

Computer Science Seminar

Combining Logic and Probability: Advances and Challenges

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Abstract: Knowledge representation and reasoning (KR&R) is the branch of Artificial Intelligence (AI) devoted to the design, analysis, and implementation of inference algorithms and data structures. Traditionally, it is divided into applications of logical representations and applications of probabilistic ones. Logic is more convenient for representing relational, object-based knowledge and is well suited for combinatorial (non-convex) problems and structures. Graphical probabilistic models represent uncertain knowledge better, are more natural for learning in the presence of noise.

In the last 15 years the field of KR&R has concentrated efforts on general methods for large-scale probabilistic representation and reasoning through relational probabilistic representations. Those representations use logical atoms such as $\text{partners}(X,Y)$ as random variables parameterized by logical variables.

In this talk I will present the state of the art in representation and inference with relational probabilistic models, pointing out open questions and challenges. I will also discuss ongoing work in my group on this topic, with applications to social network analysis and large models of dependencies in economics.

Monday, November 2 at 3:00 PM in SEO 200