SAYAK CHAKRABARTY

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My primary areas of research are Machine Learning, Design and analysis of algorithms, Graph Theory, Algorithmic Foundations of Optimization, Statistical Modelling, Data Science. I have worked previously in Monte-Carlo methods, sampling methods and additive combinatorics. I like solving Kaggle projects as a hobby.
I completed my Masters of Mathematics from ISI Kolkata, India in 2020. I joined DSAIL lab at Dartmouth college as a PhD student under supervision of Prof. V.S. Subrahmanian. After spending my first year there, I transferred to Northwestern University and currently a second year PhD student in the Department of CS and working with Prof. VS SUbrahmanian. I will start my third year from September 2022.

Education

2021-Present	PhD candidate, Department of Computer Science, **Northwestern University**
2020-2021	PhD candidate, Department of Computer Science, **Dartmouth College**
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 / 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
https://aaai.org/Conferences/AAAI-23/

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`
”Predict Future Sales” project on Kaggle	`https://www.kaggle.com/code/saychak/notebook5ead2fa2b7`
Prophet Algorithm for Stock Price Prediction	`https://github.com/hellokayas/Some-Programming-Samples/blob/master/Stock.ipynb`

Relevant Courses

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 **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

2019 **International Youth Math Challenge**, Indian Institute ofTechnology
2017 **Science and Engineering Research Board International Travel Award**, Department of Science and Technology, India
2014 **Mathematical Talent Reward**, Indian Statistical Institute