Scalable Learning and Reasoning for Large Knowledge Graphs

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Core A (Room 301)

Abstract

Learning to reason and understand the world’s knowledge is a fundamental problem in Artificial Intelligence (AI). While it is always hypothesized that both the symbolic and statistical approaches are necessary to tackle complex problems in AI, in practice, bridging the two in a combined framework might bring intractability. Most probabilistic first-order logics are simply not efficient enough for real-world sized tasks.

With the vast amount of relational data available in digital form, now is a good opportunity to close the gap between these two paradigms. The core research question that I will address in this talk is the following: how can we design scalable statistical learning and inference methods to operate over rich knowledge representations? In this talk, I will describe some examples of my work in advancing the state-of-the-arts in theories and practices of statistical relational learning, including: 1) ProPPR, a scalable learning and reasoning framework whose inference time does not depend on the size of knowledge graphs; 2) an efficient structural gradient based meta-reasoning approach that learns formulas from relational data; 3) and an application of joint information extraction and relational reasoning in NLP. I will conclude this talk by describing my other research interests and my future research plans in the interdisciplinary field of data science.

Bio

William Wang is a final-year PhD student at the School of Computer Science, Carnegie Mellon University, working with William Cohen. He has broad interests in machine learning approaches to data science, including statistical relational learning, information extraction, social media, speech, and vision. He has published more than 30 papers at leading conferences and journals including ACL, EMNLP, NAACL, IJCAI, CIKM, ICASSP, ASRU, Machine Learning, and Computer Speech & Language. He has received best paper awards (or nominations) at ASRU, CIKM, and EMNLP, a best reviewer
award at NAACL 2015, the Richard King Mellon Presidential Fellowship in 2011, and he is a Facebook Fellowship finalist. He is an alumnus of Columbia University, and a former research scientist intern at Yahoo! Labs, Microsoft Research Redmond, and University of Southern California. William’s work has been covered by various media outlets, and he also enjoys writing scientific articles that impact the broader online community: his microblog has more than 2,000,000 views each month. More: https://www.cs.cmu.edu/~yww/

Faculty Host: Dimitris Metaxas