Design and Implementation of Innovative Platform Enhancing Lawyer-Client Communication and Collaboration

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING SONARGAON UNIVERSITY (SU)

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APPROVAL

The project titled **"Design and Implementation of Innovative Platform Enhancing Lawyer-Client Communication and Collaboration."** submitted by, Akib Mozumder Apurbo (CSE2101022121), Rabeya Akter (CSE2001019221), Moriom Akter Akhi (CSE2101022118), and Nahim Islam (CSE2001019050), to Department of Computer Science and Engineering, Sonargaon University (SU), has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering approved as to its style and content.

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DECLARATION

We hereby declare the work presented in this report is the outcome of the investigation performed by us under the supervision of **Md. Ashfakur Rahman**, Lecturer, Department of Computer Science and Engineering, Sonargaon University, Dhaka, Bangladesh. We affirm that no part of this project has been or is being submitted elsewhere for the award of any degree or diploma.

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ABSTRACT

The development of technology is increasing in tune with the times and trends. Online platforms have brought a huge change in human life. In today's fast-changing business environment, it’s extremely important to be able to respond to client needs in the most effective and timely manner. We have created a platform where lawyers and law seekers can easily interact with each other. This project allows viewing various lawyers available and enables registered users to submit their cases instantly using our platform. Both clients and lawyers can contract with each other by audio and video meeting through our platform. Also, a registered lawyer can post his profile like Linkedin, post case results like Linkedin, show his schedule to clients, and sort client evidence files into a different folder. A registered client can view a lawyer list by category-wise lawyer, view a lawyer schedule and book appointments, submit complaints againts any scams, server and client-side scripting techniques, and implementation technologies such as JSX, HTML, CSS, and Javascripts. This is a project aimed at creating a basic website where a lawyer list provides a law seeker and also the technologies used to create such an application. This document will discuss each of the underlying technologies to create and implement this website.

LIST OF ABBREVIATIONS

CPU	Central Processing Unit.
CSS	Cascading Style Sheets.
DBMS	Database Management System.
DOM	Document Object Model.
FTP	File Transfer Protocol.
HTML	Hypertext Mark-up Language.
jQuery	Hypertext Maek-up Language.
React Native	A Progressive Framework.
JSX	JavaScript XML.
PC	Personal Computer.
PHP	Hypertext Pre-Processor.
RAM	Random Access Memory.
ROM	Read Only Memory.
RTP	Real-time Transport Protocol.
SDLC	The System development life cycle.
UI	User Interface.
UX	User Experience.
VI	Visual Instrument.
XAMPP	Cross-Platform (X), Apache (A), MySQL (M), PHP (P).

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CHAPTER 1
INTRODUCTION

1.1. Introduction

Bangladesh is a developing country, Information Communication and Technology (ICT) playing an important role in the development of our country. Not only Bangladesh, the importance of Information Communication and Technology (ICT) behind the development of developed countries in the world is immense. Human life goes through both periods of happiness and sadness. We face various problems at different times in our life, even legal problems. Some legal issues are highlighted like land-related cases, criminal or civil cases, divorce cases etc. To fight these cases we need good lawyers. But finding a good lawyer isn't an easy task. We seek help in various way to resolve cases, such as seeking help from people around us. Some of us go to the Bar Council to find and hire a lawyer, but most of the time we don't find a good lawyer or we fall into the trap of fake lawyers. Even if we get a lawyer, it is most expensive and time-consuming. It is quite a hassle for general people.

Many potential clients begin their search for an attorney online, and our site can make it easy for those potential clients to find the best lawyer in their category. A registered client can easily view lawyer rankings and schedules of preferred lawyers. Clients can easily select their preferred lawyers according to their case category and communicate with each other. And the client can send his case file to the lawyer in PDF format. A client can see the lawyer's book appointment and by contacting the lawyer, a client can hire a lawyer sit at home in a short time and at a low cost. On the other hand, a registered lawyer can post his profile on LinkedIn, post case results, send his schedule to clients, and organize client evidence file into different folders. Our platform is as time-consuming for a client as it is for a lawyer. Our services save a lot of time for both clients and lawyers. Also by introducing our services many new lawyers can find clients and be able to fight those cases. These services have great potential and we hope it will be successful and bring change in the legal field of Bangladesh. Finding lawyer through apps has become very popular these days as people find it convenient and easy to find a lawyer from their home or office. People can save their time and energy by searching for a lawyer online. Lawyers can be easily compared, and law seekers can choose a lawyer according to their favorable conditions, such as price and quality, for their individual needs.

From this thought, we have created a platform where general people can hire a good lawyer from home without any hassle and a lawyer can find clients very easily. Because our platform has provided categorized lawyer list such as tax lawyer, civil lawyer etc. People can easily find lawyers from categorized section as their need.

1.2.Project Overview

Here, we propose an online platform, Lawyer-Client Communication and Collaboration that allows users to register for find specific or multiple lawyers from the system. It is a website that uses multiple functions for both admins, lawyers and users. The system consists of various functionalities. For example Lawyer section, a lawyer can post his profile and case results, see client list, read client case file, send his schedule to client and organize client evidence files in different folders. On the other hand, registered users of the system, once logged in, will be able to

view category-wise list of lawyers, ranking of lawyers and schedule of lawyers, appointment booking, lawyer profile, how many cases the lawyer has won, the users will be able to see, users can send case files and communicate with both via audio/video cal. After that a lawyer can confirm the case from his panel. Lawyer can update case status from his panel. All these details can be viewed by admin in admin panelists.

1.3. Project Background

Searching lawyers online is fast gaining ground as an accepted and used today's paradigm. More and more business houses are implementing websites providing functionality for performing commercial transactions over the web. It is reasonable to say that the process of finding lawyers and submitting cases on the web, lawyer-client communication and collaboration is a new concept that people will be attracted to.

The objective of this project is to create a general purpose where we can aggregate all lawyers according to their rating and category and any lawyer seeker can submit their case to the lawyer of their choice at home through internet. However, for implementation purposes, this paper will deal with an online law firm. An online law firm is a virtual platform on the internet where a law seeker can select a lawyer of his choice. Also, the client can see the ranking, and schedule of the interested lawyer, and after the client submits the pdf of his case, the lawyer can accept that case and fight that case in court. A lawyer can also post his profile and organize client's case documents in different folders. A client can easily communicate with the lawyer through messaging, audio, or video meeting and the lawyer can also communicate with the client and share his schedule.

1.4 Saving Time

The world is developing day by day in almost all sectors in the age of Information and Communication Technology(ICT). Bangladesh is not behind in this modern age. Bangladesh is keeping pace with other parts of the world. People are becoming online dependent day by day and day by day people's needs are also increasing. As people are busy with work, they want to get various services at home to save time. We have built this platform keeping people's time in mind. People need a good lawyer after various legal problems but finding a good lawyer on time is very difficult. Considering these situations, the online finding lawyers in online platforms are being developed world wide which provides opportunities to find a good lawyer at reasonable cost. After submitting a case the user can easily communicate with the lawyer, so that the lawyer can deal with his case. As a result, they can save a lot of time.

1.5. Best Lawyer Finding

Every legal matter requires the use of an attorney. On our way, we encountered various legal problems big and small at various times. For example, land issues, many small and big criminal legal problems have to be approached before the court. Anyone involved in legal disputes, challenges or contracts in such situations can help us but dealing with these situations without the advice of a lawyer is difficult and risky.

At present, people are more curious and interested in the popular things bought and used by the people. They become fascinated by these things. So many people search for the best lawyer and try to pick him for his case. From our site, a user can find the best lawyer by seeing user reviews and ranking. So, users can easily find a good lawyer.

1.6. Importance of Communication & Collaboration in Legal Services

Communication and collaboration are fundamental in providing high-quality, efficient, and client-focused legal services. They help to prevent errors, ensure consistency, and ultimately contribute to better legal outcomes. In fighting a case, a lawyer must know from his clients all the intricacies related to their case. Knowing all the issues related to their case from the client makes it easier for the lawyer to fight the case. Considering the aspect of lawyer-client communication, we have created a platform where a lawyer and client can easily communicate with each other through video, and audio meeting on our platform. A lawyer can share the schedule to his client and a client can see lawyer schedules and book available ones. Also, a client can easily find a good lawyer of choice by looking at the lawyer ranking according to their case category and a lawyer can assign and organize PDF files under client's name which will keep the client's files safe and easy to find. After winning a lawyer can post the result of the case and update the profile and put the verification link. These benefits make our platform easy for a lawyer to find a client and for a client to find a good lawyer.

Open transparent communication helps in establishing trust, which is critical in maintaining a strong attorney-client relationship. Which is possible through our platform. So, in view of the above advantages it can be said that our platform will help establish legal communication and collaborative platforms for legal services for both lawyer and client.

1.7. Project Objectives

A project objective describes the desired results of a project, which often includes a tangible item. An objective is specific and measurable and must meet time, budget, and quality constraints. A project may have one objective, many parallel objectives, or several objectives that must be achieved sequentially. The lawyer-client communication and collaboration system’s objective is to ensure the client’s best interest in finding authentic lawyers having star client reviews. Also facilitates user and lawyer communication with each other and a lawyer can organize client documents in PDF files under the client's name so that the documents are safe and easy to find.

1.8.Aim and Scope of the Project

This project aims to develop a lawyer-client Relationship Management(CRM) system that enhances communication, collaboration, and case management between lawyers and clients. The platform will help clients find lawyers according to their case category, clients can see lawyers schedules and book available ones, post cases to hire lawyers, and send PDF files to lawyers. For lawyers, will help lawyers update their profiles, post case results, and organize and secure client case files. And will ensure communication with both the client and lawyer through video, and audio meeting. The overall goal is to improve the efficiency of legal practices, foster better lawyer-client relationships, and simplify case-related workflows through a secure and user-friendly digital interface.

CHAPTER 2
BACKGROUND

2.1. Introduction

When we create a website, we need to have knowledge of different programming languages and tools, know their proper use, and design. Various such tasks have to be performed. For example, PHP scripting, Framework, HTML, CSS, JavaScript, Bootstrap, and many other tools may be required to test a website. It is mandatory to use programming languages and tools for developing any website.[1] Our Lawyer-Client Communication and Collaboration CRM system has been developed using PHP, HTML, CSS, JavaScript, JSX,.Bootstrap and MySQL.

