

BI-Pipeline IBM Hackathon

Automation Track:

Help center conversational agent

Team 7: Corentin JUSTE, Maxime LANGELIER, Noé Le YHUELIC,
Vianney LE BOURHIS, Mame Alé SEYE, Rodolphe BIELEU

Context & Problem Statement



Initial Situation

The current Help Center relies on manual searches that are inefficient and lack contextual relevance.



Challenge

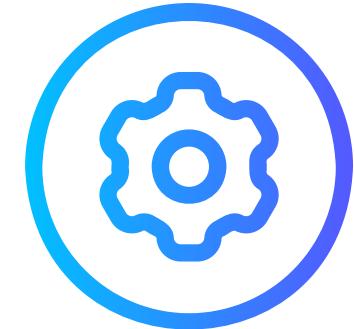
Enhance the student experience through an intelligent conversational agent.



Goal

Provide the most relevant answer or redirect the user to the appropriate channel (form or email).

Project Vision



Simple, integrable, and scalable solution,
respecting the IS technical stack with
MariaDB and Vue.js + Python and WatsonX.



Designed for quick adoption
and easy integration by the PLV
IT team.



Dual purpose: to improve the student
experience and make tracking easier on
the admin side.

Presentation of the Solution: User Interface

- Interface

The screenshot shows the homepage of the Help Center PULV. At the top, there's a blue header with the title "Help Center PULV" and a subtitle "Vous trouverez ici les réponses à toutes vos questions !". Below the header, there's a large white area with a blue speech bubble icon. The main heading "Bienvenue sur le Help Center du Pôle Léonard de Vinci !" is displayed in blue. Below it, a subtext says: "Posez-moi vos questions ! J'utilise la technologie RAG (Retrieval Augmented Generation) avec traitement LLM pour fournir des réponses précises." A section titled "Questions populaires" lists three questions with icons: "Comment créer une convention de stage", "Un certificat médical peut-il excuser une absence?", and "I forgot to sign in, how can I rectify my absence?". At the bottom, there's a search bar with the placeholder "Posez votre question ici..." and a "Rechercher" button.

