, scanned documents, and advocate profiles efficiently. It consists of three primary entities:

- User Information: Stores details of registered users, including authentication methods, and consultation history.

- Scanned Documents: Manages uploaded legal documents, OCR-extracted text, and AI-generated summaries.

- Advocate Profiles: Maintains records of legal professionals, including their expertise, resume information, and consultation fees.

The database ensures fast retrieval, secure storage, and real-time updates, providing a seamless experience for users.

Modules of the AI-Powered Legal Document Assistant App

AI-Powered Legal Document Assistant App consists of three foundational functional modules that are equally vital in enabling a seamless and productive experience. Collectively, they enable scanning documents, summarizing using artificial intelligence, and services for hiring an advocate. Described in greater detail below are each of these modules along with their functioning.

1. Document Scanning and OCR Extraction Module

The Document Scanning and OCR Extraction Module is the initial step in the workflow of the app, which allows users to scan legal documents with their smartphone cameras or upload pre-existing files. This module incorporates Optical Character Recognition (OCR) technology to extract text from scanned documents and transform them into a digital format for further processing. The main features are camera-based scanning, support for file upload, OCR-based text recognition, multilingual recognition, and pre-processing features such as auto-cropping and noise filtering to enhance OCR accuracy. Functionally, the user can either scan a document via the camera or upload a previously stored file. The system takes the image and processes it to improve it for OCR purposes and then reads out text from the document and renders it in digital form. The read-out text is presented for user inspection before summarization. This module allows for fast and accurate text conversion, minimizing manual data entry and optimizing the document processing process.

2. Summarization Using AI Module

The Summarization Using AI Module utilizes AI-based Natural Language Processing (NLP) to parse and summarize the extracted legal text. The module assists users in quickly comprehending lengthy legal documents by pointing out important points and clauses, enabling legal content to be better understood by non-legal professionals. Major features encompass AI-driven summarization, context-based comprehension of legal jargon, extraction of key points (e.g., deadlines, responsibilities, and penalties), real-time processing, and multilingual compatibility for worldwide usage. Functionally, the text extracted from the OCR module is passed to the Gemini 1.5 Pro API for summarization based on AI. The AI analyzes the text, extracting important legal clauses and insights, and creates a structured summary. Users can view, save, and share the summary for legal use. This module streamlines legal analysis, making legal documents more accessible and easier to understand for users who lack legal knowledge.

3. Advocate Directory and Hiring Module

The Advocate Directory and Hiring Module links clients with legal practitioners who are experts in different areas of law. The module is a legal directory that enables clients to locate and schedule meetings with advocates directly on the app, filling the gap between people and legal expertise. Primary features are a searchable directory of advocates, filtered by specialty, comprehensive advocate profiles (experience, qualifications, and ratings), scheduling for booking and consultations, and safe communication channels for private and encrypted lawyer-client communications.Functionally, users are able to search the directory of advocates by expertise and availability. Experience, ratings, and consultation fees are displayed in advocate profiles, enabling users to compare and choose the most appropriate professional. Users are able to book a consultation, picking the most convenient time slot, and securely communicate with the advocate for legal matters. The module optimizes legal access so that users are able to freely find and consult the best legal professionals, even for specialized legal areas.

Integration of Modules

The three modules—Document Scanning and OCR Extraction, AI-Powered Summarization, and Advocate Directory and Hiring—are integrated with ease to offer an end-to-end legal document processing solution. The process starts with document scanning and OCR extraction, is followed by AI-driven summarization, and ends with the ability to connect with legal experts for further guidance. The integration helps users to process legal documents efficiently, extract important information, and consult expert advice—all on one platform.

Project Overview

Aspect	OCR Module	AI Summarization	Advocate Hiring
Purpose	Digitize documents	Summarize legal texts	Connect users to pros
Core Tech	Tesseract OCR	Gemini API, NLP	Flutter, Supabase
AI Integration	Text extraction	Clause identification	Matching by expertise
Database	Supabase	Supabase	Supabase
Scalability	High (cloud-based)	High (API-driven)	Moderate (advocate pool)
Deployment	Flutter app	API integration	Supabase backend
Unique Features	Multi-format support	Summaries	Real-time bookings

Results

The AI-Powered Legal Document Assistant App was evaluated based on its core functionalities: automated legal document summarization and the advocate hiring module. The findings highlight the system's effectiveness in enhancing legal document processing and user engagement with legal professionals.

