Legal Insight

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July 2024

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DEDICATION

This research work is dedicated to our beloved Parents and Teachers and Friends who supported and motivated us in tough times and made us into what we are today.

ABSTRACT

This project aims to address several issues concerning the area of law with the legal profession concerning matters of case law. This is why we are introducing a web application that would become a one-stop-shop for legal materials. In terms of judgments, the platform gives lawyers rapid access to such judgments accompanied, where necessary, by a case tagline. In addition, it simplifies lawyer-client interactions through user-friendly profiles such as lawyer listing and search. Our system involves the use of OCR for automatic handling of data conversion in the case laws making the process less time consuming. Particularly, we adhere to a strict verification process to ensure efficiency and data consistency. Thus, the goal of our project is to optimize the current work of lawyers and promote the free movement of information between professionals by developing a clear and understandable platform.

Table of Contents

1 INTRODUCTION 12

1.1 Project Vision.....12

1.2 Problem Statement 12

1.3 Goals and Objectives.....12

1.4 Project Scope 13

2 Background Information ……14

3 Related Work ……..……15

4 Methodology..... 17

4.1 Dataset Collection.....17

4.2 Database Structure ……...17

4.3 Full Text Search ……..19

4.4 Search Functionality.....19

4.4.1 Normal Search 19

4.4.2 Advance Search.....20

4.4.3 Post Search Results 21

4.4.4 Case Bookmark 21

4.5 Admin Panel 21

4.5.1 Add Judgment 21

4.5.2 OCR 21

4.5.3 Edit Judgment 22

4.5.4 Delete Judgment 23

4.6 Lawyer Signup 23

4.6.1 Profile Verification 24

4.6.2 Lawyer Search 25

4.6.3 Profile Display 25

5 Results and Discussions 26

6 Conclusion and Future work..... 36

7 References 37

List of Figures

Figure 1: Database ERD 18

Figure 2: Activity Sequence Diagram of Searchbar 20

Figure 3: Activity Sequence Diagram of OCR 22

Figure 4: Activity Sequence Diagram of Profile Verification 24

Figure 5: Landing Page 27

Figure 6: Judgments Page 27

Figure 7: Login Page 28

Figure 8: Signup Page 28

Figure 9: Lawyer Signup Page (Form 1) 29

Figure 10: Lawyer Profile View 29

Figure 11: Lawyer Search Page 30

Figure 12: Lawyer Profile View for Client 30

Figure 13: Admin Panel Authentication Page 31

Figure 14: Admin Panel Home Page 31

Figure 15: Admin Panel All Judgments Form 32

Figure 16: Admin Panel Add Judgments Form 32

Figure 17: Admin Panel OCR 33

Figure 18: Admin Panel Delete Judgment Form 33

Figure 19: Admin Panel Edit Judgment Form 34

Figure 20: Admin Panel Review Request Form 34

Figure 21: Admin Panel Verify Profile Page 35

LIST OF ABBREVIATIONS AND SYMBOLS

API	Application Programming Interface
CSV	Comma-Separated Values
HTML	Hypertext Markup Language
JSON	JavaScript Object Notation
LLB	Bachelor of Laws
LLM	Master of Laws
OCR	Optical Character Recognition
SQL	Structured Query Language
Tesseract.js	JavaScript based OCR library

1. INTRODUCTION

Our web application serves as a comprehensive legal resource hub, aiming to streamline case law searches and enhance lawyer-client interactions. By providing quick access to reported judgments with case taglines and implementing advanced search options, the platform addresses the need for expeditious information retrieval. Furthermore, the application goes beyond mere information access, incorporating user-friendly lawyer profiles and leveraging OCR technology for automated case law digitization. This not only ensures data integrity through a meticulous verification process but also enhances the overall efficiency and credibility of legal research.

1.1 Project Vision

To revolutionize legal research, our web application envisions a seamless and efficient ecosystem, providing legal professionals with quick access to reported judgments, user- friendly lawyer profiles, and advanced search capabilities, thereby transforming the landscape of lawyer-client interactions.

1.2 Problem Statement

The system addresses the challenges faced by legal professionals in accessing and managing reported judgments with three key modules: (1) A user-friendly interface for efficient case law searches and bookmarking, allowing users to quickly find relevant judgments with case taglines, accessible via login credentials; (2) Enhanced lawyer-client interaction through comprehensive and verified lawyer profiles, enabling clients to search for lawyers by expertise and initiate contact via the platform; and (3) An administrative panel equipped with OCR technology for inserting, deleting, and editing case laws, as well as verifying lawyers' data before profile creation, ensuring the platform's integrity, efficiency, and accuracy.

1.3 Goals and Objectives

Goals:

1. Develop a user-friendly Legal Resource Platform to streamline case law searches.

2. Enhance lawyer-client interactions by creating comprehensive and reliable lawyer profiles.
3. Implement an administrative panel with OCR technology for efficient case law management.
4. Ensure data integrity through meticulous verification processes for lawyer profiles.

Objectives:

1.1 Create an intuitive interface for quick and advanced case law searches.

1.2 Implement a bookmark system to enhance user navigation within reported judgments.

2.1 Develop detailed lawyer profiles highlighting legal expertise and professional achievements.

2.2 Establish a streamlined verification process for accuracy in lawyer profile information.

3.1 Integrate OCR technology for automated case law digitization within the administrative panel.

3.2 Enable functionalities for insertion, deletion, and editing of case laws in the administrative panel.

4.1 Implement a thorough verification process to ensure the accuracy and reliability of lawyer profile information.

1.4 Project Scope

The project will encompass the development of a comprehensive Legal Resource Platform, focusing on efficient case law searches, enhanced lawyer-client interactions, and streamlined administrative processes. The scope includes the implementation of user-friendly interfaces for judgments, a bookmark system, and detailed lawyer profiles. Additionally, the project involves the integration of OCR technology for automated case law digitization within an administrative panel, allowing for efficient data management. The scope extends to the verification processes for lawyer profiles, ensuring accuracy and reliability, with ongoing protocols for data integrity maintenance.

2. Background Information

The legal profession in Pakistan faces significant challenges, including limited access to comprehensive legal resources, inefficient lawyer-client connections, and concerns about the authenticity of legal practitioners. These issues hinder the delivery of justice and affect trust in the legal system. Our project aims to address these challenges through a web application that bridges the gap between legal expertise and those seeking legal services.

- **Limited Access to Comprehensive Legal Resources**

Lawyers in Pakistan struggle with accessing comprehensive legal resources due to the traditional physical storage of case laws and judgments. This results in loss, damage, and difficulty in retrieval, creating barriers for legal practitioners. Our web application will provide a comprehensive database of reported judgments with case taglines, enabling advanced searches and easier navigation. By utilizing Optical Character Recognition (OCR) technology, we will digitize historical case laws, ensuring their preservation and accessibility.

- **Inefficient Lawyer-Client Connections**

Clients often find it challenging to identify and contact lawyers specializing in relevant legal areas, leading to suboptimal outcomes. Our project will develop comprehensive lawyer profiles highlighting their expertise and experience. These profiles will serve as marketing tools for lawyers and will be verified to ensure accuracy. Clients will be able to search for lawyers based on specific needs and initiate contact through the platform, facilitating more efficient and effective lawyer-client connections.

- **Concerns About the Authenticity of Legal Practitioners**

Clients face difficulties in verifying the credentials and reputations of lawyers, leading to mistrust. Our website will include an admin panel utilizing OCR technology for the digitization of case laws and the verification of lawyer profiles. This will ensure that only verified lawyers are listed, enhancing the credibility and trustworthiness of the platform.

3. Related Work/ Literature Survey

In Pakistan, the availability of comprehensive case law databases is limited. The most notable existing platform is Pakistan Law Site, which provides extensive case law information but operates on a subscription-based model. Additionally, various high courts maintain individual websites to showcase their respective case laws, but these often lack user-centric design and advanced search functionalities. This fragmentation poses a challenge for users seeking a unified and efficient source of legal information. Moreover, existing platforms do not include lawyer profiling or client-lawyer interaction mechanisms. The absence of integrated lawyer profiles, client feedback systems, and secure authentication for legal professionals limits the potential for a holistic legal management system that not only serves as a repository for legal documents but also facilitates connections between clients and lawyers, ensuring more comprehensive legal support

3.1 Literature Review Summary Table

Table 1: Literature Review

The summary of various journals highlighting the need of digitalization in law with advancement in technology.

No.	Paper name	Publishing journal	Year	Work done
1.	Historical Document	A survey of techniques, tools	2020	This paper provides a comprehensive survey of techniques, tools and trends in historical document processing, focusing on the methods and

	Processing	and trends		advancements used to convert historical documents into digital formats.
2.	Technology's Impact on the Legal Profession	International Journal of Data Science and Development	2023	Lawyers are starting to use digital technology more because it helps them work better, faster and keep up with what clients want.
3.	The Role of Technology in Enhancing Rural Access to Justice	Journal on role of technology in terms of Justice	2020	Legal technology is seen as a vital tool in enhancing access to justice, especially for those with limited resources. It aims to overcome barriers, particularly in rural areas, while stressing the importance of accessibility and cultural sensitivity.

