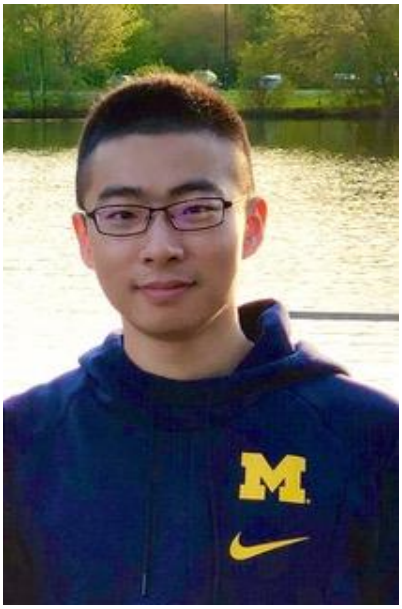
COMPUTER SCIENCE & ENGINEERING
UNIVERSITY OF MICHIGAN

DISSERTATION DEFENSE



Yongzhao Wang

Multiagent Learning by Iterative Refinement of Game Models

Monday, August 14, 2023
10:30am – 12:30pm
3725 Beyster
Hybrid – Zoom
Passcode: 344090

ABSTRACT: The methodology of Empirical Game-Theoretic Analysis (EGTA) offers a comprehensive collection of techniques for game reasoning with models based on simulation data. For multiagent systems not amenable to analytic solution, EGTA provides a simulation-based alternative, where a game model with a selected set of strategies is evaluated, addressing the most important strategic considerations. The challenge of efficiently assembling a suitable collection of strategies for a game model in EGTA is called the strategy exploration problem.

I actively investigate three main research aspects of strategy exploration under the iterative EGTA framework: evaluating strategy exploration, controlling strategy exploration, and extension of strategy exploration to mean field games (MFGs). First, I investigate some of the methodological considerations in evaluating intermediate game models generated through strategy exploration, proposing and justifying new evaluation methods based on examples and experimental observations. Second, I develop strategy exploration algorithms to build game models that involve desired solutions (e.g., a Nash equilibrium) with minimum computational costs. Third, I extend the EGTA framework to MFGs. I prove the existence of NE in the empirical MFG. Due to the non-linearity of the utility function in the mean field, to represent a game model, I introduce a game model learning approach. I combine EGTA with game model learning and provide an effective and sample efficient EGTA framework for solving MFGs.

CHAIR: Prof. Michael Wellman