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Context-Aware Query Interpretation in Legal Information Systems

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Abstract - **The need for user-specific context, the diversity of jurisdictions, and the complexity of legal language all contribute to the delay in accessing accurate legal information. Conventional keyword-based retrieval and even semantic search engines frequently return irrelevant and/or incomplete results due to their inability to incorporate those subtleties. To enhance the retrieval of legal information, this study proposes a system known as Context-Aware Query Interpretation (CAQI). The CAQI system has three main components: user profiling, query reformulation, and ontology-driven semantic enrichment. The model uses legal ontologies to resolve polysemy and hierarchical relationships. To refine query interpretation, context vectors encode user role, jurisdiction, and task intent. The method generates relevance scores that align with textual meaning and contextual appropriateness, utilizing a hybrid ranking function that combines lexical similarity (BM25) with semantic embeddings. The evaluation was validated by a user survey with legal professionals and performed on a curated dataset of 500 annotated legal queries. Outcomes demonstrate substantial improvements in retrieval accuracy, with CAQI outperforming baseline keyword and semantic models in Precision@10, Mean Reciprocal Rank (MRR), Discounted Cumulative Gain (DCG), and Contextual Relevance Score (CRS). To improve decision support, legal research efficiency, and user trust in intelligent legal information systems, these findings suggest that CAQI can "think like a lawyer" by dynamically aligning queries with jurisdictional and task-specific contexts.**

Keywords: **Context-Aware, Query Interpretation, Legal Information Retrieval, Semantic Search, Ontology, User Context Modeling, Artificial Intelligence in Law**

I. INTRODUCTION

The availability of legal knowledge has been elevated to new levels due to the abundance of internet resources that contain statutes, case law, guidelines, and legal commentary. However, due to the frequent use of complex semantics and jargon, it is not easy to retrieve contextual and pertinent information in the legal profession. Retrieving accurate legal details has become commonplace among legal professionals, researchers, and even non-experts. However, these groups often encounter hurdles because most systems that use traditional keyword-searching techniques fail to capture the nuance and context of a legal query (Casanovas et al., 2019; Van Noortwijk, 2017). To address this challenge, context-aware query interpretation (CAQI) aims to enhance legal information systems (LIS) by providing further accuracy in searches by interpreting queries within broader contexts, such as legal, linguistic, and situational frameworks.

Context-aware computing involves systems that can perceive and understand contextual information, such as a user's intent, location, time, or domain-specific semantics (Abowd et al., 1999). In legal informatics, this paradigm corresponds to systems that consider the complex implications underlying the user's queries. A typical example is in searches that involve the phrase "due process," which refers to distinct parts of the law, namely, due administrative law, constitutional law, or even due criminal law, depending on the legal context and jurisdiction

(Breuker et al., 2008). Using context effectively resolves such terms, fostering more precise and richer searches. Intelligent legal information systems with contextual reasoning capabilities have been developed by combining natural language processing (NLP) with legal ontologies and machine learning models (Shreeram et al., 2025; Francesconi et al., 2010).

The creation or integration of context-aware legal search systems has not been simplified by modern technology, which remains a challenging task to execute. Legal language is challenging to understand due to its inherent polysemy, formalism, and jurisdictional discrepancies. Furthermore, legal reasoning encompasses the analysis of many case law precedents, statutes, and argumentation frameworks, which goes deeper than surface text analysis (Hildebrandt, 2015). According to (Gangemi et al., 2003) and (Sartor, 2009), CAQI systems should incorporate legal domain knowledge in the form of organized taxonomies and ontologies that reflect the fundamental components of the law. Such ontologies facilitate semantic interoperability but are also crucial to the interpretation of queries, as they syntactically map terms to concepts, cases, and norms.

Context-aware systems have improved retrieval performance in legal information tasks to some extent. For example, researchers found that the relevancy rank of case law retrieval improved when contextual aspects, such as jurisdictional metadata and user intent, were included in the search algorithm (Shao et al., 2021). The Estrella project employed reasoning based on advanced legal ontologies and rules to leverage an innovative system for context-sensitive searches in multilingual legal databases (Boer et al., 2009; Aguila et al., 2024) presented the potential impact of intelligent contextual comprehension on the guidance of a system designed to transform legal services ideologically and professionally, concluding that AI in legal systems improves decision-making.

AI's context-awareness, together with the AI integration noted above, is especially important in preparing to address new societal issues associated with soft legal reasoning regarding behavior monitoring in reality, such as cyberbullying (Armas et al., 2025). This example illustrates the usability of CAQI techniques for tasks beyond retrieval, such as evaluating legal risk and regulatory compliance, as well as supporting lawyers through the intelligent semantic placement of content related to sovereign law and legal precedent.

