Mingyi Hou

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Summary

PhD in Mathematics with a focus on optimization methods for neural networks. Strong background in mathematical modeling, numerical methods, and programming, with a drive to apply theory to real-world challenges. Proven ability to quickly learn new domains, decompose complex problems, and deliver effective solutions.

Core Competencies

- Advanced independent problem-solving grounded in mathematical modeling and research.
- Proficient in Python (5+ yrs), Julia (3+ yrs), SQL, object-oriented programming
- Skilled in machine learning, neural networks, and AI/LLM agents. (scikit-learn, PyTorch, TensorFlow, LangChain)
- Skilled in data-driven modeling, computational methods, and visualization. (pandas, seaborn, matplotlib)
- Hands-on experience with Git, Docker, and Cloud services such as GCP, Azure.
- Strong communicator with experience in teaching, collaboration, and project coordination.
- Fast learner with a passion for applying new technologies to real-world problems, active on Kaggle, Hugging Face.
- Languages: Chinese (native), English (fluent), Swedish (basic).

Projects

AI-Augmented Job Tracker, Personal Project current

- Prototyped a job application assistant using LangChain, Python, and SQLite. Designed to parse job descriptions, and record application metadata for later analysis. CLI interface tested on 30+ real job applications.

Housing Price Prediction with XGBoost, Personal Project 2025

- Built a data analysis pipeline for housing price prediction on real-world data, achieving less than 15% relative error by data cleaning and feature engineering. See my Kaggle page.

Monte Carlo Simulation for Fokker-Planck Equations, PhD Project 2024 — 2025

- Developed high-performance Monte Carlo simulations to model and analyze mathematical problems, cutting computation time in hours to minutes using GPU acceleration. See my personal page.

High Performance Numerical Solver, PhD Project 2023 — ongoing

- Extended the theory of a numerical method to complex equations and implemented it using Julia, achieving consistently accurate results. Currently refactoring the codebase to align with industry-standard practices.

Education

Uppsala University Uppsala, Sweden
PhD, Mathematics *Sep 2020 — Aug 2025*

- Conducted research at the intersection of neural network optimization and mathematics.
- Published 1 peer-reviewed article and 3 preprints (2 as sole author); presented at international conferences.
- Investigated Physics-Informed Neural Networks (PINNs) using TensorFlow to solve PDEs.
- Accelerated Poisson integral computations using Python and Numba, reducing runtime significantly.
- Led a grant application, managing partners, drafting proposals, and budgeting.
- Taught undergraduate mathematics courses; received positive student feedback.

Uppsala University Uppsala, Sweden
MSc, Mathematics *Sep 2018 — Aug 2020*

- *Erasmus exchange* at Technical University of Munich, Germany, Spring 2019, awarded *Erasmus+ Scholarship*.
- Trained neural networks on Azure for image classification and segmentation; improved baseline performance.

Southern University of Science and Technology Shenzhen, China
BSc, Applied Mathematics *Sep 2014 — July 2018*

- Led a student project on 3D reconstruction using laser scanning.

Personal Interests

- **Open-Source Sharing**: Maintaining a personal website using Hugo and GitHub Actions, leveraging GitHub Copilot for efficient coding and debugging.

- **Home Automation**: Implementing home automation systems using Home Assistant, MQTT and Docker, integrating various devices for improved efficiency and convenience.
- **Visualization of Concepts**: Creating animations of mathematical concepts using Manim, enhancing understanding and engagement.