ZUN LI

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EDUCATION

University of Michigan, Ann Arbor *Sept. 2018 - Now*
Ph.D. in Computer Science and Engineering
Advisor: Prof. Michael P. Wellman
Topic: Computational Game Theory and Machine Learning

Shanghai Jiao Tong University *Sept. 2014 - June 2018*
B.S.E. in Computer Science (IEEE Honored Class)
Advisor: Prof. Fan Wu & Prof. Zhenzhe Zheng
Topic: Ad Auctions and Mechanism Design

INTERESTED AREAS

- Computational Economics, *e.g.*, computational game theory, auction theory, network economics
- Artificial Intelligence, *e.g.* multiagent systems, statistical learning, deep learning, reinforcement learning, evolutionary computation, probabilistic graphical models, Gaussian process, spectral learning
- Applications, *e.g.* computational advertising, recommender systems, recreational game-playing AI

PUBLICATIONS

[4] **Zun Li** (Oral), Michael P. Wellman,"Evolution Strategies for Approximate Solution of Bayesian Games", *In Proceedings of Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI)*, Virtual Online, 2021

[3] **Zun Li** (Oral), Michael P. Wellman,"Structure Learning for Approximate Solution of Many-Player Games", *In Proceedings of Thirty-Fourth AAAI Conference on Artificial Intelligence (AAAI)*, New York, 2020

[2] Steven Jecmen, Arunesh Sinha, **Zun Li**, Long Tran-Thanh, "Bounding Regret in Empirical Games", *In Proceedings of Thirty-Fourth AAAI Conference on Artificial Intelligence (AAAI)*, New York, 2020

[1] **Zun Li** (Oral), Zhenzhe Zheng, Fan Wu, Guihai Chen, "On Designing Optimal Data Purchasing Strategies for Online Ad Auctions", *In Proceedings of Seventeenth International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, Stockholm, 2018

RESEARCH EXPERIENCE

Computing Bayes-Nash Equilibrium via Evolutionary Computation *Oct. 2019 - Aug. 2020*
Research Assistant at Strategic Reasoning Group, UMich *Advisor: Prof. Michael P. Wellman*

· Considered the problem of computing Bayes-Nash equilibrium in many-player Bayesian games, with multi-dimensional type spaces and action spaces, given only black-box access to payoff values
· Formulated the problem of computing pure equilibria as a bi-level optimization problem, and designed a co-evolutionary algorithm implemented by natural evolution strategies to solve the problem
· Implemented an incremental strategy generation framework to compute mixed equilibria, including fictitious play and replicator dynamics facilitated by a supervised-model-learning module
· Evaluated all methods on a simultaneous auction game under two distinct type distributions, and found pure equilibria and mixed equilibria behaved qualitatively different for each strategic scenarios

Computing Nash Equilibrium via Model Learning *April. 2019 - Aug. 2019*
Research Assistant at Strategic Reasoning Group, UMich *Advisor: Prof. Michael P. Wellman*

· Considered the problem of computing Nash equilibrium for many-player games of complete information, given only black-box access to payoff values

- Designed two model-learning algorithms for two kinds of game structure hypothesis respectively: an unsupervised learning styled algorithm for games with symmetry property, and a greedy search algorithm for games with sparsity
- Implemented two numerical algorithms to compute Nash equilibrium for two types of succinct game models: L-BFGS-B for symmetric games, and homotopy method for graphical games
- Demonstrated the efficacy of the methods in reaching quality equilibrium in a variety of game instances
- Accepted by AAAI'2020 for oral presentation

Data Acquisition in Ad Auctions *Aug. 2016 - Sept. 2017*
Researcher Assistant at Advanced Network Lab, SJTU *Advisor: Prof. Fan Wu*

- Formulated the optimal data acquisition problem in sponsored search auctions as a two-stage game
- Derived the conditions for the uniqueness and symmetry of the equilibria using convex optimization theory and payoff equivalence principle in auction theory
- Accepted by AAMAS'18 for oral presentation

SELECTED PROJECT

Implementation of Consensus Protocols & Blockchain System *Oct. 2019 - Jan. 2020*
Course Project *Distributed Systems*

- Surveyed Paxos-family protocols including Paxos, Raft, ZooKeeper, Zyzzyva and XFT
- Implemented Paxos and Raft using Python and Go
- Designed and implemented a private blockchain system with DAG-based ledger and Byzantine consensus protocol

A Replication Study of Multiagent Reinforcement Learning *Feb. 2019 - April. 2019*
Course Project *Advanced AI*

- Surveyed state-of-the-art multiagent reinforcement learning algorithms
- Implemented multi-agent actor-critic, mean-field Q-learning, mean-field actor-critic and frequency-maximization Q-learning using PyTorch
- Compared all methods on three multiagent game tasks

A Top-K Ranking Based Collaborative Filtering Algorithm *Oct. 2018 - Dec. 2018*
Course Project *Machine Learning*

- Surveyed recommendation system algorithms including Learning-to-Rank and matrix factorization
- Designed a new metric to measure the accuracy of Top-K items ranking
- Proposed a new collaborative filtering algorithm based on the new metric
- Implemented the designed algorithm, and other state-of-art CF algorithms including Multi-Rank, Blind Regression and Retargeted Matrix Completion
- Obtained 10% for the new algorithm gain against state-of-art ones on real-world datasets including MovieLens, Netflix and Jester datasets

HONOR & REWARDS

Student Travel Scholarship: AAAI-2020, AAMAS-2018

PROGRAMMING SKILLS

• Languages: Python, C++, Go, Java • Frameworks: PyTorch, TensorFlow • Tools: Mathematica

COURSEWORK

EECS 545: Machine Learning	EECS 598: Reinforcement Learning	EECS 692: Advanced AI
EECS 586: Algorithms	EECS 591: Distributed Systems	CMPLXSYS 535: Networks
EECS 598: Quantum Computation	MATH 558: Nonlinear ODE	