

Retrieval Augmented Generation (RAG) system and AI agents for querying Feedipedia information

Integrating Feedipedia into Digital Solutions for Animal Nutrition

- A collaboration between Resilient technologies S.A.S and AFZ
- Presented by: Valérie Heuzé – AFZ

The screenshot displays the Feedipedia website interface. At the top, the 'Feedipedia' logo is prominent, followed by the tagline 'Animal feed resources information system'. Navigation links include Home, About Feedipedia, Team, Partners, Sponsoring, and Contact us. A search bar is located on the left, and a 'Donate' button is on the right. The main content area is titled 'Apple pomace and culled apples'. It features a 'Description' tab, a 'Nutritional aspects' tab, and a 'References' tab. Below the tabs, there are four images: a pile of apple pomace, a diagram of a feed ration, a basket of apples, and a group of ducks. The 'Common names' section lists various names for apple pomace in multiple languages. The 'Species' section lists 'Malus domestica Borkh. [Rosaceae]'. The 'Feed categories' section lists 'Fruits and by-products' and 'Plant products and by-products'. The 'Related feed(s)' section lists 'Grape pomace'. The 'Description' section provides a detailed explanation of apple pomace, its production, and its use in animal feed.

Feedipedia Animal feed resources information system

Home About Feedipedia Team Partners Sponsoring Contact us

Search Feedipedia Search

Sponsored by **ADISSEO** A Bluestar Company

Automatic translation
Sélectionner une langue
Fourni par Google Traduction

Feed categories

- All feeds
- Forage plants
 - Cereal and grass forages
 - Legume forages
 - Forage trees
 - Aquatic plants
 - Other forage plants
- Plant products/by-products
 - Cereal grains and by-products
 - Legume seeds and by-products
 - Oil plants and by-products
 - Fruits and by-products
 - Roots, tubers and by-products
 - Sugar processing by-products
 - Plant oils and fats
 - Other plant by-products
- Feeds of animal origin
 - Animal by-products
 - Dairy products/by-products
 - Animal fats and oils
 - Insects
- Other feeds
 - Minerals
 - Other products

Did you find the information you were looking for? Is it valuable to you? Feedipedia is encountering funding shortage. We need your help to keep providing reference-based feeding recommendations for your animals. Would you consider donating? If yes, please click on the button Donate. Any amount is the welcome. Even one cent is helpful to us!

Apple pomace and culled apples

Description Nutritional aspects Nutritional tables References

Click on the "Nutritional aspects" tab for recommendations for ruminants, pigs, poultry, rabbits, horses, fish and crustaceans

Common names

- Apple pomace [English]; marc de pommes [French]; bagaço de maçã, polpa de maçã [Portuguese]; pulpa de manzana, bagazo de manzana, pomasa, manzana de desecho [Spanish]; Apfelstreter, Trester von Äpfeln [German]
- Culled apples, fermented apples, dropped apples [English]; pommes de retrait, pommes fermentées, pommes au sol [French]; manzana de desecho [Spanish]; verworfene Apfel [German]

Species

Malus domestica Borkh. [Rosaceae]

Feed categories

- Fruits and by-products
- Plant products and by-products

Related feed(s)

- Grape pomace

Description

Apple pomace (*Malus domestica* Borkh.) is the solid residue that remains after milling and pressing of apples for cider, apple juice or puree production (Givens et al., 1987; Kafizadeh et al., 2008). Culled, dropped and damaged apples (broken, injured during plucking, unfit for packing) are available in plenty during the apple season and are sometimes used for feeding livestock.

