

Zain Ul Abidin

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Education	Sukkur IBA University Bachelor of Engineering (B.E.) in Computer Systems Engineering • Thesis: Machine Learning-Based Subsurface Defect Detection in CFRP Using Optical Pulsed Thermography • Supervisor: Dr. Junaid Ahmed [Thesis] [Code] • Cumulative GPA: 3.80 / 4.00, Rank: 2/39	2022–2026
Experience	Sukkur IBA University <i>Independent Researcher</i> • Developing execution-grounded multi-agent frameworks to automate research workflows and experimental validation. • Investigating LLM decision-making and verification techniques to reduce hallucinated outputs in autonomous systems. • Applying deep learning to multimodal defect detection, signal processing, and computer vision pipelines.	Aug 2025 – May 2026
	Mirai School of Technology <i>Artificial Intelligence Intern</i> • Designed and deployed conversational assistants using agentic AI workflows and large language models. • Automated data validation and processing pipelines to bridge language models with external APIs.	Jul 2025 – Aug 2025
Research Interests	• AI Automation & Multi-Agent Systems: Automated scientific discovery, execution-grounded reasoning, multi-agent coordination. • LLM Evaluation & Decision Making: LLM reliability and safety metrics, mitigating hallucinations/uncertainty, active claim verification. • Computational Perception: Multimodal learning & sensor fusion, inverse problems & 3D understanding, optimization in dynamic systems.	
Publications	[1] Zain Ul Abidin, Habeeban Memon, Junaid Ahmed. “Computational Depth Measurement in Thermographic Video: Overcoming Spatial Overfitting via Spatio-Temporal Decoupling.” <i>Under Review in Transactions on Instrumentation and Measurement, IEEE</i>, 2026. [arXiv] [2] Zain Ul Abidin, H. Memon, Junaid Ahmed. “Three-Channel Thermographic Fusion for Architecture-Independent Defect Detection and Segmentation in Carbon Fibre Reinforced Polymer Composites Using Deep Learning.” <i>Under Review in Engineering Applications of Artificial Intelligence, Elsevier</i>, 2026. [SSRN] [3] H. Memon, Zain Ul Abidin, Junaid Ahmed, A. Siddiqua. “Debond Detection in CFRP Structures using Optical Pulse Thermography and Deep Learning.” <i>5th International Conference on Computing, Mathematics and Engineering Technologies (iCoMET), IEEE</i>, pp. 1-6, 2026. [DOI] [4] Zain Ul Abidin, Junaid Ahmed, Dong Wang, Guiyun Tian. “Metal Defect Detection in Pulsed Thermographic Imaging via Temporal Eigen Projection and Robust Low-Rank Tensor Completion Model.” <i>Under Review in Nondestructive Testing and Evaluation, Taylor and Francis</i>, 2025. [ResearchGate] [5] Junaid Ahmed, Zain Ul Abidin, Guiyun Tian, Dong Wang. “Eddy Current Pulsed Thermography based Efficient Defect Detection in Metals via Keyframe Extraction and Accelerated Sparse Decomposition.” <i>Under Review in NDT & E International, Elsevier</i>, 2025. [ResearchGate] [6] Zain Ul Abidin, Haseeb, H. Memon, M. Younis, Junaid Ahmed. “Mitigation of DDoS Attacks with Machine Learning, Deep Learning, and Transformers.” <i>International Journal of Multidisciplinary Conference Proceedings (IJMCP)</i>, Vol. 2(1), 2025. [DOI]	

Research & Engineering Projects	AgentForge: Autonomous Multi-Agent Research Pipeline 2026 - Engineered a modular framework to autonomously plan, execute, and verify code and experimental research tasks. - Integrated isolated sandbox testing and an anti-hallucination citation layer to ensure highly reliable outputs. [Code]
	CMM-DSE: Cross-Modal Consistency-Guided Multimodal Fake News Detection 2026 - Designed a multimodal architecture leveraging a Cross-Modal Consistency Module to explicitly measure text-image alignment. - Implemented a Dempster-Shafer evidential fusion layer to output principled uncertainty scores alongside standard predictions. [Code]
	X-ray Prohibited Item Detection in Airport Inspection 2026 - Developed an automated computer vision pipeline leveraging deep learning architectures for rapid security screening. - Segmented prohibited items with high precision within complex, highly cluttered X-ray baggage image scans. [Code]
	KL-Divergence-Driven Online Sensor Relocation for Barrier Coverage 2026 - Implemented sliding-window kernel density estimation alongside a greedy sensor relocation algorithm for dynamic tracking. - Improved the mean detection rate from 65.16% to 87.30% within simulated non-stationary physical environments. [Code]
Technical Skills	Autonomous AI & LLMs: Agentic Workflows (ReAct, Planning) · Prompt Engineering · RAG (ChromaDB) · LLM Evaluation Machine Learning: Deep Learning · Ensemble Methods · Computer Vision (Segmentation, Detection) · Tensor Methods Programming Languages: Python · C/C++ · MATLAB Tools & Environments: PyTorch · Docker · Git · Edge Computing (TensorFlow Lite)
Conference Presentations	International Conference on Computing, Mathematics and Engineering Technologies (iCoMET 2026) Paper Presentation International Conference on Innovations in Science, Computing & Technology (ICISCT'25) Paper Presentation
Honors & Awards	Prime Minister's Laptop Award 2024 National merit-based award for academic excellence Sindh Educational Endowment Fund (SEEF) Scholarship 2022–2026 Fully merit-based undergraduate scholarship
Specializations	Deep Learning Specialization Udemy Machine Learning Specialization Stanford / Coursera Mathematics for ML and Data Science DeepLearning.AI Large Language Models Udemy Google Prompting Essentials Coursera
References	Dr. Junaid Ahmed Bhatti, Assistant Professor, Sukkur IBA University Dr. Kashif Hussain, Assistant Professor, Sukkur IBA University Dr. Ghulam Abbas Lashari, Assistant Professor, Sukkur IBA University