Alaa Badawii

Software & AI Engineer | Agentic Systems | RAG | Python Backend Engineering

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SUMMARY

Software & AI Engineer focused on building reliable AI-powered applications and end-to-end software systems using Python. Experienced in developing RAG pipelines, LLM-powered workflows, and agentic systems, supported by strong backend engineering foundations in API development, database architecture, authentication, and transaction management. Demonstrates hands-on experience in technical leadership, system integration, evaluation, automated testing, and building reliable solutions with measurable results.

TECHNICAL SKILLS

AI Engineering & RAG
RAG Pipelines · LLM Applications · Prompt Engineering · Embeddings · Dense Retrieval · BM25 · Hybrid Retrieval · Reciprocal Rank Fusion (RRF) · Cross-Encoder Reranking · Vector Databases · Chroma · LLM Integration · Structured Outputs · Citation Validation

Agentic Systems & Automation
AI Agents · Multi-Agent Systems · Tool Calling · Agent Memory · ReAct · Reflection · Stateful Workflows · Conditional Routing · Agentic RAG · Workflow Automation · LangChain · LangGraph · CrewAI · n8n

Backend Engineering
Python · SQL · FastAPI · Flask · RESTful APIs · SQLAlchemy · SQLModel · Pydantic · Authentication · JWT · RBAC · Dependency Injection · Async Programming · API Integration · Database Design · Transactions · Concurrency · Idempotency

Reliability, Evaluation & Infrastructure
pytest · Unit Testing · Integration Testing · API Testing · Retrieval Evaluation · Precision@K · MRR · Recall · Answer Correctness · Groundedness Evaluation · LLM-as-a-Judge · Deterministic Validation · Error Handling · MySQL · PostgreSQL (Fundamentals) · MongoDB · SQLite · Redis · Docker · Docker Compose · Linux · Bash · Git · GitHub · Postman

PROJECTS

Team Lead — Grounded RAG over NICE NG217

https://github.com/AlaaBadawii/grounded-rag-ng217

- Built an end-to-end clinical RAG system combining dense retrieval and BM25 via RRF, cross-encoder reranking, and LLM generation.
- Developed the FastAPI backend, exposing retrieval and generation workflows through REST APIs, and containerized the application using Docker.
- Evaluated retrieval and generation quality, achieving **85% P@1**, **87.9% MRR,** and **100% candidate recall**, with **75% answer correctness, 100% grounded responses,** and **130/130 citations traceable** to retrieved evidence.

LinkedIn Personal Branding Agent — AI Content & Publishing Automation

https://github.com/AlaaBadawii/PersonalBrandingAgent

- Built a scheduled AI workflow for grounded LinkedIn content generation and publishing using RAG, LLM reasoning, and validation.
- Implemented a Chroma knowledge base and SQLite-backed state management for content history, duplicate prevention, and controlled publishing.
- Integrated LinkedIn publishing with safeguards, error handling, and notifications for reliable automated execution.

Quizey — AI-First Assessment & Training Platform (In Progress)

https://github.com/AlaaBadawii/quizey-platform

- Developing an AI-first assessment and training platform designed to support personalized learning and measurable skill improvement.
- Engineered a modular Python API with RBAC, JWT authentication, copy-on-write versioning, immutable exams, and configurable workflows.
- Built concurrency-safe grading and one-time submission using database-backed idempotency, atomic transactions, and frozen attempt papers.
- Implemented Redis-backed JWT revocation with expiration-aware TTLs and fail-closed behavior during cache failures.
- Backed by 1,100+ automated tests covering authentication, authorization, concurrency, data integrity, and MySQL migration.

EXPERIENCE

Team Lead (Team of 5) — Hackathon Project

Banha, Egypt

Creativa AI Hackathon

Aug 2026 - Aug 2026

Led a 5-person team during a 40+ hour hackathon, coordinating backend, data, and frontend development of a clinical RAG system for NICE NG217.

- Coordinated technical delivery and retrieval improvements, contributing to an 85% Precision@1 result.

Backend Engineering Trainee

Remote

alx

Aug 2023 - Sep 2024

Completed ALX's Software Engineering programme, progressing through Foundations and Backend specialization.

- Developed backend applications using Python, Flask, SQLAlchemy, MySQL, REST APIs, authentication, caching, and automated testing.
- Applied software engineering practices in database design, Git, Linux, debugging, and application architecture through project-based learning.

EDUCATION

B.S. in Management Information Systems | Modern Academy — Oct 2019 - Jul 2023

CERTIFICATIONS & TRAINING

IBM RAG and Agentic AI Professional Certificate (In Progress)
IBM | Coursera • 7 of 10 courses completed · Expected Nov 2026

Agentic AI with LangChain and LangGraph
IBM | Coursera • Oct 2026

Practical DevOps Bootcamp for All Specialization
Packt | Coursera • Sep 2026

AI Agents and Agentic AI with Python & Generative AI
Vanderbilt | Coursera • Jul 2026

System Design and Architecture
Manara • Mar 2026

ALX Africa — Certified Backend Software Engineer
ALX Africa • Aug 2023 – Sep 2024

LANGUAGES

Arabic (Native)

English (Professional Working Proficiency)