YICHI ZHANG

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RESEARCH INTEREST

Neural Network, Optimization, Applied Machine Learning

EDUCATION

Fudan University *Sep.2021-Jun.2025(expected)*
B.S in Mathematics, Talent Program GPA: 3.65/4.0(overall)
Key courses: (all A- or A)
-Mathematical Analysis, Advanced Algebra, Classical Mathematical Thoughts , Ordinary Differential Equations, Real Analysis(H), Mathematical Modeling, Functional Analysis(H), Equations of Mathematical Physics(H), Optimization, Stochastic Calculus for Finance, Stochastic Processes, Mathematical Statistics.
Outstanding student of Fudan University and Fudan University Undergraduate Scholarship twice.

University of California, Irvine *Sep.2023-Dec.2023*
Mathematics, Exchange Program GPA: 3.90/4.0, Dean's Honor List
Key courses:
-Numerical Analysis, Probability Theory, Partial Differential Equations.

RESEARCH EXPERIENCES

Dynamics-Based Generative Modeling for Oscillatory Systems Control
Co-first author, Instructed by Qunxi Zhu and Wei Lin, Fudan University *Jul.2024-Dec.2024*
– Established a theoretical framework linking macroscopic oscillatory behaviors to microscopic parameters in dynamical systems, proving the existence and learnability of explicit mappings between the system characteristics.
– Developed an innovative generative model with integrated dynamical constraints, demonstrating significant improvements in parameter generation accuracy and stability for complex biological systems.
– Designed comprehensive dynamics-aware loss functions that effectively capture temporal system evolution information, enabling unprecedented precise control of oscillatory patterns through systematic parameter tuning.
– Demonstrated framework effectiveness through extensive experiments on several biological and neural networks.
– Wrote a paper and submitted to Nature Communications.

TimePhiBE: A Time-dependent PDE-Based Bellman Equation for Continuous-Time Policy Evaluation
Co-first author, Instructed by Yuhua Zhu, University of California, Los Angeles *Apr.2024-Nov.2024*
– Developed a time-dependent PDE-based framework that generalizes existing policy evaluation methods to handle dynamic, time-varying systems in reinforcement learning, including scenarios with discount factors.
– Established the first known theoretical results on error bounds for time-varying continuous-time policy evaluation, providing rigorous guarantees for both first-order and high-order approximations in dynamic systems.
– Extended the framework to handle time-varying dynamics while maintaining its theoretical guarantees, significantly improving the applicability to real-world time-dependent control problems.
– Wrote a paper and currently finalizing results for submission to NeurIPS 2025.

DetGNN: A Deterministic Feature-Enhanced Graph Neural Network for Modeling Higher-order Interactions
First Author, Instructed by Wei Lin, Fudan University *Aug.2023-Mar.2024*
– Proposed a novel deterministic feature enhancement mechanism that significantly improves prediction accuracy, establishing a new paradigm for modeling complex dynamical systems and higher-order interactions.
– Developed a breakthrough information passing mechanism that enables multi-scale node and edge interactions simultaneously, capturing higher-order network dependencies beyond traditional adjacency limitations.
– Demonstrated superior prediction capabilities across multiple complex systems including urban rail networks.
– Wrote a paper and currently inplementing more experiments for submission to ICML 2025.

PAPERS

Dynamics-Based Generative Modeling for Oscillatory Systems Control
Collaborated with He Ma, Qunxi Zhu and Wei Lin, all from Fudan University
Under the review of Nature Communications
TimePhiBE: A Time-dependent PDE-Based Bellman Equation for Continuous-Time Policy Evaluation
Collaborated with Xingjian Ma, Fudan University, Yuhua Zhu, University of California, Los Angeles
Under the review of NeurIPS 2025

DetGNN: A Deterministic Feature-Enhanced Graph Neural Network for Modeling Higher-order Interactions
Collaborated with Shenxi Wu, Xingjian Ma and Wei Lin, all from Fudan University,
Under the review of ICML 2025

WORK EXPERIENCES

Shanghai Socialize Consulting Co., Ltd. *Apr.2023-Present*
Chief Executive Officer
- Founded and led a team of 13 to provide tutoring services for high school students, focusing on both curriculum and competition preparation, as well as offering career planning and major selection guidance.
- Organized lectures and experience-sharing sessions by leading industry and academic experts to bridge the information gap.
- Currently exploring the integration of AI+Education, with plans to develop a GPT-like platform for fine-tuning, tailored to answer high school students' academic queries.

Research Institute of Intelligent Complex Systems *Oct.2022-Present*
Research Assistant
- Supervised by Professor Wei Lin on applying graph neural networks to model higher-order interactions in complex systems, focusing on biological networks, electrical networks and urban transportation networks.
- Responsible for data preprocessing, feature engineering, and developing several novel neural network structures.
- Participated in group discussions and contributed to advancing the understanding of intelligent complex systems.

Lingjun Investment *Apr.2023-Jul.2023*
Quantitative Researcher
- Designed momentum-based trading strategies utilizing deep learning for pattern recognition in high-frequency market data.
- Developed neural network integrating technical indicators and microstructure features to identify optimal trading signals.
- Achieved 20% annualized returns with 0.7 Sharpe ratio through robust risk management.

AWARDS AND GRANTS

The ACM Mathematical Modeling Competition, First Prize	*2024*
The National Innovation Challenge Cup, Silver Award	*2024*
The National Mathematical Competition, Third Prize	*2022*
The National Innovation and Entrepreneurship Competition, Bronze Award	*2024*
The Fudan University's First Excellence Cup, First Prize	*2024*
The Fudan University's First Undergraduate Research Cup, Second Prize	*2024*
The National Natural Science Foundation Research Grant(180 nationwide), PI, ¥100,000	*2024*
FDUROP (Fudan's Undergraduate Research Opportunities Program) Grant, PI, ¥20,000	*2023*

TECHNICAL SKILLS

Languages: English(fluent, with 104 for TOEFL), Chinese (native)
Programming Skills: Python(Proficient), Matlab, C

EXTRACURRICULAR EXPERIENCE

Volunteer Service Team *Sep.2022-Jun.2025(expected)*
Leader
- Led a team of 40 in organizing and executing a college-wide mathematics tutoring initiative.
- Solved mathematical problems and designed targeted learning materials, accumulating over 200 hours of service.
- Organized midterm and final review lectures to help students prepare effectively for exams.

Advanced Calculus *Sep.2024-Jun.2025(expected)*
Head of TAs
- Led a TA team for the advanced calculus hybrid class of 240 in total, inclduding latest topics to enhance teaching.
- Established an online QA platform, receiving positive feedback from both students and faculty.

Mathematics Teaching Office *Sep.2024-Jun.2025(expected)*
Member
- Provided suggestions to improve teaching practices and enhance learning experiences as the only student member.
- Collaborated with senior faculty to introduce digital teaching tools and optimize course structures, improving flexibility and effectiveness for students.