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

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 and discussions, 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, perform data processing for NLP 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

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: *Applied various machine learning methods to predict the vulnerability of Windows PCs to malware. Code can be found here.*

- **Word2Mat: A New Type of Word Representation**
  Outline: *Extend word2vec to encode words as matrices for improved contextual sense. Code and report can be found here.*

- **Exploring Personalized Image Captioning**
  Outline: *Studied Attend2You, a personalized image captioning method. Report can be found here.*

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

Certifications

Coursera

Algorithms	Algorithmic toolbox, Data structures, Graph algorithms, String algorithms
Machine Learning	Machine Learning Foundations, Regression, Deep Learning: Sequence Models

Other Academic Activities

- Attended conferences ICML 2020, NeurIPS 2021.
- Invited to (virtual) Microsoft Research conference *Frontiers of Machine Learning*, 2020.

Achievements

- Infy Insta award for commendable performance in project, Infosys, India, 2017.
- Spot Award, Certificate of Appreciation for contribution to project, Infosys, India, 2016.