Debanuj Nayak

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Education

2022 - Present	**Boston University**, *PhD, Computer Science* , advised by Prof. **Sofya Raskhodnikova**
2016 - 2020	**IIT Gandhinagar**, *B.Tech (Hons.) Computer Science & Engineering*, CPI: 9.56/10.0

Publications

- **Akhil Bhimaraju, Debanuj Nayak, Rahul Vaze. Non-clairvoyant Scheduling of Coflows**, *International Symposium on Modeling and Optimization in Mobile, Ad hoc, and Wireless Networks, WiOPT 2020*, [Link], **Best Paper Award**
- **Neeldhara Misra, Debanuj Nayak. On Fair Division with Binary Valuations Respecting Social Networks**, *International Conference on Algorithms and Discrete Applied Mathematics, CALDAM 2022*, [Link]

Research Experience

Sep 2022 - July 2023

Generating Differentially Private Samples, *Dr. Sofya Raskhodnikova*
Boston Univeristy

- Given access to iid samples from a distribution, one can generate a single differentially private sample whose distrubtion is close in total variation distance to the original distribution.
- Can we extend the results to other kinds of distributions such as Gaussian distributions

Aug 2019 - Dec 2021

Learning Non-Gaussian mixture models in a Stream, *Dr. Anirban Dasgupta*
IIT Gandhinagar

- Gaussian mixture models can be learnt in a streaming setting. Can these streaming algorithms be extended to other classes of distributions.
- We analyze the efficacy of streaming k-means on learning mixtures models of Log-Concave and multi dimensional Bernoulli distributions.
- Learnt techniques for analysis: Concentration bounds for martingales, approximate distributions using their sub-Gaussian/ sub-exponential behavior.

May 2019 - Dec 2019

Non Clairvoyant Scheduling of Coflows, *Dr. Rahul Vaze*
TIFR Mumbai

- Coflows are an abstraction developed to capture communication patterns in data centers. Investigated different scheduling problems in concerning coflows.
- Applied linear programming techniques to develop a scheduling policy called BlindFlow which reduces total coflow completion time.
- Simulated BlindFlow and compared it with previous state of the art systems such as Aalo.

Aug 2018 - Oct 2021

Fair Division with Binary Valuations on Graphs, *Dr. Neeldhara Misra*
IIT Gandhinagar

- Explored the problem of fair division on a graph i.e. distributing goods to agents on a social network.
- Experimented with 0/1 valuations and different fairness notions such as envy-freeness and proportionality.
- Introduced new notions of fairness and tackled fair division on undirected graphs. Previous results were concerned with directed graphs.

May 2018 - July 2018	**Fault Tolerant Distance Preservers**, *Dr. Manoj Gupta* **IIT Gandhinagar**

- A k - fault tolerant distance preserver is a subgraph which preserves the distance between a single source vertex to all other vertices in the original graph upto k edge failures.
- Researched and developed algorithms to compute the fault tolerant distance preserver for any arbitrary graph for k=1 and 2.
- The space required to store the k-FT distance preserver in our result was the same as previous results however the algorithm and proofs are very simple.

Professional Experience

Jul 2020 - June 2022	**Goldman Sachs - Analyst (Software Engineer)**, Built enterprise applications for business users internal to Goldman Sachs. Gained practical experience in technologies like Java, Relational Databases, React, Linux, Shell scripting and Spring batch

Teaching Experience

- CS237 Probability in Computing, Boston University
- ES112 Computing with Python, IIT Gandhinagar

Achievements

- **KVPY Fellowship Award** - Achieved All India Rank 304 and selected for the Fellowship in 2015.
- **Dean's List IIT Gandhinagar** - Selected for the Prestigious Dean's List for academically meritorious students in Semesters I , II , III , IV and V.
- **IIT JEE Advanced 2016** - Secured All India Rank **AIR 2487** among 200,000 candidates.

Skills

- **Languages** Fluent in English, Hindi, Bengali
- **Programming Languages** Python, Java, C, C++, Javascript
- **Research** Latex
- **Python Data Science Toolkit** Numpy, Pandas, Matplotlib, Scikit Learn
- **Version Control** Git, Subversion
- **Web development** Django, React, Vue.js
- **Other Technologies** SQL, Relational databases, Shell script, Spring Batch