This project will save time for both lawyers and users. Helping clients find a good lawyer in less time. Both lawyers and users can communicate with both by audio, and video meeting. A platform useful for a lawyer will also help the lawyer find clients and keep client documents safe. So, our platform will facilitate legal services.

2.2. Languages and Tools

2.2.1. PHP

PHP (Hypertext preprocessor) is a widely-used, open-source scripting language designed specifically for web development. It is embedded within HTML and allows developers to create dynamic web pages and applications. PHP is primarily used for server-side scripting, which means the code is executed on the server and then sent to the user's browser, allowing for the generation of dynamic content.

PHP is commonly used in combination with front-end technologies (like HTML, CSS, and JavaScript) and databases (such as MySQL or MariaDB) to create feature-rich web applications.

2.2.2. React Native

React Native is an open-source framework developed by Facebook that enables developers to build mobile applications using JavaScript and React. It allows you to write apps for both iOS and Android using a single codebase, providing a cost-effective and efficient way to develop cross-platform mobile applications. Cross-platform, Native Components, Hot Reloading, JavaScript and React, Large Community and Ecosystem, and Performance are the key features of React Native.

React Native uses a bridge to interact with native platform components. Your JavaScript code runs in a JavaScript thread and communicates with the native components through the bridge, making it possible to leverage platform-specific APIs and features.

React Native makes mobile app development faster and easier, especially for developers familiar with React, allowing them to write apps that perform close to native apps while sharing a common Codebase across platforms.

2.2.3 HTML

HTML (HyperText Markup Language) is the standard language used to create and structure content on the web. It defines the structure of web pages by using a system of tags or elements. HTML is the backbone of web content, allowing browsers to display text, images, links, and other multimedia.

HTML is a fundamental component of the web and is used in many ways, including. Web page, Web document creation, Internet navigation, Game development, and web documentation.

HTML works alongside CSS (Cascading Style Sheets) for design and JavaScript for interactivity.

2.2.4. CSS

CSS (Cascading Style Sheets) is a style sheet language used to control the presentation of HTML or XML documents. It allows web developers to define the visual appearance of elements on a web page, including colors, layouts, fonts, spacing, and more. CSS separates the content (HTML) from its presentation, making it easier to maintain and update the design of a website.

CSS enhances the design and layout of HTML content by applying styles. Styles are applied via selectors and declarations. You can use inline, internal, or external CSS. Key concepts include the box model, cascading, specificity, and responsive design. CSS provides powerful layout and design tools such as Flexbox, Grid, media queries, and animations.

By mastering CSS, you can control the appearance of web pages, creating user-friendly and visually appealing designs.

2.2.5. JavaScript

JavaScript is a versatile, high-level programming language that is widely used in web development. It enables interactive elements and dynamic content on websites. JavaScript can be used both on the client-side (in the browser) and on the server-side (using an environment like Node.js). Variables are not bound to specific types and can change type dynamically during execution. JavaScript is often used to create interactive web pages by responding to inputs, such as clicks or key presses. JavaScript allows asynchronous execution using mechanisms like callback, promises, and async/await to handle tasks like HTTP requests without blocking the execution of other code. JavaScript supports both object-oriented programming(OOP) and functional programming styles. Web development, Server-Side development, MobileApp development, and Game development are the common use cases.

JavaScript is an essential language for modern web development. It has a rich ecosystem of libraries and frameworks, making it suitable for a wide range of applications, from front-end interfaces to back-end server management.

2.2.6.JSX

JSX (JavaScript XML) is a syntax extension for JavaScript commonly used with React. It allows developers to write HTML-like code within JavaScript files, making it easier to build and manage the UI components of a web application. JSX allows you to write elements and components in a format similar to HTML. You can embed JavaScript expressions inside JSX by wrapping them in curly braces{}. JSX uses camelCase for HTML attributes. Browsers don’t understand JSX directly.

Tools like Babel compile JSX into regular JavaScript that can be run in a browser. JSX can be used with JavaScript control structures like if-else and loops. JSX is commonly used in React to define components. AComponent in React can return JSX to describe what should be rendered.
JSX helps make React code more readable and maintainable by keeping the structure of the user interface (UI) close to the code that controls it.

2.2.7. Bootstrap

Bootstrap is a free and open-source front-end framework used for developing responsive and mobile-first web applications. It was originally created by Twitter and is now maintained by a community of developers. Bootstrap provides pre-designed CSS, JavaScript, and HTML components that help developers quickly build aesthetically pleasing, functional, and consistent user interfaces. A flexible 12-column grid layout system to structure web pages, ensuring responsive design across different screen sizes. Ready-made components like navigation bars, buttons, forms, modals, carousels, and more that you can customize and use immediately. Built-in media queries allow for smooth adjustments to different screen sizes, making the web page responsive across desktop, tablet, and mobile devices. A collection of plugins such as tooltips, popovers, modals, dropdowns, and carousels that extend the functionality of the framework. While Bootstrap provides a set of default styles, it is highly customizable, allowing you to modify or override the default setting to fit your project's needs. Ensure consistency across various browsers. Bootstrap is widely used in web development because it speeds up the design and development process.

2.2.8 jQuery

jQuery is a fast, small, and feature-rich JavaScript library. It simplifies things like HTML document traversal and manipulation, event handling, animation, and Ajax interactions for rapid web development. It was designed to work across different browsers and has become one of the most widely used JavaScript libraries on the web. Easily select elements, modify them, and manipulate the structure and content of a web page. Handle events like clicks, mouseovers, form submissions, etc more cleanly. jQuery provides methods for basic animations like hiding, showing, fading in/out, etc. It makes it easy to send asynchronous requests to the server and update parts of the web page without reloading. jQuery helps handle cross-browser issues by abstracting away inconsistencies between browsers.
While jQuery was incredibly popular in the past, its usage has decreased in recent years with the rise of modern JavaScript frameworks like React, Angular, and Vue, which offer more comprehensive solutions for building web applications. However, jQuery is still in use in many legacy systems and smaller projects.

2.2.8. MySQL Database

A database is a structured collection of data that is stored and managed in a way that allows for efficient retrieval, updating, and management. Databases are commonly used in software applications, websites, and businesses for storing and handling large amounts of data. Other kinds of data stores can also be used, such as files on the file system of large hash tables in memory but data fetching and writing would not be so fast and easy with those types of systems.[1] MySQL is a fast, easy-to-use RDBMS being used for many small and big businesses.[1] The use of MySQL is increasing day by day. MySQL is a popular platform.

MySQL is an open-source Relational Database Management System (RDBMS) that uses Structured Query Language (SQL) to manage and manipulate data stored in a database. It's widely used for web applications and data management systems because of its reliability, speed, and flexibility. A collection of related data. In MySQL, you create a database to store tables, which in turn hold data. A table is a collection of rows and columns that has a specific data type (like integer, string, date) and holds a particular type of information. A single data entry in a table is often referred to as a "record". A vertical set of data values, each corresponding to a particular field in a record. Creating a database, creating tables, inserting data, updating data, deleting data, etc are the operations of MySQL. Using MySQL can handle large amounts of data, free to use and modify, large communities and resources. Runs on various operating systems, including Linux, Windows, and macOS.

2.2.9. XAMPP

XAMPP is a free open-source software package that provides a simple and easy-to-install distribution of Apache, MySQL, PHP, and Perl. It is primarily used for web development and local server testing, allowing developers to run a server on their local computer without needing to set up a complex environment. Apache is a web server that serves web pages to clients. MySQL database management system used to store and retrieve data for web applications. PHP server-side is used as a scripting language for creating dynamic web content. Perl is a high-level programming language, often used for system administration tasks, web development, etc and phpMyAdmin is a web-based interface for managing MySQL databases.

XAMPP is user-friendly, with an easy-to-use control panel that simplifies the process of starting and stopping services. It can be run on Windows, macOS, and Linux, making it highly portable. Ideal for testing PHP applications locally before deploying them to a live server.

2.2.10. Visual Studio Code

Visual Studio Code (VS Code) is a lightweight, open-source code editor created by Microsoft. It's designed for developers who need a versatile, customizable, efficient tool for writing and editing code. While it's not a full-fledged integrated development environment (IDE), its flexibility and extension support allow it to function like one, catering to various development needs. VS code is available on Windows, macOS, and Linux, making it accessible to a broad audience of developers across different operating systems. It supports a wide range of programming languages out of the box like JavaScript, TypeScript, Python, C++, HTML, CSS, and more, and can easily be extended to support many more languages through extensions. VS Code has a built-in terminal that allows developers to run commands directly from the editor. VS Code has a vast marketplace of extensions that enhances its functionality. Extensions range from language support to debuggers, linters, themes, and more. It provides a powerful debugging feature that allows you to debug code directly within the editor. VS Code offers integrated Git support, Which helps in version control directly from the editor. This is a code completion feature that helps in writing code faster by suggesting code completions, parameter info, and other relevant information. You can customize the appearance and functionality of VS Code with themes, keyboard shortcuts, and settings.

VS Code is an extremely popular choice for developers because of its speed, flexibility, and wide range of features. It combines the best aspects of a code editor and a lightweight IDE, making it suitable for both small projects and large-scale development. Whether you're a beginner or an experienced developer, it offers a great balance of ease of use and powerful functionality.

2.3. Review website Quality

To review a website's quality, assess factors like its design, usability, content relevance, mobile responsiveness, loading speed, SEO optimization, navigation ease, clear action, and overall user experience, considering the target audience and the website's primary purpose, use tools like PageSpeed Insights to measure technical performance and identify areas for improvement.

Key aspects to evaluate:

- **Serviceability[1**]:
  Serviceability or maintainability refers to the ability of a website to be easily and efficiently **Changed, Expanded, Updated, and Fixed**. This ensures the site remains functional, secure, and adaptable to evolving needs, providing a seamless user experience and minimizing downtime or disruptions.

- **Design and Aesthetics:**
  A well-designed aesthetic integrates branding, clarity, and optimized elements to create a visually appealing, functional, and engaging user experience.

- **Content Quality**
  Content quality is how well your content achieves its goal. It refers to the depth of information and insight within a piece of content. Content quality goes beyond information to include formatting, readability, and grammatical correctness.

