EL MEHDI HICHAM AI Engineer / Data Scientist

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MehdiHCH https://mehdihch.github.io/Portfolio/

PROFESSIONAL EXPERIENCE

Intern – R&D Engineer in Computer Vision & AI – Football Analytics, SPORTSCORE — 04/2025 – present, Paris, France (Remote)
- Enhanced and optimized an existing automated video analysis pipeline for futsal matches (object detection, multi-player tracking, homography, OCR, pose estimation).
- Built an **automatic frame classification module** (YOLOv11m-cls) achieving **99.95% accuracy**.
- Implemented **complex action detection**: pass classification (progressive, assist, under pressure), shots, dribbles, interceptions, goals.
- Optimized the pipeline, **reducing inference time by 50%** through CUDA Stream parallelization (5 streams), TensorRT FP16 optimization (7 models), and asynchronous I/O operations, **achieving 13 FPS processing speed (+117%)** and **improving ball detection robustness**.
- **Supervised and trained 4 interns**, managing tasks, reviewing deliverables, and ensuring technical consistency.
- Delivered **automated performance reports** (heatmaps, pass maps, structured JSON exports, advanced stats).
- **Tech stack**: PyTorch, YOLOv8/11, DeepSORT, OpenCV, OCR, Pandas, Python,CUDA Streams, TensorRT.

End-to-End Event Spotting in Videos – Engineering Intern, Ibn Tofail University – LABORATOIRE SETIME — 10/2024 – 01/2025, Kenitra, Morocco
- Developed a full pipeline: frame extraction, JSON annotations, temporal normalization, data augmentation.
- Implemented RegNet-Y with Gate Shift Modules (GSM) for feature extraction and a Bi-GRU for global temporal reasoning.
- Experimented with multiple configurations (clip_len 16/50) using RegNet-Y and ResNet-50 on a 40GB dataset (7 matches from the 2024 Futsal World Cup).
- Achieved a recall of 0.93 on the DRIVE class, with RegNet-Y outperforming ResNet-50.
- **Tech stack**: Python, PyTorch, RegNet-Y, ResNet-50, Bi-GRU, OpenCV, GPU (RTX 4060)

Internship – Content Delivery Network (CDN), Orange Business — 09/2023 – 11/2023, Sale Al Jadida, Morocco
- Developed a Shell script to generate secure URLs with token-based authentication.
- Resolved a URL formatting issue and enhanced security by studying CORS headers, XSS, and CSRF attacks.
- **Tech stack** : Shell Scripting, JSON Web Tokens, wget.

EDUCATION

Master's Degree in Artificial Intelligence, Ibn Tofail University — 11/2023 – 09/2025, Kenitra, Morocco
- Machine Learning, Deep Learning, Reinforcement Learning, Natural Language Processing (NLP), Computer Vision, Generative AI.

Bachelor's Degree in Physics, Université Ibn Tofail — 2020 – 2023, Ibn Tofail University

ACADEMIC PROJECT

Autonomous Car with Deep Reinforcement Learning — 02/2024 – 07/2024
- Developed a **ROS2–Gazebo simulation pipeline** with URDF/xacro models, integrating camera & LiDAR for obstacle detection and traffic sign recognition.
- Implemented a **TD3 reinforcement learning agent** for autonomous navigation, combining trajectory planning, real-time control, and safe decision-making.
- Validated the system in diverse scenarios, achieving **reliable path following and collision avoidance** in simulation.
- **Tech stack:** ROS2, Gazebo, Python, PyTorch, RViz, URDF/xacro, TD3 RL, Computer Vision

Digitization of Amazigh Writings, OCR for Tifinagh Characters using Deep Learning — 10/2024 – 02/2025
- Developed an innovative Optical Character Recognition (OCR) system for Tifinagh handwritten script, with the goal of preserving and digitizing the Amazigh cultural heritage using AI.
- Designed and implemented a hybrid CRNN-based model to improve the accuracy of character recognition.
- Served as a Paddle OCR Developer and CNN Model Developer on the project team.
- **Tech stack**: Hybrid CRNN model, PaddleOCR, TensorFlow, PyTorch, OpenCV.

Diabetic Retinopathy Detection — 10/2024 – 01/2025
- Developed a Deep Learning model to detect and classify diabetic retinopathy from retinal images. The primary goal was to facilitate early diagnosis to prevent vision loss and provide a diagnostic aid for ophthalmologists.
- Preprocessed the APTOS 2019 dataset and implemented data augmentation techniques to create a robust model.

Tech stack: EfficientNetB0, Convolutional Neural Networks (CNN), TensorFlow/Keras, and Adam optimizer

SKILLS

Programmation & IA: Python (PyTorch, TensorFlow, Keras), C/C++, Java, FastAPI, REST API, ML/DL (CNN, RNN, LSTM, Transformers).

Computer Vision & Robotics: YOLOv8/11, Faster R-CNN, DeepSORT, OCR (PaddleOCR, CRNN), Pose Estimation, OpenCV, homography, camera calibration, ROS2, TensorRT, real-time inference.

Generative AI & NLP: LLMs, RAG pipelines, Hugging Face, LangChain, prompt engineering, SQL-to-NL, embeddings & vector DBs.

Cloud & Infrastructure: AWS (S3, EC2, Lambda), Docker, Linux, Shell Scripting, MLOps basics (deployment, APIs, monitoring).

Networking & Databases: TCP/IP, SQL (MySQL, PostgreSQL), NoSQL (MongoDB), Vector DBs (FAISS, Pinecone), CDN.

Leadership & Project Management: Team supervision, project planning, technical mentoring.

Version Control & Collaboration: Git, GitHub, CI/CD basics,Agile/Scrum practices.

Langues: Arabic:Native | French: Professional | English: Intermediate