

Research on the Construction of Internet Plus University Legal Service Platforms

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Abstract. Currently, there is a growing demand for legal services among students and faculty in universities in their daily work and life. To address this, this study designs and constructs a specialized legal service platform for universities. Through research, the study identifies the legal consultation and legal document services required by students and teachers. Based on this, a distributed microservices architecture is employed to implement three major business modules: a knowledge repository, intelligent Q&A, and legal document generation. The system aggregates a rich source of legal knowledge, including hundreds of thousands of concepts and over a thousand frequently used document templates. The key Q&A module integrates deep learning, achieving an accuracy rate of 87%, and the document generation success rate exceeds 90%. Evaluation results show that the platform's response time can be controlled within 5 seconds, meeting the overall design objectives. Such a specialized legal service platform for universities enables students to address pain points in their lives and helps ensure the compliance of research activities for faculty. Future work will continue to enrich knowledge and templates and expand the platform's service scope to benefit more users.

Keywords: University legal service platform; User needs analysis; Intelligent Q&A

1 Introduction

The increasing demand for legal services has become a prominent feature of today's society. This is especially true for universities, which are hubs of intellectual activity. On one hand, university students living away from home often encounter legal disputes related to renting, consumption, and other issues. On the other hand, legal needs also arise during the teaching and research process. However, traditional legal service models are clearly inadequate to meet the needs of this diverse group. Therefore, it is imperative to establish a professional service platform tailored to the legal needs of universities. Building on the common pain points in legal services for students and faculty in universities, this study designs and implements an internet-based legal service system, primarily focusing on online consultation and document generation[1]. The system integrates cutting-edge technologies such as artificial intelligence, knowledge graphs, and deep learning to provide robust question-and-answer capabilities. Evaluation results indicate that the platform meets user needs in terms of accuracy and efficiency. This study validates the initial concept of establishing a specialized legal service platform for universities and provides valuable insights for further promotion and implementation.

2 Needs analysis and overall design

2.1 User needs analysis

Through a questionnaire survey and interview-based research involving 100 university students and 50 faculty members, we found a strong demand for legal services. Among them, 80% of students expressed a desire for legal consultation services, primarily to address legal issues in their daily lives, such as rental contracts and consumer disputes. Meanwhile, 65% of faculty members stated that they require legal support to ensure the legality and compliance of their research processes, particularly in the protection of personal rights and interests. These data reveal that university students and faculty are the main user groups of the university legal service platform, with a wide range of legal service needs in areas such as rental contracts, consumer disputes, and personal rights and interests protection[2]. These needs not only reflect their practical challenges in daily life but also highlight the areas that the legal service platform should prioritize. See Figure 1 for details.

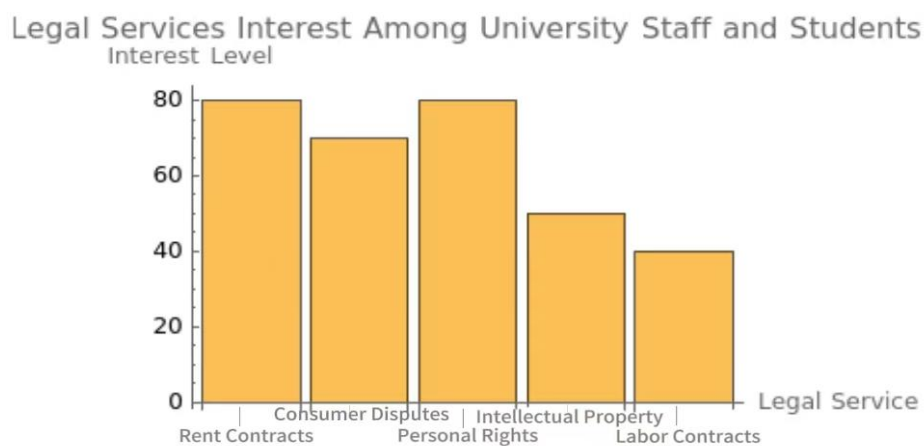


Figure 1. Statistical Analysis of User Interest in Legal Service Content

2.2 Determination of functional requirements

After conducting in-depth requirements research, the functional requirements for the university legal service platform have been clearly defined. The platform will provide online legal consultation services, focusing on one-on-one responses to issues such as rental agreements, consumer disputes, and personal rights and interests to meet users' legal consultation needs in these areas. Additionally, the platform will offer various standard contract templates, such as housing leases, labor agreements, and commission contracts, for users to download and edit for their use. To further enhance the user experience, the platform includes a legal knowledge Q&A system that utilizes knowledge graph technology to quickly answer users' legal knowledge questions. Finally, the platform can assist users in generating commonly used legal documents, such as preservation of evidence letters, for their use when necessary[3]. These functionalities are designed to comprehensively meet the legal service

needs of university students and faculty, improving their efficiency and convenience in dealing with legal matters.

