JIAYU CHEN

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Professional Experience

Carnegie Mellon University, Pittsburgh, Pennsylvania, U.S.A May 2024 – May 2025

Postdoctoral Fellow in School of Computer Science

Education Background

Purdue University, West Lafayette, Indiana, U.S.A 2020 – 2024

Ph.D. in Industrial Engineering and Operation Research

Peking University, Beijing, China 2016 – 2020

B.E. from College of Engineering, with a Minor in Computer Science

Research Areas

Reinforcement Learning, Optimal Control, Stochastic Optimization, Data-driven Decision-making.

Conference Publications

1. **Jiayu Chen**, Bhargav Ganguly, Tian Lan, and Vaneet Aggarwal, "Variational Offline Multi-agent Skill Discovery", submitted to NeurIPS 2024.
2. Swetha Ganesh, **Jiayu Chen**, Gugan Thoppe, Vaneet Aggarwal, "Global Convergence Guarantees for Federated Policy Gradient Methods with Adversaries", submitted to NeurIPS 2024.
3. **Jiayu Chen**, Vaneet Aggarwal, and Tian Lan, "A Unified Algorithm Framework for Unsupervised Discovery of Skills based on Determinantal Point Process", accepted in Proc. NeurIPS, Dec 2023.
4. **Jiayu Chen**, Dipesh Tamboli, Tian Lan, and Vaneet Aggarwal, "Multi-task Hierarchical Adversarial Inverse Reinforcement Learning", accepted in Proc. ICML, Jul 2023.
5. **Jiayu Chen**, Tian Lan, and Vaneet Aggarwal, "Option-Aware Adversarial Inverse Reinforcement Learning for Robotic Control", accepted in Proc. IEEE ICRA, Jun 2023.
6. **Jiayu Chen**, Jingdi Chen, Tian Lan, and Vaneet Aggarwal, "Scalable Multi-agent Covering Option Discovery based on Kronecker Graphs", accepted in Proc. NeurIPS, Dec 2022.
7. **Jiayu Chen**, Marina Wagdy Wadea Haliem, Tian Lan, and Vaneet Aggarwal, "Multi-agent Deep Covering Option Discovery", accepted in Proc. ICML Reinforcement Learning for Real Life Workshop, Jul 2021.
8. **Jiayu Chen**, Abhishek K. Umrawal, Tian Lan, and Vaneet Aggarwal, "DeepFreight: A Model-free Deep-reinforcement-learning-based Algorithm for Multi-transfer Freight Delivery", accepted in Proc. ICAPS, Aug 2021.
9. Pin Wang, Dapeng Liu, **Jiayu Chen**, Hanhan Li, and Ching-Yao Chan, "Decision Making for Autonomous Driving via Augmented Adversarial Inverse Reinforcement Learning", accepted in Proc. IEEE ICRA, Jun 2021.
10. Jilin Mei, **Jiayu Chen**, Wen Yao, Xijun Zhao, and Huijing Zhao, "Supervised Learning for Semantic Segmentation of 3D LiDAR Data", accepted in Proc. IEEE IV, Jun 2019.

Journal Publications

1. Bhargav Ganguly, Chang-Lin Chen, **Jiayu Chen**, Abhimanyu Shekhar, Vaneet Aggarwal, Shweta Singh, "A Deep Reinforcement Learning Approach for Circular Economy Management", in progress.

2. **Jiayu Chen**, Bhargav Ganguly, Yang Xu, Yongsheng Mei, Tian Lan, and Vaneet Aggarwal, "Deep Generative Models for Offline Policy Learning: Tutorial, Survey, and Perspectives on Future Directions", submitted to TMLR.
3. **Jiayu Chen**, Tian Lan, and Vaneet Aggarwal, "Hierarchical Deep Counterfactual Regret Minimization", submitted to JMLR.
4. Hyunsoo Choi, **Jiayu Chen**, Vaneet Aggarwal, and Zubin Jacob, "TURBO-RL: Turbulence Optimization using Reinforcement Learning for Severe Turbulence Beyond Wavefront Sensor", submitted to Optics Letters.
5. Chang-Lin Chen, Hanhan Zhou, **Jiayu Chen**, Mohammad Pedramfar, Vaneet Aggarwal, Tian Lan, Zheqing (Bill) Zhu, Chi Zhou, Pol Mauri Ruiz, Neeraj Kumar, Hongbo Dong, "Learning-based Two-tiered Online Optimization of Region-wide Datacenter Resource Allocation", submitted to IEEE Transactions on Network and Service Management (TNSM).
6. Dipesh Tamboli, **Jiayu Chen**, Kiran Pranesh Jotheeswaran, Denny Yu, Vaneet Aggarwal, "Reinforced Sequential Decision-Making for Sepsis Treatment: The PosNegDM Framework with Mortality Classifier and Transformer", accepted in IEEE Journal of Biomedical and Health Informatics, Mar 2024.
7. **Jiayu Chen**, Vaneet Aggarwal, and Tian Lan, "Hierarchical Adversarial Inverse Reinforcement Learning", accepted in IEEE Transactions on Neural Networks and Learning Systems (TNNLS), Aug 2023.
8. **Jiayu Chen**, Jingdi Chen, Tian Lan, and Vaneet Aggarwal, "Learning Multi-agent Options for Tabular Reinforcement Learning using Factor Graphs", accepted to IEEE Transactions on Artificial Intelligence (TAI), Jul 2022.

