Soumya Sarkar

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Master of Technology (M.Tech) graduate in Computer Science and Engineering from the Indian Institute of Technology (IIT) Ropar, India, with research publications in reputed venues. Passionate about Machine Learning (ML) and its applications in solving real-world problems, I am currently seeking Ph.D. opportunities in both theoretical and applied ML. My active research interests include, but are not limited to, federated learning (FL), knowledge distillation, trustworthy Artificial Intelligence (AI), and causal AI.

EDUCATION

Masters in Computer Science and Engineering — Indian Institute of Technology, Ropar
Advisor: Dr. Shweta Jain — 2022 — 2024
CGPA: 9.1/10

Bachelors in Civil Engineering — Indian Institute of Science and Technology, Shibpur
Advisor: Dr. Sneha Murmu — 2015 — 2019

RESEARCH EXPERIENCE

IIT Ropar — Rupnagar, Punjab
Junior Research Fellow (Advised by Dr. Shweta Jain) — August 2024 — Present
- Working on client selection problem in FL
- Devising a theoretical framework to generalize convergence guarantees for FL and FL-like settings
- Formalizing an algorithm for heirarchichal decentralized FL algorithm

IIT Ropar — Rupnagar, Punjab
Master Thesis (Advised by Dr. Shweta Jain) — August 2023 — May 2024
- Worked on generating recommendations based on user preferences for counteracting negative classification from black box models
- Developed a novel algorithm IFC1 to learn user preference based on duelling bandits
- Created an end-to-end system where one can directly achieve recourse with causal graphs being learnt from data itself, preference being learnt by IFC1, and a Wachter-like metric being used to generate counterfactuals
- Extensive experimentation against existing baselines show improvement when it comes to validity (managing to generate recourse 100% of the time) on a real world dataset, while having costs comparable (At worst around 1.6% difference).
- **Areas of Research:** Explainable AI, Counterfactuals, Causality

PROFESSIONAL EXPERIENCE

SCA Technology — Gurgaon, Haryana
Software Engineer — June 2024 — August 2024

Tata Consultancy Services — Kolkata, West Bengal
Systems Engineer — Jun 2019 — Oct 2021

PUBLICATIONS

Soumya Sarkar, Nitin Singhal, Shweta Jain, and Shashi Shekhar Jha. 2024. **CGFLasso: Combating Multicollinearity using Domain Knowledge.** In Proceedings of the 7th Joint International Conference on Data Science & Management of Data (11th ACM IKDD CODS and 29th CO-MAD) (CODS-COMAD '24). Association for Computing Machinery, New York, NY, USA, 252–256. https://doi.org/10.1145/3632410.3632468 [Paper]

Kumar Mangalam, **Soumya Sarkar**, Yakul Dogra, Mukesh Saini, Neeraj Goel. 2023. **What Did the Chicken Say?: A Multi-class Classification Method on Chicken Vocalisations.** In Proceedungs of the International Conference on Systems and Technologies for Smart Agriculture (ICSTA 2023) [Paper]

SKILLS

- **Programming Languages:** C, C++, Python, Java, SQL
- **Libraries:** PyTorch, Pandas, Numpy, Matplotlib
- **Tools and Technologies:** SQL Server, LaTeX, Jupyter Notebook/Google Colab, PostGIS, GitHub, Microsoft PowerPoint

TEACHING EXPERIENCE

IIT Ropar — Rupnagar, Punjab
Teaching Assistant — January 2023 — May 2024

- Worked as a teaching assistant for four courses - Computer Architecture, Introduction to Computing and Data Structures, Data Structures and Algorithms (DSA), and Programming Paradigms
- Range of responsibilities include conducting regular lab examinations, conducting tutorials, answer script evaluations and exam invigilation duties
- Mentored group projects for DSA

ACHIEVEMENTS

- Promoted to Digital Profile in TCS - Top 5% in India among 3000+ TCS Employees
- Recieved back-to-back 5/5 Appraisals
- Secured 99%ile in GATE 2022 - securing a rank of 746

INVITED TALKS

Webinar
Fakir Chand College — June 2024
<u>Topic</u>: A Brief Look at AI : Exciting Areas and Developments

POSITIONS OF RESPONSIBILITY

Department Placement Coordinator — *Career Development and Placement Cell, IIT Ropar*
Led the M.Tech delegation in SDE Team to ensure maximum opportunities for M.Tech CS/AI students

Mentor and Volunteer — *Animal Welfare Committee, IIT Ropar*
Assisted in daily feeding activities, rescue and vaccination of 80+ dogs and 20+ birds on campus, as well as setting up fundraising events