- **Usability:**
  Usability creates a seamless user experience by ensuring intuitive navigation, easy access to search functions, clear and functional forms with effective call-to-action buttons, and a consistent user interface. These elements help users interact with the product or website efficiently and without confusion, enhancing overall satisfaction and usability.

- **Technical Performance**:
  Optimizing technical performance aspects ensures a website that is fast, secure, and accessible across different devices and browsers, leading to improved user experience and higher engagement.

- **SEO Optimization:**
  Effective SEO optimization focuses on using the right keywords, optimizing on-page elements like meta descriptions and title tags, and building a strong backlink profile to boost website ranking and visibility.

- **Social media integration:**
  Active social media presence and sharing buttons on website content.

2.4. Accessibility

Website accessibility refers to the design and development of a website in such a way that it can be easily used by all individuals, including those with disabilities. This encompasses a range of guidelines and best practices to ensure that people with varying abilities can navigate, understand, and interact with web content effectively. To assess website accessibility, various tools and automated tests, like WAVE, Lighthouse, or AXE can be used to check for compliance with accessibility standards and guidelines. If there is a query or problem with someone visiting the website, they do not have to look for customer service options. This should be available readily. It makes the visitor feel uneasy when customer service is unreachable. Two forms of users are accessible on this website. One user is non-registered and another user is registered. Both users can read comments, but non-registered users can't comment and can't rate, but ratings and comments can be given by registered users as feedback.

2.5. Privacy and Security

Protecting privacy and security is important for a platform or website. Websites often collect sensitive information from users, such as personal details, login credentials, etc. If privacy and security measures are not in place, this data can be exposed to unauthorized access, leading to identity theft, financial loss, or privacy violations. Many regions have laws and regulations (e.g. GDPR, CCPA) that require websites to protect user data. Failing to comply with these regulations can result in legal consequences, fines, and damage to the website's reputation. A website that prioritizes privacy and security is more likely to gain users' trust. Visitors are more likely to interact with a website and make purchases if they feel confident that their data is being handled responsibly. Websites are targets for cyberattacks, such as hacking, phishing, and malware attacks. Robust security measures, like SSL encryption, firewalls, and regular updates, are essential to safeguard against these threats and ensure the integrity of the site. A breach of privacy or security can severely damage a website's reputation. Users may avoid the site in the future, and negative media coverage can harm the brand. Trust, once lost, is difficult to regain. Cyberattacks, especially those targeting payment systems or user data, can lead to direct financial losses for both the website owner and users. Securing payment gateways and ensuring encryption can mitigate these risks. The privacy and security of a website not only protect users' sensitive information but also ensure the long-term success and integrity of the site itself. This website is independent of the platform. It can easily be used by both buyers and sellers. This website does not store any user data or any personal data or any personal data and never promotes any form of brand.

CHAPTER 3
METHODOLOGY

3.1. Introduction

The introduction of a methodology in research outlines the approach and techniques employed to collect, analyze, and interpret data in a study. It serves to explain how the research was conducted and provides justification for the chosen methods. The goal is to ensure transparency, allowing readers to assess the validity and reliability of the research findings. This section provides readers with an understanding of how the research was carried out and ensures the study's findings are robust and credible.

3.2. Agile Software Development Model

The Agile model is a flexible, iterative approach to software development that emphasizes collaboration, customer feedback, and rapid delivery of small, working software increments. Agile methodologies prioritize adaptive planning, continuous improvement, and flexibility, ensuring that developers can respond to changing requirements throughout the project lifecycle. Work is completed in short cycles, typically lasting one to four weeks. Developers, designers, and stakeholders work closely together, ensuring that the project meets customer needs. Regular feedback from the customer helps ensure the product meets expectations and allows for adjustments as the project progresses. Focus on delivering the simplest solution that works. Agile allows for changes in project scope or direction, even late in development. The following illustration is a representation of the Agile model.



Figure 3.1: Agile Software Development Model.

Agile process phases, define the high-level requirements, vision, and scope of the project. Breaks the project into smaller deliverables with clearly defined goals. Works on specific features or components, including integration, system, and acceptance testing. Put a version of the software into production or deliver it to the client. After each iteration, the team reviews the work done, gathers feedback, and reflects on improvements for the next iteration. This model ensures the work is delivered frequently in small, manageable increments, allowing teams to adjust quickly to changes and deliver high-quality software more effectively.

3.3. Proposed Methodology

The proposed methodology typically outlines the approach, steps, and techniques you plan to use to achieve the project's objectives. Where you demonstrate the feasibility of your project by detailing your experience and resources that will be drawn upon to carry out the project.

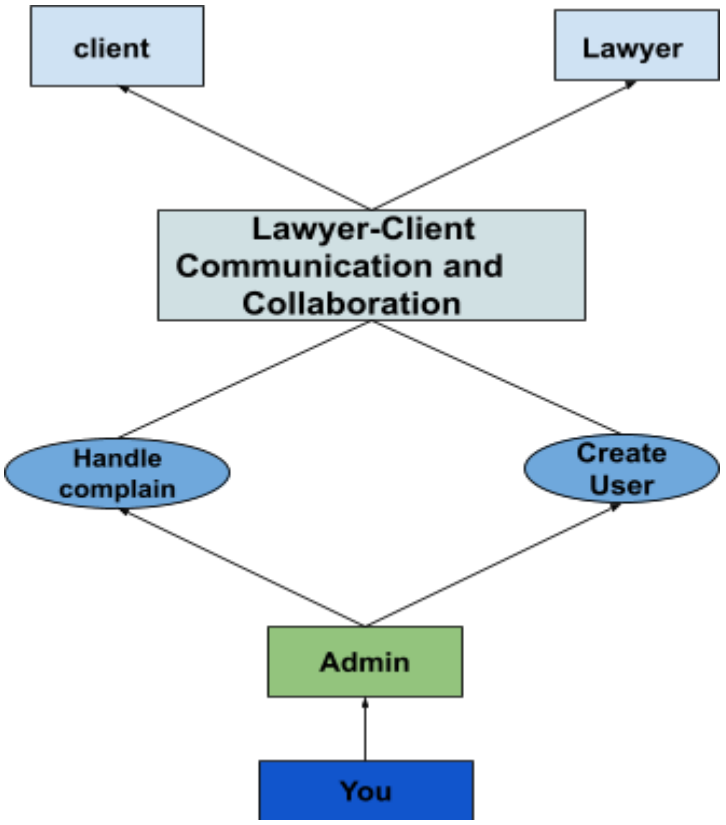


Figure 3.2: Proposed Model.

A proposed methodology offers a systematic approach to how the software project will be executed. This includes planning, design, development, testing, and maintenance phases. A clear methodology helps the project team stay on track and ensures consistency throughout the development process. A well-defined methodology helps clarify the roles and responsibilities of the project team, each with specific tasks. This clarity improves communication and accountability. The methodology provides a framework for planning and estimating resources, time, and budget. For instance, using methodologies like waterfall or Agile gives clear milestones and deliverables that help the project managers track progress and manage expectations with stakeholders. By selecting a methodology

that aligns with the project's needs, potential risks can be identified and mitigated early. For example, Agile's iterative approach allows for continuous feedback and adjustments, reducing the likelihood of major failures at the end of the project. A clear methodology promotes communication between stakeholders, developers, and testers. It establishes regular checkpoints, Which ensures everyone is aligned and informed throughout the project. The methodology defines how quality will be assured throughout the project. Different methodologies offer different levels of adaptability. Agile, for example, is known for its flexibility and ability to adapt to changing requirements. If your project needs to accommodate changes, an Agile approach would allow for quick pivots. When the methodology is defined and communicated properly, it ensures transparency in the project's progress. A methodology helps align the project with stakeholder expectations. It helps to establish a clear timeline, scope, and deliverables that stakeholders can agree upon. These misunderstandings or misalignments as the project progresses. Many modern software as Agile encourage continuous improvement by reflecting on what went well and what didn't after each iteration. This focus on learning from each phase helps in improving both the process and product over time.

A proposed methodology is essential for a software project as guides the team through structured development processes, ensures efficient resource management, facilitates, quality control, and allows the project to stay aligned with the business goals and expectations. It forms the backbone of successful software development by providing a systematic, repeatable approach to delivering a working, reliable product.

3.3.1. Admin Interface

The Admin interface of software refers to the user interface or dashboard designed for system administrators or users with elevated privileges to manage and configure various aspects of the software or application. The Admin interface of a lawyer-client communication and collaboration CRM is crucial for managing the platform's operations, ensuring smooth communication, and maintaining system integrity. The admin panel will be used by platform administrators to oversee users, cases, appointments, schedules, and more. Admin should be able to view, add, update, or delete users. Admin can see user roles and their profile status. Admin can view all cases, including the case description, client, lawyer, status, and result. Admin can update the case status. Admin can manage case results. Admin can view, approve, or cancel appointments between lawyers and clients. Admin can monitor the schedule of all lawyers and ensure that no appointments conflict. Admin can view and download all files uploaded by clients and lawyers. Admin should be control over who uploads files and can remove inappropriate or unwanted files. Admin can view, add, update, or delete lawyer schedules. Admin ensures that lawyer schedules are accurate and updated. Admin should have access to reports such as total number of appointments, etc. Admin can also track platform activity. The Admin ensures smooth operations for both lawyers and clients while maintaining the integrity of the Platform. The Admin interface is a powerful tool to provide control, configuration, and management capabilities, ensuring the software functions optimally and securely. It is typically designed with a focus on usability, offering admins the ability to perform complex tasks with ease.

3.4 System Planning

System planning is crucial for project development because it sets a clear foundation for the entire project. System planning helps define the goals and scope of the website, ensuring that the development team understands what needs to be built and what problems need to be solved. It allows for the identification of the identification of the resources required for development, making sure the project stays within budget and timeline constructions. Planning helps anticipate potential risks and challenges, enabling the development team to devise strategies for mitigating them. A well-structured plan streamlines the development process, preventing unnecessary rework and delays by providing clear guidelines and milestones. It aligns the team and stakeholders on the project's vision and progress, fostering better communication and expectations management. Proper planning considers future scalability and long-term maintenance of the system, reducing the risk of creating software solutions that is hard to modify or extend. In the Lawyer-Client Communication and Collaboration project, we worked for 90 days. In the initial phase, discovery and planning take 30 days. 27 days, prototype development of the proposed project begins. After the entire project development started in the next semester and continued till the examination phase. The system is debugged to resolve any errors found during testing. The feedback we received from system testers, was collected and used as system reference. System planning provides the blueprint that ensures the development process is systematic, focused, and successful.

