SAYAK CHAKRABARTY

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My primary areas of research is Design and Analysis of algorithms. I am broadly interested in theoretical computer science, and machine learning. I am currently in working on some approximation algorithm problems related to corelation clustering and also problems in combinatorial optimization greatly interest me.
As secondary interest, I like to mention Few-Shot Learning, theoretical guarantees related to consistency in probabilistic methods and community recoveries in stochastic block models.
I work with Prof. Konstantin Makarychev. I have completed my PhD(also Masters in CS) course requirements in Fall 2022 and was awarded the Masters 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

Present / Fall 2022 — Graduate Research Assistant, Northwestern University, Computer Science Department
- Working on designing approximation algorithm for co-relation clustering problems in constant number of passes in semi-streaming setting

Theoretical Computer Science

September 2022 / September 2021 — Graduate Research Assistant, Northwestern University, Computer Science Department
- Designed and implemented JUST, a logic based framework to assist judges reach better decisions in court cases
- Ongoing work on fake news spread on Twitter

Python | Scikit-learn | Pytorch | Pandas | Networkx

September 2021 / September 2020 — Graduate Research Assistant, Dartmouth College, Computer Science Department
- Worked in a team and designed SockAttack algorithm, a deep reinforcement learning based algorithm that will avoid detections of RFDS and operate fake accounts on e-commerce websites efficiently
- Built SockDef, a defense algorithm that mitigates the efficacy of SockAttack

Python | Scikit-learn | Pytorch | Pandas | Networkx

2020 / 2019 — Masters of Mathematics student, Indian Statistical Institute, Math-Stat Department
- Completed my Master's Project : Markov Chains and Monte Carlo Methods and FPRAS for bipartite graphs

Probability Theory | Graph Theory

Publications

Accepted — A New Dynamically Changing Attack on Review Fraud Systems and a Dynamically Changing Ensemble Defense, 2020-2021, IEEE International Conference on Dependable, Autonomic and Secure Computing
Youzhi Zhang, Sayak Chakrabarty, Rui Liu, Andrea Pugliese and V.S. Subrahmanian
http://www.wikicfp.com/cfp/servlet/event.showcfp?eventid=153958

Ongoing Work — Preventing the spread of fake news in social media like Twitter, 2021-Present, Ongoing work
Youzhi Zhang, Sayak Chakrabarty, Andrew Pulver, Andrea Pugliese and V.S. Subrahmanian
Not yet submitted anywhere

Submitted — Judicial Support Tool : Finding the k-Most Probable Judicial Worlds, 2021-2022, AAAI 2023
Maksim Bolonkin, Sayak Chakrabarty, Cristian Molinaro and V.S. Subrahmanian
submitted

Accepted	The Repeated Divisor Function and Possible Correlation with Highly Composite Numbers, 2017, International Workshop for Young Mathematicians "Number Theory", Poland Sayak Chakrabarty, Arghya Datta http://kmsuj.im.uj.edu.pl/workshop2017/index.php.html

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 **Introduction to Data Science Pipeline**, 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