KHUSHBU PAHWA

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Education

Rice University, Houston, Texas, U.S.A — September 2023-Present
Ph.D. in Computer Science — Expected Aug 2027
Specialization: Trustworthy & Efficient AI Algorithms Research for LLMs, Foundation Models
Advisors: Prof. Xia (Ben) Hu, Prof. Vladimir Braverman
Ken Kennedy Institute Fellowship

University of California Los Angeles, California, U.S.A — September 2021-June 2023
M.S. in Electrical & Computer Engineering
Specialization: Signal Processing & Machine Learning
Advisor : Prof. Abeer Alwan
Relevant Coursework : Secure & Trustworthy Edge Computing Devices, Neural Networks & Deep Learning, Large Scale Data Mining Modeling and Algorithms, Large Scale Social & Complex Networks, Adversarial Robustness in ML, Signal & Image Processing for Biomedicine GPA: 3.97 / 4.0
Awarded Graduate Research Fellowship for 3 consecutive quarters with full tuition waiver

Delhi Technological University, Delhi, India — Aug 2016-Dec 2020
B.Tech in Electrical & Computer Engineering
GPA: 9.57 / 10.0
Dept Rank 1, Vice Chancellor Gold Medalist, IEEE Prof. P. Kundu Gold Medal, DTU Merit Award, NUS Research Scholarship

Publications

Chakraborty, M., **Pahwa, K.**, Rani, A., Mahor, A., Pakala, A., Sarkar, A., ... & Das, A. (2023). **FACTIFY3M: A Benchmark for Multimodal Fact Verification with Explainability through 5W Question-Answering**. Accepted for EMNLP 2023 - Main

Oota, S. R., **Pahwa, K.**, Marreddy, M., Gupta, M., & Raju, B. S. (2023, June). **Neural architecture of speech** ICASSP 2023

Amani, S., **Pahwa, K.**, Braverman, V., & Yang, L. F. (2023). **Scaling Distributed Multi-task Reinforcement Learning with Experience Sharing**. Poster Acceptance at KDD 2023 Federated Learning Workshop.

Jain, R., **Pahwa, K.**, & Pandey, N. (2021). **Booth-Encoded Karatsuba: A Novel Hardware-Efficient Multiplier**. Advances in Electrical and Electronic Engineering, 19(3), 272-281.

PAHWA, K., BHARTI, A., & SAHU, K. J. (2019, December). A Novel Wireless Sensor Network Based Rescue Management System. In 2019 IEEE 16th India Council International Conference (INDICON) (pp. 1-4).IEEE

Under Review

Kosan, M., Verma, S., Armgaan, B., **Pahwa, K.**, Singh, A., Medya, S., & Ranu, S. (2023). **GNNX-BENCH: Unravelling the Utility of Perturbation-based GNN Explainers through In-depth Benchmarking**. arXiv preprint arXiv:2310.01794.

Pahwa, K., Oota, S.R., Malladi, A., Singh, M., Gupta, M., Raju, B.S. **Brain encoding models based on binding multiple modalities across audio, language, and vision**

Maheshwari, S., **Pahwa, K.**, & Sethi, T. (2021). **WiseR: An end-to-end structure learning and deployment framework for causal graphical models**. arXiv preprint arXiv:2108.07046.

Research Experience

Graduate Research Fellow at RICE University — Sep 2023-Present

- Working towards developing a high performant transformer model for determining influential gene-gene interactions for Alzheimers disease from the SEA-AD Dataset. Plan on inspecting the sparsity of the attention matrix for discovering novel interactions
- Worked on cardiac arrhythmia detection using a hybrid deep learning architecture from single lead ECG signals

Research Intern at UCSD with Dr. Pengtao Xie May 2023-Jul 2023
Generative AI & Medical Imaging

- Worked towards Developed a Denoising Diffusion Probabilistic Model for precise denosiing of microscopy data.
- Successfully completed a research project on semantic segmentation for ultrasound tooth images

UCLA Graduate Research Fellow with Dr. Abeer Alwan Mar 2023 - May 2023
Privacy Preserving Machine Learning

- Worked on depression detection while preserving speaker identity. Evaluated various adversarial debiasing techniques.
- Led the research project on studying variations in voice features amongst elderly twins for four different speech tasks

UCLA Graduate Research Fellow with Dr. Dan Ruan Jan 2023 - Mar 2023

- Led & Successfully completed the research project : Fast & Learnable Measurement Conditioned Undersampled MR Image Reconstruction

Generative AI Researcher with Dr. Amitava Das Nov 2022 - Jan 2023
Co-led the research project for the curation of Benchmark for Multimodal Fact Verification with Explainability through 5W Question-Answering. Work accepted at **EMNLP 2023 Main Conference**

UCLA Graduate Research Fellow with Dr. Lin Yang Dec 2021 - Jan 2023
Led the DARPA Research Project for developing a **Shared Experience Lifelong Learning distributed RL framework** for atari games. Work accepted at KDD Federated Learning Workshop.

UCLA Graduate Research Fellow at HiLAB with Dr. Yang Zhang Sep 2021 - Sep 2022
Developed a **Privacy-sensitive microphone mechanism for ambient activity recognition using the remaining spectrum of sound (other than human speech).**

Research Internship Experience

Amazon AWS Machine Learning Solutions Lab June 2022-Sept 2022
Applied Scientist Intern

- Led the research project **Zero Shot Open Information Extraction for financial domain - Knowledge Graph Construction**
- Worked on generative and extractive approaches for information extraction such as DeepEx and RelationPrompt.
- **Improved over the current SOTA method - DeepEx** by proposing a novel triplet decoding and triplet ranking strategy

Selected Course Research Projects

Adversarial Robustness in Machine Learning with Dr. Cho-Jui Hsieh Spring 2022

- Led the research project **Computationally Efficient Gradient Based Whitebox Adversarial Attack against Text Transformers**
- Achived better results compared to the Gradient Based Adversarial Attack proposed by FAIR.

Secure & Trustworthy Edge & Cloud Systems with Dr. Nader Sehatbakhsh Winter 2022

- Co-led the reserch project **TinyML has a Security Problem - An Adversarial Perturbation Perspective**
- Evaluated the adversarial robustness of tiny ML models and proposed a NAS framework for the optimal tradeoff of utility, computation, and device constraints.

Link to academic research projects

References

Dr. Abeer Alwan
Professor of Electrical & Computer Engineering at UCLA, **Email:** alwan@ee.ucla.edu

Dr. Pengtao Xie
Assistant Professor of Electrical & Computer Engineering at UCSD, **Email:** p1xie@ucsd.edu

Dr. Cho-Jui Hsieh
Associate Professor of Computer Science at UCLA, **Email:** chohsieh@cs.ucla.edu

Dr. Yang Zhang
Assitant Professor, UCLA & Director of HiLab ,**Email:** yangzhang@ucla.edu