YAN ZHANG

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EDUCATION

Xi'an Jiao Tong University (XJTU) *Xi'an, China*
M.Sc. Mechanical Engineering (Robotics Major) *Sept. 2019-June 2022*
Ranking: top 6% GPA: 3.72/4.0
Thesis Title: *Learning and Optimizing Variable Impedance Manipulation Skills with Human Demonstrations*
Advisors: Prof. Fei Zhao & Prof. Muxun Xu

Ecole Centrale de Lille (ECLille) *Lille, France*
M.Eng. General Engineering (Robotics and Machine Learning Minor) *Sept. 2017-June 2022*
Double Master's Degree Program between XJTU and ECLille

Xi'an Jiao Tong University (XJTU) *Xi'an, China*
B.Eng. Mechanical Engineering (Robotics Minor) *Aug. 2015-Sept. 2019*

RESEARCH INTERESTS

Robot Learning, Deep Reinforcement Learning, Learning from Demonstration, Simulation-to-Reality (Sim2Real) Transfer, Human-Robot Interaction, Robot Dynamics, Impedance Control, and Optimal Control in Robotics.

PROFESSIONAL SKILLS

Theory:	Deep Reinforcement Learning, Imitation Learning, Pattern Recognition and Computer Vision (Variable) Impedance Control and Admittance Control Theory, Optimal Control Theory Dynamics of Robot Manipulators and Quadruped Robots
Languages:	English-IELTS-7.5, French-DALF-C1
Programming:	Python, C++, MATLAB, Java
Software:	PyTorch, ROS, PyBullet, MuJoCo, SolidWorks
Others:	Linux, Latex, Git

RESEARCH EXPERIENCE

Xi'an Jiao Tong University (XJTU) *Xi'an, China*
Research Assistant *July 2019-Current*
Institute of Robotics and Intelligent Systems
Research Project: adaptive behaviors of robots in complex manipulation tasks based on interaction patterns and multi-space featured learning from demonstration methods
Role: Main contributor to robot compliant manipulation skills learning and optimization

- Developed an imitation learning framework for robots learning and generalizing variable impedance manipulation skills from human demonstrations
- Validated the imitation learning framework on the Franka Emika Robot for pouring liquid tasks using Python, C++, and ROS
- Assisted in the development and real-world validation of an imitation learning framework for robots autonomously adapting learned variable impedance manipulation skills based on the interaction forces
- Developed our group's first deep reinforcement learning framework for robots optimizing variable impedance manipulation skills in a human-like safe way using Python and PyTorch

- Validated the deep reinforcement learning framework in simulation environments built with PyBullet and MuJoCo, and in the real world for solving contact-rich tasks (established our group's first reinforcement learning validation platform from scratch)
- Developing stability-guaranteed impedance gains optimization methods for further improving our proposed deep reinforcement learning framework

Tencent Robotics X Lab *Shenzhen, China*
Research Internship *Oct. 2021-Jan. 2022*
Intelligent Agent Center
Research Project: Robots learning to move like animals
Role: Main contributor to quadruped robot locomotion gaits Sim2Real transfer

- Designed real-world experiments to test the accuracy of sensors of our self-designed quadruped robot
- Investigated factors related to the failure of quadruped robots locomotion gaits Sim2Real transfer and tested their influences on the transfer performance of our robot
- Optimized the deep reinforcement learning framework based on previous experiment results
- Successfully transferred gaits learned in simulation to the real-world quadruped robot with a 100% success rate

PAPERS AND POSTERS

- [Paper 1] **Yan Zhang**, Fei Zhao, Zhiwei Liao, "Learning and Generalizing Variable Impedance Manipulation Skills from Human Demonstrations." Accepted by *2022 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM2022)* [arXiv]
- [Paper 2] **Yan Zhang**, Fei Zhao, Xiao Wang, Muxun Xu "Learning Optimal Manipulation Skills in a Human-like Safe Way for Contact-rich Tasks." Submitted to the *IEEE Robotics and Automation Letters (RA-L) and IROS 2022*
- [Poster 1] Fei Zhao, Zhiwei Liao, **Yan Zhang**, Yuqiang Wu, "Human-Robot Skill Transfer Systems and Robot Human-like Manipulation Skills Learning Methods." In *2021 Annual Conference of Chinese Robotics Society*

AWARDS, HONORS AND SERVICES

- **China Scholarship Council (CSC) Scholarship** *Sept. 2017-July 2019*
  - 2 out of 281 students in the School of Mechanical Engineering and 20 out of thousands of students at XJTU
  - Awarded to particularly excellent undergraduate students for participating in the Double Master's Degree Program between XJTU and the universities of the Centrale Group in France
- **Nominated for the ABB Scholarship** (6 out of 281) Oct. 2016
  - Sponsored by the ABB Group. This scholarship is awarded to outstanding undergraduate students for their excellent academic performance
- **Special Prize, Academic Scholarship for postgraduate students at XJTU** (top 10%) *2019, 2020, 2021*
- **Second Prize, China Postgraduate Robot Innovation and Design Competition** *Dec. 2020*
- **Vice President of Club Time** *July 2018–July 2019*
  - Club Time is an international student organization aiming to help international students at ECLille.
- **Primary School Teacher** *Aug. 2015–Jan. 2016*
  - Voluntary social activity at XJTU; Instructed primary school students from poor families after school