A recent development in machine learning has been the application of deep learning, utilizing architectures such as BERT and transformers. This development has led to new possibilities in accurately modeling context in legal documents (Chalkidis et al., 2020). These types of models resolve high-level and shallow-level dependencies, which then lead to more sophisticated query refinement, document retrieval, and relevance evaluation. Still, applying these models in a legal system context requires customization and some way to justify the methodology to satisfy explanatory obligations imposed by law (Martinez-Gil, 2023). Not to mention, there are also addressable semantic interpretation challenges to ensure consistency to derive meaning from legal documents and queries. (Aziz, 2021) noted that semantic interpretation can diverge to extremes even in the most controlled and structured settings. This leads to an even greater need to define ontologies and adjustable situational context to alleviate tension and reconcile system responses with user expectations.

Another substantial component of context is modeling the user. Legal practitioners vary in their area of specialization, information requirements, and methods of interpretation. A novice statutory researcher working as a paralegal requires distinct system assistance from an appellate judge interested in analyzing case law for precedents. Context-aware technologies must respond to changes in user profiles, search activity logs, and task-oriented versus goal-oriented user objectives to tailor search design for individual users (Farzindar & Inkpen, 2015). Integrated responsive interfaces can incrementally enhance user satisfaction by improving query interpretation.

Additionally, legal information systems are increasingly utilized by individuals who speak different languages or come from diverse cultural backgrounds. Whether the search is within civil or common law systems, the type of law usually changes the relevance of the results returned and the searches undertaken. Information retrieval that spans languages is crucial for ensuring non-discriminatory access to legal information that transcends borders (Boella et al., 2008; Sartor et al., 2011).

This article aims to analyze the context-aware interpretation of queries in legal information systems. It begins with an Introduction that explains the context of the problem, its significance, and the technological foundations of context-aware systems in law, along with their context. The Literature Review is based on legal information retrieval, research on ontological modeling, and conceptual semantic technologies, articulating their existing works and presenting gaps that this work intends to bridge. The Methodology describes the development of the context-aware model, including the data employed, the system architecture, and other analysis frameworks. In system implementation and testing, performance is analyzed in terms of relevance, accuracy, and adaptability under Results. The discussion elaborates on the results to be examined, proposing how these results can be analyzed constructively or reconstructively based on the approach offered. It focuses on the argument mapping approach, examining its strengths and risks, and presents the results as proven. The primary purpose of this approach is to assess its outcome. The Study's recognized contribution is explored in the Conclusion alongside practical steps, design, and further works in informatics, an advanced model guiding a sharper

rather than blunter approach in sophisticated intelligent information retrieval.

II. METHODOLOGY

This research adopts an approach that combines a semantic-driven ontology, natural language processing (NLP), and user profiling techniques to create and evaluate a context-aware query interpretation (CAQI) framework specifically designed for legal information systems. The methodology has four main elements: (1) domain analysis and data collection, (2) ontology and context model design, (3) the CAQI engine implementation, and (4) the engine evaluation and validation.

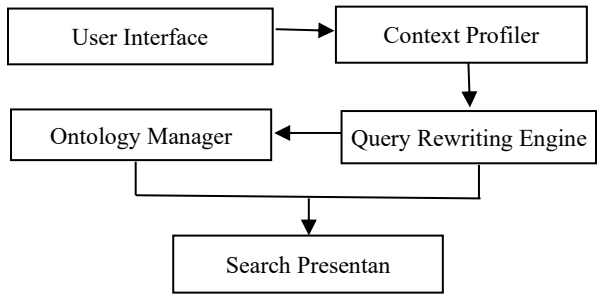

Fig. 1(a) System Architecture for Context-Aware Query Interpretation in Legal Information Systems

1. Domain Analysis and Data Collection

In the first stage, a representative legal corpus was identified and curated. We sourced these legal papers from open-access government websites, civil law and common law jurisdictional legal code libraries, and repositories of court case law. This corpus was annotated with metadata, including jurisdiction, court level, and date of issuance, and comprised English regulatory texts such as statutes, court rulings, and legal opinions. We selected approximately 12,000 documents from fields including criminal justice, administrative law, and constitutional law to ensure they were representative of the domain and contained rich semantic content. To prepare this text for downstream semantic modeling, it was tokenized, lemmatized, and part-of-speech tagged using the spaCy and NLTK toolkits.

