Avijit Ghosh

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`Algorithmic Fairness` `Ethical AI` `Machine Learning` `AI Explainability` `Computational Social Science`

Education

Northeastern University   Boston, MA
Ph.D. candidate in Computer Science   *2019 - 2023 (Expected)*

Indian Institute of Technology (IIT) Kharagpur   Kharagpur, India
B.Tech. in Chemical Engineering, M.Tech in Financial Engineering, Minor in Computer Science   *2014 - 2019*

Experience

Twitter   San Francisco, CA
Research Intern   *Sep – Dec 2021 and Jun – Aug 2022*
- Worked with the META (Machine Ethics, Transparency and Accountability) team at Twitter, to investigate the relationship between demography agnostic and demography dependent author impression fairness metrics at scale.
- Developed home timeline diversity metrics based on user feedback, to find balance between recommendation efficiency and fairness.

Fiddler Labs   Palo Alto, CA
Research Intern   *Oct 2020 – Apr 2021*
- Explain distributional shifts in Machine Learning model outputs by unifying Shapley based methods.
- Using optimal transport theory, proposed a threshold independent fairness metric that allows for real time explanations.
- Worked with the product team and civil rights lawyers in the deployment of Fiddler's Machine Learning model fairness dashboard. Introduced and incorporated intersectional fairness metrics in the product.

Northeastern University   Boston, MA
Research Assistant at Khoury College of Computer Sciences | Advisors: Alan Mislove, Christo Wilson   *Sep. 2019 – Present*
- Analyzing Fair ranking systems and showing how they fail in the presence of noisy protected attribute data. Also investigated adversarial attacks on the guaranteed fairness of retrieval systems.
- A cooperative fairness audit of the recommendation algorithm of PyMetrics, a talent matching software. Press Release, Wired article.
- Investigated Facebook's Special Audiences system for opportunity advertisements and showed that the audience creation algorithm was still biased against women, seniors and minorities. Covered in the media by Propublica, The Federal Reserve and Mother Jones.
- Analyzed the ad reach and spend information obtained from Facebook's ad transparency feature and the personal targeting dataset from Propublica's Facebook ad dataset and showed that advertisers with higher budgets use more privacy sensitive targeting techniques like PII or Lookalike audiences. Findings published and presented at IEEE ConPro 2019.

LIG, University of Grenoble Alps   Grenoble, France
Visiting Researcher | Advisor: Oana Goga   *May 2019 – July 2019*
- Study of how news companies promote different items on social media, investigating possible patterns of differential information spreading using both posts and ads.
- We also discovered and reported an exposed access token bug to Facebook Bug Bounty.

Xerox Research Centre   Bangalore, India
Research Intern   *May 2017 – July 2017*
- Implemented XTrack, a Smart Vehicle Tracking and Battery usage minimizing Algorithm, using BLE to relay GPS information.
- Proposed a method for Uber-like Surge Price Prediction using Spatio-Temporal techniques like the Neural Hawkes and Recurrent Marked Temporal Point Process. Awarded the title of Best Internship Project.

Google Summer of Code   Remote
GSoC Student at OpenMRS   *Apr 2016 - Aug 2016*
- Replaced the HTML XForms system used with native generated forms using the Forms REST Api in the android client of the Opensource Medical Record System. Added offline form saving. Configured Travis CI to automatically build and push the apk to the play store.
- Overall, contributed 100K lines of code and became the top code contributor in the project repository.

IIT Kharagpur   Kharagpur, India
Undergraduate Researcher | Advisors: Niloy Ganguly, Saptarshi Ghosh - CNERG Lab   *2014 – 2019*
- Automated Extraction of Catchwords from Legal Documents using a novel NER tagger to help categorize lengthy legal texts.
- Automatically position user comments against relevant news article paragraphs. Presented at ECIR 2019.
- Savitr - A real-time location extraction system for disaster management using twitter. Presented at WWW-SMERP 2018.
- Classification and Summarization of tweets during a disaster event, presented at IBM Day 2016.

