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Yue (Sophie) Guo

EDUCATION

Carnegie Mellon University *Pittsburgh, PA, US Aug 2018 - (Expected) May 2024*

PhD in Computer Science (general AI area), advised by Prof. Katia Sycara at Robotics Institute

Teaching Assistant for courses 15-482 Autonomous Agents and 15-780 Artificial Intelligence (internal GPA 3.78/4.0)

Brown University *Providence, RI, US Aug 2014 - May 2018*

B.S. in Applied Math - Computer Science, Magna Cum Laude, Honors (internal GPA 4.0/4.0)

Teaching Assistant for courses CSCI1420 Machine Learning and CSCI1430 Computer Vision

RESEARCH INTEREST

Advancing Model Transfer Techniques

Developing innovative strategies for transferring learned models across tasks, environments, and agents.

Human-Machine Teaming

Fostering collaboration between humans and AI systems through effective communication and shared understanding.

Multi-Agent Learning Systems

Designing learning algorithms that enable multiple AI agents to cooperate, compete, and learn from each other.

SELECTED PUBLICATIONS

- **Y. Guo**, J. Campbell, S. Stepputtis, R. Li, D. Hughes, F. Fang, and K. Sycara. *"Explainable action advising for multi-agent reinforcement learning."* In the Proceedings of International Conference on Robotics and Automation (ICRA). IEEE, 2023.
- J. Campbell, **Y. Guo**, F. Xie, S. Stepputtis, and K. Sycara. "*Introspective action advising for interpretable transfer learning."* In the Proceedings of Conference on Lifelong Learning Agents (CoLLAs), 2023.
- **Y. Guo**, I. Yang, Y. Wang, K. Sycara. "*Reinforcement Learning Methods for Network-based Transfer Parameter Selection*" In the *Intelligence & Robotics* (Journal), 2023.
- **Y. Guo**, I. Yang, Y. Wang. "*Reinforcement Learning Techniques for Network-Based Transfer Learning."* US Patent accepted, Notice of Allowance received in 2023.
- **Y. Guo**, R. Jena, D. Hughes, M. Lewis, K. Sycara. "*Transfer Learning for Human Navigation and Triage Strategies Prediction in a Simulated Urban Search and Rescue Task."* In the Proceedings of International Symposium on Robot and Human Interactive Communication (RO-MAN). IEEE, 2021.
- **Y. Guo**, B. Wang, D. Hughes, M. Lewis, K. Sycara. *"Designing Context-Sensitive Norm Inverse Reinforcement Learning Framework for Norm-Compliant Autonomous Agents."* In the Proceedings of International Symposium on Robot and Human Interactive Communication (RO-MAN). IEEE, 2020.
- D. Abel, Y. Jinnai, **Y. Guo**, G. Konidaris, M. Littman. "*Policy and Value Transfer in Lifelong Reinforcement Learning.*" In the Proceedings of International Conference on Machine Learning (ICML), 2018.
- **Y. Guo**, C. Binnig, T. Kraska. "*What you see is not what you get!: Detecting Simpson's Paradoxes during Data Exploration*." In the Proceedings of Workshop on Human-In-the-Loop Data Analytics (SIGMOD), ACM 2017.

RESEARCH EXPERIENCE

Carnegie Mellon University School of Computer Science *Pittsburgh, PA Oct 2018 - Present*

Advanced Agent-Robotics Technology Lab, directed by Prof. Katia Sycara

(1) Thesis Work: Action Advising framework for reinforcement learning policy transfer

• Distilled the advisor's policy to generate explanations accompanied with advice.

• Enabled the agent to evaluate the transferability of advice in unseen environments.

• Empowered the advisor to introspect its advice based on outcome estimation.
• Built a world model with prediction networks for the advisor to improve.
• *Current Work*: Enhancing advice for heterogeneous agents forming teams; incorporating team advising where agents teach each other; and advising human students using large language models.

(2) Artificial Social Intelligence for Successful Teams (ASIST)
• Developed an AI system demonstrating machine social skills of urban search and rescue (USAR) missions.
• Modeled USAR navigation into graphs of a hierarchical connection reflecting human spatial cognition.
• Deployed a network for single-player navigation prediction transferred across layouts.
• Estimated coordination time based on player roles to improve rescue efficiency.

(3) Ethical Norms for Autonomous Agents
• Created a new normative reasoning framework for context-aware learning.
• Differentiated between states and contexts, and derived reward functions from norm-compliant trajectories.
• Comprehended implicit reward functions associated with norms conflict.
• Estimated generalization of ethical reasoning to unseen scenarios.

Brown University Department of Computer Science *Providence, RI May 2016 - May 2018*

Data Science & Database Lab, directed by Prof. Tim Kraska and Prof. Carsten Binnig
• Developed efficient methods for Simpson's Paradox detection.
• Designed algorithms to reduce sample size.
• Implemented a PCA-based technique for reducing higher-dimensional queries.

Intelligent Robot Lab, directed by Prof. George Konidaris
• Performed research on policy optimization in multi-task reinforcement learning for optimal action priors.
• Explored fixed but unknown distribution with unfixed transition functions.

INDUSTRIAL EXPERIENCE

PlusAI - Research Intern *Santa Clara, California, US Jun 2022 - Aug 2022*

The company specializes in driver assistance and autonomous driving solutions.

Project on vehicle intention prediction transfer across markets, leading to an accepted US patent as 1st inventor.
• Utilized expertise in reinforcement learning to create a parameter selector for the prediction network.
• Coordinated and synchronized with teams in various global markets.

Fields Institute for Research in Mathematical Sciences - Research Intern *Toronto, Canada Jul 2017 - Aug 2017*

The Institute continues the legacy of Fields by promoting a broader understanding and applications of mathematics.

Project on Simulating a Rapidly Spinning Baseball with GPU Computing.
• Constructed models with fluid dynamics formulas.
• Implemented low-level parallel computing to handle massive computation.

XiTian Information Technology - Research Intern *Shanghai, China Jun 2015 - Aug 2015*

The company specializes in generating medical data analysis and 3-D graph for medical use.

• Applied Machine Learning methods to detect abnormal patterns in patients' data.

SKILLS

Machine Learning & AI: reinforcement learning, transfer learning, multi-agent algorithms, explainable AI, and safety.
Programming & Tools: Python, Jupyter, Matlab, C/C++, PyTorch, TensorFlow, Keras, and RLlib.
Statistical & Data Science: probability, computation theory, computer vision, and basic natural language processing.
Systems & Database: large-scale data processing and computation on server, cloud, and database-related projects.
Presentation & Communication: presenting complex findings and collaborating across multidisciplinary teams.

ACTIVITIES

FemSex: Member of the Gender, Power, Sexuality (GPS) workshop at Brown University.
Women@SCS: Member of the Women at School of Computer Science at Carnegie Mellon University.