Harshit Sharma

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Google Scholar, LinkedIn

EDUCATION

Ph.D. Computer and Information Science, Arizona State University, Tempe, AZ (exp.) 05/26

B.S. Computer and Information Science, BMS College of Engineering, Bangalore, India 2019

EXPERIENCE

Research Assistant, Syracuse University, College of Engineering and Computer Science
Supervised by Dr. Asif Salekin 2020–Present

- Designed and developed novel machine learning solutions for human centric data as a member of the Ubiquitous and Intelligent Sensing (UIS) Lab.
- Utilized deep learning models and multivariate statistics to analyze real-time human-centric data like IMU sensor data, physiological signals (heart rate, skin conductance) and audio features (formants, MFCCs).
- Conducted fairness and explainability (XAI) analysis on deep learning and machine learning models using SHAP and LIME frameworks.
- Developed deep learning models for affect detection using thermal and RGB images.
- Analyzed speech arousal using spectrograms and state-of-the-art models like wav2vec.
- Developed new multi-modal data fusion techniques for wearable sensors (Empatica E4, Biopac) to analyze psycho-physiological arousal.
- Worked with Vayyar and Walabot (UWB) sensors and point cloud data for health biomarkers and presence detection.

Research Assistant, M.I.N.D Lab Syracuse University 2019
Supervised by Dr. Mark Costa

- Developed a NodeJS and Neo4j graph database backend for analyzing and collecting physiological data, supporting mindfulness interventions in AR/VR.

RESEARCH FOCUS

My research centers on advancing Responsible AI in ubiquitous sensing applications, with a primary focus on Model Interpretability, Fairness, and Adversarial Learning. I have hands-on experience working with real-time audio data, time series data from smart wearables (such as heart rate and electrodermal activity) and Text data. I specialize in harnessing perceptible physical signals to create human-centric applications, employing cutting-edge techniques in machine learning, deep learning, signal processing, and natural language processing (NLP). My goal is to develop AI systems that excel in performance while prioritizing ethics, making technology more accessible and equitable.

PROGRAMMING COMPETENCES

Languages and Libraries: Python, Julia, Java, C++, NodeJS, Android, Pytorch, Pytorch Mobile, Keras, Librosa, Optuna, Pandas, Numpy, Matplotlib, scikit-learn, SQL, SHAP, LIME, Captum, Praat, PraatIO, AI Fairness 360, Flower Framework

MENTORING

Teaching Assistant 2021-2022

- CIS 675 (Design and Analysis of Algorithms)
- CIS 477 (Intro/Analysis of Algorithms)

PUBLICATIONS

[1] Shaily, Roy*, **Sharma Harshit***, and Salekin Asif. "Fairness Without Demographics in Human-Centered Federated Learning." arXiv preprint arXiv:2404.19725 (2024).

[2] Yi Xiao, **Harshit Sharma**, Zhongyang Zhang, Dessa Bergen-Cico, Tauhidur Rahman, and Asif Salekin. 2023. "Reading Between the Heat": Co-Teaching Body Thermal Signatures for Non-

intrusive Stress Detection. Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 7, 4, Article 189 (December 2023), 30 pages https://doi.org/10.1145/3631441. (Accepted for Ubicomp 2024)

[3] Brian Testa, Yi Xiao, **Harshit Sharma**, Avery Gump, and Asif Salekin. 2023. Privacy against Real-Time Speech Emotion Detection via Acoustic Adversarial Evasion of Machine Learning. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.* 7, 3, Article 126 (September 2023), 30 pages. https://doi.org/10.1145/3610887 ***(Patent pending)***

[4] **Harshit Sharma**, Yi Xiao, Victoria Tumanova, and Asif Salekin. 2022. Psychophysiological Arousal in Young Children Who Stutter: An Interpretable AI Approach. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.* 6, 3, Article 137 (September 2022), 32 pages. https://doi.org/10.1145/3550326

[5] Benway, Nina R., Jonathan L. Preston, Asif Salekin, Yi Xiao, **Harshit Sharma**, and Tara McAllister. "Classifying Rhoticity of/r/in Speech Sound Disorder using Age-and-Sex Normalized Formants." arXiv preprint https://arxiv.org/abs/2305.16111 (2023) . (Accepted INTERSPEECH 2023)

[6] Benway, Nina R., Jonathan Preston, Elaine Hitchcock, Asif Salekin, **Harshit Sharma**, and Tara McAllister. 2022. "PERCEPT-R: An Open-access American English Child/clinical Speech Corpus Specialized for the Audio Classification of /r sound/." OSF Preprints. May 27. doi:10.31219/osf.io/8zdsg. (Accepted INTERSPEECH 2022)

[7] Xiao, Yi, **Harshit Sharma**, Victoria Tumanova, and Asif Salekin. "Psychophysiology-aided Perceptually Fluent Speech Analysis of Children Who Stutter." arXiv preprint https://arxiv.org/abs/2211.09089 (2022).

[8] Agrawal, Arun Prakash, Ankur Choudhary, and **Harshit Sharma**. "An Empirical Study on the Issues of Traditional Defect Life Cycle in Agile Model." In International Conference on Advances in Engineering Science Management & Technology (ICAESMT)-2019, Uttaranchal University, Dehradun, India. 2019. Available at SSRN: https://ssrn.com/abstract=3402842

VOLUNTEERING

- **Academic Program Senator**, Graduate Student Organization, Syracuse University 2022-2023
- **Reviewer ETRA 2021**, Workshop 2022
- **Reviewer ISWC 2021**, Posters and Demo Session 2022
- **Student Volunteer**, UBICOMP 2022 2022
- **Reviewer CHI 2024**, Case Studies 2023
- **Reviewer** ECIS 2024 2023

NEWS COVERAGE

- Our on-going work on combining Artificial Intelligence with mindfulness-based practices to provide intervention for people with opioid use disorder was highlighted by Syracuse University: Link
- Our work on Privacy against Real-Time Speech Emotion Detection via Acoustic Adversarial Evasion of Machine Learning was highlighted by Syracuse University: Link