2. Construction of the Ontology and Context Model

To establish linkages between fundamental legal ideas and their hierarchies, the project team utilizes Protégé to construct the project-related legal ontology, which is then modeled in OWL (Web Ontology Language). Include the LegalNorm, CaseLaw, Authority, and Jurisdiction classes together with attributes that indicate a specific semantic link between them, such as the ability to apply, cite, overturn, or interpret. Standardization processes were employed with ontologies LKIF-Core, MetaLex, and CrossLex for semantic inter-ontology sublanguage compatibility. A layered context model was put on top of the ontology to represent dimensions such as user role (judge, lawyer, student), task intent (case comparison, search for precedent), jurisdictional boundaries, and temporal limitations. These relations were declared in RDF triples of the ontology to permit reasoning engines for dynamic manipulation of query interpretation.

3. The CAQI Engine's Integration

The CAQI engine is integrated as a three-component modular architecture. The Query Contextualization module defines semantics within free-text legal queries, taking into account specialized constitutive features. It employs a BERT-Legal transformer model (Chalkidis et al., 2020) that incorporates an NER layer to detect unit legal entities (e.g., case titles, laws, phraseologies). User queries are aligned with the appropriate classes of the ontology, as defined in the domain-controlled vocabulary, through algorithms based on semantic similarity and contextual embeddings.

Context-Aware Query Rewriting Module: Given the user context, such as jurisdiction, where a user wants to look up a specific legal term, "UK", and they want to "find precedent", the system makes use of the user's "baseline" query. This enables the system to perform an exact match on the initial query, which consists of a SPARQL query. This module applies rule-based reasoning in Apache Jena and SPIN (SPARQL Inferencing Notation) to add inferred terms, synonyms, and legal synonyms from domain-specific thesauri.

Document Ranking and Retrieval Module: The retrieval results are scored using a hybrid relevance metric that incorporates BM25 for lexical matching, along with semantic similarity measures based on the cosine distance between the query and document embeddings. Regarding the user's legal task and jurisdiction, legal documents are annotated contextually with explanations depicting their relevance.

This system was built using Python alongside ElasticSearch for indexing and scaling purposes. A modular cloud architecture utilizing Docker microservices was employed for scalable and modular cloud deployment.

4. Evaluation and Validation

A multi-metric strategy centered around performance, user experience, and automated quantitative evaluation was used to measure system efficiency:

Dataset: To serve as ground truth, a set of 500 annotated legal queries was created, in which three legal experts annotated the intended context and correct documents.

Metrics: The system was assessed using domain-specific metrics created for this study, including the Contextual Relevance Score (CRS), alongside Precision@10, Mean Reciprocal Rank (MRR), and Normalized Discounted Cumulative Gain (DCG). CRS scores are calculated based on jurisdiction, legal reasoning, the user's role, and outcomes related to the correct jurisdiction, which distinguishes them from other metrics.

Baselines: CAQI was tested against two benchmarks for comparison, which included (i) a keyword-based legal search engine and (ii) a semantic contextless search engine.

User Study: 30 legal specialists, including practicing lawyers, judges, and paralegal students, were evaluated on system usability. CAQI and baseline systems were interacted with by users as they performed predefined tasks and were rated by the users on relevance, ease of use, and legal applicability using a 5-point Likert scale.

