Hamza Aamer

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EDUCATION

Karlsruhe Institute for Technology **Aug. 2027**
Degree (MS), Majors (Computer Science) *Karlsruhe, Germany*

National University of Computer & Emerging Science **June. 2025**
Degree (BS), Majors (Computer Science), Gold Medalist, Rector's List of Honor *Islamabad, Pakistan*

WORK EXPERIENCE

Adept Tech Solutions **Feb. 2025 – present**
AI Engineer & Product Lead

- Spearheaded development of advanced data synthesis and analysis systems using PySpark, statistical modeling, and computer vision, achieving **10x** improvement in data generation accuracy and automation of complex workflows. Key achievements include:
  - Architected and led migration of **Ascend v2** from monolithic to distributed microservices architecture, designing and implementing **30+ microservices** with domain-driven design principles. Established event-driven communication via Apache Kafka, containerized services with Docker, and implemented RESTful API Gateway using FastAPI for modular scalability and independent deployment cycles.
  - Engineered proprietary **DNA Signature Technology** that extracts and preserves statistical properties of datasets through adaptive binning algorithms, enabling rule-based synthetic data generation with complex dependency management and distribution-based transformations, reducing massive datasets to compact statistical signatures while maintaining **99.5%** statistical fidelity and preserving database relationships.
  - Implemented **13+ specialized data engineering modules** including intelligent class balancing that automatically calculates optimal scaling factors for imbalanced datasets, outlier detection, time series standardization, and precision correction, processing datasets exceeding **10M** rows while reducing synthesis time from hours to minutes.
  - Developed **Aerial Roof Analysis Platform** integrating satellite imagery with LiDAR point cloud processing and Open3D 3D reconstruction, implementing multi-stage geometric algorithms with CRM boundary refinement to automatically classify roof components (ridge, hip, valley, rake lines) with **95%** accuracy and deliver contractor-grade measurements within **±2%** tolerance.
- Led deployment of production-ready CLI tools with distributed computing optimization across Spark clusters, enabling seamless pipeline execution on Ascend and improving geospatial analysis accuracy by **40%** through advanced 3D-to-2D projection techniques.

Antematter **May. 2024 – Feb. 2025**
AI Engineer

- Contributed to the development of various Multi-Agent Frameworks using orchestration frameworks, including CrewAI, LangChain, ELIZA, and Phidata, significantly boosting company outreach by **10x**. Key achievements include:
  - Developed **Ant-AI**, a genetic multi-agent framework built with CrewAI to optimize system prompts for low-parameter LLMs, reducing input prompt ambiguity by **70%** and fully automating prompt engineering.
  - Designed supervisory agents within crew environments capable of autonomously generating additional AI agents with function-calling capabilities, enabling tailored collaboration and integration of individual strengths toward collective tasks.
  - Engineered the **First Genetic Agent Framework** capable of generating and iteratively refining results through collaborative Synthesis and QA agents. Developed specialized Agentic Mutation and Crossover Crews that enhance adaptability and accuracy.
  - Designed and deployed virtual clones of real personalities using ELIZA, enabling autonomous control over social media platforms to expand online presence and automate lead generation for ICP interactions, increasing online engagement by **8x**.
- Took part in a project with **Nedge Computing** consisting of creating virtual cloud systems with divided vGPU access of Nvidia A16 GPUs.

DataInsight **May. 2023 – Sept. 2023**
Research Assistant

- Made contributions to the domain of Machine Learning, actively participating in a project valued at **$90,000**.
- As an RA at DataInsight, I leveraged Python, TensorFlow, and various image processing libraries to accomplish the following tasks:
  - Developed an Artificial Intelligence-driven yolo + image processing pipeline for the efficient recognition of handwritten and printed text, enhancing dataset acquisition speed **2.5x**.
  - Designed a TrOCR model leveraging Artificial Intelligence for accurate text detection within doctors' prescriptions with **84%** accuracy.

    - Engineered an algorithm to extract dataset for model training using encrypted data provided by preprocessing pipeline which connected the two pipelines automating the previously manual approach.
    - Orchestrated an end-to-end approach for text detection in images, providing structured data using DocParser and Donut.
    - Removed the need of OCRs, LMs and separate components lowering the computing power requirements by **50%** than that of the orthodox approach by applying a set of Transformers, Encoders and Decoders.
- Played a key role in a team that achieved a **10x** performance improvement in Machine Learning models through the integration of Artificial Intelligence techniques, significantly reducing computing power requirements.

Afiniti Software Solutions Private Limited **June. 2020 - Aug. 2020**

Project Trainee

- Engaged in software development activities, including the design and implementation of a Natural Language Processing **(NLP)** and **Speech to Text** system powered by Artificial Intelligence.
- Actively participated in client interactions, ensuring their requirements were met with AI-enhanced solutions.

Notable Projects:

Ascend v2: Enterprise Data Engineering Framework (04/2025) **Python, PySpark, PostgreSQL, MySQL**

- Modular data engineering framework with proprietary DNA signature technology for synthetic data generation preserving complex relationships. Migrated from monolithic to microservices architecture with 30+ services using Kafka, Docker, and FastAPI. Includes 13+ specialized modules for data curation.

Artisan Roofing: AI-Powered Aerial Analysis Platform (05/2024) **Python, Flask, YOLOv8, Open3D, QGIS**

- Professional roof measurement system integrating satellite imagery with LiDAR point cloud processing to automatically classify roof components and generate contractor-grade reports. Implements multi-stage geometric algorithms delivering comprehensive analysis in under a minute.

Ant-AI: Multi-Agent Prompt Optimization Framework (11/2024) **Python,CrewAI, Streamlit, Poetry**

- Framework for optimizing task prompts using multi-agent systems and genetic algorithms. Implements dynamic agent roles for iterative refinement, employing reasoning tools like Tree of Thoughts and structured prompt tagging for enhanced LLM input generation.

GenSynth: Adversarial Image-to-Image Translation (07/2024) **Python, PyTorch**

- Generative adversarial framework utilizing CycleGAN and Conditional GANs for bidirectional face sketch-to-image translation, ensuring high-precision synthesis through cycle-consistency and pixel-wise L1 loss.

NeuroCart: A Cognitive Shopping Fusion Framework for the Future (10/2023) **Python,Java,Kotlin,XML,Collab**

- Mobile application merging online and physical shopping experiences, enabling users to employ a trained YOLO model for real-time item detection using their device's camera.

Multi-Core Neural Network Operating System in C (05/2023) **C**

- A multi-core operating system to implement a neural network architecture using separate processes and threads, enabling efficient utilization of multiple cores for parallel processing.