In short this literature reviews present a comprehensive overview of the evolving landscape in legal and historical document processing. They highlight the increasing integration of digital technology within the legal profession, emphasizing its role in enhancing efficiency for lawyers and meeting evolving client demands. Furthermore, the reviews stress the pivotal role of legal technology in promoting access to justice, particularly in underserved areas, by overcoming barriers and prioritizing cultural sensitivity and accessibility.

4. METHODOLOGY

4.1 Data Collection

The sample employed in this study comprises of 6300 reported and non-reported judgments from the Lahore High Court and the Supreme Court of Pakistan, prepared by the author through web scraping. These judgments were given in the last 14 years and hence they have taken into account all the major fields of law while relying on certain legal precedent. The dataset contains a total of 360 decision numbers provided by 100 judges observing both courts; as such, the dataset is a comprehensive and diverse source of legal material.

4.2 Database Structure

The database for the legal resource platform is designed to support efficient storage, indexing, and full-text searching of a vast repository of case laws. It includes key tables such as Judges4, CaseSubjects4, CaseLaws4, Login, BookmarkJudgements, and LawyerSignupData.

- Judges4 stores unique information about judges, while CaseSubjects4 handles unique subjects of cases.
- CaseLaws4 contains detailed information about each case law, including case number, subject, title, court, author judge, judgment date, citations, tagline, and the full text of the judgment. This table is linked to Judges4 and CaseSubjects4 via foreign keys to ensure data normalization and integrity.
- Login stores user credentials securely, with encrypted passwords.
- BookmarkJudgements records user bookmarks, linking to both Login and CaseLaws4 via foreign keys.
- LawyerSignupData maintains comprehensive profiles of lawyers, including their credentials and specializations, and is linked to Login for user verification.
- Additionally, tables such as PracticeAreas, ConsultationModes, OfficeHours, and LawyerReviews provide detailed information on lawyers' practice areas, consultation methods, office hours, and user reviews, respectively, enhancing the platform's functionality and user experience.

- Full-text indexing is implemented on relevant columns to enable advanced search capabilities, significantly enhancing the efficiency of legal research.

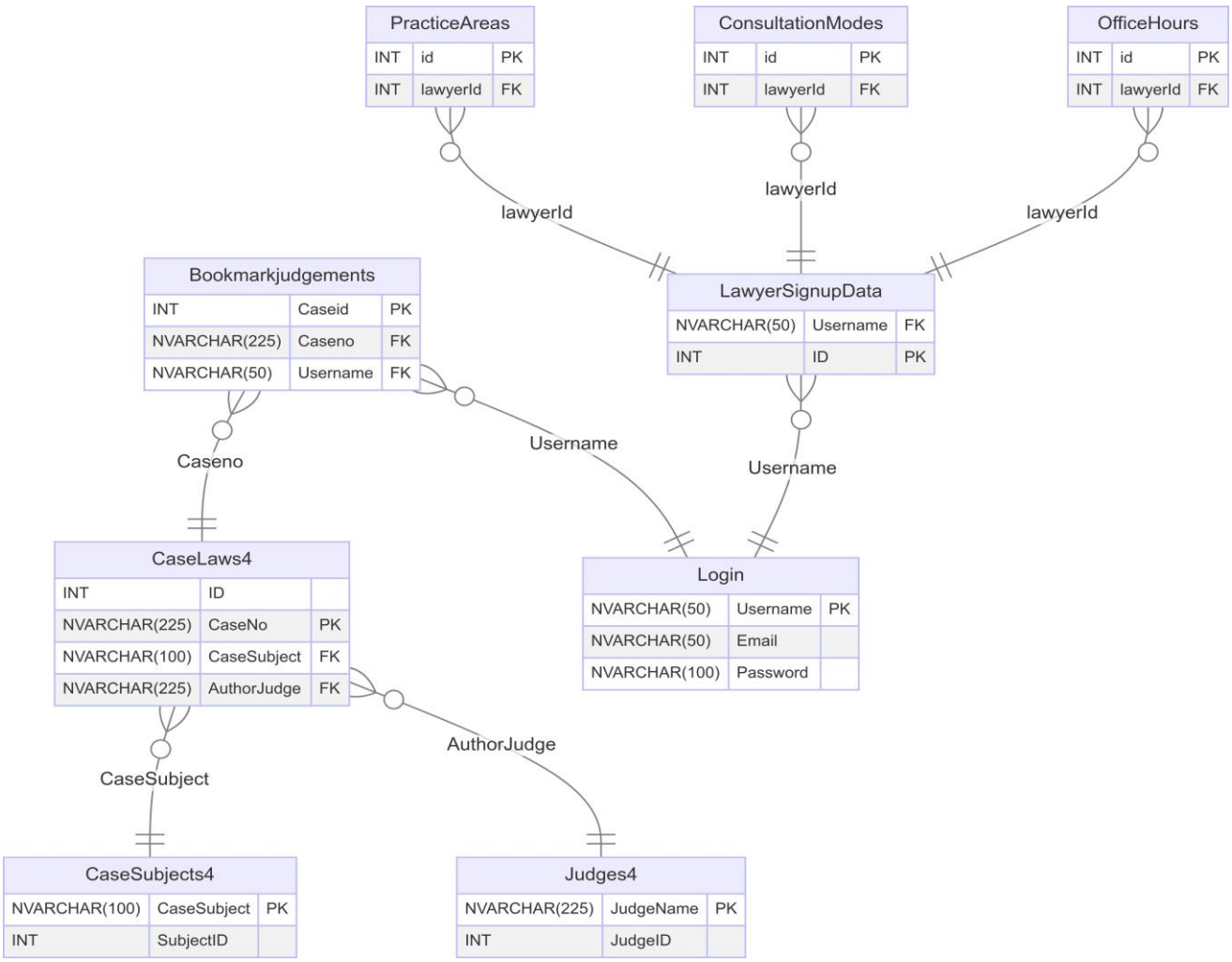

Figure 1: ERD of Database showing relation between tables

4.3 Full text search

A special index, IX_CaseLaws_ID4, is built on the ID column of the CaseLaws4 table to enhance search efficiency and query relevancy. This index helps in distinguishing each case law for easier indexing and reference. A full-text catalog, CaseLawsCatalog4, is created for storing full-text indexes, allowing efficient searches with large text volumes. The full-text index on the CaseLaws4 table includes columns like CaseNo, CaseSubject, CaseTitle, Court, AuthorJudge, JudgementDate, Citation, SCCitation, Tagline, and Judgement. This index is especially helpful for large textual fields, making it easy to find records meeting specific criteria. The full-text index uses a system stop list to filter out common words and highlight meaningful ones, optimizing search performance. During a search, the index is utilized for fast searching within several columns. For example, in a keyword search, the input string is broken into individual keywords, stop words are excluded, and a Dynamic SQL using the CONTAINS clause is generated, allowing the database to look up each word in all indexed columns and sort by relevance.

4.4 Search Functionality:

4.4.1 Normal Search Bar

The home page features two search engines: a basic search bar and an expert search bar for case law searches. The simple search starts with user input, forming an SQL query by extracting keywords and excluding stop words. If the query includes double quotes, it is treated as an exact phrase search on parameters like case number, title, court, author judge, judgment date, citation, SCCitation, tagline, and text. For common keywords, terms are stemmed and matched individually using SQL CONTAINS, which supports full-text search. Results are dynamically ranked by relevance, with the highest scoring records displayed first. A filtering mechanism ensures records with at least half of the keywords are included.

