

REVIEWER'S REPORT

Manuscript No.: **IJAR-58708**

Title: **AI-Augmented Judicial Relativity Framework (JRF).**

Recommendation:

Accept as it is

Accept after minor revision.....

Accept after major revision ...✓.....

Do not accept (*Reasons below*)

Rating	Excel.	Good	Fair	Poor
Originality		✓		
Techn. Quality		✓		
Clarity			✓	
Significance			✓	

Reviewer's ID: JPR- **098**

Detailed Reviewer's Report

Decision: Accept after Major Revision

Major Comments

- Lack of empirical validation:** The proposed framework is conceptual, and no real-world dataset or experimental implementation is provided. The authors should validate the framework using appropriate real legal datasets and report quantitative results.
- Insufficient justification of judicial dimensions:** The selection of dimensions such as Evidence Strength, Witness Reliability, and Precedent Similarity requires stronger theoretical and domain-expert justification. The authors should explain how these dimensions are identified and validated.
- PCA-to-legal interpretation needs clarification:** PCA generates statistical components based on variance and does not inherently correspond to legally meaningful concepts. The manuscript should provide a rigorous methodology for mapping PCA components to judicial dimensions.
- No experimental justification for five dimensions:** Although the manuscript proposes reducing approximately 120 variables to five judicial dimensions, actual eigenvalues, explained-variance ratios,

REVIEWER'S REPORT

cumulative variance, or other evidence supporting the choice of five dimensions are not presented.

5. **Precedent retrieval is not experimentally evaluated:** The proposed top-100 → top-10 → top-3 retrieval strategy and HNSW-based search require quantitative evaluation using suitable retrieval metrics such as Precision@K, Recall@K, and MRR.
6. **Causal-inference component is insufficiently developed:** The road-accident case mentions causal inference, but no causal graph, variables, assumptions, estimation procedure, or experimental validation is provided.
7. **Shapley-value formulation requires further clarification:** The relationship between PCA feature contributions and Shapley values should be explained more rigorously. The authors should clearly distinguish exact PCA decomposition from approximate Shapley/KernelSHAP explanations for nonlinear models.
8. **Insufficient comparison with existing approaches:** The manuscript should compare JRF with existing legal-AI systems, legal precedent retrieval approaches, and explainable decision-support methods to clearly demonstrate its novelty and advantages.
9. **Hypothetical case studies limit the conclusions:** The property-ownership and road-accident examples are illustrative rather than empirical. The authors should either introduce real or properly benchmarked cases or substantially moderate claims regarding effectiveness and generalizability.
10. **Need for expert/human evaluation:** Since the framework is intended to assist judges, its usefulness should be evaluated by legal experts or appropriate judicial professionals. The authors should assess interpretability, usefulness, trust, consistency, and the risk of automation bias.

Minor Revisions

1. **Strengthen the research gap:** The introduction should more explicitly identify the specific limitations of existing legal-AI systems that the proposed framework addresses.

REVIEWER'S REPORT

2. **Improve terminology consistency:** Terms such as *judicial dimensions*, *judicial components*, *latent dimensions*, and *principal components* should be clearly defined and used consistently throughout the manuscript.
3. **Clarify illustrative numerical values:** Scores such as 92%, 87%, 95%, and 76% in the judicial dashboard should be explicitly identified as hypothetical examples rather than experimental results.
4. **Provide implementation details:** The manuscript should specify the exact NLP models, embedding models, software libraries, model versions, and important hyperparameters required to reproduce the proposed framework.
5. **Expand knowledge-graph methodology:** The authors should provide additional information about the ontology, entity types, relationship types, and procedures used to construct and validate the legal knowledge graph.
6. **Clarify contradiction detection:** The limitations of general-purpose NLI models for detecting complex legal contradictions should be discussed, and the manuscript should explain how legal-domain contradictions will be validated.
7. **Improve the figures:** The architecture figures should provide clearer data-flow relationships between NLP processing, feature fusion, dimensionality reduction, precedent retrieval, XAI, and the final judicial dashboard.
8. **Improve Table 1:** The manuscript should indicate how the listed numerical variables are obtained, measured, normalized, and validated.
9. **Strengthen the limitations section:** The authors should explicitly acknowledge the absence of empirical evaluation, real judicial data, baseline comparisons, and expert validation as limitations. The current section already discusses bias, automation bias, data quality, and security.
10. **Proofread and improve presentation:** The manuscript should be carefully checked for grammatical issues, formatting inconsistencies, equation presentation, spacing, terminology, and reference formatting before resubmission.