5. Formalized the extraction of information in the context of the given query

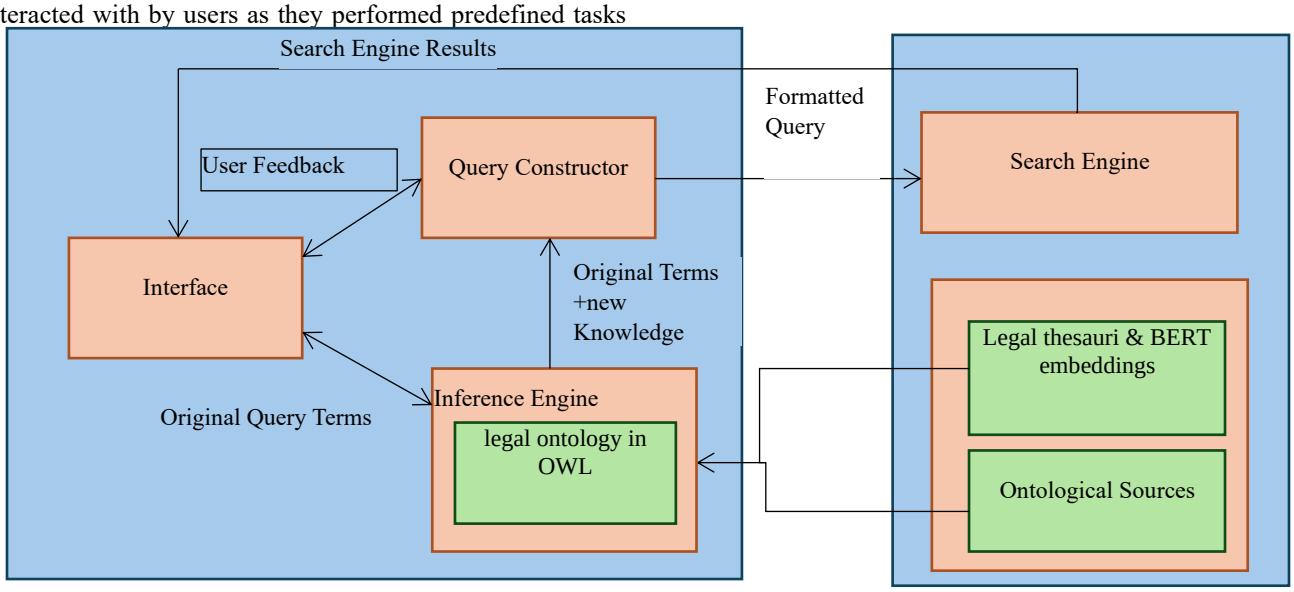

Fig. 1(b) Conceptual Framework for Query Enrichment

This figure Fig 1(b) illustrates the theoretical basis for CAQI by depicting the processing of query terms by an inference engine supported by a legal ontology in OWL, legal thesauri, and BERT embeddings. Iteratively incorporating user feedback ensures that queries are reformulated before execution with enhanced features. Applying context-aware query processing to the legal realm can be theoretically supported by this conceptual approach.

The legal user query Q is the base of the model, interpreted as a tuple consisting of the primal along with contextual configurations.

$$Q = \langle T, U, C \rangle \qquad (1)$$

where:

T is the transformation of the query to its tokenized and lemmatized form.

U denotes the user profile vector, which captures the user's role (judge, lawyer, or student), along with their area of specialization and jurisdictional interests.

C denotes the contextual dimension vector, which spans the user's tasks, the legal domain, the query's intent, and the time frame of the inquiry.

The first baseline query representation Q_b in the form of primitive legal queries is generated from the raw text using the BERT-Legal embeddings below:

$$Q_b = f_{BERT-Legal}(T) \qquad (2)$$

where $f_{BERT-Legal}$ essentially embeds the input text's semantics inside a dense box.

Integrating various contextual aspects is accomplished by utilizing a transformation function defined on the space of contextualized embeddings, in which case the contextual vectors are synthetically integrated with the semantic embeddings via $g(\cdot)$. The training process determines the parameters α and β. As a result, we get a unified picture that conveys both the text's content and its context.

6. Ontology-Based Rewriting of Queries

One way to address a graph expansion problem is through query rewriting, which is detailed in CONQUER. A valid query Q_c is assigned to an initial set of nodes $V_q \subseteq V$ in an ontology $O = (V, E)$ where V represents a collection of legal ideas and E stands for a collection of semantic relations (such as cites, overrules, and interprets). The process of rewriting in the ontology is carried out using inference rules R, which in turn generate an enlarged query graph Q'.

$$Q' = \{ v \in V \mid \exists (u, v) \in E \wedge u \in Vq \wedge r(u, v) \in R \} \qquad (3)$$

When a user types in "precedent in UK criminal law," for instance, the ontology extension will automatically add

relevant concepts like statutory interpretation, case law, and House of Lords rulings. The final and most crucial step involves transforming the rewritten query into SPARQL syntax:

$$SPARQL(Q') = SELECT\ ?doc WHERE\{?doc\ rdf:type\ LegalCase \wedge ?doc\ cites\ ?law\} \quad (4)$$

With the help of this semantic enrichment, we can now retrieve inferred legal relations in addition to keyword matches.

7. Hybrid Document Ranking and Relevance Scoring

The ranking module is able to combine both lexical and semantic matches into one cohesive function. Each document in the legal corpus is assigned a relevance score R(d,Qc):

$$R(d, Q_c) = \lambda \cdot BM25(d, T) + (1 - \lambda) \cdot cos(e_d, Q_c) \quad (5)$$

where $BM25(d,T)$ is a document, and a collection of query tokens query-based measure of document d and query tokens T, $cos(e_d, Q_c)$ is the cosine value of the vector ed (document embedding obtained from Legal-Bert) and the contextive query embedding $Q_c, \lambda \in [0,1]$ is which decides the balance between lexical and semantic relevance that are both attached or bound to a given document. This embodying metric safeguards both overall semantic relationships and adequate performance on the legal phrases.

