

Jixin (Kevin) Yan

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EDUCATION

Northwestern University

B.S. in Computer Science, McCormick School of Engineering

– GPA: 3.9/4.0

Evanston, IL

Anticipated June 2029

RESEARCH INTERESTS

- **Embodied Agents:** Building general-purpose agentic systems that interact with the physical world, perform dexterous manipulation, and excels long-horizon tasks.
- **Foundation Models for Robotics:** Advancing vision-language-action models, world-action models, and tactile foundation models for general-purpose robotics.
- **Human Data for Robotics:** Scaling robotic foundation models with egocentric video and other human-generated data to train general-purpose robotic models.

RESEARCH EXPERIENCE

IDEAS Lab, Northwestern University | *Research Assistant, Prof. Qi Zhu*

January 2026 – June 2026

- Contributed to SENTINEL, a formal-verification framework for evaluating the safety of foundation-model-based embodied agents, by authoring safety-critical scenes in AI2-THOR.
- Developed a web application for ManiGuard, a follow-up framework designed to accelerate collaborative scene migration from AI2-THOR to OmniGibson using BEHAVIOR-1k assets.
- Constructed OmniGibson scenes with embedded safety hazards and teleoperated a Franka arm in simulation to collect tabletop manipulation demonstrations for supervised fine-tuning on GR00T and $\pi 0.5$ VLA policies.
- Integrated and adapted OmniSafe safe-RL implementations, including FOCOPS, PPO-Lag, and CPO, into the ManiGuard training and evaluation pipeline.

Integrative AI Lab, Northwestern University | *Research Assistant, Prof. Naichen*

January 2026 – June 2026

- Developed an online Generative Bayesian Filtering algorithm for LPBF defect monitoring using CVAEs as learned likelihoods, outperforming a baseline CNN classifier by 20%.
- Built a semi-automated X-ray ground-truth labeling pipeline using Grounded SAM2 and minimal LabelMe annotation, processing 150 trajectories, approximately 75,000 frames, into a four-state pore-generation taxonomy.
- Designed systematic experiments to improve algorithm performance by modifying the model architecture from a U-Net style design to a transformer-style design, designing reconstruction-focused loss functions, and using Optuna for hyperparameter tuning.

INDUSTRY EXPERIENCE

Litchi AI @ Tsinghua Spatial Intelligence Lab | *Research Intern*

June 2026 – September 2026

- Built Embodied Harness, a two-tier agentic system pairing a VLM planner with fresh-context navigation, manipulation, and verification agents to improve long-horizon success over flat-policy baselines on VLN-CE and BEHAVIOR-1K, also validated on real R1Pro and Agibot embodiment.
- Built an automatic video annotation pipeline that segments robotics manipulation subtasks, synthesizes agent reasoning and verification traces for agentic VLA finetuning.
- Built an embodied-agent benchmark evaluating VLM’s capabilities on long horizon tasks’ subtask tracking, decision-making, planning, and progress monitoring, including classification of completed, failed, and pending subtasks across long-horizon tasks.
- Developed code-as-policy control scripts for powder weighing with a Franka arm and Sharpa dexterous hand, structuring closed-loop manipulation, task sequencing, and exception-aware recovery.

IDX Exchange | *Software Engineering Intern*

January 2026 – April 2026

- Built a Zillow-style property search app with React frontend, Express.js REST API, and MySQL in Docker, supporting city/ZIP/price/beds/baths filtering across 40,000+ listings with offset-based pagination
- Created composite indexes on City/ListPrice and Bedrooms/Bathrooms columns, rewrote queries with parameterized placeholders to prevent SQL injection; verified with EXPLAIN to cut query time from 2s to <100ms
- Wrote Jest + Supertest tests mocking mysql2 pool for API handlers and React Testing Library tests for search/filter/pagination components, reaching 90% coverage; deployed to Vercel/Railway with environment-based CORS and feature-branch Git workflow

PUBLICATIONS

1. ManiGuard: A Specification-Grounded Safety Benchmark for Foundation-Model Manipulation

Philip Wang, Simon Sinong Zhan, Yiyang Peng, Yiqi Lyu, **Jixin Yan**, Fiorelli Wong, Xinyu Cao, Hang Yin, Haoran Lu, Xiangyu Shi, Zhenyang Ni, Ruochen Jiao, Han Liu, Huajie Shao, Manling Li, Ruohan Zhang, Qi Zhu
In submission

2. Generative Bayesian Filtering for Manufacturing State Estimation

Lei Cao, Sihang Feng, **Jixin Yan**, Tao Sun, Naichen Shi
ISFA 2026, *under review*

SELECTED PROJECTS

Embodied Harness

June 2026 – Present

- Architected a two-tier framework where a VLM planner orchestrates fresh-context navigation, manipulation, and verification agents over swappable simulator, policy, VLM, and tool backends (OmniGibson, remote VLA/VLN/WM inference, SAM3).
- Built a predicate-scoped execution lifecycle—before-state capture, action dispatch, object-aligned verification, and three-way verdicts—over a scene graph and coverage-based spatial memory for long-horizon state tracking.
- Improved reliability via verification-gated retries, downstream replanning on subtask failure, and a final repair gate; added analytic reach/lift/lower IK transport primitives validated to ~ 3 mm end-effector precision on an R1Pro in OmniGibson.
- Built a resumable flat-versus-harness evaluation pipeline with BDDL scoring, JSONL/image traces, ablation switches, and 402 tests; outperforms flat-policy baselines by 10% success on VLN-CE navigation and 33% on BEHAVIOR-1K long-horizon mobile manipulation.

OpenSO-101: Open-Source Robot Learning Framework

April 2026 – June 2026

- Built an open-source NVIDIA Isaac Lab framework for the LeRobot SO-101 arm, unifying PPO with distillation, ACT, and Diffusion Policy training with a real-arm deployment bridge under a single CLI/Python API.
- Designed a joint-position action space in LeRobot motor units so a single checkpoint can run in Isaac Sim and deploy on a Feetech follower through a shared loader, removing the need for sim-to-real action-space conversion.
- Implemented visual, observation, and physics domain randomization across three manipulation tasks: Lift, PickPlace, and Stack.
- Built an asynchronous daemon-thread leader-arm reader at approximately 1 kHz with streaming HDF5 support and maintained a codebase backed by 80+ unit tests.

SpiderPi Hexapod Robot

January 2025 – March 2025

- Designed tripod and wave gaits for a 6-DOF hexapod using inverse kinematics and IMU-based PD feedback, improving locomotion stability on uneven terrain.
- Implemented A* path planning on a discretized occupancy grid with a subsumption-based reactive controller for real-time obstacle avoidance.
- Built a frontier-based exploration pipeline that incrementally constructs an occupancy map and prioritizes frontiers by information gain for efficient autonomous coverage.

GRANTS AND AWARDS

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| • Northwestern Academic Year Research Grant | 2026 |
| • Northwestern Summer Undergraduate Research Grant | 2026 |

TECHNICAL SKILLS

Programming Languages: Python, C/C++, MATLAB, SQL, JavaScript/TypeScript, R

AI & Robotics: PyTorch, TensorFlow, vLLM, LangChain, Gymnasium, ROS2, LeRobot, Stable-Baselines3

Simulation Environments: NVIDIA Isaac Sim, OmniGibson, MuJoCo, Gazebo, AI2-THOR

Tools: Linux, Git, Docker, CUDA, Hugging Face, AWS