3.5. System Analysis

System analysis is the process of studying and understanding a system, its components, and its functioning, with the aim of improving or redesigning it to meet specific needs or resolve problems. A website system analysis ensures that all aspects of the website are carefully planned, functional, and aligned with the needs of the stakeholders. It involves both technical and non-technical considerations, from designing the interface to implementing back-end architecture and ensuring security. It helps in gathering and understanding the functional and non-functional requirements of a website, ensuring it meets user and business goals. Through system analysis, you can identify usability issues, improve user experience, and ensure that the website design is intuitive and easy to navigate. Analysis helps assess the website's performance, identify bottlenecks, and optimize speed, which is critical for user relations and search engine ranking. It helps identify potential security vulnerabilities, ensuring that user data and the website are protected against attacks. Analyzing the system ensures that the website can scale efficiently as traffic grows and simplifies future updates or modifications. It helps in identifying and fixing technical issues or bugs that may affect functionality, thereby improving the overall reliability of the website. System analysis is crucial for ensuring that a website functions optimally, meets business objectives, provides a positive user experience, and is secure and scalable.

3.6. Requirements Analysis

Requirement Analysis is the process of identifying, understanding, and documenting the needs and expectations of a software system. It is a critical phase in software development, as it establishes a clear understanding of the user needs and ensures that the software is built to meet those needs. This phase is crucial in the software development lifecycle as it helps in translating the client's needs into clear, actionable requirements that guide the design, development, and testing of the system. By

conducting a thorough requirement analysis, the development process becomes more structured and efficient, ultimately leading to a software product that meets user expectations and business goals.

3.7. Hardware and Software Requirements

Hardware

- Intel ® Core(™) i3-10100, CPU 3.6 GHz or above
- GB RAM
- 1000GB Hard Disk Drive (HDD)
- Monitor

Software

- Mozilla Firefox
- XAMP
- Visual Studio Code and Notepad

The hardware and software requirements for a software application define the necessary system configurations to run the software efficiently. Hardware requirements define the physical components needed to run the software. Software requirements define the operating systems, libraries, and other tools needed for the software to run effectively.

3.8. User Data Flow

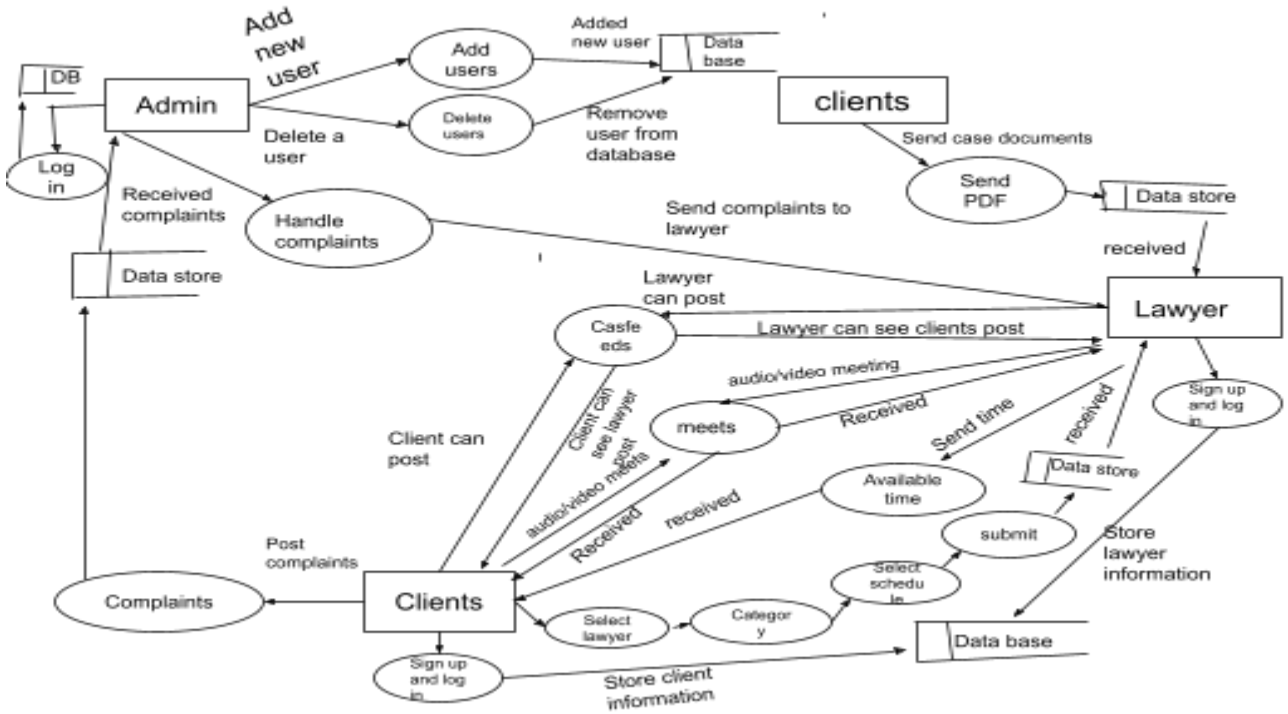


Figure 3.3: User Data Flow for Lawyer-Client Communication Collaboration Website.

The assessments in the dataset consist of attributes such as Registration, Login, Case Submit, Rating.

3.8.1. User

The Lawyer-Client Communication and Collaboration platform has two user sides, one is the client and the other is the lawyer. From the client side, the client can select the lawyer, have an audio and video meeting with the lawyer, post the case and show the posted case in the lawyer panel, and send the case papers to the hired lawyer in PDF format. From the lawyer's side, a lawyer can assign the client's case file in a folder under the client's name, talk to the client in audio and video meetings, post the result of the case after winning, update the profile, and put a verification link on the profile. Lawyer's profile, verification link, and posted case results will show in client panel.

3.8.2. Admin

The Administrator is a technical professional who manages the design, development, maintenance troubleshooting of a website. Administrator can handle user add, user delete, and user complaints on the platform. The admin procedure is as follows:-

- **Add User**
  Admin navigates to the "users" section, fills out a form with user details (name, email, role, etc.), and clicks "Add user" to create a new user.

- **Delete User**
  Admin searches for the user in the user list, click a "Delete" button, confirms the action, and the user is removed from the system.

- **Handle Complaints**
  Admin accesses the "complaints" section, reviews submitted complaints, takes appropriate action (e.g. resolve, forward to another department), and marks the complaints as resolved.

CHAPTER 4
SYSTEM DESIGN AND CODING STRUCTURE

4.1. Introduction

System design and coding structure are both fundamental to the success of a software project. Both system design and coding structure are critical for building high-quality, reliable,scalable software. The system design provides the strategic framework, addressing how different parts of the system will work together, while the coding structure deals with how the implementation will be executed efficiently, ensuring that the software is maintainable, readable, and extendable. When combined, they result in software that is easier to develop, maintain, and scale while reducing errors, enhancing performance, and improving collaboration.

System design refers to the process of defining the architecture, components, modules, interfaces, and data for a software system to meet specific requirements. Proper system design ensures that the software can handle increasing loads or user demands as it grows. Without a solid design, the system might not scale effectively, leading to performance issues or crashes. A well-designed system is easier to maintain and update. It allows developers to make changes with minimal disruption, reducing the risk of introducing bugs when enhancing features or fixing issues. System design helps to optimize the use of resources and improves the overall performance of the software. A thoughtfully designed system considers security from the start, protecting sensitive data and preventing unauthorized access, minimizing vulnerabilities. The system design provides a blueprint that helps ensure a software system is robust, efficient, secure, and adaptable to future needs. Some of the activities that need to take place during the design phase are:

- Design the application
- Design and integrate the network
- Design and integrate the database
- Create a contingency plan
- Review the design
- Articulate the business processes and procedures
- Establish a transition strategy
- Review final design

4.2. System Architecture Design

System architecture design refers to the process of defining the structure, components, and interactions within a system to ensure it meets both functional and non-functional requirements. Software architecture design is the process of defining the high-level structure of a software system. It ensures that the development team has a clear blueprint to follow, reducing confusion and enhancing collaboration. A well-designed architecture makes it easier to adapt to future changes or requirements and reduces technical debt. ther team members about how the system is structured and how components work together. By considering architectural concerns early in the process, you can anticipateand address risks related to performance, security, and scalability.

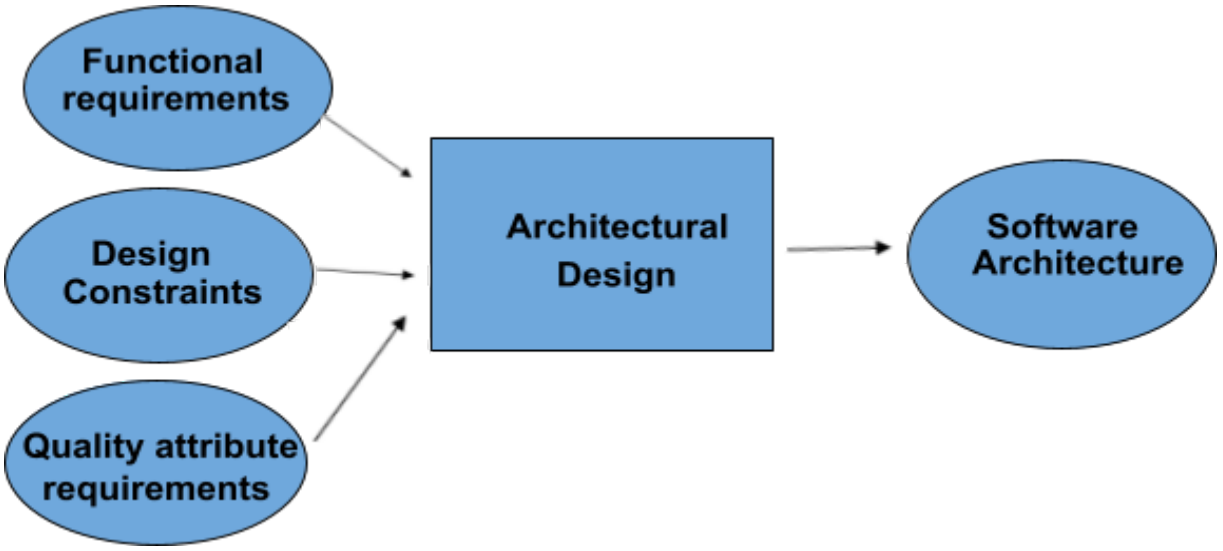


Figure 4.1: Software Architecture Design.