- Example

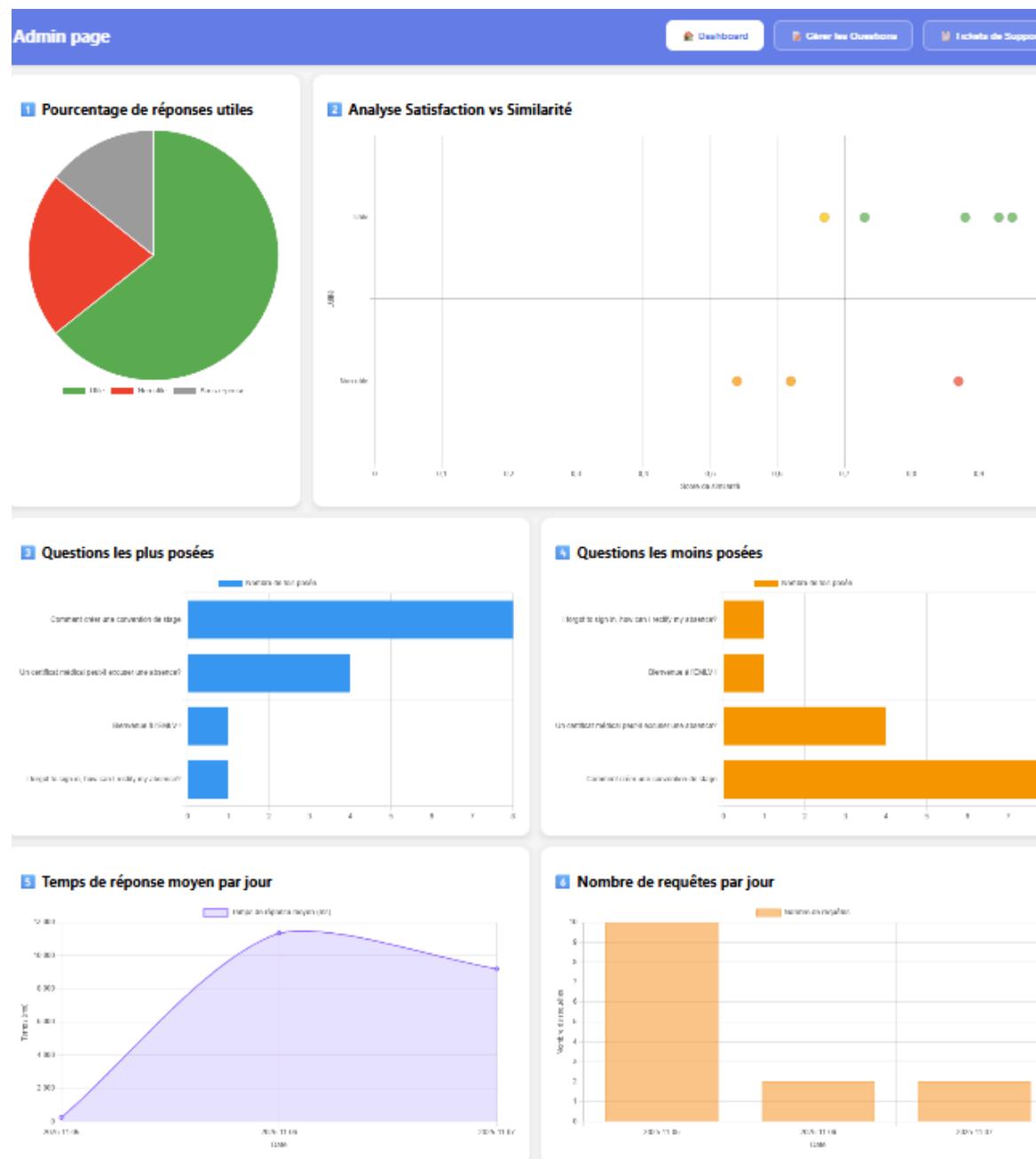
This screenshot shows a video player embedded in the Help Center PULV interface. The video is titled "ESILV - Pascal Pinot - Directeur" and has a duration of 9.5s. Below the video, there's a list of names and roles: Blandine JARRY (Responsable scolarité), Najet ASSAKI (A1 sauf restart), Carine VAN DER GUCHT (A2/restart), Cindy VALLÉE (Nantes), Bastien LEJEUNE (A3), Catherine BEIGNET (A4), Irène BLANQUART (A5), Samira ESSARDY (A4/A5 alternance), Sarah MASSUELLES (étudiants internationaux), and Laurence LEGRAND (Bachelor). At the bottom of the video player, there are two links: "Bienvenue à l'ESILV !" and "Qui sont les correspondants VSS à l'ESILV...". There are also like and dislike buttons.

- Forms

This screenshot shows a modal window titled "Créer un ticket de support". It asks for the user's email ("Email") which is "votre.email@example.com", their school ("École") which is "Sélectionnez votre école", their status ("Type d'utilisateur") which is "Sélectionnez votre statut", and their question ("Votre question") which is "Qui suis-je ?". At the bottom, there are "Annuler" and "Envoyer le ticket" buttons.

Presentation of the Solution: User Interface

- Dashboard



- Tracking dashboard

Admin page

Liste des questions

ID	TITRE	CONTENU	TYPE	LANGUES	THÉMATIQUES	UTILISATEURS	ÉCOLES	STATUT	DATE	ACTIONS
2133	Un certificat médical peut-il excuser une absence?	Non, en cas de problèmes de santé, seul un bulletin	question	Français	Scolarité Absences	faculty/staff/student	EMLV ESILV EXEC...	PUBLISH	01/09/2023	
2134	Un rendez-vous médical peut-il excuser une absence?	Non, en cas de problèmes de santé, seul un bulletin	question	Français	Scolarité Absences	faculty/staff/student	EMLV ESILV EXEC...	PUBLISH	01/09/2023	
2135	Quel est le quota d'absence autorisée par semestre?	Vous disposez d'un quota de 18 absences autorisées	question	Français	Scolarité	faculty/staff/student	EMLV ESILV EXEC...	PUBLISH	01/09/2023	
2136	Quelle est la conséquence d'une évaluation lors d'une absence non excusée?	Si vous avez une question	question	Français	Scolarité	faculty/staff/student	EMLV ESILV EXEC...	PUBLISH	01/09/2023	
2137	Quelle est la conséquence d'une évaluation lors d'une absence excusée?	Si vous avez une question	question	Français	Scolarité	faculty/staff/student	EMLV ESILV EXEC...	PUBLISH	01/09/2023	

