

Shamman Noor Shoudha

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Education

The University of Texas at Dallas , Richardson, Texas Ph.D. in Electrical Engineering, GPA: 4.00/4.00 (<i>Advisor: Dr. Naofal Al-Dhahir</i>)	Jan, 2021 – May, 2024
The University of Texas at Dallas , Richardson, Texas M.Sc. in Electrical Engineering, GPA: 3.97/4.00	Aug, 2018 – Dec, 2020
Bangladesh University of Engineering and Technology , Dhaka, Bangladesh B.Sc. in Electrical and Electronic Engineering, GPA: 3.71/4.00	Feb, 2013 – Sep, 2017

Skills

Machine Learning: Graph Neural Network, Convolutional Neural Network, Multilayer Perceptron, Support Vector Machine, PyTorch Quantization, LSF GPUs

Programming: Python (OOPS), C/C++, MATLAB, GitLab, GitHub, Docker

Measurements & Lab Skills: USRPs, Spectrum Analyzers, Oscilloscopes, Signal Generators

Experience

Qualcomm Inc.

Senior Engineer, Modem Systems (Machine Learning)

June, 2024 – Present

- Increased GNSS positioning accuracy by 18% using Graph Neural Network inspired MLP for Google Pixel-3 wearable device (*on production*)
- Increased floating-point training time 12x using Load Sharing Facility GPUs and improved 8-bit quantization performance 15% using MSE-based quantization scheme and intelligent quantization encoding computation method.

Qualcomm Inc.

Internship, Modem Systems (Receiver Front-end)

May – Aug, 2023

- Doubled pull-in range and quadrupled accuracy of carrier frequency offset estimation using 4 pilot symbols for 5G receiver (*patent submitted*)

Qualcomm Inc.

Internship, Modem Systems (Transmitter Front-end)

May – Aug, 2022

- Achieved 37% peak-to-average-power ratio reduction using deep-Q learning based method of crest factor reduction for 5G transmitter

The University of Texas at Dallas

Research Assistant, Supervisor: Dr. Naofal Al-Dhahir

Aug, 2018 – May, 2024

- Improved Wi-Fi 6 (23%) and Bluetooth 5.1 (34%) based localization performance using OpenPose inspired CNN model and achieved centimeter-level accuracy in challenging indoor multipath environments.
- Reduced frame synchronization error below $1e-15$ using CNN-based frame synchronizer for Aeronautical Mobile Telemetry receivers.
- Achieved target BER at $1e-5$ with lower C/I ratio requirement using MMSE based joint LTE interference and multipath suppressor for Aeronautical Mobile Telemetry receivers.

Journal Publications

- OpenPose-Inspired Reduced-Complexity CSI-based WiFi Indoor Localization, *IEEE Communications Letters* (2024)
- Wi-Fi 5GHz CSI-based Single-AP Localization with Centimeter-Level Median Error", *IEEE Access* (2023)
- Bridging the performance gap between two-way and one-way CSI-based 5 GHz WiFi ranging, *IEEE Access* 11 (2023)
- Reduced-Complexity Decimeter-Level BLE Ranging in Multipath Environments, *IEEE Access* (2022)

Conference Publications

- A Convolutional Neural Network based Frame Synchronizer, *ITC* (2021)
- Joint LTE Uplink Interference and Multipath Suppression for Aeronautical Telemetry, *ITC* (2019)
- Co-Existence of Aeronautical Mobile Telemetry and LTE Systems in the L-Band, *ITC* (2019)
- Audio Visual Emotion Recognition using Wavelet Packet Domain Features, *IEEE WIECON* (2017)
- Real time hand movement controlled robotic arm for risk prevention, *IEEE R10-HTC* (2018)

Projects

Wi-Fi sniffer

- Developed ERP-OFDM receiver for IEEE 802.11g Wi-Fi packets (2.400-2.4835 GHz) with operations: signal detection, frame synchronization, CFO compensation, phase tracking and correction, channel estimation and equalization, RF compensation, PHY and MAC PDUs decoding, and network SSID capture

MMSE Channel Estimator

- Achieved NMSE lower than $1e-1$ for SNR 15 dB for single snapshot and 64 transmit antennas using CNN based MMSE channel estimator

SVM Equalization

- Acquired BER $1e-4$ for AWGN channel with SNR 17 dB using non-linear SVM equalizers for AWGN and colored noise

Speech denoising using Fully Connected Neural Networks

- Collected and denoised (subjective evaluation) speech (babble from university cafeteria, SNR 10.4 dB) and non-speech (kitchen fan and garbage disposal noise, SNR 9.67 dB) signals using fully-connected CNN based speech denoiser with 6 convolutional layers

IoT Devices, Sensors and User Management System

- Programmed AES-128 encryption, decryption, and the RBAC process in Python with secured database access management architecture for IoT using Raspberry Pi 4 Bluetooth 5 connectivity