Vibhor Porwal

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EDUCATION

Indian Institute of Technology Kanpur Jul 2016 – Dec 2019
B.Tech. in Computer Science and Engineering
CPI: 9.2/10
Awards: Academic Excellence Award, Nita Goyal & Ashish Gupta Scholarship

Sir Padampat Singhania Education Center, Kanpur, India Apr 2015 – May 2016
Class XII
Percentage: 95.0%

RESEARCH EXPERIENCE

Adobe Research, Bangalore, India Aug 2020 – Present
Research Associate

- Working on projects in Causal Inference, Causal Discovery, and Approximate Query Processing in collaboration with various product teams at Adobe.
- The research work has resulted in paper submissions, patents, and technology transfer to products.

National University of Singapore Jan 2020 – Feb 2020
Research Intern | Supervisor: Prof. Diptarka Chakraborty

- Studied the problem of approximating Edit Distance between two strings given in a compressed form.

Adobe Research, Bangalore, India May 2019 – Jul 2019
Research Intern | Supervisor: Dr. Vishwa Vinay

- Worked on offline evaluation of a search ranker using behavioral data collected by the search engine.
- Implemented and compared various counterfactual and regression based offline evaluation methods.
- Used Adobe Stock and Yandex search engine behavioral datasets for experimentation.

PAPERS

[1] Nikhil Sheoran, Subrata Mitra, *Vibhor Porwal*, Siddharth Ghetia, Jatin Varshney, Tung Mai, Anup Rao, Vikas Maddukuri, "*Conditional Generative Model based Predicate-Aware Query Approximation*," Accepted for publication at AAAI 2022.

[2] *Vibhor Porwal*, Piyush Srivastava, Gaurav Sinha, "*Almost Optimal Universal Lower Bound for Learning Causal DAGs with Atomic Interventions*," Under Review, Nov 2021. arxiv:2111.05070.

PATENTS

[1] Isha Chaudhary, Rashul Chutani, Shaurya Goel, Simarpreet Singh Saluja, *Vibhor Porwal*, Gaurav Sinha, "*Jointly Predicting Multiple Individual Level Labels from Aggregated Label Proportions*," Approved for Filing, Oct 2021.

[2] Iftikhar Ahamath Burhanuddin, Koyel Mukherjee, *Vibhor Porwal*, Rebin Silva Valan Arasu, Jonathan Vance, Satya Gadikoyila, Meenakshi CS, "*Data Story Generation from Tabular Data and a User Specified Query*," Approved for Filing, Sep 2021.

[3] *Vibhor Porwal*, Ayush Chauhan, Aurghya Maiti, Gaurav Sinha, Ruchi Pandya, "*Systems for Estimating Terminal Event Likelihood*," US Patent, Filed on 16 Aug 2021.

RESEARCH PROJECTS

Robust Learning of Causal Bayesian Networks Oct 2021 – Present
Supervisor: Dr. Gaurav Sinha

- Studying the problem of learning a causal bayesian network when an adversary can corrupt a fraction of both observational and interventional samples.

Causal Graph Learning using Interventions Aug 2020 – Present
Supervisor: Prof. Piyush Srivastava & Dr. Gaurav Sinha *Paper*

- Surveyed the existing literature on algorithms and lower bounds for learning causal graphs using interventions in both adaptive and passive settings.
- Proposed a new lower bound on the number of atomic interventions required to learn a causal graph, and proved that this lower bound is tight up to a factor of two.
- Currently working on extending our techniques to design better causal graph learning algorithms.

Approximate Query Processing Aug 2020 – Present
Supervisor: Dr. Subrata Mitra

- Proposed a conditional generative model based technique for better approximation of SQL queries having a large number of predicates.
- Currently developing sampling based methods for the approximation of complex queries with JOINs.

Lower Bounds for Graph Streaming Algorithms Aug 2019 – Dec 2019

Supervisor: Prof. Raghunath Tewari

- Surveyed the state of the art bounds for graph problems such as Min-Cut, Directed Connectivity, and Maximum Matching in the streaming model.
- Proposed multi-pass space lower bounds for Maximum Weighted Matching and Shortest Path problems in the turnstile streaming setting.

Motion Planning with Probabilistic Guarantee Jan 2019 – Apr 2019

Supervisor: Prof. Indranil Saha *Book Chapter*

- Studied the problem of designing a control strategy for a robot to maximize the probability of satisfying certain specifications formulated as LTL or PCTL formulas.
- Surveyed the state of the art algorithms for this problem in discrete as well as continuous time dynamic environments and co-authored a book chapter on this topic.

Smallest Enclosing Circle Jul 2018 – Nov 2018

Supervisor: Prof. Surender Baswana *Presentation*

- Reinvented an incremental randomized algorithm with expected $O(n)$ time complexity for finding the smallest enclosing circle of n points in a $2D$ plane.
- Implemented this algorithm in C++ using the LEDA library and experimentally analyzed it.

SCHOLASTIC ACHIEVEMENTS

- Country Rank 120 in JEE(Advanced)-2016 among 150,000 candidates.
- Country Rank 1123 in JEE(Main)-2016 among 1.1 Million candidates.
- Country Rank 277 in KVPY-2015 conducted by IISc Bangalore.

COURSEWORK

- Data Structures and Algorithms
- Theory of Computation
- Randomized Algorithms
- Probability and Statistics
- Logic in Computer Science
- Algorithms-II
- Computational Complexity
- Compiler Design
- Discrete Mathematics
- Linear Algebra
- Machine Learning
- Quantum Computing
- Stochastic Processes
- Abstract Algebra
- Database Systems

TALKS

- Applications of Communication Complexity in Streaming Algorithms, IIT Kanpur *Presentation*

MENTORING EXPERIENCE

- Co-mentored undergraduate interns for projects on Learning from Label Proportions and Data Summarization & Storytelling at Adobe Research.
- Co-mentored undergraduate students for reading projects on Graph Theory and Randomized Algorithms.
- Took extra classes and provided one-to-one mentoring to first-year undergraduate students as an academic mentor for the introductory Mechanics course at IIT Kanpur.

TECHNICAL SKILLS

- **Programming Languages**
  C, C++, Python, Scala (Basic)
- **Utilities**
  Git, Bash, LaTeX, HTML