Sina Shaham *Curriculum Vitae*

RESEARCH INTEREST

Privacy and Fairness in AI, Multi-Modal Learning, Graph Neural Networks

EDUCATION

University of Southern California, USA — 2020 - 2023
Ph.D. in Computer Science
- Thesis Title: Responsible AI in Spatio-Temporal Data Processing

University of Southern California, USA — 2020 - 2022
M.Sc. in Computer Science
- Thesis Title: Privacy & Fairness in Machine Learning Models for Communities

University of Sydney, Australia — 2017 - 2019
M.Sc. in Information Technology
- Thesis Title: Location Privacy in the Era of Big Data and Machine Learning

University of Warwick, UK — 2014 - 2015
M.Sc. in Engineering Business Management
- Thesis Title: User Acceptance of Location-Based Mobile Applications

University of Manchester, UK — 2011 - 2014
B.Eng. in Electrical and Electronics Engineering
- Thesis Title: Computer Vision Techniques for Rescaling Digital Human Phantoms

HONORS & AWARDS

- Amazon ML Fellowship — 2022
- University of Southern California Graduate Fellowship — 2020
- University of Sydney Postgraduate Award (APA) — 2019
- Norman-I Prize — 2018
- University of Sydney International Scholarship (tuition waiver plus $ 26,000 per annum) — 2017
- University of Warwick Tuition Waiver — 2014
- Silver Medal in the National Mathematics Olympiad, IR — 2010
- Bronze Medal in the National Informatics Olympiad, IR — 2009
- Membership in National Elites Foundation, IR — 2009

PROFESSIONAL EXPERIENCE

Facebook (Meta), United States — January 2023 - Present
Research Scientist
Responsibility & Privacy Org

- Lead the design and implementation of advanced machine learning pipelines for Ads Delivery, ensuring strict adherence to privacy and fairness regulations.
- Provide comprehensive backend support for specialized Ads Delivery products, enhancing product functionality and user experience.
- Develop key metrics and monitoring solutions to enhance product transparency and fairness for the Advertisement Fairness team.

Amazon, United States Summer 2023
Applied Scientist Intern
Fraud Detection Team

- Specialized in Representation Learning with a keen focus on Gestural Data, driving innovative ways to interpret human movements.
- Explored Contrastive Learning based on supervised and self-supervised approaches for Anomaly Detection.
- Engineered a Multi-Modal Architecture tailored for Gestural Data, seamlessly integrating images (Computer Vision) and text data (Natural Language Processing).
- Successfully incorporated Contrastive Learning into a Multi-Modal setting, enhancing the overall effectiveness of data analysis and interpretation.
- Demonstrated expertise in implementing diverse ML architectures such as ResNet, AlexNet, and Convolutional AutoEncoders.

Facebook (Meta), United States Summer 2022
Machine Learning/SWE Intern
Ads Fairness Team

- Conducted extensive research on mitigation techniques to ensure fairness in model outcomes with respect to gender and race, contributing to a more equitable AI approach.
- Innovatively implemented a new loss function to effectively improve miscalibration concerning protected attributes, enhancing model fairness.
- Accomplished significant improvements in subgroup calibration with respect to gender within production-level Machine Learning models, ensuring more balanced performance.
- Developed and successfully integrated code in multiple languages and frameworks including C, Python, Caffe2, and PyTorch, demonstrating wide-ranging technical expertise.

CSIRO, Australia Aug 2018 - Aug 2020
Researcher

- Contributed to a series of research collaborations with the esteemed team at CSIRO, focusing on cutting-edge issues of Location Privacy.
- Authored multiple papers recognized and published in prestigious forums including the IEEE International Conference on Computer Communications (INFOCOM) and IEEE Transactions on Knowledge and Data Engineering (TKDE).
- Actively collaborated with industry partners, playing a crucial role in integrating privacy-preserving algorithms to bolster data sharing practices across their organization.

InDebted, Australia Aug 2017 - Aug 2018
Data Scientist

- Applied expertise in Supervised Machine Learning methodologies, implementing complex models like Logistic Regression, Random Forest, and Decision Tree to drive insights.
- Utilized Unsupervised Machine Learning algorithms, including K-means, to extract insightful patterns and relationships from data.
- Demonstrated proficiency in organizing Relational Databases, leveraging SQL to manage and manipulate complex datasets.

Computer Skills

- Programming Languages: Python, PyTorch, SQL, TensorFlow, C/C++, Matlab
- Libraries: Pandas, Numpy, Scikit Learn, Matplotlib, and Seaborn
- Math Skills: Linear, Non-linear, and Convex Optimization
- Visualization: Tableau and LATEX

Citation Record

Link to my Google Scholar Profile:
https://scholar.google.com/citations?user=WnWN4NkAAAAJ&hl=en&oi=ao

