Michael Einhorn

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Skills

- Python, C, C++, C#, Java, R
- Julia, SQL
- AWS Serverless Development
- Agile Methodology and Unified Modeling Language
- Software Testing with Junit
- Machine Learning and Computer Vision with Keras, Tensorflow, and Pytorch
- Parallel Processing with CPU Multithreading, GPU CUDA, and Network MPI
- Linear Algebra and Differential Equations
- Data Cleaning and Preprocessing
- Data Visualization in PyPlot and GGPlot

Education

Georgia Institute of Technology, College of Computing, Expected Graduation Dec 2022
Major: Computer Science, GPA: 3.92
Concentrations: Artificial Intelligence, Modeling and Simulation

Work Experience:

Georgia Tech Research COAR Lab Spring 2022:
Testing convergence and linear speedup for federated reinforcement learning using different algorithms on simulated applications. Tabular Q learning, Linear Function Approximation and Neural Network Function Approximation with TRPO and PPO.

Georgia Tech Research Institute CIPHER: Full time internship Fall 2021
Developed methods to accurately determine scaling laws for neural networks to predict the amount of data needed and evaluate improvements to scaling laws. Used this procedure to test Resnet with Mixup data augmentation on the CIFAR-10 image datasets. Analyzed data with regression in R using blocking to incorporate results from multiple different experiments. Tested for heteroskedasticity and non-normality of residuals and adjusted with Iteratively Reweighted Least Squares.

Orca IoT Intern Spring and Summer 2021:
Developed software for management of construction sites. Developed Serverless APIs with Python using AWS Lambda, and Cloud Formation. Implemented a Yolo model in AWS Neuron using Inferentia Chip which was both more accurate and less expensive per 100 images than AWS Rekognition analyzing our in house dataset. Created marketing tech demo visualizing object detection boxes with real data in the SQL server. Ran Machine Learning models on edge devices using Coral TPU, and Jetson Nano.

Georgia Tech Research with CHAT (Cetacean Hearing and Telemetry) Spring 2021:
Developed an AI application to facilitate real time 2 way communication with dolphins. Used Computer Vision Cascade Classifier in OpenCV to detect dolphin whistles in a spectrogram. Tested different data preprocessing, and hyperparameters for Precision, Recall, and Inference Time. Debugged multithreaded C code with Valgrind.

Georgia Institute of Technology CS Coursework:

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

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Computer Simulation:
Analysing systems of differential equations, discrete models such as cellular automaton. Semester project on simulating trading and luqidity providing on the Uniswap decentralized crypto exchange.

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, Neural Networks. Worked on a semester long 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 bears, elk and birds.

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.

Projects

Blending Music with an Autoencoder
Presented at Georgia Tech Music, Art, and Technology Fair:
Modified an Autoencoder Neural Network that composed music to smoothly blend two songs. Presented at the Georgia Tech Music Art and Technology Fair in March of 2020. The Autoencoder can write an original song if given a random latent vector. Within the simple latent space, it is possible to take a linear path between any 2 latent vectors that represent songs, and when the network is properly trained, the smooth transition in the latent space translates to a smooth transition in the music regardless of how different the songs are from each other.

Computer Systems Mentorship using C:
Participated in a two year mentorship program working on a collaborative case study utilizing Quake 3, an early networked 3D game written in C and capable of running efficiently on even the slowest of computers. Added several Vector and Quaternion functions to handle rotation, interpolation, and projection. The use of Quaternions enabled 3D swinging motion, allowing the player to swing through the level like spiderman. Created a library for each of the vector and quaternion methods with documentation and tutorials so that any team in future years would be able to utilize these tools.

Carnegie Mellon: National Game Academy:
Attended a 6-week Computer Science course at Carnegie Mellon for game design. Collaborative teams of 5 people were assigned to remake a classic game with a twist, and then make an original idea in VR. Learned how to maintain focus and motivation within the team as the stress of the deadline approached and how to manage code with multiple people. Learned to use Audacity for sound design, photoshop, and Autodesk Maya, while programming the game with the Unity engine in C#.

Other activities:

Effective Altruism AI Safety Seminar Spring 2022, Attended Def Con 27,
Math Tutor 2016-2021, Eagle Scout, Scuba Certified, Pep Band