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

Publications

[1] India Irish, **Finkelberg, Roy**, Daniel Nkemelu, Swar Gujrania, Aadarsh Padiyath, Sumedha Raman, Chirag Tailor, Rosa Arriaga, and Thad Starner. PARQR: Automatic Post Suggestion in the Piazza Online Forum to Support Degree Seeking Online Masters Students. In *Proceedings of the Seventh ACM Conference on Learning @ Scale*, L@S '20, pages 125–134, New York, NY, USA, August 2020. Association for Computing Machinery.

[2] Noah Bilgrien, **Finkelberg, Roy**, Chirag Tailor, India Irish, Girish Murali, Abhishek Mangal, Niklas Gustafsson, Sumedha Raman, Thad Starner, and Rosa Arriaga. PARQR: Augmenting the Piazza Online Forum to Better Support Degree Seeking Online Masters Students. In *Proceedings of the Sixth (2019) ACM Conference on Learning @ Scale*, pages 1–4, Chicago IL USA, June 2019. ACM.

Selected Research Projects

Weakly Supervised Activity Recognition with Hierarchical Constraints

Georgia Tech Computational Behavior Analysis Group Aug. 2020 - Present

- Exploring extensions to visual action recognition systems which incorporate hierarchical action information as weak supervision

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 testing of model performance and impact across 1000+ users
- Assisted in the design of a study to measure 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
- Led a cross-department collaboration developing tools for automatic classification of cognitive presence from text data in course forums

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

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