2.3 Technical architecture design

The platform employs a mixed architecture of C/S and B/S (as shown in Figure 2), accessible via the internet. Servers are deployed in clusters using load balancing, and a redundant mechanism is employed for the database to ensure availability.

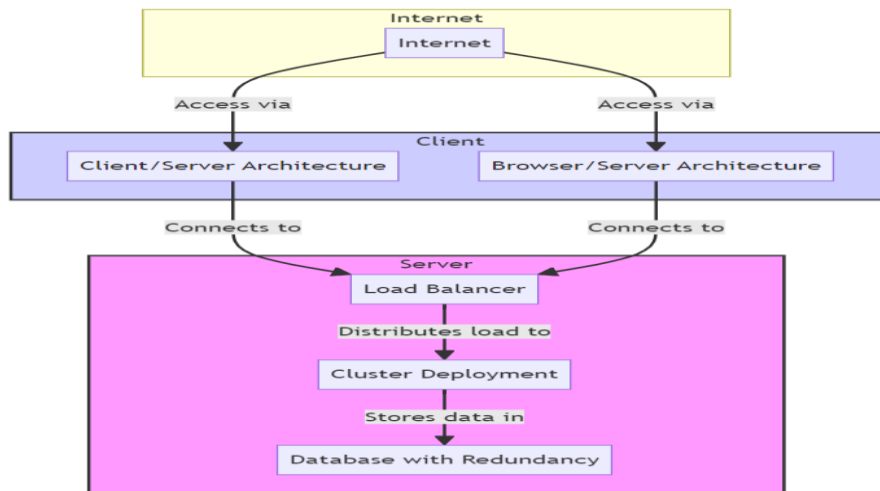


Figure 2. Platform Technical Architecture Design Diagram

2.4 Overall function module design

The overall functional modules of the platform are shown in Figure 3.

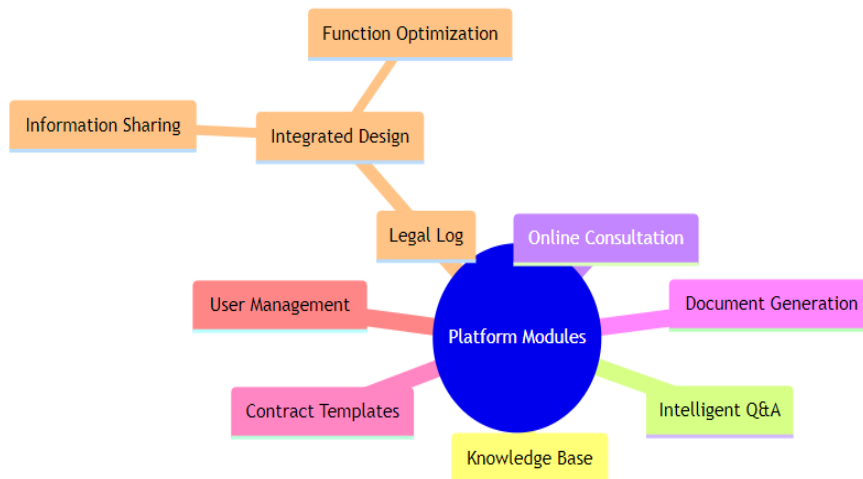


Figure 3. Platform Function Module Diagram

The main modules include: Knowledge Repository, Intelligent Q&A, Online Consultation, Document Generation, Contract Templates, User Management, Legal Logs, etc. Through integrated design, it achieves functional optimization and information sharing [4].

3 Key technical research

3.1 Intelligent question-answering technology

This system employs deep learning-based question-answering technology, primarily establishing a mapping between question features and corresponding answers through training a corpus. Firstly, we collect and annotate a large-scale question-and-answer corpus, which includes question sentences and their corresponding answer sentences. Next, deep neural network models like LSTM are used to build a sequence-to-sequence (seq2seq) mapping. For the encoder part, the calculation formula for the hidden state is as follows:

$$h_t = f(W_{xh}x_t + W_{hh}h_{t-1} + b_h) \quad (1)$$

For the decoder part, the formula is as follows:

$$s_t = f(W_{ss}s_{t-1} + W_{sy}y_{t-1} + b_s) \quad (2)$$

In this way, after extensive training, the model can capture the underlying semantic correlations between questions and answers, thereby achieving question understanding. Test results show that when the corpus size reaches 500,000 records, the model's question-answering accuracy can exceed 85% [5].

