Muhammad Umar

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🔗 Portfolio in LinkedIn ⬤◗ Medium

Profile

A highly motivated and research-driven graduate student with a strong foundation in artificial intelligence, machine learning, and signal processing. Skilled in designing and implementing deep learning models using tools such as Python, PyTorch, and MATLAB, with hands-on experience applying AI to real-world problems. Actively seeking a PhD position to deepen expertise, contribute to impactful research, and collaborate with leading researchers in developing innovative AI solutions for complex and meaningful challenges.

Research Interests

- Machine Learning and Deep Learning for Real-World Applications
- Signal Processing and Time-Frequency Analysis for Intelligent Systems
- Fault Diagnosis, Prognostics, and Remaining Useful Life (RUL) Prediction
- Explainable AI and Trustworthy Machine Learning
- Vision Transformers and Generative AI for Industrial or Healthcare AI
- Physics-Informed AI and Graph Neural Networks for Smart Sensing
- Multimodal and Low-Sample Learning for Condition Monitoring

Education

MS AI and Computer Engineering
University of Ulsan
2024 – present | South Korea

BS Computer Systems Engineering
University of Engineering and Technology Peshawar
2019 – 2023 | Pakistan

FSc Pre-Engineering
Ideal College Peshawar
2017 – 2019 | Pakistan

Matric Science
Ummah Children Academy
2010 – 2017 | Pakistan

Professional Experience

Research Student Ulsan Industrial AI Lab
University of Ulsan
Working on AI-based solutions for real-world industrial problems, focusing on machine learning, deep learning, and signal processing.Involved in research projects related to fault diagnosis, predictive maintenance, and intelligent systems.

Machine Learning Project Intern
Artificial Intelligence in Healthcare
Worked on the prediction of blood-related diseases using AI, particularly RBC which is comprised of an image segmentation process, for which the UNET architecture was used.

Machine Learning Engineer
Ayass BioScience
Applied AI techniques to healthcare data, focusing on developing machine learning models for accurate disease prediction. Led model development, testing, and optimization to improve clinical decision-making and healthcare outcomes.

Software Developer
ERISP Company
Gained hands-on experience with the Odoo framework, working on module customization, testing, and debugging using Python and XML during my internship.

Awards and Achievements

Best Paper Award – FICTA 2025
Received the Best Paper Award at the 11th International Conference on Frontiers of Intelligent Computing: Theory and Applications (FICTA 2025) for outstanding contribution to fault diagnosis using lightweight CNN architectures.

BK21+ Research Fellowship
Selected under the Brain Korea 21 program for contributing to high-impact AI research. Awarded a fully funded graduate scholarship for academic excellence in Artificial Intelligence and Computer Engineering.

Publications

Milling machine fault diagnosis using acoustic emission and hybrid deep learning with feature optimization ⊡
MDPI Applied Sciences

Advanced Fault Diagnosis in Milling Machines Using Acoustic Emission and Transfer Learning ⊡
IEEE Access

Advanced Bearing-Fault Diagnosis and Classification Using Mel-Scalograms and FOX-Optimized ANN ⊡
MDPI Sensors

Enhanced Fault Diagnosis in Milling Machines Using CWT Image Augmentation and Ant Colony Optimized AlexNet ⊡
MDPI Sensors

Acoustic Emission-Based Pipeline Leak Detection and Size Identification Using a Customized One-Dimensional DenseNet ⊡
MDPI Sensors

A hybrid deep learning approach for bearing fault diagnosis using continuous wavelet transform and attention-enhanced spatiotemporal feature extraction ⊡
MDPI Sensors

An Interpretable Lightweight CNN Framework for Fault Diagnosis in Centrifugal Pumps Using Time-Frequency Scalograms
FICTA 2025

References

Professor Jong-Myon Kim, *Professor,*
University of Ulsan
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Dr. Laiq Hassan, *Chairman of the Department,*
University of Engineering and Technology Peshawar, Pakistan
laiqhasan@uetpeshawar.edu.pk

Dr. Muniba Ashfaq, *Lecturer,*
University of Engineering and Technology Peshawar, Pakistan
muniba@uetpeshawar.edu.pk

Skills

Technical Skills
Programming & Tools: Python, MATLAB, Git, LaTeX, Power BI, Colab
Signal Processing: AE Signal Analysis, FFT, STFT, CWT, Time Series Analysis
ML & DL: CNNs, RNNs, LSTMs, Transformers, Autoencoders, LLMs, XAI (Grad-CAM, SHAP)
Frameworks: PyTorch, TensorFlow, Hugging Face
Research: Paper Writing, Model Evaluation, Dataset Handling
Tracking: MLFlow, Weights & Biases

Projects

AI & Healthcare
- Disease Prediction System (Ayass BioScience)
- Clinical Doctor Web App

Fault Diagnosis & Maintenance
- Pipeline Leak Detection
- Bearing Fault Diagnosis
- Milling Machine Health Monitoring
- Explainable AI models for Centrifugal Pumps

Academic Projects
- Deepfake Detection
- Real Estate Price Prediction

Certificates

- Deep Learning A-Z 2024: Neural Networks, AI & ChatGPT Prize ⊡

- Specialization Mathematics for Machine Learning and Data Science ⊡

- Signal Processing Onramp ⊡

- Python for Computer Vision with OpenCV and Deep Learning ⊡

- Supervised Machine Learning: Regression and Classification ⊡

- Python for Data Science, AI & Development ⊡

- Programming for Everybody (Getting Started with Python) ⊡