Admin page

Tickets de Support

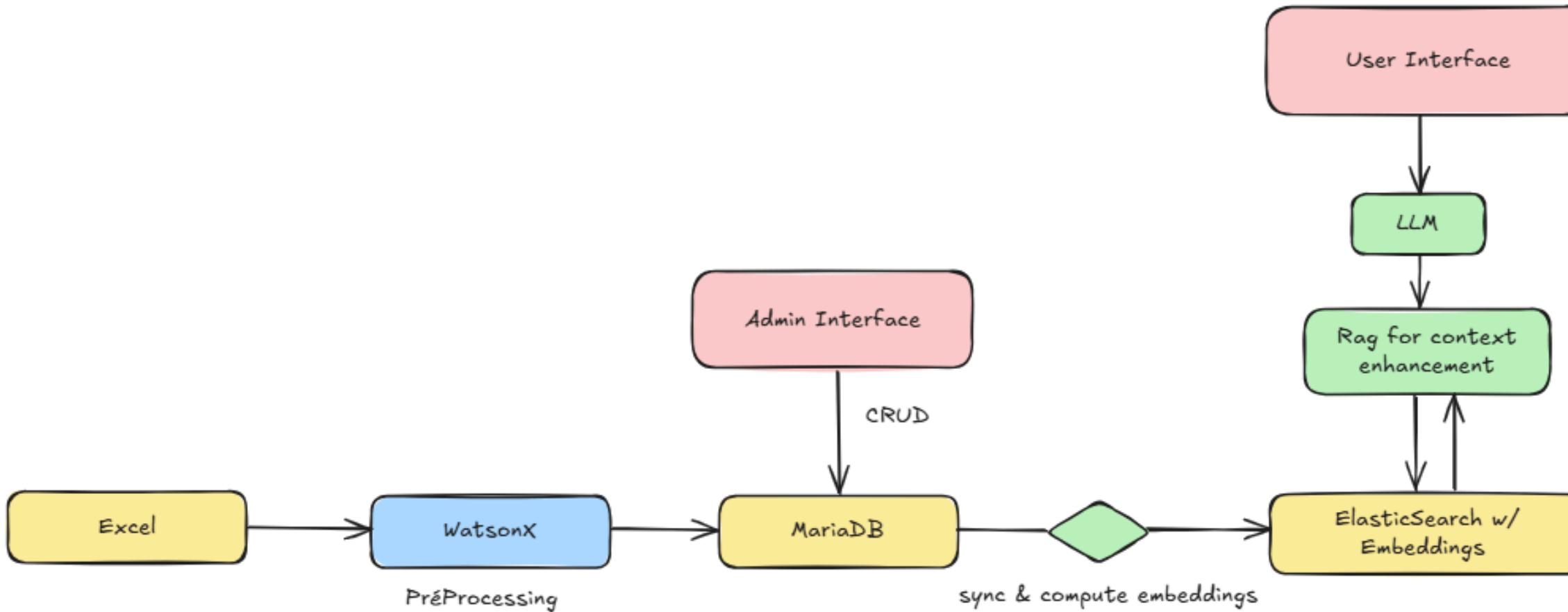
ID	EMAIL	ÉCOLE	TYPE	QUESTION	DATE
13	noe.leyuelic@outlook.fr	ESILV	Étudiant	bonjour qui suis-je ?	6 novembre 2025 à 1650
12	maxime.langeller@edu.devinci.fr	IIM	Étudiant	Quelle taille fait la tour eiffel?	6 novembre 2025 à 1640
11	maxime.langeller@edu.devinci.fr	ESILV	Étudiant	Comment je m'appelle?	6 novembre 2025 à 1623
10	emma.leroy@edu.devinci.fr	IIM	Personnel	Je gère l'emploi du temps et un étudi...	2 novembre 2025 à 1540
9	paul.girard@edu.devinci.fr	ESILV	Enseignant	Je dois valider plusieurs conventions.	3 novembre 2025 à 1725
8	julie.blanc@edu.devinci.fr	EXECUTIVE	Étudiant	Je suis en contrat d'apprentissage et...	5 novembre 2025 à 1310
7	antoine.bernard@edu.devinci.fr	ESILV	Personnel	Dans le cadre du support administrati...	2 novembre 2025 à 1315
6	camille.moreau@edu.devinci.fr	EMLV	Enseignant	J'ai un apprenant qui souhaite effect...	4 novembre 2025 à 1120
5	thomas.rousseau@edu.devinci.fr	ESILV	Étudiant	Impossible de soumettre ma demand...	5 novembre 2025 à 1455
4	lucas.petit@edu.devinci.fr	EMLV	Personnel	Un étudiant m'a signalé un blocage s...	4 novembre 2025 à 0920

