

ICRAMCS 2026

THE EIGHTH EDITION OF THE INTERNATIONAL CONFERENCE ON
RESEARCH IN APPLIED MATHEMATICS AND COMPUTER SCIENCE

April 23-24-25, 2026 | Marrakech, Morocco



DeepLawExpert: An Agentic Hybrid Graph-Vector RAG ChatFramework for Complex Legal Reasoning in the Moroccan Juridical Context

Communication Info

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Keywords:

- (1) Graph RAG
- (2) Moroccan Law
- (3) Agentic AI
- (4) Neo4j
- (5) LangGraph
- (6) Semantic Search

Abstract

The structure of the Moroccan legal system is very complex, it includes many legislation and it is difficult to retrieve a factual legal answer [1]. The standard Vector RAG models have significant shortcomings including poor modeling of structural relations like normative hierarchy, amendment, repeal and legal hallucination [2]. We propose a new hybrid Agentic RAG framework that focuses on the Moroccan law [3]. DeepLawExpert combines semantic vector retrieval and knowledge graph reasoning in a multi-modal database (Neo4j). An independent orchestrator picks up the right retrieval method according to query complexity [4]. The system relies on four main modules: segmented at article level to keep legal coherence, a Moroccan legal ontology for mapping Dahirs and articles, a multi-agent (Vector, Graph and Web) architecture coordinated with LangGraph for multi-hop reasoning, and smart context fusion for truthful, source-traceable, Arabic/French responses [5]. Experiments results prove a good improvement of the response completeness and correctness, with a significant reduction of hallucination.

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