ELLIOT TOWER

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EDUCATION

University of Massachusetts Amherst — Amherst, MA

M.S. in Computer Science — Concentration in Data Science (3.85 GPA) — *Sep. 2020 –May 2022*

B.S. in Mathematics — Concentration in Computing, *Second major in Philosophy* — *Sep. 2016 – May. 2020*

Graduate Coursework

Neural Networks & Neurodynamics
Deep Learning for Computer Vision
Advanced Natural Language Processing
Algorithms for Data Science
Systems for Data Science
Empirical Research Methods in CS
Combinatorics & Graph Theory
Introduction to Simulation
Simulation & Causal Modeling

EXPERIENCE

Research Intern — Information Extraction and Synthesis Laboratory (IESL) — Jun. 2021 – Aug. 2021

- Helped create novel architecture combining non-parametric Case-based reasoning (CBR) with graph neural networks
- Coded data pre-processing pipeline and experiment setup, and optimized on-the-fly near-neighbor subgraph retrieval
- Implemented KBC baselines and CBR model using PyTorch Geometric, ran hyperparameter sweeps with WandB
- Author in ICML publication *Knowledge Base Question Answering by Case-based Reasoning over Subgraphs* (Das, 2022)

Data Science Industry Mentorship — Facebook AI Research (FAIR) — Feb. 2021 – Jun. 2021

Open Catalyst Project: using graph neural networks to model & discover new catalysts for use in renewable energy storage

- Adapted Graph Transformer to PyTorch Geometric for project-specific task: energy prediction from atomic structure
- Tuned hyperparameters & beat previous SOTA atomic chemistry models SchNet, DimeNet on OCP dataset
- Optimized on-the-fly data pre-processing and vectorized data transformation, resulting in 10x runtime reduction
- Open-source contributions: Graph Transformer model, Colab Notebook for installing environment/dataset & training

Data & Analytics Intern — Slalom Build — May. 2020 – Aug. 2020

- Engineered data pipeline architecture with AWS serverless components (DynamoDB, S3, Kinesis, Glue, Athena)
- Automated deployment of entire data pipeline system using AWS CloudFormation (infrastructure as code)
- Created live analytics dashboard for data-driven app development/monitoring using AWS QuickSight
- Developed analytics, crash reporting, and user tracking features for React Native mobile app in TypeScript
- Presented results & architecture overview for senior management and consulting client, bi-weekly demos

PROJECTS

Brain-Inspired Generative Replay for **Continual Learning** — *with Professor Hava Siegelmann (UMass Amherst)*

- Reduced catastrophic forgetting through novel selective replay method (choosing which samples to replay to model)
- Improved brain-inspired replay model: 21.3% to 25.1% on CIFAR-100 (Class-Incremental) with no added parameters
- Method inspired by neuroscience research: selective replay mechanism for memory consolidation in the human brain

SKILLS

Languages: Python (6 years), Java (2 years), R (1 year), TypeScript, Bash, SQL
Tools: PyTorch, PyG, HuggingFace, Bitbucket CI, Docker, Spark, AWS EC2, S3, DynamoDB, Kinesis, Glue, CloudFormation
Skills: Machine Learning, Deep Learning, Computer Vision, Natural Language Processing, Data Science, Data Engineering, DevOps, Analytics, Statistics, Simulations, Causal Inference, Data Visualization