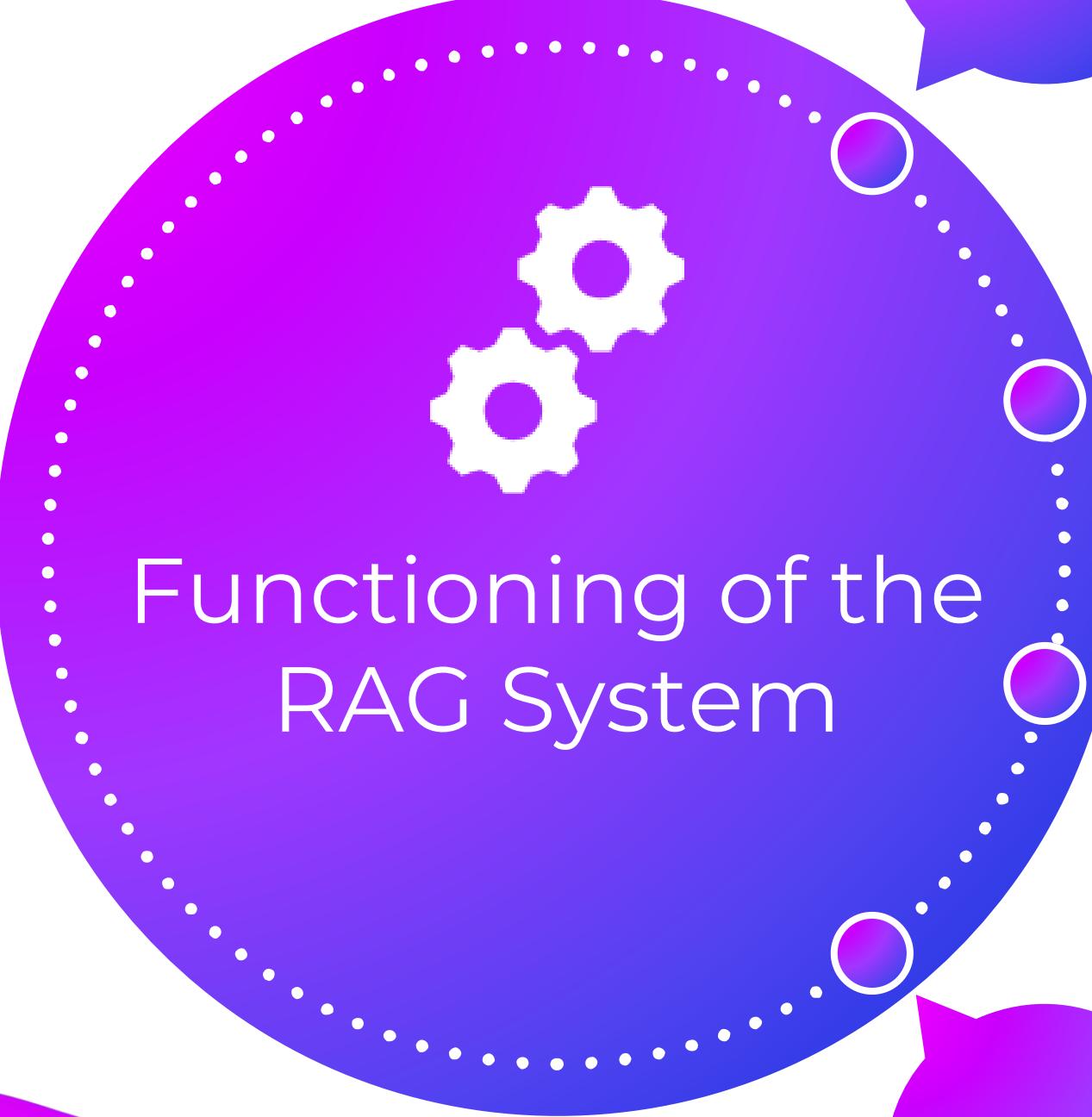
Rechercher par titre:
Rechercher par email ou école:

