SAYAK CHAKRABARTY

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My primary area of research is Machine Learning Theory and Algorithms. I am broadly interested in theoretical computer science, currently working on problems related to Discrepancy Theory and Probabilistic Methods. I have previously worked on some approximation algorithm problems related to correlation clustering. I have worked on problems related to Correlation clustering and proving theoretical guarantees in models like PPCA and ICA.
I work with Prof. Konstantin Makarychev. I completed my PhD(also Masters in CS) course requirements in Fall 2022 and was awarded the master's degree. I have not completed my PhD qualification exam yet.

Education

2021-Present	PhD student, Department of Computer Science, **Northwestern University**
2021-2022	Masters in Computer Science, **Northwestern University**
2018- 2020	Masters of Mathematics, **Indian Statistical Institute** (Kolkata)
2015- 2018	Bachelors of Science(Hons) in Mathematics and Computer Science, **Chennai Mathematical Institute**

Professional Experience

Fall 2022 till present — **PhD Student, Northwestern University, Computer Science Department**
› I work in the Theoretical CS group
ML Theory | Algorithms | Optimization

September 2021 September 2022 — **Graduate Research Assistant, Northwestern University, Computer Science Department**
› Completed course requirement for Masters and Ph.D. in Computer Science
Theory Track

Publications

2023 — **Single-Pass Pivot Algorithm for Correlation Clustering. Keep it simple!, (Accepted),**
Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS,2023)
Sayak Chakrabarty | Konstantin Makarychev

2023 — **On the Consistency of Maximum Likelihood Estimation of Probabilistic Principal Component Analysis, (Accepted),**
Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS,2023)
Arghya Datta | Sayak Chakrabarty

2023 — **JUST : Judicial Support Tool, US Patent,**
Submitted
Maksim Bolonkin | Sayak Chakrabarty | Cristian Molinaro | V.S. Subrahmanian

2023 — **Judicial Support Tool : Finding the k-Most Probable Judicial Worlds, ,**
Submitted
Maksim Bolonkin | Sayak Chakrabarty | Cristian Molinaro | V.S. Subrahmanian

2023 — **SockDef : A Dynamically Adaptive Defense to a Novel Attack on Review Fraud Detection Engines, (Accepted), IEEE Transactions on Computational Social Systems**
Youzhi Zhang | Sayak Chakrabarty | Rui Liu | Andrea Pugliese | V.S. Subrahmanian

2021 | **A New Dynamically Changing Attack on Review Fraud Systems and a Dynamically Changing Ensemble Defense, (Accepted), IEEE Best Paper Award**
IEEE Intl Conf on Dependable, Autonomic and Secure Computing, Intl Conf on Pervasive Intelligence and Computing, Intl Conf on Cloud and Big Data Computing, Intl Conf on Cyber Science and Technology Congress (DASC/PiCom/CBDCom/CyberSciTech)
Youzhi Zhang | Sayak Chakrabarty | Rui Liu | Andrea Pugliese | V.S. Subrahmanian

2017 | **The Repeated Divisor Function and Possible Correlation with Highly Composite Numbers, Accepted,**
International Workshop for Young Mathematicians "Number Theory"
Sayak Chakrabarty | Arghya Datta

Skill

Programming Language :	**Python**, C++, SQL, Haskell
Operating Systems :	**Windows**,Linux
Tools and Framework :	**Pandas, Scikit-learn, Networkx,NumPy,Matplotlib,Seaborn**, PyTorch,R, LATEX, Git,Excel
Statistical Skills :	**Regression Analysis,Testing of Hypothesis : A/B testing**, Probability theory

Fun Projects

A fast SVD algorithm	`https://github.com/hellokayas/Some-Programming-Samples/blob/master/faster_SVD.py`
Prophet Algorithm for Stock Price Prediction	`https://github.com/hellokayas/Some-Programming-Samples/blob/master/Stock.ipynb`

Relevant Courses

2023 **Approximation Algorithms**, Northwestern University
2022 **Logic in Artificial Intelligence**, Northwestern University
2022 **Machine Learning**, Northwestern University
2022 **Graduate Course on Design and Analysis of Algorithms**, Northwestern University
2022 **Combinatorial Optimization**, Northwestern University
2022 **Theory of Computational Complexity**, Northwestern University
2022 **Advanced Graphics**, Northwestern University
2022 **Quantum Computation**, Northwestern University
2021 **Mechanism Design**, Northwestern University
2021 **Randomized Algorithms**, Dartmouth College
2021 **Topics in Probability**, Dartmouth College
2020 **Game Theory**, Indian Statistical Institute
2017 **Stochastic Processes**, Chennai Mathematical Institute
2016 **Advanced Programming**, Chennai Mathematical Institute
2016 **Discrete Mathematics and Graph Theory**, Chennai Mathematical Institute

Awards

2022 **Best Paper Award**, The 20th IEEE International Conference on Dependable, Autonomic and Secure Computing (DASC 2022)
2019 **International Youth Math Challenge**, Indian Institute of Technology
2017 **Science and Engineering Research Board International Travel Award**, Department of Science and Technology, India
2014 **Mathematical Talent Reward**, Indian Statistical Institute