

# ARHAM AQEEL

Product Engineer | Full-Stack Developer | ML Engineer | Mechanical Engineer | Trichy, India  
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## EDUCATION

- **National Institute of Technology Tiruchirappalli** Aug 2022 – Present  
B.Tech in Mechanical Engineering | Coursework: Data Structures, Algorithms, Statistics, Finite Element Analysis, CFD, Fluid Mechanics, Engineering Design

## SKILLS

- **Languages:** Python, TypeScript, JavaScript, C++, SQL
- **Frontend & Backend:** Next.js, React, Tailwind CSS, Firebase, Firestore, Supabase, REST APIs, Node.js
- **AI / ML:** TensorFlow, scikit-learn, XGBoost, FAISS, Gradio, Ollama, SMOTE, NLP, RAG, Collaborative Filtering, PCA, K-Means
- **DevOps & Infra:** Docker, Vercel, Netlify, Cloudflare Tunnel, Git, Zapier, Google Sheets API, Meta Ads API, Linux
- **Engineering CAD / FEA:** PTC Creo, SolidWorks, Fusion 360, ANSYS, CFD, Topology Optimisation
- **Hardware / Embedded:** ESP32, Arduino, SCD30 sensors, PIV data processing, Sensor calibration (Licor, Testo)

## PROFESSIONAL EXPERIENCE

- **Research Intern — Fluid Dynamics Lab (FE2B), IIT Delhi** May 2025 – Jul 2025
  - Engineered custom Python data pipelines to post-process Particle Image Velocimetry (PIV) data, extracting velocity and vorticity field maps across 500+ experimental frames.
  - Designed and optimized an experimental setup for fluid energy extraction from autorotating flat plates, managing rigorous calibration across multi-day testing cycles.
  - Analyzed complex fluid behaviors and contributed to lab research documentation on energy extraction efficiency at varying angles of attack and flow velocities.
- **Digital Marketing Intern, Blink Digital, Mumbai** Mar 2025 – May 2025
  - Managed paid acquisition campaigns on Meta Ads and Google Ads for 3 e-commerce clients, owning A/B testing and daily budget pacing to systematically optimize ROAS.
  - Engineered multiple Zapier automation pipelines integrating lead forms, Google Sheets, and email follow-ups, successfully eliminating 8+ hours/week of manual data entry.
  - Developed robust Python scripts using API integrations for automated campaign reporting, reducing dashboard generation turnaround from 2 days to under 2 hours.
  - Identified funnel drop-off patterns from web analytics and proposed landing page architecture changes to drive significant improvements in lead-to-conversion rates.
- **Research Intern — Interdisciplinary Sensing Group, IIT Delhi** May 2024 – Jul 2024
  - Engineered a real-time IoT air quality monitoring device using ESP32 microcontrollers and SCD30 sensors, handling end-to-end hardware assembly and firmware programming.
  - Calibrated the low-cost sensor network against high-end Licor and Testo lab-grade references across multiple environmental conditions to ensure uncompromising data validity.
  - Developed comprehensive Python Jupyter notebooks to parse time-series sensor data, analyzing complex multi-channel pollution patterns for an interdisciplinary research symposium.

## PROJECTS

- **Self-Hosted AI Workstation & LLM Infrastructure** Mar 2026
  - Architected and deployed a self-hosted AI environment running 10+ open-source LLMs locally on an NVIDIA RTX 4060, achieving 40+ tokens/sec inference at **\$0/month** recurring cost.
  - Unified local models and cloud APIs (Groq, OpenRouter) into a single Open WebUI frontend, dynamically optimizing API routing for cost and enterprise-grade latency.
  - Configured Cloudflare Tunnels for secure public exposure with HTTPS, implementing custom guest access controls and rigorous zero-trust authentication protocols.
  - Automated the entire full-stack startup sequence using a custom .bat script, drastically streamlining model loading and network tunneling workflows.
- **ThriftX — Full-Stack P2P Thrift Marketplace** Jan–Mar 2026
  - Solo-developed an end-to-end peer-to-peer e-commerce marketplace utilizing Next.js, React, and Tailwind CSS for a highly responsive, mobile-first frontend experience.
  - Engineered a scalable backend architecture with Firebase Auth for secure session management and Firestore for real-time NoSQL data modeling across thousands of dynamic listings.
  - Designed comprehensive seller onboarding workflows, product listing quality standards, and automated image optimization pipelines to ensure aesthetic consistency.
  - Implemented a robust dispute handling system and order tracking mechanisms from scratch to maintain marketplace trust and highly reliable peer-to-peer transactions.
- **VivaVoce — AI Professor (EdTech Product)** Mar 2026
  - Developed an AI-powered oral exam simulator using the NVIDIA API and Llama 3 to help engineering students prepare rigorously for academic and technical vivas.