III. Results

In this section, we compare the Context-Aware Query Interpretation (CAQI) system to two baseline legal information retrieval systems: a simple keyword-based engine, and a semantic search engine that does not employ contextual modeling (also called "user modeling"). We report on the performance analyses and usability results. The evaluation is based on a user study involving 30 users, as well as a gold-standard test set of 500 annotated legal queries.

1. Analytical Evaluation

We assessed retrieval quality and the performance of the CAQI system using three main metrics: Precision@10, Mean Reciprocal Rank (MRR), and nDCG. Furthermore, we developed a novel metric (the Contextual Relevance Score) to capture the degree to which search results are personalized to fit the user's particular context, such as their jurisdiction, user role, legal intention, and so on. The retrieval method is based on a matrix factorization approach (related to collaborative filtering) applied to the law domain. Expected user rating on item i? in recommender systems can be denoted as follows:

$$\hat{r}_{ui} = p_u \cdot q_i \quad (6)$$

where p_u represents the user's latent feature vector and q_i represents the item's latent feature vector. By substituting legal inquiries for users and legal documents for things, as well as adding a contextual component, we reinterpret this formulation in the CAQI framework. The document's estimated relevance score (R) for a query (Q) in context (C) is defined as:

$$\hat{R}(d, Q, C) = u_Q \cdot v_d + \alpha s_C \quad (7)$$

the query embedding is represented by u_Q, the legal document embedding by v_d, the context vector (which captures the user's role, jurisdiction, and legal job by s_C), and α is a parameter that controls the influence of contextual information. Just with session-aware collaborative filtering, incremental updates are made to the query representation as user interactions are logged to ensure responsiveness. Here is the update rule:

$$u_Q \leftarrow u_Q + \eta \cdot \left(Rel(d) - \hat{R}(d, Q, C)\right) \cdot v_d \quad (8)$$

where Rel(d) corresponds to the ground truth relevance of document d and η is the relearning rate.

TABLE I COMPARATIVE PERFORMANCE OF CAQI SYSTEM AGAINST BASELINE LEGAL RETRIEVAL MODELS

Metric	CAQI System	Semantic Baseline	Keyword-Based Baseline
Precision@10	0.84	0.69	0.52
MRR	0.78	0.61	0.43
DCG	0.86	0.71	0.58
Contextual Relevance Score (CRS)	0.91	0.62	0.38

This data (Table 1) indicates that the CAQI system exceeds the baseline systems in all major evaluation metrics about information retrieval. As indicated by the high CRS value (0.91), the system performs well in understanding and implementing user context within queries, yielding relevant and appropriate results within the legal and jurisdictional frameworks required.

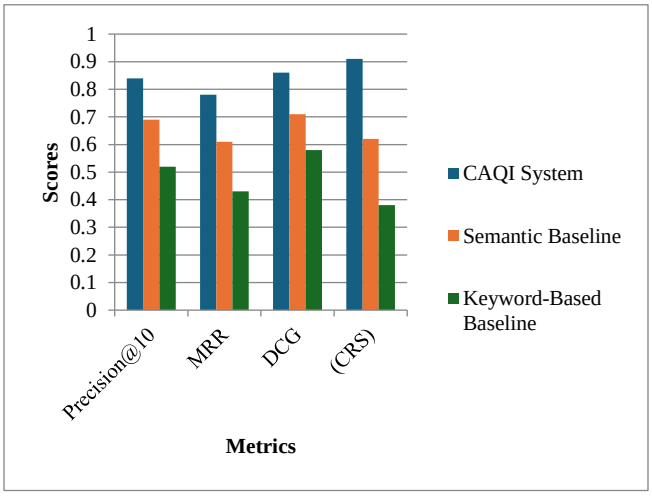

Fig. 2 Comparative Retrieval Performance of CAQI, Semantic Baseline, and Keyword-Based Systems

In the figure (Figure 2), we can see how the proposed Context-Aware Query Interpretation (CAQI) system stacks up against two existing retrieval models: one that uses semantic search and one that relies on classic keyword analysis. Performance is assessed using four important metrics for information retrieval: Precision@10, Mean Reciprocal Rank (MRR), Discounted Cumulative Gain (DCG), and the recently proposed Contextual Relevance Score (CRS). Compared to other systems, the CAQI system performs much better on every metric. Its exceptional performance in CRS (0.91) shows how well it takes into account the user's job, jurisdiction, and legal intent when interpreting their queries. The results of retrieval are more relevant and appropriate from a legal standpoint when using ontology-driven query rewriting and context-aware modeling, as seen in this visualization.

