

Jun Jin, PhD

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EDUCATION

University of Alberta	Edmonton, Canada
Ph.D. Computing Science	2016 - 2021
Thesis: Learning Geometry from Vision for Robotic Manipulation	
Ph.D. student, Construction Engineering and Management (2016 - 2017)	
Wuhan University	Wuhan, China
M.Eng. Geomatics Engineering	2012
B.A. Geodesy and Geomatics Engineering	2010
B.A. Computer Science	2010

PROFESSIONAL APPOINTMENTS

Fellow , Alberta Machine Intelligence Institute (Amii)	Sep 2023
Assistant Professor , University of Alberta	Aug 2023
Staff Senior Researcher , Noah's Ark Lab, Huawei Technologies Canada	2021 - 2023
Vice Director , Department of Intelligent Systems, China Aluminum International Engineering Corporation Limited (CHALIECO), China	2011 - 2016

AWARDS & HONORS

- **ICRA 2022 Outstanding Student Paper Finalist** (top 3 runner-up), first-author paper
IEEE Robotics and Automation Society
ICRA selects only 1 outstanding student paper from all submission tracks. 2022
- **Future Star Award**, Huawei Technologies Canada 2021
- **Alberta Graduate Excellence Scholarship**, Government of Alberta, Canada 2020
- **ICRA 2019 Travel Award**, IEEE Robotics and Automation Society 2019
- **KUKA Innovation Award: Real-World Interaction Challenge, global top 5**
KUKA AG. Germany. Role: main contributor 2018
- **Science and Technology Award**, 2nd Prize, Government of Hunan Province, China 2015
- **Science and Technology Award**, 1st Prize, Chinese Society of Nonferrous Metals, China 2014
- **Science and Technology Award**, 2nd Prize, State Bureau of Surveying and Mapping, China 2012

RESEARCH INTERESTS

Robot Learning (reinforcement learning, imitation learning), Human-Centered Autonomy.

I am passionate about creating learning architectures and algorithms on physical robots to solve real-world problems.

PUBLICATIONS

Published Manuscripts (7 first-author papers, 11 co-author papers)

* IEEE ICRA is the most cited publication venue among all robotics journals and conferences (Google Scholar, top publications in robotics), and IEEE IROS is the 4th highest cited one.

- [1] Y. Mu, Q. Zhang, M. Hu, W. Wang, M. Ding, J. **Jin**, B. Wang, J. Dai, Y. Qiao, and P. Luo, "Embodiedgpt: Vision-language pre-training via embodied chain of thought," in *Advances in Neural Information Processing Systems (NeurIPS)*, Accepted as a ***Spotlight Paper***, 2023.
- [2] H. Zhang, C. Xiao, H. Wang, J. **Jin**, B. Xu, and M. Muller, "Replay memory as an empirical mdp: Combining conservative estimation with experience replay," in *International Conference on Learning Representations (ICLR)*, 2023. Presented on May 1st, 2023, Kigali, Rwanda.
- [3] A. Karimi, J. **Jin**, J. Luo, A. R. Mahmood, M. Jagersand, and S. Tosatto, "Variable decision-frequency option critic," in *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, 2023.
- [4] B. Rafiee, S. Ghiassian, J. **Jin**, R. Sutton, J. Luo, and A. White, "Auxiliary task discovery through generate and test," in *Second Conference on Lifelong Learning Agents (CoLLAs)*, 2023.
- [5] J. **Jin**, D. Graves, C. Haigh, J. Luo, and M. Jagersand, "Offline learning of counterfactual predictions for real-world robotic reinforcement learning," in *2022 IEEE International Conference on Robotics and Automation (ICRA)* (*** Outstanding Student Paper Award Finalist**), pp. 3616–3623, IEEE, 2022.

