

Ayan Majumdar

Date of Birth: Dec. 29, 1992

Address: Max Planck Institute for Software Systems (MPI-SWS)
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🌐 <https://ayanmaj.netlify.app/>

📄 Ayan Majumdar

🐙 <https://github.com/ayanmaj92>

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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

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. *CoRR, abs/2111.14726*. (under review). arXiv: 2111.14726. Retrieved from 🌐 <https://arxiv.org/abs/2111.14726>



Under Review & Ongoing

- 1 Rateike*, M., **Majumdar*, A.**, Mineeva, O., Gummadi, K. P., & Valera, I. (2022). Don't throw it away! The utility of unlabeled data in fair decision making. (under review).


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**
IIST, 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

- 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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Other Academic Activities

- 📌 Attended conferences ICML 2020, NeurIPS 2021.
- 📌 Invited to (virtual) 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.