

MUHAMMAD AHMAD

Full-Stack Software Engineer, Backend and AI Systems

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SUMMARY

Software engineer with five years of hands-on experience, three of them full time building distributed Node.js and TypeScript backends for property marketplaces serving 40M+ monthly users, and the AI layer above them: agentic delivery pipelines, MCP gateways and production retrieval systems. Now a Forward Deployed Engineer at UnternehmerTUM's Venture Lab in Munich and an M.Sc. candidate at TU Ilmenau.

PROFESSIONAL EXPERIENCE

UnternehmerTUM, Venture Lab

Aug 2026 – Present
Munich, Germany

Forward Deployed Engineer II, Intelligence

- Embedded in Venture Lab product teams, carrying AI use cases from concept to deployed internal product on multi-day cycles.
- Building an AI use-case validation application for the lab's ventures, with compliance tooling that checks work against internal AI policy and EU AI Act risk criteria.
- Shipping production LLM pipelines rather than notebooks: RAG over internal corpora on the Claude API, wired into live Supabase and Salesforce data, alongside internal applications consolidating scattered organisation-wide processes.

NestJS · Node.js · Next.js · Python · Claude API · RAG · Supabase · Salesforce

DubizzleLabs, Propforce, Zameen.com and Bayut.sa (40M+ monthly users)

Jul 2023 – Jul 2026
Lahore, Pakistan

Senior Software Engineer, Backend

- Designed and led AVA, an internal AI copilot and autonomous delivery pipeline used across multiple Dubizzle products: a chat request becomes clarified requirements, LLM-drafted wireframes, a Jira ticket, and a branch of generated code and tests opened as a pull request under review. Cut PR prep from ~40 minutes to ~6 (85%).
- Designed the production workflow behind Zara AI, an autonomous calling agent: campaign orchestration, call-state branching, transcript analysis, CRM tasks and WhatsApp follow-through across Propforce and Jarvis, with an enable/disable control the business team ran without a deployment. 10+ campaigns in three markets, 25,000+ clients targeted each.
- Architected a Model Context Protocol gateway exposing internal microservice APIs to LLM agents as typed, permissioned tools, with dynamic schema generation, per-caller rate limiting and full invocation logging. Cut manual developer lookups ~30% and replaced blanket database access with a reviewable capability surface.
- Cut core query latency 45% by reshaping MySQL and PostgreSQL schemas around real access patterns, adding indexes the planner was missing and removing N+1 fan-out from hot read paths, buying growth headroom on existing infrastructure.
- Shipped an end-to-end mortgage product covering application through approval, adopted by 5,000+ active clients, and built a RAG knowledge base over architecture decision records that gave engineers sourced answers during onboarding without interrupting senior staff.

Node.js · TypeScript · NestJS · Next.js · PostgreSQL · MySQL · Redis · OpenSearch · AWS · Docker · Claude API · MCP · LangChain

Beacon Secure, UK security-technology startup (remote)

Jan 2024 – Jan 2025
United Kingdom

Software Engineer, Backend (contract, part-time)

- Built the complete backend from scratch in NestJS, TypeScript and MongoDB for an acquired product line; the secure REST API patterns became the team's template for new services.

NestJS · TypeScript · MongoDB · REST APIs

Stacks Pakistan (Bitcoin L2 ecosystem, New York based), Community Lead and Blockchain Developer Lead, remote

Mar 2021 – Jan 2024

- Wrote and published Clarity smart contracts on Stacks, and led the developer chapter in Pakistan through hackathons, bootcamps and mentoring, training 89 students in Web3 and backend engineering; 22 went on to international software roles.

Educative.io, Technical Content Engineer, Answers (internship), Lahore, Pakistan (on-site)

Jun 2022 – Aug 2022

- Authored 35+ technical answers across computer networking, data structures and operating systems and peer-reviewed 40 to 60 written by other interns; received 3 Best Answer awards.

SELECTED PROJECTS

ask-ahmad, retrieval-grounded digital twin [live](#)

2026

- Answers questions about my work using only published material, with a persistent AI-twin label and refusal when no source supports an answer.
- Replaced fixed-window chunking with structure-aware chunking, one chunk per job, project or case-study section prefixed with its own title, after size-based splitting lost employer attribution. Deterministic source:ref:index ids make re-ingestion an upsert rather than a duplicate corpus.

Next.js · TypeScript · Supabase pgvector · Gemini embeddings · Groq · Vercel

rag-integrity-guard, retrieval-integrity layer [live](#)

2026

- Every RAG chunk is fingerprinted at ingestion and re-verified at query time, so a poisoned or tampered chunk is caught before it reaches the model rather than trusted by default. 100% true-positive and 0% false-positive detection across three attack types on a 500-pair public benchmark, at 2.73 ms added latency per query.

Python · LangChain · FastAPI · pytest

Career OS, career-operations console [live](#)

2026

- Runs three parallel job searches from one evidence-backed profile, pairing a deterministic 11-factor scorer with a fabrication-guarded LLM second opinion so no claim reaches an application unsourced. 645+ tests cover the scorer and guard paths.

Next.js 16 · TypeScript · Drizzle ORM · PostgreSQL · multi-provider LLM router

Data-Integrity Layer for LangChain QnA Systems

2024 – Present

Independent research with two PhD researchers, University of Verona

- Blockchain-anchored Merkle fingerprints over a retrieval corpus, re-verified at inference time, so tampering with source documents is detected before a poisoned answer is served. Paper in progress.

LangChain · Python · Merkle Proofs · Smart Contracts · IPFS

EDUCATION

M.Sc. Computer and System Engineering, Technische Universität Ilmenau

Mar 2026 – Oct 2028 (expected)

Focus on distributed systems, AI integration and data integrity for LLM pipelines.

B.Sc. Computer Science, FAST National University of Computer and Emerging Sciences

Aug 2019 – Sep 2023

Dean's Honour Roll for multiple semesters (SGPA 3.5+). Ranked 7th nationally in the NU admission test. Lahore, Pakistan.

Leadership: Aspire Leaders Program, Aspire Institute (incubated at Harvard University), 2023. · Community Evangelist, Algorand UK, Jun 2022 – Mar 2024, grew regional developer chapters.

TECHNICAL SKILLS

Languages	TypeScript · JavaScript · Python · Go · C++ · SQL · Solidity
Backend & Web	Node.js · NestJS · Express · REST · GraphQL · Microservices · Distributed Systems · Background Workers · RBAC and Authentication · API Design · React · Next.js (App Router)
AI and LLM	Retrieval-Augmented Generation (RAG) · Model Context Protocol (MCP) · Agentic Pipelines · LangChain · Embeddings · Vector Search · pgvector · Prompt Engineering · LLM Evaluation and Guardrails · Claude, OpenAI, Gemini and Groq APIs
Data	PostgreSQL · MySQL · MongoDB · Redis · Supabase · Sequelize · Drizzle ORM · Query Optimization · Indexing · Schema Design
Infrastructure	AWS · Docker · GitHub Actions · CI/CD · Vercel · Observability (Logging, Metrics, Tracing) · Git
Practices	System Design · Code Review · Unit and Integration Testing · Agile/Scrum · Technical Writing · Mentoring