Feedipedia's website

- Opened in 2012
- 13 million visits as of May 2025
- 25 million page views
- 8.5 million international visitors
- 5000 visits/d (work days)



USA, 15.6%



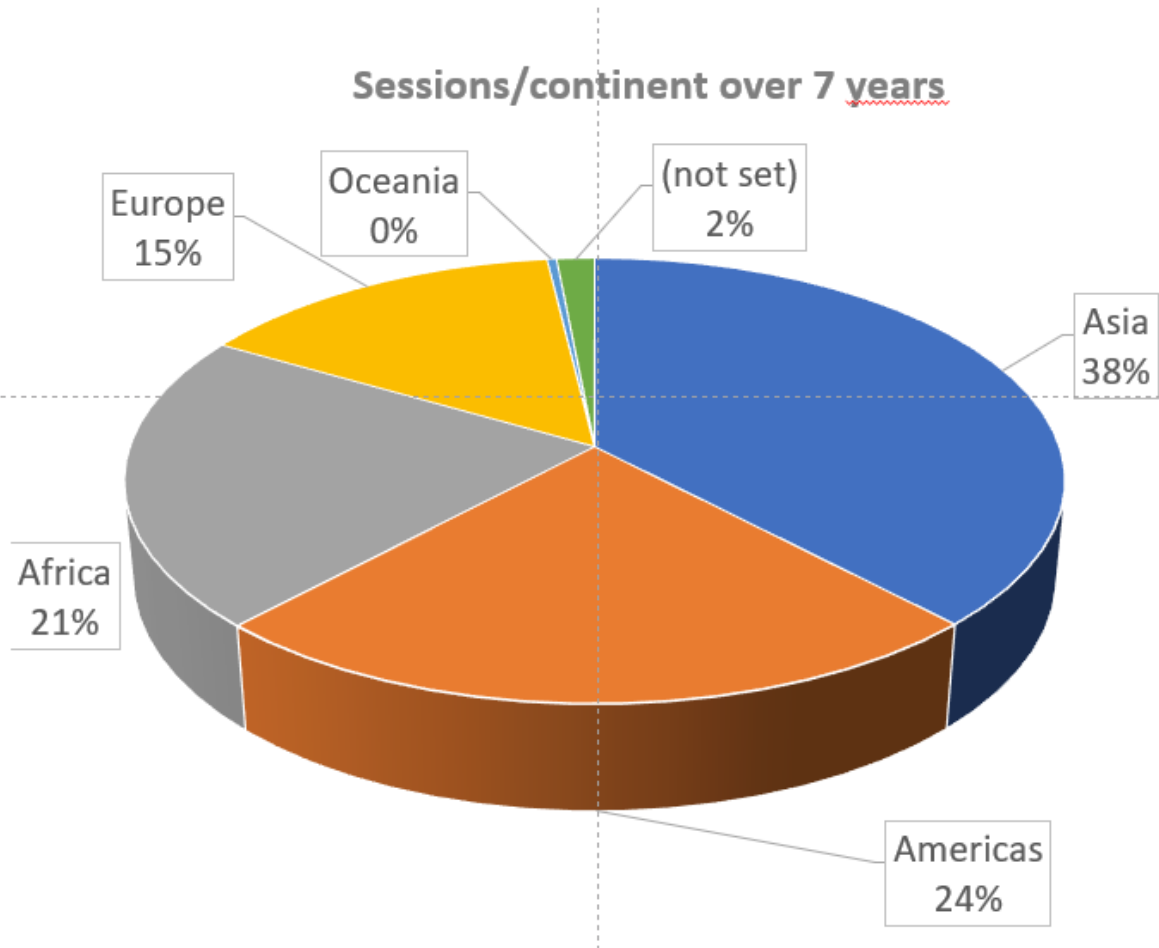
India, 14.0%



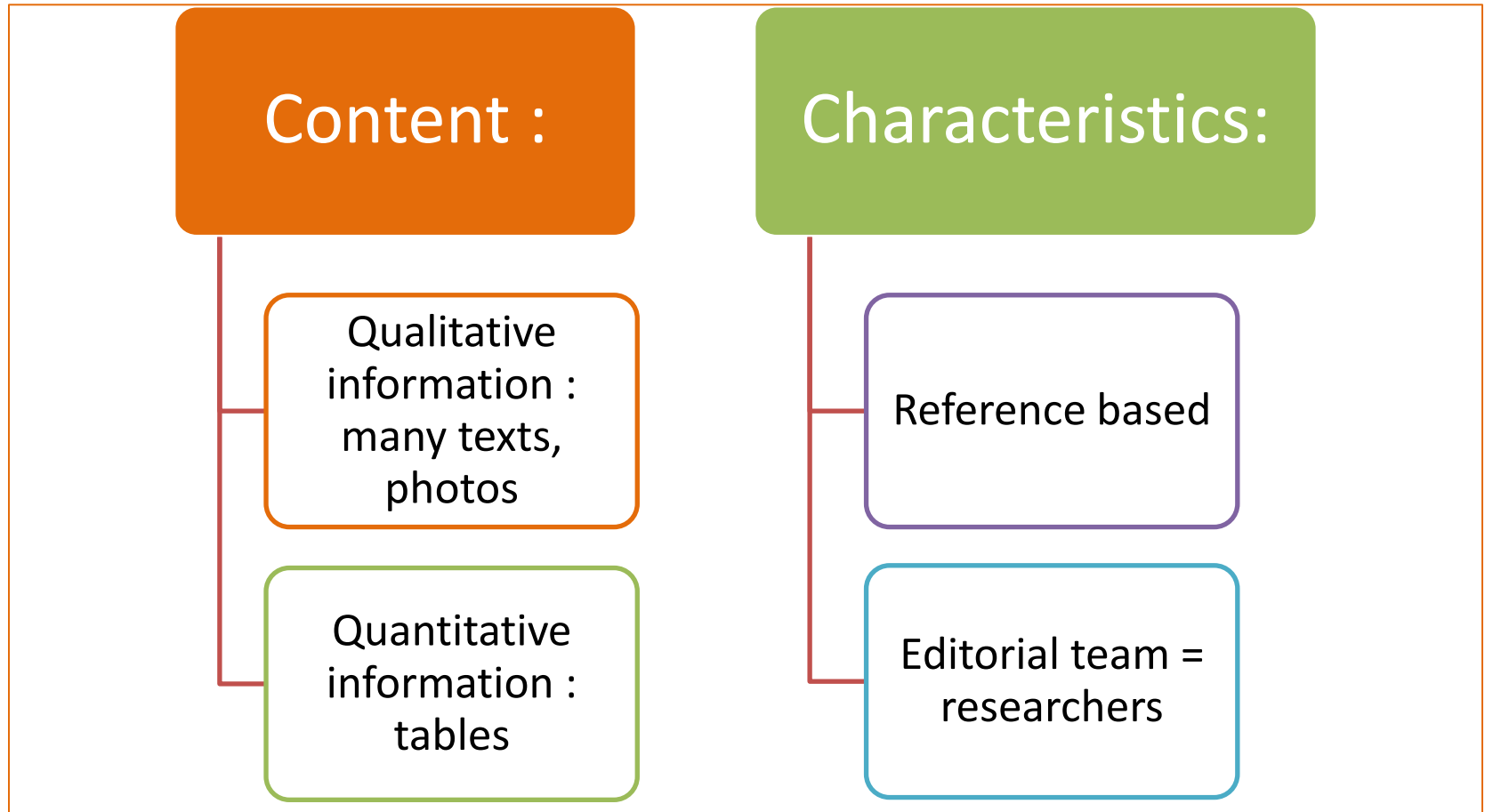
Nigeria, 7.8%



Philippines, 6.6%



Feedipedia : an encyclopedia



Related constraints



Huge amount of information but limited search functionality



Structural (nodularity) challenge : Hard to identify key insights, connect different entries, and generalize knowledge



Tables : not downloadable, hard to extract, not queryable



No visualization tools : lacks comparative graphs and analytical features.

How it started?