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Global Architecture

- **Source** : Merged and cleaned Excel file on WatsonX (data preprocessing).
- **Stockage** : MariaDB for IT compatibility and CRUD management via the admin interface.
- **Vectorisation** : Embeddings computed in Python and indexed in ElasticSearch.
- **Recherche** : RAG for contextual retrieval and generation via LLM.
- **Interfaces** :
 - User → interactive chatbot (Vue.js).
 - Admin → dashboard, Q/A management, and performance monitoring.





Functioning of the RAG System

04

Answer : The LLM returns a structured response containing the synthesized answer in HTML, the sources it relied on, metadata, and redirection options if the information is insufficient or unavailable.

01

Indexing : The MySQL documents are converted into vector embeddings using OpenAI's text-embedding-3-small model and stored in Elasticsearch with a cosine-similarity index for efficient search.

02

Retrieval : When a user asks a question, it is converted into an embedding, and Elasticsearch performs a vector similarity search to find the top-k most relevant documents based on cosine similarity scores.

03

Generation : The retrieved documents (matches) are sent to an OpenAI model along with a system prompt instructing the LLM to synthesize an answer strictly from the provided excerpts, including citations and a structured JSON output.

WatsonX Integration



Initial Approach

Vectorization then RAG on WatsonX via Milvus



Brakes

Lack of tokens, unsupported data sources, not in the team's stack



Solution retenue

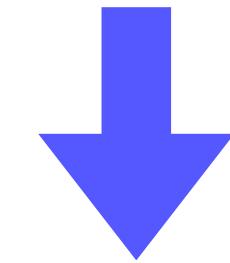
Preprocessing before storage



Valeur ajoutée

Flexibility, query speed, full compatibility with the stack

Thématiques	Écoles
String	String
Scolarité>Absences	f... EMLV ESILV EXECUTIVE
Scolarité>Absences	f... EMLV ESILV EXECUTIVE
Scolarité>Absences	f... EMLV ESILV EXECUTIVE
Scolarité>Absences	f... EMLV ESILV



Search & Replace

Thématiques	Écoles
String	String
Scolarité Absences	f... EMLV ESILV EXECUTIVE
Scolarité Absences	f... EMLV ESILV EXECUTIVE
Scolarité Absences	f... EMLV ESILV EXECUTIVE
Scolarité Absences	f... EMLV ESILV

Self Improvements using logging interactions

Feedback analysis (Similarity vs Satisfaction)

Scenario 1

High Similarity - Low Satisfaction

User Query: "Ma boîte est au Canada, comment faire ma convention de stage?"

Matched (0.92): "Comment créer une convention de stage"

Feedback: 🤦 "Ne répond pas à ma question sur les entreprises étrangères"

Solution Idea : Ajouter des edge cases au dataset (Convention en NA)

Scenario 2

Low Similarity - High Satisfaction

User Query: "Excuser une maladie"

Matched (0.62): "Un certificat médical peut-il excuser une absence?"

Feedback: 👍

Solution Idea : Ajouter des synonymes pour améliorer l'embedding

Smart Suggestions

The Problem

Top 10 Questions = 60% of queries
A waste of users' time and of energy.

Solution

Track Frequency + Satisfaction rate
Display Top 10 at page load

Impact

Better User Experience
Cost Efficiency
Sustainability

Safety First Approach

No Automatique Updates | Admin-Reviewed | Human in the Loop

Results & Perspectives



- Chatbot capable of understanding complex contexts.
- Reduced information search time.
- Admin tool for monitoring and quality control.
- Integrable, scalable solution.



- Integration into the student portal.
- Continuous improvement through data and feedback.
- Ability to add new features (automatic analysis of new tickets, multilingual support, etc.).