System architecture design is a critical phase in building complex systems. It involves defining key components, data flow, scalability, security, performance, fault tolerance, and integration with other systems. The goal is to ensure the system is reliable, efficient, scalable, and maintainable, while also optimizing for future growth and changes.

4.3. Database

An organized collection of data that is typically kept and accessible electronically via a computer system is called a database. Formal design and modeling techniques are frequently used to construct databases that are more complicated. The software that communicates with applications, end users, and the database itself in order to collect and analyze data is known as the database management system (DBMS). The essential features offered to manage the database are also included in the DBMS software. It is possible to refer to the entire database, DBMS, and related applications as a "database system." A database system, database application, or any of the DBMS are frequently referred to by the general term "database."

Relational databases became dominant in the 1980s. These model data as rows and columns in a series of tables and the vast majority use SQL for writing and quesrying data. In the 2000s, non-relational databases became popular, referred to as NoSQL because they use different query languages.

4.3.1. Database name

Database name is set as ‘la’ according to the name of the project ‘Lawyer-Client Communication and Collaboration’. The database is designed according to the project development and system analysis. The tables are created under the database to store the products with details and handle all the valuable information for the administrative and users. In table “users”, it has 3 roles: admin,

client and lawyer. Only clients and lawyer can sign up and register. The database consists of following tables-----

- **Users**
- **Complaints**

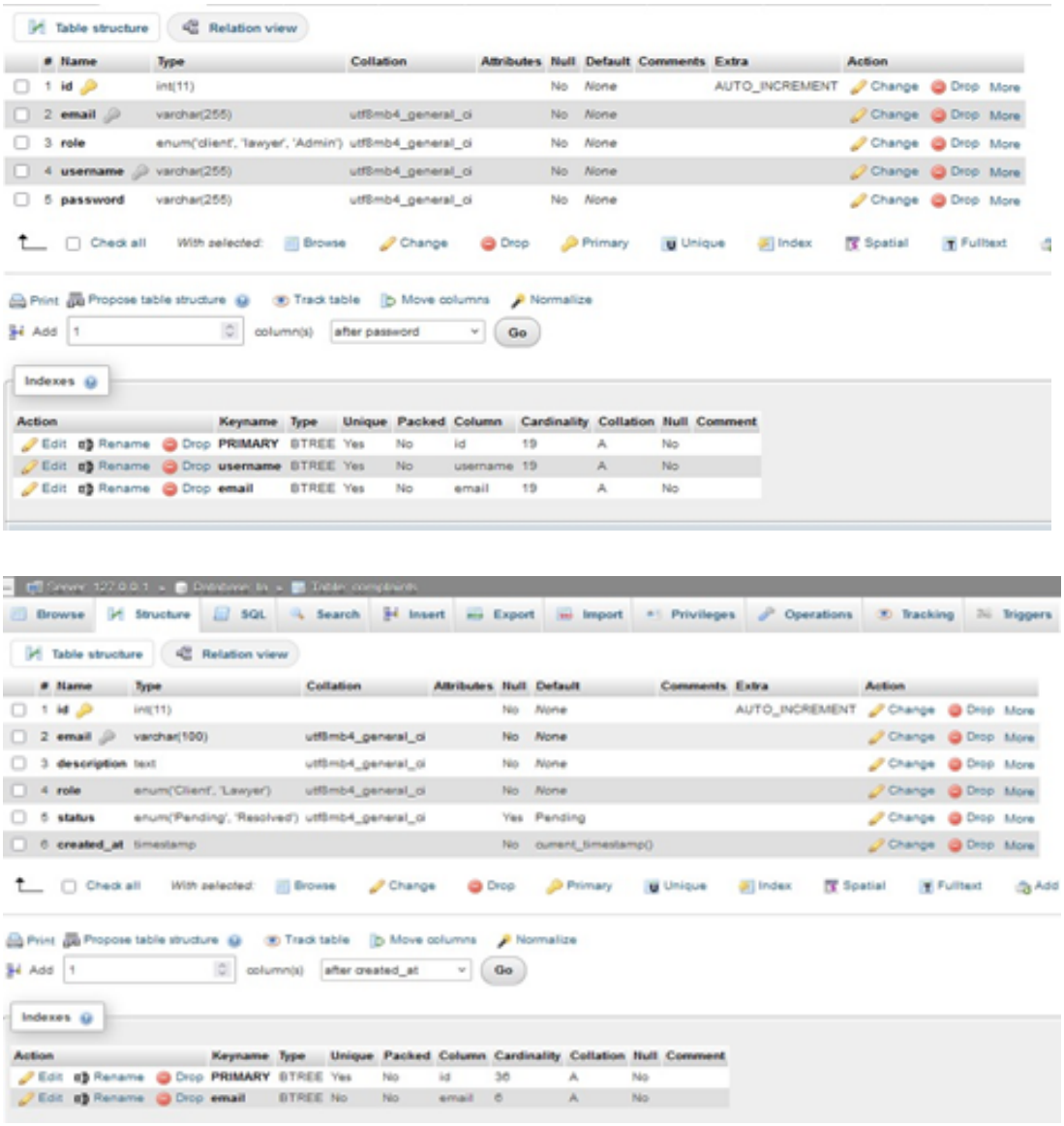


Figure 4.2: Database Design.

4.4. User as Lawyer Sign up and login

Lawyers must register first to access the Lawyer page. This function has been developed for secure login. For password entry. User would need to add his email, Name and password. He would be able to perform this operation in the following pages.

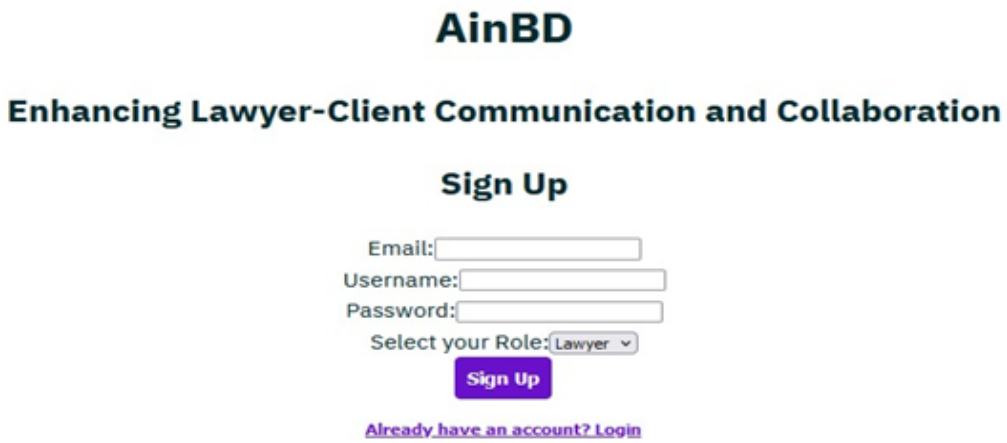


Figure 4.3: Lawyer Registration, Login**.**

4.5. User as Client Sign up and login

Client can easily check and view the lawyer details by visiting our website with creating an acoount. But before posting a case to a case feeds a new client must register using required information and then login in the website. The user will be able to register and login in the same page respectively by just selecting the role.



Figure 4.4.Client Registration and Login page.

4.6. Home Page

Once any user visits the Find Lawyer site, he can see Law related feed and the specific news. Client can also see the Senior lawyer list by category wise top 10 lawyer list, login/registration and contact option. From this section the user can submit a case and post it with a cover letter and necessary information.

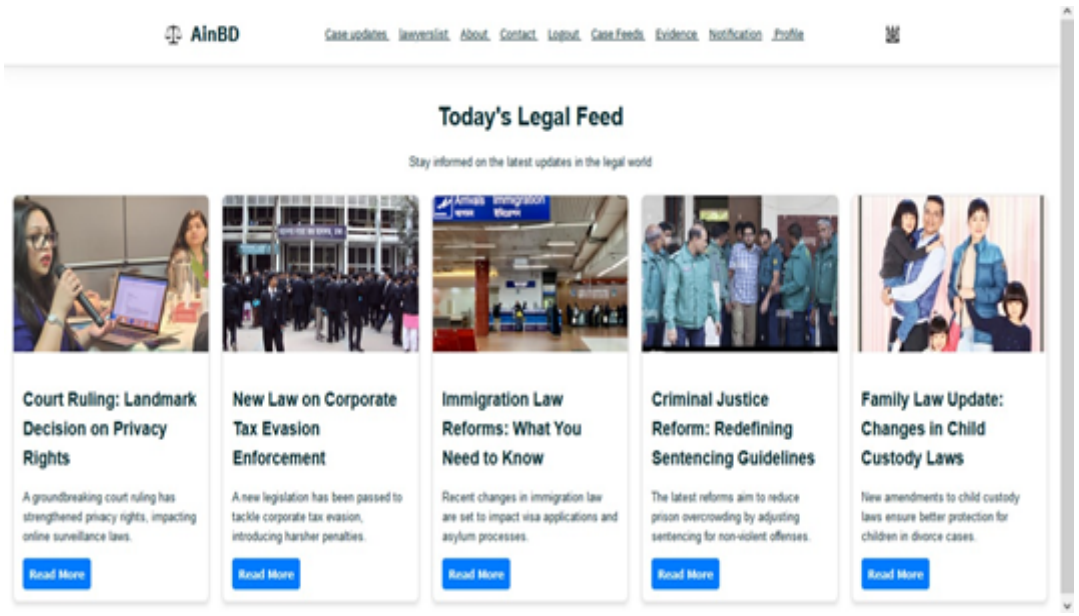


Figure 4.5: Find Lawyer Home Page.

4.7. Top 10 lawyers list by rating

In this list we have used Dynamic Rating. Through this rating we have ranked lawyers. To make this rating we have used.

