Fanzhi Lu

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Education

- **Tsinghua University** *09/2020 - 07/2024(Expected)*
  BS, Physics GPA: 3.72/4.00

Research Experience

- **Benchmark for Physics-Informed Neural Networks** *10/2022 - 06/2023*
  Group Member, Advisor: Hang Su, Jun Zhu TSAIL Group, Tsinghua University
  – Investigated various PINNs and incorporated LAAF-PINN (Locally Adaptive Activation Function) and GAAF-PINN (Globally Adaptive Activation Function) into the PINNacle toolbox as SOTA methods
  – Implemented and ran experiments with the 2 methods on PINNacle PDE dataset

- **Consensus-Based Optimization with Constraints** *07/2023 - 11/2023*
  Research Intern, Advisor: Yuhua Zhu HDSI, UC San Diego
  – Implemented and ran a new gradient-free optimization algorithm on several high-dimensional constrained optimization problems and machine learning tasks, and compared its performance with existing baseline
  – Applying the method to challenging machine learning problems with multiple constraints

- **Fine-tuning via Self-Verification on Llemma** *10/2023 - Ongoing*
  Core Group Member, Advisor: Shi-Min Hu Tsinghua University
  – Made a thorough investigation on deep learning for symbolic math and formulated the research plan
  – Currently doing experiments testing prompts for self-verification to train an Adapter for fine-tuning

Manuscripts

- **(ICLR 2024 under review)** Zhongkai Hao, Jiachen Yao, Chang Su, Hang Su, Ziao Wang, Fanzhi Lu, Zeyu Xia, Yichi Zhang, Songming Liu, Lu Lu, and Jun Zhu. PINNacle: A Comprehensive Benchmark of Physics-Informed Neural Networks for Solving PDEs.

Projects Experience

- **Large-scale Unsupervised Semantic Segmentation** *07/2023*
  Interdisciplinary Practical Course on Deep Learning and Computer Graphics, Final Project
  – Trained a model in PASS baseline method with a change to Transformer backbone to improve performance

- **C++ Web Server for System Management** *08/2023*
  C++ Programming for Linux, Final Project
  – Implemented a Web Server in C++, with the basic function of process management and reading system information from Linux

- **Training a Flexible Convolution Kernel to Model Human Receptive Field** *11/2022*
  Cognitive Psychology, Experiment Design Report
  – Discussed Deep Neural Networks for modeling information transmission in the human visual cortex
  – Designed an fMRI experiment and proposed a method to use the data to train a flexible convolution kernel similar to human receptive field

Skills

Technical Skills: Python, C/C++, Pytorch, DeepXDE, LaTeX
Maths: advanced calculus, linear algebra, probability theory, statistics(in physics), PDE(in physics)
Related Courses: Mathematical Physics Equations(A), Quantum Mechanics(A-), Statistical Mechanics(B+), Atom and Molecule Physics(A), Programming Fundamentals(A+)

* *Currently taking*: Elementary Probability Theory, Data Structures and Algorithms, Selected Topics in Computational Quantum Physics

Honors and Awards

- **Literature and Art Excellence Scholarship** Tsinghua University *Autumn 2023*
- **Best Performance Award for Chorus** Beijing University Student Music Competition *Spring 2023*
- **Literature and Art Excellence Scholarship** Tsinghua University *Autumn 2022*
- **Second Prize in National Mathematical Olympiad** *Spring 2019*

Extracurricular Activities

- **Deputy Leader**, Tsinghua Student Choir *07/2022 - Now*
- **Member**, Tsinghua Student Choir *09/2021 - 07/2022*
- **Deputy Group Leader**, Student Council of Tsinghua University *07/2022 - 06/2023*
- **Class Representative for Publicity**, Zhili College *09/2021 - 07/2022*
- **Volunteer**, THU Kids Studio (A Public Welfare Club in Tsinghua) *09/2020 - 06/2023*
- **Member**, Basketball Team of Zhili College *09/2020 - 06/2023*