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## **The Use of Probabilistic Description Logics in Artificial Intelligence (AI)**

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Probabilistic Description Logics (PDLs) are extensions of Classical Description Logics (DLs) by incorporating probabilistic reasoning, enabling the representation and manipulation of uncertain knowledge in a syntactically and semantically rich framework. The widespread use of AI in everyday life such as IoT, semantic web services, biology, medicine etc., and the limitations and issues in the uncertain reasoning are two factors that lead us to study how uncertainty are represented by probabilistic approaches. I first introduce a tableau-based algorithm and two probabilistic reasoners TRILL and TRILLP, for SHOIQ KBs and ALC KBs, respectively, and by them I try to solve two major probabilistic problems in semantic web, i.e. uncertainty and inconsistency. By this algorithm and reasoners, I really introduce a probabilistic framework to represent the uncertainty and the inconsistency degree of the KBs and reasoning about them. This framework has been implemented as a plugin in the Protg ontology editor. Probabilistic reasoning provides a mathematical framework for representing and understanding uncertainty, and reduce the complexity to EXPTIME.

**Keywords.** probabilistic description logic, uncertainty, knowledge graph, TRILL and TRILLP, planning, artificial intelligence (AI)