A Criminal Domain Ontology for Modelling Legal Norms

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Abstract

- An ontological model for legal norms of the criminal domain.
- An ontology-based modelling approach: (1) build a criminal domain ontology; (2) formalize the legal rules based on it.
- A middle-out approach is applied for developing the criminal domain ontology based on ontology modularization and reuse processes.
- Domain application: Lebanese criminal code.

Objectives

- Simplify the difficulty of modeling legal norms by proposing an ontology-based approach.
- Simplify the complexity of ontology building process by reusing foundational and legal core ontologies.
- Obtain a well-founded ontological model for the legal norms of the criminal domain.

Methods

- Modelling the legal norms:
  1. Modelling the content of the legal norms: results in an ontological model (criminal domain ontology).
  2. Modelling the procedural aspect of the legal norms using logical formalisms: results in list of formalized rules.

- Building a criminal domain ontology: modularize the ontology into four modules: upper, core, domain and domain-specific.
  1. Top-down: conceptual modelling process (using OntoUML as ontology modelling language) performed by reuse of existent validated ontologies.
     - Upper module: reuse of the unified foundational ontology (UFO).
     - Core module: reuse of the legal core ontology (LKIF-Core).
  2. Bottom-up: Ontology learning process from texts + NLP techniques (domain and domain-specific modules).
  3. Modules Integration.

Results

- Upper module in ONTOUML (Concepts reused from UFO)
- Core Module in ONTOUML (Concepts reused from LKIF-Core)
- Domain Module in Protégé
- Domain-specific Module in Protégé

Conclusion

- Criminal domain ontology filled the gap between texts and norms modelling.
- Reusing UFO in conceptual modelling for building well-founded and consistent legal domain ontology.
- Reusing UFO and LKIF-Core facilitate and speed up the ontology building process.