

Chenyu Li

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Education

New York University

Jun. 2024 - Sep. 2024

Visiting Student in Courant Institute of Mathematics

Tsinghua University

Sep. 2021 - Jul. 2025 (Expected)

Undergraduate in School of Software

- GPA: 3.91 / 4.00, Ranking: 6 / 78
- Core Courses: Introduction to Artificial Intelligence(A+), Machine Learning(A), Calculus(A), Linear Algebra(A), Probability and Statistics(A), University Physics(A+), Physics for Scientists and Engineers(A), Practice of Programming(A), Foundation of Object-Oriented Programming(A), Students Research Training(A+)

Research Interests

My research interests primarily lie in the domains of **deep learning and machine learning**, with a current focus on **computer vision**. I have experience applying machine learning techniques to **time series analysis** and **video generation**. Currently, I am particularly interested in the following topics: (1) video generation (2) video understanding (3) long context modeling.

Publications

(* indicates equal contribution)

- PISA Experiments: What Video Diffusion Models Learn from Watching Stuff Drop
Chenyu Li*, Oscar Michel*, Xichen Pan, Sainan Liu, Mike Roberts, Saining Xie
Submitted to IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR, 2025)
- Timer: Generative Pre-trained Transformers Are Large Time Series Models
Yong Liu*, Haoran Zhang*, **Chenyu Li***, Xiangdong Huang, Jianmin Wang, Mingsheng Long
Forty-first International Conference on Machine Learning (ICML, 2024) [PDF][Code]
- Koopa: Learning Non-stationary Time Series Dynamics with Koopman Predictors
Yong Liu*, **Chenyu Li***, Jianmin Wang, Mingsheng Long
Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS, 2023) [PDF][Code]

Research Experience

Evaluation and Enhancement of Intuition Physics of Video Diffusion Models Apr.2024 - Present

Advisor: Saining Xie, Assistant Professor, New York University

- Proposed **PISA** (**P**hysics-**I**nformed **S**imulation and **A**lignment), a framework to evaluate and enhance video diffusion models' understanding of intuitive physics.
- Curated and annotated 361 real-world videos of free-fall and designed 3 spatial metrics, enabling the evaluation of intuitive physics of state-of-the-art image-to-video diffusion models.
- Synthesized data with Kubric and proposed Physics Supervised Fine-Tuning (PSFT) and Object Reward Optimization (ORO), significantly improving the physical accuracy of video generation for falling objects.
- Submitted to CVPR 2025.

Generative Pre-trained Transformers for Large Time Series Models

Aug.2023 - Apr.2024

Advisor: Mingsheng Long, Associate Professor, Tsinghua University

- Developed **Timer**, a generative pre-trained Transformer designed for large-scale time series analysis, addressing various downstream tasks like forecasting, imputation, and anomaly detection.
- Curated large-scale datasets comprised of 1B time points and proposed a unified format for heterogeneous time series data, enabling Timer to adapt across different tasks and datasets while scaling up.
- Conducted experiments in real-world benchmarks for different tasks and demonstrated the ability to achieve state-of-the-art performance with few samples and zero-shot capability.
- Accepted by Forty-first International Conference on Machine Learning (ICML, 2024).

Apache IoTDB Artificial Intelligence Node

Jan.2023 - Dec.2023

Advisor: Mingsheng Long, Associate Professor, Tsinghua University

- Participated in the development of IoTDB Artificial Intelligence Node (AINode), a native machine learning engine integrated into Apache IoTDB. Users build, train, manage and use machine learning models in IoTDB databases using SQL statements.
- Designed and implemented storage module and inference module(core modules in Artificial Intelligence Node), a unified inference framework which supports user-defined models(imported from local directory or huggingface) and built-in models for inference.
- Artificial Intelligence Node has been released at the IoTDB User Conference in December 2023 and has been applied in industrial production.

Non-stationary Time Series Forecasting with Koopman Predictors

Oct.2022 - Oct.2023

Advisor: Mingsheng Long, Associate Professor, Tsinghua University

- Proposed Koopa as novel **Koopman** forecaster for non-stationary time series forecasting based on modern Koopman theory.
- Devised the stackable structure of Koopa composed of modular Fourier Filter and Koopman Predictor, which can hierarchically disentangle and exploit time-invariant and time-variant dynamics for time series forecasting.
- Conducted experiments in six real-world benchmarks and demonstrated a competitive performance with state-of-the-art model while saving 77.3% average training time and 76.0% average memory usage.
- Accepted by Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS, 2023).

Selected Honors and Awards

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| ○ National Scholarship (Top scholarship in China; 0.2% domestically), Ministry of Education | 2024 |
| ○ SenseTime AI Scholarship (30 undergraduates domestically), SenseTime | 2023 |
| ○ Huawei Scholarship (Top 5%), Tsinghua University | 2023 |
| ○ Software Innovation Competition(1st place), Tsinghua University | 2023 |
| ○ 12·9 Scholarship(Top scholarship; 1 student per department), Tsinghua University | 2022 |
| ○ National College Students Physics Competition(Second prize), Beijing Physical Society | 2021 |

Skills

- **Programming Languages:** Python, C/C++, Java, Javascript
- **Professional Software:** Pytorch, NumPy, Pandas, Git, LaTeX
- **Language:** Chinese(native), English(TOEFL 107 [R30/L25/S23/W29])