Mohamed Abdalkader

AI Engineer

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Professional Summary

AI Engineer with 1+ year building production ML systems for medical imaging and NLP. Delivered 240% accuracy gains via LoRA fine-tuning and multi-agent architectures. Deployed RAG pipelines indexing 50+ medical textbooks with sub-second retrieval. Reduced model memory by 59% through quantization. Secured $3,450 in competitive grants from ITAC and ASRT. Shipped 8 production ML projects with Docker and cloud deployment.

Experience

Freelance AI Engineer **May 2025 – Feb 2026**
Deep Learning, Computer Vision, NLP, Medical AI, MLOps *Remote*

- Fine-tuned Qwen 2.5 7B VLM with LoRA rank-32 on 35,000 retinal images for diabetic retinopathy diagnosis.
- Boosted retinopathy detection 20% → 68% (+240%) and edema 87% → 94%, cutting diagnosis time by 75%.
- Built multi-agent pipeline (2 CNNs + RBF-SVM) raising BLEU from 0.01 to 0.26 (26x gain).
- Deployed RAG system indexing 20+ textbooks via FAISS (0.3s latency) with Flask API in Docker.
- Reduced inference memory 17GB → 7GB (-59%) via 4-bit quantization with no accuracy loss.

AI Research Intern **Aug 2024 – Sep 2024**
Neuronetix

- Built XGBoost + Random Forest ensemble on 5,000+ patient records; achieved AUC 0.92, F1 0.89.
- Ranked Top 3 of 150 in customer churn challenge with 93.5% accuracy using gradient-boosted trees.
- Authored model cards and deployment documentation for production readiness.

Machine Learning Intern **Mar 2024 – Jun 2024**
ShAI

- Developed music genre classifier (MFCC + XGBoost) achieving 95% accuracy across 8 classes.
- Built price prediction models with MAE < $50 via feature engineering and Optuna tuning.

Research & Competitive Funding

ITAC Research Grant | *70,000 EGP ($2,300 USD)* **2023**

- Built cloud-monitored solar generation system with LSTM models; achieved 92% accuracy with a 48-hour predictive window.

ASRT Research Grant | *35,000 EGP ($1,150 USD)* **2023**

- Integrated IoT sensors with Transformer-based forecasting for energy consumption estimation; reduced prediction error by 23%.

IEEE Graduation Project Award | *National Recognition* **2023**

- Recognized nationally for renewable energy forecasting framework spanning 21 deep learning architectures.

Projects

Medical VLM with Multi-Agent Architecture | *Qwen 2.5, PyTorch, LoRA* **NDA**

- Fine-tuned 7B VLM with LoRA rank-32 on 35,000 retinal scans
- achieved 224% accuracy gain (retinopathy 20% → 59%, edema 72% → 87%).
- Designed multi-agent ensemble (2 CNNs + RBF-SVM) for decision fusion, improving report BLEU 0.01 → 0.17 (17x gain).
- Applied 4-bit quantization, cutting VRAM 17GB → 7GB (-59%) with negligible accuracy drop (<0.5%).

Medical Knowledge RAG System | *LangChain, FAISS, Transformers* **NDA**

- Indexed 20+ medical textbooks (5,000+ pages) with FAISS; achieved 0.3s retrieval latency and 0.89 recall@5.
- Grounded VLM outputs with retrieved knowledge, lifting retinopathy 59% → 68% and edema 87% → 94%.
- Boosted caption BLEU 0.17 → 0.26 (+53%) and cut hallucination rate 18% → 5% via knowledge grounding.

Brain Tumor Classification | *CNN, TensorFlow, Streamlit, Docker* **GitHub** | **Demo**

- Trained CNN achieving 95% accuracy on 3,000 brain MRI scans across 4 tumor types.
- Deployed Streamlit app with <2s inference in Docker; expanded training set by 400% via augmentation.

Face Recognition & Similarity System | *PyTorch, Streamlit, SQL* **GitHub** | **Demo**

- Built facial recognition system with desktop GUI and SQL database managing 1,000+ identity profiles.
- Deployed Streamlit API with cosine similarity matching; achieved 0.92 accuracy at 15 FPS on CPU hardware.

Technical Skills

LLM & Generative AI: Qwen 2.5, LLaMA, BERT, GPT, Vision-Language Models, LoRA/QLoRA, Few-shot & Chain-of-Thought Prompting, RAG (LangChain, FAISS, Chroma), BLEU/ROUGE/Perplexity, Hallucination Detection

Modeling & Training: PyTorch, TensorFlow, Hugging Face Transformers, CNNs (DenseNet, EfficientNet, ResNet), YOLO, OpenCV, MediaPipe, 4-bit/8-bit Quantization, Model Pruning, Knowledge Distillation, XGBoost, LightGBM, Scikit-learn

MLOps & Deployment: Docker, MLflow, FastAPI, Flask, Azure, AWS, Apache Airflow, Git/GitHub, CI/CD Pipelines

Data & Visualization: Pandas, NumPy, FAISS, Chroma, Pinecone, Matplotlib, Seaborn, Streamlit, SQL

Programming: Python (Expert), Java, SQL, Bash

Education

B.Sc. Computer Science **2019 – 2023**
Zagazig University *Cairo, Egypt*

- Coursework: Machine Learning, Deep Learning, NLP, Computer Vision, Algorithms, Databases.
- **Graduation Project:** Python framework with 21 DL models (LSTM, GRU, Transformers) for renewable energy forecasting; achieved <15% MAPE on solar/wind prediction.

Digital Egypt Pioneers Initiative (DEPI) **Apr 2024 – Oct 2024**
Machine Learning Engineer Scholarship — Microsoft Track

- 6-month program (300+ hrs) covering production ML, MLOps, and Azure deployment.
- **Capstone:** Breast cancer classifier, 97% accuracy on 15,000+ images using DenseNet transfer learning.

Professional Certifications:

- Deep Learning & Machine Learning Specializations — DeepLearning.AI / Stanford University, Andrew Ng (2022–2024)

Soft Skills

ML System Architecture · Model Debugging & Performance Optimization · Prompt Engineering · Research & Technical Documentation · Cross-functional Collaboration · Algorithm Problem-Solving (100+ LeetCode) · Fast Technology Adoption