- Initial question: Can Feedipedia data be leveraged for research and product development?
- Talk on 'Big Data and AI in Animal Nutrition' at X International Poultry Nutrition Seminar (Amevea)-WPSA



Project objective : ease Feedipedia's users experience



EASILY SEARCH FEEDIPEDIA
IN NATURAL LANGUAGE
USING AN AGENT



MAKE DATA AVAILABLE VIA
AN API FOR EXTRACTION



PROVIDE SOFTWARE TOOLS
FOR VISUALIZATION AND
ANALYSIS

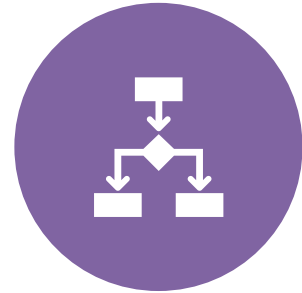
Phases Overview



- PHASE 1: WEB SCRAPING



- PHASE 2: API DEVELOPMENT



- PHASE 3: DECISION SUPPORT SYSTEMS

Phase 1 - Webscrapping



Tool: R (Rvest package for webscraping and “Polite” library for ethical scraping)



Modular process: Nutritional tables + metadata (pending revision, etc)

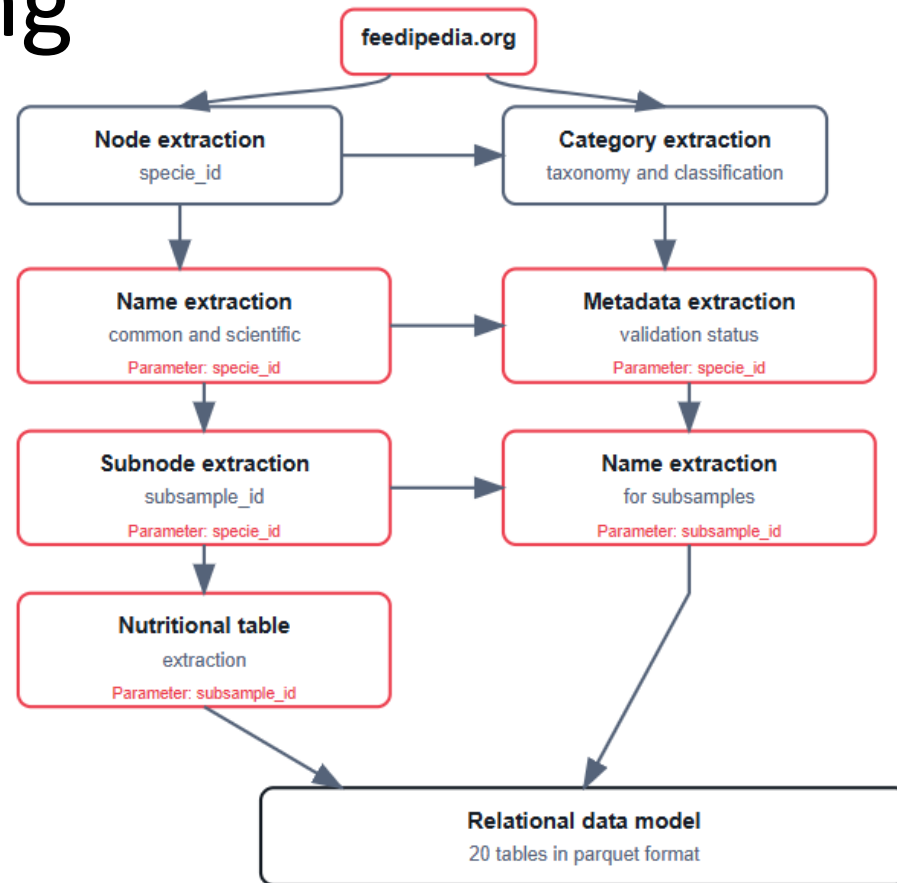


Output: Parquet files



Outcome: Initial database + relational model

Webscrapping flow from Feedipedia to Parquet files



- No parameters
- With parameters
- Result

Phase 2 – API Development



- API REST built using R's Plumber package



- Output format: JSON

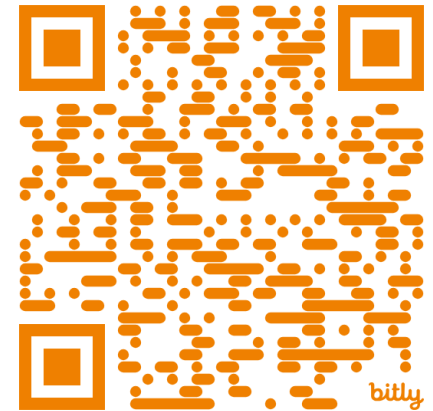


- Future tools: Developer libraries for R and Python



- Deployment: Cloud or local servers (to decide)

Outputs: API



 Plumber 1.1.0

<https://api-feedipedia-1042514922887.us-central1.run.app/openapi.json>

LOCAL JSON FILE

Feedipedia API 1.0.0

API para acceder a datos nutricionales de especies vegetales para nutrición animal

1.

