HABEEBAN MEMON

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GitHub | LinkedIn | ResearchGate | Google Scholar

RESEARCH PROFILE

Computer Systems Engineer with research experience in computer vision, machine learning, image processing, signal processing, and Non-Destructive Testing (NDT). Co-author of five research papers, including one published, one accepted, and three ready for submission, focused on defect detection, segmentation, thermographic imaging, depth estimation, 3D reconstruction, image super-resolution, multimodal learning and explainable ai for real-world engineering applications. Actively seeking thesis-based MSc research opportunities to collaborate with professors on applied AI and computer vision problems in intelligent inspection and visual systems, with a focus on building interpretable and trustworthy models for real-world engineering applications.

RESEARCH INTERESTS

Machine Learning and Deep Learning for Industrial Applications | Computer Vision and Image Processing | Non-Destructive Testing and Evaluation | Digital Signal Processing

EDUCATION

B.Eng. in Computer Systems Engineering (Result Awaited) *Sep 2022 - May 2026*
Sukkur IBA University, Sukkur, Sindh, Pakistan | iba-suk.edu.pk

- CGPA: 3.5 / 4.00 (A = 4.0, US 4.0 GPA scale; all courses taught in English)
- PEC Accredited, Level II, Washington Accord Substantial Equivalence

PUBLICATIONS

Published

1. Mitigation of DDoS Attacks with Machine Learning, Deep Learning, and Transformers *2024*
*Zain Ul Abidin, Haseeb, **Habeeban Memon**, Muhammad Younis, Junaid Ahmed*
International Journal of Multidisciplinary Conference Proceedings (IJMCP), Vol. 2(1), 2024 | DOI: 10.61503/Ijmcp.v2i1.181

- Benchmarked ML and DL models for multi-class DDoS detection on CICDDoS2019. LightGBM and XGBoost achieved the best accuracy-speed balance for real-time network security.

Accepted (In Press)

2. Debond Detection in CFRP Structures using Optical Pulse Thermography and Deep Learning *2026*
***Habeeban Memon**, Zain Ul Abidin, Junaid Ahmed, Ayesha Siddiqua*
iCoMET 2025, IEEE Xplore | Preprint: ResearchGate

- Compared YOLOv8, Faster R-CNN, and Mask R-CNN for CFRP debond detection. Mask R-CNN achieved the highest accuracy with pixel-level defect segmentation.

Ready to Submit / Preprints

3. OPT-based Three-Channel Thermographic Fusion for Architecture-Independent Defect Detection and Segmentation in CFRP Composites *2026*

*Zain Ul Abidin, **Habeeban Memon**, Junaid Ahmed | Target journal to be confirmed*

- Proposed an automated, architecture-independent input representation using a three-channel fusion based on cyclic alignment of raw thermal intensity, PCA, and TSR to isolate small, low-contrast defects.

4. Automated Depth Estimation and 3D Reconstruction of CFRP Subsurface Defects via Optical Pulsed Thermography *2026*

***Habeeban Memon**, Zain Ul Abidin, Junaid Ahmed | Target journal to be confirmed*

- Proposed a two-stage pipeline extracting 16 physics-informed features to predict through-thickness depth and reconstruct 3D topologies of CFRP subsurface delaminations.

5. CMM-DSE: Cross-Modal Consistency-Guided Multimodal Fake News Detection via Dempster-Shafer Evidential Reasoning *2026*

***Habeeban Memon**, Zain Ul Abidin, Umair Ayaz Kamangar | Target journal to be confirmed*

- Proposed a Cross-Modal Consistency Module and Dempster-Shafer evidential fusion layer, utilizing 2D FFT features for robust uncertainty quantification in multi-modal forgery detection.

ACADEMIC PROJECTS & THESIS

1. Undergraduate Thesis | Machine Learning Based Subsurface Defect Detection in CFRP Using Optical Pulse Thermography *May 2025 - May 2026*

NDT/NDE | CFRP Composites | Defect Detection | Defect Segmentation | Depth Estimation | 3d Reconstruction

- Developed a machine learning-based system to automate the detection and analysis of subsurface defects in Carbon Fiber Reinforced Polymer (CFRP) composites.
- Processed raw optical pulsed thermography (OPT) sequences to build an end-to-end pipeline (Detection → Segmentation → Depth Estimation → 3D Reconstruction) for non-destructive testing.

