Abhishek Sehgal

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SUMMARY

- Results-driven Engineer specializing in Machine Learning and Digital Signal Processing for real-time applications.
- Experienced in developing and deploying real-time DSP and ML solutions on Android and iOS devices.
- Skilled in designing experimental studies to validate ML and DSP algorithms in real-world scenarios.
- Proficient in model development, optimization, and efficient on-device deployment.

WORK EXPERIENCE

Staff Engineer II. Research

Samsung Research America

- · Designed and optimized algorithms for wireless communication and sensing applications, specializing in signal processing techniques for data-driven inference.
- Developed spatial context modeling solutions for the Samsung Galaxy Personal Data Engine, integrating GPS and Wi-Fi signals to enable intelligent user experience enhancements; deployed in Samsung One UI 7.0.
- Led the design and deployment of adaptive Multi-Link Operation (MLO) techniques, achieving up to 14% reduction in Wi-Fi power consumption on the Samsung Galaxy S24 Ultra through real-time optimization strategies.
- Developed predictive, time-series-based Target Wake Time (TWT) algorithms, enabling up to 13% reduction in Wi-Fi power consumption on the Samsung Galaxy S22.
- Engineered deep learning models for 60 GHz radar sensing using Convolutional Neural Networks (CNN) and timefrequency analysis, enhancing Gesture Recognition, Liveness Detection, and Facial Recognition capabilities.
- Developed a reinforcement learning framework for the "Intelligent WiFi Connection" feature in Samsung smartphones, enabling real-time adaptive switching between Wi-Fi and Cellular networks based on signal quality and user behavior.

Graduate Research Assistant

University of Texas at Dallas

- Developed a smartphone app leveraging convolutional neural networks (CNN) for real-time noise reduction in hearing devices, optimizing DSP pipelines for enhanced audio clarity.
- · Designed and implemented a noise classification app using sub-band features and a Random Forest classifier, outperforming a previous system based on Mel-Frequency Cepstral Coefficients (MFCC) and Gaussian Mixture Model (GMM) classifiers.
- Engineered a real-time deep learning inference framework for smartphones, utilizing multi-threading to create a unified deployment pipeline for Android and iOS.
- Authored a book advocating the use of smartphones over DSP boards for real-time signal processing education, enabling cost-effective mobile laboratory experiences.

Associate Software Engineer

Accenture

- Implemented an ASP.Net Web Application for a Big Oil company, adhering to Agile Methodology
- Conducted Knowledge Transfer sessions, wrote documentation and provided acceptance testing & support
- · Successfully achieved all project objectives within the stipulated timeline

EDUCATION

University of Texas at Dallas

Ph.D., M.S. (Thesis) in Electrical Engineering

Visvesvaraya Technological University

B.E. in Instrumentation Technology

Aug 2014 — May 2019 Bengaluru, KA, India Sep 2008 — May 2012

Richardson, TX

TECHNICAL SKILLS

• Programming Languages: Python, C/C++, Java, Objective-C, Swift

• Machine Learning Frameworks: TensorFlow, Keras, Scikit-Learn, PyTorch, Ollama, Langchain

