Hongjie Jiang

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Education

Sep, 2022 – present

B.S. in Mathematics, Peking University
Relevant Coursework: Partial Differential Equations, Real Analysis, Numerical Algebra, Introduction to Numerical Analysis, Optimization Methods, Foundations of Machine Learning, Fluid Mechanics, etc.
GPA: 3.87/4.00, Top 3% of Class, Ranked First in My Major

Standard Tests

Augest, 25th, 2024

Graduate Record Examination(GRE) :
Total 327+3.5: 157 in Verbal Reasoning, 170 in Quantitative Reasoning, 3.5 in Analytical Writing

Jan, 17th, 2023

The Test of English as Foreign Language (TOEFL–IBT) :
Total 105: 30 in reading, 25 in listening, 23 in speaking, 27 in writing

Researches and Projects

Oct, 2024 – present

Numerically Solving Schrödinger Equation: Enhancing PESNet for Multistate Fitting
Supervised by Prof. L. Wang
Introduction: Focused on enhancing PESNet to simultaneously fit multiple lowest-energy states, enabling accurate ground-state energy estimation even in the presence of state crossings.
My Work:

- Independently implemented major code modifications to adapt PESNet for multistate fitting.

- Refine techniques and validate results with instructions from senior researcher and supervisor.

Skills gained: Expertise in natural gradient descent, variational Monte Carlo, neural network design and optimization, independent problem-solving, Python programming, and numerical experimentation.

Researches and Projects (continued)

Dec, 2023 – present ▌ **PDE Foundation Model: Mesh-free and Unsupervised PDE Solver**
Supervised by Prof. B. Dong
Introduction: Focused on developing a mesh-free, unsupervised method to solve PDEs and inverse problems, enabling fast adaptation to new parameters for applications in scientific computing.
My Work:

- Researched the application of solvers (e.g., Fluent, Matlab PDEToolbox) and evaluated their feasibility for training data generation, providing key insights for team decisions.

- Designed a 3D encoder combining techniques from video coding to optimize the pretraining process of implicit neural representations (INR), laying the foundation for INR-boost research.

- Conducted data screening and quality assessment using traditional numerical methods (e.g., residual calculations and cross-validation) to enhance dataset reliability.

Skills gained: Advanced deep learning techniques, proficiency in Python and MindSpore, video coding integration with INR, numerical analysis methods, and independent literature review capabilities.

April, 2023 – June, 2023 ▌ **PKUDSA Eraser: A Self-Designed Program for Assignment Battles**
Supervised by Prof. B. Chen, Prof. Y. Liu, in collaboration with the TA team
Introduction: Developed an online program allowing students to participate in game-like battles, with a visualization of battle processes.
My Work:

- Designed sample codes for players.

- Led team efforts in closed beta testing, identified and corrected invalid operations.

- Optimized game balance through theoretical analysis.

Skills gained: Team collaboration, advanced Python programming, and proficiency in data analysis using NumPy.

Skills

Languages ▌ English (Fluent), Mandarin Chinese (Native).

Programming Languages ▌ Python, C/C++, MATLAB, LaTeX

Deep Learning Framework ▌ PyTorch, MindSpore, JAX with GPU programming experience.

Numerical Methods ▌ Familiarity with numerical solutions to differential equations, optimization, and methods like finite differences or finite element analysis.

Skills (continued)

Theoretical Skills   🔖   Strong foundation in fundamental mathematics (linear algebra, multi-variable calculus) and physics (classical mechanics, fluid mechanics, quantum mechanics).

Miscellaneous Experience

Awards and Achievements

Sep, 2024   🔖   **China Merchants Securities(CMS) Scholarship**, Peking University

🔖   **Academic Excellence Scholarship**, Peking University

June, 2024   🔖   **Applied Mathematics Honors Program**, the School of Mathematical Sciences, Peking University

Sep, 2023   🔖   **The Peking University Zheng Geru Scholarship**, Peking University

🔖   **Merit Student**, Peking University

Sep, 2022   🔖   **Scholarship for Freshman**, Peking University

May, 2022   🔖   **The Winner of Gold Medal in the 22nd Asian Physics Olympiad**, Asian Physics Olympiad