- Client feedback
- Case winning rate and
- Educational qualification

According to the average rating, we have shown the top 10 categories.

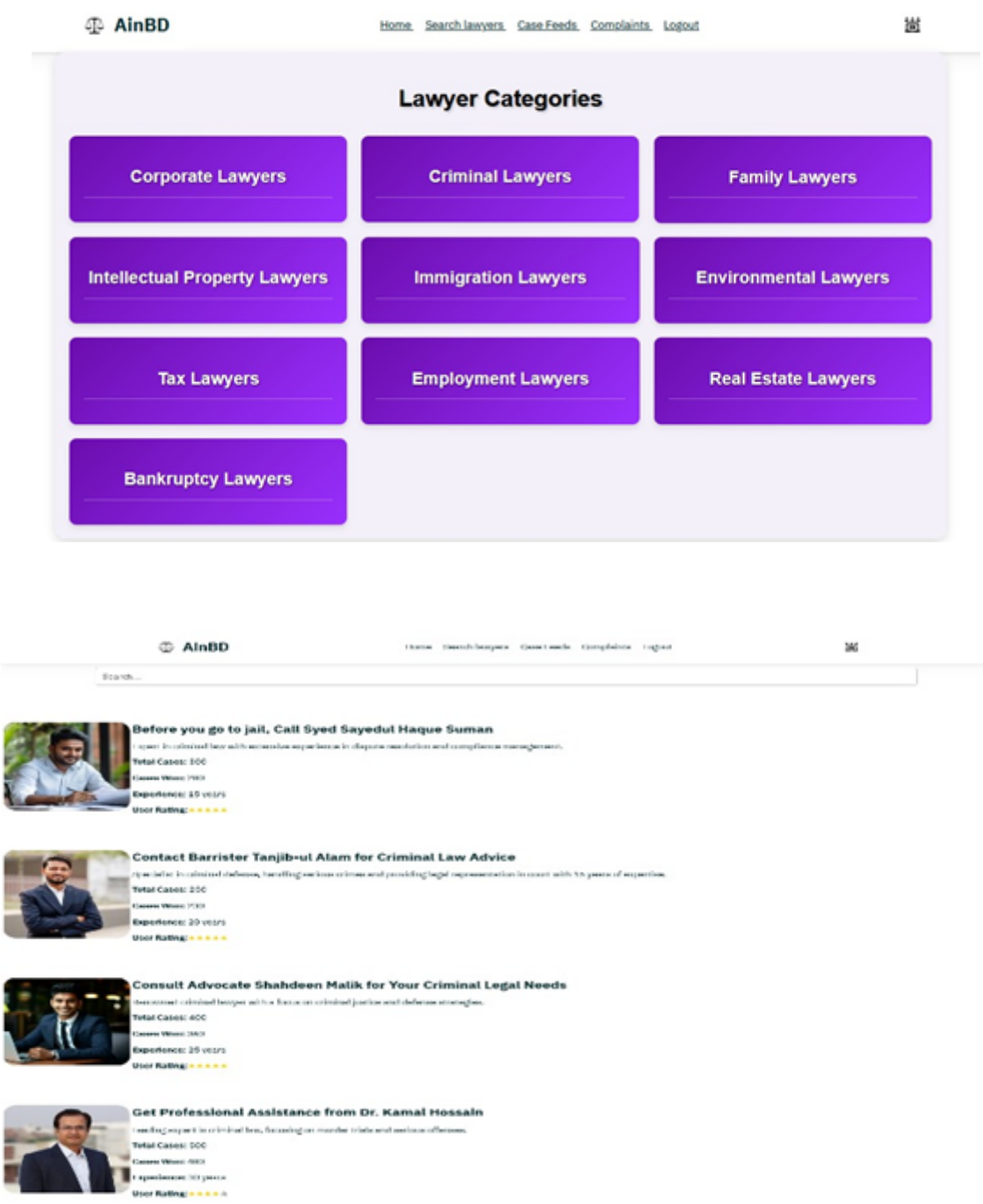


FIgure 4.6: Top Categories to choose lawyer.

4.8. Case Submit to Feeds

Submit case is an important feature of this project. Users can submit a case to all lawyers from this site. To submit a case, user have to login first as client. Without login, users can't submit any case.

User will submit the case with a cover letter and add his personal contact number in post so lawyers can get back to him/her.

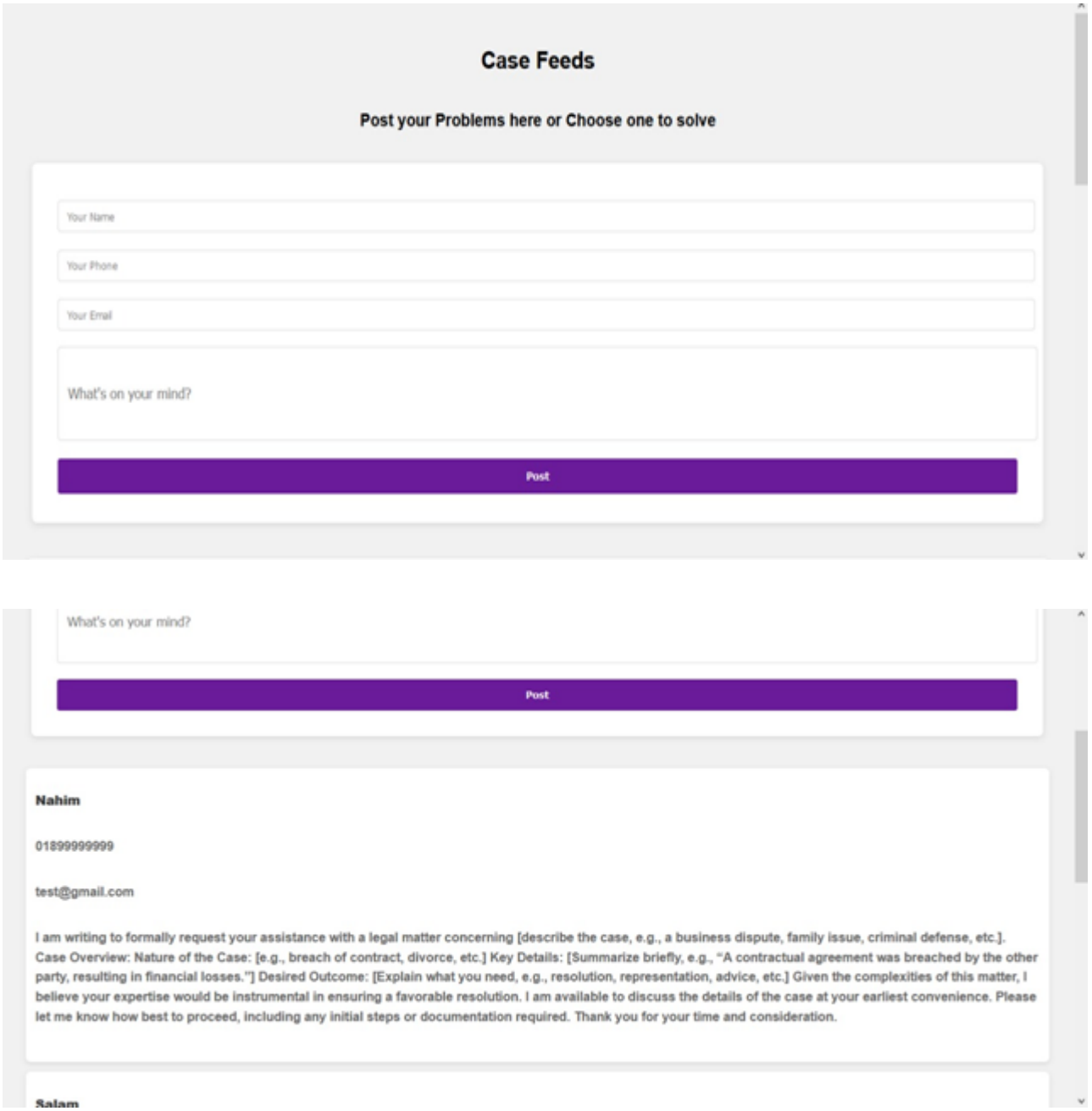


Figure 4.7: Case Submit to a Case feeds page.

4.9. Submit schedule of a Lawyer

After choosing desired lawyer user can submit available schedules of a lawyer and lawyer will be notified.

