

# Felipe Espinosa

AI Engineer

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## SUMMARY

AI Engineer with expertise in agentic, retrieval-augmented, and LLM-powered systems. Developed a functional SQL Agent prototype at CFM using LangChain and LangGraph for natural-language data querying. Also developed the first Walloon TTS system published at SSW 2025, applying generative AI to solve real data challenges.

## EXPERIENCE

### Capital Fund Management | Paris, France

AI Engineer Intern

March 2025 – September 2025

Developed a functional SQL Agent prototype that enables analysts to query financial data in natural language. The system was built using **LangChain** and **LangGraph** to design **agentic architectures** and a **hybrid retrieval** mechanism that merges keyword and semantic search for more accurate table selection.

- Achieved **88% accuracy** and **93% correct table retrieval** on an internal test set built with the data team.
- Designed a **hybrid search engine** using **BM25**, **semantic embeddings**, and **Reciprocal Rank Fusion (RRF)** to improve table relevance and precision across **Oracle** databases.
- Created **RAG pipelines** with schema enrichment, multi-step reasoning, and fallback strategies to make the system more reliable for complex financial queries.
- Built the complete solution including retrieval modules, validation tools, an evaluation pipeline, and a **Streamlit** interface tested and adopted by internal analysts.
- Delivered a **functional prototype** that now serves as the foundation for future **LLM-based** automation tools.

### Laboratoire Interdisciplinaire des Sciences du Numérique (LISN) | Orsay, France

NLP Research Intern

April 2024 – August 2024

Developed the first **Text-to-Speech** system for the Walloon language using the **VITS** architecture. The project covered the entire pipeline, from data collection to model training, fine-tuning, evaluation, and public deployment.

- Trained multiple **VITS** models with and without French pretraining, achieving a **Mean Opinion Score (MOS)** of **4.22** for the best configuration.
- Conducted objective evaluations using **PESQ**, **MCD**, and **SECS** metrics, and validated the results through perceptual tests with native speakers.
- Published results at the **13th Speech Synthesis Workshop (SSW 2025)**, highlighting cross-lingual transfer strategies for low-resource **TTS**.
- Released trained models, demos, and inference scripts publicly on **Hugging Face** to support open research and community use.

## SKILLS

**Programming & Databases:** Python, SQL, Oracle, Redis, ChromaDB

**AI & GenAI Frameworks:** PyTorch, LangChain, LangGraph, Transformers, Hugging Face, Scikit-learn, Pandas, NumPy, Matplotlib, Deep Learning, Generative AI, Agent Architectures, RAG, Hybrid Search, Fine-tuning, Prompt Engineering, Vector Databases, Model Deployment

**Tools & Platforms:** Git, Docker, Slurm, AWS, Streamlit, Jupyter, Confluence, Jira

**Soft Skills:** Analytical Thinking, Problem Solving, Teamwork, Communication, Adaptability, Autonomy

**Languages:** Spanish (Native), English (C1), Portuguese (B2), French (B1)

## EDUCATION

### Paris Saclay University

September 2023 – September 2025

Master Degree in Artificial Intelligence

### Lloyds International College

February 2020 – February 2022

Advanced Diploma in Leadership and Management

### Universidad Industrial de Santander

April 2010 – December 2016

B.Sc. in Electronic Engineering