

Zonglin Lyu

Email | Phone: (646) 445-9529 | Website | Google Scholar

EDUCATION

University of Utah, Salt Lake City, UT
(Incoming) Ph.D. in Computer Science

Aug 2024 —

Columbia University, New York, NY
M.S. in Operations Research

Sept 2021 — Dec 2022
3.65 | MS-level 4.09

University of California San Diego, La Jolla, CA
B.S. in Applied Mathematics

Sept 2017 — June 2020
3.81 | Major 3.95

RESEARCH INTERESTS

- Computer Vision
- Multi-modal Learning
- Generative Models

PUBLICATION

*: equal in contribution

†: corresponding author

1. Zonglin Lyu, Ming Li, Jianbo Jao, and Chen Chen[†]. Frame Interpolation with Consecutive Brownian Bridge Diffusion. Under Review. [pdf](#)
2. Zonglin Lyu, Mingxuan Lu, Gao Zhu, Yiming Li, and Chen Feng[†]. Can multimodal LLM help place recognition? Under Review.
3. Yiming Li*, Zhiheng Li*, Nuo Chen*, Moonjun Gong*, Zonglin Lyu*, Zehong Wang, Peili Jiang, Chen Feng[†]. Multi-agent Multitraversal Multimodal Self-Driving: The MARS Dataset. Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR). 2024.
4. Yiming Li*, Zonglin Lyu*, Mingxuan Lu, Chao Chen, Michael Milford, and Chen Feng[†]. "Collaborative Visual Place Recognition." (Submitted to IROS 2024). [pdf](#)
5. Xuande Feng*, Zonglin Lyu*[†]. "How Features Benefit: Parallel Series Embedding for Multivariate Time Series Forecasting with Transformer." In 2022 IEEE 34th International Conference on Tools with Artificial Intelligence (ICTAI) (Oral presentation). [pdf](#)

RESEARCH EXPERIENCE

Video Frame Interpolation

University of Central Florida, FL

Advisor: Chen Chen

Feb 2024 - April 2024

- Conduct a literature review on Video Frame Interpolation and Diffusion Models.
- Design a Diffusion-based Frame Interpolation method that achieves SOTA performance.
- Implemented with PyTorch. Codebase can be found [here](#).

AI4CE Lab

New York University, NY

Advisor: Chen Feng

Jan 2023 - present

- Conduct a literature review on Test Time Training, Visual Place Recognition, Point Cloud Prediction, VLMs.
- Formulate the first framework for Collaborative Visual Place Recognition and develop an effective and robust algorithm that balances noise and extra information that collaborators provide. Multi-agent collaboration achieves at most a 50% reduction in error rate than single-agent. The [paper](#) was submitted to IROS 2024.
- Collect and benchmark a large-scale outdoor dataset. The paper is accepted to CVPR 2024.
- Study how and when Multimodal LLMs benefit VPR tasks. Design a training-free, data-free, and label-free pipeline to incorporate Multimodal LLMs into VPR.
- Implemented with PyTorch. Codebase can be found [here](#).

Transformer in Multivariate Time Series Prediction

Columbia University, NY

Self-designed research

March 2022 - July 2022

- Conduct literature reviews on time series prediction based on Neural Networks.
- Propose Parallel Series Embedding method applied in transformer-based models to predict time series, achieving notable improvements (at most 50% reduction in RMSE) over the baseline. The [paper](#) was accepted to ICTAI 2022.
- Implemented with PyTorch. Codebase can be found [here](#).

PROJECT EXPERIENCE

SE-(3) Equivariant Performer

Advisor: *Krzysztof Choromanski*

Columbia University, NY

Oct 2022 - Dec 2022

- Conduct literature reviews on equivariant neural networks for point clouds.
- Prove that SE3 equivariance is compatible with Performer (linear transformer).
- Design a novel model based on SE(3)-Transformer, making it compatible to performer. The model achieves a 10% performance increase and 2x speedup over the baseline, and the performer variant archives a 5% performance improvement and more than 20% memory efficiency.
- Implemented with PyTorch. Codebase can be found [here](#).

Supervising OCR models with LLMs

Advisor: *Peter N. Belhumeur*

Columbia University, NY

Oct 2022 - Dec 2022

- Conduct literature reviews on Language Models, OCR Models, and Diffusion Models.
- Design a method to supervise an OCR Model with LLMs, which achieves a small improvement over the baseline.
- Implemented with PyTorch. Codebase can be found [here](#) and [here](#).

Statistical Inference & Random Optimization

Advisor: *Henry Lam*

Columbia University, NY

Sept 2021 - Oct 2022

- Construct an algorithm to implement cheap bootstrap efficiently with application to Neural Network Model, Queuing system, Computer Network Model, and Integer Programming.
- Construct algorithms to solve the random optimization problem for different methods.
- Implemented with Python, Matlab, and R.

ACADEMIC SERVICES

- Reviewer: IROS2024

SKILLS

- **Relevant Coursework:** Mathematics of Deep Learning (A+), Practical Deep Learning & System Performance (A+), Machine Learning & High Dimensional Data Mining, Simulation (A+), Python, Reinforcement Learning (audit), Deep Learning for Computer Vision (audit), Machine Learning, Intro to C, Intro to Java, Probability, Statistics, Stochastic Processes, Optimization, Numerical Analysis, Linear Algebra, Mathematical Analysis
- **Online Courses:** Analysis of Algorithm, Data Structure
- **Programming and Software** Python (Pytorch, Numpy, Pandas, matplotlib, etc), Java, C, C++, SQL, R, MATLAB, LaTeX.

Awards

- **Provost Honor, UCSD:** Fall 17, Winter 18, Winter 19, Spring 19, Winter 20, Spring 20