- [6] J. **Jin** and M. Jagersand, “Generalizable task representation learning from human demonstration videos: a geometric approach,” in *2022 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 2504–2510, IEEE, **2022**.
- [7] L. Petrich, J. **Jin**, M. Dehghan, and M. Jagersand, “A quantitative analysis of activities of daily living: Insights into improving functional independence with assistive robotics,” in *2022 International Conference on Robotics and Automation (ICRA)*, pp. 6999–7006, IEEE, **2022**.
- [8] J. **Jin**, H. Zhang, and J. Luo, “Build generally reusable agent-environment interaction models,” in *Advances in Neural Information Processing Systems (NeurIPS) 2022 Workshop: Foundation Models for Decision Making*, **2022**.
- [9] Z. Zhang, J. **Jin**, M. Jagersand, J. Luo, and D. Schuurmans, “A simple decentralized cross-entropy method,” in *Advances in Neural Information Processing Systems (NeurIPS)*, vol. 34, pp. 29304–29320, **2022**.
- [10] B. Rafiee, J. **Jin**, J. Luo, and A. White, “What makes useful auxiliary tasks in reinforcement learning: investigating the effect of the target policy,” in *The 5th Multidisciplinary Conference on Reinforcement Learning and Decision Making*, RLDM, **2022**.
- [11] D. Graves, N. M. Nguyen, K. Hassanzadeh, J. **Jin**, and J. Luo, “Learning robust driving policies without online exploration,” in *2021 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 13186–13193, IEEE, **2021**.
- [12] B. Xie, M. Han, J. **Jin**, M. Barczyk, and M. Jagersand, “A generative model-based predictive display for robotic teleoperation,” in *2021 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 2407–2413, IEEE, **2021**.
- [13] J. **Jin**, N. M. Nguyen, N. Sakib, D. Graves, H. Yao, and M. Jagersand, “Mapless navigation among dynamics with social-safety-awareness: a reinforcement learning approach from 2d laser scans,” in *2020 IEEE international conference on robotics and automation (ICRA)*, pp. 6979–6985, IEEE, **2020**.
- [14] J. **Jin**, L. Petrich, M. Dehghan, and M. Jagersand, “A geometric perspective on visual imitation learning,” in *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 5194–5200, IEEE, **2020**.
- [15] J. **Jin**, L. Petrich, Z. Zhang, M. Dehghan, and M. Jagersand, “Visual geometric skill inference by watching human demonstration,” in *2020 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 8985–8991, IEEE, **2020**.
- [16] J. **Jin**, L. Petrich, M. Dehghan, Z. Zhang, and M. Jagersand, “Robot eye-hand coordination learning by watching human demonstrations: a task function approximation approach,” in *2019 International Conference on Robotics and Automation (ICRA)*, pp. 6624–6630, IEEE, **2019**.
- [17] M. Dehghan, Z. Zhang, M. Siam, J. **Jin**, L. Petrich, and M. Jagersand, “Online object and task learning via human robot interaction,” in *2019 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 2132–2138, IEEE, **2019**.
- [18] X. Qin, S. He, Z. Zhang, M. Dehghan, J. **Jin**, and M. Jagersand, “Real-time edge template tracking via homography estimation,” in *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 607–612, IEEE, **2018**.

PATENTS (SELECTED)

Before coming to Canada, I held 6 patents in China, in Autonomous Mining Systems, 3 patents in Construction Structural Health Monitoring Systems, and 2 patents for In-Vehicle Navigation Systems. Only my 2 relevant patents granted in China are highlighted below.

- [19] D. M. Graves, J. **Jin**, and J. Luo, “Methods and systems for support policy learning,” 2021. US Patent App. US20210357782A1. Pending.
- [20] J. **Jin** and N. Du, “A precision mining system with gnss integration in autonomous open pit mining,” 2016. China Patent App. CN104533528A. Granted. Google Patent Search Link.
- [21] J. **Jin** and N. Du, “A geo-robot control system for structural health monitoring,” 2015. China Patent App. CN103017824A. Granted. Google Patent Search Link.