Journal Publications

1. **Shaham, S.**. Hajisafi, A., Quan, M., Nguyen, D., Krishnamachari, B., Peris, C., Ghinita, G., Shahabi, C. and Pathirana, P. "Holistic Survey of Privacy and Fairness in Machine Learning" Submitted to ACM Computing Surveys, 2023.
2. Abdali, S., **Shaham, S.** and Krishnamachari, B., "Multi-modal misinformation detection: Approaches, challenges and opportunities" Submitted to ACM Computing Surveys, 2023.
3. **Shaham, S.**, Ghinita, G. and Shahabi, C., "Supporting Secure Dynamic Alert Zones Using Searchable Encryption and Graph Embedding" To appear in the VLDB Journal, 2023.
4. **Shaham, S.**, Ghinita, G., Ahuja, R, Krumm, J. and Shahabi, C., "HTF: Homogeneous Tree Framework for Differentially-Private Release of Large Geospatial Datasets with Self-Tuning Structure Height" in ACM Transactions on Spatial Algorithms and Systems (TSAS), 2022.
5. **Shaham, S.**, Dang, S., Wen, M., Mumtaz, S., Menon, V.G. and Li, C., "Enabling Cooperative Relay Selection by Transfer Learning for the Industrial Internet of Things" in IEEE Transactions on Cognitive Communications and Networking, Jan 2022.
6. Liu B, Ding M, **Shaham, S.**, Rahayu W, Farokhi F, Lin Z, "When Machine Learning Meets Privacy: A Survey and Outlook" in ACM Computing Surveys, March 2021.
7. **Shaham, S.**, Ding, M., Liu, B., Dang, S., Lin, Z. and Li, J., "Privacy preservation in location-based services: a novel metric and attack model" in IEEE Transactions on Mobile Computing (TMC), May 2020.
8. **Shaham, S.**, Ding, M., Liu, B., Dang, S., Lin, Z. and Li, J., "Privacy Preserving Location Data Publishing: A Machine Learning Approach" in IEEE Trans. on Knowledge and Data Engineering (TKDE), January 2020.
9. Wang, Z., Dang, S., **Shaham, S.**, Zhang, Z. and Lv, Z., "Basic Research Methodology in Wireless Communications: The First Course for Research-Based Graduate Students" in IEEE Access, vol. 7, pp. 86678-86696, 2019.
10. **Shaham, S.**, Ding, M., Kokshoorn, M., Lin, Z., Dang, S. and Abbas, R., "Fast Channel Estimation and Beam Tracking for Millimeter Wave Vehicular Communications," in IEEE Access, vol. 7, pp. 141104-141118, 2019.

Conference Publications

1. **Shaham, S.**, Krishnamachari, B. and Kahn, M. "ILB: Graph Neural Network Enabled Emergency Demand Response Program For Electricity" Submitted to 23rd IEEE International Conference on Data Mining (ICDM), 2023.
2. **Shaham, S.**, Ghinita, G. and Shahabi, C., "Models and Mechanisms for Fairness in Location Data Processing" in Proceedings of the VLDB Endowment, 2023.

3. **Shaham, S.**, Ghinita, G. and Shahabi, C., "Fair Spatial Indexing: A paradigm for Group Spatial Fairness" submitted to ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD), 2023.

4. Hajisafi, A., Lin, H., **Shaham, S.**, Hu, H. Siampou, M. Chiang, Y. and Shahabi, C., "Learning Dynamic Graphs from All Contextual Information for Accurate Point-of-Interest Visit Forecasting" Submitted to 31st ACM SIGSPATIAL international conference on advances in geographic information systems, 2023.

5. Lin, H., **Shaham, S.**, Chiang, Y. and Shahabi, C., "Generating Realistic and Representative Trajectories with Mobility Behavior Clustering" Submitted to 31st ACM SIGSPATIAL international conference on advances in geographic information systems, 2023.

6. **Shaham, S.**, Ghinita, G. and Shahabi, C., "Differentially-Private Publication of Origin-Destination Matrices with Intermediate Stops" in 25th International Conference on Extending Database Technology (EDBT), 2022.

7. **Shaham, S.**, Ghinita, G., Ahuja, R, Krumm, J. and Shahabi, C., "HTF: Homogeneous Tree Framework for Differentially-Private Release of Location Data" to appear in Proceedings of the 29th ACM SIGSPATIAL international conference on advances in geographic information systems, 2021.

8. **Shaham, S.**, Ghinita, G. and Shahabi, C., "An Efficient and Secure Location-based Alert Protocol using Searchable Encryption and Huffman Codes" in 24th International Conference on Extending Database Technology (EDBT), 2021.

9. **Shaham, S.**, Ghinita, G. and Shahabi, C., "Enhancing the Performance of Spatial Queries on Encrypted Data Through Graph Embedding" in IFIP Annual Conference on Data and Applications Security and Privacy (DBSec), pp. 289-309, Springer, Cham, June 2020.

10. **Shaham, S.**, Kokshoorn, M., Ding, M., Lin, Z. and Shirvanimoghaddam, M., "Extended kalman filter beam tracking for millimeter wave vehicular communications" in IEEE International Conference on Communications Workshops (ICC Workshops), pp. 1-6, June 2020.

11. **Shaham, S.**, Ding, M., Liu, B., Lin, Z. and Li, J., "Machine Learning Aided Anonymization of Spatiotemporal Trajectory Datasets" in IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS), pp. 1-6, April 2019.

12. **Shaham, S.**, Ding, M., Liu, B., Lin, Z. and Li, J., "Transition-Entropy: A Novel Metric for Privacy Preservation in Location-Based Services" in IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS), pp. 1-6, April 2019.

13. Zhang, L., Qian, Y., Ding, M., Ma, C., Li, J. and **Shaham, S.**, "Location Privacy Preservation Based on Continuous Queries for Location-Based Services" in IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS), pp. 1-6, April 2019.

14. **Shaham, S.**, Kokshoorn, M., Lin, Z., Ding, M. and Wu, Y., “RAF: Robust Adaptive Multi-Feedback Channel Estimation for Millimeter Wave MIMO Systems” in IEEE Wireless Communications and Networking Conference (WCNC), pp 1-6, Barcelona, Spain, April 2018.

15. Ma, Z.X., Zhang, **Shaham, S.**, Dang, S., and Hart, J., "Literature review of the communication technology and signal processing methodology based on the smart grid.", In Applied Mechanics and Materials. Trans Tech Publications 2015.

TECHNICAL REVIEWER

- NeurIPS, KDD, Globecom, WCNC, ICC
- ACM Computing Surveys
- IEEE Transaction on Wireless Communications
- IEEE Transaction on Communications
- IEEE Transactions on Mobile Computing