

Ayaan Aatif

Robotics & Autonomous Systems Engineer | AI and Embedded Research

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Google Scholar: scholar.google.com/citations?user=ABC3PioAAAAJ

ABOUT ME

Electrical engineering undergraduate specialising in autonomous robotics, digital twins and embedded AI, with six published or accepted papers spanning swarm robotics, FPGA-based navigation, edge computer vision and IoT security. Research assistant at Pakistan's National Center of Artificial Intelligence and founder of two ventures. Seeking research and engineering internships in autonomous systems and applied machine learning.

WORK EXPERIENCE

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|----------------|---|
| 2026 – Present | Research Assistant
<i>National Center of Artificial Intelligence (NCAI) — Pakistan</i> <ul style="list-style-type: none">Investigate neural rendering and AI image enhancement using Gaussian splatting within the AI & Computer Vision research group.Develop digital twin systems for autonomous platforms: real-time physical-virtual synchronisation, semantic mapping and predictive analytics. |
| 2026 – Present | Research Collaborator
<i>RF Antenna & Electromagnetic Compatibility Testing Laboratory — Pakistan</i> <ul style="list-style-type: none">Integrate RF antenna subsystems into robotic platforms and support EMC testing for digital-twin-enabled communication systems. |
| 2026 – Present | Founder
<i>FormatIQ — Pakistan</i> <ul style="list-style-type: none">Built a research automation platform streamlining academic formatting for reports, theses, CVs and IEEE papers; own product direction, architecture and delivery. |
| 2026 | Robotics Intern
<i>Brain Swarm Robotics — Pakistan</i> <ul style="list-style-type: none">Developed navigation, perception and simulation workflows for a warehouse automation robot. |
| 2026 | Robotics Intern
<i>Aerial Robotics Laboratory — Pakistan</i> <ul style="list-style-type: none">Contributed to underwater robotic manipulator integration and autonomous robotic platform development. |
| 2025 – 2026 | Contract Research Assistant
<i>International Research Collaboration — Türkiye (remote)</i> <ul style="list-style-type: none">Supported development of an autonomous inspection drone platform for solar farm monitoring. |
| 2024 – Present | Founder & Technical Lead
<i>AyroX Labs — Pakistan</i> <ul style="list-style-type: none">Founded a robotics venture building intelligent drones, digital twins and AI-enabled inspection systems; lead research-to-product development across robotics, AI and cyber-physical systems. |
| Ongoing | Founder
<i>Scentimental — independent perfume brand — Pakistan</i> <ul style="list-style-type: none">Launched and grew an independent perfume brand, securing multiple sponsorships including recognition within NUST. |
| 2021 – Present | Freelance Engineer (Fiverr Level 2 Seller)
<i>Fiverr — Remote</i> |

- Deliver robotics, AI, embedded systems and software development projects for international clients; maintain a 5-star rating.

EDUCATION AND TRAINING

2024 – 2028
(expected)

BE Electrical Engineering

National University of Sciences and Technology (NUST) — Pakistan

- Focus areas: robotics, embedded systems and artificial intelligence.

ROS2 Professional Training Program

Professional certification

PUBLICATIONS

- M. Adnan, M. A. Chaudary, M. M. Ali, **H. A. Aatif**, M. I. Raza and H. A. Ramzan, "Fault-Tolerant Adaptive Routing in NoCs: Machine Learning Approaches for Resilient On-Chip Networks," *2025 International Conference on Artificial Intelligence, Computer, Data Sciences and Applications (ACDSA)*, Antalya, Türkiye, pp. 1–7, 2025, doi: 10.1109/ACDSA65407.2025.11165816.
- "A Hardware-in-the-Loop Multi-Sensor Fusion Framework for Low-Latency Autonomous Navigation on FPGA-Based Mobile Robots" — accepted, IEEE conference.
- "Decentralized Swarm Formation of Miniature Robots using the SCOPE Strategy" — accepted.
- "Robust Zero-Day Intrusion Prevention in IoT Networks Using Hybrid Machine Learning" — accepted.
- "LARD: Lightweight Attention-Augmented Real-Time Detection for Occlusion-Robust Pedestrian Recognition on Edge Hardware" — accepted.
- "Machine Learning Approaches for Network Intrusion Detection in IoT Environments," *GIKI International Conference, 2026* — accepted; presentation scheduled November 2026.

SELECTED PROJECTS

- **TwinVerse Inspect AI** — AI infrastructure inspection platform integrating drone, CCTV, robotic and smartphone data; defect detection, severity assessment, predictive maintenance analytics and digital twin visualisation. Regional winner, Alibaba Cloud AI Hackathon.
- **TwinVerse Digital Twin & Sim2Real Platforms** — real-time synchronised digital twin environment with semantic scene understanding, plus a ROS2 pipeline deploying robotic policies from simulation to real-world autonomous systems.

HONOURS AND AWARDS

- Regional Winner — Alibaba Cloud AI Hackathon (TwinVerse Inspect AI).
- Presenter — GIKI International Conference 2026.
- Participant — Indus Ras Expo Engineering Competition.

LANGUAGE SKILLS

Language	Listening	Reading	Spoken interaction	Spoken production	Writing
Urdu	Mother tongue	Mother tongue	Mother tongue	Mother tongue	Mother tongue
English	C1	C1	C1	C1	C1

Levels: A1/A2 basic user · B1/B2 independent user · C1/C2 proficient user (Common European Framework of Reference).

DIGITAL AND TECHNICAL SKILLS

Robotics: ROS2, Gazebo, Nav2, AMCL/NavFn/DWA, SLAM, autonomous navigation, drone control, Sim2Real transfer, swarm coordination, digital twin systems.

AI & machine learning: CNNs, supervised classification, scikit-learn, TensorFlow, CLIP, surrogate models, computer vision, Gaussian splatting.

Embedded & hardware: ESP32, Arduino, STM32, UART/SPI/I2C, real-time firmware, MQTT; FPGA (Verilog), PCB design, hardware-in-the-loop, multi-sensor fusion, RF antenna integration, EMC testing.

Programming: Python, C/C++, Java, Verilog-HDL, Assembly (CISC, RISC), JavaScript.

Design & tools: SolidWorks, AutoCAD, Blender, Proteus, LTspice, Git, Linux, PostgreSQL.