Nikhil Sheoran

✉ nikhilsheoran96@gmail.com   ☎ (217) 318-9259
in linkedin.com/in/nikhil96sher   ⌂ github.com/nikhil96sher

EDUCATION

University of Illinois at Urbana Champaign   Champaign, IL
Master of Science in Computer Science   Aug 2021 - Dec 2022
Thesis: DeepOLA - An Online Aggregation Approach to Approximating Deeply Nested Queries
GPA: **3.95/4.0** | **Advisor:** Prof. Yongjoo Park

Indian Institute of Technology Roorkee   Roorkee, India
Bachelor of Technology in Computer Science and Engineering   June 2014 - May 2018
GPA: **9.52/10.0** | **Advisor:** Prof. Sugata Gangopadhyay and Prof. Manoj Mishra

EXPERIENCE

Databricks   Mountain View, CA
Software Engineer, Query Optimization   Feb 2023 - Present

Meta Platforms, Inc. (formerly Facebook)   Menlo Park, CA
Software Engineer Intern, AI Productivity   May 2022 - Aug 2022
- Ranking models suffer from normalized entropy explosion (NEX) when the model performance gets poorer than a static baseline.
- Developed a data-driven classification model to predict NEX whose attribution scores can be used to perform root-cause-analysis.
- Utilized input features' statistics and model architecture representation obtained using unsupervised embeddings.

Adobe Research   Bangalore, India
Research Associate, Big Data Experience Lab   June 2018 - Aug 2021
- *Predicate-Aware Approximate Query Processing*
  - Built a conditional generative model that uses query's predicates to generate targeted samples.
  - Evaluated query approximation error, latency and memory footprint against multiple baselines.
- *Scheduling of Time-Varying Workloads in Multi-Tenant Clusters*
  - Built a Deep-RL based agent for taking scheduling decisions exploiting temporal resource usage patterns.
  - Evaluated the performance with average resource-utilization, fragmentation and over-utilization on real production traces.
- *Multi-Touch Attribution for B2B Marketing Journeys*
  - Built a conversion prediction model with each stage transition modelled using a temporal convolution network.
  - Utilized layer-wise relevance propagation for computing attribution scores validated with perturbation-based techniques.
- *Surveys Without Questions: A Reinforcement Learning Approach*
  - Modelled users' behavior on an online platform as a partially-observed MDP and extracted proxy ratings from clickstream.
  - Evaluated the derived user experience metric against survey scores and provided aggregate-level actionable insights.

Adobe Research   Bangalore, India
Research Intern, Big Data Experience Lab   May 2017 - Jul 2017
- Modelled the temporal nature of users' online browsing behavior through various models - constrained LSTM, Probabilistic Suffix Tree and Hidden Markov Models.
- Proposed the concept of stage-wise experience values and their computation based on user's behavior logs.

PROJECTS

DeepOLA: Online Aggregation for Deeply Nested Queries [Abstract] [Thesis] [Repository]   UIUC
Masters Thesis Project, CreateLab   Jan 2022 - Present
- Propose a generalized framework and implementation for performing online aggregation in arbitrarily nested queries.
- Introduce the notion of *incremental dataframes* and *incremental operations* to support online aggregation.

Analysis of RCA Tools for Cloud Applications [Report]   UIUC
Course Project, Reliability of Cloud Systems   May 2022
- Automated RCA tools help identify potential root causes in cloud applications given an alert.
- Compared two tools - *Sieve* and *MicroRCA* in their performance in detecting root causes after manually injecting various faults.

Distributed Storage Networks with Smart Contracts Incentivisation [Report]   IIT Roorkee
Bachelor Thesis Project, Department of Computer Science   Jan 2018 - April 2018
- Proposed a smart-contract based storage network incentivized for sharing storage.
- Obtains proof of space (availability of storage) through memory-hard puzzles based on Merkle trees.

SKILLS

Languages: Python, Rust, Scala, C++, SQL, Bash, Java, PHP
Frameworks/Utilities: Apache Spark, Keras, PyTorch, Tensorflow, Django, HTML, CSS, Nginx.

HONORS
- AIR 10 in ACM ICPC Chennai On-Site Regionals 2017-18.
- AIR 5 in Microsoft Build The Shield Onsite Round 2016.
- Prime Minister's Scholarship Scheme Award 2014-18.

- KVPY Fellowship Award 2013.

