

Bilel Saghrouchni

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PhD Candidate (CIFRE) and AI Engineer with expertise in Machine Learning, Deep Reinforcement Learning, and AI Agents. Strong focus on applying advanced models to anomaly detection, complex system environments, and observability.

Experience

AI Engineer / PhD Candidate (CIFRE) in Machine Learning , INSA Lyon – SPIE ICS	Nov 2023 – Dec 2026
<i>Applied research & algorithms design</i>: Architected autonomous AI agents utilizing Deep Reinforcement Learning (PPO, A2C, Double DQN), Contextual Bandits and adversarial learning for high-dimensional anomaly detection and observability. <i>System Implementation</i>: Engineered and optimized custom simulation environments to facilitate agent training. Designed novel semi-supervised reward functions leveraging ensemble learning and fuzzy-clustering on complex, real-world data. <i>End-to-End ML Pipelines & MLOps</i>: Built robust data ingestion, cleaning, and feature extraction pipelines (Auto-Encoders, Contrastive Learning/SCARF) using PyTorch. Integrated MLflow for rigorous experiment tracking and scientific reproducibility. <i>Production deployment</i>: Dockerized production workflows and deployed inference services via secure REST APIs, ensuring high-availability and scalability for real-world hospital partners. <i>Generative AI</i>: Scoping, implementation, and project management for generative AI. Gathering client requirements, designing the architecture, RAG, model selection, and fine-tuning. <i>Scientific communication</i>: Conducted communication and podcast about AI concepts. Supervised engineering interns, led code reviews, and enforced strict software quality standards. <i>Tech Stack</i>: Python, PyTorch, TensorFlow, Gymnasium, Stable-Baselines3, MLflow, Docker, PostgreSQL, Scikit-Learn, LangGraph, LangChain.	
Software Engineer (Applied AI) , Devoteam – Levallois-Perret	June 2022 – Sept 2023
<i>Distributed AI</i>: Developed and deployed a privacy-preserving Federated Learning algorithm for decentralized image recognition model training and aggregation. <i>TensorFlow, Python, Flask</i>. <i>NLP & AI Product</i>: Engineered a conversational AI voice assistant for field technicians from prototype to production, integrating robust NLP and speech recognition pipelines. <i>Rasa, VOSK, Python</i>.	
Software Engineer , ETIC – INSA Lyon	Sept 2021 – April 2023
Developed and deployed a high-availability maintenance application for a national transport company. Designed full-stack architecture and backend logic to handle high-throughput data <i>Angular, Flask, Postgres, AWS BeanStalk</i>.	
Data Scientist Intern , Worldline – Villeurbanne	April – Aug 2021
Processed large-scale financial transaction data for fraud prediction models. Optimized data retrieval pipelines and developed dashboarding tools for model interpretability <i>Pandas, Scikit-Learn, SQL</i>.	

Education

INSA Lyon - M.Eng. in Computer Sciences and Telecommunications	Sept 2019 - Dec 2022
Ranking: Top 5% of the graduating class. Key Coursework: Computer Network, Computer Security, Deep Learning, Advanced Machine Learning, Distributed Computing, Algorithms (C++, Go, Python).	
National University of Singapore (NUS) - School of Computing Exchange	Jan - May 2022
Focus: Computer Security, Feature Engineering for ML, Information Retrieval.	

Research & Publications

DRL for Continuous Intrusion Detection using Unsupervised Fuzzy Clustering-based Rewards - KES 2026	2026
Comprehensive Comparison of Streaming Clustering-Based IDS - KES 2025 [DOI]	Sept 2025
Towards An Unsupervised Reward Function For A DRL Based IDS - CSNet 2024 [DOI]	Dec 2024
Deep Reinforcement Learning for IDS (Semi-Supervised Setting) - (under submission)	2026

Side projects

Ask Zotero — RAG on Zotero Library	ask_zotero
Built RAG tooling to query and summarize academic literature directly from a personal dataset using vector embeddings and LLMs. <i>Langchain, Pytorch, Streamlit</i>	
ExplainMe — LLM Explanation Generator	explainme
Tool to generate concise explanatory videos or summaries using LLMs and automated prompt engineering workflows. <i>Langchain, Pytorch, Streamlit</i>	
Data Explorer for ML Data	dex
Interactive data exploration tool designed to assist ML engineers with dataset inspection, cleaning, and preprocessing workflows. <i>Python, Streamlit, ScikitLearn</i>.	
CNN Font Recognition System	font_finder
Developed and trained a convolutional neural network to classify fonts from images. End-to-end ML lifecycle from data collection/augmentation to model training/evaluation. <i>TensorFlow, OpenCV</i>.	

Interests

- Hackathons & Innovation** — Multiple-time laureate in national coding challenges (1st Prize Devoteam Devogame, 3rd Prize Accenture Hackathome & Safran Black Out).
- Popularization of science** in blog articles or video podcasts | **Judo Black Belt** — 18 years of practice, National Competitor, Certified Referee. | **Photography** (Portrait & Commercial).