

James Ngai

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Education

Carnegie Mellon University

Pittsburgh, PA

B.S. Computer Science, Concentration in Machine Learning, GPA: 3.81/4.00

Aug 2022 - May 2026

- **Courses:** 11-785 Deep Learning, 15-213 Computer Systems, 15-259 Probability, 15-210 Parallel Algorithms, 21-355 Real Analysis

Work Experience

National Security Agency

Fort Meade, MD

Incoming Machine Learning Engineering Intern

Jun 2024 - Aug 2024

- Deliver **Quantum Machine Learning Model** to be deployed at **Google Quantum AI**.
- Write and present research report on **Quantum Neural Networks** to **senior NSA officials**.

Carnegie Mellon University

Pittsburgh, PA

Machine Learning Researcher

May 2023 - Aug 2023

- Developed Python code to simulate Agent-Based **Reinforcement Learning** model to find optimum trading prices in **real world** forest graphs.
- **Improved model convergence** from prior PhD students' work of 53% to **99%** by experimenting with **greedy/equal payoff splits**, resolving a **significant bottleneck** that had persisted in the research lab for **3 years** prior to my arrival.
- Accelerated research feedback loop by developing a **systematic testing framework** utilizing **Docker containers**, **Linux Scripts**, and **Multi-threading** on **Google Cloud**, enabling 24/7 model testing.
- **Technical Skills:** Python, NumPy, Matplotlib, Pandas, Ubuntu Linux, Linux tools, Shell Scripting, Git, Google Cloud (GCP).

Exprii

Pittsburgh, PA

Teaching Assistant

Feb 2022 - Sep 2022

- Instructed and mentored a team of **20+ TAs**, resulting in consistently **high performance evaluations** and enhanced student satisfaction.
- Identified class-specific misconceptions, improving teaching clarity through **in-depth analysis** of student test results using **R** code.
- Taught **advanced combinatorics** and **probability** courses for **100+ students** in several different classes for **AMC** and **MATHCOUNTS** contests.
- **Technical Skills:** R, Probability, Combinatorics, Algebra.

Allstate

Seattle, WA

Software Engineering Intern

Jun 2018 - Jun 2022

- Realized **significant cost savings** of over **\$10,000 annually**, by leading an end-to-end development of a comprehensive **data pipeline** to automate Allstate's advertising processes.
- Achieved a **17%** improvement in the quality of **SalesGenie data** through the implementation of **Cross-Validation** techniques using **REST APIs** and **web-scraping** methodologies, ensuring **robustly accurate advertising data**.
- **Technical Skills:** Python, C++, Matplotlib, Pandas, Scikit-learn, Ubuntu Linux, Linux tools, SQL, Git, CI/CD.

University Projects

AI Safety Research: Robust Control on Transformers

Pittsburgh, PA

Center for AI Safety

Feb 2024 - Present

- Engineered an **evaluation pipeline** used by **20+ researchers** tailored for **language generation** tasks, meticulously parsing transformer outputs across diverse formats including JSON, Pig Latin, and Chinese.
- Proved the **robustness** of **Representation Engineering** against current methods, included in evaluation within **published paper**, by comparison with **Direct Preference Optimization (DPO)** and **Supervised Fine-Tuning (SFT)**.
- **Technical Skills:** Python, PyTorch, HuggingFace Transformers, Natural Language Processing (NLP), Linux, Docker.

eBay Machine Learning Competition (NER)

Pittsburgh, PA

eBay

Aug 2023 - Nov 2023

- Ranked **12th** out of 887 teams, **surpassing** primarily **PhD student-led teams**.
- Spearheaded data preprocessing for **10 million rows** of **labeled data**, leveraging **Pandas** and **Hugging Face** to create training/evaluating/testing pipeline in Python.
- Optimized **NLP model** training scripts using **LoRA**, **Quantization**, and **DeepSpeed** to facilitate efficient **Multi-GPU** training, resulting in a **55% reduction in memory consumption** while preserving **competitive performance** levels.
- Conducted **hyperparameter tuning** and **K-Cross Fold Validation** on **11 billion parameter models** in distributed training setups on **AWS EC2**.
- **Technical Skills:** Python, Pytorch, HuggingFace Transformers, Natural Language Processing (NLP), AWS, Google Cloud (GCP), DeepSpeed.

Skills

Programming Python (Pandas, PyTorch, NumPy, Scikit-learn), R(ggplot2), C/C++, Java, HTML/CSS, JavaScript, SQL.

Miscellaneous Linux, Docker, GCP, AWS, Shell, Bash, Tableau, Git.