Muhammad Manzar Hussain

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PROFESSIONAL SUMMARY

Over 5 years of experience in wireless connectivity, focused on simulating, automating, and testing Wi-Fi, Bluetooth, UWB, and ZigBee systems in lab and field. Skilled in PHY/MAC analysis, coexistence testing, OTA evaluation, and signal processing based wireless sensing. Experienced with lab instruments like signal generators, spectrum, and network analyzers. Inventor of a CSI-based sensing patent and author of conference papers. Strong communicator and proactive team player with a passion for innovative wireless technologies.

TECHNICAL EXPERTISE

- **Wireless Standards**: Expertise in IEEE 802.11 (ax/be), Bluetooth Classic/BLE, and UWB technologies.
- **Wi-Fi Features Investigation**: OFDMA, beamforming, EVM, MCS, antenna gain/return loss, SISO/MIMO, interference, roaming, and Wi-Fi security protocols.
- **Connectivity Testing**: on QoS such as coexistence, latency, packets drop, RSSI, throughput, data rates, coverage, etc.
- **Compliance**: Familiarity with FCC, ETSI, and countries level regulations.

CORE COMPETENCIES

- **Software & Automation**: MATLAB, Python, C, Linux/Windows Bash/Batch/PowerShell
- **Communication and Testing Tools**: SSH, PuTTY, ADB, Win-SCP, TCP/IP, UDP IPERF, Ping, Wireshark, Ellisys Bluetooth Explorer & Analyzer, Wi-Fi Sniffer
- **RF Equipment**: Signal Generator, Spectrum & Network Analyzers, Channel Emulator, USRP/UHD, Wi-Fi testers (Aircrack-ng Suite, Kismet. etc.)
- **Infotainment/Telematics**: ET-Framework & TUT, NTG6, NTG7, Gen20x.i2, Gen20x.i3
- **Operating Systems**: Android Automotive, QNX, RichOS, Linux, Windows
- **Embedded**: NRF52 DK (BLE), UWB DWM1000/3000, Raspberry Pi, Arduino, ESP32
- **Collaboration and Version Control:** Git/GitLab, Confluence
- **Technical Documentation and Design**: LaTeX, Eagle PCB Design

PROFESSIONAL EXPERIENCE

- **perisens GmbH** Feldkirchen, Germany
  Project Development Engineer *April 2020 - Present*

  - **Integrated Testing & Collaboration**: Defined features requirements and executed comprehensive lab testing to validate new features, providing actionable insights to chipset manufacturers.
  - **Software & Automation**: Developed and optimized performance evaluation tools and automated testing scripts, significantly reducing manual errors and improving testing efficiency.
  - **Advanced Lab Expertise**: Utilized advanced lab equipment to perform in-depth testing and validation, ensuring compliance with international automotive and wireless communication standards.
  - **Wireless Technology Development**: Innovated methods for breathing estimation inside vehicles using Wi-Fi and UWB channel data, enhancing in-vehicle monitoring capabilities.
  - **Signal Analysis & Evaluation**: Conducted thorough analysis of Bluetooth RSSI, transmit power, and range; assessed smartphone advertising and scanning efficiency and performed antenna polarization evaluations for cross-device compatibility.
  - **Market & Technology Research**: Researched emerging wireless technologies, evaluating technical specifications, market applications, and integration strategies to drive strategic innovation and product development.
  - **Documentation & Reporting**: Produced detailed technical documentation, including test reports, result analyses, and user manuals, ensuring reproducibility and clarity.

Educational Background

- **Hochschule Bremen** Bremen, Germany
  MSc. in Electronics Engineering *March 2018 - March 2020*

  - **Dissertation**: "In-Vehicle Human Presence Detection and Breathing Rate Estimation using IEEE 802.11n Channel State Information".
  - **Grade**: 1.6 (German Grading Scale)

- **Sukkur IBA University** Sukkur, Pakistan
  BE in Electrical (Telecommunication) Engineering *August 2011 - November 2015*

  - **Thesis**: "Interference Alignment in Two-tier Heterogeneous Cellular Network".
  - **Grade**: 2.3 (German Grading Scale)

Publications and Patents

- **Patent, 2022**: "Vehicle having a presence detection system and warning method alerting to a living being having been forgotten in a vehicle"
- **Conference, 2020**: "In-Vehicle Breathing Rate Monitoring Based on WiFi Signals"
- **Matlab Expo, 2019**: "Analysis of Multi-Path Channels Using the WLAN Packet Preamble"
- **Conference, 2018**: "Stochastic geometry based interference alignment in two-tier heterogenous cellular networks"

Project as Hobby

- **Facial Recognition System (Ongoing)**:
    - Developing a face recognition attendance system using Python, OpenCV, and TensorFlow
    - Integrating camera input, database handling, and front-end interface for real-world deployment
    - Enhancing understanding of AI/ML through practical development

Recent Educational Pursuits

- **Career Track "Machine Learning Engineer" from DataCamp**:

MLOps Concepts
End-to-End Machine Learning
Developing Machine Learning Models for Production
Introduction Shell
Predictive Modeling for Agriculture (project)
MLOps Deployment and Life Cycling
Introduction to Docker
Introduction to MLflow
Fully Automated MLOps
Predicting Temperature in London (project)
ETL and ELT in Python
Monitoring Machine Learning Concepts
Monitoring Machine Learning in Python
CI/CD for Machine Learning

- **Individual Courses**:

Introduction to Deep Learning in Python
Advanced Deep Learning with Keras
Image Modeling with Keras
Programming For Beginners - Master the C Language
Advanced C Programming Course (In Progress)

Linguistic Proficiency

- **English**: Professional proficiency
- **German**: Intermediate (B1)
- **Sindhi and Urdu**: Native proficiency