

Shubham SINGH

Ph.D. Student

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RESEARCH INTERESTS

Algorithmic Fairness

Machine Learning

Privacy and Security

Computational Social Science

EDUCATION

2019 - Present **Doctor of Philosophy, Computer Science**, University of Illinois Chicago (UIC)
2016 **Bachelor of Technology, Computer Science**, Indraprastha Institute of Information Technology (IIIT), Delhi

PUBLICATIONS

* indicates equal contributions.

- Rayaan Siddiqi*, **Shubham Singh***, Lenore Zuck, and Chris Kanich. Tracking, but make it offline: The privacy implications of scanning qr codes found in the world. In *7th Workshop on Technology and Consumer Protection (ConPro '23)*, Co-located with the *44th IEEE Symposium on Security and Privacy*, May 25, 2023, San Francisco, CA, USA, May 2023.
- **Shubham Singh**, Bhuvni Shah, Chris Kanich, and Ian A. Kash. Fair decision-making for food inspections. In *Equity and Access in Algorithms, Mechanisms, and Optimization*, EAAMO '22, New York, NY, USA, October 2022. Association for Computing Machinery.
- Tanya Berger-Wolf, Allison Howell, Chris Kanich, Ian A. Kash, Moniba Keymanesh, Barbara Kowalczyk, Gina Nicholson Kramer, Andrew Perrault, and **Shubham Singh**. Open problems in (un)fairness of the retail food safety inspection process. In *Responsible Decision Making in Dynamic Environments Workshop, Held in Conjunction with ICML 2022*, July 23, 2022, Baltimore MD, USA, July 2022.
- Mohammad Taha Khan, Christopher Tran, **Shubham Singh**, Dimitri Vasilkov, Chris Kanich, Blase Ur, and Elena Zheleva. Helping users automatically find and manage sensitive, expendable files in cloud storage. In *30th USENIX Security Symposium (USENIX Security 21)*. USENIX Association, August 2021.
- Rishabh Kaushal, **Shubham Singh**, and Ponnurangam Kumaraguru. NeXLink: Node Embedding Framework for Cross-Network Linkages Across Social Networks. In *Proceedings of NetSci-X 2020: Sixth International Winter School and Conference on Network Science*, pages 61–75, Cham, 2020. Springer International Publishing.
- **Shubham Singh**, Rishabh Kaushal, Arun Balaji Buduru, and Ponnurangam Kumaraguru. KidsGUARD: Fine Grained Approach for Child Unsafe Video Representation and Detection. In *Proceedings of the 34th ACM/SIGAPP Symposium on Applied Computing*, SAC '19, page 2104–2111, New York, NY, USA, 2019. Association for Computing Machinery.

RESEARCH

January 2020
Present

Research Assistant, UNIVERSITY OF ILLINOIS CHICAGO, USA

Mentors: Prof. Chris Kanich, Prof. Ian A. Kash

- **Fair ML for Public Decision-Making.** Studied the use of machine learning by Chicago Department of Public Health (CDPH) and the unfair health inspection scheduling for the residents. Proposed in-processing and post-processing methods to generate a fair schedule while achieving efficiency. Worked with a team of Food Science researchers at OSU, Data Science team at the City of Chicago offices.
- **User-driven ML for Sensitive Files.** Analysed and coded user study data to understand how do users store sensitive and useful files on online cloud storage. Developed ML-based system to help users remove sensitive files from online cloud storage and reducing their risk of breach by 26%. Cross-collaboration between UIC and UChicago. Live app: cloudsweeper.app
- **QR Code Privacy.** Studied the use of QR codes in the wild to learn the privacy threats users are subjected to when scanned. Analysed 900+ QR code scans and observed the current landscape of QR codes does not possess an active threat to users.
- **Redistricting in Chicago.** Performed empirical analysis on the redistricting data for Chicago to learn if voter turnout influences the ward and precinct boundaries of the city.
- **Algorithmic Recommendation for Kids Videos.** Studied the effect of YouTube recommendation system on suggestions for kids-focused videos and the relationship between videos and the advertisements shown. Mentored an undergraduate student as a part of the project.

May 2022 Aug 2022	Research Intern, MAX PLANCK INSTITUTE FOR SOFTWARE SYSTEMS, Germany Mentors: Dr. Oshrat Ayalon, Dr. Elissa M. Redmiles <ul style="list-style-type: none"> ➤ Behavioral Economics for Online Accounts Value Recruited undergraduate and graduate students as participants from MPI-SWS and Saarland University to conduct in-lab user study and Prolific for online study. Conducted the study to elicit true value of people's online accounts using behavioral economics methods. Presented the preliminary results from the qualitative data analysis at the Cornell, Maryland, Max Planck Research School (CMMRS) 2022.
October 2017 July 2019	Research Associate, PRECOG RESEARCH LAB, New Delhi Mentors: Prof. Ponnurangam Kumaraguru, Prof. Arun Balaji Buduru <ul style="list-style-type: none"> ➤ Applied deep learning models to detect unsafe content on video streaming platforms, making them 30% more safe for children. ➤ Created node embedding framework for efficient cross-network representation of user profiles, beating the then state-of-the-art approach by 20%. ➤ Studied the discriminative features of entity-specific sensitive information on the internet.

