MINGHUAN LIU

Email: minghuan AT utexas.edu
http://minghuanliu.com [Google Scholar]

WORKING EXPERIENCE

University of Texas at Austin *Aug. 2025 - Now*
Postdoctoral fellowship
· Robot Perception and Learning Lab
· Director: Yuke Zhu
- General robot policy with spatial alignment, tactile integration, high dynamic, cross-embodiment, and sim-real data cotrain.

ByteDance Seed-Robotics (Prev. AILab Research) *Nov. 2024 - Aug. 2025*
Research Scientist
· Director: Tao Kong, Hang Li
- 3D foundation model and sim-to-real manipulation.

EDUCATION

Shanghai Jiao Tong University (SJTU) *Sep. 2019 - Dec. 2024*
Ph.D in Computer Science and Technology
· Apex Data & Knowledge Management Lab
· Prior Leader of the ApexRL research group
· Advisor: Weinan Zhang
· Member of Wu Wen Jun Honorary Doctoral Plan (Advisor: Cewu Lu)
- Reinforcement learning, imitation learning, humanoid, and cross-embodiment.

University of California San Diego (UCSD) *Sep. 2023 - Aug. 2024*
Visiting Ph.D. in Electrical and Computer Engineering
· Advisor: Xiaolong Wang
- Legged lo-manipulation, sim-to-real, and teleoperation system.

Southwest Jiaotong University (SWJTU) *Sep. 2015 - July. 2019*
B.S. in Computer Science and Technology
· Overall GPA: 3.84/4.0 Ranking: 1/98
· Key Lab of Cloud Computing and Intelligent Technology
· Advisor: Tianrui Li
- Neural Language Processing

RESEARCH INTERESTS

- My research interests lie in the general area of **decision modeling**. Particularly, I was devoted to (data-driven) **reinforcement learning (RL)** methods (such as **imitation learning (IL)**, **offline RL**) and also **foundation models** that can help resolve real-world decision-making challenges.

- I have been working on one of the most complicated decision-making problems, **robots**, aiming at taking intelligent robots closer to real life, e.g., expanding the skills of robots, and helping robots make smart decisions. Recently, I've been thinking about the right way to build the real general robot policies, specifically, the way to align the action (embodiment's 3D information) to the world (external 3D information).

SELECTED PUBS / PREPRINTS

(* Equal Contribution / Project Lead)

Manipulation as in Simulation: Enabling Accurate Geometry Perception in Robots. [ManipAsInSim Page]
Minghuan Liu*, Zhengbang Zhu*, Xiaoshen Han*, Peng Hu*, Haotong Lin, Xinyao Li, Jingxiao Chen, Jiafeng Xu, Yichu Yang, Yunfeng Lin, Xinghang Li, Yong Yu, Weinan Zhang, Tao Kong, Bingyi Kang
Tech Report.

RHINO: Learning Real-Time Humanoid-Human-Object Interaction from Human Demonstrations. [RHINO Page]
Jingxiao Chen, Xinyao Li, Jiahang Cao, Zhengbang Zhu, Wentao Dong, **Minghuan Liu***, Ying Wen, Yong Yu, Liqing Zhang, Weinan Zhang
Tech Report.

HugWBC: A Unified and General Humanoid Whole-Body Controller for Fine-Grained Locomotion. [HugWBC Page]
Yufei Xue, Wentao Dong, **Minghuan Liu***, Weinan Zhang, Jiangmiao Pang
RSS 2025.

Prompting Depth Anything for 4K Resolution Accurate Metric Depth Estimation. [PromptDA Page]
Haotong Lin, Sida Peng, Jingxiao Chen, Songyou Peng, Jiaming Sun, **Minghuan Liu**, Hujun Bao, Jiashi Feng, Xiaowei Zhou, Bingyi Kang
CVPR 2025.

Towards Generalist Robot Policies: What Matters in Building Vision-Language-Action Models. [RoboVLMs Page]
Xinghang Li*, Peiyan Li, **Minghuan Liu***, Dong Wang, Jirong Liu, Bingyi Kang, Xiao Ma, Tao Kong, Hanbo Zhang*, Huaping Liu
Tech Report.

WildLMa: Long Horizon Loco-Manipulation in the Wild. [WildLMa Page]
Ri-Zhao Qiu*, Yuchen Song*, Xuanbin Peng*, Sai Aneesh Suryadevara, Ge Yang, **Minghuan Liu**, Mazeyu Ji, Chengzhe Jia, Ruihan Yang, Xueyan Zou, Xiaolong Wang
ICRA 2024.

GenSim2: Scalable Robotic Data Generation with Multi-modal LLMs. [GenSim2 Page]
Pu Hua*, **Minghuan Liu***, Annabella Macaluso*, Yunfeng Lin, Weinan Zhang, Huazhe Xu, Lirui Wang
CoRL 2024.