Aug 2018 — Present

Jan 2015 — Aug 2018

Richardson, TX

Jul 2012 — Jul 2013 Bangalore, KA, India

Plano, TX

SELECTED PUBLICATIONS

Journal Papers

- [J1] N. Dawar, K.N. Nguyen, **A. Sehgal**, Y. Zhu, B.L. Ng, and J. Choi "Enhancing Wi-Fi 7: Traffic Flow Intelligence and Multi-Link Operation for Optimal Efficiency," *IEEE Access*, 2025
- [J2] Y. Cheng, **A. Sehgal**, K.J. Kim, N.Dawar, and Y. Zhu "A Low-Duty-Cycle and Congestion-Robust Design of Adaptive Wi-Fi 7 Multi-link Operation Control over User Side," *IEEE Access*, 2025
- [J3] V.V. Ratnam, H. Chen, H.H. Chang, **A. Sehgal**, and J. Zhang, "Optimal preprocessing of WiFi CSI for sensing applications," *IEEE Transactions on Wireless Communications*, 2024
- [J4] W. Qiu, G. Chen, K.N. Nguyen, **A. Sehgal**, P. Nayak, and J. Choi, "Category-based 802.11 ax target wake time solution," *IEEE Access*, 2021
- [J5] **A. Sehgal** and N. Kehtarnavaz, "Guidelines and Benchmarks for Deployment of Deep Learning Models on Smartphones as Real-Time Apps," *MDPI Machine Learning and Knowledge Extraction*, 2019
- [J6] **A. Sehgal** and N. Kehtarnavaz, "A Convolutional Neural Network Smartphone App for Real-Time Voice Activity Detection," *IEEE Access*, 2018. [Featured Article on IEEE Access]

Conference Proceedings

- [C1] I. Sinharoy, M. Budagavi, E. Faramarzi, S. Ni, and **A. Sehgal**, "End-to-end system for real-time bidirectional holographic communication," SPIE Real-Time Image Processing and Deep Learning, 2024
- [C2] **A. Sehgal** and N. Kehtarnavaz, "Utilization of Two Microphones for Real-Time Low-Latency Audio Smartphone Apps," *IEEE International Conference on Consumer Electronics (ICCE)*, 2018
- [C3] **A. Sehgal**, F. Saki, and N. Kehtarnavaz, "Real-time implementation of voice activity detector on ARM embedded processor of smartphones," *IEEE International Symposium on Industrial Electronics (ISIE)*, 2017
- [C4] F. Saki, A. Sehgal, I. Panahi and N. Kehtarnavaz, "Smartphone-based real-time classification of noise signals using subband features and random forest classifier," IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2016

Patents

- [P1] K. N. Nguyen, G. Chen, H. Chen, **A. Sehgal**, and R. Al Jurdi, "System and method for detecting network services based on network traffic using machine learning." U.S. Patent 12,040,914
- [P2] V. V. Ratnam, H. Chen, A. Sehgal, and H. H. Chang, "Multi-antenna WiFi based breathing rate estimation." U.S. Patent 12,160,298
- [P3] I. Sinharoy, **A. Sehgal**, N. Tripathi, M. Budagavi, and E. Faramarzi, "Generation and distribution of immersive media content from streams captured via distributed mobile devices." U.S. Patent 11,924,397
- [P4] R. Al Jurdi, H. Chen, K. N. Nguyen, **A. Sehgal**, and B. L. Ng, "Power saving for in-device coexistence between Wi-Fi and Ultra-Wide Band communication." U.S. Patent 12,219,490
- [P5] R. Al Jurdi, **A. Sehgal**, H. Chen, B. L. Ng, and Y. Zhu, "Apparatus and method for promoting in-device coexistence between Wi-Fi and ultra-wide band communication." U.S. Patent 12,010,618
- [P6] **A. Sehgal**, G. Chen, and W. Qiu, "Adaptive adjustment for Target Wake Time duration configuration." U.S. Patent 11,910,225
- [P7] W. Qiu, A. Sehgal, K. Gill, V. Va, and B. L. Ng "Systems and methods for Radar based Face Authentication Anti-Spoofing." U.S. Patent 11,506,753.
- [P8] **A. Sehgal**, W. Qiu, and B. L. Ng "Millimeter Wave Radar and Camera Fusion based Face Authentication System." U.S. Patent 11,017,209.

Book

[B1] N. Kehtarnavaz, A. Sehgal, S. Parris, and A. Azarang, "Smartphone-Based Real-Time Digital Signal Processing"

PROFESSIONAL SERVICE

Associate Editor	Springer-Nature Journal of Real-Time Image Processing, 2023-Present
Program Committee	SPIE Real-Time Image Processing and Machine Learning, 2024-Present

Reviewer

IEEE Access, IEEE Transactions on Audio, Speech and Language Processing, IEEE Transactions on Biomedical Circuits and Systems, IEEE International Conference on Communications, Interspeech