GET /ping

Verifica si la API está funcionando

2.

GET /species

Obtiene la lista de todas las especies disponibles

3.

GET /species/search

Busca especies por nombre común o científico

4.

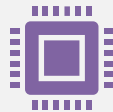
Phase 3 – Decision Support Systems



- Visualization tools: dashboards, graphs, tables



- AI agent (Feedibot): NLP-based system

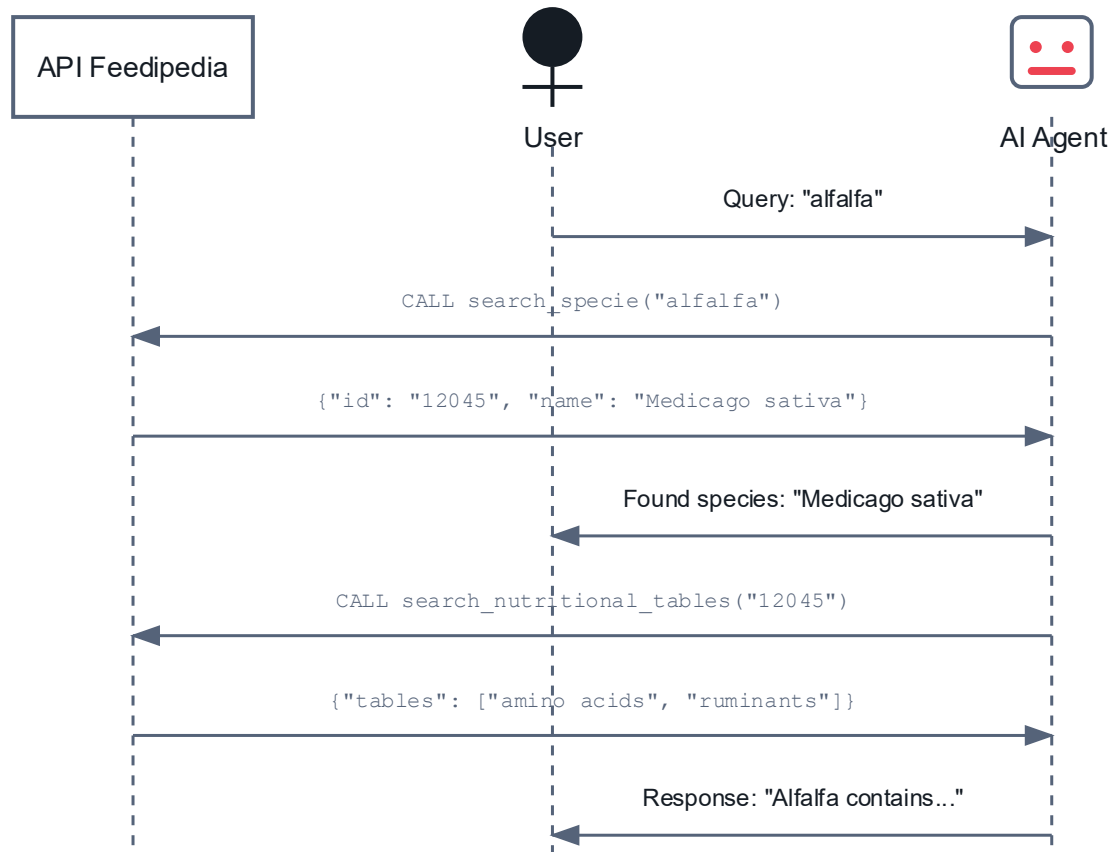
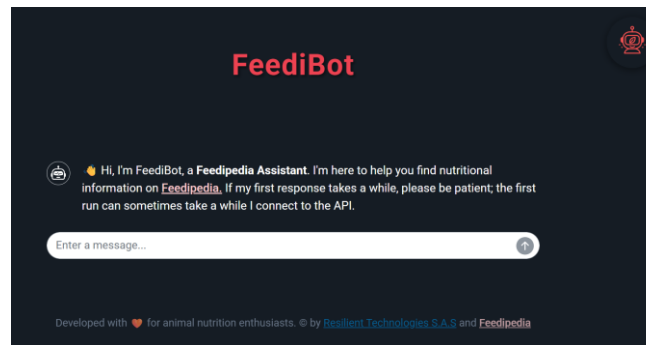


