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# Ilyes Ben Khalifa

Tunis, Tunisia

ilyesbenkhalifa22@gmail.com

(216)55123938

## Summary

Senior Data Scientist with expertise in applied AI, predictive modeling, and data-driven decision systems. Proven track record of delivering high-impact machine learning solutions in industry, including pricing optimization and portfolio analytics in the insurance sector. Author of peer-reviewed publications in Q1/Q2 journals and international venues, with research spanning machine learning, AI systems, and software analytics. Focused on transforming cutting-edge research into scalable, production-ready solutions that create measurable business value.

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## Publications

### Articles Published in Indexed and Impacted Journals

[J1] I. Ben Khalifa, M. Ben Messaoud, and M. W. Mkaouer.

*LARK: Python-Specialized License Analysis with RAG and Knowledge Graphs.*

Accepted by *Information and Software Technology*, Special Issue on Regulatory Compliance in Software Engineering, 2026.

Impact Factor (2026): 3.862, Quartile Q1 – Category: Computer Science (Applications, Information Systems, Software).

[J2] I. Ben Khalifa, M. Ben Messaoud, and M. W. Mkaouer.

*LARK in Action: Smarter License Checking with AI, RAG, and Knowledge Graphs.*

Accepted by *IEEE Software Magazine*, 2026.

Impact Factor (2026): 3.0, Quartile Q2 – Category: Computer Science (Software).

[J3] M. Ben Messaoud, A. Nour, I. Ben Khalifa, M. Tounsi, and M. W. Mkaouer.

*Hierarchical Multi-label Classification for Concrete Defects: An Industrial Case Study.*

*Journal of Systems & Software*, 231: 112588, 2026.

Impact Factor (2026): 4.1, Quartile Q1 – Category: Computer Science (Information Systems, Software).

[J4] M. Ben Messaoud, A. Nour, I. Ben Khalifa, M. Tounsi, and M. W. Mkaouer.

*Detecting Software Defects with Hierarchical Multilabel Classification: Insights from an Industrial Case Study.*

*IT Professional*, 27(5): 31–37, 2025.

Impact Factor (2026): 2.6, Quartile Q2 – Category: Computer Science (Software).

### Short Papers and Articles Published in International Peer-Reviewed Workshops

[W1] K. Al Sharou, M. K. Jamei, I. Ben Khalifa, S. Missaoui, M. Ben Messaoud, and J. Moorkens.

*UEwMT: Leveraging User Experience and Deep Learning-Driven Methodology for Evaluating Machine Translation Services.*

In: Kallel S., et al. (Eds.), *Service-Oriented Computing – ICSOC 2024 Workshops*, ICSOC 2024.

Lecture Notes in Computer Science (LNCS), vol. 15834, Springer, Singapore, 2024.

ERA Ranking: B / Qualis.

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## Experience

### Ominimo Insurance

Data Scientist I • Amsterdam, Netherlands

05/2025 - Present

- Lead pricing analysis for the **Netherlands insurance portfolio**.
- Develop **machine learning models for insurance coverages and tariff optimization**.
- Run **portfolio simulations** to adjust pricing strategies and improve risk segment distribution.

## UBIAI

Data Scientist • California City, CA

01/2024 - 05/2025

- **LLM Fine-Tuning & Multimodal AI:** Led fine-tuning initiatives on state-of-the-art models including LLaVA, LLaMA2/3, Mixtral, Qwen, Phi, and DeepSeek Gemma using advanced reinforcement learning (RLHF, RLAI, DPO, KTO). Optimized cost-performance tradeoffs with LoRA, QLoRA, and OLLAMA for efficient on-premise deployment.
- **NER, REL & Annotation Acceleration:** Developed LLM agents that outperformed baseline zero-shot models in Named Entity Recognition (NER) and Relation Extraction (REL). Engineered advanced chunking, fuzzy matching, and result combination techniques, reducing document annotation time by 80% (from 1 min to 10 sec).
- **Multiagent Systems & Orchestration:** Built multiagent workflows using CrewAI and LangGraph with intelligent node orchestration to automate complex AI pipelines.
- **Infrastructure & Scaling:** Scaled LLM infrastructure via AWS SageMaker, EC2, and GCP Cloud Run for robust training and inference environments.
- **Big Data & ETL Pipelines:** Designed and executed ML training pipelines using PySpark on Azure Databricks, improving big data handling and pipeline efficiency.
- **Web App Integration & Research:** Integrated models like SpaCy, BERT, and LayoutLM into Django-based platforms for real-time annotation. Authored technical articles on cutting-edge topics such as Reinforced Fine-Tuning (ReFT) and comparisons of RLHF vs RLAI.