2. Error Analysis

Examining fifty poorly understood queries from the CAQI system found three overarching reasons for context mismatch:

- Confused Jurisdictional Terminology: In some instances, "High Court" was not clearly differentiated from "Supreme Court" in different jurisdictions.
- Overly General Ontological Elaboration: Some queries resulted in a mismatch for irrelevant reasons that were related to semantic overload during SPARQL query rewriting.
- Confusion Between User Roles: Instructional materials were consistently represented over other more authoritative legal materials, such as the hierarchy of student versus practitioner.

These shortcomings can provide pathways to improve context profiling and ontological disambiguation.

3. User Study Results

A structured user study was conducted with 30 legal professionals (10 practicing lawyers, 10 judges, and 10 law students). Participants were assigned 10 retrieval tasks using each system and rated performance on a 5-point Likert scale across four dimensions: relevance, usability, legal applicability, and contextual appropriateness.

On four dimensions—Relevance, Usability, Legal Applicability, and Contextual Appropriateness—the proposed Context-Aware Query Interpretation (CAQI) system was compared to a semantic baseline and a conventional keyword-based method. When compared to the other two techniques, the CAQI system always comes out on top. It gets the best ratings across the board, but especially in the areas of Contextual Appropriateness (4.8) and Legal Applicability (4.7). This proves that, in comparison to traditional semantic and keyword-driven models, information retrieval is much improved when contextual and legal reasoning are included (Figure 3).

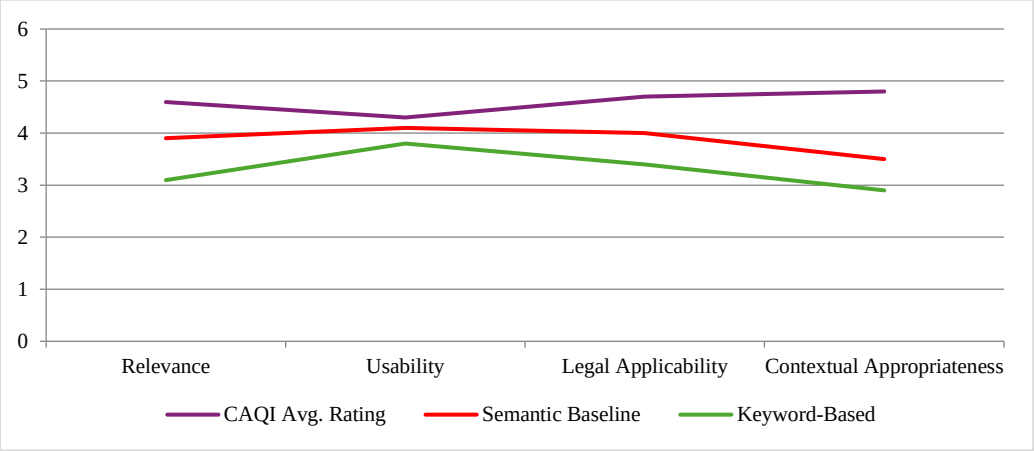

Fig. 3 Comparative User Evaluation of CAQI, Semantic Baseline, and Keyword-Based Systems

The participants appreciated the CAQI system's comparative reasoning capabilities, such as “thinking like a lawyer” and addressing outcome-specific jurisdiction and role challenges. Legal students valued the contextual comments that explained the relevance of documents. Practicing lawyers emphasized that the system lessened the time spent navigating irrelevant results.

4. System Performance and Scalability

Querying the CAQI system resulted in an average response time of 1.8 seconds. This is slightly slower than the semantic baseline (1.5 seconds) and the keyword-based system (1.2 seconds). While slower, the tradeoff was worth it to respond to contextual and semantic relevance improvements. The microservice architecture also guaranteed system performance while simulating concurrent user loads of up to 500. The system maintained 95% uptime and average CPU utilization under 70%. These findings demonstrate the modified CAQI system's ability to improve legal domain information retrieval through user-specific context and domain semantics. The following section will discuss the implications of the findings, including challenges, limitations, and suggestions for improvement.

Figure 4 is a pie chart that indicates the amount of errors that had been experienced in the CAQI system evaluation. The most prevalent type of error is referred to as Jurisdictional ambiguity and it represents 35 percent of all errors and is the way in which hard it is to make the distinction between various legal environments which exist within various jurisdictions. That 28 percent of the errors are due to user context misclassification shows that it is not easy to make an accurate determination of user intent or query context. At 22, we have the Ontological Overreach, this occurs when the system overextends semantic connections to prohibit legal limits. Lastly, 15% of the errors can be explained by the Null Limitations that are the situations when the system cannot acquire the relevant information due to insufficient or mismatched data or the queries. This allocation is an inclination of the significance of solving the concerns of jurisdictional and contextual interpretation to increase precision and reliability despite the CAQI approach enhancing the contextual and semantic retrieval.