- Integration with R/Python packages



- Long-term: ML models for prediction and pattern recognition

Outputs



<https://feedibot-1042514922887.us-central1.run.app/>

Data Extraction with R

1. rvest
2. tidyverse
3. polite
4. arrow
5. Others

API Development with R

1. plumber
2. rapidoc
3. googleCloudStorageR
4. tidyverse
5. Others

Feedibot Development with Python

1. shiny
2. chatlas
3. pyarrow
4. pandas
5. Others



Git - Github



RStudio

Studio

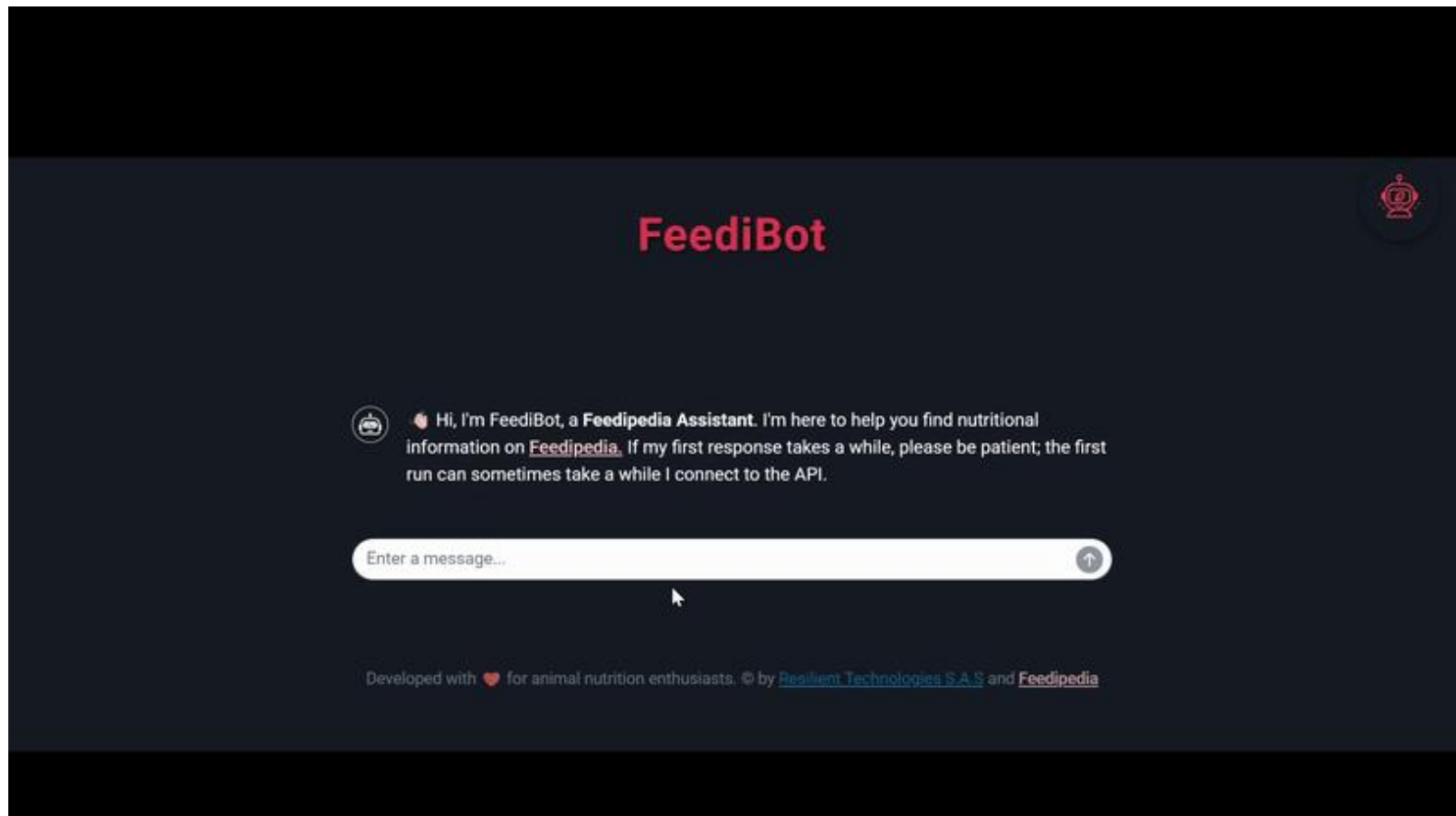


Visual Studio
Code



Quarto

Coming soon on Feedipedia !



Benefits & Impact



- Easier access to Feedipedia's nutritional data



- Supports research and decision-making in animal nutrition



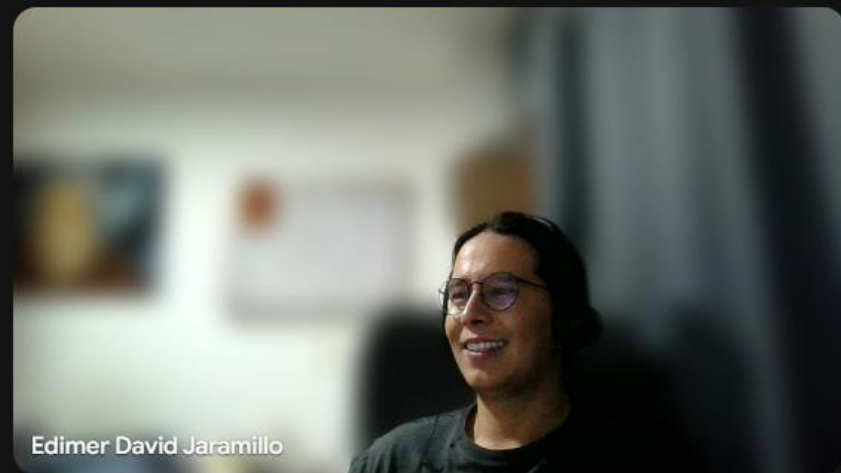
- Scalable, maintainable, and innovative architecture

Conclusion

- Strategic partnership combining data, technology, and science

