Qi Zhang

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Positions

University of South Carolina, Columbia, SC   Aug 2020 - Present
Assistant Professor, Computer Science and Engineering
Faculty, Artificial Intelligence Institute

Education

PhD - Computer Science and Engineering, University of Michigan, Ann Arbor   2015 - 2020

BEng - Electrical Engineering, Shanghai Jiao Tong University, Shanghai, China   2011 - 2015

Research Interests

Theory and applications of Artificial Intelligence, Reinforcement Learning, Multi-Agent Systems

Selected Awards

Faculty Early Career Development Program (CAREER) Award, NSF, 2023

David J. Kuck Dissertation Prize, University of Michigan, 2021

Nominated by University of Michigan for ACM Dissertation Award, 2020

National Scholarship (1%), Ministry of Education of China, 2012 & 2013

Grants

Awarded

1. Lead PI, "CAREER: Identifying and Exploiting Multi-Agent Symmetries", $535K, May 2023 – April 2028, NSF CAREER, NSF IIS-2237963

2. Lead PI, "RI: Small: Cooperative Planning and Learning via Scalable and Learnable Multi-Agent Commitments", $332K, July 2022 – June 2025, NSF CISE Core Programs, NSF IIS-2154904

3. Lead PI, "CCRI: Planning-C: Planning to Build Digital Infrastructure for Real-Time, Continual, and Intelligent Transportation Analysis and Management", $93K, Oct 2022 – Mar 2024, NSF Community Research Infrastructure (CCRI) Program, NSF CNS-2213731

4. Lead PI, "Meta-Learning Multi-Agent Communication", $15K, July 2021 – September 2022, ASPIRE Program, University of South Carolina

5. Co-PI, "Benedict College – University of South Carolina Collaborative Program to Promote Undergraduate Computing Research", $18K, September 2022 – August 2023, Google's exploreCSR

Pending Proposals

1. Lead PI, "Adapting Foundation Models for Language-Rich Sequential Decision Making : New Focuses, Formalisms, Methods, and Applications", $550K, NSF

Papers

Preprints in Submission

1. **E(3)-Equivariant Actor-Critic Methods for Cooperative Multi-Agent Reinforcement Learning.**
   Dingyang Chen, Qi Zhang.
   Submitted to AAMAS 2024.

2. **Convergence and Price of Anarchy Guarantees of the Softmax Policy Gradient in Markov Potential Games.**
   Dingyang Chen, Qi Zhang, Thinh T. Doan.
   Submitted to AAAI 2024.

3. **Leveraging Domain Adaptation to Achieve Accurate Machine Learning Predictions for Screening New Halide Perovskites.**
   Dipannoy Das Gupta, Zachary Bar, Suxuen Yew, Santosh Adikari, Brian DeCost, Qi Zhang, Charles Musgrave, Christopher Sutton.
   In submission for Journal of the American Chemical Society (JACS).

Conference

5. **Context-Aware Bayesian Network Actor-Critic Methods for Cooperative Multi-Agent Reinforcement Learning.**
   Dingyang Chen, Qi Zhang.
   The 40th International Conference on Machine Learning (ICML 2023).

6. **Ensemble Policy Distillation with Reduced Data Distribution Mismatch.**
   Yuxiang Sun, Qi Zhang.
   The 2022 International Joint Conference on Neural Networks (IJCNN 2022).

7. **Communication-Efficient Actor-Critic Methods for Homogeneous Markov Games.**
   Dingyang Chen, Yile Li, Qi Zhang.
   The Tenth International Conference on Learning Representations (ICLR 2022).

8. **Knowledge Infused Policy Gradients with Upper Confidence Bound for Relational Bandits.**
   Kaushik Roy, Qi Zhang, Manas Gaur, Amit Sheth.
   European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD) 2021.

9. **Efficient Querying for Cooperative Probabilistic Commitments.**
   Qi Zhang, Edmund Durfee, Satinder Singh.
   The 35th AAAI Conference on Artificial Intelligence (AAAI 2021).

10. **Modeling Probabilistic Commitments for Maintenance Is Inherently Harder than for Achievement.**
    Qi Zhang, Edmund Durfee, Satinder Singh.
    The 34th AAAI Conference on Artificial Intelligence (AAAI 2020).

11. **Learning to Communicate and Solve Visual Blocks-World Tasks.**
    Qi Zhang, Richard Lewis, Satinder Singh, Edmund Durfee.
    The 33rd AAAI Conference on Artificial Intelligence (AAAI 2019).

