Samuel Gerstein

Wake Forest, NC
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Education

University of Illinois at Urbana-Champaign December 2024
Bachelor of Science, Major in Computer Science, Minor in Mathematics GPA: 3.96/4.00

- Grainger Engineering Global Disaster Resilience Scholar

Florida Atlantic University May 2022
Dual-Enrolled Concurrently with High School

- Peer Reviewer for the IEEE Computational Intelligence Magazine
- Recipient of FAU's Undergraduate Research Grant

Relevant Coursework

- Data Structures
- Algorithm Design
- Discrete Mathematics
- Data Science
- Reinforcement Learning
- Applied Cryptography

Technical Skills

Languages: Python, R, C++, C, Java
Technologies/Frameworks: RShiny, Tensorflow/Keras, Pandas, Numpy, Scikit-Learn, dplyr, Matplotlib, OpenAI gym

Experience

Undergraduate Research Assistant January 2023 – Present
Contextual Engineering Group, Applied Research Institute UIUC *Champaign, IL*

- Study and deploy entropy maximization techniques using **SciPy** to model communities' contextual influences
- Investigate qualitative encoding practices to support engineering design, and how to quantitatively represent these findings
- Explore the use of sentiment analysis for bilingual Navajo speakers, to support the design of water stations and microgrids in the Navajo Nation

Undergraduate Research Assistant August 2021 – May 2022
Machine Learning Control and Intelligent Systems Laboratory, FAU *Boca Raton, FL*

- Designed machine learning algorithms that predict energy consumption and generation in smart homes
- Deployed recurrent neural networks (RNNs), artificial neural networks (ANNs), and deep neural networks (DNNs) in **Tensorflow/Keras** and **Scikit-Learn**
- Prototyped federated learning simulations with 99% accuracy using **Flower Federated Learning Framework**
- Constructed research figures and diagrams with Exploratory Data Analysis (EDA) visualizations using **Matplotlib**
- Produced research grants and presentations within my graduate research group and symposia

Calculus II Learning Assistant August 2021 – May 2022
Math Learning Center, FAU *Boca Raton, FL*

- Facilitated student group work in Calculus II lectures in tandem with course faculty
- Collaborated with students to build an understanding of course material with small-group office hours
- Mastered the art of questioning, engagement, and student development in the classroom with weekly pedagogy training
- Brainstormed alongside professors weekly to alter our curriculum based off of student feedback

Projects

Federated Multi-Arm Bandits With Differential Privacy | *Python, NumPy, Pandas*

- Applied federated averaging to MABs to build privacy-preserving advertisement optimization
- Simulated communication between multiple users, where the global model was updated on a central server
- Up to 2x increase in user clicks and an 1000x reduction in time until convergence

Grid World Simulation with Temporal Difference Learning | *Python, NumPy, OpenAI gym*

- Simulated Q-learning, double Q-learning, and SARSA(λ) using the OpenAI gym
- Measured and evaluated the accuracy of each algorithm, with each converging to the optimal policy

An Analysis of Countries' Life Expectancies | *RShiny, R, dplyr, ggplot*

- Examined the social determinants of health in various countries using an RShiny web app
- Implemented no-code exploration of the dataset for the user with dplyr
- Created dynamic plots in ggplot given a user's desired variables
- Modeled a linear regression algorithm given a user's chosen variables, and allowed the user to make predictions