Sushant Agarwal

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EDUCATION

Northeastern University, USA *Current*
PhD in Computer Science, Advisor: Jonathan Ullman

University of Waterloo, Canada *April 2020*
Master's in Computer Science, Advisor: Shai Ben-David

Chennai Mathematical Institute, India *April 2017*
Bachelor's in Math and Computer Science

PUBLICATIONS (CITATIONS: 176)

- Private Mean Estimation with User-Level Differential Privacy
  Sushant Agarwal, Gautam Kamath, M. Majid, A. Mouzakis, R. Silver, Jonathan Ullman
  In submission

- On the Power of Randomization in Fair Classification and Representation
  Sushant Agarwal, Amit Deshpande
  ACM **FAccT** 2022 [pdf].

- Towards the Unification and Robustness of Post-hoc Explanations
  Sushant Agarwal, S. Jabbari, C. Agarwal*, S. Upadhyay*, Hima Lakkaraju, Steven Wu
  (contribution order, * represents equal contribution)
  ICML 2021 [pdf], **FORC** 2022 [pdf].

- Open Problem: Are all VC-classes CPAC learnable?
  Sushant Agarwal, Nivasini A., Shai Ben-David, Tosca Lechner, Ruth Urner
  COLT 2021 [pdf].

- On Trade-offs between Fairness, Interpretability, and Privacy in Classification
  Sushant Agarwal
  Master's Thesis [pdf].
  AAAI 2021 workshop on *Explainable Agency in AI* [pdf].
  IJCAI 2021 workshop on *AI for Social Good* [pdf 1][pdf 2].

- On Learnability with Computable Learners
  Sushant Agarwal, Nivasini A., Shai Ben-David, Tosca Lechner, Ruth Urner
  ALT 2020 [pdf].

- Impossibility Results for Fair Data Representation
  Tosca Lechner, Shai Ben-David, Sushant Agarwal, Nivasini A. (contribution order)
  Arxiv [pdf].

EXPERIENCE

Google Deepmind, *Research Intern under Rishi Saket and Aravindan Raghuveer* *Current*

- Conducting research on achieving privacy guarantees via various aggregation techniques.

Microsoft Research, *Research Intern under Amit Deshpande* *Jun '21 - Jan '22*

- Conducted research on problems in fair machine learning, leading to a paper at ACM FAccT 2022.

- Given a data distribution, we characterize and give an algorithm for the optimal fair classifier and representation.

Harvard University, *Research Assistant under Hima Lakkaraju*   *Aug '20 - Feb '21*

- Worked on problems in explainable machine learning, leading to papers at ICML 2021, and FORC 2022.

- Proved an equivalence between two popular explanation techniques, and robustness properties for both methods.

- Empirically verified our theoretical results. Code was written in Python, Pytorch and Tensorflow.

University of Waterloo, *Research Assistant under Gautam Kamath*   *Feb '22 - Aug '22*

- Empirically measured the privacy of various machine learning algorithms using membership inference attacks.

- Code was written in Python, using machine learning frameworks such as Pytorch and Tensorflow.

National University of Singapore, *Research Intern under Rahul Jain*   *May '16 - July '16*

- Conducted research in quantum complexity theory.

Codechef, DirectI, *Software Intern*   *December '14 - April '15*

- Wrote solutions and editorials in Python and C++ for their competitive programming problems on their platform.

Teaching Assistant   *Jan '16 - Apr '20*

- *Courses at UWaterloo:* Statistical Machine Learning, Introduction to Artificial Intelligence, Introduction to Logic, Algorithmic Problem Solving, Data Structures, Algorithm Design, Introduction to Computer Science

- *Courses at CMI:* Design & Analysis of Algorithms, Discrete Mathematics, Advanced Programming (Python)

SCHOLASTIC ACHIEVEMENTS

- Coach of the Northeastern ACM-ICPC team for the world finals in Bangladesh (November, 2022).

- Recipient of Vector AI Institute Scholarship.

- Recipient of the University of Waterloo Graduate Scholarship.

- Recipient of the INSPIRE Scholarship by Dept. of Science and Tech, Govt. of India.

- Recipient of CMI Undergraduate Scholarship.

- Reviewer for COLT, NeurIPS, AISTATS.

- Stood 2nd in Gujarat state in the Indian National Maths Olympiad 2012.

- Obtained a rank in top 0.25 percent of India in JEE Advanced 2014.

- Was among 275 students across India to clear Zonal Informatics Olympiad 2013.

RELEVANT COURSEWORK

Machine Learning: Statistical Foundations of ML, Fairness and Interpretability in ML, Privacy in Data Science, Adversarial ML, Deep Learning for Discrete Optimization, Reinforcement Learning, Theory of Clustering, Data Mining and ML, Optimization for Data Science, AI: Law, Ethics & Policy.

CS Theory: Complexity Theory, Advanced Algorithms, Advanced Combinatorics & Probabilistic Methods, Topics in Graph Theory, Cryptography, Theory of Computation, Game Theory, Games on Graphs

Mathematics: Linear Algebra, Group Theory, Rings & Fields, Calculus (1, 2, & 3), Real Analysis, Complex Analysis, Differential Equations, Topology, Probability Theory, Discrete Mathematics

Programming: Programming in Python, Functional Programming, Concurrent Programming

TECHNICAL STRENGTHS

Programming: Python, C++, Haskell, machine learning frameworks such as Pytorch & Tensorflow