Kanav Mehra

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Summary: Graduate researcher with a strong background in predictive modeling, machine learning, and natural language processing (NLP). Demonstrated expertise in building fair and transparent AI/ML solutions.

Experience

University of Waterloo | *Graduate AI Researcher* August 2021 - Present

- Developed a post-processing fair-ranking algorithm for search engine and recommendation applications based on proportional usage based "voting" rules.
- Our method guarantees fairness across multiple categorical protected attributes and beats state-of-the-art on aggregate fair ranking and search relevance benchmarks.
- Designed fair deliberation and voting methods using synthetically generated election data to enhance user welfare and representation outcomes, prioritizing user inclusion in group decision-making and participatory governance.

PwC | *Technology Consultant* Jul 2019 - Sep 2021

- Led a 3-member global team to implement an infrastructure and service monitoring system with real-time anomaly detection, customized alerting profiles, dashboards, and automated incident generation to track application performance. Resulted in detection of application incidents in half the benchmark time.
- Managed and led the development of a threat response system involving two global teams. Investigated log data, implemented a location-specific spam prediction and forecasting model using Splunk Machine Learning Toolkit, and classified threats by severity. Reduced spam and threats to end users by 73%.
- Spearheaded the process improvement initiative by replacing manual troubleshooting with intelligent root-cause analysis, leading to a 30% improvement in overall process efficiency and a smoother client on-boarding process.

Data Science for Social Good Foundation | *Data Scientist* Jul 2020 - Nov 2020

- Leveraged large-scale Twitter discourse (500k tweets in 3 languages) to extract narratives and identify unmet needs during natural disasters, aiding relief efforts with actionable insights.
- Designed a pipeline utilizing zero-shot text classification with a large BART model for topic analysis, followed by sentiment analysis, point-of-view extraction, and extractive summarization to flag tweets indicating unmet needs.
- Utilized document embedding model to generate tweet and user embeddings to construct a network followed by community detection and network clustering methods to extract popular users and narratives.

Indian Institute of Technology, Kharagpur | *Research Intern* May 2017 - Jul 2017

- Empirically analyzed several extractive summarization methods and developed novel unsupervised and supervised ensemble summarization algorithms using graph processing, community detection, and learning-to-rank methods.

Education

University of Waterloo Waterloo, Canada
Master of Mathematics, Computer Science (Thesis) 2021 - Present
Advisor: Prof. Kate Larson | Cumulative GPA: 96.33%
Thesis: Fairness and Diversity in Ranking and Voting Systems

Indian Institute of Engineering Science and Technology, Shibpur West Bengal, India
Bachelor of Technology in Information Technology 2015 - 2019
Cumulative GPA: 8.9/10.0 (First Class Honours)

Technical Skills

Programming Languages: Python, C, SQL, Splunk SPL, PromQL
Technologies: PyTorch, NumPy, Sklearn, Pandas, Git, NetworkX, Elasticsearch, Splunk, Prometheus, Grafana
Key Skills: Machine Learning, Data Analysis, Predictive Modelling, NLP, Model Development and Validation

Selected Publications

Mehra, K., Sreenivas, N., Larson, K. (2023). *Deliberation and Voting in Approval-Based Multi-Winner Elections.* International Joint Conference on Artificial Intelligence (IJCAI) 2023 Main Track [to appear].

Crayton, A., Fonseca, J., **Mehra, K.**, Ng, M., Ross, J., Sandoval-Castañeda, M. & von Gnechten, R. (2020). *Narratives and Needs: Analyzing Experiences of Cyclone Amphan Using Twitter Discourse.* Tackling Climate Change with Machine Learning Workshop at Neural Information Processing Systems (NeurIPS) 2020.

Dutta, S., Chandra, V., **Mehra, K.**, Das, A., Chakraborty, T. & Ghosh, S. (2018). *Ensemble Algorithms for Microblog Summarization.* IEEE Intelligent Systems, Issue on "Summarization of Things", vol. 33, no. 3, pp. 4–14.

Honors & Awards

Best Paper Award at Citizen-Centric Multiagent Systems Workshop, AAMAS	2023
Pradeep Khare Memorial Scholarship	2023
University of Waterloo Entrance Scholarship	2021
International Master's Award of Excellence	2021
PwC STAR&R Client Appreciation Award	2020
GAABESU Undergraduate Research Award for excellence in research	2019
SMERP Data Challenge - Summarization Track, SMERP Workshop, ECIR 2017 : 1st Position	2017