Saad Mannan

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Skills

Languages: Python, C/C++
Technologies & Tools: Audio Signal Processing, Speech Language Model, LLM, Machine Learning, Linux, Matlab/Simulink, Sensor fusion, IBM DOORS, Vector, Git, Jira, Azure DevOps, AWS, PowerBI, Office 365

Education

University of Paderborn, Paderborn, Germany *October 2019 – June 2023*
M.Sc. in Information and Signal Processing
Relevant Coursework: Digital Speech Signal Processing, Statistical Signal Processing, Optimal & Adaptive Filtering, Sensor Technology & Fusion, Pattern Recognition and Machine Learning
Thesis: Solving Direct and Inverse Electromagnetic Scattering Problems Using Deep Learning

- Developed 3D occupancy grid method of synthetic data and targets to analyze Maxwell's equation for the forward scattering problem with U-Net based neural network, which produce results 4000 times faster than traditional computing systems
- Solving inverse scattering problems for remote sensing applications and training deep neural networks in a multi-GPU environment on an HPC Supercomputer
- Developed an algorithm to reconstruct the shape and orientations of a particle from electromagnetic scattered data points

Bangladesh University of Professionals, Bangladesh *January 2015 – December 2018*
B.Sc. in Electrical Electronic and Communication Engineering
Relevant Coursework: Computer Programming with C and C++, Digital Signal Processing, Information Theory and Communication, Numerical analysis with MATLAB
Thesis: Bending Effects of Optical Fibers and Hexagonal Lattice Photonic Crystal Fibers

- Modeled unique refractive index structure of photonic crystal fibers (PCFs) and comparing it to the traditional optical fibers
- Improved bending effect analysis by simulating light propagation in both PCFs and regular optical fibers using COMSOL, leading to better design insights
- Provided key insights into how the periodic structure of PCFs impacts light behavior under bending condition, offering advantages over traditional fiber designs in certain applications

Experience

EDAG Engineering GmbH, Ingolstadt, Germany *August 2024 – Present*
Professional Software Tester (CARIAD & Audi projects)

- Optimized vehicle network integration by PDU data processing for seamless system communication
- Enhanced signal communication by analyzing and troubleshooting CAN, FlexRay, and Ethernet-Bus
- Delivered results through data processing, analysis, and visualization using PowerBI and Elastic dashboards
- Strengthened software validation processes by planning, executing, and documenting bug reports in Azure DevOps

Magna International, Ingolstadt, Germany *March 2024 – July 2024*
Driving Functionality Validation Engineer (Audi Project)

- Improved code efficiency in IPG CarMaker Simulator to simulate and validate various driving maneuvers, enhancing test accuracy
- Developed Python scripts in TraceCheck for advanced signal processing and analysis, automating test workflows for increased productivity
- Optimized HiL test implementation using dSPACE Control Desk and EXAM tools, ensuring reliable validation of driving function requirements

- Refined signal measurement and manipulation processes using Vector CANape, resulting in precise data collection and analysis

Continental AG, Ingolstadt, Germany *September 2023 – March 2024*

Working student, Research and Development

- Processed 6-axis motion sensor data with filtering and transformation to enhance vehicle seat motion detection
- Used Kalman filtering algorithms to improve sensor fusion accuracy and ensure precise seat positioning
- Simulated seat adjustment scenarios in MATLAB/Simulink and Simscape, optimizing functionality through model-based development

Projects & Workshops

University of Paderborn, Paderborn, Germany *September 2020 – August 2021*

Speech Activity Detection, Speaker Identity Detection, Automatic Speech Recognition and Speaker Diarization on FEARLESS STEPS Dataset using Deep learning and ESPnet speech Language model Toolkit

Domain & Tools: Python, Git, PyTorch, Jenkins, Machine Learning, Deep Learning, and Signal Processing

- Processed and extracted 2D STFT features of 100 hours of noisy and unbalanced audio data, from NASA's Apollo-11 space mission, improving speaker activity detection (SAD), speaker identity detection (SID), and automatic speech recognition (ASR) accuracy
- Implemented advanced ANN and CNN models, along with ResNet-based LSTM neural network architectures, significantly enhancing the detection and recognition performance

University of Paderborn, Paderborn, Germany *April 2021 – September 2021*

Seminar on "An Algorithmic Introduction to Clustering"

Domain & Tools: Python, Git, Machine Learning, Statistical analysis

- Developed Gaussian Mixture Model (GMM), k-means, Spectral Clustering, DBSCAN and Mean Shift algorithms through extensive research of several scientific papers, and programmed in Python
- Analyzed and presented the limitations and practical applications of the respective clustering methods

Professional Development

- Learn C++ Programming – Beginner to Advance – Deep Dive in C++ *Udemy.com, 25.12.2024*
- Complete Modern C++ (C++11/14/17) *Udemy.com, 08.02.2025*
- CMake, Tests and Tooling for C/C++ Projects *Udemy.com, 16.03.2025*