Anand Brahmbhatt

Google Research India

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🏠 Homepage 🎓 Google Scholar

EDUCATION

Indian Institute of Technology Delhi *2018 - 2022*
B.Tech in Computer Science and Engineering **GPA: 9.687/10**
Advisors: Prof. Parag Singla & Prof. Mausam

WORK EXPERIENCE

Google Research India *Jul 2022 - Present*
Pre-Doctoral Researcher
Advisors: Dr. Rishi Saket & Dr. Aravindan Raghuveer
Worked on privacy and learnability of aggregated data

Adobe Research *May 2021 - Aug 2021*
Research Intern
Advisors: Dr. Shiv Saini & Dr. Atanu R Sinha
Worked on designing fairer methods for cloud-based resources allocation

PUBLICATIONS & PATENTS

Conference Publications
* - equal contribution

1. **PAC Learning Linear Thresholds from Label Proportions** **[NeurIPS'23]**
   Anand Brahmbhatt*, Rishi Saket* and Aravindan Raghuveer.
   Spotlight *@ Neural Information Processing Systems (**NeurIPS**), 2023*

Preprints

4. **Label Differential Privacy via Aggregation** **[Preprint-1]**
   Anand Brahmbhatt, Rishi Saket, Shreyas Havaldar, Anshul Nasery and Aravindan Raghuveer.
   *arXiv:2310.10092, 2023 (under review @ **ITCS 2024**)*

3. **LLP-Bench: A Large Scale Tabular Benchmark for Learning from Label Proportions** **[Preprint-2]**
   Anand Brahmbhatt*, Mohith Pokala*, Rishi Saket and Aravindan Raghuveer.
   arXiv:2310.10096, 2023

2. **Towards Fair and Calibrated Models** **[Preprint-3]**
   Anand Brahmbhatt, Vipul Rathore, Mausam and Parag Singla
   *B.Tech Project, Computer Science and Engineering, IIT Delhi, 2021 - 22 (under review @ **AAAI 2024**)*

1. **Measures of Closeness to Cordiality for Graphs** **[Preprint-4]**
   Amitabha Tripathi, **Anand Brahmbhatt** and Kartikeya Rai
   preprint, 2023

Patents

1. **Cloud-Based Resource Allocation Using Meters** **[Patent'23]**
   Atanu R Sinha, Shiv Kumar Saini, Sapthotharan Nair, Saarthak Marathe,
   Manupriya Gupta, **Anand Brahmbhatt**, Ayush Chauhan
   US Patent number 20230259403, 2023

AWARDS AND HONORS

- **Department Rank 5** amongst 90+ students in the CSE Department at IIT Delhi *2018 - 2022*
- **All India Rank 917** in JEE Advanced (IIT-JEE) 2018 among 150,000 candidates *2018*
- Awarded KVPY Fellowship from Government of India - **All India Rank 514** *2018*
- Awarded Certificate of Merit for being in **Institute Top 7%** in semesters I, II, III and VI at IIT Delhi *2018 - 2022*

Research Projects

Algorithms for Aggregated Data   *Google Research India*
Advisors: Dr. Rishi Saket & Dr. Aravindan Raghuveer

❖ **Learning from Label Proportions (LLP) with Linear Thresholds (LTFs)**   *Sep 2022 - Feb 2023*
- Studied the **NP-Hard LLP with LTF** problem after imposing realistic **distributional assumptions**
- Proposed a **PCA** based algorithm to PAC learn LTFs (in this relaxed case) with **polynomial sample complexity**
- Work to be presented as **Spotlight paper (top 3% of all submissions)** at NeurIPS 2023   **[NeurIPS'23]**

❖ **Aggregation algorithms for Differential Privacy**   *Feb 2023 - Sep 2023*
- Studied the implications of random aggregation to attain **label differential privacy** (label DP)
- Suggested two aggregation methods for label DP: one **without noise**, the other with **minimal additive noise**
- Established the dependence of privacy and utility on bag size and number of bags for both mechanisms **[Preprint-1]**

❖ **Benchmark for Learning from Label Proportions (LLP)**   *Jul 2022 - May 2023*
- Created a **benchmark of LLP datasets** by Criteo CTR prediction dataset using different realistic techniques
- Introduced **metrics** to assess **LLP dataset learnability** and demonstrated benchmark diversity using these metrics
- Evaluated **9 SOTA LLP techniques** on our benchmark and provided insights to aid future exploration **[Preprint-2]**

Bias Amplification in Deep Networks   *B.Tech Project, IIT Delhi*
Advisors: Prof. Parag Singla & Prof. Mausam   *Sep 2022 - Feb 2023*
- Proved that **Proportional-Equality Definition** is an implication of **group-wise calibration**
- Posited modifications of existing calibration techniques to attain group-wise calibration
- Analysed tradeoffs of these techniques between fairness and calibration   **[Preprint-3]**

Fairer Cloud Resource Allocation   *Adobe Research*
Advisors: Dr. Shiv Saini & Dr. Atanu R Sinha   *May 2021 - Aug 2021*
- Designed a **Shapley-Value** based approach for fairer cloud resource allocation using historic meter (usage metrics) data
- Presented a fresh method for pinpointing the **most suitable meters** for resource allocation
- Identified resource under-utilization by modelling ideal utilization on internal Adobe usage data   **[Patent'23]**

Quantifying Closeness to Cordiality of Graphs   *Summer Research Project, IIT Delhi*
Advisor: Prof. Amitabha Tripathi   *Apr 2020 - Jul 2020*
- Proposed two measures of **distance from cordiality** for graphs
- Computed these measures or bounds on these measures for general classes of graphs
- Proved an overarching theorem of bound on these measures under graph join operations   **[Preprint-4]**

Relevant Courses

Mathematics	Real & Complex Analysis, Probability & Stochastic Processes, Linear Algebra & Differential Equations, Calculus
Computer Science	Discrete Mathematical Structures, Theory of Computation, Analysis & Design of Algorithms, Machine Learning, Artificial Intelligence, Natural Language Processing, Database Management Systems, Data Structures & Algorithms, Operating Systems, Computer Networks
Electrical Engineering	Signal & Systems, Computer Architecture, Digital Logic & System Design

Extra Curricular Activities

- **Academic Mentor** for the introductory Applied Mechanics course at IIT Delhi   *Jul 2019 - Dec 2019*
- Board of Student Welfare **Student Mentor** to four incoming freshmen at IIT Delhi   *2020-2022*