Jiaheng Chen

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Education

Shanghai Jiao Tong University **Shanghai, China**
Undergraduate Student *Sep. 2018 - Now*

- Mathematics and Applied Mathematics, Zhiyuan College
- Cumulative Grade : 90.56/100 (Rank: 1/21) GPA : 3.94/4.3 (Rank: 1/21)
- Advisors : Prof. Haizhao Yang (Purdue University), Prof. Lei Li (Shanghai Jiao Tong University)

Research Interests

My research interests lie in the general area of applied mathematics and statistics, particularly in mathematical theory of machine learning and deep learning, as well as their applications in scientific computing problems. Also, I'm strongly interested in building bridges between statistical physics, information theory and deep learning (in the future). Specifically, my research lies in the span of the following topics:

- Mathematical theory of deep learning, approximation, optimization and generalization
- Optimal transport theory, random matrix theory, stochastic analysis, statistical physics for deep learning
- Computational mathematics and numerical analysis

Research Experiences

Optimal transport, flow models and deep learning
Advisor: Prof. Lei Li *Jul. 2021 - Now*

- Exploiting optimal transport theory to construct and analyze flow-based generative models
- Try to analyze the theory of sampling algorithms based on gradient flow and interacting particle systems

Mathematical theory of deep neural networks (approximation, optimization and generalization)
Advisor: Prof. Haizhao Yang *Mar. 2021 - Now*

- Learn mathematical theories of neural networks, such as NTK, implicit regularizations of DNN, random matrix theory for deep learning
- Analyze the optimization and generalization theory of solving PDEs using DNN

A Pharmacy Model for Patients with Chronic Diseases Based on Data Mining
Advisor: Prof. Xiaofeng Gao *Oct. 2020 - Sep. 2021*

- Use the methods of statistical learning, ensemble learning (Random Forest, XGBoost, etc.) and deep neural network to predict the dose of warfarin (a kind of anticoagulant).
- Aiming to predict the dose more accurately, developed the existing models and tried to handle the imbalance problem in our dataset.

The Analysis of Multimodal Data in Accounting and Finance Using Deep Learning
Advisor: Prof. Yang Bao *Aug. 2020 - Mar. 2021*

- Based on recent techniques in Natural Language Processing, predict stock price volatility by lever-

aging multimodal data in conference calls of listed companies.

- Proposed a novel framework and compared its performance with other baselines, our model outperforms the previous work in the mid-long term prediction task

Honors and Awards

- **SIAM Award** in MCM & ICM 2021
- **COMAP Scholarship Award** in MCM & ICM 2021
- **Outstanding Winner** (Top 0.1%), Mathematical Contest in Modeling and Interdisciplinary Contest in Modeling 2021
- **National Scholarship** (Top 2 students in Mathematics Department, Zhiyuan College), Ministry of Education of P.R.China 2020
- **Undergraduate Merit Scholarship of SJTU** (A, Top 10%) 2020
- **Zhiyuan College Honors Scholarship** (Top 5%), Shanghai Jiao Tong University 2018-2020
- China Mathematics Olympiad, **Silver Medal** 2017