

MUHAMMAD HASSAN

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PROFESSIONAL SUMMARY

AI Engineer with hands-on experience across both hardware and software systems, spanning embedded electronics, robotics, IoT, and full-stack AI-driven applications. Skilled in building autonomous systems using Raspberry Pi, LiDAR, ROS, and computer vision, alongside developing production-grade backends, APIs, and automation workflows with Node.js, Python, and modern web frameworks. Proven track record delivering award-winning projects in robotics, GIS, and disaster-response technology, combining strong engineering fundamentals with practical software development to design end-to-end intelligent systems.

EDUCATION

Master of Engineering in Artificial Intelligence Engineering (Applied) <i>National University of Technology (NUTECH)</i>	2026 <i>Islamabad, Pakistan</i>
Bachelor of Engineering in Computer Engineering (Completed) <i>National University of Technology (NUTECH)</i>	2022 – 2026 <i>Islamabad, Pakistan</i>
Intermediate (Pre-Engineering) <i>Concept College of Sciences</i>	2019 – 2021 <i>Rawalpindi, Pakistan</i>

PROFESSIONAL EXPERIENCE

Research Assistant (Full-Time) | EU Centre of Excellence for Climate Action with ICT, NUTECH

Aug 2026 – Present | *Islamabad, Pakistan*

- Working on the HEC-funded NRPU project “IoT-Driven Monitoring and Tracking Framework for Healthcare Waste Management in Urban Hospitals”.
- Designing and deploying IoT hardware and firmware for real-time tracking, monitoring, and segregation of healthcare waste across urban hospitals.
- Developing the software stack, including a web dashboard for live waste tracking, analytics, and compliance reporting.
- Contributing to research activities and technical writing, including project documentation, technical reports, and publications.

AI Automation Engineer (Part-Time) | NemaxAI

July 2026 – Present | *Rawalpindi, Pakistan*

- Built omnichannel CRM integrations linking AI voice bots with WhatsApp, Instagram, and Facebook Messenger using n8n and Make.com.
- Automated cross-channel workflows to streamline client onboarding and voice-bot-to-CRM handoffs.

IoT Engineer (Full-Time) | Tech GIS Pvt Ltd

July 2025 – Feb 2026 | *Islamabad, Pakistan*

- Built and deployed a GPS-based boundary detection system for golf carts using Raspberry Pi, automatically stopping the cart if it moved outside the defined path.
- Developed a centralized GIS dashboard mapping administrative boundaries (tehsil, district, mouza, province) and infrastructure networks (cable, telephone, internet) across Pakistan with analytical insights.
- Automated data workflows using n8n to support real-time dashboard updates and reporting.

AI & Robotics (Intern) | National Engineering and Scientific Commission (NESCOM)

July 2025 – Sep 2025 | *Islamabad, Pakistan*

- Developed a LiDAR-based SLAM system using ROS for autonomous localization and mapping of an Unmanned Ground Vehicle (UGV).
- Integrated LiDAR and OAK-D depth camera for real-time perception, navigation, and obstacle detection in autonomous UGV operations.

Backend Developer (Part-Time) | Lancers Softwares Pvt Ltd

Dec 2024 – July 2025 | *Rawalpindi, Pakistan*

- Developed and maintained the backend for the Amanat App using Node.js, Express.js, and a MySQL database.
- Developed REST APIs, user authentication, and CORS configuration for secure and efficient integration.

PROJECTS

Automatic Fabric Inspection System (Final Year Project) | YOLOv26, PatchCore, Roboflow, FastAPI

- Developed a real-time AI-based fabric defect detection system for textile quality inspection.
- Used YOLOv26 and custom computer vision models for defect detection and classification, with automated image preprocessing, defect identification, and real-time inspection workflow integration.

Grabpic AI – Intelligent Identity & Retrieval Engine (Vyrothon 2026) | ResNet-50, Pinecone, YOLOv8

- Developed a backend system for large-scale event image retrieval during Vyrothon 2026 at NSTP, NUST.
- Built a Selfie-as-a-Key workflow using facial recognition and vector similarity matching for automatic identity assignment and image retrieval from event datasets.

RISC-V Processor Verification Hackathon (PSS 2026) | ACT4 Framework, RISC-V, Buggy-V

- Worked on ISA-level verification of the Buggy-V RISC-V processor core using the ACT4 compliance framework and Sail reference model.
- Performed bare-metal and assembly-level debugging, verified ISA compliance, analyzed signature mismatches, and reported architectural bugs through structured GitHub issue workflows.

Trash Segregation UGV (ICAT 2023 – Winner) | Raspberry Pi, Pi Camera, MobileNet, OAK-D

- Developed an autonomous trash segregation UGV for the ICAT Project at NUTECH.
- Used YOLOv8 and OAK-D for trash detection with a 5-DOF arm for sorting, integrating ESP32, Raspberry Pi, and ROS for real-time control.

Smart Point of Sale (POS) System | Django, MySQL, React

- Developed a full-stack Point of Sale and logistics management platform with a dashboard, AI assistant, and modular business workflows.
- Used MySQL for database design, Flask (Python) for REST APIs, and React (TypeScript, Vite, Tailwind) for a responsive dashboard, with modular UI and scalable backend integration.

ResQ Disaster Management Mobile App | React, Node.js, Bluetooth Mesh

- Developed a disaster preparedness and response mobile app for the NDMA Hackathon, securing 3rd position.
- Built with Flutter and Mapbox on the frontend and Node.js, Firebase, and Python on the backend, featuring real-time disaster alerts, AI risk analysis, offline Bluetooth mesh, SOS, and smartphone-based earthquake detection.

AI-Powered Upwork Job Scraper & Proposal Automation | n8n, Puppeteer, Node.js

- Built an end-to-end n8n workflow that scrapes Upwork job listings via a custom Puppeteer-based scraper API, bypassing Cloudflare bot detection to extract structured job data.
- Automated the full pipeline from job discovery to proposal generation and submission, streamlining the entire freelance bidding process.

NUTECH Weather Station Dashboard | MongoDB, Django, Weather Underground

- Resolved database, sensor, and server issues for a live weather monitoring dashboard serving two stations, and converted it into a desktop application.
- Migrated MongoDB Atlas cluster, restructured 500+ daily collections into weekly format, fixed broken external data sources (Wunderground, WAQI, PMD), and packaged the web dashboard as a standalone desktop app.

SKILLS

Frameworks: Frontend: React.js, Vue | Backend: Node.js, Express.js, FastAPI, Flask, Django

Databases: MySQL, PostgreSQL, Redis, MongoDB, Pinecone

Languages: Python, JavaScript, C++, HDL Verilog, Embedded C

AI/ML: Deep Learning (ANN, CNN, RNN, Transformers); NLP (Text Classification, Speech Recognition); Computer Vision (Image Classification, Face Recognition)

IoT & Embedded: Raspberry Pi, ESP32, Arduino, LiDAR, ROS, OAK-D, Sensor Integration, MQTT

Algorithms: Linear & Logistic Regression, K-Means, Random Forest, SVM, XGBoost, DBSCAN, PCA, LSTM, GRU