Vatsal Sharan

CONTACT INFORMATION
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INTERESTS Machine Learning, Learning Theory, Algorithms, Optimization

EDUCATION

Stanford University

Ph.D. in Electrical Engineering, Grade Point Average = 3.90/4.00 **2014 – present**

Advisor: Prof. Gregory Valiant, Dept. of Computer Science

Indian Institute of Technology Kanpur

B.Tech. in Electrical Engineering, Cumulative Performance Index (CPI) = 9.9/10 **2010 – 2014**

PREPRINTS (asterisk indicates joint or alphabetical authorship)

1. **Sample Amplification: Increasing Dataset Size even when Learning is Impossible**
   Brian Axelrod*, Shivam Garg*, Vatsal Sharan*, Gregory Valiant*
   Preliminary version in NeurIPS'19 Workshop on Machine Learning with Guarantees (Oral presentation)

2. **Understanding the Capabilities and Limitations of Neural Networks for Multi-task Learning**
   Vatsal Sharan, Xin Wang, Brendan Juba, Rina Panigrahy
   Preliminary version in NeurIPS'19 Workshop on Machine Learning with Guarantees

PUBLICATIONS

1. **PIDForest: Anomaly detection via Partial Identification**
   Parikshit Gopalan*, Vatsal Sharan*, Udi Wieder*
   Neural Information Processing Systems (NeurIPS) 2019 (Spotlight presentation)

2. **Fast and Accurate Low-Rank Factorization of Compressively-Sensed Data**
   Vatsal Sharan*, Kai Sheng Tai*, Peter Bailis, Gregory Valiant
   International Conference on Machine Learning (ICML) 2019

3. **Memory-sample Tradeoffs for Linear Regression with Small Error**
   Vatsal Sharan, Aaron Sidford, Gregory Valiant
   Symposium on the Theory of Computing (STOC) 2019

4. **Recovery Guarantees for Quadratic Tensors with Limited Observations**
   Hongyang Zhang, Vatsal Sharan, Moses Charikar and Yingyu Liang
   Artificial Intelligence & Statistics (AISTATS) 2019

5. **A Spectral View of Adversarially Robust Features**
   Shivam Garg, Vatsal Sharan*, Brian Zhang*, Gregory Valiant
   Neural Information Processing Systems (NeurIPS) 2018 (Spotlight presentation)

6. **Efficient Anomaly Detection via Matrix Sketching**
   Vatsal Sharan, Parikshit Gopalan, Udi Wieder
   Neural Information Processing Systems (NeurIPS) 2018

7. **Prediction with a Short Memory**
   Vatsal Sharan, Sham Kakade, Percy Liang, Gregory Valiant
   Symposium on the Theory of Computing (STOC) 2018

8. **Sketching Linear Classifiers over Data Streams**
   Kai Sheng Tai, Vatsal Sharan, Peter Bailis, Gregory Valiant
   ACM SIGMOD Conference on Management of Data (SIGMOD) 2018

9. **Moment-Based Quantile Sketches for Efficient High Cardinality Aggregation Queries**
   Edward Gan, Jialin Ding, Kai Sheng Tai, Vatsal Sharan, Peter Bailis
   Conference on Very Large Data Bases (VLDB) 2018

10. **Learning Overcomplete HMMs**
    Vatsal Sharan, Sham Kakade, Percy Liang, Gregory Valiant
    Neural Information Processing Systems (NeurIPS) 2017

11. **Orthogonalized Alternating Least Squares: A Theoretically Principled Tensor Factorization Algorithm for Practical Use**
    Vatsal Sharan, Gregory Valiant
    International Conference on Machine Learning (ICML) 2017

12. **Large Deviation Property for Waiting Times of Markov Sources**
    Vatsal Sharan, Rakesh Bansal
    IEEE Symposium on Information Theory (ISIT) 2014

Internships

Google Research, Mountain View *(with Rina Panigrahy)* Summer 2019

VMware Research, Palo Alto *(with Parikshit Gopalan)* Summer 2017

Distinctions

- Outstanding (top 5%) reviewer at ICML 2019
- Invited speaker at China Theory Week, Tsinghua University 2018
- Selected for Irwin Mark Jacobs and Joan Klein Presidential Fellowship, MIT 2014
- Selected for Gordon Wu Fellowship, Princeton 2014
- Director's Gold Medal for best all-round performance and leadership in Class of 2014, IIT Kanpur 2014
- Ranked 2nd in Class of 2014, IIT Kanpur (out of 820 students) 2014
- Best Final Year Project in Electrical Engineering, IIT Kanpur 2014
- Honda Young Engineer and Scientist Award, awarded annually to up to 15 students from India who have excelled in science and technology 2013

Teaching and Service

Teaching Assistant (Stanford): Modern Algorithmic Toolbox (Spring'16, Spring'17, Spring'18), Randomized Algorithms (Fall'15), Fourier Transforms (Summer'15)
Reviewer: STOC, FOCS, SODA, ITCS, COLT, ICML, NeurIPS, AAAI

Selected Talks

ETH Zurich Institute for Theoretical Studies November 2019
A Few New Questions on Learning with a Small, or Short, Memory

EPFL Theory Coffee November 2019
Memory-sample Tradeoffs for Continuous Optimization and Learning

Northwestern Junior Theorists Workshop November 2019
New Problems and Perspectives on Learning, Sampling, and Memory

NYU Theory Seminar November 2019
Memory-sample Tradeoffs for Continuous Optimization and Learning

University of Washington Theory Lunch October 2019
Memory-sample Tradeoffs for Continuous Optimization and Learning

Cornell ORIE Young Researchers Workshop October 2019
Memory-sample Tradeoffs for Continuous Optimization and Learning

China Theory Week, Tsinghua University September 2018
Prediction with a Short Memory

SIAM Annual Meeting, Portland July 2018
Orthogonalized ALS: Theoretically Principled Tensor Factorization for Practical Use

Google Mountain View Algorithms TechTalk March 2018
Prediction with a Short Memory