- Feedipedia becomes more accessible and functional

- Preparing future tools, products, and research



More about our teams

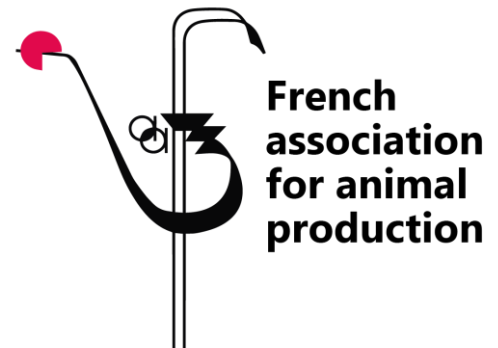
- Resilient Technologies S.A.S (Colombian start-up -> data-driven solutions):

- Specialized in data science, AI, and development of data products
- Mission: Transform data into valuable tools across sectors
- <https://restec.com.co/>



- AFZ (French association for animal production)

- Specialized in feed characterization and animal feeding
- Manager, writer and editor of Feedipedia
- <https://zootechnie.fr>



Thank you for your attention!



Happy to answer any questions.



Contacts :

[Valérie Heuzé :](mailto:valerie.heuze@zootechnie.fr)
valerie.heuze@zootechnie.fr

[Gilles Tran : gilles.tran@zootechnie.fr](mailto:gilles.tran@zootechnie.fr)

[Restec Team : servicios@restec.com.co](mailto:servicios@restec.com.co)