# Matthew Harvill

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## EDUCATION

**M.S. Computer Science, Stanford University** | Expected June 2024 | GPA: 4.0/4.0

Parallel Computing, Systems for Machine Learning (ML), Deep Reinforcement Learning (RL), Computer Vision, Decision Making Under Uncertainty, ML with Graphs, Natural Language Processing (MLP), Mining Massive Datasets, Computer Networks

**B.S. Computer Engineering, University of Texas at Dallas** | Graduated May 2022 | GPA: 3.99/4.0

Operating Systems, Embedded Systems, Computer Architecture, Data Structures and Algorithms

## EXPERIENCE

**Teaching Assistant - Stanford University. Stanford, CA** | September 2022 - Present

- Led successful quarterly course-review lectures and weekly discussion/problem sections for Probability and Statistics, and Computer Organization and Systems
- Recognized by Professor as an exceptional teacher in Probability and Statistics

**Machine Learning Engineer Intern - Hippocratic AI. Palo Alto, CA** | June 2023 - September 2023

- Built and oversaw the company's large language model (LLM) evaluation framework on Amazon Web Services (AWS)
- Trained hundreds of healthcare-specific 7B+ parameter LLMs on AWS SageMaker and SLURM
- Researched custom healthcare tokenizer cost/performance tradeoffs, leveraging techniques like TFIDF
- Greatly reduced data processing latencies by migrating pipelines to containers on AWS SageMaker

**Software Engineer Intern - Texas Instruments, Inc. Dallas, TX** | May 2022 - August 2022

- Founded Texas Instruments's (TI) Wi-SUN Embedded Host application in C/C++, allowing customers to fully integrate the new Wi-SUN communication standard into existing large-scale applications
- Co-created TI's Wi-SUN ReactJS + NodeJS web application for intuitive network management across hundreds of nodes

**Test Engineer Intern - Texas Instruments, Inc. Dallas, TX** | June 2021 - August 2021

- Generated C++ test plans to verify various aspects of hardware functionality on a lowside driver board
- Detected elusive board issues while running tests on automated testing equipment

## PROJECTS

**Smarter Atari Agents with Efficient(est)Zero**

- Improved EfficientZero's State of the art (SoTA) performance with dynamic parallel Monte Carlo Tree Search (MCTS)
- Researched a novel state-based similarity sharing technique to improve MCTS, but found it is inhibitively slow

**Designing a Reliable *Crew* Member**

- Designed a MCTS agent for the cooperative trick-taking game, *The Crew*, that significantly outperformed a random agent and was robust to unreliable teammates
- Built the simulation environment for playing *The Crew* and testing agent performance from scratch in Python

**Cryptocurrency Fraud Detection with GNNs**

- Applied Recurrent Neural Network (RNN)-based Graph Neural Networks (GNNs) to predict illicit crypto transactions
- Discovered that RNN-based GNN models do not improve performance over their vanilla counterparts

**Multitasking with BERT Embeddings**

- Performed in the top quartile of Stanford class on sentiment classification, paraphrase detection, and semantic textual similarity tasks by fine tuning BERT embeddings with various strategies, including incorporating Jaccard Similarity metrics

**Coup for all** | https://coup-for-all-8b5265fb626c.herokuapp.com

- Architected a secure, fault-tolerant, real-time, mobile-friendly public website for playing the popular game *Coup*
- Built everything from scratch, including all frontend designs, using ReactJS, NodeJS, websockets, and MongoDB

**Dominion Local Area Network Multiplayer Game**

- Built a multithreaded Java application from scratch for playing the multiplayer game, *Dominion,* on the users' LAN
- Wireframed an appealing UX using Scene Builder and JavaFX

## SKILLS

**Programming Languages -** Python, C/C++, Bash, CUDA, SQL, JavaScript/TypeScript, Java
**Frameworks/Libraries -** PyTorch, Numpy, PySpark, OpenMP, Pandas, NodeJS, ReactJS
**Platforms/Tools -** AWS SageMaker, AWS Simple Storage Service (S3), AWS Elastic Cloud Compute (EC2), AWS Elastic Container Registry (ECR), SLURM, Docker, GitHub, JIRA, Heroku, MongoDB, PostgreSQL
**Operating Systems-** MacOS, Unix/Linux, Embedded Linux, Windows