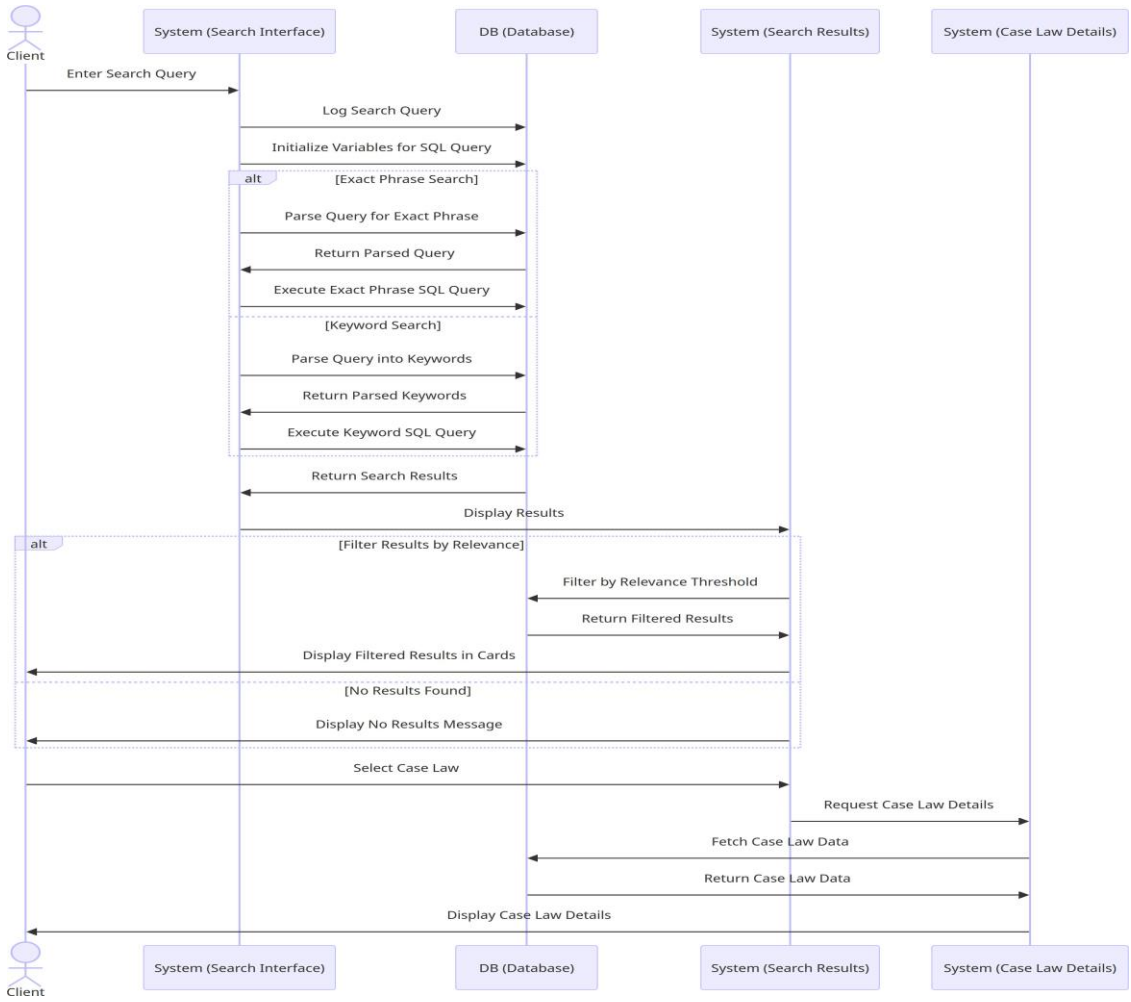

Figure 2: Activity Sequence Diagram of Searchbar

4.4.2 Advanced Search Bar

The advanced search allows users to specify fields such as case number, subject, title, judge's name, judgment date, court, citation, and keywords. The system cleans inputs and constructs SQL query conditions, using the CONTAINS function for field-specific terms. A scoring system sorts results by matching criteria, displaying only those above a minimum score in order of relevance. The backend code handles database communication, enhancing full-text search with the CONTAINS function and a scoring system.

4.4.3 Post-Search Features

After a search, a table of case records is generated, including details like case number, subject, title, authoring judge, judgment date, citation, tagline, and full judgment. Each row has a button for full-text access. The table starts with 50 entries per page, with navigation arrows and options to display 20, 50, or 100 rows per page, improving usability and flexibility.

4.4.4 Case Bookmark

Users can bookmark cases to their profiles for later access, a feature available only after login. Unlogged users are redirected to the login page, ensuring secure and personal bookmarking. This feature enhances the user experience for legal practitioners and researchers by combining search, display, and bookmarking functionalities.

4.5 Admin Panel

The first module of the admin panel is to handle case laws where users can view, store, modify, and delete cases. It lowers administrative work, making the management of legal data more effective. Users get a listof case laws by judgment date with features including case no., subject, title, judge, date, citation, and SCCitation displayed in rows. Editing and deleting icons are also placed in every row in order to facilitateeasy use of those functions.

4.5.1 Add Case Law

To add new case laws, there is the “Add Case Law” form that has fields namely; Case No, Subject, Title, Court, Judge, Date, Citation, SCCitation, Tagline, and Judgment. The form provides buttons with “ScanJudgment” and “Add Judgment” functions to start the OCR process to recognize text in the images and to input the case law into the database, respectively.

4.5.2 Optical Character Recognition (OCR)

The OCR component is one of the core elements of the admin panel that was meant to simplify the entry of judgment texts. This feature employs the Tesseract technology as envisioned by the. text recognition library within a given React component. The program allows users to select the target language in text recognition and import more than one picture file. With the click of the “Recognize All” button, Tesseract.js workersdeal with

each image, recognizing the text while showing the progress for the users. The extracted text is then saved in an array and user can copy it to the clipboard by pressing the "Copy Text" button. After copying text to clipboard the text will be pasted in the "Judgment" field of the added case law form to input accurate record data. The recognized text is also included into the search data context, so it is easily accessible for the subsequent utilization in the application. This saves a lot of time which also increasesthe efficiency of managing case law data and also increases the accuracy when entering the data.

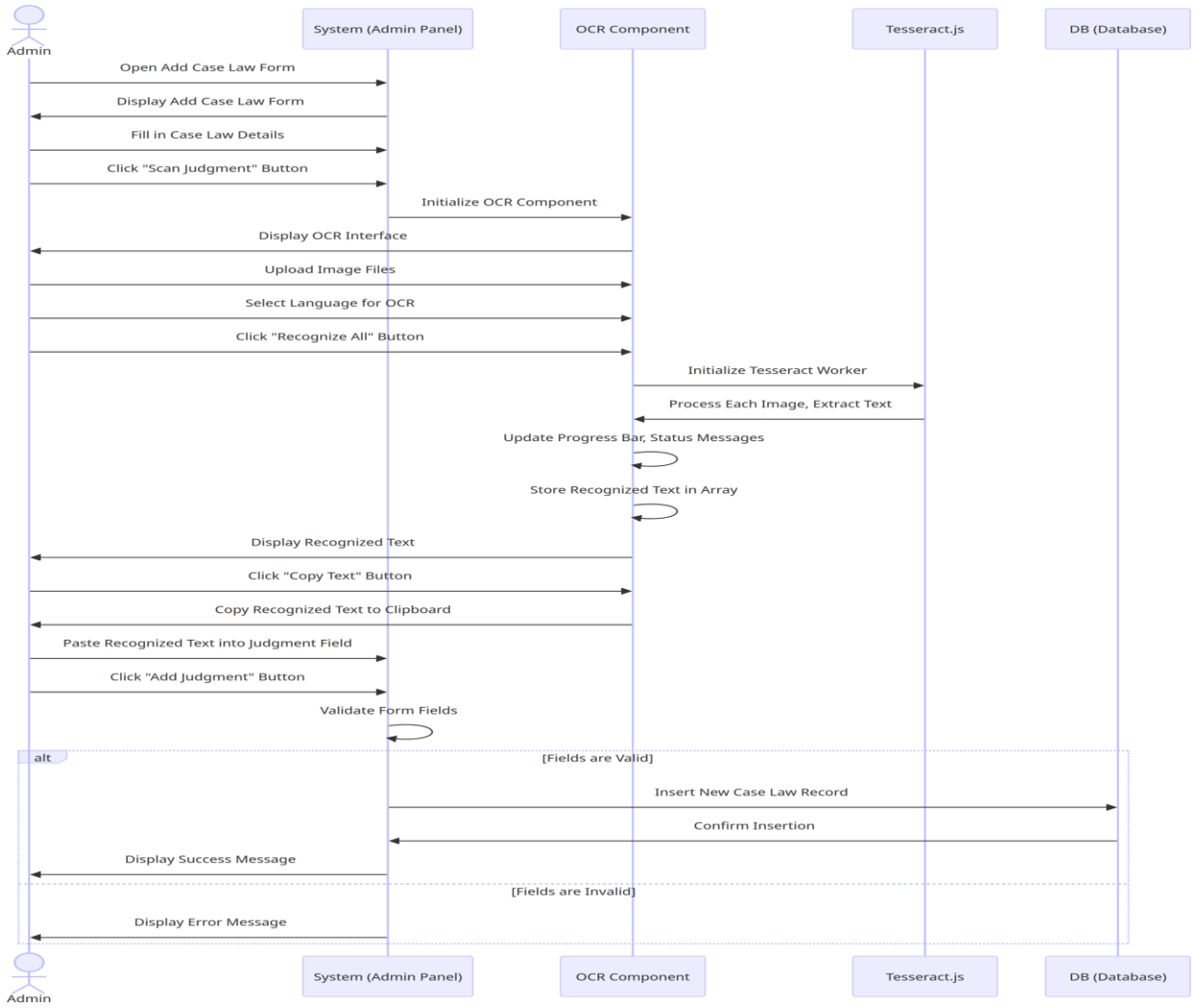

Figure 3: Activity Sequence Diagram of OCR

4.5.3 Edit Case Law

To edit a case law, users need to click the “Edit” button in the table row. This will open an auto populated form with all the information of the existing case. These are current and new case number, subject, title, court, judge, date, citation, sccitation, tagline, and judgement. Users complete and modify fields when necessary, and using the “Edit Judgment” button, which will amend the case law information in the database.

4.5.3 Delete Case Law

The delete functionality additionally provides a confirmation to avoid deleting items by mistake. When auser attempts to delete a file, a dialog box comes up to confirm the action. If the user agrees with such action, the case law is deleted from the database for good. Also, users can delete a case law by using the case number and completing a form then a confirm form will be displayed.

