Aziz Karaborni

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Applied AI and Machine Learning Engineer with experience developing data-driven systems across industrial simulation, scientific computing, and cheminformatics. Skilled in machine learning model development, computer vision integration, and scalable algorithm optimization. Experienced in end-to-end AI development from problem formulation and model experimentation to system implementation and performance optimization in real-world environments.

Skills

Machine Learning: Supervised and Unsupervised Learning, Deep Learning, Transfer Learning, Model Fine-Tuning, Model Evaluation, Model Deployment (FastAPI, Docker) | **Computer Vision:** YOLO, SuperGlue, U-Net, EfficientNet, OpenCV | **Natural Language Processing and LLMs:** Transformers, BERT, Hugging Face | **XR & Graphics:** Unity (C#), VR development, OpenGL, real-time rendering | **High performance computing:** OpenMP, MPI, CUDA, parallel programming | **Tools:** Linux, Git, Docker, SQL | **Programming:** Python, C++, C#, MATLAB

Professional Experience

Dassault Systems, Applied Machine learning Engineer, Internship 01/2026 | Paris, France
Worked on improving the robustness of retrosynthesis prediction models (LocalRetro) under real-world dataset shift using customer reaction data. Evaluated and implemented adaptation strategies including fine-tuning and regularized training methods to improve model generalization. Designed benchmarking experiments to assess model performance across shifted datasets and contributed to defining model lifecycle evaluation gates for production deployment. Collaborated with research and engineering teams to integrate experimental results into the retrosynthesis modeling pipeline within BIOVIA's cheminformatics platform.

SIEMENS AG, **Software Engineer (VR & Computer Vision), Part-time** 05/2022 – 03/2024 | Munich, Germany
Developed industrial Virtual Reality applications using Unity (C#) to support simulation and digital twin environments. Contributed to the integration of computer vision–based tracking systems and real-time data pipelines for interactive and data-driven simulations.Participated in the end-to-end development lifecycle, including client meetings to define technical requirements, translating business needs into engineering tasks, and working within Agile/Scrum workflows with sprint planning and iterative delivery.Responsible for 3D asset integration, system implementation, and performance profiling/optimization to ensure real-time performance in immersive environments. Collaborated with cross-functional teams (engineering, design, and domain experts) to validate features, refine simulations, and deliver production-ready solutions.

XLIM, **Scientific Visualization Engineer (C++ / OpenGL), Internship** 04/2021 – 09/2021 | Limoges, France
Developed a real-time visualization method for large biological molecules using the Solvent-Excluded Surface (SES) representation, enabling improved analysis of molecular structures and interactions.Implemented high-performance rendering algorithms in C++ and OpenGL, focusing on efficient surface generation and real-time visualization of complex molecular geometries.Collaborated with the Image Synthesis and Bioinformatics teams to integrate the visualization pipeline into existing scientific analysis workflows and validate results with experts.

PWC Tunisia, Exploratory internship: IT Consulting 07/2020 – 08/2020 | Tunis, Tunisia
Participated in various digital transformation projects for companies and institutions.

Education

Technical University of Munich, 04/2022 – 05/2025 | Munich, Germany
M.Sc. Computational Science and Engineering
A rigorous program blending applied mathematics, computer science, and engineering, with a focus on Machine learning electives.
- Courses: Machine Learning, Deep Learning, Advanced Programming, Parallel Programming, Machine Learning for Graphs and Sequential data, High-Performance Computing, Computer Vision, Scientific computing, Numerical Programming.
- Master's Thesis: "Scalable Kernel Matrix Inversion using Hierarchical Low-Rank Approximations", implemented and tested for Machine learning models such as Gaussian processes, Kernel ridge regression and Kernel PCA, achieved a speed-up of 20-30% of the process.

École Centrale de Nantes, Generalist Engineering Diploma 09/2019 – 09/2022 | Nantes, France
- French 'diplôme d'ingénieur' equivalent to a Master of Science and Engineering with majors in more particular fields.
- Core commun courses in mathematics (probability, stochastic processes), computer science (C++), mechanical modeling, and economics.
- Specialization in real-time 3D graphics, VR/AR, computer vision, haptic systems, and industrial software.
- Business modules: Innovation management, entrepreneurship, and project management.

IPEST, Preparatory Classes (CPGE PCSI/PC) 09/2017 – 10/2019 | Tunis, Tunisia
- *Pathway to French Grandes Écoles*

Awards

Machine learning competitions:

- 🥇 **Gold Medal — Zindi | IBM SkillsBuild Hydropower Climate Optimisation** Ranked **Top 5 among 1,000+ participants**. Built multivariate forecasting models for hydropower optimization using **XGBoost**, **time-series modeling**, and advanced feature engineering.
- 🥈 **Silver Medal — Zindi | Amini Cocoa Contamination Challenge** Ranked **26th out of 300 teams** (**Top 9%**). Developed a **mobile-efficient YOLO-based computer vision model** for cocoa leaf disease detection.
- 🥉 **Bronze Medal — Kaggle | Stanford RNA 3D Folding (2025)** Ranked **Top 135 globally** (**Top 10%**) in an RNA 3D structure prediction challenge.
- **Kaggle | Image Matching Challenge (2025)** Ranked **Top 140 globally** (**Top 14%**). Designed a robust image matching pipeline using **DINOv2**, **ALIKED**, and **LightGlue** for accurate visual correspondence estimation.
- **Kaggle | Predict Calorie Expenditure** Ranked **230th out of 4,500 participants** (**Top 5%**).
- **Kaggle | Nexar Dashcam Crash Prediction Challenge** Ranked **50th out of 250 participants** (**Top 20%**). Developed early collision prediction models from dashcam video using **EfficientNet**, **LSTM/GRU**, **XGBoost**, and **3D CNNs**.

Languages

English: C2 | **French:** C2 | **Arabic:** C2 | **German:** B1 | **Spanish:** A2