- Implemented dynamic prompt engineering to manage customized subject/topic selection, adaptive difficulty scaling, and complex adversarial questioning flows.
- Built a scoring mechanism that evaluates user answers for technical accuracy and confidence, providing detailed end-of-session feedback metrics to guide student improvement.
- **AI Book Recommendation Engine** Feb 2026
  - Built a hybrid multi-model recommendation system combining Collaborative Filtering, SVD Matrix Factorisation, Neural NCF, and FAISS NLP semantic search, trained on 7M+ user ratings.
  - Engineered the vector search pipeline using Sentence-Transformers to map complex book synopses into high-dimensional embeddings for exceptionally accurate retrieval.
  - Deployed the underlying models via a live Gradio web application, enabling real-time personalized inferences and allowing users to perform side-by-side multi-model query comparisons.
- **Telecom Churn Analysis — Full ML Pipeline** Jan 2026
  - Developed an end-to-end machine learning pipeline utilizing Python to predict customer churn and identify core attrition drivers on a dataset of 15,000 Indian telecom customers.
  - Trained and exhaustively hyperparameter-tuned a soft-voting ensemble model (Gradient Boosting, Random Forest, Logistic Regression) to achieve an AUC of 0.76.
  - Segmented high-risk customer personas using K-Means clustering and PCA dimensionality reduction, explicitly flagging an estimated **Rs. 4.77 Crore** in annual revenue at risk.
  - Deployed an automated HTML reporting dashboard using Pandas and Matplotlib to consolidate model outputs and deliver highly actionable business insights to stakeholders.
- **Arangam — Artisan Marketplace (Early Stage Startup)** 2025
  - Spearheaded deep market validation for an artisan-to-consumer gifting platform, specifically aiming to bridge the distribution gap between rural craftsmen and high-intent urban buyers.
  - Conducted extensive qualitative user research, executing 50+ on-ground field interviews with cooperatives across Tamil Nadu and conducting consumer product testing in Bangalore.
  - Synthesized unstructured qualitative research data to formulate a precise Go-To-Market strategy and successfully pitched the Next.js/Supabase MVP to the Rockfort Venture Club.
- **Oil Spill Remediation Using Human Hair Biosorbents** 2025
  - Designed advanced adsorption experiments across vegetable oil, crude oil, and diesel; successfully demonstrated **>90% volumetric oil uptake within 5 minutes** of exposure.
  - Proposed human hair waste as a highly biodegradable, low-cost alternative to traditional synthetic sorbents; meticulously documented methodology and empirical results for academic submission.

## LEADERSHIP & ENGINEERING

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- **Brakes Subsystem Lead & Chief Design Engineer, PSI Racing — NIT Trichy** Jan 2023 – Jan 2025
  - Led a 17-member cross-functional engineering team, managing comprehensive product roadmaps, cross-departmental resource allocation, and strict delivery timelines for national BAJA SAEINDIA competitions.
  - Designed robust pedal assemblies, brake caliper mounts, and wheel hubs for a 4WD off-road ATV; successfully achieved a 20% unsprung weight reduction via ANSYS structural topology optimisation.
  - Pioneered NIT Trichy's first-ever regenerative braking system on the EBAJA electric ATV, actively reducing peak mechanical rotor temperatures by 15% via CFD thermal simulation analysis.
  - Secured **AIR-2 nationally** at BAJA SAEINDIA 2024 (MBAJA 4WD) and **AIR-8 overall** at BAJA SAEINDIA 2025 (EBAJA Electric), successfully leading the team to multiple podium finishes.
- **Audio Visuals Director, Festember — NIT Trichy Cultural Festival** Jan 2023 – Oct 2024
  - Directed end-to-end AV production for India's largest student-run cultural festival, accommodating 10,000+ attendees across 3 days and seamlessly executing over 50 individual large-scale events.
  - Managed a dedicated 15+ member internal crew and successfully negotiated 5+ external vendor contracts; oversaw all sound systems, stage lighting rigs, and professional live streaming operations.

## EXTRACURRICULAR INITIATIVES

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- **TEDxNITTrichy:** Developed data-driven social media content strategies that increased platform engagement by 40%; curated corporate sponsorship outreach yielding critical event funding.
- **Anime Society Lead:** Organised massive campus-wide screenings and discussion events; radically expanded membership demographics and drove continuous student community engagement.
- **STEM Outreach:** Coordinated interactive science and technology demonstration sessions specifically designed for local school children as part of NIT Trichy's broader educational community programmes.
- **Continuous Learning:** Passionate self-taught developer; maintains a rigorous personal knowledge base spanning advanced software engineering, generative AI/ML frameworks, start-ups, and business modelling.

## ACHIEVEMENTS

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- **AIR-2 Nationally** — BAJA SAEINDIA 2024 (MBAJA 4WD) among 100+ competing university teams
- **AIR-8 Overall, AIR-2 Rookie Teams** — BAJA SAEINDIA 2025 (EBAJA Electric ATV)
- Secured two consecutive, highly competitive summer research internships at IIT Delhi (2024 and 2025)
- Rockfort Venture Club — Selected to formally present the Arangam artisan startup concept to a live investor panel
- Festember AV Director — Successfully produced the technical foundation for India's largest student-run cultural festival