ACE: A Cross-platform Visual-Exoskeletons for Low-Cost Dexterous Teleoperation. [ACE Page]
Shiqi Yang, **Minghuan Liu**, Yuzhe Qin, Runyu Ding, Jialong Li, Xuxin Cheng, Ruihan Yang, Sha Yi, Xiaolong Wang
CoRL 2024.

Visual Whole-Body Control for Legged Loco-Manipulation. [VBC Page]
Minghuan Liu*, Zixuan Chen*, Xuxin Cheng, Yandong Ji, Ruihan Yang, Xiaolong Wang
CoRL 2024. CoRL.

Visual-Language Foundation Models as Effective Robot Imitators. [RoboFlamingo Page]
Xinghang Li*, **Minghuan Liu***, Hanbo Zhang, Cunjun Yu, Jie Xu, Hongtao Wu, Chilam Cheang, Ya Jing, Weinan Zhang, Huaping Liu, Hang Li, Tao Kong

ICLR 2024. Spotlight.

Unleashing Large-Scale Video Generative Pre-training for Visual Robot Manipulation. [GR1 Page]
Hongtao Wu, Ya Jing, Chilam Cheang, Guangzeng Chen, Jiafeng Xu, Xinghang Li, **Minghuan Liu**, Hang Li, Tao Kong
ICLR 2024.

MADiff: Offline Multi-agent Learning with Diffusion Models.
Zhengbang Zhu*, **Minghuan Liu***, Liyuan Mao, Bingyi Kang, Minkai Xu, Yong Yu, Stefano Ermon, Weinan Zhang
NeurIPS 2024.

Visual Imitation Learning with Patch Rewards. [PatchAIL Page]
Minghuan Liu, Tairan He, Weinan Zhang, Shuicheng Yan, Zhongwen Xu.
ICLR 2023.

PerfectDou: Dominating DouDizhu with Perfect Information Distillation. [PerfectDou Page]
Guan Yang*, **Minghuan Liu***, Weijun Hong, Weinan Zhang, Fei Fang, Guangjun Zeng, Yue Lin.
NeurIPS 2022.

Plan Your Target and Learn Your Skills: Transferable State-Only Imitation Learning via Decoupled Policy Optimization. [DePO Page]
Minghuan Liu, Zhengbang Zhu, Yuzheng Zhuang, Weinan Zhang, Jun Wang, Yong Yu, Jianye Hao.
ICML 2022.

Goal-Conditioned Reinforcement Learning: Problems and Solutions.
Minghuan Liu, Menghui Zhu, Weinan Zhang.
IJCAI 2022 (Survey Track).

Curriculum Offline Imitation Learning.
Minghuan Liu*, Hanye Zhao*, Zhengyu Yang, Jian Shen, Weinan Zhang, Li Zhao, Tie-Yan Liu.
NeurIPS 2021.

MapGo: Model-Assisted Policy Optimization for Goal-Oriented Tasks.
Menghui Zhu*, **Minghuan Liu***, Jian Shen, Zhicheng Zhang, Sheng Chen, Weinan Zhang, Deheng Ye, Yong Yu, Qiang Fu, Wei Yang.
IJCAI 2021.

Energy-Based Imitation Learning.
Minghuan Liu, Tairan He, Minkai Xu, Weinan Zhang.
AAMAS 2020. Oral.

AWARDS & HONORS

ByteDance Scholarship (10 per year in China) *2022*

NeurIPS 2022 Top Reviewer *2022*

China National Scholarship for Ph.D. (1‰) *2022*

TOP 1, Ubiquant Special Retro Snake Challenge (Bonus ∼ $10k) *2022*

TOP 6, Finalist of Sports Analytics Challenge (sponsored by PSG) *2019*

TOP 10, SCADA Data Missing Repair Competition *2019*

TOP 3, AI Challenger 2018 in Weather Forecasting *2018*

Sishiyanghua Medal (Only 10 in university) *2019*

Outstanding Graduate *2019*

National First Prize, China Undergraduate Mathematical Contest in Modeling *2017*

Meritorious Winner, Mathematical Contest In Modeling *2017*

China National Scholarship × 2 (1%) *2016&2017*

Tang Lixin Scholarship (1‰) *2017*

IBM Scholarship (1‰) *2017*

Special Grade Comprehensive Scholarship × 4 (1%) *2016 - 2018*

SERVICES

Conference Reviewer: NeurIPS'21'22'23, ICML'21'22'23, ICLR'23'24, CVPR'24, IJCAI'24

SKILLS

Tools: ROS 1/2, IsaacLab, Isaac Gym, SAPIEN, Autodesk Fusion, Git, Pytorch, Jax, Tensorflow, Scikit-Learn, LightGBM

Programming Languages: Python, JavaScript, C / C++, Java, MATLAB

Robot Experience: Unitree H1/B1/Z1/G1, Fourier GR-1, Inspired Hand, Ability Hand, Franka Emika Panda, UFactory xArm 7, Universal Robots UR5e

Hobbies and Interests: Tennis, Soccer, Gym, Swimming