4.6 Lawyer Signup Process

The lawyer signup process is a crucial feature of our platform, allowing lawyers to create detailed profiles. This process involves a series of forms that capture information about their specialization, education, experience, and contact details, helping potential clients review their services. The first form collects basic information on the lawyer's practice areas and bar memberships, ensuring their fields of specialization are appropriately listed. The second form gathers personal details such as full name, province, and city, establishing their geographical location and basic credentials. The third form records educational qualifications like LLB, LLM, and LLD along with the institutions attended. The fourth form details professional experience, including current position, years of practice, and experience in various courts, which helps evaluate the lawyer's proficiency. The fifth form allows the addition of certifications, case experiences, notable cases, and success stories, enhancing the profile's effectiveness. The sixth form collects office details, including address, consultation options, and fees, aiding clients in seeking services. The final form includes social media handles, contact information, and requires uploading degree and certification pictures for verification. Once registration is complete, profiles are validated using the uploaded documents.

4.6.1 Profile Verification

The verification process begins with the Pending Verifications Table, listing submitted profiles awaiting approval. This table includes the lawyer's name, email, submission date, status, and an action column with a "View Details" button for each profile. Verifiers select a profile to access a Detailed Verification View with seven forms corresponding to the signup fields, containing specific information and scanned documents. Verifiers review and accept or reject parts of the document, leaving comments on any issues. They can approve the entire profile or reject specific sections and send feedback to the lawyer. This process updates the profile status automatically, ensuring listed legal professionals are genuine and qualified, thus instilling client confidence.

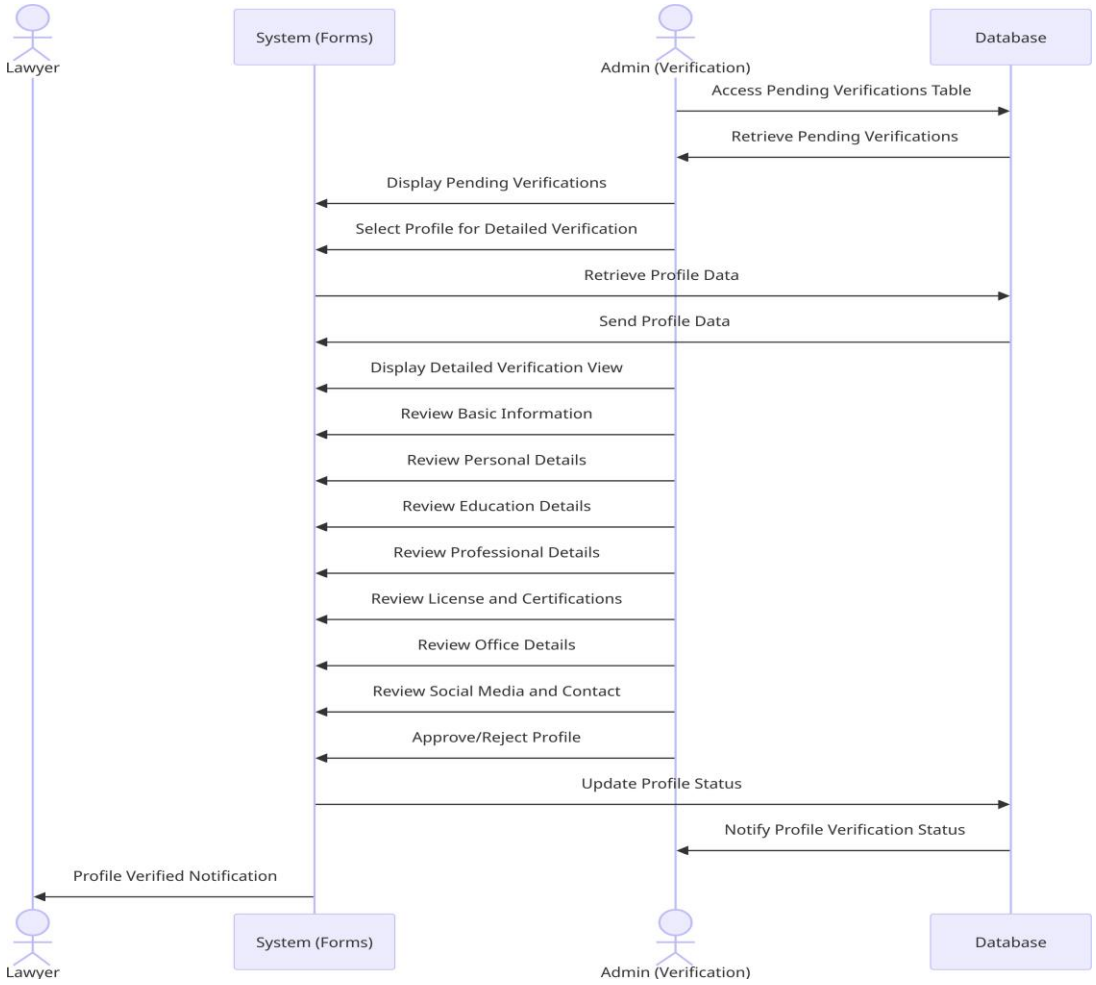

Figure 4: Activity Sequence Diagram of Verification Form

4.6.2 Lawyer Search

The advanced search module for clients features a user-friendly interface with two main components: Search Interface and Profile Display. The Search Interface includes three input fields and a search button. The "Law Area Dropdown" allows users to select a specific law area like Family or Criminal Law. The "City/Location Input" lets users input a city or location, and the "Lawyer Name Input" allows for the input of a specific lawyer's name. After initiating the search, results are displayed as rectangular cards, each showing the lawyer's profile picture, full name, current position, years of experience, and city or location for easy filtering based on user preferences.

4.6.3 Profile Display

When a user selects an attorney from the search results, they are directed to the Profile Display, which provides detailed information about the attorney. This display is divided into sections: "Basic Information" (practice areas and bar affiliation), "Personal Information" (full name, province, and city of practice), "Education" (LLB, LLM, and LLD degrees), "Professional Information" (job title, experience, and court practice), "License and Certification" (additional certifications and case experience), "Office Information" (office address, operation hours, and consultation details), and "Social Media and Contacts." Clients can also access a "Reviews and Ratings" section to read or post reviews, helping them make well-informed decisions.

5. Results and Discussions

The implementation of the proposed system yielded significant improvements in the accessibility and management of legal information. The user-centric design and responsive UI facilitated easy access and interaction with the platform across various devices. The integration of a robust search functionality allowed users to perform both basic and advanced searches, effectively retrieving relevant case laws. The table representation and popup views enhanced the user experience by providing structured and detailed information. The bookmarking mechanism, coupled with secure user authentication, ensured that users could efficiently save and manage important case laws.

Lawyers were able to create and maintain comprehensive profiles, and the client feedback system provided a transparent and interactive platform for client-lawyer interactions. The admin panel's CRUD operations and OCR integration streamlined the management and verification of data, contributing to the overall reliability and accuracy of the platform. This system not only addressed the existing gaps in the availability and accessibility of legal information in Pakistan but also set a precedent for a unified platform that combines comprehensive case law data with detailed lawyer profiling and client feedback mechanisms. Future work can focus on expanding the database, integrating additional legal resources, and enhancing the user interface based on user feedback and technological advancements

Web Application Result:

- **Landing Page**

The landing page highlights the core features of the website, offering users an intuitive path to navigate through the site's offerings, such as searching for lawyers and accessing judgments. It serves as a welcoming interface to explore the platform's functionalities.

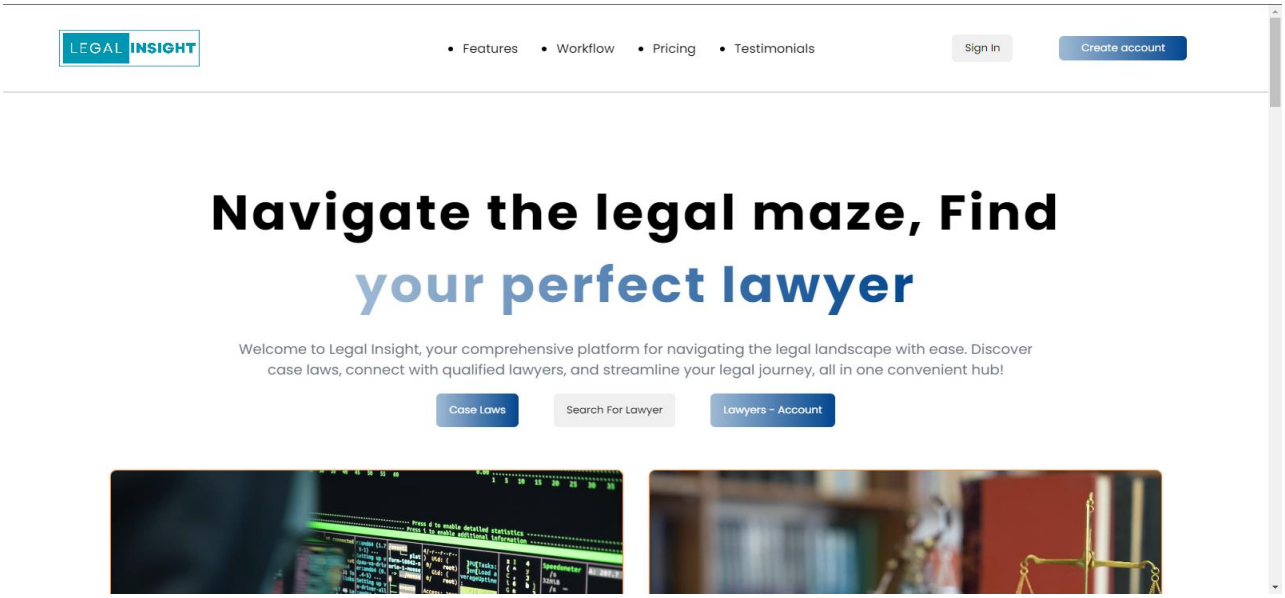

Figure 5: Landing Page

- **Judgments Page**

The judgments page provides a comprehensive list of case judgments, allowing users to browse through detailed legal decisions. Users can search, filter, and view judgments relevant to their legal needs.

