Roy Finkelberg

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Education

Georgia Institute of Technology Atlanta, GA

Joint Bachelor and Master of Science in Computer Science

- **M.S in Computer Science (Jan. 2020 - May. 2021)**: GPA: 4.0/4.0; Specialization: Machine Learning
- **B.S in Computer Science (Aug. 2016 - Dec. 2019)**: GPA: 3.85/4.0 (Highest Honors)
  Concentrations: Artificial Intelligence, Embedded Computing

Work Experience

Facebook Menlo Park, CA

Data Science - Infrastructure Strategy Intern May 2020 - Aug. 2020

- Conducted exploratory analyses to determine causes of poor evaluation metric quality for an internal search and knowledge discovery system
- Redesigned the system responsible for slicing search events into sessions to use linguistic features rather than static rules, reducing session fragmentation by 86% and improving downstream metric quality
- Refactored session slicing logic from a monolithic SQL query into a python-based Hive transformer, improving scalability and extensibility

NVIDIA Austin, TX

Data Science - AI Infrastructure Intern (RAPIDS AI) May 2019 - Aug. 2019

- Adapted deep representation learning methods (graph autoencoders) to develop scalable network analysis and link prediction methods for large cybersecurity networks
- Developed pure GPU implementations for ordinal feature encoding and data train/test split modules, giving up to 290x speedups over CPU implementations on large ($\sim 10^7$ row) datasets
- Constructed, profiled, and optimized fundamental data science primitives such as one-hot encoding and scalar-vector binary operations in Cython and Numba, improving performance by 1.5x on wide datasets

Pindrop Security Atlanta, GA

Software Engineering Intern - Research May 2018 - Aug. 2018

- Developed an automated testing harness for a cloud based machine learning platform
- Designed an abstract schema to streamline creation and integration of new models
- Created a standardized interface for reporting and viewing model performance metrics through Datadog, reducing manual Research Scientist intervention by ~ 70 hours per week
- Scaled Scikit-Learn's DBSCAN algorithm to $\sim 10^6$ dimensional feature vectors using Spotify's open source Annoy library

Selected Projects

Dynamically Characterizing Hierarchical Information in Human Activity Recognition

Georgia Tech Computational Behavior Analysis Group Aug. 2020 - May 2021

- **MS Thesis:** Developed a framework to dynamically learn and characterize hierarchical feature information in visual human activity datasets, with the goal of providing additional weak supervision to resource constrained action recognition pipelines
- Designed and evaluated the performance of extensions to current state of the art recurrent architectures on hierachically labeled time-series human activity data
- Demonstrated that modern activity recognition models implicitly learn salient aciton hierarchies without additional supervision, providing new avenues for developing interpretable deep action recognition systems

Piazza Automated Related Question Recommender

Georgia Tech Contextual Computing Group AUG. 2018 - PRESENT

- Developed a natural language understanding pipeline for a recommendation engine which leverages the collective memory of online forums to prevent duplicate posts. Results demonstrating 40% reduction in duplicate posts were published in ACM Learning @ Scale 2019 (34% acceptance rate)
- Conducted A/B tests of model performance and impact across 1000+ users
- Designed mixed-methods studies measuring the impact of the tool on student/instructor behavior in forums. Results showing statistically significant improvement in user efficiency were published in ACM Learning @ Scale 2020

Towards Scalable Cybersecurity Network Analysis with Graph Autoencoders

NVIDIA - RAPIDS AI AUG. 2019

- Investigated the use of autoencoder based methods for large scale cybersecurity network analysis
- Adapted existing graph autoencoder architectures in Tensorflow and PyTorch to static and dynamic cybersecurity networks
- Published as an internal NVIDIA whitepaper, demonstrating up to 4x performance increases and 9x speedups on link prediction tasks

Model Based Intent Detection for Intelligent Prostheses

Georgia Tech Exoskeleton Prosthetic and Intelligent Controls Lab AUG. 2017 - DEC. 2017

- Collected and analyzed biometric sensor data to determine features important to gait speed detection
- Preprocessed data and engineered features using Python's Scikit-Learn library
- Presented a preliminary offline gait speed detection model demonstrating the effectiveness of these features
- Assisted in the design of a Kivy GUI which interfaced with ROS to visualize and adjust a prosthetic's control parameters during operation

SKILLS

- **Languages**: Python, Java, C
- **Tools/Technologies**: PyTorch, Numpy/Scipy, Pandas, Numba (with CUDA), Cython, Pytest, LaTeX, Software Integration, Experimental Design, Hardware Prototyping, Linux Environments