Heng Zhang

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About Me

I am a PhD student at HRII Lab at **Italian Institute of Technology (IIT)**, supervised by Dr. Arash Ajoudani, I'm interested in robot learning, reinforcement learning. Specifically, My current research interest focuses on:

- Learning-based methods for robotic contact-rich tasks, focusing on safety issues, including safe exploration and safe execution;
- RL fine-tuning for VLA to achieve safe contact manipulation (multimodal VLA, including force-torque, vision, tactile sensing, and language processing).

Education

HRII Lab, IIT and **University of Genova** , PhD student in robotics and intelligent machine — Nov. 2022 – date

RAIL lab, Tongji University, Master in Control Engineering — Sep. 2019 – May. 2022

Northeast Electric Power University, Bachelor in Automation — Sep. 2012 – Jun. 2016

Work Experience

I&C Engineer, China National Nuclear Corporation, Taizhou — Jul. 2016 – Aug 2019

Selected Publications

- **SRL-VIC: A Variable Stiffness-Based Safe Reinforcement Learning for Contact-Rich Robotic Tasks**
  Heng Zhang, Gokhan Solak, Gustavo J. G. Lahr, Arash Ajoudani
  IEEE Robotics and Automation Letters, vol. 9, no. 6, pp. 5631-5638, June 2024, doi: 10.1109/LRA.2024.3396368
  transfered to The 33rd IEEE International Conference on Robot and Human Interactive Communication (IEEE RO-MAN 2024)

- **Survey on Imitation Learning for Contact-Rich Tasks in Robotics** [in submission to IJRR]
  Toshiaki Tsuji, Arash Ajoudani, Gokhan Solak, **Heng Zhang**, Tadej Petrič, Yasuhiro Kato, and Francesco Nori

- **Towards Passive Safe Reinforcement Learning: A Comparative Study on Contact-rich Robotic Manipulation**
  Heng Zhang, Gokhan Solak, Sebastian Schleisner Hjorth, Arash Ajoudani
  under review, 2025, IEEE R-AL

- **SESE: Safe Exploration And Safe Execution: Safe Learning-based Methods for Robot Contact-rich Tasks**
  Heng Zhang, Rui Dai, Gokhan Solak, Arash Ajoudani
  in progress, 2025

- **Bresa: Bio-inspired Reflexive Safe Reinforcement Learning for Contact-Rich Robotic Tasks**
  Heng Zhang, Gokhan Solak, Arash Ajoudani
  under review, 2025, IEEE R-AL

- **Scaling Laws of Scientific Discovery with AI and Robot Scientists** [in submission to Nature Machine Intelligence]
  Pengsong Zhang, Heng Zhang, Huazhe Xu, Renjun Xu, Zhenting Wang, Cong Wang, Animesh Garg, Zhibin Li, Arash Ajoudani, Xinyu Liu

- **Semantic Visual Simultaneous Localization and Mapping: A Survey**
  Kaiqi Chen;Junhao Xiao; Jialing Liu; Qiyi Tong; **Heng Zhang**; Ruyu Liu; Jianhua Zhang; Arash Ajoudani; Shengyong Chen
  IEEE Intelligent Transportation Systems Transactions, 2025

Additional Experience And Awards

Reviewer
I am serving as a reviewer in community, such as IEEE RAL, TCDS, IROS, RO-MAN, CAC.
Workshop Organization
IROS 2025: Embodied AI and Robotics for Future Scientific Discovery
Honors
1.2022 Excellent Graduate of class 2022 at Tongji University.
2.2022 Outstanding Graduate student in 2022 at Tongji University.
3.2021 Winner of Excellent Graduate Student at Tongji University.