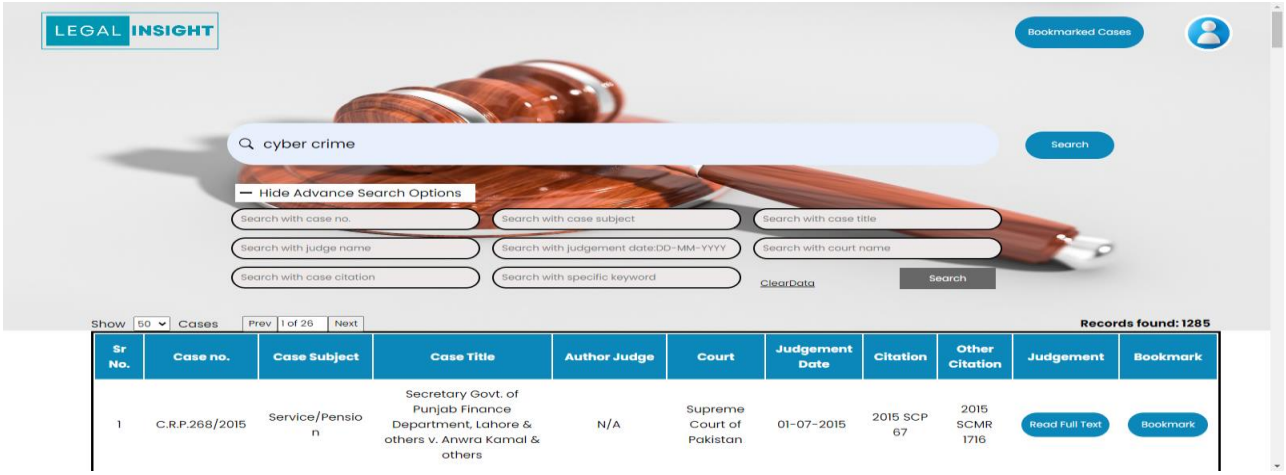

Figure 6: Judgments Page

- **Login Page**

The login page is designed for users to securely access their accounts. It features fields for entering email and password, along with options for password recovery and account creation.

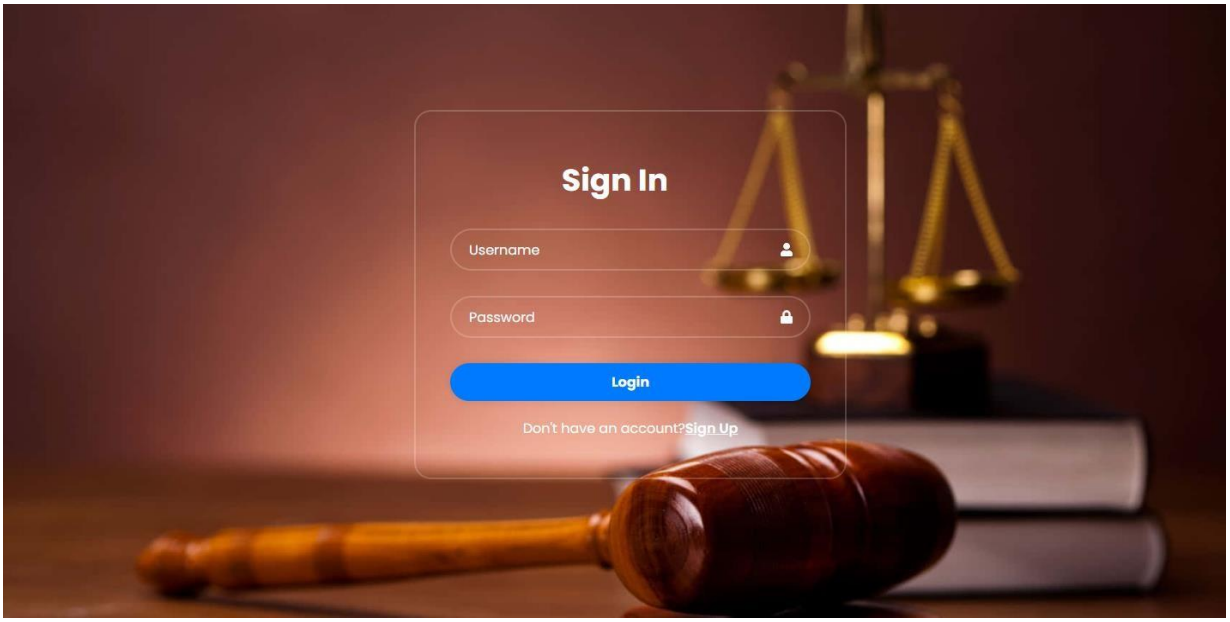

Figure 7: Login Page for user

- **Signup Page**

The signup page facilitates new user registration by collecting essential details such as name, email, and password. It ensures a smooth onboarding process for new users.

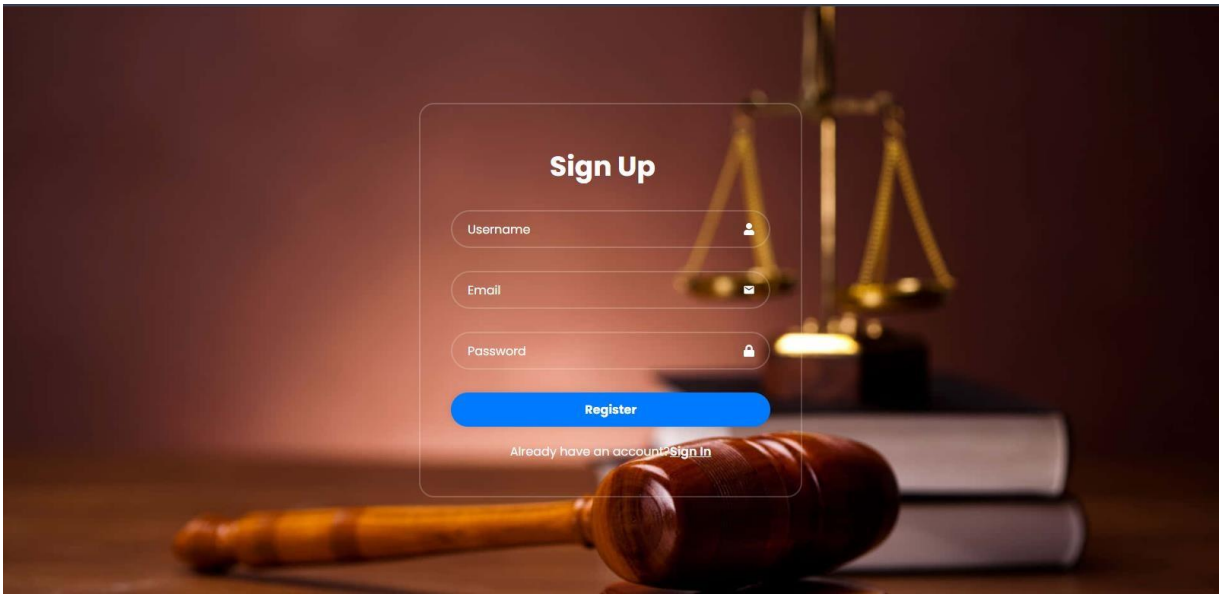

Figure 8: Signup Page for user

- **Lawyer Signup Page (Form 1)**

The lawyer signup page allows legal professionals to create profiles by providing their practice details, qualifications, and contact information. This form helps lawyers to become part of the platform.

