Hairui Yin

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Education

University of Maryland, College Park 09/2024 - 05/2026
Master of Science, Data Science GPA: 4.00/4.00

University of Wisconsin, Madison 01/2023 - 07/2023
Exchange in Computer Science GPA: 3.80/4.00

Shanghaitech University 09/2020 - 06/2024
Bachelor of Engineering, Computer Science and Technology GPA: 3.53/4.00

Courses: Robotics, Advanced Machine Learning, Computer Vision, Computer Graphics, Natural Language Processing, Information Theory, Natural Language Processing, Computational Learning Theory, Signals and Systems, Computer Architecture, Database, Computer Network, Big Data Analytics

Research

Egocentric: First-person AR scene world model 08/2025 - Present
Collaborator | Advised by Jiaben Chen, Meta

- Extending EgoGen with hand–object interaction capture and replay, generating aligned hand and object poses, to improved realism and data diversity for egocentric perception.
- Designed and implementing an egocentric data pipeline from Blender to Unreal Engine, automating scene layout, first-person camera rigging, sequencing, and rendering.
- Developing walk-to-interact sequence generation that synthesizes or imports trajectories, stitches clips with position, orientation, and velocity smoothing, to produce videos with stable motion and natural transitions suitable for training and evaluation.

Physical-based motion video generation 08/2025 - Present
Intern | Advised by Prof. Chuang Gan at University of Massachusetts, Amherst

- Extending physics-based humanoid control (InterMimic, PHC) with controllable hand–object interactions, introducing physical attributes—friction, mass, and external forces to elicit new interaction behaviors.
- Aligned rendered videos with motion sequences and constructed a video–motion integration dataset with synchronized poses, contact events, and scene dynamics, improving realism, diversity, and controllability.
- Designed an end-to-end pipeline in Unreal Engine and Blender inspired by BEDLAM, including data import and asset retargeting, procedural garment synthesis and simulation, camera rigging with egocentric tracking, lighting and material standardization, and multi-pass rendering.

Structural Causal model based Diffusion 03/2025 - Present
Advised by Prof. Abdirisak Mohamed at University of Maryland, College Park

- Extended existing counterfactual backtracking methods by removing the restrictive assumption of invertible noise–to–causal node mappings.
- Developing a counterfactual backtracking method for image editing with causal consistency, with the aim of improving controllability in diffusion models.

Tool-Oriented Prompt Injection Attacks on LLM Agents 05/2025 - 06/2025
Advised by Researcher Udari Madhushani Sehwag

- Extended and customized existing multi-agent frameworks (AutoGen, AgentDojo) to support tool injection attack scenarios.

Multi-modal data-driven extraction of genealogy images 09/2023 - 05/2024
Research Assistant | Advised by Prof. Haipeng Zhang at Shanghaitech University

- First to build a large-scale genealogy multimodal dataset (2.8TB) enabling sociological analysis, using multimodal combining OCR, Vision Neural Networks, and LLMs.
- Conducted demographic and sociological analysis, visualizing insights to uncover historical trends and patterns.

Professional Experience

Assistant Data Enginner | Glodon - Shanghai, China 01/2024 - 07/2024

- Enhanced camera-based construction site safety monitoring systems by applying advanced object detection models (YOLO, Faster R-CNN) with data processing, augmentation and model fine-tuning, achieving human-level accuracy and significantly improving real-time detection efficiency, reducing safety incidents in pilot deployments.

- Designed and implemented a scalable synthetic data generation pipeline using Blender, 3D point cloud models, OpenCV, to cut data collection costs while expanding dataset diversity, accelerating model retraining cycles and improving generalization for few-shot scene.

Security Engineer Intern | NSFOCUS – Shanghai, China 06/2022 - 08/2022

- Implemented robust data validation and preprocessing workflows to ensure data integrity and prevent SQL injection risks in database interactions.
- Developed secure data storage and transmission protocols, including encryption and hashing techniques, to safeguard sensitive information.

Skills

Programming: Python, C++, C, MATLAB, SQL, Markdown
Common Tools: PyTorch, OpenGL, AutoGen, Scikit Learn, OpenCV, CUDA, Hugging Face, Unreal, Blender