WORKS DEPLOYED ON REAL-WORLD ROBOTIC SYSTEMS

- [1] **Multi-modal Foundation Models for multi-task robotic manipulation.** 2022-2023
This project is not published. My work relates to foundation models, transformers, Decision-making transformers (DTs), and cross-attention mechanisms to entangle NLP and control. We finished reproducing DeepMind Gato, Google RT1 (small scale) and VIMA. We developed our own decision-making multi-modal foundation models for robots. I was the main code contributor, including the transformer network and the high-performance multi-GPU training code base.
- [2] **Offline reinforcement learning for autonomous driving solutions** 2021-2022
I lead a team working on creating offline reinforcement learning solutions for autonomous driving in Huawei Canada.
- [3] **Hannover Messe 2018, live demo**, invited by KUKA AG., Hanover, Germany. 2018
“Interactive Robotic Task Teaching via online human-robot interaction”, KUKA Innovation Award global finalist. Role: main developer. Performed sensitive vision and force control in a task live for 5 days, where a KUKA iiwa robot arm applied cosmetic and personal grooming to a human mannequin. Hannover Messe is the world’s largest robotics and automation exhibit with over 300,000 industry and academic researchers attending. Media coverage: [MM MaschinenMarkt](#), [KUKA’s official YouTube video](#)
- [4] **IROS 2017 Exhibition, live demo**, invited by KUKA AG., Vancouver, Canada. 2017
“Hybrid Vision and Force Control”. Role: main developer. Performed compliance robot control interactive demos running for 3 days. We allow the audience to draw a picture on a touch panel, and our hybrid vision-force controller drives the KUKA iiwa robot arm to replicate the picture on the rough surface of a pumpkin bought from a local superstore in celebration of Thanksgiving day. Our demo caught the audience’s attention from various backgrounds, including students, professors, industrial leaders, reporters and Prof. Oussama Khatib, the director of Stanford Robotics Lab. Media coverage: [CBC News](#), [Leiphone Robotics Trends](#)
- [5] **Robotic Probe for Underground Mining Pit Investigation**, work in CHALIECO, China. 2015-2016
“A Robotic Probe for Geological and Environmental Investigation in Underground Mining Pits”, deployed in a copper mine pit, Chuxiong, Yunnan Province, China. Role: project lead. We designed an all-terrain robotic probe equipped with a 2D LiDAR, a spectrometer and a manipulator to drill samples to conduct geological and environmental investigations of old underground mining pits. The copper mine we investigated can be dated back to 300 years ago in the Ming Dynasty.
- [Project presentation](#)
- [6] **Autonomous Precision Mining for Open-pit mines**, work in CHALIECO, China. 2013-2016
“Autonomous Mining based on 3D GIS Modeling and differential GNSS”, deployed in Asia’s largest open-pit bauxite mine in Pingguo, China. Role: project lead. My team developed an autonomous mining system that can guide a fleet of excavators to perform precision mining workloads autonomously, and connect to the geological information of ore minerals provided by a 3D Geographic Information System (GIS) that manages the distribution of mineral resources. The project was among CHALIECO’s 2015 Scientific Breakthroughs. CHALIECO belongs to Aluminum Corporation of China Limited, the #1 leading company in China’s non-ferrous metals industry. Related patent: CN104533528A, CN106545046A.
- [Project presentation](#)
- [7] **A Geo-robot based Structural Health Monitoring System**, work in CHALIECO, China. 2011-2012
*“A high-precision Structural Health Monitoring System using a Geo-robot”. Role: inventor. I developed a geo-robot control system that can drive a geo-robot autonomously to measure the structural placement of civil infrastructures. My designed system is still running autonomously to monitor the structural health status of the *world’s fastest and tallest outdoor elevator*, the “Bailong Elevator”, which is 1,070 ft high and built on the iconic cliffs in Zhangjiajie, China. Related patent CN103017824A. Media coverage: [CCTV.com News](#)*
- [Project presentation](#)

SERVICE & OUTREACH

- Reviewer**, ICRA, IROS, NeurIPS, ICML, ICLR 2019 - present
- Reviewer**, Journal of Intelligent & Robotic Systems, IEEE Internet of Things Journal 2020 - present
- Reviewer**, 18th International Symposium on Experimental Robotics (ISER) 2023

PROFESSIONAL MEMBERSHIPS AND SKILLS

- Member of IEEE Robotics & Automation Society (RAS). 2019 - present
- Project Management Professional (PMP), License No. 1808776, PMI, USA. 2015 - present