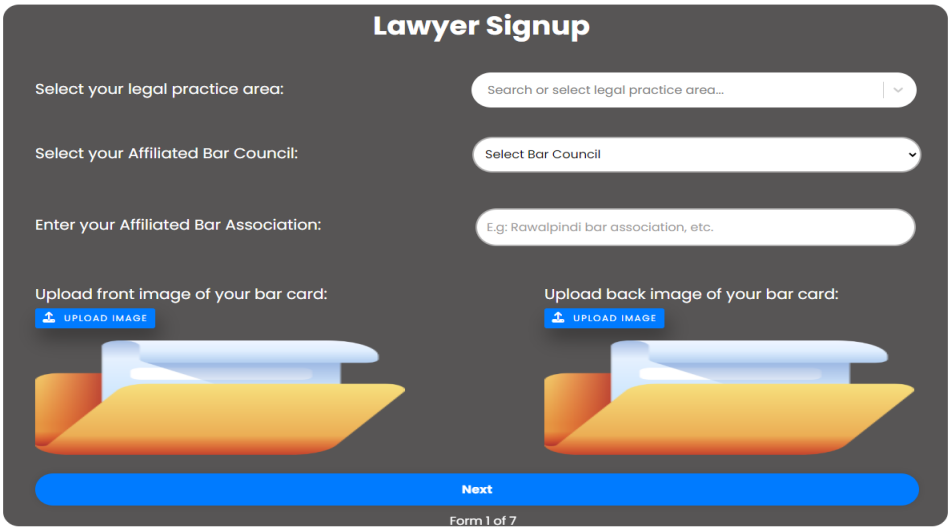

Figure 9: Lawyer Signup Page (Form 1)

- **Lawyer Profile View**

The lawyer profile view displays all the data of lawyer profile including reviews. It helps lawyer to view his submitted data and the reviews about his services from clients.

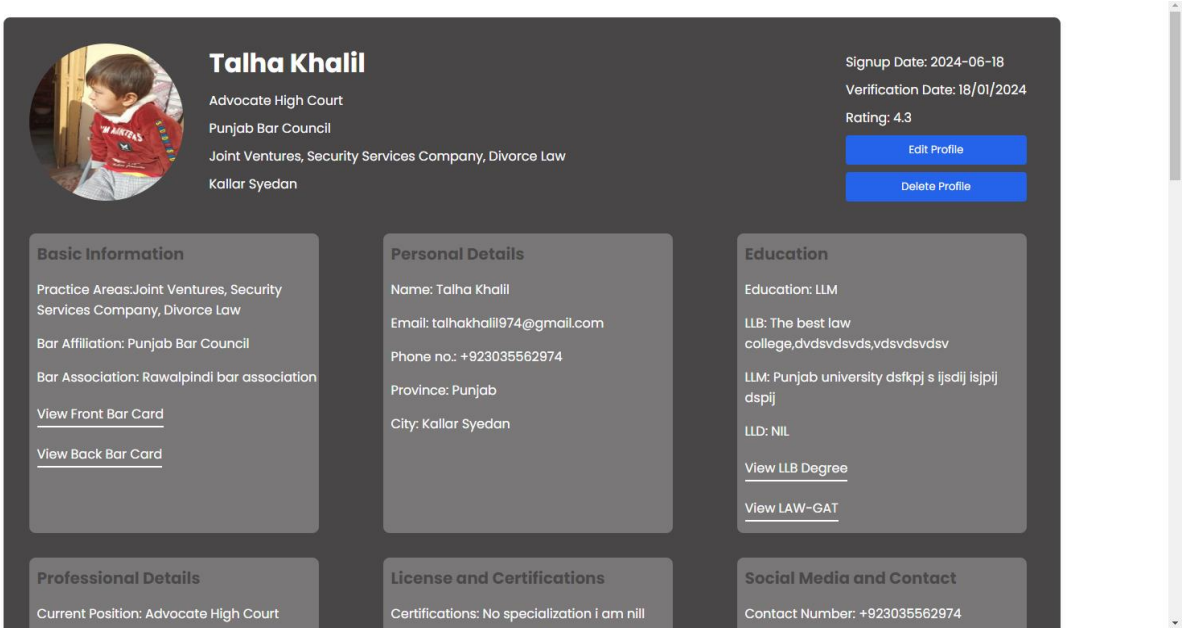

Figure 10: Lawyer Profile View

- **Lawyer Search Page**

The lawyer search page enables users to find lawyers by specifying criteria such as law area, city, or lawyer's name. Search results are displayed in an easy-to-navigate format, aiding users in finding the right legal assistance.

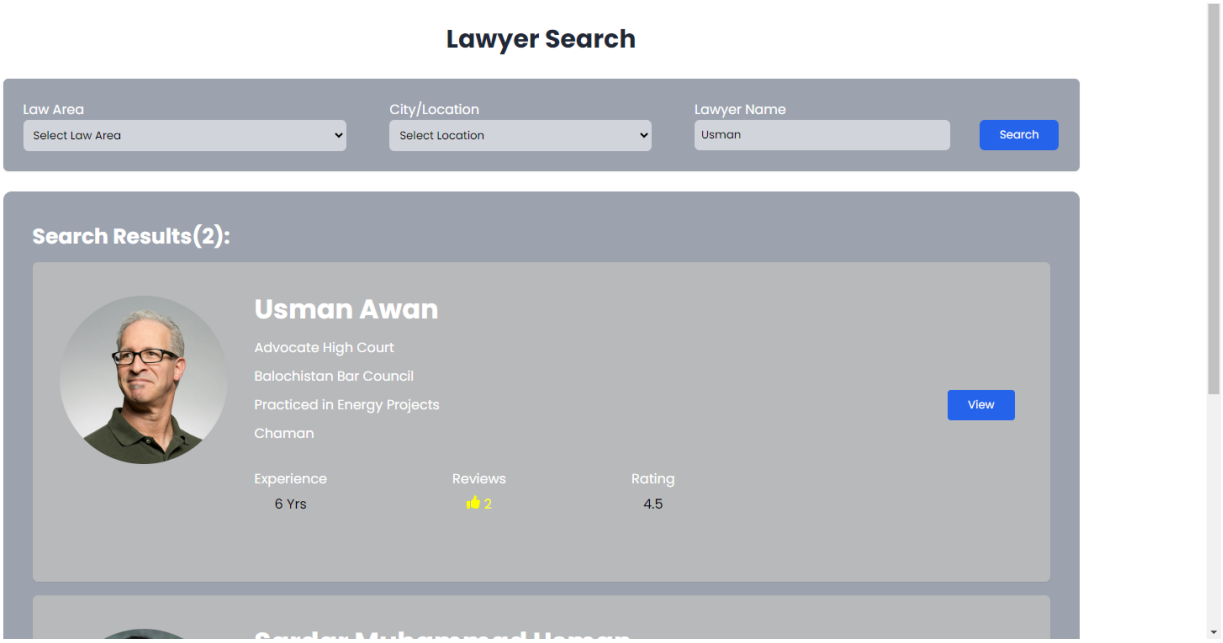

Figure 11: Lawyer Search Results Page

- **Lawyer Profile View for Client**

This view offers clients a detailed look at a lawyer's profile, showcasing their qualifications, experience, and client reviews. It helps clients make informed decisions when choosing legal representation.

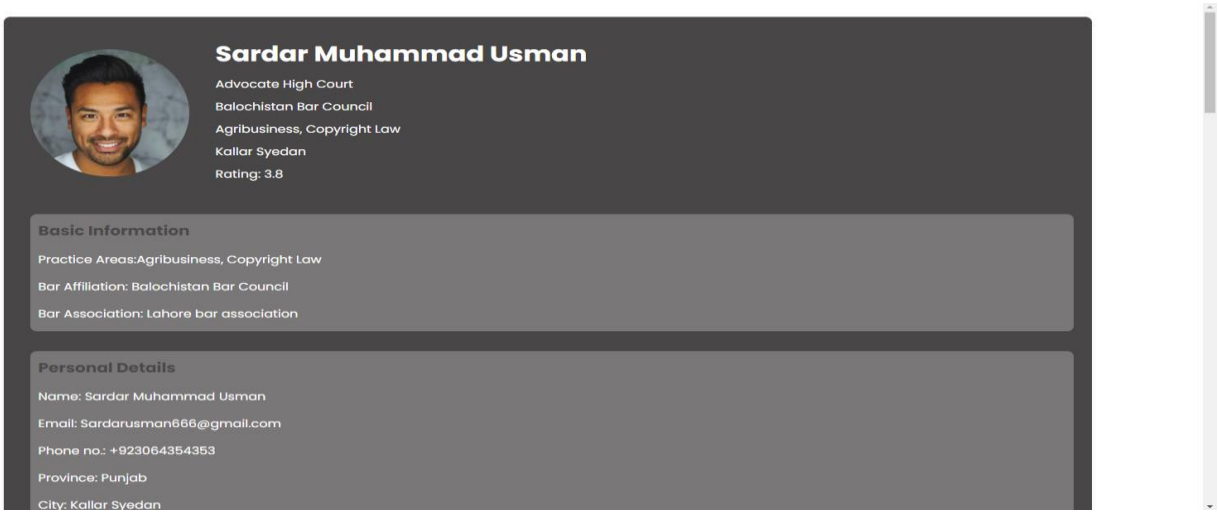

Figure 12: Lawyer Profile View (For client)

- **Admin Panel Authentication Page**

The admin panel authentication page provides secure access for administrators to log into the backend system. It includes fields for admin credentials and options for password recovery.

