Xiao Ma

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Bio

I'm a research scientist at ByteDance Research, Singapore. My research spans across general decision making, robotics, and multi-modal models. My long-term goal is to develop intelligent embodied agents that perceive, interact with, and adapt to unstructured physical environments in a shared autonomy with humans.

My work about learning composable robot systems with Differentiable Algorithm Networks (DAN) was selected as the **best system paper finalist** and **best student paper finalist** at the *Robotics: Science and Systems* (RSS), 2019.

Education

National University of Singapore (NUS) Aug. 2017 - Dec. 2021
Doctor of Philosophy in Computer Science
Advisor: Prof. David Hsu
Shanghai Jiao Tong University (SJTU) Sept. 2013 - July 2017
Bachelor of Engineering in Computer Science and Technology

Work Experiences

Research Scientist at ByteDance Research July 2024 - present
Lead Researcher at Dyson Robot Learning Lab Feb. 2023 - July 2024
Research Scientist at SEA AI Lab Jul. 2021 - Jan. 2023
Research Intern at SEA AI Lab (hosted by Dr. Min Lin and Dr. Shuicheng Yan) Apr. 2021 - Jun. 2021
Research Intern at SenseTime Research (hosted by Dr. Shuai Yi) Oct. 2019 - Sept. 2020
Software Engineer Intern at Intel Asia Pacific R & D Center May 2016 - Dec. 2016

Preprints

1. Bingyi Kang*, **Xiao Ma***, Yirui Wang, Yang Yue, Shuicheng Yan. "Improving and Benchmarking Offline Reinforcement Learning Algorithms", *arXiv preprint arXiv:2306.00972* (*equal contribution)
2. Eugene Teoh*, Sumit Patidar*, **Xiao Ma**, Stephen James. "Green Screen Augmentation Enables Scene Generalisation in Robotic Manipulation", *arXiv preprint arXiv:2407.07868* (*equal contribution)

Publications

1. Wenbo Zhang, Yang Li, Yanyuan Qiao, Siyuan Huang, Jiajun Liu, Feras Dayoub, **Xiao Ma**, Lingqiao Liu. "Effective Tuning Strategies for Generalist Robot Manipulation Policies", *International Conference on Robotics and Automation (ICRA), 2025*
2. Nikita Chernyadev*, Nicholas Backshall*, **Xiao Ma***, Yunfan Lu, Younggyo Seo, Stephen James. "Bi-Gym: A Demo-Driven Mobile Bi-Manual Manipulation Benchmark", *Conference on Robot Learning (CoRL), 2024* (*equal contribution)
3. Yang Yue, Bingyi Kang, **Xiao Ma**, Qisen Yang, Gao Huang, Shiji Song, Shuicheng Yan. "Decoupled Prioritized Resampling for Offline RL", *IEEE Transactions on Neural Networks and Learning Systems, (TNNLS)*
4. **Xiao Ma**, Sumit Patidar, Iain Haughton, Stephen James. "Hierarchical Diffusion Policy for Kinematics-Aware Multi-Task Robotic Manipulation", *Computer Vision and Pattern Recognition (CVPR), 2024*
5. Pietro Mazzaglia, Nicholas Backshall, **Xiao Ma**, Stephen James. "Redundancy-aware Action Spaces for Robot Learning", *IEEE Robotics and Automation Letters (RA-L), 2024*
6. **Xiao Ma***, Bingyi Kang*, Zhongwen Xu, Min Lin, Shuicheng Yan. "Mutual Information Regularized

Offline Reinforcement Learning", *Conference on Neural Information Processing Systems (NeurIPS), 2023* (*equal contribution)

