

대규모 언어모델을 활용한 건축법령 해석 지원 시스템 고도화 방안 연구

Improving the Large Language Model Based Building Code Interpretation
Support System(Archilaw)

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SUMMARY

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1. Introduction

The complexity of Korea's building regulations has grown due to increased societal demands for safety, environmental protection, and consideration of vulnerable groups. These changes have made precise interpretation of building laws critical for compliance in construction, maintenance, and demolition. However, the sheer volume and complexity of these regulations challenge even experts.

This study aims to enhance the effectiveness of a building code interpretation support system, leveraging large language models (LLMs) to address these challenges. By building on previous research, the study explores ways to overcome existing limitations and improve real-world applicability.

2. Performance Analysis of Existing Systems and Improvement Strategies

Existing systems for interpreting building laws, while innovative, face several challenges:

❑ Performance Gaps:

- Current systems struggle with retrieving all relevant legal references and generating accurate responses. Only 21.6% of references matched user queries fully, with a maximum accuracy of 66.2% when partial matches occurred.

❑ Key Limitations

- Difficulty in interpreting the unique language and structure of legal documents.
- Failure to account for the complex relationships between legal terms and clauses.

❑ Proposed Improvements:

- Introduce advanced algorithms that better understand legal intricacies.
- Improve RAG techniques and implement knowledge graphs to strengthen reference retrieval and interpretation.
- Reflect real-world workflows by incorporating historical query-response patterns and case studies used by practitioners.

3. Implementation of Archilaw V2

Archilaw V2 was developed to overcome the limitations of its predecessor and improve the efficiency and accuracy of building law interpretation.

❑ Key Enhancements

- Language Model Upgrades: Incorporation of more powerful LLMs capable of processing longer legal texts and generating precise reasoning.
- Optimized Vector Databases: Enhanced database structures allow for faster and more accurate retrieval of legal references.

- **New Features:**
 - Integration of historical case studies and queries to improve contextual understanding.
 - Real-time legal amendment tracking to ensure responses reflect the latest regulations.
- **Benefits**
 - These improvements enable Archilaw V2 to provide more consistent, accurate, and reliable support for legal and administrative tasks.

4. System Evaluation and User Perception

The effectiveness of Archilaw V2 was evaluated through performance assessments and user feedback.

☐ Performance Results:

- Archilaw V2 showed a significant improvement in legal reference retrieval and response generation accuracy.
- It outperformed the previous version in terms of speed and user satisfaction.

☐ User Feedback:

- Public officials and legal experts appreciated the system's reliability, ease of use, and ability to provide clear answers quickly.
- Users suggested further improvements in response flexibility to better handle unique scenarios.

☐ Monetization Potential

- Surveys revealed that many users are willing to pay for the system if priced reasonably, indicating commercial viability.

5. Conclusion

This study demonstrates that Archilaw V2 effectively addresses the challenges of interpreting complex building laws, offering significant improvements over its predecessor.

□ Key Achievements

- Enhanced accuracy and reliability in building law interpretation, making it a valuable tool for public officials and legal professionals.
- Reduction in response times and improvement in user satisfaction.

□ Recommendations

- Ensure continuous updates to maintain the system's relevance with evolving regulations.
- Further improve the user interface and expand the system's capabilities to address a broader range of queries and applications.
- Consider strategies for commercialization, including tiered pricing models to support wider adoption.

Keyword

Artificial Intelligence, Large Language Model, Building Law, Question and Answer, Legal Interpretation System, Vector Database