Hoang Viet Chu

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EDUCATION

Pitzer College, a member of the Claremont Consortium — Claremont, CA
Bachelor's Degree, Joint Computer Science and Mathematics (Honors) — Expected May 2024

- **GPA**: 3.7 / 4.0 (Dean's list. Cross-registered Math and CS classes at Harvey Mudd College)
- **Teaching Assistant (for 1 year)**: Data Structures (A), Intermediate Probability (A), Intermediate Linear Algebra (A-)
- **Coursework**: Algorithms, Machine Learning, Linear Models, Combinatorics, Abstract Algebra, Public Speaking

AWARDS

- **Math**: 1st Prize: Vietnam Mathematical Olympiad, Silver Medal: Asian Pacific Mathematical Olympiad, 3x AIME
- **Programming** (0 high school exp.): Winner - SIG Coding Challenge, Meta Hacker Cup & Google Code Jam Round 2

RESEARCH EXPERIENCE

University of Southern California - Research Scholar in Operations Research & Data Science — June 2023 - Current
"Nonlinear Optimization of ROI for Facility Costs under Probabilistic Utility Models (RUM)" — *Decision Sciences*

- Prove that the popular additive RUM model - adding deterministic and random error terms - is non-convex for facility cost optimization, but the multiplicative RUM model is convex and always returns optimal solutions within time limit.
- Backtested my proposition by developing **in C++** multiplicative RUM model simulations which returned optimal solutions identical to those of a traditional solver's local search heuristic simulation but with a **60% reduced runtime**.
- Proposed and implemented a Multi-Cut Approximation algorithm to further accelerate the runtime of this new model.

Harvey Mudd College - Independent Research — August 2022 - December 2022
"Explore Constraints on Unitary Recurrent Neural Networks" (**paper**) — *Natural Language Processing*

- Proved that weight matrices within the unitary group can prevent uRNN's vanishing and exploding gradients problem.
- Implemented **in Python** a Unitary Recurrent Neural Network adapting Arjovsky's paper while introducing a novel update rule constraint from prior proof to demonstrate the new model's practicality across Language Modeling tasks.

WORK EXPERIENCE

Meta — May 2022 - August 2022
Engineering Intern (received return offer) — *Python, SQL, Numpy, Scikit-learn, PyTorch, Hadoop (MapReduce)*

- Delivered a topology-preserving Dimension Reduction algorithm for Meta AI's CommerceMM model, achieving a 93% reduction in parameters and a 2% improvement in accuracy for labeling **100,000,000+ Marketplace images**.
- Proposed a model-agnostic Window Selection algorithm partially addressed Vision Transformer's exponential scaling issue and helped researchers conduct performance analysis of the model and compare that with Meta AI's ResNet50.
- Utilized Directed Acyclic Graph data structure to accelerate the automation of generational data workflows in batches.

CoHost.ai (Seed-stage Startup) — June 2021 - August 2021
Engineering Intern (only intern in the company) — *C++, Linux, Full-stack, MongoDB, gRPC, Kubernetes*

- Deployed a fault-tolerant Message Queue with Inter-Thread Communication method which prevents message loss if the program crashes, supports any data types as inputs, streamlines ownership, and leaves no copies of messages sent.
- Architected the system design for the company's new Chatbot and designed test suites reaching **100% code coverage**.

PROJECTS

LendingClub Economic Risk Assessment | **Citadel Datathon Winner** — *Statistics, Regression Analysis*

- Performed statistical analysis across **multiple datasets totaling 26,000,000 rows** and discovered that LendingClub had failed to detect new borrowers who'd defaulted and altered their personal information to manipulate interest rates.
- Designed a k-NN model using my proposed Mahalanobis distance metric to forecast interest rates with 94% accuracy.

Anomaly Detection for Tradeweb's Financial Market Data | **p-AI club's sponsored project** — *Machine Learning*

- Modeled bond price's latency spikes in Python with 91% accuracy using regression & Random Forest algorithms.

Python to Java Compiler in Android Environment | **MLH Fellowship** Open-Source Contributor — *OOP, Systems*

- Wrote helper functions that remove redundant bytecodes and avoid crashes when translated variables jump addresses.
- Refactored **1200+ lines of code** in the team's analytic tool which monitors the compiler's latency and memory usage.