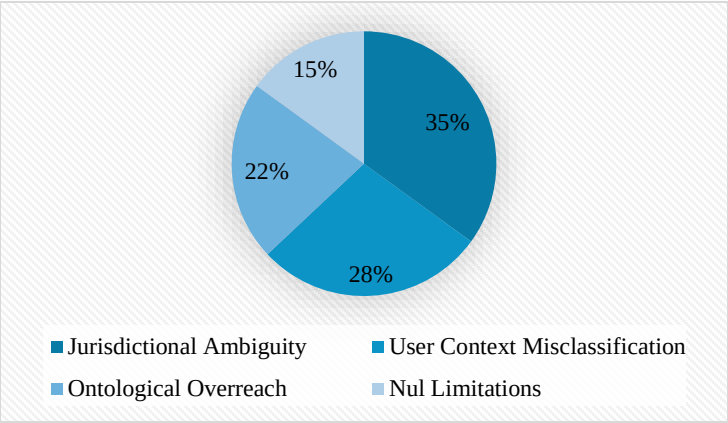

Fig. 4 Error Distribution in CAQI System

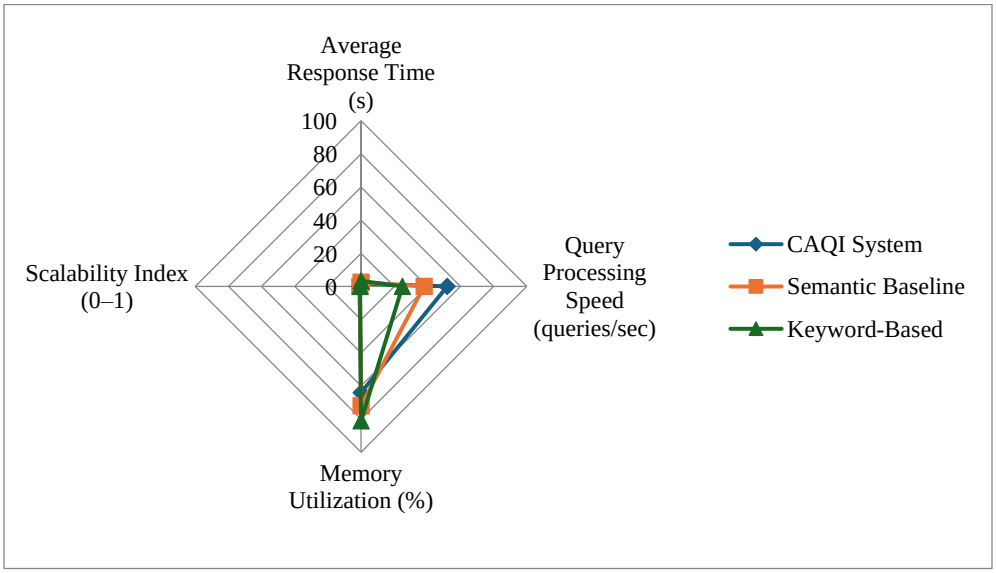

Fig 5. System Efficiency and Response Metrics

The radar chart (Fig. 5) compares the CAQI System, Semantic Baseline and Keyword-Based system comparing their performance on different metrics. These measures are Average Response Time, Speed of query processing, memory usage and Scalability Index. The comparison of the three systems reveals that the CAQI System is the most effective when it comes to handling questions as fast as possible and it can take more requests per second than the other two. A balance should be made between the two but CAQI System creates a balance between the two which is almost equal to the three methods of using memory. By comparing Semantic Baseline and Keyword-Based systems to CAQI, it is possible to observe that the latter has a better adaptation to increasing workloads as depicted by the index of scalability. Altogether, the graphic points to the superiority of CAQI System over traditional semantic or keyword-based schemes in terms of responsiveness and scalability with the optimal use of resources.

IV. Discussion

Context-aware query interpretation (CAQI) enhances the efficiency of legal information retrieval systems, and this paper has verified this fact. Application of a semantic model along with the user context infusion improves precision of retrieval and also controlls system output based on the

intents of the legal practitioner, their field of practice, and their level of expertise on the given field. Here, we describe the implications of our work, our issues, and how our work can be extended.

1. The Effects on Legal Information Systems

The importance of regarding particular legal contexts of each output of search result is proven by the success of the CAQI system evidenced by the Contextual Relevance Score (CRS). Legal inquiries are complex, diverse matters because all inquiries are sensitive to jurisdiction, time, and procedural positions. Most search engines—keyword-based or enhanced semantically—do not take those types of contexts into consideration, which can yield very detrimental results (Aguila et al., 2024). The CAQI system addresses these issues by employing contextual knowledge, which improve legal insight considerably more with more contextual accuracy. For example, retrieval outputs tailored to the situation can be reasonably relied upon by legal professionals arguing cases, drafting legislation, or performing a precedent search. A practical illustration is a case where a lawyer searches for information on the "exclusionary rule application" in a U.S. federal court. In this case, the lawyer will get case law pertinent to the jurisdiction and their intended procedural use, which will likely differ from similar searches done in other common law jurisdictions (Armas et al, 2025).