7. Bingyi Kang*, **Xiao Ma***, Chao Du, Tianyu Pang, Shuicheng Yan. "Efficient Diffusion Policies for Offline Reinforcement Learning", *Conference on Neural Information Processing Systems (NeurIPS), 2023* (*equal contribution)
8. Jiawei Ren*, Mingyuan Zhang*, Cunjun Yu*, **Xiao Ma**, Liang Pan, Ziwei Liu. "InsActor: Instruction-driven Physics-based Characters", *Conference on Neural Information Processing Systems (NeurIPS), 2023* (*equal contribution)
9. Siwei Chen, **Xiao Ma**, Zhongwen Xu. "Imitation Learning via Differentiable Physics", *Computer Vision and Pattern Recognition (CVPR), 2023*
10. Siwei Chen*, Cunjun Yu*, Yiqing Xu*, Linfeng Li, **Xiao Ma**, Zhongwen Xu, David Hsu. "Benchmarking Deformable Object Manipulation with Differentiable Physics", *International Conference on Learning Representations (ICLR), 2023* (**oral**, *equal contribution)
11. Jiawei Ren*, Cunjun Yu*, Siwei Chen, **Xiao Ma**, Liang Pan, Ziwei Liu. "DiffMimic: Efficient Motion Mimicking with Differentiable Physics", *International Conference on Learning Representations (ICLR), 2023* (*equal contribution)
12. Wei Qiu, **Xiao Ma**, Bo An, Svetlana Obraztsova, Shuicheng Yan, Zhongwen Xu. "RPM: Generalizable Behaviors for Multi-Agent Reinforcement Learning", *International Conference on Learning Representations (ICLR), 2023*
13. Hai Nguyen*, Zhihan Yang*, Andrea Baisero, **Xiao Ma**, Robert Platt, Christopher Amato. "Hierarchical Reinforcement Learning under Mixed Observability", *Workshop on the Algorithmic Foundations of Robotics (WAFR), 2022* (*equal contribution)
14. **Xiao Ma**, David Hsu, Wee Sun Lee. "Learning Latent Graph Dynamics for Visual Manipulation of Deformable Objects", *International Conference on Robotics and Automation (ICRA), 2022*
15. Daisheng Jin*, **Xiao Ma***, Chongzhi Zhang, Yizhuo Zhou, Jiashu Tao, Mingyuan Zhang, Zhoujun Li, Xiaolong Liu. "Towards Overcoming False Positives in Visual Relationship Detection", *British Machine Vision Conference (BMVC), 2021* (*equal contribution)
16. **Xiao Ma**, Siwei Chen, David Hsu, Wee Sun Lee. "Contrastive Variational Model-Based Reinforcement Learning for Complex Observations", *The 4nd Conference on Robot Learning (CoRL), 2020*
17. Jiawei Ren, Cunjun Yu, Shunan Sheng, **Xiao Ma**, Haiyu Zhao, Shuai Yi, Hongsheng Li. "Balanced Meta-Softmax for Long-Tailed Visual Recognition", *Advances in Neural Information Processing Systems (NeurIPS), 2020*
18. Siwei Chen, **Xiao Ma**, David Hsu. "DinerDash Gym: A Benchmark for Policy Learning in High-Dimensional Action Space", *In IL workshop, Robotics: Science and Systems (RSS), 2020*
19. Cunjun Yu*, **Xiao Ma***, Jiawei Ren, Haiyu Zhao, Shuai Yi. "Spatio-Temporal Graph Transformer Networks for Pedestrian Trajectory Prediction", *European Conference on Computer Vision (ECCV), 2020* (*equal contribution)
20. Zuowu Zheng, Xiaofeng Gao, **Xiao Ma**, Guihai Chen. "Predicting Hot Events in the Early Period through Bayesian Model for Social Networks", *IEEE Transactions on Knowledge and Data Engineering (TKDE), 2020*
21. **Xiao Ma**, Peter Karkus, David Hsu, Wee Sun Lee, Nan Ye. "Discriminative Particle Filter Reinforcement Learning for Complex Partial Observations", *International Conference on Learning Representations (ICLR), 2020*
22. **Xiao Ma***, Peter Karkus*, David Hsu, Wee Sun Lee. "Particle Filter Recurrent Neural Networks", *AAAI Conference on Artificial Intelligence (AAAI), 2020* (*equal contribution)

23. Peter Karkus, **Xiao Ma**, David Hsu, Leslie Pack Kaelbling, Wee Sun Lee, Tomas Lozano-Perez. "Differentiable Algorithm Networks for Composable Robot Learning", *Robotics: Science and Systems (RSS), 2019* (**Best Student/System Paper Finalist**)

24. **Xiao Ma**, Peter Karkus, David Hsu, Wee Sun Lee "PF-LSTM: Belief State Particle Filter for LSTM", *In RLPO Workshop, Advances in Neural Information Processing Systems (NeurIPS), 2018*

25. **Xiao Ma**, Xiaofeng Gao, Guihai Chen. "BEEP: a Bayesian perspective Early state Event Prediction model for online social networks", *IEEE International Conference on Data Mining (ICDM), 2017*

26. **Xiao Ma**, Zhenzhe Zheng, Fan Wu and Guihai Chen. "Trust-Based Time Series Data Model for Mobile Crowdsensing", *IEEE International Conference on Communications (ICC), 2017*

Awards

NUS School of Computing Research Achievement Award	2020
Robotics: Science and Systems Best Student Paper Finalist	2019
Robotics: Science and Systems Best System Paper Finalist	2019
NUS Research Scholarship	2017
Excellent Project of the *National Undergraduate Training Programs for Innovation*	2016
Academic Excellence Scholarship, SJTU	2016, 2014
Honorable Mention of Mathematical Contest In Modeling	2015, 2016

Professional Activities

Reviewer

- Conferences: NeurIPS (2020 - 2024), WACV (2021 - 2023), ICRA (2021 - 2023), AAAI (2021 - 2023), CVPR (2021 - 2023), ICLR (2022 - 2023), ICML (2022 - 2024)
- Journals: RA-L (2021 - 2023)

Teaching

- CS3243: Introduction to Artificial Intelligence (Spring 2018)
- CS6244: Robot Motion Planning and Control (Winter 2018)
- CS5478: Intelligent Robots: Algorithms and Systems (Spring 2020)