12. **Minimizing Maximum Regret in Commitment Constrained Sequential Decision Making.**
    Qi Zhang, Satinder Singh, Edmund Durfee.
    The 27th International Conference on Automated Planning and Scheduling (ICAPS 2017).

13. **Commitment Semantics for Sequential Decision Making Under Reward Uncertainty.**
    Qi Zhang, Edmund Durfee, Satinder Singh, Anna Chen, Stefan Witwicki.
    In 25th International Joint Conference on Artificial Intelligence (IJCAI 2016).

14. **Incentivize Crowd Labeling under Budget Constraint.**
    Qi Zhang, Yutian Wen, Xiaohua Tian, Xiaoying Gan, Xinbing Wang.
    In 2015 IEEE Conference on Computer Communications (INFOCOM 2015).

Workshop

15. **Subgoal Proposition Using a Vision-Language Model.**
    Jianhai Su, Qi Zhang.
    Workshop on Language and Robot Learning: Language as Grounding (LangRob) at CoRL 2023.

16. **Exploiting MDP Symmetries for Offline Reinforcement Learning.**
    Jinzhu Luo, Qi Zhang.
    Workshop on Learning Effective Abstractions for Planning (LEAP) at CoRL 2023.

17. **Intent-Aware Autonomous Driving: A Case Study on Highway Merging Scenarios.**
    Nishtha Mahajan, Qi Zhang.
    The Multi-Agent Dynamic Games Workshop at IROS 2023.

18. **Process Knowledge-infused Learning for Clinician-friendly Explanations.**
    Kaushik Roy, Yuxin Zi, Manas Gaur, Jinendra Malekar, Qi Zhang, Vignesh Narayanan, Amit Sheth.
    AAAI Second Symposium on Human Partnership with Medical Artificial Intelligence, AAAI 2023
    Summer Symposium Series.

19. **A Meta-Gradient Approach to Learning Cooperative Multi-Agent Communication Topology.**
    Qi Zhang, Dingyang Chen.
    Workshop on Meta-Learning at NeurIPS 2021.

20. **Knowledge Infused Policy Gradients for Adaptive Pandemic Control.**
    Kaushik Roy, Qi Zhang, Manas Gaur, Amit Sheth.
    AAAI-MAKE at AAAI Spring Symposium 2021.

21. **Challenges in the Trustworthy Pursuit of Maintenance Commitments under Uncertainty.**
    Qi Zhang, Edmund Durfee, Satinder Singh.
    The 20th International Trust Workshop at AAMAS 2018.

Journal

21. **Semantics and Algorithms for Trustworthy Commitment Achievement under Model Uncertainty.**
    Qi Zhang, Edmund Durfee, Satinder Singh.
    Autonomous Agents and Multi-agent Systems, 34(1), 19.

22. **Quality-Driven Auction based Incentive Mechanism for Mobile Crowd Sensing.**
    Yutian Wen, Jinyu Shi, Qi Zhang, Xiaohua Tian, Zhengyong Huang, Hui Yu, Yu Cheng, Xuemin (Sherman) Shen.
    IEEE Transactions on Vehicular Technology, 64(9), 4203-4214, 2015.

Teaching Experience

Instructor - Advanced Programming, CSCE 240, University of South Carolina [FA22, FA23]
Instructor - Artificial Intelligence, CSCE 580, University of South Carolina [FA20, FA21]
Instructor - Reinforcement Learning, CSCE 790, University of South Carolina [SP21, SP22, SP23]

Professional Service

Organizer
The Deep Reinforcement Learning Workshop at NeurIPS 2022

NSF Workshop on Data-Driven Approaches to Transportation: Bridging Research and Practice, 2023
BC-USC exploreCSR Program to Promote Undergraduate Computing Research, 2022-2023

NSF Panelist
NSF Graduate Research Fellowships Program (GRFP)NSF
NSF CISE Core Small Panel in Robust Intelligence

Conference Reviewer/Program Committee
The International Conference on Learning Representations (ICLR)
The Deep Reinforcement Learning Workshop at NeurIPS 2019, 2020
Advances in Neural Information Processing Systems (NeurIPS)
The International Conference on Machine Learning (ICML)
The AAAI Conference on Artificial Intelligence (AAAI)
IEEE World Congress on Computational Intelligence (WCCI)
The International Joint Conference on Artificial Intelligence (IJCAI)

Journal Reviewer
IEEE Internet Computing
ACM Transactions on Intelligent Systems and Technology (TIST)