Yinlong Dai

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EDUCATION

Virginia Polytechnic Institute and State University (Virginia Tech), VA　　Sep 2024 – Present
Ph.D. in Mechanical Engineering　　　　　　　　　　　　　　　　　　　　　*GPA: 4.00 / 4.00*

New York University, NY　　　　　　　　　　　　　　　　　　　　　　　Sep 2020 – Jun 2024
Bachelor of Science in Computer Science, Honors Program　　　　*Minor: Robotics | GPA: 3.865 / 4.00*
Undergraduate Honors: *Dean's List; Dean's Undergraduate Research Fund (DURF) Award; Best in Poster Presentation at the 50th NYU Annual Research Conference; CS Prize for Academic Excellence in the Honors Program*

RESEARCH

Collaborative Robotics Lab (Collab) — Ph.D. Researcher　　　　　　　　Aug 2024 – Present
Virginia Tech | *Advised by Prof. Dylan P. Losey*
Research focus: Imitation Learning, Human–Robot Interaction, Vision-Language Models for Robotics

Generalizable Robotics and AI Lab (GRAIL) — Undergraduate Researcher　　Mar 2023 – Aug 2024
New York University | *Advised by Prof. Lerrel Pinto*
Research focus: Dexterous Manipulation with Image and Tactile Sensing, Reinforcement Learning, Multimodal Policy Learning

PUBLICATIONS

Under Review / Preprints

Y. Dai, B. A. Christie, D. J. Evans, D. P. Losey, S. Stepputtis. Language Movement Primitives: Grounding Language Models in Robot Motion. *(Under Review, 2026)*

Y. Dai*, R. Ramirez Sanchez*, R. Jeronimus, S. Sagheb, C. M. Nunez, H. Nemlekar, D. P. Losey. CIVIL: Causal and Intuitive Visual Imitation Learning. *(Under Review, 2025)*

Conference Papers

Y. Dai, A. Keyser, D. P. Losey. Prepare Before You Act: Learning From Humans to Rearrange Initial States. *(Accepted to IEEE International Conference on Robotics and Automation, ICRA, 2026)*

I. Guzey, **Y. Dai**, G. Savva, R. Bhirangi, L. Pinto. HuDOR: Bridging the Human to Robot Dexterity Gap through Object-Oriented Rewards. *(Accepted to IEEE International Conference on Robotics and Automation, ICRA, 2025)*

A. Iyer, Z. Peng, **Y. Dai**, I. Guzey, S. Haldar, S. Chintala, L. Pinto. OPEN TEACH: A Versatile Teleoperation System for Robotic Manipulation. *(Accepted to Conference on Robot Learning, CoRL, 2024)*

I. Guzey, **Y. Dai**, B. Evans, S. Chintala, L. Pinto. See to Touch: Learning Tactile Dexterity through Visual Incentives. *(Accepted to IEEE International Conference on Robotics and Automation, ICRA, 2023)*

Z. Xue, **Y. Dai**, Q. Lei. Exploring the Diversity of Label-irrelevant Patches: Efficient Active Learning via Pretrained ViTs. *(Accepted to Conference on Parsimony and Learning, PMLR, 2024)*

EXPERIENCE

Language Movement Primitives: Grounding Language Models in Robot Motion Sep 2025 – Jan 2026

- Architected and implemented the Language Movement Primitives (LMP) framework to ground robot motion policies in a low-dimensional semantic parameter space using Dynamic Movement Primitives (DMPs).
- Implemented and benchmarked state-of-the-art foundation model baselines, including fine-tuned Vision-Language-Action (VLA) models, across 20 real-world manipulation tasks.
- Built a 3D open-vocabulary perception module leveraging RGB-D sensing to abstract environments into semantically interpretable representations for language models.

Prepare Before You Act: Rearranging Initial States   May 2025 – Sep 2025
- Learned a spatiotemporal transformer-based corrective robot policy from action-agnostic human videos and point flow representations.
- Implemented and benchmarked diffusion-based robot action policies and real-world dynamics models for model-based planning.

CIVIL: Causal and Intuitive Visual Imitation Learning   Sep 2024 – Apr 2025
- Architected and implemented a transformer-based visual manipulation policy.
- Built a multimodal data collection system enabling users to communicate task intent through both ArUco markers as visual signals and natural language instructions.
- Learned visual representations encoding task-relevant human intent from multimodal demonstration data.

Bridging the Human to Robot Dexterity Gap through Object-Oriented Rewards Jan 2023 – Sep 2024
- Mainly responsible for building the data collection pipeline, projecting human hand keypoints captured via Meta Quest into a fixed physical world frame through visual calibration, enabling dexterous policy learning from human egocentric demonstrations.
- Explored reliable camera streaming from the VR device, enabling video data collection and policy deployment using onboard VR cameras.

OPEN TEACH: A Versatile Teleoperation System for Robotic Manipulation   Sep 2023 – Feb 2024
- Mainly responsible for integration of the teleoperation system with an Allegro Hand mounted on a Kinova robotic arm.

See to Touch: Learning Tactile Dexterity through Visual Incentives   May 2023 – Sep 2023
- Involved in creating the Tactile Adaptation from Visual Incentives (TAVI) framework that aims to achieve generalization ability through training an encoder with 2.5 hours of tactile-based play data on an Allegro hand and uses online reinforcement learning for dexterous manipulation tasks.
- Mainly responsible for creating a replay buffer for online reinforcement learning and assessed long-horizon robustness of TAVI by training and testing it on multiple concatenated tasks.
- Evaluated the performance of TAVI framework through testing five challenging real-world manipulation tasks.

T-Dex: Dexterity from Touch   Feb 2023 – May 2023
- Worked on training dexterous manipulation policies on a four-fingered dexterous Allegro hand with XELA tactile sensors.
- Assisted in evaluating T-DEX across five challenging tasks, such as opening a book, bottle cap opening, and precisely unstacking cups.

Efficient Active Learning via Pretrained ViTs for Medical Image Classification   NYU, NY
Research assistant, Mentored by Assistant Professor Qi Lei   Sep 2022 – Sep 2023
- Participated in developing a new active learning (AL) framework based on self-supervised learning with Vision Transformers to learn the approximately minimally sufficient representations for medical image classification.
- Trained a lightweight encoder to transfer the representation closer to minimally sufficient through a Data Augmentation method for localizing and augmenting label-irrelevant patches.
- Evaluated the effectiveness and efficiency of the framework across various datasets and AL strategies.

Surgical Sim: Omentum Simulation   NYU, NY
Research assistant, Mentored by Clinical Assistant Professor Gizem Kayar   Sep 2022 – May 2024
- Explored and tested various setups and frameworks for the haptic-integrated & physically-based interactive simulation of omentectomy surgery with Unity, such as 3D Systems Haptic Plugin and Obi Softbody Plugin.
- Designed a model of the interaction between deformable omentum and rigid surgery tools based on a mass-spring system.
- Awarded the Dean's Undergraduate Research Fund (DURF) Grant (Spring 2023); received Best Poster Presentation at the 50th NYU Annual Research Conference.

SKILLS

Languages: English, Mandarin
Programming: Python, Java, C/C++, C#, SQL, MATLAB
Frameworks & Tools: PyTorch, Matplotlib, MongoDB, Git, Linux, Excel, Jupyter Notebooks, ComfyUI, Unity