Select Publications

Peer-Reviewed

Can There be Art Without an Artist? HEGM@NeurIPS '22

Avijit Ghosh, *Genoveva Fossas* *New Orleans, USA*

Subverting Fair Image Search with Generative Adversarial Perturbations FAccT '22

Avijit Ghosh, *Matthew Jagielski, Christo Wilson* *Seoul, South Korea*

FairCanary: Rapid Continuous Explainable Fairness AIES '22

Avijit Ghosh*, *Aalok Shanbhag*, Christo Wilson* *Oxford, United Kingdom*

Algorithms that "Don't See Color": Comparing Biases in Lookalike and Special Ad Audiences AIES '22

Piotr Sapiezynski, **Avijit Ghosh**, *Levi Kaplan, Alan Mislove, Aaron Rieke* *Oxford, United Kingdom*

When Fair Ranking Meets Uncertain Inference SIGIR '21

Avijit Ghosh, *Ritam Dutt, Christo Wilson* *Montreal, Canada / Virtual*

Building and Auditing Fair Algorithms: A Case Study in Candidate Screening FAccT '21

Christo Wilson, **Avijit Ghosh**, *Shan Jiang, Alan Mislove, Lewis Baker, Janelle Szary, Kelly Trindel, Frida Polli* *Toronto, Canada / Virtual*

Characterizing Intersectional Group Fairness with Worst-Case Comparisons AIDBEI@AAAI '21

Avijit Ghosh, *Lea Genuit, Mary Reagan* *Vancouver, Canada / Virtual*

Analyzing Political Advertisers' Use of Facebook's Targeting Features Conpro@S&P '19

Avijit Ghosh, *Giridhari Venkatadri, Alan Mislove* *San Francisco, USA*

Public Sphere 2.0: Targeted Commenting in Online News Media ECIR '19

Ankan Mullick, Sayan Ghosh*, Ritam Dutt*, **Avijit Ghosh***, *Abhijnan Chakrabarty* *Cologne, Germany*

SAVITR: A System for Real-time Location Extraction from Microblogs during Emergencies SMERP@WWW '18

Ritam Dutt, Kaustubh Hiware, **Avijit Ghosh**, *Rameshwar Bhaskaran* *Lyon, France*

Preprints

Unified Shapley Framework to Explain Prediction Drift Under Review

Aalok Shanbhag*, **Avijit Ghosh***, *Josh Rubin**

Miscellaneous

Connectedness of Markets with Heterogeneous Agents and the Information Cascades App. Adv. Analytics'21

Avijit Ghosh, *Aditya Chourasiya, Lakshay Bansal, Abhijeet Chandra* *Journal*

WebSelect: A Research Prototype for Optimizing Ad Exposures based on Network Structure WITS'19

Avijit Ghosh, *Agam Gupta, Divya Sharma, Uttam Sarkar* *Dublin, Ireland*

* Equal contribution

Awards and Grants

2022	**Winner**, Best Paper - Runner Up	*Conpro'22*
2019	**Winner**, Best Poster Award	*ECIR'19*
2019	**Dean's Fellowship**, First Year PhD students	*Northeastern University*
2019	**Winner**, Institute Order of Merit - Technology	*IIT Kharagpur*
2018	**Winner**, SGSIS Institute Challenge Grant - Worth INR 1 Million	*IIT Kharagpur*
2017	**Silver Medal**, Stock Market Analysis	*Inter IIT Tech Meet, Kanpur*
2016	**Gold Medal**, Software Development	*Inter IIT Tech Meet, Mandi*
2012	**Governor's Medal**, National Rank 5, ICSE Board	*Government of West Bengal*
2010	**NTSE Scholar**, National Talent Search Examination	*NCERT*

Service and Leadership

2022	**Invited Speaker**	*UKCDEI, Trustworthy ML Initiative*
2021-22	**Program Committee/Reviewer**	*FAccT, AIES, NeurIPS, WWW, EMNLP*
2021-22	**Organizer - Queer in AI**	*SIGIR, FAccT*
2016-22	**Founder - Kharagpur Winter of Code**	*IIT Kharagpur*

Technical Skills

Languages: Python, Java, C, R, Bash, SQL, HTML/CSS, JavaScript, Matlab

Tools & Frameworks: Git, TravisCI, Pytorch, Keras, TensorFlow, Docker, AWS, Sagemaker, Google Cloud ML, Android

Machine Learning: Transformers/BERT, ResNets, Adversarial examples, Fairness, Explainability