## Business & AI

Data Scientist • Ben Arous, Tunisia

11/2022 - 01/2024

- **LLM-Powered Information Extraction:** Engineered advanced NLP pipelines using large language models for Named Entity Recognition (NER), achieving 95% accuracy in extracting structured data from over 1 million web pages. Enabled strategic insights through scalable, high-quality dataset generation.
- **Web Scraping & Data Engineering:** Designed and deployed a robust end-to-end web scraping and reporting system with integrated ETL pipelines. Boosted data extraction efficiency by 70%, significantly improving downstream predictive modeling across domains.
- **Multimodal ML Research:** Led R&D efforts integrating LLMs with machine learning for speech-to-text and audio diarization tasks. Delivered a 40% improvement in accuracy, processing 10,000+ hours of audio and enabling deeper analytics for voice-based datasets.
- **Predictive Analytics & Cost Optimization:** Architected a predictive analytics platform leveraging ML models and distributed data processing. Enhanced forecast accuracy by 30% for critical KPIs, contributing to a 15% reduction in operational costs through data-driven decisions.

## The Sparks Foundation

Data Science & Business Analytics intern • Remote

08/2022 - 11/2022

- **Data Preprocessing & Visualization:** Built scalable data preprocessing pipelines using Pandas and NumPy, enhancing data quality by 40% and reducing analysis time by 25%. Delivered clear, actionable insights through visualizations created with Matplotlib and Seaborn, tailored for non-technical audiences.
- **Supervised Learning & Model Deployment:** Developed and deployed classification and regression models using Scikit-Learn and XGBoost, achieving a 15% improvement over baseline models. Supported critical business functions by integrating these models into real-world decision pipelines.
- **Natural Language Processing & Speech Analytics:** Implemented NLP solutions for text and speech analysis, processing 10,000+ documents and 500+ hours of audio. Boosted information extraction efficiency by 30%, enabling strategic insights from previously untapped unstructured data sources.

## PARADA Agency

Junior machine learning engineer • Paris, IL . Remote

01/2022 - 08/2022

- **Deep Learning for Vision Tasks:** Contributed to the development and evaluation of deep learning models for object detection and recognition using TensorFlow and PyTorch, improving model performance on real-world datasets.
  - **Pose Estimation & Tracking:** Implemented machine learning solutions for object tracking and pose estimation, enhancing system accuracy and reducing latency across various applications.
  - **Data Preparation & Augmentation:** Led efforts in data cleaning, augmentation, and labeling, significantly boosting the quality and scalability of training datasets for computer vision projects.
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## Freelance Experience

Upwork • Remote • 2023 – Present

100% Job Success Score | Top-Rated Profile

- **AI Development & Prompt Engineering:** Delivered high-impact projects in machine learning, neural network design, and prompt engineering, consistently earning 5.0 client ratings. Successfully integrated OpenAI APIs and built scalable AI-driven solutions.
  - **ETL & Python Solutions:** Executed robust ETL pipelines and custom Python applications across multiple domains, streamlining workflows and enhancing data processing capabilities.
  - **Generative AI & RAG Systems:** Developed generative AI solutions and Retrieval-Augmented Generation (RAG) systems tailored to specific business needs, improving content generation and knowledge extraction.
  - **Multiagent Systems & Database Agents:** Built intelligent AI agents for use cases such as quiz generation, database interaction, and automated research, leveraging frameworks like LangGraph and Crewai.
  - **Client Collaboration & Results:** Known for rapid delivery, clear communication, and building long-term client relationships through consistent value delivery and technical excellence.
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## Education

### Tunis Business School

Bachelors, Information Technology • Ben Arous, Tunisia

06/2025

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## Skills

Python, SQL, Git, Tensorflow, PyTorch, Scikit-learn, XGBoost, Pandas, NumPy, Matplotlib, Seaborn, Beautiful Soup, Scrapy, OLLAMA, Langchain, Crewai, NLP, NER, REL, LLMs, AWS, RAG, LLM Fine-Tuning, Prompt Engineering, Reinforcement Learning for LLMs (RLHF, RLAIF), Structured Data Extraction, Research & Development, Project Management, Problem Resolution, Zero-shot, Few-shot, Algo Trading, GCP, AWS, Azure