INDUSTRY

June 2016 September 2017	Full Stack Developer, TAPZO (ACQUIRED BY AMAZON PAY), Bengaluru Mentor: Adarsh Pandey <ul style="list-style-type: none"> ➤ Saved hundreds of hours in development cycle by building a generic cross-category coupons module for Android application, that was used by 7 other teams. Also, developed food, bill payment and hotel categories from scratch and launched to 5M users. ➤ Wrote back-end services to track transaction state changes and user actions for providing better user reinforcements that improved user's post-transaction experience.
May 2015 July 2015	Application Developer Intern, MOBikwik, Gurgaon Mentor: Atul Goyal <ul style="list-style-type: none"> ➤ Migrated Android build environment from Maven to Gradle for better dependency management and faster build times. ➤ Rewrote the application network layer for multi-thread performance and error handling to support low-bandwidth users.

TEACHING

August 2019 May 2021	Graduate Teaching Assistant, CS 361: COMPUTER SYSTEMS PROGRAMMING, University of Illinois Chicago Mentor: Prof. Chris Kanich <ul style="list-style-type: none"> ➤ Designed, instructed, and evaluated programming labs and assignments for Computer Systems Programming course, taken by 180+ undergraduate students in both in-class and remote environments. ➤ Received an average 4.48/5.0 in the evaluation feedback.
June 2018	Lab Instructor, SUMMER SCHOOL ON SOCIAL COMPUTING, IIIT-Hyderabad <ul style="list-style-type: none"> ➤ Taught lab sessions for 50+ summer school participants on data collection using APIs, data analysis and constructing network graphs. ➤ Made the tutorial code public at precog-iiitd/social-computing-18.
January 2016 May 2016	Teaching Assistant, CSE 501: DESIGNING HUMAN CENTERED SYSTEMS, IIIT-Delhi Mentor: Prof. Ponnurangam Kumaraguru <ul style="list-style-type: none"> ➤ One of the select few undergraduate teaching assistants, for a class taken by 80+ undergraduate and graduate students. ➤ Assisted in defining the course structure, designed and evaluated assignments and course projects.

SERVICE

NeurIPS 2022	Algorithmic Fairness through the Lens of Causality and Privacy (AFCP) Workshop, External Reviewer
ACM FAccT 2022	Paper Presentation and CRAFT Sessions, Student Volunteer
NeurIPS 2021	Algorithmic Fairness through the Lens of Causality and Robustness (AFCR) Workshop, External Reviewer
CSCW 2022	Reviewer



LEADERSHIP ACTIVITIES

- 2023-Present **Working Groups Leader**, MD4SG
Coordinator of six working groups organizers that bring together researchers from diverse backgrounds around the world. The working groups focus on issues related to Civic Participation, Climate and Inequality.
- 2020-2022 **Treasurer**, CSGSA, UIC
Treasurer and organizer for social and professional events for Computer Science graduate students at UIC.
- 2016 **Student Mentor**, IIIT-Delhi
Mentored 10+ freshman students for the academic and non-academic issues faced by them. Received the **Best Student Mentor Award**.
- 2014 **Placement Coordinator**, IIIT-Delhi T&P Cell
Organized and managed the campus recruitment interviews with 35+ company officials for 250+ students of the senior batch.



TALKS

- Aug 2022 **Q&A Panel with Experienced International TAs**, UIC New TA Orientation
- Aug 2021 **Q&A Panel with Experienced International TAs**, UIC New TA Orientation
- July 2019 **Cybersafety for Kids on Video Streaming Platforms**, ACM Summer School on Cybersecurity and Data Analytics, IIIT-Delhi



AWARDS & HONORS

- Feb 2023 **Google CSRMP**, Google CS Research Mentorship Program. Selected as a advanced stage Ph.D. student mentee for the program.
- June 2021 **Graduate Student Service Award**, UIC CSGSA. Received a certificate and award money.
- Feb 2017 **Employee of the Month**, Tapzo (Acquired by Amazon-Pay). Received a certificate, public recognition, and a gift.
- May 2016 **Best Student Mentor**, IIIT-Delhi. Received a certificate.



SKILLS

- Programming Languages** Python, R, MATLAB, Java, JavaScript, C, C++
- Frameworks** PyTorch, Keras, Numpy, Scikit, Flask, NodeJS, Celery, Android
- Databases** MongoDB, MySQL, PostgreSQL
- Tools** Git, Docker, VSCode, Vim, Sublime, Jupyter, IntelliJ, \LaTeX



VOLUNTEER WORK

- 2021-2022 **Volunteer**, Greater Chicago Food Depository
Food repacking volunteer at one of the largest food banks in Chicagoland.
- 2013 **Teaching Volunteer**, Pratham Delhi
Taught underprivileged children science and mathematics in understaffed Pratham education centers.