

Mohamed Khalil Brik

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Summary

AI Engineer with production experience building LLM systems, RAG pipelines, and ML solutions across finance, legal, and enterprise domains. Founded an AI startup delivering **3 enterprise-grade AI agents** to Egyptian companies. Author of accepted IEEE conference papers in quantum-classical optimization. M.Sc. student (Erasmus Mundus, UniGe/UTC) specializing in advanced ML and optimization. Seeking fully remote AI engineering roles within Europe.

Technical Skills

LLM Engineering: LangChain, LlamaIndex, OpenAI API (GPT-4), LLaMA (inference, fine-tuning), Hugging Face Transformers, LoRA/PEFT, RAG Architectures, embedding pipelines, retrieval evaluation, tool calling, multi-agent systems

Vector Databases: ChromaDB, FAISS, semantic search

Machine Learning: PyTorch, TensorFlow, Scikit-Learn, Whisper (ASR fine-tuning), NLP, Computer Vision, model evaluation

Backend & Deployment: Python, SQL, FastAPI, Django, Flask, REST APIs, Docker, AWS (production), Linux, Git

Research & Specialized: Quantum Computing (D-Wave, QUBO, QAOA, Qiskit), ETL Pipelines, Pandas, NumPy

Additional: C++, JavaScript, R, Beautiful Soup

Languages: Arabic (Native), English (TOEFL 106/120 — C1), French (B2), German (A2), Italian (A1)

Professional Experience

Co-Founder & AI Engineer — The AI Company | *Remote* Feb 2026 – Aug 2026

- Built and deployed **3 production AI agents** for Egyptian SMEs using LangChain, LLaMA, ChromaDB, and FastAPI, containerized with Docker and served via REST APIs, reaching **500+ end users** across client organizations
- Accounting Document Agent:** RAG pipeline over chunked financial documents (invoices, ledgers, bank statements) indexed in ChromaDB, with custom NER for structured field extraction; reduced manual reconciliation time by **70%**, processing **1,000+ documents/month**
- Job Application Review Agent:** Hugging Face sentence-transformer embeddings with cosine similarity matching against JD vectors, LLM-powered shortlisting and bias-aware scoring via LangChain; cut screening time by **65%** across **300+ applications per hiring cycle**
- HR Management Agent:** Multi-turn conversational agent with RAG over chunked policy documents, confidence-threshold fallback to human escalation, tool-use for leave and onboarding workflows integrated via REST APIs; reduced HR response time by **50%**

ML & Data Engineering Intern — Ernst & Young (EY), Technology Practice | *Tunis, Tunisia* Jul 2025 – Aug 2025

- Built ML-powered **vendor recommendation system** in Python using SQL databases and predictive modeling, delivering technology selection insights that directly informed a **\$500K AI platform investment**
- Conducted Python-based market analysis for a financial services client, identifying **3 strategic growth opportunities** worth **\$1M+** in potential revenue
- Performed technical due diligence on M&A transaction, analyzing system architectures, data infrastructure, and technical debt to support C-suite strategic decision-making

AI/Information Security Engineering Intern — Abu Dhabi Islamic Bank (ADIB) | *Cairo, Egypt* Jul 2024 – Aug 2024

- Built **NLP-based data leakage detection system** using TF-IDF and SVM to monitor employee email communications, achieving **~72% classification accuracy** with real-time threat detection across **5,000+ user** infrastructure
- Engineered **Django automation system** for Identity Access Management, increasing operational efficiency by **60%** and reducing process errors by **40%**
- Built web scraping pipeline aggregating **700,000 malicious IP addresses** from threat intelligence sources into enterprise security infrastructure

NLP Engineering Intern — DiaspÜra (Immigration Tech Startup) | *Remote (France)* Jan 2024 – Jun 2024

- Designed, built, and **deployed production RAG chatbot on AWS** using **LLaMA** with a retrieval layer over scraped government immigration sources, serving **1,000+ active users** — system remains live
- Achieved **20% improvement in answer accuracy** through automated web scraping pipeline aggregating real-time data from official immigration portals into a vector-indexed knowledge base
- Built multi-turn conversation flow logic with backend API integrations for complex legal and documentation topics

