

# SAYAK CHAKRABARTY

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My primary areas of research are Machine Learning, Statistical Modelling, Data Science, Design and analysis of algorithms. 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 third year PhD student in the Department of CS and working with Prof. VS Subrahmanian.

## Education

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|--------------|---|
| 2021-Present | PhD candidate, Department of Computer Science, <b>Northwestern University</b>                         |
| 2020-2021    | PhD candidate, Department of Computer Science, <b>Dartmouth College</b>                               |
| 2018- 2020   | Masters of Mathematics, <b>Indian Statistical Institute</b> (Kolkata)                                 |
| 2015- 2018   | Bachelors of Science(Hons) in Mathematics and Computer Science, <b>Chennai Mathematical Institute</b> |

## Professional Experience

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| <b>Present</b><br><b>September 2021</b>        | <b>Graduate Research Assistant, Northwestern University, Computer Science Department</b> <ul style="list-style-type: none"><li>&gt; Designed and implemented JUST, a logic based framework to assist judges reach better decisions in court cases</li><li>&gt; Ongoing work on fake news spread on Twitter</li></ul> <div>Python Scikit-learn Pytorch Pandas Networkx</div>  |
| <b>September 2021</b><br><b>September 2020</b> | <b>Graduate Research Assistant, Dartmouth College, Computer Science Department</b> <ul style="list-style-type: none"><li>&gt; 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</li><li>&gt; Built SockDef, a defense algorithm that mitigates the efficacy of SockAttack</li></ul> <div>Python Scikit-learn Pytorch Pandas Networkx</div> |
| <b>2020</b><br><b>2019</b>                     | <b>Masters of Mathematics student, Indian Statistical Institute, Math-Stat Department</b> <ul style="list-style-type: none"><li>&gt; Completed my Master's Project : Markov Chains and Monte Carlo Methods and FPRAS for bipartite graphs</li></ul> <div>Probability Theory Graph Theory</div>   |

## Publications

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| <b>Accepted</b>     | <b>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</b><br>Youzhi Zhang, Sayak Chakrabarty, Rui Liu, Andrea Pugliese and V.S. Subrahmanian<br><div><a href="http://www.wikicfp.com/cfp/servlet/event.showcfp?eventid=153958">http://www.wikicfp.com/cfp/servlet/event.showcfp?eventid=153958</a></div> |
| <b>Ongoing Work</b> | <b>Preventing the spread of fake news in social media like Twitter, 2021-Present, Ongoing work</b><br>Youzhi Zhang, Sayak Chakrabarty, Andrew Pulver, Andrea Pugliese and V.S. Subrahmanian<br><div>Not yet submitted anywhere</div>  |
| <b>Submitted</b>    | <b>Judicial Support Tool : Finding the k-Most Probable Judicial Worlds, 2021-2022, AAAI 2023</b><br>Maksim Bolonkin, Sayak Chakrabarty, Cristian Molinaro and V.S. Subrahmanian<br><div><a href="https://aaai.org/Conferences/AAAI-23/">https://aaai.org/Conferences/AAAI-23/</a></div>   |
| <b>Accepted</b>     | <b>The Repeated Divisor Function and Possible Correlation with Highly Composite Numbers, 2017, International Workshop for Young Mathematicians "Number Theory", Poland</b><br>Sayak Chakrabarty, Arghya Datta<br><div><a href="http://kmsuj.im.uj.edu.pl/workshop2017/index.php.html">http://kmsuj.im.uj.edu.pl/workshop2017/index.php.html</a></div>   |

## Skill

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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

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A fast SVD algorithm	<a href="https://github.com/hellokayas/Some-Programming-Samples/blob/master/faster_SVD.py">https://github.com/hellokayas/Some-Programming-Samples/blob/master/faster_SVD.py</a>
"Predict Future Sales" project on Kaggle	<a href="https://www.kaggle.com/code/saychak/notebook5ead2fa2b7">https://www.kaggle.com/code/saychak/notebook5ead2fa2b7</a>
Prophet Algorithm for Stock Price Prediction	<a href="https://github.com/hellokayas/Some-Programming-Samples/blob/master/Stock.ipynb">https://github.com/hellokayas/Some-Programming-Samples/blob/master/Stock.ipynb</a>

## Relevant Courses

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

## Awards

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