Anand Brahmbhatt

Google Research India
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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 and 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: , 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: , 2023.

2. **Towards Fair and Calibrated Models.** **[Preprint-3]**
Anand Brahmbhatt, Vipul Rathore, Parag Singla and Mausam
*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]**
Amithbha 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 to achieve label differential privacy with **little/no additive noise**, respectively.
  - 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]**

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]**

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Bias Amplification in Deep Networks *B.Tech Project, IIT Delhi*
Advisors: Prof. Parag Singla and 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]**

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

Extra Curricular Activities

- Acted as an **Academic Mentor** for the introductory Applied Mechanics course at IIT Delhi. *Jul 2019 - Dec 2019*
- Board of Student Welfare **Student Mentor** to four undergrads in the CSE Department at IIT Delhi. *2020-2022*