

Avijit Ghosh

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Algorithmic Fairness Ethical AI Machine Learning AI Explainability Computational Social Science

Education

Northeastern University

Ph.D. candidate in Computer Science

Boston, MA

2019 - Present

Indian Institute of Technology (IIT) Kharagpur

B.Tech. in Chemical Engineering, M.Tech in Financial Engineering, Minor in Computer Science

Kharagpur, India

2014 - 2019

Experience

Twitter

Research Intern

San Francisco, CA

Sep 2021 – Dec 2021

- Working with the META (Machine Ethics, Transparency and Accountability) team at Twitter, investigating the relationship between demography agnostic and demography dependent fairness metrics at scale.

Fiddler Labs

Research Intern

Palo Alto, CA

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

Research Assistant at Khoury College of Computer Sciences | Advisors: Alan Mislove, Christo Wilson

Boston, MA

Sep. 2019 – Present

- Analyzing Fair ranking systems and showing how they fail in the presence of noisy protected attribute data. Currently looking at adversarial attacks on Fair 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

Visiting Researcher | Advisor: Oana Goga

Grenoble, France

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

Research Intern

Bangalore, India

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

GSoc Student at OpenMRS

Remote

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 play store.
- Overall, contributed [100K lines of code](#) and became the top code contributor in the project repository.

IIT Kharagpur

Undergraduate Researcher | Advisors: Niloy Ganguly, Saptarshi Ghosh - CNERG Lab

Kharagpur, India

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

Algorithms that “Don’t See Color”: Comparing Biases in Lookalike and Special Ad Audiences	Conpro@S&P ’22
<i>Piotr Sapiezynski, Avijit Ghosh, Levi Kaplan, Alan Mislove, Aaron Rieke</i>	San Francisco, USA
When Fair Ranking Meets Uncertain Inference	SIGIR ’21
<i>Avijit Ghosh, Ritam Dutt, Christo Wilson</i>	Montreal, Canada / Virtual
Building and Auditing Fair Algorithms: A Case Study in Candidate Screening	FACCT ’21
<i>Christo Wilson, Avijit Ghosh, Shan Jiang, Alan Mislove, Lewis Baker, Janelle Szary, Kelly Trindel, Frida Polli</i>	Toronto, Canada / Virtual
Characterizing Intersectional Group Fairness with Worst-Case Comparisons	AIDBEI@AAAI ’21
<i>Avijit Ghosh, Lea Genuit, Mary Reagan</i>	Vancouver, Canada / Virtual
Analyzing Political Advertisers’ Use of Facebook’s Targeting Features	Conpro@S&P ’19
<i>Avijit Ghosh, Giridhari Venkatadri, Alan Mislove</i>	San Francisco, USA
Public Sphere 2.0: Targeted Commenting in Online News Media	ECIR ’19
<i>Ankan Mullick, Sayan Ghosh*, Ritam Dutt*, Avijit Ghosh*, Abhijnan Chakrabarty</i>	Cologne, Germany
SAVITR: A System for Real-time Location Extraction from Microblogs during Emergencies	SMERP@WWW ’18
<i>Ritam Dutt, Kaustubh Hiware, Avijit Ghosh, Rameshwar Bhaskaran</i>	Lyon, France

Preprints

Subverting Fair Image Search with Generative Adversarial Perturbations	Under Review
<i>Avijit Ghosh, Matthew Jagielski, Christo Wilson</i>	
FairCanary: Rapid Continuous Explainable Fairness	Under Review
<i>Avijit Ghosh*, Aalok Shanbhag*</i>	
Unified Shapley Framework to Explain Prediction Drift	Under Review
<i>Aalok Shanbhag*, Avijit Ghosh*, Josh Rubin*</i>	

Miscellaneous

Connectedness of Markets with Heterogeneous Agents and the Information Cascades	App. Adv. Analytics’21
<i>Avijit Ghosh, Aditya Chourasiya, Lakshay Bansal, Abhijeet Chandra</i>	Journal
WebSelect: A Research Prototype for Optimizing Ad Exposures based on Network Structure	WITS’19
<i>Avijit Ghosh, Agam Gupta, Divya Sharma, Uttam Sarkar</i>	Dublin, Ireland
Supervised extraction of catchphrases from legal documents	Term paper
<i>Avijit Ghosh*, Prerit Gupta*, Ritam Dutt, Kaustubh Hiware, Arpan Mandal, Kripabandhu Ghosh, Saptarshi Ghosh</i>	

* Equal contribution

Awards and Grants

2019	Dean’s Fellowship , First Year PhD students	Northeastern University
2019	Winner , Best Poster Award	ECIR’19
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
2010	NTSE Scholar , National Talent Search Examination	NCERT

Service and Leadership

2022	Program Committee	FACCT
2021	Reviewer	NeurIPS, EMNLP
2021	Organizer - Queer in AI	SIGIR

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