Research & ML Projects

Quantum-Classical Hybrid Optimization — Bachelor's Thesis (IEEE QCNC 2026)

Jun 2025 – Jun 2026

Supervised by Prof. Moustafa Youssef | The American University in Cairo

- Formulated WiFi Access Point selection as a **QUBO problem** for indoor localization, processing **520 APs** across **19,937 fingerprints** spanning 5 floors and 3 buildings
- Achieved **90.4% feature space reduction** while maintaining positioning accuracy, optimizing for resource-constrained edge device deployment
- Benchmarked **D-Wave quantum hardware** vs. classical algorithms for NP-hard combinatorial optimization

Emergency Response LLM System — The American University in Cairo | Cairo, Egypt

Aug 2024 – Dec 2024

Presented at NCUR 2025

- Built end-to-end LLM pipeline (GPT-4, **Whisper fine-tuned via LoRA** on 911 call domain, NER) to classify emergency calls, extracting addresses (**76.5% field-level accuracy**) and caller info (**48.3% field-level accuracy**) from a **dataset of 518 calls**
- Integrated voice-based sentiment analysis for real-time stress detection; improved dispatch response efficiency by **25%**

Fairness-Aware Healthcare ML — Data Mining Lab, College of Charleston | USA

May 2025 – Jul 2025

- Engineered ML pipeline (SVM, Random Forest, DNNs) on **NIH All of Us dataset** to detect algorithmic bias across demographic groups in healthcare predictions
- Designed custom fairness metrics combining statistical and demographic parity, improving bias quantification by **17%**; demonstrated **15% higher fairness consistency** in regularized deep learning vs. classical models

LLM-Assisted Feedback Clustering — College of Charleston | USA

Jan 2025 – May 2025

- Built GPT-4 few-shot semantic clustering framework analyzing **2,000+ student feedback entries**, improving peer assessment coherence by **28%**
- Validated GPT-human clustering agreement using ARI and silhouette scores; proposed transformer embedding-based recommender for adaptive assessment

Education

M.Sc. Computer Engineering — Erasmus Mundus EMSSE | Italy / France

Sep 2026 – Aug 2028

University of Genova & Université de Technologie de Compiègne | Advanced Machine Learning and Optimisation of Systems

- Dual-degree joint programme | Second year at Heudiasyc Laboratory, UTC — focus on optimization under uncertainty and autonomous systems

B.Sc. Computer Science | Cairo, Egypt

Sep 2022 – Jun 2026

The American University in Cairo

- **GPA: 3.7/4.0** | Dean's List every semester (Top 5%)
- Coursework: Machine Learning, Deep Learning, NLP, Computer Vision, Quantum Computing, Data Mining, Algorithms

Semester Abroad | Charleston, SC, USA

Jan 2025 – May 2025

College of Charleston

- **GPA: 3.9/4.0** | Focus: Advanced ML, Large Language Models, Computer Vision, Data Mining

Publications

- **[1]** M.K. Brik, A. Shokry, M. Youssef. "Quantum Optimization for Access Point Selection Under Budget Constraint." **Accepted, IEEE QCNC 2026** — First Author
- **[2]** M.K. Brik. "Orbital Intelligence: Sustainable LLM Training in Space." **Accepted, IEEE ICGHIT 2026**
- **[3]** M.K. Brik. "Using LLMs to Enhance Emergency Response Systems." Presented at **NCUR 2025**, Pittsburgh, PA

Leadership & Awards

- **Tomorrow's Leaders Scholar — U.S. Department of State** (2022–2026): Competitively selected from **1,000+ Tunisian applicants** for full undergraduate scholarship
- **NASA ATLAS Mission Architecture Competition** (2025): **1st place** among 5 proposals, presented to 20+ senior NASA scientists; led 10-person team designing **\$2B+ Saturn exploration mission simulation**
- **Chair of Academics — CS Association, AUC** (2024–2025): Delivered 5 technical workshops on AI and Quantum Computing to **150+ students**
- **Technology Instructor — 3aIRaseef Club** (2023–2024): Weekly coding and digital literacy classes to **50+ underprivileged youth**