

Soumya Sarkar

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M.Tech Graduate in Computer Science and Engineering from IIT Ropar with two publications so far. Previously worked for 2.5 years at Tata Consultancy Services as a Systems Engineer. Passionate about exploring machine learning and using it to solve real world problems.

RESEARCH INTERESTS

Research Interests: Theoretical and Applied Machine Learning, Federated Learning, Trustworthy Machine Learning, Explainable AI, Causality, Deep Learning

EDUCATION

Indian Institute of Technology, Ropar, M.Tech. in Computer Science and Engineering 2022 — 2024

Indian Institute of Science and Technology, Shibpur, B.Tech. in Civil Engineering 2015 — 2019

PUBLICATIONS

- **CGFLasso: Combating Multicollinearity using Domain Knowledge**

CODS-COMAD 2024

[Link](#)

- Found a novel regularization technique to deal with the issue of multicollinearity
- Tried to incorporate prior knowledge in the form of weighted Bayesian networks generated via various techniques
- Our method showed significant improvements on LASSO, Ridge and Elastic Net regularization techniques when it comes to reducing multicollinearity (Standard error of coefficient reduction factors upto almost 1000x) while achieving comparable accuracy (Minimum error difference of $2.67 * 10e^{-6}$, while beating other methods at best).

- **What Did the Chicken Say?: A Multi-class Classification Method on Chicken Vocalisations**

ICSTA 2023

[Link](#)

- In this we employ a multi-class vocalisation detection and classification system of chicken vocalisations into distress (more specifically, distress due to visitors), feeding vocalisations and egg-laying vocalisations.
- We provide a system to collect audio data on hand-held devices and convert it into Mel Spectrograms in order to use three kinds of models to classify (a simple CNN model, a vGG16-based model as well as a VIT-based method) the audio
- Earlier version of this work accepted for poster demonstration at the ICA-23 held at IIT Ropar.

PROFESSIONAL EXPERIENCE

IIT Ropar

Junior Research Fellow

Rupnagar, Punjab

August 2024 — Present

- Working on client selection problems in federated learning.

SCA Technology

Software Engineer

Gurgaon, Haryana

June 2024 — August 2024

- Worked on creating proof of concepts for future features and improving upon existing ones.

Tata Consultancy Services

Systems Engineer

Kolkata, West Bengal

Jun 2019 — Oct 2021

- Worked in all phases of SDLC lifecycle for one of the largest banks in America in BFSI domain.
- Onboarded several applications onto Jenkins and automating the build process with simple code check-ins, as well as ensuring easy deployment to DEV and UAT environments via RLM.
- Involved in the shifting of the entire codebase from RTC to BitBucket repository.

PROJECTS

Generating Algorithmic Recourse Using User Preference (Master Thesis Project)

[Github](#)

Dr. Shweta Jain

- Worked on generating suggestions based on user preferences for counteracting negative classification from black box models
- Developed a novel algorithm IFC1 to learn user preference using duelling bandits
- Developed 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 using a Wachter-like metric to generate counterfactuals
- Improved upon SOTA when it comes to validity (managing to generate recourse 100% of the time) on a real world dataset, while having costs comparable to other baselines (At worst around 1.6% difference when compared to the SOTA baseline on the dataset).
- **Areas of Research:** Explainable AI, Counterfactuals, Causality

Co-Location Pattern Mining

[Github](#)

Dr. Vishwanath Gunturi

- Implemented co-location pattern mining algorithm using PostGIS and Python

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, PowerPoint

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
- Generated leads for 100+ companies

Mentor and Volunteer

Animal Welfare Committee

IIT, Ropar

- Assisted in daily feeding activities on campus
- Assisted in the rescue and vaccination of 80+ dogs and 20+ birds on campus
- Assisted in setting up a fundraising tent during the college fest, managing to generate funds upwards of Rs.20000
- Led initiatives to reform the structure of AWC in order to reward consistent and hardworking juniors with PORs

ACHIEVEMENTS

- Promoted to Digital Profile in TCS - Top 5% in India among 3000+ TCS Employees
- Received back-to-back 5/5 Appraisals - Only junior in training batch (among 30) to receive back-to-back 5/5 ratings
- Secured 99%ile in GATE 2022 - securing a rank of 746