Matthew Sahagun | Shelton, CT, USA | 203-513-1038 | mevsahagun@gmail.com

EDUCATION

Yale University, *B.S.* Applied Mathematics, *B.S.* Computer Science May 2028
Relevant Coursework: Probabilistic Machine Learning, Intermediate Machine Learning, Advanced Optimization Techniques, Natural Language Processing & Large Language Models, Probability Theory, Data Structures & Information Systems, Linear Algebra, Discrete Math, Econometrics, Game Theory, Multivariable Calculus

TECHNICAL SKILLS

Languages: Python, Go, R, C++, Java, TypeScript, SQL
Libraries: PyTorch, Spring Boot, Django, NumPy, TensorFlow, Pandas, Scikit-Learn, Seaborn, Matplotlib, Optuna
Tools/Platforms: AWS, Git, Weights & Biases, UNIX, High Performance Computing, Hugging Face
Skills: Machine Learning, Deep Learning, Natural Language Processing, Reinforcement Learning, Computer Vision

WORK EXPERIENCE

Vault Kinetics | Machine Learning Researcher Intern | New Haven, CT May 2025 - August 2025
• Developed **deep learning autoencoder-based** injury prediction model achieving an **85% reconstruction accuracy**
• Used **Python, PyTorch, Weights & Biases** to quantify per-feature reconstruction errors for over **10,000** unique visitors

Yale Machine Learning Research Assistant | Planning and Optimization Lab | New Haven, CT Sept. 2025 - Present
• Developed a **generative deep learning** framework using **Neural Cellular Automata (NCA)**, including a novel topological loss function and multi-target optimization; submitted to **ICML 2026** (top-tier **machine learning** conference)

Yale Machine Learning Research Assistant | Krishnaswamy Machine Learning | New Haven, CT Sept. 2025 - Present
• Contributed to development of geometric priors for **LLM-based machine learning** agents with Python and PyTorch

Yale Econometrics Research Assistant | Tobin Economic Research Lab | New Haven, CT August 2025 - Present
• Engineered data pipeline with caching layer for causal parameter inference, **improved** computational efficiency by **10%**
• Scaled multi-parametric optimization workflows using RCDD package on **High Performance Computing** cluster

Percent Human | Co-Founder | Shelton, CT December 2022 - June 2023
• Built React.js interface for **10,000 users** and **100,000+ visitors;** awarded **Google Chrome Web Store Featured Badge**
• Developed and led front-end software development, leading to **acquisition by GPTZero**

PROJECTS

Adaptive Bayesian Line Search (ABLS) | PyTorch, Python, Numpy, Pandas December 2025
• **Engineered** a novel hybrid derivative-free optimization algorithm combining pattern search with Bayesian optimization
• Reduced Gaussian Process updates by **90%;** achieved **52%** tighter convergence across **50 benchmark trials**

Distributed Key-Value Store with Raft Consensus | Go, Raft, gRPC October 2025
• Built **distributed key-value storage system** with **Raft** consensus protocol for **fault-tolerant data replication**
• **Developed** benchmarking suite to measure latency, throughput, and fault recovery under simulated failures

3D Deep Learning for ACL Tear Detection | PyTorch, Numpy, Pandas, Weights & Biases, HPC June 2025
• Developed custom **3D Deep Learning Convolutional Neural Network** with spatial attention mechanism for ACL tear detection from multi-plane MRI scans, achieving **90% AUROC** on **1,370+ knee exams**
• Implemented automated **hyperparameter optimization** using **Optuna** and experiment tracking with **Weights & Biases**

Cloud-Native Task Management API | Go, PostgreSQL September 2024
• **Engineered** a cloud-native **RESTful API** in **Go** with **PostgreSQL**; deployed locally with **AWS LocalStack**
• Automated infrastructure provisioning with **Terraform**

ATOMIC-SM | Python, PyTorch, Django, Pandas, Numpy February 2021 - February 2023
• Developed hierarchical **deep learning model** combining temporal attention-based **LSTM** for sentiment analysis with **Graph Attention Network** for modeling inter-company relationships and stock market dynamics
• Built **Django** application to visualize **29.47% cumulative return in 9-month backtest (10% above SPY benchmark)**

PUBLICATIONS

Sahagun, M., & Sanborn, L. (2023). **Media Moments and Corporate Connections: A Deep Learning Approach to Stock Movement Classification.** Machine Learning / Deep Learning paper, arXiv:2309.06559