

Michael Einhorn

<https://michaeleinhorn.github.io/Portfolio/>

Skills

Python, C, C++, C#, Java, R Julia, SQL AWS Serverless Development Linux Shell Scripting Agile and Test Driven Development	Machine Learning, Computer Vision Natural Language Processing Finetuning large models with Deepspeed PyTorch, Keras, TensorFlow	Data Cleaning and Preprocessing Data Visualization in PyPlot and GGPlot Parallel Processing with CPU Multithreading, GPU CUDA, and MPI Distributed Computing
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Education

Georgia Institute of Technology, College of Computing, Graduated May 2023
Major: Computer Science, GPA: 3.90
Concentrations: Artificial Intelligence, Modeling and Simulation

Work Experience:

Computer Scientist US Air Force 453rd Electronic Warfare Squadron: Jan 2024 – Present

Modernized legacy Javascript software into a pipeline with a Pub/Sub architecture to automate previously manual processes and enable flexibility for future features. Developed modular containerized applications for that pipeline with Python and Docker Swarm. Reduced the time to setup an environment for a new developer from one week to one hour with automated and consistent deployments in Ansible.

Georgia Tech COAR Lab: Spring 2022 - 2023

Worked with a graduate student to experimentally test their theoretical predictions for the convergence and linear speedup of federated reinforcement learning. Tested Tabular Q-learning, and Convolutional Networks with PPO. Analyzed results in R and wrote an Undergraduate Thesis.

Stanford Existential Risk Initiative Machine Learning Alignment Theory Scholars: Fall 2022

Research Engineer on a multidisciplinary team in Berkeley and London. Finetuned Language Models GPT-Neo 1.3B and GPT-Neox 20B with PPO using Deepspeed with multiple GPUs to play text adventures. Debugged Deep Learning code. Tested KL divergence and prompt engineering.

Georgia Tech Research Institute CIPHER: Fall 2021

Developed methods to determine scaling laws for neural networks to predict the amount of data needed and statistically evaluate improvements to scaling laws. Used this procedure to test Resnet with Mixup data augmentation on the CIFAR-10 image dataset. Analyzed data with regression in R using blocking to incorporate results from multiple experiments. Tested for heteroskedasticity and non-normality of residuals and adjusted with Iteratively Reweighted Least Squares. Wrote a draft report on results.

Orca IoT AWS Developer: Spring and Summer 2021

Developed and code reviewed production software for management of construction sites. Developed Serverless APIs with Python using AWS Lambda, and Cloud Formation. Deployed a Yolo model in AWS Neuron which was both more accurate and less expensive than AWS Rekognition analyzing our in-house dataset. Created a marketing tech demo for visualizing object detection boxes with real data in the SQL server. Tested models on edge devices such as Coral TPU and Jetson Nano.

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Georgia Tech Research with CHAT (Cetacean Hearing and Telemetry): Spring 2021

Developed an AI application to facilitate real time communication with dolphins. Used Cascade Classifier in OpenCV to detect dolphin whistles in a spectrogram. Tested data preprocessing, and hyperparameters for Precision, Recall, and Inference Time. Debugged multithreaded C code with Valgrind.

Georgia Institute of Technology CS Coursework:

Natural Language Processing:

Implemented models and algorithm's such as LSTMs, Attention, Beam Search, Part of Speech Tagging and Classification. Worked on a team project to use a variation of Tuned Lens to interpret Language Models.

Machine Learning and Intro to AI:

Programmed in Python using NumPy. Implemented models and algorithms such as A* Search, Gaussian Mixture Model, Decision Trees, Reinforcement Learning, Semi-Supervised Learning, and Neural Networks. Worked on a semester team project with Semantic Segmentation using Convolutional Neural Networks. After training on labeled images of pet cats and dogs, the model was able to generalize to segment images of wildlife such as elk, bears, and birds.

Perception and Robotics:

Modeling robot perception and planning using probability theory. Projects include using maximum a posteriori to sort items from sensor readings, and different methods for path planning such as RRT.

Computer Simulation:

Analyzing systems of differential equations, discrete models such as cellular automaton. Semester team project on simulating trading and liquidity providing on the Uniswap decentralized crypto exchange.

High Performance Computing:

Wrote efficient parallel algorithms in Julia. Used SSH and Jupyter Notebooks to run code on the Georgia Tech Pace Computing Cluster. Implemented algorithms with shared memory CPU multithreading, CUDA GPU multithreading, and MPI distributed memory computing. Algorithms include Dense/Sparse Matrix Multiplication, FFT, and sorting.

Data Structures and Algorithms