Nikhil Sheoran

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RESEARCH INTERESTS

Systems, Machine Learning for Systems, Information Security, Computer Networks

EDUCATION

Indian Institute of Technology, Roorkee, India
Bachelor of Technology — June 2014 - May 2018
Department Rank 2, Computer Science and Engineering — CGPA: 9.524 (scale of 10)

PUBLICATIONS

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

N. Sheoran, S. Mitra, S. Ghetia, J. Varshney, V. Porwal, T. Mai, A. Rao, V. Madukkuri, L. Mishra. *Predicate-Aware Query Approximation using Generative Models.* Under Review in VLDB 2021.

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

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

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

PROFESSIONAL EXPERIENCE

Research Associate — Adobe Research, Bangalore, India
Big Data Experience Lab [Profile] — Jun 2018 - Present

- **System Intelligence**
  Scheduling of Time-Varying Workloads in Multi-Tenant Clusters
  - Deep RL agent for taking scheduling decisions - which job to be placed where.
  - Evaluated on average resource-utilization, fragmentation and over-utilization.

  Predicate-Aware Approximate Query Processing
  - Conditional generative model to generate predicate aware targeted samples.
  - Evaluated query approximation error, latency and memory footprint.

  Root Cause Analysis in Microservices-based Cloud Systems
  - Causal graph based approach to identify unexplained metric behaviors.
  - Evaluated against ground truth labels from a synthetic service with injected faults.
- **Customer Intelligence**
  Measurement of User's Browsing Experience
  - Modelled users' behavior on an online platform as a Partially Observed MDP.
  - Evaluated the derived user experience metric against survey scores.

  Multi-Touch Attribution for B2B Marketing Journeys
  - Utilized Conversion Prediction as an auxiliary task for deriving attribution scores.
  - Modified LSTM cell state to incorporate time-aware decay.

PATENTS

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

S. Mitra, **N. Sheoran**, S. Subha, N. Dhake, R. Nehra, R. Simha. *Self-Learning Scheduler for Application Orchestration on Shared Compute Cluster.* [Google Patents]

*Equal Contribution

A. Sinha, D. Jain, **N. Sheoran**, D. Gupta, S. Khosla. *Machine-Learning Models Applied To Interaction Data For Facilitating Experience-Based Modifications To Interface Elements In Online Environments* [Google Patents]

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

HONORS & AWARDS

Awarded **Prime Minister's Scholarship Scheme** 2014-18 for academic performance.
Selected for **KVPY Fellowship Award** 2013
AIR 10 in **ACM ICPC** Chennai On-site Regionals 2016-17
AIR 5 in **Microsoft Build The Shield** Onsite Round 2016
AIR 9 in **Junior Mathematical Olympiad**, KVS 2013

INTERNSHIPS

Research Intern — Adobe Research
May - June 2017 — Bangalore, India
- 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.

Developer Intern — Scholastic Solutions Pvt. Ltd.
May - June 2015 — Remote
- Designed trust-score algorithm for a crowd-sourced educational institutions' data listing and verification platform.
- Implemented the algorithm and modules for the search engine, user profile and system generated answers in PHP.

PROJECTS

Distributed Storage Networks with Smart Contracts Incentivisation [Report]
Advisors: Dr. Manoj Mishra and Dr. Sugata Gangopadhyay, CSE Dept. IIT Roorkee
- Proposed a smart contracts based storage network incentivized for sharing storage.
- Proof of space (availability of storage) through memory-hard puzzles.

Forminator [Blog]
Information Management Group, IIT Roorkee
- Built a data collection and management platform allowing custom form creation.
- Provide ability to limit audience through logical combinations of various campus level individual attributes.

COMPUTER SKILLS

Languages: Python, C++, Bash, Java, SQL.
Web Development: Django, PHP, JavaScript, HTML, CSS, Apache, Nginx.
ML Frameworks: Keras, Tensorflow

OFFICIAL POSITIONS

Chief Coordinator, Information Management Group, IIT Roorkee
- Led and mentored a group of 50 developers and designers in developing scalable applications supporting approximately 10,000 campus students and faculties.
- Delivered lectures on - Web Development, Information Security, Computer Networks.

Vice Chair, ACM Student Chapter, IIT Roorkee
- ACM Student Chapter aims at promoting Computer Science culture in the Campus.
- Coordinated and organized various campus activities like Career Workshops, Guest Lectures and Hackathons.

Mentor, Student Mentorship Programme, IIT Roorkee
- Mentored 5 first year undergraduate students for both academic as well as non-academic affairs.