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
IIEST, 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 (FAccT)
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

Other Academic Activities

- Attended conferences ICML 2020, NeurIPS 2021, ACM FAccT 2022.
- 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.