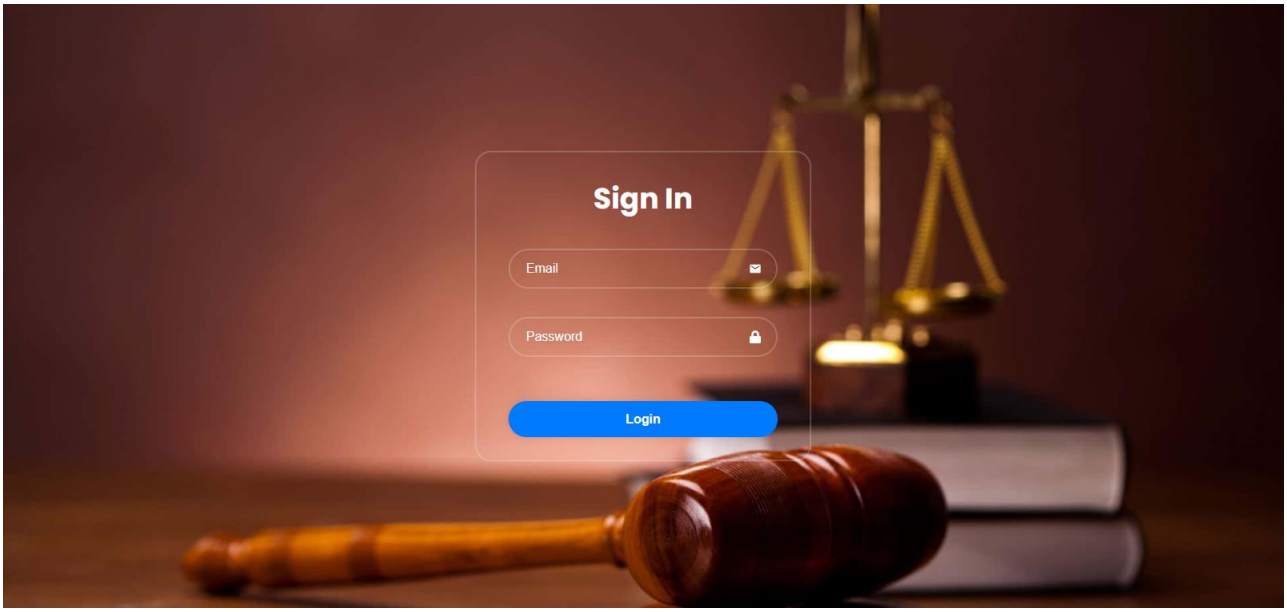

Figure 13: Admin Authentication Panel

- **Admin Panel Home Page**

The admin panel home page displays an overview of the total judgments available and the status of review requests, including pending and approved requests. It serves as a dashboard for administrators to manage the system effectively.

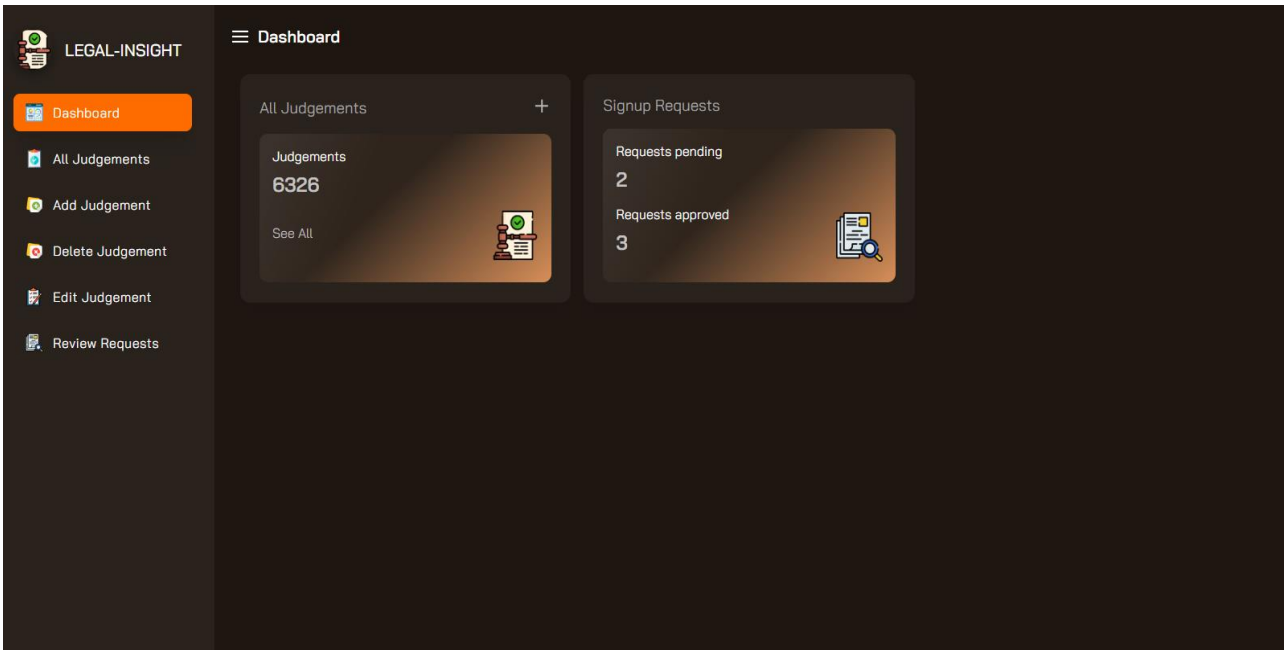

Figure 14: Admin Panel Home Page

- **Admin Panel All Judgments Form**

This form in the admin panel lists all judgments in the database, allowing administrators to view, search, and manage the entries efficiently.

Figure 15: Admin Panel All Judgments Form

- **Admin Panel Add Judgments Form**

The add judgments form in the admin panel enables administrators to input new judgments into the system. It ensures that the database is continuously updated with the latest legal decisions.

Figure 16: Admin Panel Add Judgments Form

- **Admin Panel OCR**

The OCR page in the admin panel facilitates the conversion of scanned documents into editable and searchable text, enhancing the efficiency of data entry and retrieval.

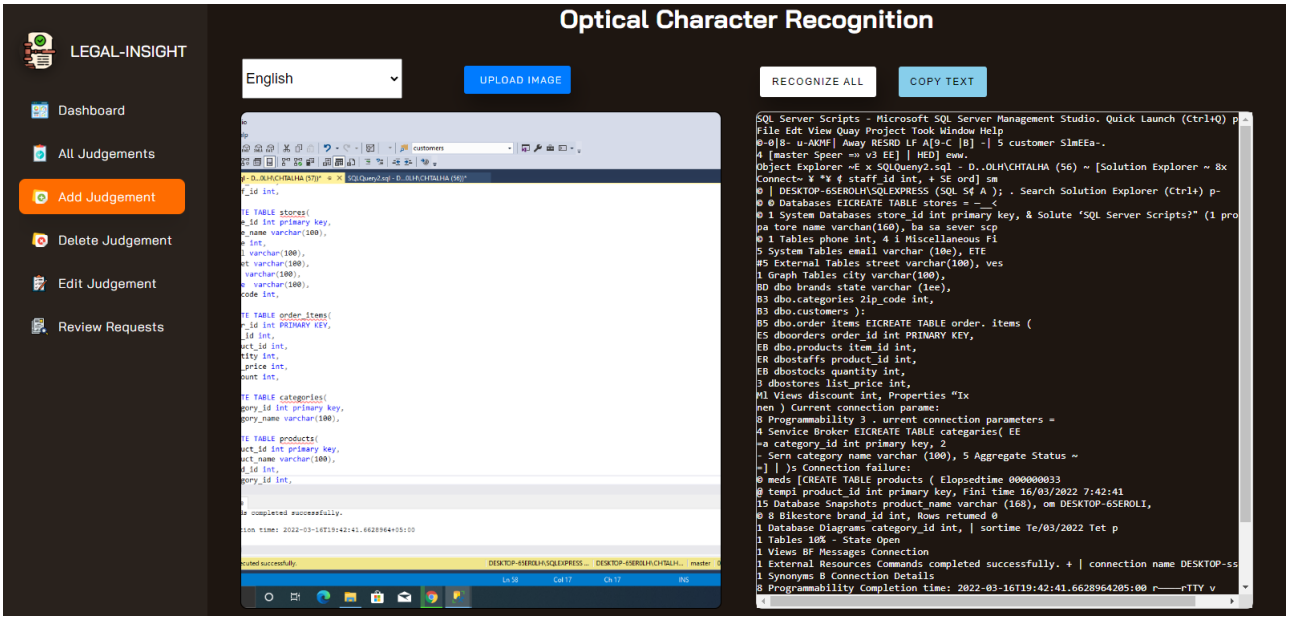

Figure 17: Admin Panel OCR

- **Admin Panel Delete Judgment Form**

The delete judgment form allows administrators to remove judgments from the database. This feature ensures that outdated or incorrect entries can be efficiently managed.