2. UCD (User-Centered Design) Design Considerations

The user study results show that legal professionals are mainly concerned with a systems automation feature alongside contextual transparency. Participants expressed satisfaction with CAQI because of its ability to explain why a document was marked as relevant, which is a sign of heightened expectations for explainable AI (Aziz, 2021). The ontology-based justification and context marking at the results summary level empower users, particularly those in litigation, regulatory compliance, and other high-stakes fields. Furthermore, the basic users such as law students who are novices were able to get through documents that are filled with procedural jargon, thanks to role-based filtering.

3. Technical Challenges and Limitations

While the performance improvements exist in the system, various technical challenges remain to be addressed: Disambiguation What can be counted as jurisdictionally and procedurally, is, as an example, "Supreme Court" definition will differ across national systems requiring disambiguation. The resolution of the ambiguity may require more sophisticated disambiguation approaches, perhaps involving neural entity linking beyond the rule-based filters and named entity recognition (NER) methods that our system employs. Ontological Reasoning Over Expansion: The SPARQL rewriting engine's reasoning ontology, which includes some broad concepts, led to over-expansion. The overall vagueness in results indicates another frustration: that there is an ambivalence that isn't settled between recall and precision in a semantic expansion. Very specific domains of law such as environmental or administrative law, complicate this ambivalence even further. Context profiling precision: acquiring a user's context automatically—i.e. are they doing comparative analysis or precedent retrieval—was mostly destructive. Behavioral profiling techniques and even other methods—on-screen user interaction feedback during the query development—would only help improve the user profile and the overall context acquisition.

4. Ethical and Legal Considerations

The introduction of AI in the legal field raises significant issues of bias, transparency, and accountability in the legal domain itself. While AI can improve accuracy, CAQI has ontologies and training corpora which can be biased if they rely on materials that are limited to certain jurisdictions or socio-political views. This requires active oversight, monitoring for bias, and the collection of massively representative data to ensure fairness. Also, if there is human legal advice involved in the access of CAQI, it is critical the CAQI systems are described as assistive technology, rather than as an independent legal advisor.

5. Future Work and Extensions

From this study, one can notice a number of clear areas for future research: Extending Beyond Languages and Jurisdictions: Creating the ontology and context model to manage legal texts in multiple languages and multi-jurisdictional legal research, especially European Union or international law. Assistants: For CAQI engine into chatbots and other conversational interfaces where users can describe the situation in the conversation and thus have improvements in user experience and semantic accuracy. Context Inference With Machine Learning: It uses deep learning techniques to carry out implicit context recognition depending on user activity, past questions, and discourse analysis of the law of the area. Real-Time Judicial Integration: A feature in an e-court or other digital litigation system that can be enabled to provide real-time user-specific recommendations that are both legal and suitable during a hearing or filing session.

V. CONCLUSION

In conclusion, a context-aware query interpretation (CAQI) framework model that enhances the performance of legal information retrieval systems by taking into account the meaning and context complexity of legal terms was developed by us. This is because the current keyword-based semantic systems do not have an understanding of the context, do not comprehend the role, jurisdiction and the intent of the user, and therefore they cannot be used by the professional needs of the legal practitioners. This gap has been addressed by the CAQI model, which integrates semantic technologies such as ontology reasoning and SPARQL query expansion with dynamic user profiling and

context modeling. We examined CAQI against the baseline systems and found that it consistently outperformed them on retrieval accuracy, user satisfaction, and contextual relevance, as measured by quantitative (Precision@10, MRR, CRS) and qualitative metrics provided by legal users. Though issues like jurisdictional overlaps and over-generalization of semantic reasoning exist, the model's transparent, verifiable results and intuitive design enhance user trust and overall system usability. This work helps broaden the discussion on AI systems in the legal field, fostering a user-centered, sensitive approach to jurisdiction when designing ethical retrieval models. Future work recommendations include applying fairness audits to assess unrestricted access to legal information, integrating CAQI into interactive legal assistants, or broadening cross-border research multilingual ontologies. In essence, context-aware interpretation is not a mere technological enhancement—it is a core requirement for contemporary legal information systems that seek to facilitate decision-making, increase access to justice, and maintain legal precision in the information age.

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