

Unranked Probabilistic Theory: Project Presentation

Since the early days of Artificial Intelligence logical and probabilistic methods have been independently used in order to solve tasks that require some sorts of intelligence. Probability theory deals with the challenges posed by uncertainty, while logic is more often used for reasoning with perfect knowledge. Considerable efforts have been devoted to combining logical and probabilistic methods in a single framework, which influenced the development of several formalisms and programming tools.

All probabilistic logic formalisms studied so far permit only individual variables, that can be instantiated by a single term. On the other hand, theories and systems that use also sequence variables (these variables can be replaced by arbitrary finite, possibly empty, sequences of terms) and unranked symbols (function and/or predicate symbols without fixed arity) have emerged. The unranked term is a first-order term, where the same function symbol can occur in different places with different number of arguments. Unranked function symbols and sequence variables bring a great deal of expressiveness in language. Therefore, it is actual to study extension of probabilistic logic with sequence variables and flexible-arity function and predicate symbols.

This talk is a presentation of the fundamental research project, that aims to develop an unranked probabilistic logic, study its properties and introduce reasoning method for it. We discuss preliminary results obtained during the project preparation and objectives of the project, what is planned to be achieved.