HanHoupu

Personal Information

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Personal website: https://hanhoupu.github.io/ (contains some personal projects)

Education

Michigan State University – Bachelor of Science in Physics, Minor in Economics *May 2025* GPA: 3.32/4.0 | Dean's List: Spring 2023, Summer 2024

University of Pennsylvania – Master of Computer and Information Technology 2025 – Present

Machine Learning & AI Experience

Performance Profiling of Diffusion-based LLMs (LLaDA-8B, Dream, Fast-dLLM)

Research Assistant, Georgia Tech EIC Lab | August 2025 – Present

- Developed automated evaluation pipelines in Python using PyTorch and HuggingFace to run GSM8K, HumanEval, and MBPP at scale on local and remote GPU clusters.
- Implemented experiment harnesses to sweep decoding and KV-cache configurations (e.g., dual-cache, block-wise decoding, similarity-based KV merging, thresholding) and logged tokens-per-second, number of function evaluations (NFE), and accuracy.
- Built reproducible scripts for launching, monitoring, and resuming long-running inference jobs; analyzed failure modes using structured logs and GPU telemetry.
- Aggregated per-sample evaluation results into benchmark reports, computing metrics, exact match, and latency distributions to compare model variants and settings.
- Collaborated with PhD mentors to interpret scaling trends and propose KV-cache optimization strategies for faster and more stable diffusion-based decoding.

Independent ML & LLM Projects

2023 – Present

- **BTC LSTM Prediction** – Built an LSTM model in Python to predict BTC price trends using multi-asset input signals (BTC, Gold, S&P 500); implemented data ingestion, feature engineering, sliding-window batching, and backtesting of prediction performance.
- **ENSDF Scientific Modeling (Transformer + Diffusion)** – Built ML models to predict nuclear energy levels using the ENSDF dataset. Trained a Transformer model with incremental temporal signals (data cleaning, sequence construction, training/evaluation) and released the code on my personal website. Complemented this with diffusion-based experiments for scientific data completion on structured numeric inputs using HuggingFace Diffusers, focusing on practical pipelines and precise evaluation.

Academic

Fabrication of Type-I Superconductors via Chemical Vapor Deposition (CVD)

March 2024 - May 2024

Fabricated SIS and SSS thin films using a CVD system and verified SSS superconducting properties via four-point probe measurements (Tc ~7.2 K).

Conducted quantum tunneling experiments on SIS junctions; tunneling effects were not observed, prompting process refinements.

Gained experience in thin-film fabrication, resistivity measurements, and troubleshooting experimental setups.

Experimental Investigation of Optical Pumping in Rubidium

January 2024 - March 2024

Performed optical pumping experiments on rubidium atoms with magnetic shielding to eliminate Earth's magnetic field.

Verified theoretical predictions of spin dynamics by observing expected signal patterns on an oscilloscope.

Acquired experience in experimental optimization, magnetic field calibration, and data acquisition.

Supported laboratory setup and mechanical assembly for ongoing research projects

May 2024 – May 2025

Designed and constructed a precision-adjustable support frame for a vacuum chamber, enabling fine alignment along the X, Y, and Z axes to accommodate experimental constraints.

Designed and built two custom laser table frames using SolidWorks; integrated procured components to meet experimental requirements.

Simulated magnetic field distributions of magnet assemblies in COMSOL Multiphysics, gaining proficiency in finite element analysis and parameterized modeling.

Contributed to the integration and alignment of experimental apparatus, ensuring mechanical stability and compatibility with lab setups.

Developed hands-on skills in CAD modeling, mechanical assembly, and magnetic simulation techniques.

Federal Reserve University Challenge

January 2024 – May 2025

Researched macroeconomic indicators (inflation, GDP, unemployment) to support monetary policy analysis.

Analyzed data to evaluate real-world impacts of Federal Reserve policies and proposed actionable strategies.

Collaborated on a team report aligning with Federal Reserve objectives, contributing research and policy insights.

Skills

Programming Languages: - Python (main language) and Java; also familiar with C and R. - Comfortable with Git, Linux command line, conda environment management, and working on remote GPU servers using SSH and tmux.

AI/ML Tools & Frameworks: - PyTorch and HuggingFace Transformers/Diffusers; some experience with TensorFlow/Keras.
- Comfortable running and lightly fine-tuning LLMs/sequence models, and able to read and modify training scripts and configs.
- Use Python (NumPy, pandas) for data processing, including working with CSV/JSON files, basic cleaning, and deduplication.
- Built evaluation workflows using GSM8K, HumanEval, and MBPP; familiar with metrics such as accuracy, pass@1, precision/recall, and latency.
- Able to use simple SQL/SQLite queries for state tracking in ML pipelines.

Software Tools: COMSOL, SolidWorks

Languages: Fluent in Mandarin Chinese and English

Programming Projects

please see my personal website.