Mohammed HACHOUD

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Algiers, Algeria

Professional Summary

Computer Science Engineer with an Engineering Degree and MSc in Artificial Intelligence and Data Science. Experience in developing AI-powered applications, integrating large language models, building backend services, and conducting machine learning research. Currently working on conversational AI systems at the High Commission of Digitalization. Strong background in Python, deep learning, graph neural networks, computer vision, and software development, with practical experience taking projects from problem formulation and implementation to evaluation and application integration.

Professional Experience

Computer Science Engineer Nov. 2025 – Present

High Commission of Digitalization *Algiers, Algeria*

- Contribute to the design and development of AI-powered conversational applications leveraging large language models for intelligent information processing and user interaction.
- Develop backend components and integrate AI capabilities into software applications supporting national digitalization initiatives.
- Work on the integration of language models and information processing components into application workflows.

Freelance Full-Stack Developer Sept. 2021 – Present

Software Developer *Independent*

- Designed and developed web and desktop applications for clients using Python, JavaScript, and modern development frameworks.
- Built backend APIs, implemented application features, and integrated data processing components.
- Managed software development activities from implementation and deployment to maintenance and technical support.

Research Intern - Machine Learning Feb. 2025 – Aug. 2025

LS2N Laboratory - Nantes Université *Nantes, France*

- Developed a graph-based machine learning approach for hierarchical classification of archaeological ceramics with incomplete attributes.
- Constructed heterogeneous graph representations connecting objects, features, and functions, incorporating domain knowledge through ontology-based relationships.
- Implemented and compared MLP and R-GCN architectures using multi-hot feature encoding and BERT embeddings.
- Evaluated classification performance on more than 11,000 artifacts, reporting 98.33% accuracy in the evaluated experimental setting.
- Developed a human-in-the-loop interface enabling domain experts to review and validate classification results.

Education

Higher National School of Computer Science (ESI-SBA) Sept. 2019 – Sept. 2025

Engineering Degree & MSc in Artificial Intelligence and Data Science *Sidi Bel Abbès, Algeria*

- **Relevant Coursework:** Machine Learning, Deep Learning, Computer Vision, Natural Language Processing, Reinforcement Learning, Operations Research.

Sidi Bel Djilali University Sept. 2021 – June 2022

Bachelor's Degree in Computer Science *Sidi Bel Abbès, Algeria*

Selected Engineering & AI Projects

RAG Retrieval & Generation Benchmark

Python, Qdrant, BM25, Sentence Transformers, Ollama, LLM Evaluation

- Developed a reproducible RAG evaluation pipeline comparing sparse and dense retrieval across different document chunking strategies.
- Evaluated retrieval performance using Precision@k, Recall@k, MRR, and latency measurements on a dataset of 100 queries.
- Benchmarked Granite 3B and 8B language models, assessing answer correctness, grounding, citation accuracy, and inference performance.
- Investigated the effects of retrieval depth, model size, and chunking configurations on system performance and answer quality.

RunRightAI - AI-Powered Sports Analysis Platform

Python, Computer Vision, Pose Estimation, OpenCV, LLMs

- Developed a video-based sprint analysis system using human pose estimation and keypoint tracking to extract movement-related measurements.
- Applied homography-based transformations and geometric processing techniques to support spatial analysis.
- Integrated language models to generate performance feedback from extracted measurements.

Heterogeneous GNN Recommendation System

Python, PyTorch Geometric, Graph Neural Networks, Reinforcement Learning

- Constructed a heterogeneous graph from online marketplace data, modeling users, items, and different types of interactions.
- Developed a graph neural network to learn representations and applied reinforcement learning to adapt recommendation rankings.
- Evaluated recommendation performance against baseline approaches using NDCG and Hit Rate.

Technical Skills

Programming: Python, JavaScript, TypeScript, SQL

AI & Machine Learning: Deep Learning, Graph Neural Networks, NLP, Computer Vision, Reinforcement Learning

LLMs & Information Retrieval: LLMs, RAG, Prompt Engineering, Semantic Search, Dense Retrieval, BM25, Embeddings, LLM Evaluation

ML Frameworks & Libraries: PyTorch, PyTorch Geometric, TensorFlow, Scikit-learn, Sentence Transformers, OpenCV

Backend & Full-Stack Development: FastAPI, Node.js, Express.js, React.js, REST APIs

Tools & Infrastructure: Git, Docker, Qdrant, Ollama

Additional Information

Languages: Arabic (Native), English (Duolingo English Test: 115/160), French (TCF B2).
Certification: Machine Learning Specialization - DeepLearning.AI.