

Abu Bakar

Software Engineer

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EDUCATION

Namal University Mianwali

Bachelor of Science in Computer Science

Mianwali, Pakistan

Oct. 2022 – July. 2026

- Relevant Coursework: Data Structures and Algorithms, Software Engineering, Database Systems, Artificial Intelligence, Machine Learning, Cloud Computing, and Web Application Development.

EXPERIENCE

Machine Learning Fellow

Bytewise Limited

July 2024 – Sep. 2024

Remote

- Trained and evaluated 12+ ML algorithms across 5 end-to-end projects and deployed 3 model-serving web applications (Flask, Streamlit) during an intensive 18-module fellowship.
- Engineered a neural network from scratch in NumPy (forward/backpropagation, gradient descent), verifying core mathematical and algorithmic foundations beyond framework abstraction.

PROJECTS

SudhaarAI

Oct. 2025 – May. 2026

- Architected a full-stack platform with 30+ REST endpoints, orchestration, a RAG pipeline, and a 5-provider LLM abstraction with automatic failover.
- Implemented Clerk JWT/JWKS RS256 authentication, three-tier role resolution, per-endpoint rate limiting, and hardened development-bypass guards preventing privilege escalation in non-production environments.
- Engineered an automated test suite (pytest, Hypothesis property-based testing, performance regression baselines) integrated into GitHub Actions CI/CD; containerized with Docker Compose (4 services) for Azure deployment.

Certea

2025

- Engineered a FastAPI service-layer architecture: **KeyManager** (RSA key generation, AES-256 at-rest encryption), **SignatureService** (PKCS#1 v1.5/PSS padding abstraction), and **CertificateAuthority** (X.509 verification).
- Hardened the API with a 404-line validation module, per-endpoint rate limiting, concurrent-request semaphores, hourly operation caps, and audit-trail logging for non-repudiation.
- Delivered a test automated test suite using pytest-xdist parallelization, pytest-asyncio, and freezegun-mocked expiry, securing 100% pass rates across concurrency, edge cases, and cryptographic validation.

Rumi House Hub

2026

- Delivered a MERN platform with 7 Mongoose models, 5 REST route modules, and layered middleware (Helmet → CORS → rate limit → JWT → role gate → object-level policy → error handler).
- Implemented a three-layer authorization system with HS256-pinned JWT verification (preventing algorithm confusion attacks), role-based middleware, and relationship-aware policy predicates.
- Authored automated tests across backend and frontend, including dedicated unit tests for authorization policies, with complete OpenAPI/Swagger specifications and schema documentation.

TECHNICAL SKILLS

Languages: Python, TypeScript, JavaScript, SQL

Frontend & Backend: Next.js, React, Node.js, Express, Flask, FastAPI, Tailwind CSS, REST APIs

Databases & ORM: PostgreSQL, MongoDB/Mongoose, ChromaDB, Prisma, Firebase Firestore, Redis

Testing & QA: pytest, Hypothesis Property-Based Testing, pytest-xdist, Vitest, CI/CD Gates

DevOps & Systems: Docker, Azure, GitHub Actions CI/CD, Git, Linux, System Design

HONORS & CERTIFICATIONS

Certifications: Machine Learning Fellowship (Bytewise), DeepLearning.AI (AI for Everyone), AI Seekho 25/26

Honors & Leadership: Beta Microsoft Learn Student Ambassador (MLSA), 2nd Runner-Up Agri Fusion 2025, Hacktoberfest 2024 Contributor