

SYED MUHAMMAD KHIZER HAIDER

Software Engineer | AI/ML | Computer Vision | Full-Stack | Mobile (Flutter) | Edge AI | IoT

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Professional Summary

Versatile CS undergraduate at NUST (Class of 2027) and **Gold Medalist High Achiever** with production-grade experience across AI/ML, computer vision, full-stack web, and cross-platform mobile development. Sole engineer on a NUST-funded confidential drone-based aerial detection system — delivered end-to-end from dataset curation to a fully offline edge inference pipeline on NVIDIA Jetson. NASA Space Apps Challenge Winner 2025. Proven track record of shipping complex systems independently under research and commercial constraints.

Education

Bachelor of Computer Science | National University of Sciences & Technology (NUST) 2023 – 2027
Islamabad, Pakistan (7th Semester) *Gold Medalist — High Achiever Award 2025*

Technical Skills

- **AI / ML / Computer Vision:** Python | PyTorch | TensorFlow | YOLOv8 OBB | TensorRT | OpenCV | ONNX Runtime | TFLite | Hugging Face | PEFT | LoRA | QLoRA | DeepStream | MediaMTX
- **Full-Stack Web:** React | Next.js | Node.js | Express.js | Django | REST APIs | WebSocket | JavaScript | TypeScript | HTML5 | CSS3 | Bootstrap | Tailwind
- **Mobile & Edge:** Flutter | Dart | Kotlin | MediaCodec | TFLite Delegates | XNNPACK | Firebase | SQLite | NVIDIA Jetson Orin NX
- **Databases & DevOps:** PostgreSQL | MongoDB | SQLite | Neo4j | AWS | Azure | Docker | Git | Cloudinary
- **Embedded & Networking:** Arduino | Verilog | VHDL | RTMP | RTSP | TCP/IP | IoT Protocols

Experience

Research Assistant | NUST Funded Project (Computer Vision — Confidential) Feb 2026 – Present

- Sole engineer on a confidential aerial object detection system — full ownership from raw data collection to a production-deployed, fully offline edge pipeline on a **DJI Matrice 4** drone platform.
- Collected drone-captured imagery; performed **OBB annotation** for 7 domain-specific classes; resolved class imbalance via targeted re-collection and weighted sampling.
- Built a full **data preprocessing pipeline**: geometric augmentations (flips, rotation, perspective warp), photometric augmentations (HSV, mosaic, mixup), and resolution normalisation for altitude/lighting robustness.
- Trained **YOLOv8 OBB**; conducted ablation studies across resolutions, thresholds, and augmentation configs; reported mAP50, mAP50-95, and P/R curves to faculty supervisors.
- Exported model to **TensorRT FP16** on **NVIDIA Jetson Orin NX**; achieved 60–90 FPS GPU inference (~20× CPU baseline speedup).
- Architected a fully **offline real-time pipeline**: DJI Pilot 2 RTMP → MediaMTX → TensorRT → Flask/WebSocket annotated stream — zero internet dependency at any layer.
- Built **ground station** on Jetson acting as WiFi hotspot; RC pushes H264 over RTMP; Jetson serves annotated MJPEG + JSON telemetry to Android tablet over USB-C tethering.
- Fused live **GPS telemetry** (DJI MSDK serial, 10 Hz) per-frame with detections; results timestamped, geotagged, and persisted in **SQLite**.
- Engineered **Flutter mobile app** with native Kotlin plugin (MediaCodec HW decode, YUV→Bitmap), WebSocket client, offline tile maps, per-detection GPS pins, and SQLite detection log.
- Benchmarked **TFLite delegates** (CPU/GPU/NNAPI) across FP32/INT8; built dual inference backends (TFLite + ONNX Runtime with XNNPACK).

Software Engineer | NUST Flagship Project (Computer Vision — Confidential) Jan 2026 – Feb 2026

- Curated and cleaned real-world image datasets; designed augmentation pipelines for domain shift robustness.
- Fine-tuned **YOLOv8** on custom domain-specific object detection task.
- Quantised model to **float16** and deployed on-device via Flutter for real-time mobile inference.

Software Engineer Intern | UpSkillers (Remote) Sep 2024 – Mar 2025

- Delivered full-stack web features across multiple client projects within an agile remote team.

Network Engineer Intern | Quetta Safe City Project Jul 2024 – Sep 2024

- Optimised network efficiency and security within a large-scale government surveillance infrastructure.

Projects

Space Biology Knowledge Engine | NLP | React | Neo4j | RAG | Semantic Search



- Built an AI-powered research platform that transforms NASA space biology papers into a Neo4j knowledge graph and employs a RAG pipeline with vector embeddings for contextual scientific literature retrieval. **Winner — NASA Space Apps Challenge 2025.**

Exam Management System | React | Node.js | Express | SQLite | JWT



- Full-stack seating allocation system: automated multi-room scheduling, PDF invigilation pack generation, JWT-secured admin panel.

Healthcare Enterprises Website | Next.js | React | MongoDB



- Production client website: dynamic product catalogue, MongoDB backend, polished Next.js/React frontend.

CourseUp — Online Learning Platform | Flutter | Node.js | Express | MongoDB | Cloudinary



- Full-stack e-learning platform: Flutter mobile frontend with custom video streaming controls (media_kit)
- Node.js/Express REST API backend, MongoDB Atlas for persistence, and Cloudinary for media hosting.
- Implemented course browsing with category filtering, slug-based routing, thumbnail management with base64 handling, and a structured MVC backend architecture.

Family Tree Software | Python | MongoDB | PySide6 | Graphviz | C++

Feb 2025 – Present

- Desktop app supporting 5M+ individuals with graph-traversal search, zoom, and dynamic PDF export.

Network Intrusion Detection System | ML | Random Forest | LSTM

Nov 2024

- ML-based NIDS combining Random Forest and LSTM for superior network anomaly detection.

Achievements & Certifications

- **Gold Medalist — High Achiever Award, NUST (2025)** — Awarded for outstanding academic and extracurricular performance.
- **Winner** — NASA Space Apps Challenge (BUIITEMS, 2025): Space Biology Knowledge Engine.
- **Winner** — NUST CS Department Coding Competition (May 2024).
- **Qualified** — Regional Round, Ignite Digital Cybersecurity Hackathon (Nov 2024).
- **Certifications:** Deep Learning Specialization (Deeplearning.ai) · Generative AI with LLMs (AWS/Coursera) · Meta React Basic & Advanced · IBM Node.js & Express · IBM Python for Data Science · AI A-Z 2024 (Udemy) · *Enrolled:* NLP Specialization (Coursera)