

Rayane Bencharef

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SKILLS

Machine Learning: Data Science, Model Optimization/Efficiency (Distillation, Finetuning), Multimodality (VQA), Computer Vision (Classification & Segmentation), Natural Language Processing (Tokenization & Language Model), Time Series (Analysis & Forecasting), Data Engineering & Preprocessing, Data & Features Analysis, Distributed computing/training

Software Development: Full-stack Web Development, Database Design & Implementation

Programming Languages: Python, R, JavaScript, Java, PostgreSQL

Frameworks/Libraries: PyTorch, TensorFlow, OpenCV, ReactJS/Native, Node.js, Bootstrap

Developer Tools: Git, CUDA, Visual Studio, GitHub, HuggingFace, Slurm, Android Studio

Language: French (Native), English

EXPERIENCE

Student Researcher in Multimodality & Efficiency (Master's Research Project) Jan. 2024 – Nov. 2025
Synchromedia, ÉTS Montreal, QC

- Reduced the computational cost of a **Large Vision-Language Model** in DocVQA by studying two **distillation** approaches between **heterogeneous architectures**, which halved the latency (**896ms → 446ms**).*
- Fine-tuned the **GEMMA LLM** decoder with a hierarchical visual encoder for DocVQA, using QLoRA, **improving the performance from 80.20 to 82.67 ANLS**.*
- Investigated positional encoding in Vision Transformer (ViT) using 2D Fourier features, increasing performance **from 83 to 84 ANLS**.
- Studied how VQA models handle structure and layout understanding through document classification and layout analysis tasks (**interpretability**).*
- Adapted single-page Document Understanding VLM to process multi-page documents **without adding parameters** for industrial applications.
- Developed a lightweight OCR Transformer with a **new decoder approach** in this field.
Presented at the 22nd Conference of the International Graphonomics Society (**IGS 2025**), at Montréal
- Read and wrote scientific articles.

*Presented & published at the **VisionDocs workshop (ICCV2025)** and received the **best paper award**.

Intern Data Scientist Jun. 2023 – Aug. 2023
Atout Majeur Concept Toulouse, France

- Engineered and analyzed patient data for **feature selection**.
- Built an SVM model to predict hospital stay duration from patient symptoms and characteristics, achieving **78% accuracy with limited data**.
- Developed a full pipeline to **automatically process** new patient data and generate predictions.

Independent Data Analyst Dec. 2022
Linkypharm.fr Remote

- Cleaned and preprocessed large pharmacy statistics datasets for downstream analysis.
- Created data-driven **geographic visualizations** of France to highlight pharmacy usage and distribution patterns.

Independent Data Engineer Sep. 2022 – Nov. 2022
TrainPredict Remote

- Designed and implemented a data model for cycling-related datasets.
- Built an interactive web application for **statistical data visualization** using React and Redux.

Intern Data Scientist in Time Series May 2022 – Aug. 2022
CHU Toulouse Toulouse, France

- Engineered and preprocessed emergency call datasets from SAMU31 (emergency medical service).
- Conducted **exploratory feature analysis** using geographic and statistical visualizations.
- Built ARIMA and LSTM forecasting models (Keras) to predict call volumes, **reaching 80% accuracy**.

Front-End Developer <i>Horus HealthCare Systems</i>	Sep. 2021 – Aug. 2022 Castres, France
<ul style="list-style-type: none"> Built a Django web application for the Castres Olympique rugby club to manage training sessions, matches, and events. Designed responsive, user-centric interfaces with HTML5, JavaScript, and Bootstrap. Worked in a 15-member team using Trello for project coordination and GitHub for collaborative development. 	
Full Stack Developer <i>TrainPredict</i>	Jan. 2021 – Sep. 2021 Castres, France
<ul style="list-style-type: none"> Built full-stack web and mobile applications (React, React Native, Redux, Node.js) to assist cyclists during training sessions. 	
Back-End Developer <i>Horus HealthCare Systems</i>	Jul. 2020 – Feb. 2021 Castres, France
<ul style="list-style-type: none"> Built a web application with a 10-member team using Sails.js for the French National Cancer Institute (INCA), enabling psychologists to track patient progress during treatment. 	

PEER-REVIEWED PUBLICATION

International Conference on Computer Vision (ICCV), VisionDocs Workshop <i>Spotlight/Best Paper Award</i>	Oct. 2025 Honolulu, Hawai'i
<ul style="list-style-type: none"> <i>DIVE-Doc: Downscaling foundational Image Visual Encoder into hierarchical architecture for DocVQA.</i> Code Repository: github.com/JayRay5/DIVE-Doc Model Weights: huggingface.co/JayRay5/DIVE-Doc-FRD 	

EDUCATION

École de Technologie Supérieure de Montréal (ÉTS) <i>Master of Science (M.Sc) in Artificial Intelligence with thesis</i>	Montreal, QC Sept. 2023 – Nov. 2025
<ul style="list-style-type: none"> Mention Excellent (Table of Honor) Jury recommendation for the Master's Excellence Award 	
ISIS Castres (INSA partner) <i>Master's of Engineering (M.Eng) in Software Engineering (CTI-accredited degree)</i>	Castres, France Sep. 2019 – Nov. 2025
European University of Cyprus <i>Student Exchange in Software Engineering (Erasmus)</i>	Nicosia, Cyprus Feb. 2023 – June 2023