ZEKAI YIN | zekaiyin2025@gmail.com | Boston, MA (open to relocate)

EDUCATION

Boston University, Boston, USA | Sep 2023 - Jan 2025
Master of Science in Artificial Intelligence
Coursework: Deep Learning, Computer Vision, Machine Learning Systems, Neural Networks, Reinforcement Learning, MLOps
Peking University, Beijing, China | Sep 2019 - Jul 2023
Bachelor of Science in Data Science and Big Data Technology
Coursework: Statistical Learning, Data Mining, Natural Language Processing, Computer Vision, Distributed Systems

PUBLICATIONS

Robot Structure Prior Guided Temporal Attention for Camera-to-Robot Pose Estimation from Image Sequence
Yang Tian, Jiyao Zhang*,* ***Zekai Yin*,*** *Hao Dong*
Accepted *by IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2023*

ZeroVO: Visual Odometry with Minimal Assumptions
Lei Lai,* ***Zekai Yin*,*** *Eshed Ohn-Bar*
Accepted *by IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2025*

BranchOut: Capturing Realistic Multimodality in Autonomous Driving Decisions
Hee Jae Kim, ***Zekai Yin,*** *Lei Lai, Jason Lee, Eshed Ohn-Bar*
Submitted to The Conference on Robot Learning (CoRL), 2025

SKILLS

- **Programming Languages: Python**, **C++**, **C**, **MATLAB**
- **Machine Learning Frameworks: PyTorch**, **TensorFlow**, **Scikit-learn**, **JAX**, **Keras**, **HuggingFace**
- **ML Engineering: MLflow**, **Weights & Biases**, **Docker**, **Kubernetes**, **ONNX**, **TensorRT**, **Ray**
- **Computer Vision: OpenCV**, **Detectron2**, **YOLO**, **SAM**, **NeRF**, **3D Reconstruction**, **Gaussian Splatting**
- **Data Processing: NumPy**, **Pandas**, **Matplotlib**, **SciPy**, **Dask**, **Spark**, **Luigi**
- **Robotics & Simulation: ROS**, **ROS2**, **Blender**, **PyBullet**, **Libfranka**, **Franka-Control**, **CAD, Fusion 360**

RESEARCH EXPERIENCE

H2X Lab, Boston University
Machine Learning Engineer / Research Assistant | Jan 2024 - Present

- Proposed **ZeroVO** (**Zero**-Shot **V**isual **O**dometry) as a co-first author, presenting a novel visual odometry algorithm by fusing **VLM features** with **geometric information** using a **multi-head-cross-attention module**, accepted by **CVPR 2025**.
- Created a synthetic dataset with the **GTA**, generating **300,000 images** across **1,200 videos** with diverse driving conditions.
- Proposed a Gaussian Mixture Model-based diffusion model for motion planning that captures multimodal, human-like driving behavior, achieves state-of-the-art performance, and exposes limitations of single-ground-truth data, submitted to **CoRL 2025**.
- Developed **VR-based** simulation using Racing Systems, integrating **3DGS** and **NeRF-based** scene reconstruction methods.
- Organized user study and collected **20,000+** diverse and feasible trajectories for benchmarking planning models in simulation.
- Built real-world experiment pipeline integrating **Visual-Language-Action** model and **Viper X300S** robotic arm using **ROS2**.
- Captured diverse guide-dog navigation data with **XSense** and visualized it through Python-based 3D animations in **Blender**.

PKU-Agibot Lab, Peking University
Machine Learning Engineer / Research Assistant | Jul 2022 - May 2023

- Proposed **SGTAPose** (**S**tructure-**G**uided-**T**emporal-**A**ttention **Pose**) as a co-first author, using **temporal cross-attention** mechanism, surpassing traditional hand-eye calibration on **camera-to-robot pose estimation,** achieving **real-time** running speed on **ONNX** and **TensorRT** optimized model (**36** frame per second), accepted by **CVPR 2023**.
- Created synthetic dataset with **Blender** containing **180,000 images** for training robust pose estimation models.
- Engineered **ROS-based** control system for **Franka Panda** robotic arm using **PyBullet** for motion planning.
- Designed **Refiner module** implementing **Levenberg-Marquart** algorithm with **weighted PNP solving** for error minimization.
- Integrated **SAM** with **6D pose estimation** models, creating an **end-to-end pipeline** for robotic manipulation tasks on **XARM6**.

WORK EXPERIENCE

Nanjing Zealen Technology
Machine Learning Engineer Intern | Feb 2023 - May 2023

- Designed **time-series forecasting** models using **ST-GCN** and **PyTorch** for **24-hour** wind power prediction.
- Implemented **Temporal Fusion Transformer** and **XGBoost** models for long-term pollution trend prediction tasks.
- Created **feature engineering pipeline** processing meteorological data, improving model accuracy by **18%** over baselines.
- Developed **ML pipeline** with **MLflow** tracking, optimizing hyperparameters through **Bayesian optimization** techniques.

Beijing Siling Robot Technology
Software Development Intern | Jan 2021 - Feb 2021

- Developed interaction interfaces and **API components** using **C++** and **QT** for robotic control systems.
- Created **cross-platform communication** protocols for the robot operating system with **low-latency** performance requirements.
- Implemented **real-time data processing** modules for sensor fusion, optimizing robot arm control response times.
- Assisted with system integration testing, achieving **99%** reliability in production deployment environments.

LEADERSHIP EXPERIENCE

Yuanpei College
Tutor and Course Organizer | Mar 2020 - Jul 2023

- Founded carpentry course for engineering education, developing **hands-on curriculum** and **safety protocols** for students.
- Expanded program into co-cultivation initiative between Yuanpei College and Beijing 101 Middle School.
- Instructed **150+** students over three years, winning **2022 YuanPei Special Contribution Award** scholarship.

Yuanpei College 3D Printing and Designing Lab
Founder and Leader | Feb 2023 - Jul 2023

- Established the college's first 3D printing lab, implementing **CAD-to-fabrication workflow** with material printing capabilities.
- Designed graduation gifts utilizing **parametric modeling** techniques and **additive manufacturing** production methods.