Teaching Experience

School of IE, Purdue University, West Lafayette, Indiana, U.S.A 2021 Fall – 2024 Spring

Teaching Assistant IE 23000 - Probability And Statistics, IE 53800 - Nonlinear Optimization

Research Experience

School of IE, Purdue University, West Lafayette, Indiana, U.S.A 07/2020 – 05/2024

Research Assistant Instructor: Prof. Vaneet Aggarwal

- Reinforcement Learning Algorithm Design:
  - Unsupervised/Multi-agent/Offline skill discovery;
  - Hierarchical decision making;
  - Multi-task hierarchical imitation learning;
- Reinforcement Learning Applications:
  - Developed a scalable and robust scheduling algorithm that integrates Multi-agent Reinforcement Learning and Non-linear Optimization for multi-transfer freight delivery.
  - Developed a large-scale Poker AI based on Multi-agent Reinforcement Learning and Heuristic Search.
  - Utilized Offline Reinforcement Learning (specifically Decision Transformer) to optimize healthcare decision-making for Sepsis treatment, approaching the level of expert performance.
  - Applied deep reinforcement learning and an optimization solver in conjunction for efficient computing resource allocation. (A collaboration with Meta.)

School of EECS, University of California, Berkeley, California, U.S.A 09/2019 – 01/2020

Research Assistant Instructor: Prof. Ching-Yao Chan

- Developed a lane-changing simulator of autonomous vehicles based on SUMO for efficient Reinforcement Learning training and evaluation.
- Proposed a novel Meta Imitation Learning algorithm for diverse lane-changing behavior learning of autonomous vehicles, surpassing SOTA baselines.

School of EECS, Peking University, Beijing, China 09/2018 – 07/2020

Research Assistant Instructor: Prof. Huijing Zhao

- Proposed the optimal composition and combination of data input from various sensor types for the semantic segmentation of 3D LiDAR data, crucial for semantic understanding in autonomous driving.
- Implemented Semi-Supervised Learning for Semantic segmentation of 3D LiDAR data in dynamic scenes, achieving performance on par with fully supervised algorithms while utilizing just 50% labeled data.
- Constructed a simulator using CARLA to model interactions between autonomous vehicles and pedestrians, emulating crucial decision-making scenarios in autonomous driving, and employed (Inverse) Reinforcement Learning techniques to facilitate driving behavior learning.

Honors and Awards

Awarded Benz Scholarship, Peking University	Dec 2017
Acquired Learning Excellence Award, Peking University	Dec 2017
Awarded JJ World Scholarship, Peking University	Dec 2018
Acquired Merit Student Award, Peking University	Dec 2018
Awarded Peking University Third Prize Scholarship, Peking University	Dec 2019
Acquired Merit Student Award, Peking University	Dec 2019
NeurIPS Scholar Award, NeurIPS	Oct 2022, Oct 2023
Oracle for Research Project Award, Oracle	Aug 2023
Graduate School Summer Research Grant, Purdue University	Mar 2024

Service

- Reviewer:
  - ICLR 2024, NeurIPS 2023, ICML (2022, 2024), L4DC 2024
  - Information Sciences, Engineering Applications of Artificial Intelligence
  - IEEE Transactions on Neural Networks and Learning Systems
  - IEEE Transactions on Artificial Intelligence
  - IEEE Transactions on Games
  - IEEE Transactions on Intelligent Transportation Systems
  - IEEE Transactions on Cybernetics
  - IEEE Transactions on Cognitive and Developmental Systems
- Program Committee:
  - IEEE International Conference on Data Science and Advance Analytics, 2023

Miscellaneous

- **Personal Website:** https://lucascjysdl.github.io/
- GitHub: https://github.com/LucasCJYSDL
- LinkedIn: https://www.linkedin.com/in/jiayu-chen-a707b5198/