An Experiment Manager for Simulation-Based Game Studies

TECHNOLOGY NUMBER: 5821

Technology ID
5821

Category
Software
MOSS - Michigan Open Source Support

Inventor
Michael Wellman
Ben-Alexander Cassell

Further information
Ashwathi Iyer
ashwathi@umich.edu
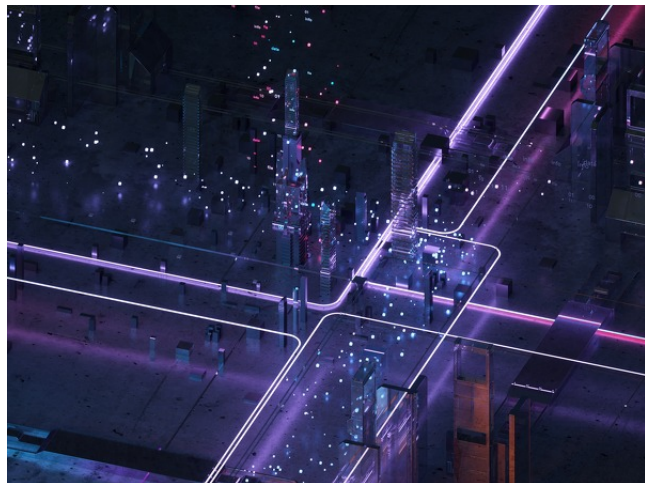
View online

OVERVIEW

Online tool manages empirical game-theoretic analysis experiments for complex simulations

- Automates data gathering and management, streamlining large-scale strategic game analysis
- Economics, policy modeling, multi-agent systems, strategic behavior research

BACKGROUND

Empirical game-theoretic analysis (EGTA) is widely used for exploring how agents make decisions in complex, strategic environments via agent-based simulation. Traditional approaches to studying such scenarios involve creating detailed payoff matrices that map possible outcomes of different agent strategies. However, as the complexity of games increases, the amount of data needed grows exponentially, resulting in extensive computational demands and cumbersome data management. Manual collection and processing of these large datasets are not only time-consuming and error-prone, but they also limit the scale and depth of analysis researchers can achieve. Moreover, coordinating large-scale EGTA experiments often requires custom code and intricate workflows, posing barriers to adoption and collaboration. There is a growing need for automated tools that can efficiently manage experimentation, data gathering, and analysis in large and intricate strategic games.

INNOVATION

EGTAOnline is an advanced experiment management system specifically designed to streamline and automate empirical game-theoretic analysis for complex, multi-agent games. The system orchestrates agent-based simulations, automates the construction of payoff matrices, and efficiently manages the substantial data generated throughout the process. By providing a robust architecture for experiment setup, execution, and result aggregation, EGTAOnline significantly reduces the computational and managerial burden on researchers. This not only enables the study of larger and more sophisticated strategic scenarios but also increases reproducibility and collaboration among research teams. EGTAOnline's capabilities pave the way for broader and more rigorous analysis in domains such as economics, policy design, adversarial security, and intelligent multi-agent systems, where modeling and responding to complex behaviors are vital.

ADDITIONAL INFORMATION

PROJECT LINKS:

- [EGTAOnline Github](#)

DEPARTMENT/LAB:

- [Michael Wellman, Computer Science and Engineering (CSE)](#)

LICENSE:

-