

Ayan Majumdar

Date of Birth: Dec. 29, 1992

Address: Max Planck Institute for Software Systems (MPI-SWS)
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Education

- 2021 – ongoing 📖 **Ph.D. in Computer Science**
Max Planck Institute for Software Systems, Saarbrücken, Germany
Area: *Machine Learning, Fairness, Accountability*
Advisor: Prof. Dr. Krishna P. Gummadi, Prof. Dr. Isabel Valera
- 2017 – 2021 📖 **M.Sc. in Computer Science**
Saarland University, Saarbrücken, Germany
Thesis: *Generating Counterfactuals for Causal Fairness*
Outline: *Deep generative models and their implicit assumptions in generating counterfactuals from observed data in the context of fairness.*
Advisor: Prof. Dr. Krishna P. Gummadi, Prof. Dr. Isabel Valera
GPA: 1.2/1.0 (German Scale)
- 2011 – 2015 📖 **B.Tech. in Electronics & Communication**
Heritage Institute of Technology, Kolkata, India
Project: *Automated traffic detection using image processing*
Outline: *Utilize blob detection techniques for detecting traffic from video sequences.*
Supervisor: Prof. Anindya Sen
GPA: 8.8/10.0

Research Interests

- Trustworthy Machine Learning 📖 Fairness, Explainability, Accountability, Robustness
Deep Learning 📖 Generative Models, Neural Networks, Representation Learning
Machine Learning 📖 Supervised, Semi-supervised, Self-supervised Learning, Causality

Publications

Conference Proceedings

- 1 Rateike*, M., **Majumdar***, A., Mineeva, O., Gummadi, K. P., & Valera, I. (2022). Dont Throw it Away! The Utility of Unlabeled Data in Fair Decision Making. In *2022 ACM Conference on Fairness, Accountability, and Transparency* (pp. 1421–1433).



Archival Pre-prints

- 1 Nanda, V., **Majumdar, A.**, Kolling, C., Dickerson, J. P., Gummadi, K. P., Love, B. C., & Weller, A. (2021). Exploring Alignment of Representations with Human Perception. *arXiv preprint arXiv:2111.14726*.




Work Experience

- Oct. 2019 – Mar. 2021  **Research Assistant**
Max Planck Institute for Software Systems, Saarbrücken, Germany
Project: *Exploring bias and fairness with deep generative models*
Role: Lead project regarding exploration of bias in deep generative models for facial image data; design methodologies and experiments.
Supervisor: Prof. Dr. Krishna P. Gummadi
- Apr. 2018 – Mar. 2019  **Research Assistant**
SFB1102, Saarland University, Saarbrücken, Germany
Project: *Mutual Intelligibility in Slavic Languages*
Role: Develop web-user studies, automate collection and processing of large-scale textual data for machine translation experiments.
Supervisor: Prof. Dr. Dietrich Klakow
- Jul. 2015 – Aug. 2017  **Systems Engineer**
Infosys Ltd., Bengaluru, India
Role: Oversee functionality of SIP and VoIP in session border controllers.
- Feb. 2016 – Nov. 2016  **Research Assistant**
IEST, Shibpur, India
Project: *Community-based Routing in Delay Tolerant Networks*
Role: Implement a simulator for a novel community-based routing algorithm using social metrics for delay tolerant networks in post-disaster scenarios.
Supervisor: Raj Rakshit, Prof. Tamaghna Acharya

Teaching Assistance

- Summer 2021  **Seminar on Machine-Assisted Decision Making**, Saarland University
Summer 2019  **Statistical Natural Language Processing**, Saarland University

Talks and Posters

- 2022  **Mila Quebec AI Institute**
Quebec, Canada (virtual)
Don't Throw it Away! The Utility of Unlabeled Data in Fair Decision Making
-  **ACM Conference on Fairness, Accountability and Transparency (FACt)**
Seoul, Republic of Korea
Don't Throw it Away! The Utility of Unlabeled Data in Fair Decision Making
- 2020  **Cornell, Maryland, Max Planck Pre-doctoral Research School**
Saarbrücken, Germany
Counterfactual data generation using VAE

Relevant Coursework

Graduate	📌	Artificial Intelligence, Information Retrieval and Data Mining, Machine Learning, Statistical Natural Language Processing, Neural Networks, Computer Vision, Methods of Mathematical Analysis, Statistics with R, Human-centered Machine Learning, Machine Learning in Cybersecurity, Information Extraction, Seminar: Machine Learning
Undergraduate	📌	Signals and Systems, Digital Signal Processing, Information Theory and Coding, Digital Electronics, Microprocessor and Microcontrollers, Data Structures, Object Oriented Programming, Embedded Systems, Database Management Systems

Other Relevant Projects

- 📌 **Predicting the Vulnerability of Windows Machines to Malware**
Outline: *Predicted the vulnerability of Windows PCs to malware. Further details [here](#).*
- 📌 **Word2Mat: A New Type of Word Representation**
Outline: *Extend word2vec to embed words as matrices for improved contextuality. More details [here](#).*
- 📌 **Exploring Personalized Image Captioning**
Outline: *Studied Attend2You, a personalized image captioning method. Report can be found [here](#).*

Technical Skills

Programming, Packages and Frameworks

Languages	📌	Python, R, Java, C, C++, MATLAB
Database	📌	SQL
Machine Learning	📌	PyTorch, Keras, TensorFlow, NumPy, Scikit-learn, Pandas, SciPy, NLTK, Spacy
Trustworthy ML	📌	CleverHans, Foolbox, robustness, AIF360
Others	📌	Latex, Stan, HTML, CSS, Shell Scripting, Django

Software

Version control	📌	Git, Clearcase
Operating Systems	📌	Linux, MacOS, Windows


Online Certifications

Coursera	📌	1. Algorithms : Algorithmic toolbox, Data structures, Graph algorithms, String algorithms 2. Machine Learning : Machine Learning Foundations, Regression, Deep Learning: Sequence Models
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Academic Activities

Paper Reviewer	📌	NeurIPS 2022
Professional Membership	📌	ACM, PhD Students in AI Ethics, MD4SG




Academic Activities (continued)

Other Activities  Invited to Microsoft Research Conference *Frontiers of Machine Learning*, 2020

Language Skills

Native/Fluent		English		Bengali	
Proficient/Intermediate		Hindi		Deutsch	

Achievements

-  Granted scholarship for fee waiver at the (virtual) Nordic ProbAI School, 2021.
-  Infy Insta award for commendable performance in project, Infosys, India, 2017.
-  Spot Award, Certificate of Appreciation for contribution to project, Infosys, India, 2016.