Arjun **Roy**

Machine Learning | Researcher

About me

I'm Arjun Roy, a seasoned researcher with over five years of dedicated experience in machine learning. Currently, I'm affiliated with Research Institute CODE (Cyber Defence and Smart Data) at Universität der Bundeswehr München, actively engaged in the EU project MAMMOth. Previously, I conducted research at L3S Research Center in Hannover, funded by the Volkswagen Foundation. My expertise spans various domains in machine learning, including FairML, Multi-task Learning, Deep Reinforcement Learning, and more. I earned my master's degree in Mathematics and Computing from the esteemed Indian Institute of Technology Patna, currently pursuing a doctorate in machine learning at Freie Universität Berlin, Germany.

Contact

Born on 07/03/1989, Age 35

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Languages

English - Professional Knowledge

German - Basic Knowledge

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EDUCATION

2021-Ongoing

Doctorate — Berlin, Germany
Freie Universität Berlin
Dept. of Mathematics and Computer Science
Working on the topic of Multi-criteria of fairness-aware Machine Learning under the guidance of Prof. Dr Eirini Ntoutsi.

2017-2019

Master Degree — Patna, India
Indian Institute of Technology Patna
Dept. of Mathematics
Received Master of Technology degree in Mathematics & Computing with the thesis title 'Fake News Detection' under the guidance of Prof. Dr Pushpak Bhattacharyya, Dr Asif Ekbal, and Prof. Dr Stefan Dietze.
Degree: 9.16/10 CPI (Summa cum laude)

2013-2016

Master Degree — Kolkata, India
St. Xavier's College (IGNOU)
Dept. of Computer Science
Received Master of Computer Application degree with the thesis title 'Online Journal Management' under the guidance of Assoc. Prof. Shalabh Agarwal.
Degree: 62.14/100 (Magna cum laude)

WORK EXPERIENCE

2023 - till date

Researcher — Munich, Germany
Research Institute CODE
Currently, my focus lies within the EU-funded project MAMMOth. My role entails crafting a fair machine learning (ML) model that is cognizant of differential privacy, slated for deployment on a server. This model will undergo training via Federated Learning on edge devices situated at client locations. The overarching objective is to fortify the model against potential adversaries launching membership inference attacks, thereby safeguarding against privacy breaches concerning sensitive data. The ultimate aim is to furnish our software development partner, Exus, with a financial decision-making model, and our collaborator, IDNow, with an identity verification model. These models are anticipated to exhibit robustness across all demographic groups while concurrently shielding demographic information from potential leaks.

2019 - 2023

Researcher — Hannover, Germany
L3S Research Center
During my tenure I worked on at Project BIAS, funded by the VW Foundation, I had the privilege to contribute to an interdisciplinary research endeavor uniting experts from philosophy, law, and computer science. My role involved orchestrating collaboration between the philosophical and legal teams, fostering an understanding of societal biases and fairness principles. Subsequently, I spearheaded the development of ethical algorithms aimed at assessing and mitigating biases, while ensuring alignment with anti-discrimination laws. Addressing the technical complexities inherent in the project, I navigated multi-objective challenges inherent in fairness-aware learning, particularly concerning multiple protected attributes, while maintaining high predictive performance across all classes.

2022 - 2023

Visiting Researcher — Munich, Germany
Research Institute CODE
My job was to develop the necessary tools and techniques for the discovery and mitigation of (multi-)discrimination in tabular, visual, and graph data. The goal is to demonstrate through pilots the developed solutions into three relevant sectors of interest: a) finance/loan applications, b) identity verification systems, and c) academic evaluation.

Soft Skills and Strengths

Creative | Flexible | Confident | Innovator | Problem Solving | Team Work | Leadership | Good Communication | Diplomacy | Patience

Professional Skills

- Coding
- Debugging
- DBMS

Programming Languages

- Python
- C,C++
- Java
- SQL
- HTML, JSP

Deep Learning Frameworks

Pytorch | Keras | Tensorflow

Teaching Skills

- Tutorials, Artificial Intelligence (UniBw, 2024)
- Tutorials, Artificial Intelligence (UniBw, 2023)
- Tutorials, Reinforcement Learning (FUB, 2021-22)
- Tutorials, Data Mining (LUH, 2020-21)

Other Interests

- Guitar
- Chess
- Gym
- Travels
- Climbing
- Books

Awards

- DAAD (Deutscher Akademischer Austauschdienst) Scholarship for Master's Thesis work (2018)
- Graduate Aptitude Test in Engineering (GATE): top 3% rank in India, awarded Scholarship for master's studies.

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WORK EXPERIENCE

2022-2022 — **Visiting Researcher** — Thessaloniki, Greece
Information Technologies Institute-CERTH
Worked on the topic of 'Grouping Fairness-aware Multi-Tasking NN'. My focus here was to develop algorithms that in training performs a network architecture search within a Multi-task Learning setup that groups tasks together to improve per-task fairness and accuracy (positive and fairness-aware transfer of inter-task information).

2018-2019 — **Research Intern** — Hannover, Germany
L3S Research Center
Working on the topic of 'Stance Detection'. I along with Dr Fafalios under the guidance of Prof. Dr. Dietze developed a pipeline algorithm that searches for relevant documents for a given claim and finds the agree/disagree stance of such relevant documents.

PUBLICATIONS

Total citations: 456 (till last update)

Ramanaik, C. K., Roy, A., & Ntoutsi, E. (2024). Adversarial robustness of vaes across intersectional subgroups. *arXiv preprint*.

Swati, S., Roy, A., & Ntoutsi, E. (2024). Exploring fusion techniques in multimodal ai-based recruitment: Insights from faircvdb. *EWAF*.

Roy, A., Koutlis, C., Papadopoulos, S., & Ntoutsi, E. (2024). Fairbranch: Mitigating bias transfer in fair multi-task learning. *IEEE-IJCNN*.

Roy, A., Horstmann, J., & Ntoutsi, E. (2023). Multi-dimensional discrimination in law and machine learning-a comparative overview. *ACM-FAccT*.

Roy, A., Fafalios, P., Ekbal, A., Zhu, X., & Dietze, S. (2022). Exploiting stance hierarchies for cost-sensitive stance detection of web documents. *JIIS*.

Roy, A., & Ntoutsi, E. (2022). Learning to teach fairness-aware deep multi-task learning. *ECML-PKDD*.

Roy, A., Iosifidis, V., & Ntoutsi, E. (2022). Multi-fairness under class-imbalance. *Discovery Science*.

Iosifidis, V., Roy, A., & Ntoutsi, E. (2022). Parity-based cumulative fairness-aware boosting. *KAIS*.

Le Quy, T., Roy, A., Iosifidis, V., Zhang, W., & Ntoutsi, E. (2022). A survey on datasets for fairness-aware machine learning. *Wiley: DMKDD*.

Le Quy, T., Roy, A., Friege, G., & Ntoutsi, E. (2021). Fair-capacitated clustering. *EDM*.

Roy, A., & Ekbal, A. (2021). Mulcob-mulfav: Multimodal content based multilingual fact verification. *IEEE-IJCNN)*.

Roy, A., Basak, K., Ekbal, A., & Bhattacharyya, P. (2019). A deep ensemble framework for fake news detection and multi-class classification of short political statements. *ICNLP*.

Roy, A., Kapil, P., Basak, K., & Ekbal, A. (2018). An ensemble approach for aggression identification in english and hindi text. *TRAC Workshop*.