Guanglei (Ian) Zhu

guanglez@andrew.cmu.edu | LinkedIn | 412-598-4541

Education

Carnegie Mellon University - School of Computer Science Pittsburgh, PA
Master of Science in Computer Vision, GPA: 4.00/4.00 Dec. 2024

- **Current Courses:** Advanced Computer Vision, Machine Learning, Large Language Models Methods and Application

University of Toronto Toronto, Canada
Honours Bachelor of Science in Computer Science, GPA: 3.87/4.00 May 2023

- **Relavent Courses:** Computer Vision, Deep Learning, Algorithms & Data Structures, Operating Systems, Computer Networks, Software Design, Database Systems, Computer Organization
- **Awards:** In-Course Scholarship (2020), Dean's List Scholar (2019 - 2021)
- **Teaching Assistant:** MAT137 - Calculus with Proof

Work Experience

Vector Institute Toronto, Canada
Research Intern, supervised by *Prof. Animesh Garg* Apr. 2022 – May 2023

- Developed pose estimation for challenging hand-object interaction scenes with high occlusion and complex dynamic
- Leveraged differentiable rendering as a prior for optimizing hand-object poses, aligning estimated 3D models with 2D images, leading to a 30% reduction in 3D mesh error compared to state-of-the-art methods
- Engineered an end-to-end pipeline to predict full pose trajectories from RGB videos by integrating object detection, segmentation, pre-trained model prediction, and optimization
- Submitted HandyPriors: Physically Consistent Perception of Hand-Object Interactions with Differentiable Priors to *ICRA* 2024

People, AI, & Robots Research Group Toronto, Canada
Research Assistant, supervised by *Prof. Animesh Garg* July 2022 – Oct. 2022

- Evaluated a large-scale dataset for multi-finger robotic grasping, addressing the scarcity of high-quality training data
- Generated 60,000+ robotic grasps from black-box optimization on a diverse 200-object dataset, setting a robust evaluation baseline against the DexGrasp-1M dataset
- Enhanced a SOTA vision-based grasping model by retraining on million-sample dataset, achieving a 30% increase in contact area and validating potential to advance modern robotic grasping methods
- Published Fast-Grasp'D: Dexterous Multi-finger Grasp Generation Through Differentiable Simulation at *ICRA* 2023

Projects

Out of Distribution Detection on Text Classification June 2022 - Aug. 2022
Chinese Academy of Science Beijing, China (Remote)

- Implemented a self-supervised OOD detection by adapting Virtual Outlier Synthesis to NLP classification tasks, enabling safe and reliable deployments of ML systems in practice
- Reduced false positive rate to 30% without affecting in-distribution accuracy or requiring additional OOD training labels

Neural ODE in Multi-Scale Time Series Modeling Jan. 2022 - Apr. 2022
ParaMathics Lab, University of Toronto Toronto, Canada

- Developed a novel multi-scale time series forecasting model using Neural ODE and the Heterogeneous Multiscale Method to capture complex variable dependencies across over 15 variables sampled at different frequencies
- Achieved 70% lower loss and faster convergence compared to LSTM baselines, while handling irregularly sampled data

Skills

- Programming Languages: Python, C/C++, Java, PostgreSQL
- Libraries & Tools: PyTorch, OpenCV, Scikit-learn, Pandas, Numpy, Git, Docker, Linux, LaTeX, Markdown