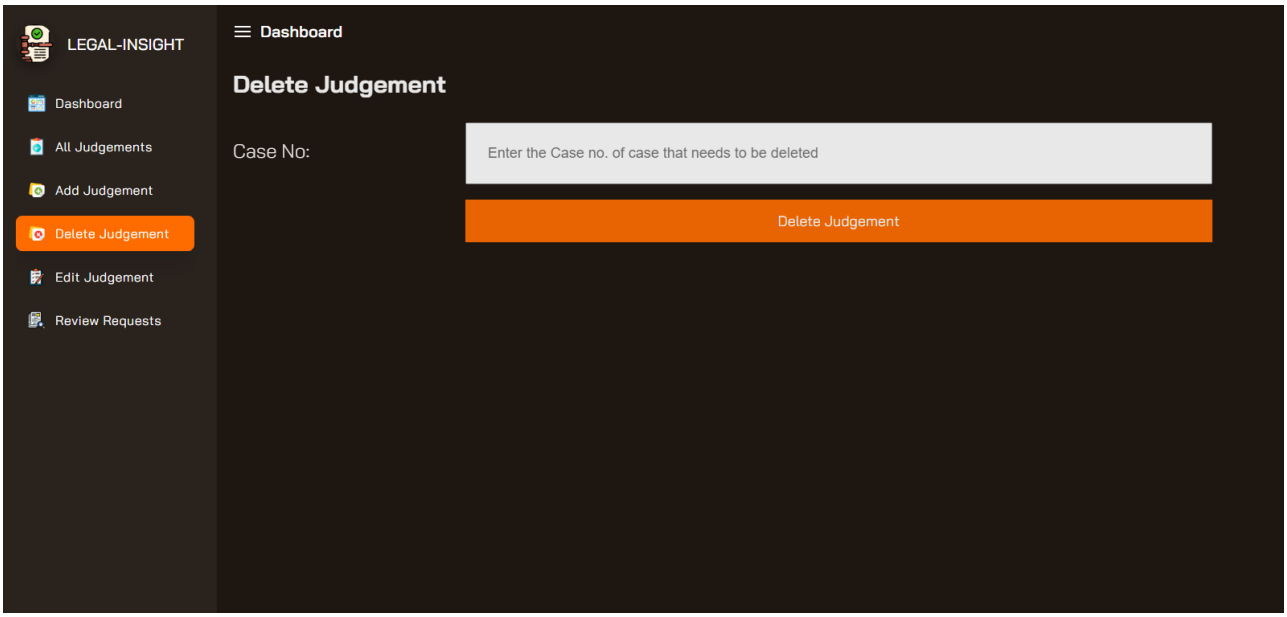

Figure 18: Admin Panel Delete Judgment Form

- **Admin Panel Edit Judgment Form**

The edit judgment form provides a user-friendly interface for administrators to update existing judgment entries. This ensures the accuracy and relevance of the database.

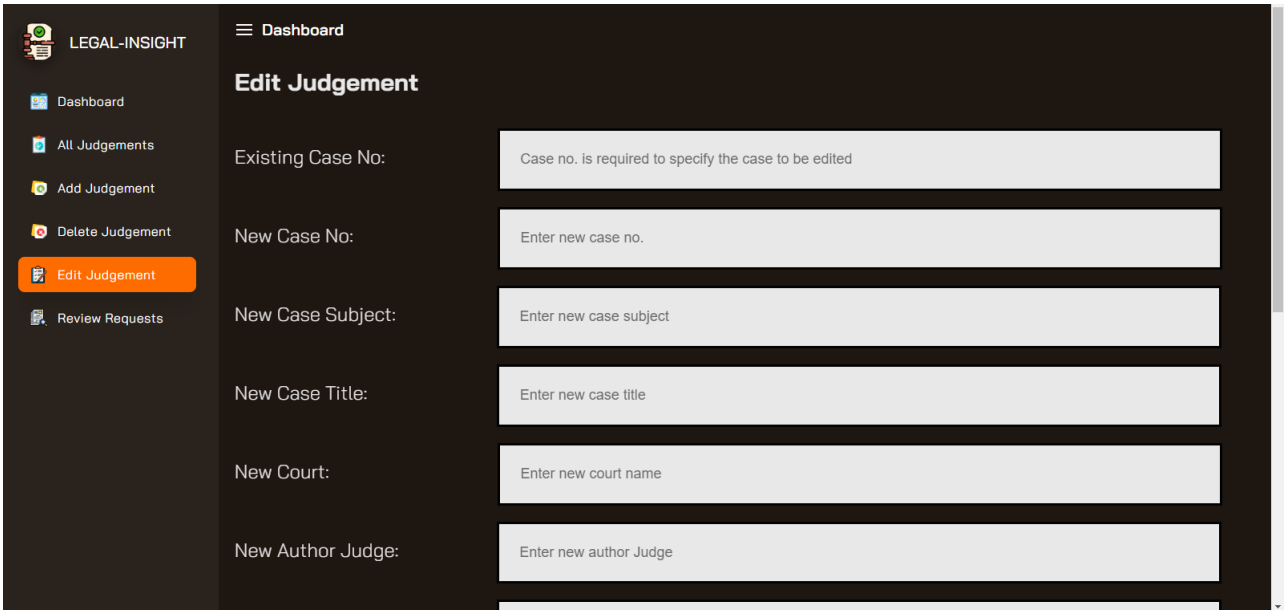

Figure 19: Admin Panel Edit Judgment Form

- **Admin Panel Review Request Form**

The review request form allows administrators to manage requests for judgment reviews, tracking the status and ensuring that all requests are processed in a timely manner.

Figure 20: Admin Panel Review Request Form

- **Admin Panel Verify Profile Page**

The verify profile page in the admin panel is used to authenticate and approve lawyer profiles. This process ensures that only verified legal professionals are listed on the platform.

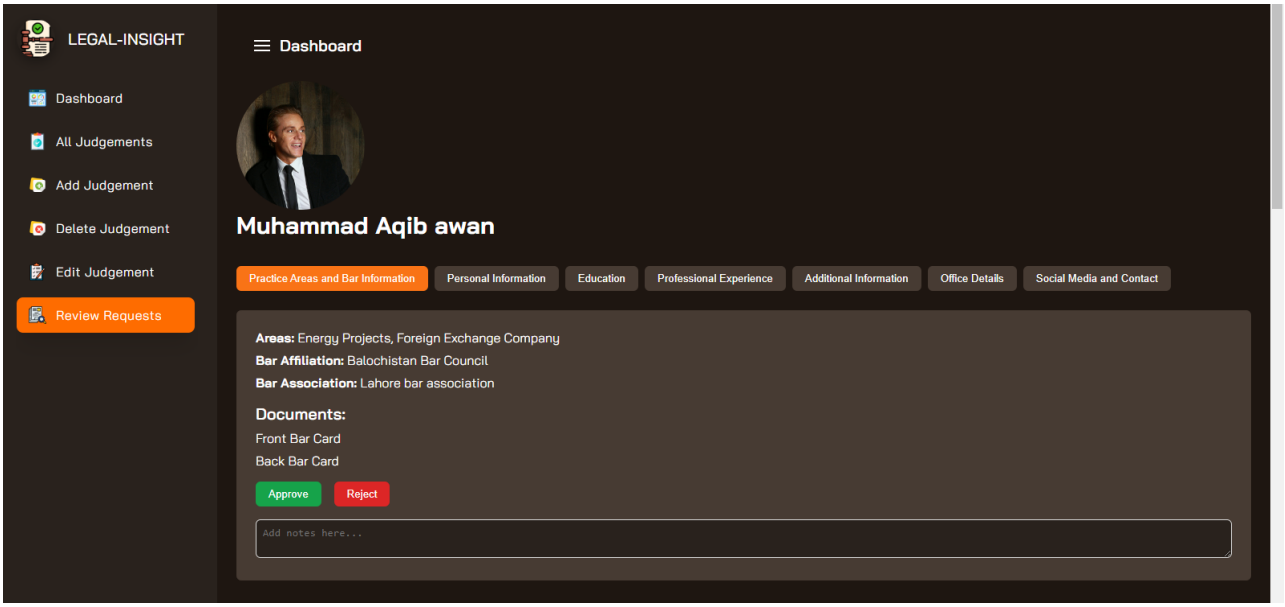

Figure 21: Admin Panel Verify Profile Page

6. Conclusion and Future Work

The Final Year Project (FYP) on the legal management system successfully integrates user-centric design principles, advanced search functionalities, comprehensive lawyer profiling, and robust administrative control to create a dynamic platform for legal case management and lawyer-client interactions. Key achievements include a responsive, user-friendly interface for efficient case law searches, a secure bookmarking system, and interactive lawyer profiles that facilitate client feedback and enhance engagement. The admin panel supports CRUD operations, OCR integration for text extraction, and secure authentication and authorization mechanisms.

Future Work:

Future enhancements could focus on advanced analytics and reporting, machine learning integration for improved search accuracy, and the development of a mobile application to ensure accessibility on-the-go. Additional security measures, integration with external legal resources, and features to facilitate client-lawyer communication will further strengthen the platform. Continuous user feedback and iterative improvements will ensure the system remains responsive to the evolving needs of the legal community, making it an indispensable tool for legal professionals and clients alike.

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