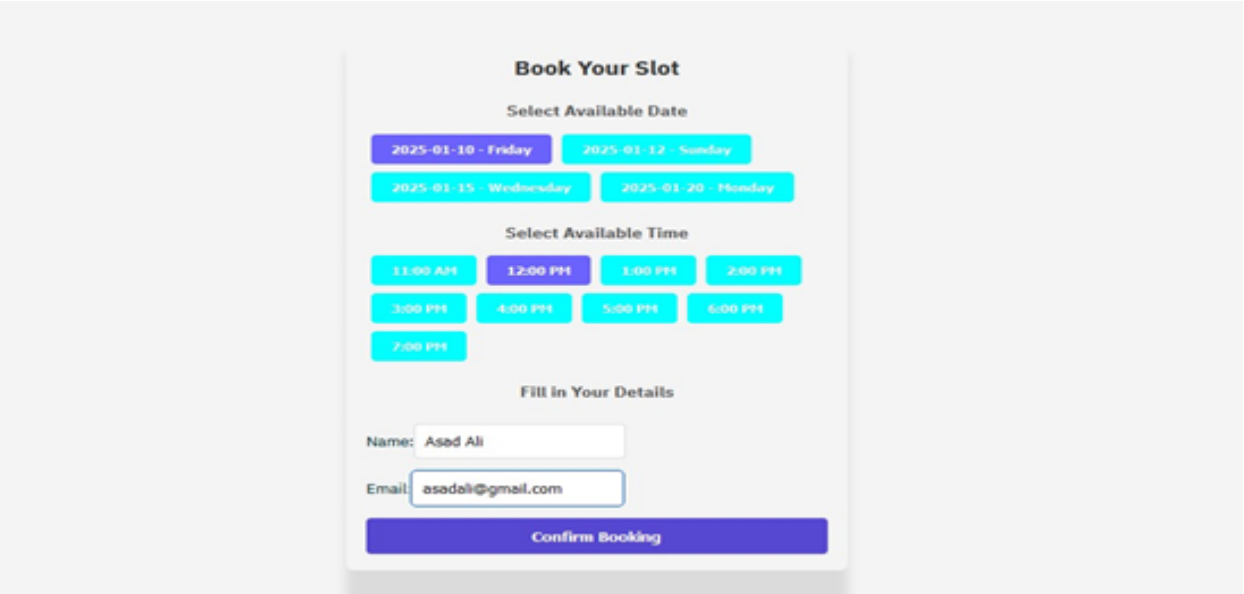
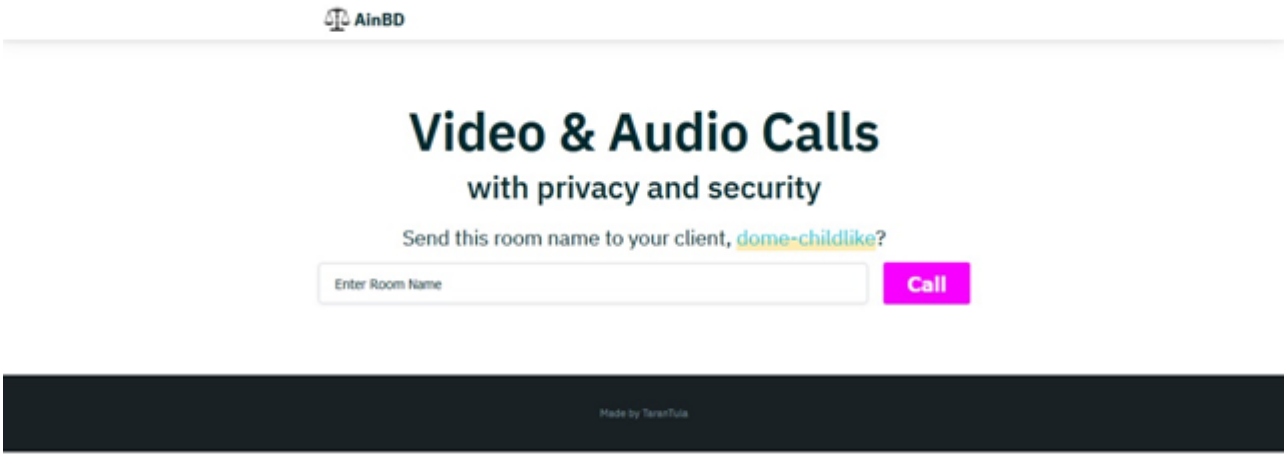


Figure 4.8: Booking Schedule to lawyer's page.

4.10. Conference between lawyer and client

User can do video and audio call to lawyer and lawyer can do the same to client but here they are not going to use their personal name because of confidential matter for a client we have used random username generator to generate room name where both user can communicate.



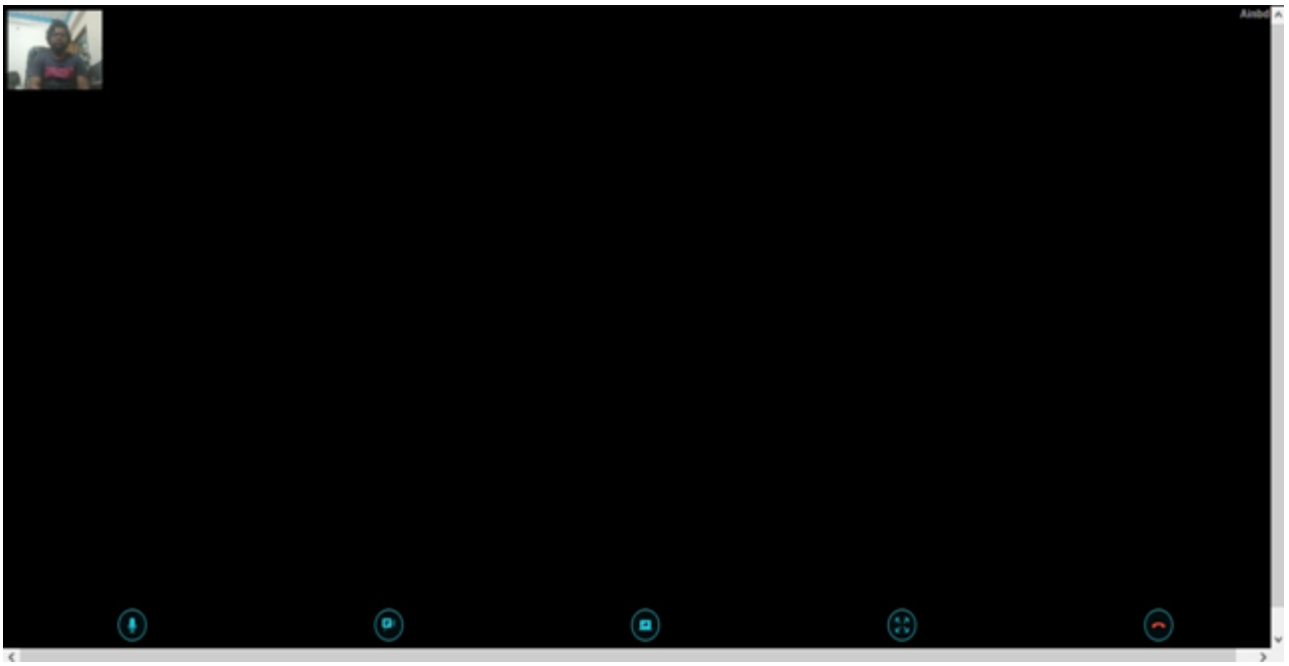


Figure 4.9: Calling page

4.11. Submit a report to admin for a problem

For client and lawyer both users can submit their complaints if they face any problem in this website or from a particular person. These complaints will go back to admin panel where admin can review those and take action. Admin will let them know through email in 7-10 days.

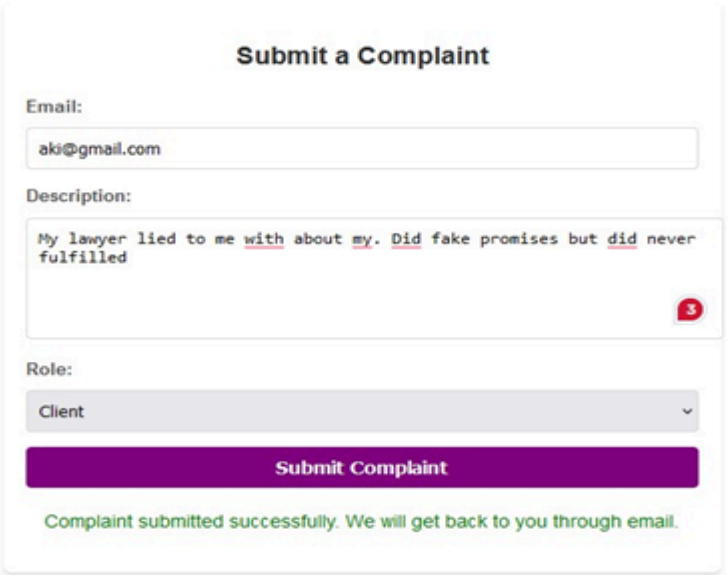


Figure 4.10: Reporting a problem.

4.12. Managing Admin Panel

Both user lawyer and client will submit their problem in complaints section. From Admin panel user can be added and deleted by admin and admin can see the complaints and the time when complaint was made including status.

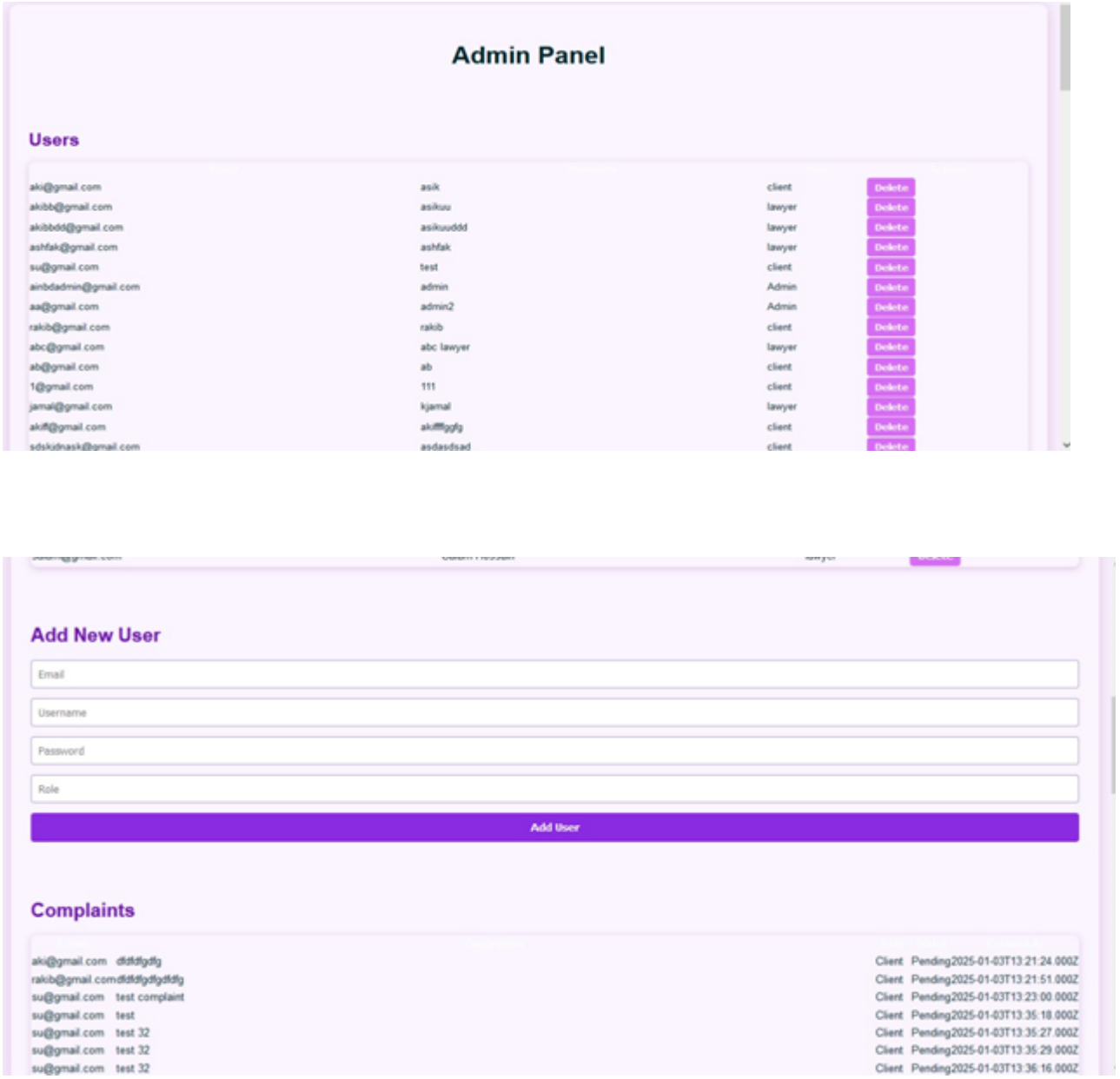


Figure 4.11: Manage users and Complaints.

