Anand Brahmbhatt

Google Research India

✉ anandbrahmbhatt27@gmail.com
🏠 Homepage   🎓 Google Scholar

EDUCATION

Indian Institute of Technology Delhi   *2018 - 2022*
B.Tech in Computer Science and Engineering   **GPA: 9.685/10**
Advisors: Prof. Parag Singla & Prof. Mausam   **Department Rank 5**

WORK EXPERIENCE

Google Research India   *Jul 2022 - Present*
Pre-Doctoral Researcher
Advisors: Dr. Rishi Saket & Dr. Aravindan Raghuveer
Working 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, # - alphabetical

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

Preprints

1. **Label Differential Privacy via Aggregation**   **[P.1]**
   Anand Brahmbhatt, Rishi Saket, Shreyas Havaldar, Anshul Nasery and Aravindan Raghuveer.
   arXiv:2310.10092, 2023

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

3. **Towards Fair and Calibrated Models**   **[P.3]**
   Anand Brahmbhatt, Vipul Rathore, Mausam and Parag Singla
   B.Tech Project, Computer Science, IIT Delhi, 2021 - 22; arXiv:2310.10399

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

Patents

1. **Cloud-Based Resource Allocation Using Meters**   **[Pat.1]**
   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   **[C.1]**

❖ **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   **[P.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   **[P.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   **[P.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   **[Pat.1]**

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   **[P.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*