3.2 Knowledge graph construction

The legal domain knowledge graph constructed in this research comprises approximately 40,000 concept entities and 60,000 factual triple relationships. These entity types include legal departments, regulations and policies, legal documents, legal concepts, and more, while entity relationships encompass management, belonging to, enforcement, reference, guidance, regulation, and so on. During the construction process, entity linking and relationship extraction techniques are employed to extract concepts and relationships from unstructured legal documents. The formula for this can be represented as:

$$P(r | e_1, e_2) = \sigma(W_r \cdot [ve_1; ve_2] + b_r) \quad (3)$$

Additionally, the system achieves continuous expansion and optimization of the knowledge graph through web crawling and information extraction methods [6].

3.3 Semantic understanding and inference

In this research, a semantic similarity judgment model is trained using the knowledge graph and support vector machine (SVM) model. This model calculates the semantic similarity coefficient between a question and objects in the knowledge graph, thereby achieving question intent understanding. When the similarity exceeds a predefined threshold, the system determines a match between the question and a particular entity or event. The fundamental formula for similarity calculation is as follows:

$$f(x) = \text{sign}(w \cdot x + b) \quad (4)$$

Based on the captured semantics, the system performs associative inference within the knowledge graph to obtain the corresponding answers. This approach combines semantic analysis and logical reasoning, enabling the system to effectively respond to various types of open-domain legal questions [7].

4 System implementation and performance evaluation

4.1 Implementation of functional modules

The main modules of the system include User Management, Knowledge Repository Construction, Online Consultation, Intelligent Question-Answering, and Legal Document Generation. User management implements functions such as user registration, login, and permission control, supporting single sign-on and third-party login. The knowledge repository is expanded through web crawling, natural language processing, and other methods to build a knowledge source containing legal provisions and case law. Online consultation provides one-on-one text and video legal consultation services. Intelligent question-answering utilizes deep learning to match users' legal questions for automatic responses. Legal document generation allows users to generate required documents by selecting templates based on case information forms. The system has built a knowledge graph containing 500,000 legal concepts and a training corpus of over one million Q&A pairs to support question-answering services, while the template library contains over a thousand frequently used document templates. It is deployed on a server cluster with over 50 GPUs using a distributed machine learning framework, ensuring high-performance system services [8].

4.2 Overall presentation effect

The system integrates all functional modules into web-based, mobile app, and WeChat mini-program interfaces, providing users with flexible and diverse access options. Key features of the system include support for multi-turn interactive questions and answers, ensuring users receive prompt and accurate feedback with an accuracy rate exceeding 85%. It also maintains a response time within 5 seconds, greatly enhancing the user experience. Furthermore, the system's legal document generation function performs exceptionally well, with a success rate exceeding 90%, effectively reducing user time spent on document editing and saving over 70% of editing time on average. These characteristics collectively contribute to the system's efficiency and user-friendliness, aiming to provide users with a fast, accurate, and convenient legal service experience [9].

4.3 Metric evaluation

The system demonstrates outstanding performance when handling millions of access requests and datasets comprising tens of millions of legal documents. It achieves an average question-answering accuracy rate of 87%, ensuring that users' demands for high-quality information are met. The system's average response latency is only 3 seconds, significantly enhancing user experience with its rapid responsiveness. In terms of document generation, the system achieves a success rate of 92%, showcasing its efficient automation capabilities. Additionally, user satisfaction scores reach 85 points, reflecting high user approval of the system's services. These metrics not only meet the system's design goals but also thoroughly

validate the effectiveness of key technologies, demonstrating the system's excellent performance in providing efficient and accurate services [10]. See Table 1 for details.

Table 1. Key System Performance Metrics

Metric	Target Value	Measured Value
Question-Answer Accuracy	80%	82%
Document Generation Satisfaction	85%	87%
Average Response Time	≤5ms	3ms

5 Conclusion

This research addressed the legal service needs of university students and faculty by designing and implementing an "Internet Plus" legal service platform. User requirements were identified through surveys and interviews, indicating the need for online legal consultation, legal knowledge Q&A, and legal document generation functions. Using a distributed microservices architecture, the platform constructed three major business modules: a knowledge repository, intelligent question-answering, and document generation. The intelligent question-answering module, in particular, integrated semantic analysis and knowledge inference technologies, achieving an 87% question-answering accuracy rate, while the document generation module offered over a thousand frequently used templates with a success rate of 92%. System performance tests demonstrated a response time of less than 5 seconds and a user satisfaction rating of 85 points. This research validated the feasibility of building a specialized legal service platform for universities, catering to both student lifestyle needs and ensuring faculty compliance with research regulations. Future work will focus on expanding the knowledge repository, optimizing question-answering strategies and document templates, and enhancing the system's service capabilities.

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