School of Computing and Augmented Intelligence
Spring '22 Seminar Series

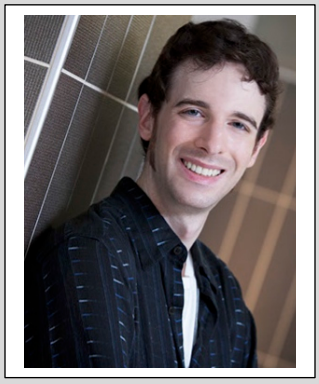
Efficient and Safe Learning of Probably Approximately Complete Action Models

Friday, January 21, 2022, 11:00AM-12:00PM (AZ time)
ZOOM: https://asu.zoom.us/j/85216088373

Abstract

In domain-independent planning, we must supply an action model that describes how the acting agent interacts with its environment. Specifying these action models can be a difficult knowledge engineering task. A natural alternative to knowledge engineering by hand is to use examples of how to solve problems in the domain to learn an action model. For example, such examples may be provided by a human operator. However, popular model learning approaches do not guarantee that the effects of an action in the model will match those in the actual environment; indeed, in some cases, the model may indicate that an action can be performed when in actuality, it will fail. In this sense, the learned action model is not safe to use. In some settings, such failures are not acceptable. In this talk, we will propose algorithms for learning action models that do guarantee safety. Although the price of safety is that sometimes for a solvable problem, the model may be inadequate to express any successful plan, we show that when given a number of demonstrations that scales linearly with the possible size of the action model, with high probability, new problems will be solvable in the learned model. Moreover, the algorithms are also guaranteed to run in polynomial time as well.

Based on joint work with Roni Stern and Hai Son Le.



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Bio

Brendan Juba is an associate professor in the Department of Computer Science and Engineering at Washington University in St. Louis. His current research interests lie in theoretical approaches to Artificial Intelligence, founded on the theory of Algorithms and Computational Complexity, and is also interested in Theoretical Computer Science more broadly construed. He is the author of "Universal Semantic Communication," concerning methods for communication without a common language. He was the recipient of a 2015 AFOSR Young Investigator Award and an NSF CAREER award in 2020.

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