Jianhan Ma

+1 619-458-2556 mjianhan@gmail.com Kingspenguin Personal Page

Education

University of California, San Diego **Sep. 2022 – Mar. 2024**
M.S. in Electrical and Computer Engineering *La Jolla, CA, United States*

Zhejiang University **Aug. 2017 – Jun. 2021**
B.E. in Electrical Engineering *Hangzhou, China*

University of Illinois at Urbana-Champaign **Aug. 2017 – Jun. 2021**
B.S. in Electrical Engineering *Champaign, IL, United States*

Publication

* denotes equal contribution

Generalized Animal Imitator: Agile Locomotion with Versatile Motion Prior
Ruihan Yang, Zhuoqun Chen*,**Jianhan Ma***, Chongyi Zheng*, Yiyu Chen, Quan Nguyen, Xiaolong Wang*

- **CoRL 2024**
- Workshop on Towards Reliable and Deployable Learning-Based Robotic Systems, **CoRL 2023**
  Workshop Best Paper Award

Experience

TEA Lab, Tsinghua University / Shanghai Qi Zhi Institute **Oct. 2024 – Present**
Reseacrh Assistant, Advisor: Prof. Huazhe Xu *Shanghai, China*

- Conducting research on 3D diffusion policies for generalized visual imitation learning systems, with applications in bimanual manipulation, mobile manipulation, and humanoid robots.
- Developed and implemented a VR-based teleoperation system for a mobile manipulator that consists of an XArm, a Leaphand dex hand, and a Ranger Mini, enabling the collection of high-quality expert data to advance imitation learning pipelines.

Wang Lab, UCSD **Oct. 2022 – July. 2024**
Graduate Student Researcher, Advisor: Prof. Xiaolong Wang *La Jolla, CA, United States*

- Developed the Versatile Instructable Motion (VIM) framework for quadruped robots IsaacGym, enabling a single policy to learn and execute diverse agile locomotion skills such as running, jumping, backflipping, and cantering. The work was implemented on the Unitree A1 robot, demonstrating high agility and robustness in both simulation and real-world scenarios.
- Trained a low-level motion prior to execute multiple agile locomotion skills by leveraging diverse reference motion datasets, including motion capture, synthesized, and optimized trajectories. Optimized the reward parameters in the imitation learning framework to balance functionality and stylization, ensuring smooth transitions across tasks.
- Reduced the simulation-to-real gap by calibrating physical model parameters in the URDF and fine-tuning robot dynamics in IsaacGym, leading to enhanced accuracy in real-world deployments.
- Engineered a high-level control framework that integrated learned motion priors for task-specific commands, enabling real-time deployment of dynamic locomotion behaviors like sharp turns, obstacle jumping, and speed adjustments on the Unitree A1 robot.

AI4H Lab, Zhejiang University **Oct. 2021 – May 2022**
Undergraduate Research Assistant, Advisor: Prof. Zuozhu Liu *Haining, China*

- Executed an innovative self-supervised representation learning strategy to enhance the accuracy of semantic segmentation in Cone-Beam Computed Tomography (CBCT) datasets. This approach significantly improved the precision of image analysis, facilitating more accurate and reliable interpretations in medical imaging.
- Established, trained, and evaluated a custom-adapted pixel-level contrastive learning pipeline, specifically tailored for large-scale, unlabeled Cone-Beam Computed Tomography (CBCT) datasets. This pipeline was rigorously tested on a dataset comprising 123,904 unlabeled CBCT images from 400 patients. It achieved an impressive average Intersection over Union (IoU) of 91.33% for tooth labeling in a subsequent transfer learning process using only 500 labeled CBCT images. This significant reduction in the need for labeled data marks a major step forward in reducing manual effort in both clinical and industrial CBCT applications

IRVC Lab, Zhejiang University **Jan. 2021 – May 2021**
Undergraduate Senior Design, Advisor: Prof. Liangjing Yang *Haining, China*

- Engineered a sophisticated Augmented Reality (AR) auxiliary system designed to accurately track and tag tumor locations in real-time. This system was adeptly integrated with the vision system of an endoscope mounted on an OpenManipulator-X robot arm. It effectively displayed the pinpointed tumor locations directly onto the endoscope's visual feed, enhancing precision and guidance during medical procedures.
- Accomplished a significant reduction in operative errors by precisely aligning Unity's virtual scene, which represented the patient's tumor, with the real-time visual feed captured by an endoscope controlled by a robotic arm. This innovative alignment technique provided a crucial solution for assisting doctors in accurately locating tumors within a patient's body. It effectively reduced the risk of surgical accidents due to misjudgment, thereby enhancing the safety and reliability of medical procedures.

Teaching

Teaching Assistant | ECE 342 & 343 - Electronic Circuits **Spring 2021**

- Course Instructor: Prof. Aili Wang

Teaching Assistant | ECE 313 - Probability with Engineering Application **Fall 2020**

- Course Instructor: Prof. Mark Butala

Technical Skills

Languages: Python, C++, C#, Matlab, System Verilog
Developer Tools: Git, Kubernetes, Docker, CMake
Technologies/Frameworks: PyTorch, IsaacGym, ROS, Unity, Blender
Hardware: Unitree A1 & B1 & Go1, FPGA, Arduino

Service

- **Conference Reviewer for ICRA 2025**