Other Activities

- Graduate Teaching Assistant, Fall 2022. CS511: Advanced Data Management, UIUC.
- Graduate Research Assistant, Spring 2022. Prof. Yongjoo Park, UIUC.
- Graduate Teaching Assistant, Fall 2021. CS240: Introduction to Computer Systems, UIUC.
- Chief Coordinator, Information Management Group, IIT Roorkee
- Vice Chair, ACM Student Chapter, IIT Roorkee
- Mentor, Student Mentorship Programme, IIT Roorkee

Publications (8)

A Step Towards Deep Online Aggregation [Paper]
N. Sheoran, S. Chockchowwat, A. Chheda, S. Wang, R. Verma, Y. Park
In Proceedings of the ACM on Management of Data, SIGMOD 2023.

Electra: Conditional Generative Model Based Predicate-Aware Query Approximation [Paper]
N. Sheoran, S. Mitra, S. Ghetia, J. Varshney, V. Porwal, T. Mai, A. Rao, V. Madukkuri, L. Mishra.
In Proceedings of the Thirty-Sixth AAAI Conference on Artificial Intelligence, AAAI 2022.

Scheduling of Time-Varying Workloads in Multi-Tenant Clusters using Deep Reinforcement Learning [Paper]
S. Shanka*, **N. Sheoran**[1], S. Mitra.
In Proceedings of the Thirty-Fifth AAAI Conference on Artificial Intelligence, AAAI 2021.

Learning to Place Applications in a Shared Cluster [Slides] [Paper]
S. Mitra, S. Shanka, **N. Sheoran**, N. Dhake, R. Nehra, R. Simha.
In Proceedings of the 10th ACM SIGOPS Asia-Pacific Workshop on Systems, APSys 2019.

Efficient Insights Discovery through Conditional Generative Model based Query Approximation [Talk] [Paper]
V. Porwal, S. Mitra, F. Du, J. Anderson, **N. Sheoran**, A. Rao, T. Mai, G. Kowshik, S. Nair, S. Arora, S. Mahapatra
In Proceedings of the International Conference on Management of Data - Demo Track, SIGMOD 2022.

Multi-touch Attribution for Complex B2B Customer Journeys using Temporal Convolutional Networks [Paper]
A. Agrawal, **N. Sheoran**, S. Suman and G. Sinha.
In the Companion Proceedings of TheWebConf 2022.

Surveys Without Questions: A Reinforcement Learning Approach [Paper]
A. Sinha, D. Jain, **N. Sheoran**, S. Khosla, R. Sasidharan.
In Proceedings of the Thirty-Third AAAI Conference on Artificial Intelligence, AAAI 2019.

Measurement of Users' Experience on Online Platforms from their Behavior Logs [Paper]
D. Jain , A. Sinha, **N. Sheoran**, D. Gupta, S. Khosla.
In Advances in Knowledge Discovery and Data Mining, PAKDD 2018.

Granted Patents (5)

Query-oriented approximate query processing based on machine learning techniques. [Patent]
S. Mitra, **N. Sheoran**, A. Rao, T. Mai, S. Nair, S. Vaithyanathan, T. Jacobs, G. Siddharth, J. Varshney, V. Maddukuri, L. Mishra.

Machine-learning models applied to interaction data for determining interaction goals and facilitating experience based modifications to interface elements in online environments. [Patent]
N. Sheoran, N. Raju, V. Srivastava, N. Golakiya, D. Singal, D. Jain, A. Sinha.

Characterizing and Modifying User Experience of Computing Environments Based on Behavior Logs. [Patent]
D. Jain, A. Sinha, D. Gupta, **N. Sheoran**, S. Khosla, R. Sasidharan.

Machine-learning models applied to interaction data for facilitating experience based modifications to interface elements in online environments. [Patent]
A. Sinha, D. Jain, **N. Sheoran**, D. Gupta, S. Khosla.

Predictive analysis of target behaviors utilizing RNN-based user embeddings. [Patent]
S. Kim, D. Jain, D. Gupta, E. Koh, B. Kveton, **N. Sheoran**, A. Sinha, H. Bui, C. Chen

Published Patents (4)

Causal Multi-touch Attribution. [Patent]
A. Aggarwal, **N. Sheoran**, G. Sinha.

Workload Equivalence Class Identification For Resource Usage Prediction. [Patent]
N. Sheoran, S. Mitra.

Self-learning scheduler for application orchestration on shared compute cluster. [Patent]
S. Mitra, **N. Sheoran**, S. Subha, N. Dhake, R. Nehra, R. Simha.

---

[1]Equal Contribution