

PR-OWL: A Framework for Probabilistic Ontologies

Paulo C. G. COSTA, Kathryn B. LASKEY

Ngoc-Tung Nguyen

CS-498

Limitation of OWL

- Has its roots in traditional knowledge representation formalism that has historically not considered uncertainty
- Provides no consistent support for uncertainty representation or plausible reasoning
 - Due to a closed system designed to perform well-defined tasks, from which clear and unambiguous vocabularies can be constructed
- As a result, too much information is lost to the lack of a good representational scheme that captures structural constraints and dependencies

PR-OWL: Why was it Created?

- Need to introduce a logically coherent representation for uncertainty
- How:
 - Developed as an extension enabling OWL to represent complex Bayesian probabilities models in a flexible manner

$$P(A|B) = \frac{P(B|A) P(A)}{P(B)}$$

PR-OWL Implementation

Multi-Entity Bayesian Network (MEBN)

- Provides a mathematical foundations for learning and inference, that reduces to classical logic in the case of certain knowledge
- Represent the world as comprised of entities that have attributes and are related to other entities
- Even the most specific situations can be represented, provided that it can b in FOL

Main Elements of the PR-OWL Upper Ontology