2. Hospital Management System (CHMS) *2026*

ASP.NET | C# | SQL Server | JavaScript | Full-Stack | Live Deployment | GitHub

- Developed a web-based hospital management system for patient records, appointments, and billing, deployed live at chms.somee.com

3. Speech Enhancement through Advanced DSP Techniques *2025*

DSP | STFT/ISTFT | Spectral Subtraction | Noise Gating | GitHub

- Developed an end-to-end audio processing system using spectral subtraction and noise gating in the frequency domain to restore speech clarity in high-noise environments.

4. Image Compression Analysis: JPEG vs JPEG2000 *2024*

Image Processing | DCT | DWT | PSNR | SSIM | GitHub

- Conducted performance analysis of DCT-based JPEG against wavelet-based JPEG2000, quantifying trade-offs between compression ratio and visual fidelity.

5. Smart Elevator Controller *2025*

FSM | Moore Machine | Manhattan Distance | Verilog | GitHub

- Developed a 5-floor digital elevator controller using Moore FSM with Manhattan distance-based nearest-request optimization.

6. IoT Health Monitor using ESP32 | 2025

IoT | ESP32 | PulseSensor | LM35 | Blynk | GitHub

- Built a real-time health monitoring system with threshold-based emergency alerts and dual visualization on LCD and Blynk cloud.

7. Obstacle-Aware ROS2 Bot *2025*

ROS 2 | Gazebo | URDF | Sonar | Camera | GitHub

- Developed a mobile robot simulation with custom URDF robot and dual-sensor suite (sonar + camera) for obstacle-aware navigation.

8. MATLAB Voice Recognition using FFT *2025*

Signal Processing | FFT | MATLAB | Pitch Extraction | GitHub

- Developed a speaker identification system using FFT-based pitch extraction and distance-based matching for biometric security.

9. Student Management System with ML Integration *2025*

Desktop App | RBAC | MySQL | ML | Predictive Analytics | GitHub

- Engineered an academic administration desktop app with role-based access and ML-powered predictive analytics for student outcomes.

10. Real-Time Speech Enhancement System *2025*

DSP | Spectral Subtraction | Butterworth Filter | SNR Analysis | GitHub

- Implemented a multi-stage speech enhancement pipeline with noise spectrum estimation and Butterworth band-pass filtering for real-time noise reduction.

WORK EXPERIENCE

1. AI and Web Development Intern *Jul 2025 – Aug 2025*

VitaNova – International Alliance for Sciences | Remote

- Integrated AI tools (ChatGPT, Perplexity, GravityWrite) into research and clinical diagnosis workflows, while applying Ethical AI frameworks to healthcare innovation and sustainable development goals.

2. Systems Engineering Intern *Jun 2025 – Jul 2025*

State Life Insurance Corporation of Pakistan | On-Site, Sukkur, Sindh

- Conducted SWOT analysis of corporate digital infrastructure and analyzed departmental workflows to propose digitization strategies for manual insurance claim tracking.

TECHNICAL SKILLS & EXPERTISE

- **Programming & Development:** Python, MATLAB, SQL, Verilog, C#, HTML/CSS, ASP.NET Web Forms
- **Machine Learning & AI:** scikit-learn, XGBoost, LightGBM, Support Vector Regression (SVR), Random Forest
- **Deep Learning & Generative AI:** TensorFlow, PyTorch, Keras, ViT, DeBERTa-v3, BLIP, RT-DETR-L, UNet, FPN, DeepLabV3+, LSTM, LLMs, Prompt Engineering
- **Computer Vision:** OpenCV, YOLO, Faster R-CNN, Mask R-CNN, Semantic Segmentation, Instance Segmentation
- **Explainable AI (XAI):** SHAP, Grad-CAM, LIME
- **Scientific Computing & Data Analysis:** NumPy, SciPy, Pandas, Matplotlib, Seaborn
- **Web, Automation & Software Tools:** Streamlit, n8n, Git, GitHub, Jupyter Notebook
- **Databases:** SQL Server, MySQL, SQLite, ADO.NET
- **Embedded Systems & IoT:** ESP32, Arduino, Raspberry Pi (Basic)

CERTIFICATIONS

- Deep Learning Specialization:Advanced AI, Hands-on Lab, Udemy, Udemy
- Machine Learning Specialization, DeepLearning.AI / Coursera
- Advanced Learning Algorithms, DeepLearning.AI / Coursera
- Unsupervised Learning, Recommenders, Reinforcement Learning, DeepLearning.AI / Coursera
- Supervised Machine Learning: Regression and Classification, DeepLearning.AI / Coursera