

Muhammad Haroon

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RESEARCH INTERESTS

Privacy and transparency of online content recommendation and advertising systems.

EDUCATION

Ph.D. in Computer Science 2021 - Present

CGPA: 4.0

University of California, Davis

B.S. in Computer Science 2014 - 2018

National University of Computer & Emerging Sciences, Pakistan

EXPERIENCE

University of California, Davis 2021 - Present

Graduate Student Researcher

Advisors: Prof. Zubair Shafiq and Prof. Magdalena Wojcieszak

Ongoing Ph.D. research on the privacy and transparency of online systems. I create automated pipelines for collecting, parsing, and analyzing data from different platforms at large scales. I also focus on building tools and machine learning models to address some of the issues we identify.

Lahore University of Management Sciences 2019 - 2021

Research Associate

Advisor: Prof. Fareed Zaffar

Worked on authorship privacy preservation and news media analytics. Additionally, I worked on automating workflows for archiving historic content.

Techlogix 2018 - 2019

Software Engineer

Worked as a full-stack developer on HealthCloud - a hospital management system. I improved the nearly hour-long deployment protocol for delivering critical updates to under 10 minutes.

PUBLICATIONS

YouTube, The Great Radicalizer?

Auditing and Mitigating Ideological Biases in YouTube Recommendations 2022

Under review in the Proceedings of the National Academy of Sciences (PNAS)

Authors: **M. Haroon**, A. Chhabra, X. Liu, P. Mohapatra, Z. Shafiq, M. Wojcieszak

[\[pre-print\]](#) [\[website\]](#) [\[code\]](#)

HARPO: Learning to Subvert Online Behavioral Advertising 2022

The Network and Distributed System Security Symposium (NDSS)

Authors: J. Zhang, K. Psounis, **M. Haroon**, Z. Shafiq

[\[paper\]](#) [\[code\]](#)

Avengers Ensemble! Improving Transferability of Authorship Obfuscation 2021

arXiv:2109.07028

Authors: **M. Haroon**, F. Zaffar, P. Srinivasan, Z. Shafiq

[\[pre-print\]](#) [\[code\]](#)

ONGOING RESEARCH

Auditing TikTok and YouTube Shorts Recommendations

Conducting a large-scale automated analysis to answer whether recommendations in TikTok and YouTube Shorts lead users to problematic content.

Manipulating YouTube News Consumption Behavior

Conducting a survey of users to analyze their news consumption behavior on YouTube when subjected to different algorithmic manipulations.

RESEARCH TOOLS DEVELOPED

YouTube Audit Platform

Identifies the daily top YouTube recommendations for politically left, right, and center users by automatically running several **Selenium**-based sock puppets in **Docker** containers. Web platform built using **Vue**. [\[website\]](#)

HARPO

Web extension that uses a A2C reinforcement learning model backend built using **PyTorch** to obfuscate the user's online profile. [\[code\]](#)

ResearchTube

Web extension for YouTube that subjects users to various algorithmic manipulations and observes changes to their content consumption patterns. [\[website\]](#)

CenterTube

A DQN reinforcement learning model implemented in **PyTorch** that monitors a user's YouTube homepage and systematically manipulates user recommendations towards moderate/neutral news content.

YENET

A Convolutional Neural Network for video frame interpolation. [\[code\]](#)

LUMS Digital Archive

Developed automated workflows for restoring and cataloging historic documents, and developed a platform in **AngularJS** to allow researchers easy access. [\[website\]](#)

YouTube/TikTok Driver

A series of libraries for programmatically interacting with YouTube, YouTube Shorts, and TikTok implemented using **Selenium**. [\[code\]](#)

SIDE PROJECTS *(can be found on my GitHub among other projects)*

ASL Handsigns Recognition

A Convolutional Neural Network implemented in **PyTorch** with a **Tkinter** frontend that recognizes ASL handsigns in real-time using the system webcam.

Scholar Lens

A VSCode Extension that auto-fills BibTeX entries using Semantic Scholar's API. Overleaf version in-progress.

Discord Stats Bot

Developed a Discord bot for video game statistics calculation that organically grew to over 200+ Discord servers.

INVITED TALKS + PODCASTS

Auditing Social Recommender Systems

- Politics and Computational Social Science Conference (PaCSS), Harvard University, 2022 [\[slides\]](#)
- Summer Institute in Computation Social Science (SICSS), University of Pennsylvania, 2022 [\[slides\]](#)
- The Backdrop - A Podcast by UC Davis [\[listen\]](#)
- UC Davis College of Engineering News [\[read\]](#)

Offensive Privacy to Counter AdTech Surveillance

- Nothing to Hide - A Data Privacy Podcast [\[listen\]](#)

SKILLS

Languages: *Python, C/C++, C#, R, Java, JavaScript, SQL, LaTeX*

Platforms/Frameworks: *Docker, Selenium, Node.js, Vue*

Libraries: *PyTorch, SciPy, spaCy, BeautifulSoup, Pandas, Scikit-learn, Matplotlib, Seaborn, Plotly, Tkinter*

TEACHING EXPERIENCE

ECS 152A: Computer Networks

Teacher's assistant responsible for designing and conducting weekly discussion sessions, and occasionally substituted for the main lecture.

AWARDS & HONORS

Graduate Group Research Fellowship University of California, Davis	2023
Dean's Honor List National University of Computer & Emerging Sciences, Pakistan	2018

REFERENCES

Zubair Shafiq

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