CHAPTER 5
REVIEW SYSTEM IMPLEMENTATION AND TESTING

5.1. Introduction

A review is a methodical evaluation of a document conducted by one or more individuals, primarily to identify and correct errors at an early stage in the software development process. It is used to assess various documents, including requirements, system designs, code, test plans, and test cases. Typically, reviews are carried out manually, while static analysis is performed with the help of automated tools.

5.2. System Implementation

Implementation refers to the final step in transitioning a solution from development to production. Depending on the project, this phase may be referred to as deployment, go-live, rollout, or installation. All these terms essentially mean the same thing as "implementation" in the context of the software development life cycle.

There isn't a single standard method for implementing a website; the approach varies depending on the project's specifics and the nature of the solution. This type of implementation is particularly relevant when the solution is new, and development and testing are happening within what will eventually become the production environment. In such cases, implementation can be viewed as a shift in perspective—one day the solution is in development, and the next, it is live in production.

5.3. User Training

The first round of training sessions for users is conducted, with training materials provided during the sessions. It is recommended that some help desk staff also attend these initial training classes. Additional training sessions can be scheduled as new users begin using the website. The training is carried out on the user acceptance test system, using the test database or a dedicated training database.

5.4. Distributed User Documentation

The user documentation, which was finalized during User Acceptance Testing, is now distributed and available to the users.

5.4.1 Finalized System Documentation

The system documentation, incorporating all the updates from the testing phases, is delivered to the production support team.

5.4.2 Installed Production System

The production system has been set up in the designated production environment or on the designated production server, and installed on any client workstations where it is needed.

5.4.3 Post-Implementation Review Summary

This report is generated following the post-implementation review meeting and provides a summary of the project's success criteria, including those that were met, those that were not met, and the reasons for any issues. It also highlights key lessons learned to enhance practices for future projects. Specifically, the report should identify any techniques or practices that were particularly effective in this project, which the project team believes could benefit both current and future projects.

5.4.4 Methodology Compliance Form

The project team initiates this form, which is then completed by a methodology representative who has reviewed and approved the project documentation. The form is filled out in Word.

5.5. Website Deployment

Website deployment refers to all the tasks involved in making a website review system accessible for use. The overall deployment process includes multiple interconnected activities, which may involve transitions between them. These activities can take place on either the producer's side, the consumer's side, or both. Since every system is unique, the exact procedures within each activity are difficult to define in a standardized way. As a result, "deployment" should be understood as a flexible process that needs to be tailored to meet specific requirements or characteristics. A brief overview of each activity will be provided later.

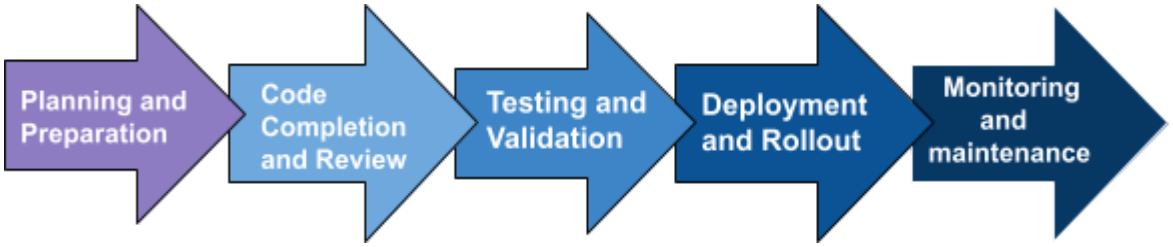


Figure 5.1: Deployment Process

5.6. Deployment Activities

5.6.1 Release

The release activity comes after the development process is complete. It involves all tasks necessary to prepare the system for assembly and delivery to the user site. As such, it must identify the resources needed for operation at the user site and gather the information required for the next steps in the deployment process.

5.6.2. Activation

Activation refers to the process of launching the executable component of a website. For simpler systems, this typically involves executing a command to start the system. For more complex systems, activation includes preparing all supporting systems to be operational. (This should not be confused with the common usage of "activation" related to licensing, which pertains to digital rights management systems.) In larger website deployments, the live version of the website is usually installed on a production server within a production environment. Other versions of the website may be set up in separate environments, such as testing, development, and disaster recovery environments.

5.6.3. Deactivate

Deactivation is the reverse of activation and involves shutting down any active components of a system. It is often necessary in order to carry out other deployment tasks. The process of taking outdated or rarely used systems out of service is commonly known as website retirement or application decommissioning.

5.6.4. Adapt

The adaptation activity involves modifying a review system that has already been installed. Unlike updating, which is typically triggered by a remote software producer, adaptations are driven by local events, such as changes in the customer's environment.

5.6.5. Update

The update process involves swapping out an earlier version of a website review system, either entirely or partially, with a more recent release.

5.6.6. Built-In

Some systems have built-in mechanisms for installing updates. The level of automation in these processes can vary, from fully automatic to user-controlled. For instance, Norton Internet Security employs a semi-automatic process to retrieve and install updates for both antivirus definitions and other system components. Other software products offer query features that allow users to check for the availability of updates.

5.6.7. Retire

Eventually, a review system is deemed obsolete, and the producers cease to provide support for it. This marks the end of the product’s life cycle.

5.7. Software Testing

Software testing is a process conducted to provide stakeholders with valuable insights into the quality of the product or service being evaluated. It offers an objective and independent assessment, enabling the business to better understand the risks associated with implementing the software. The testing process involves running a program or application to identify software bugs, errors, or other

defects. This typically includes executing a software or system component to assess specific properties of interest. These properties generally evaluate how well the component or system under test:

- Aligns with the requirements that guided its design and development,
- Correctly responds to various inputs,
- Performs its functions within an acceptable time frame,
- Is user-friendly and easy to use,
- Can be installed and run in its designated environments, and
- Delivers the desired outcomes for its stakeholders.

5.7.1. Security Testing

Understanding safety objectives and planning tests to address the security needs of each user is crucial. We assess our application based on its security requirements. Typically, a deliberate malicious attack is simulated to evaluate how the web application responds in such scenarios. If any security vulnerabilities are identified, we determine the most effective solutions to mitigate them.

5.8. Principles of software testing

Principle 1: Testing reveals defects in the software.

This principle highlights that the purpose of testing is to identify defects or bugs within the software by employing various testing strategies to thoroughly examine the application.

Principle 2: Exhaustive testing is not feasible.

This means that it is impossible to test every aspect of the software in complete detail. Instead, testers should allocate an optimal amount of time for testing, based on a risk assessment of the application.

Principle 3: Test early in the development process.

It is essential to begin testing as soon as possible. Early testing helps identify and fix defects within the required time frame, ensuring that developers can deliver the software to clients on schedule.

Principle 4: Defect clustering.

This principle states that a small number of modules within an application are likely to contain the majority of the defects, meaning that most of the issues are concentrated in specific areas.

Principle 5: The Pesticide Paradox.

Repeatedly running the same tests over time will eventually fail to uncover new bugs. This is known as the Pesticide Paradox. The solution is to regularly review and revise test cases, introducing new and diverse tests to find additional defects.

Principle 6: Testing is context-dependent.

Testing methods vary based on the type of application being tested. For example, the approach for testing a mobile app differs from that for testing a web app. Likewise, testing a Mac application is different from testing an Android application, and so on.

CHAPTER 6
CONCLUSION AND FUTURE WORK

6.1 Conclusion

In the past, when individuals required legal assistance, the typical approach was to seek recommendations from friends, family, or local referrals. Some might consult the Yellow Pages or contact the local bar association, while only a small percentage would turn to the Internet as their primary resource.

However, in today's fast-paced world, people seek quick and convenient ways to hire a lawyer from the comfort of their homes. Inspired by this shift in behavior, we developed our platform. We aim to simplify the process of finding a lawyer by offering a faster, more efficient, and comprehensive solution that outperforms traditional methods.

6.2 Future Plan

6.2.1 OTP (one-time password) Verification

OTP verification can be used for sign-in or sensitive actions. Implements OTP generation (using a service like Twilio or Firebase Authentication). By sending OTP to users through SMS or email. Validates OTP on the backend. OTP uses feedback for input and submission.

6.2.2 Educational Qualification Verification via API

To further enhance trust and transparency, we plan to integrate an API that can verify a lawyer's educational qualifications. By adding this feature, users will be able to confirm a lawyer's credentials directly through our platform, increasing the overall confidence in the lawyer ratings and improving the reliability of the service.

6.2.3 AI-Powered Legal Assistance

We have planned AI-powered legal assistance on our platform. Which will implement AI chatbots to provide initial legal advice and help categorize cases. Help guide clients through their legal journey before consulting a lawyer. Will provide immediate support for clients and save time for lawyers.

6.2.4 Integrated Payment Gateway

We will in the future add integrated payment gateways to our platform which will introduce an integrated payment system for clients to pay legal fees, either per consultation or a flat rate for services. This will simplify the payment process and provide secure transaction management.

6.2.5 Legal Resource Hub

We will add a dedicated section to our platform where users can access useful legal resources, articles, FAQs, and other helpful guides. Empowers users with knowledge and allows them to make informed decisions.

6.2.6 Multi-Language Support

We are looking to add a multi-language support system to our platform that will help cater to clients from different linguistic backgrounds. It will increase accessibility and extend the platform's reach to a wider audience.

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