

대규모 언어모델(LLM)을 활용한 건축민원 대응 효율화 방안 연구

Study on the Efficient Response to Architectural Civil Complaints Using Large Language Models (LLM)

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The construction, maintenance, and management of buildings are regulated by many laws, including the 'Building Act'. In the process of architectural approval, there are 199 laws to be checked, and including subordinate laws and ordinances, it can be quite difficult to confirm and interpret the regulations applicable to specific situations.

For the general public to request an interpretation of these laws, it is mandatory to go through a question-and-answer process with the relevant department in charge of the law. The Ministry of Land, Infrastructure and Transport, which handles questions about the Building Act and related laws, receives over 10,000 inquiries per year, resulting in considerable administrative effort.

Meanwhile, the accessibility to large language model technology has greatly improved recently, making it possible for AI to provide appropriate information by referencing various data in response to questions about specific situations. Therefore, this study aims to examine technical and institutional issues for the interpretation of building laws and efficient response to queries using large language models, and to derive corresponding solutions. This includes designing and testing a prototype system, literature review, and expert consultation.

Large language models like GPT have nearly human-level text interpretation abilities, but for sophisticated tasks like legal review, a preprocessing system that includes prepared reference information extracted from a well-constructed vector database and a semantic processing system that defines the appropriate format for queries is necessary.

In this study, a prototype of the SPARC (Semantic Processing for Architecture Regulation Compliance) model, a kind of Retrieval Augmented Generation framework, was developed and built. It was tested using actual inquiry data received by the Ministry of Land, Infrastructure and Transport and legal interpretation cases from the Legislation and Legal Affairs Agency.

The analysis showed that the prototype system's answers achieved over 80% accuracy (in the case of the Precision Model) for general inquiry complaints where officials had reached a clear conclusion, and between 70% to 100% accuracy for more complex legal interpretation cases from the Legislation and Legal Affairs Agency, depending on the field.

Although this project is not a full-scale system development study, but rather a research to verify the technical and policy feasibility of system development, it has successfully developed a high-level prototype system. It holds significant importance as the first study to apply AI technology extensively in the field of regulatory administration. If the AI-supported architectural law interpretation system is officially promoted at the government level in the future, efficient policy projects can be expected based on the results of this study. Continued research and discussion on subsequent research tasks identified during this study can lead to advanced academic and policy outcomes.

Keywords :

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