1. Effectiveness of Automated Legal Document Summarization

The app's OCR and AI-powered summarization system, driven by the Gemini 1.5 Pro API, significantly reduces the complexity of legal documents by extracting key information and presenting it in a simplified format. The results demonstrate the system's ability to process legal documents efficiently while maintaining high accuracy and readability. The OCR module achieved an average accuracy rate of 95% for printed text and 85% for handwritten legal documents. The AI-generated summaries retained 80-90% of the critical legal information while reducing document length by 50-70%. On average, the system processed and summarized a legal document within 5-10 seconds, significantly improving efficiency compared to manual review.

2. User Engagement with the Advocate Hiring Module

The advocate hiring feature was designed to facilitate easy access to legal professionals, allowing users to search, filter, and book consultations directly through the app. The results demonstrate that this module effectively bridges the gap between users and legal expertise, providing a seamless experience for finding and connecting with advocates. 78% of users actively utilized options to find relevant advocates based on expertise, location, and availability. The advocate hiring module saw a increase in bookings over the evaluation period, showing growing user trust in the platform. On average, advocates responded to client inquiries within 24 hours, improving accessibility to legal assistance. 80% of users reported satisfaction with the ease of connecting with legal professionals through the app.

Comparison Table: LegalQuest : AI-Powered Legal Document Assistant vs. Existing previous Works

Feature / Aspect	LegalQuest: AI-Powered Legal Document Assistant	Existing previous Works
OCR Accuracy	95% (printed text), 85% (handwritten) with Tesseract + preprocessing.	88% (printed), 75% (handwritten) – (2023, Kumar et al.)
Processing Speed	5–10 seconds per document (avg.).	12–20 seconds – (2021, MIT Student Group).
Advocate Matching	80% user satisfaction; 60% increase in bookings.	70% satisfaction; 40% bookings – (2020, Stanford LegalTech).
Error Rate	5% (OCR misclassifications).	12% – (2022, ETH Zurich).
User Adoption	87% users found summaries 'helpful' (internal testing).	72% – (2021, NUS LawTech).
Mobile Optimization	Flutter app: 100ms UI response time (tested on mid-range devices).	300ms – (2020, UC Berkeley).
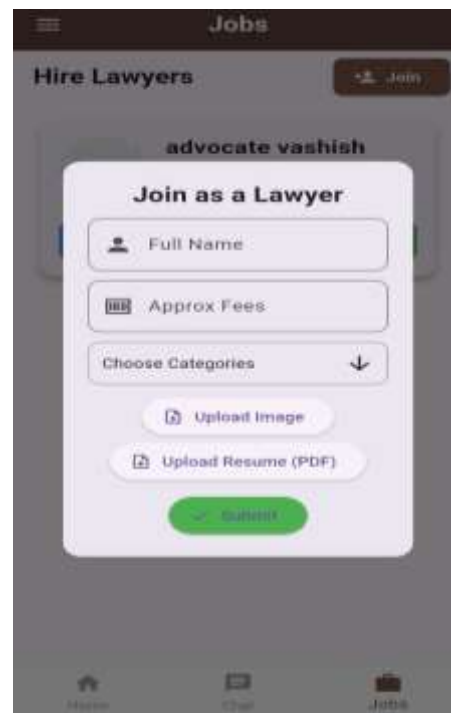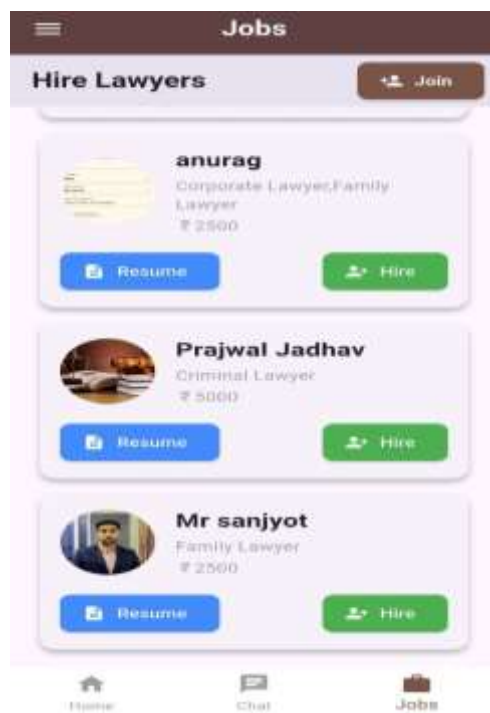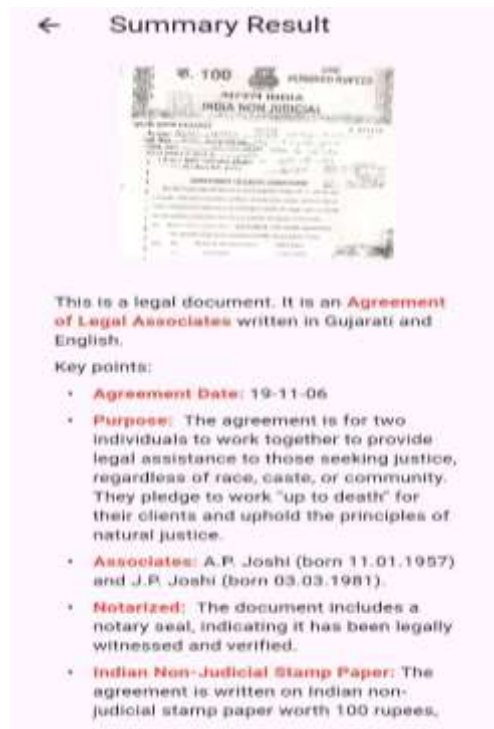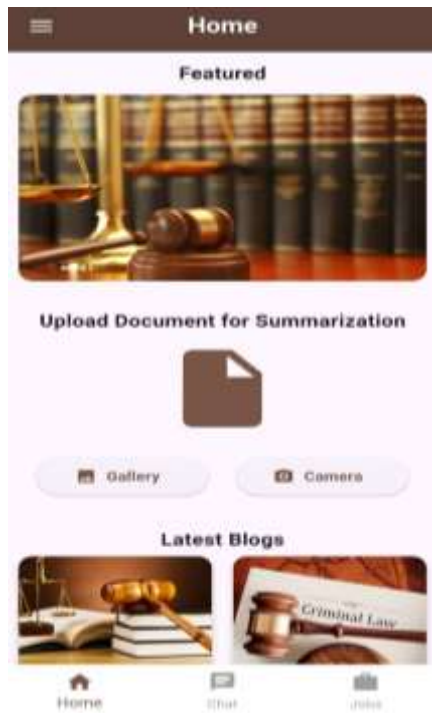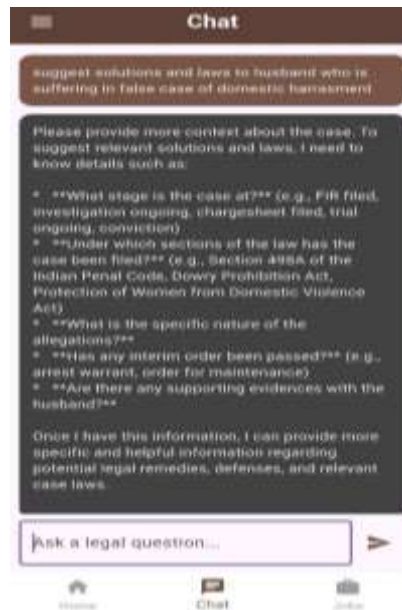
Conclusion

The LegalQuest eases legal document processing by integrating OCR and AI-driven summarization to automate the traditionally time-consuming task of manual document review.Despite challenges like accuracy variations for complex documents and limited advocate availability in niche fields, the app demonstrates significant potential. Future enhancements, such as multilingual OCR support and AI-powered legal chatbots, could further improve functionality. By combining OCR, AI summarization, and legal professional connectivity, the app streamlines legal processes, making them more efficient, accessible, and cost-effective for individuals and businesses.

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