EcoParse

Automated Species-Level Data Extraction Tool

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MOBI Lab

LIVING DATA 2025

Faculty of Environmental Sciences

INTRODUCTION:

The Problem:

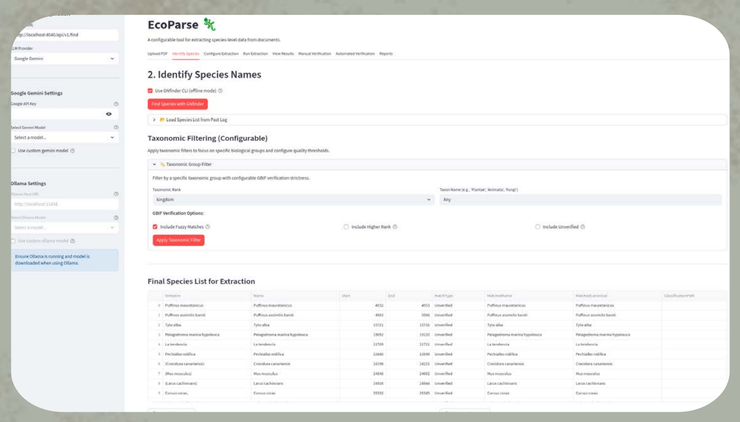
Valuable species-level data are often hidden in various sources.

For large-scale analyses, data must be extracted accurately and manually. This can take many human hours.

In our case:
Thousands of Regional Redlists
RegRed Project

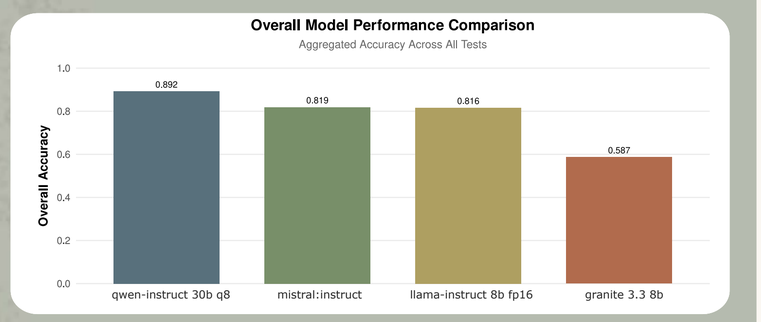
Our Solution:

A pipeline that combines NLP with contextual chunking and existing LLM's into a GUI.
Provided as a Docker image.



Accuracy:

We tested against 8 Redlists and compared 4 local models with identical settings between runs.
We used a 20GB VRAM GPU.



Best performer = Qwen-instruct
~ 89 % mean accuracy

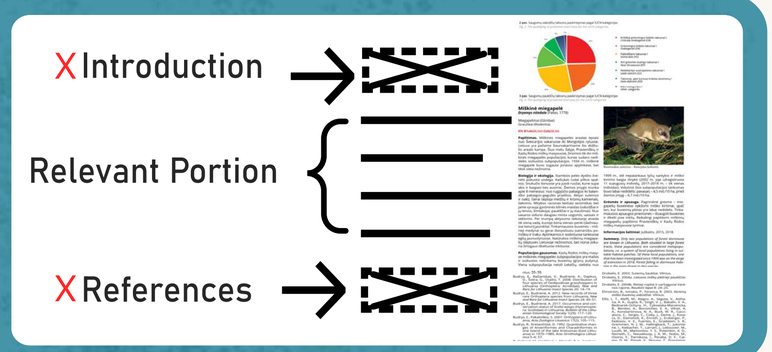
Try it out, contribute:

github.com/AdamUlicny/EcoParse

PIPELINE OVERVIEW:

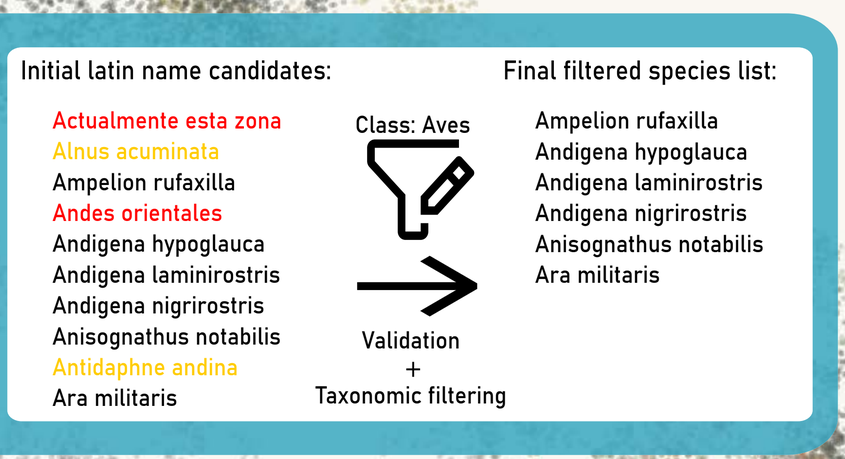
File Preparation

Trim irrelevant sections.
This step focuses the extraction and reduces all API calls.
Fewer FP's and tokens used.



Species names

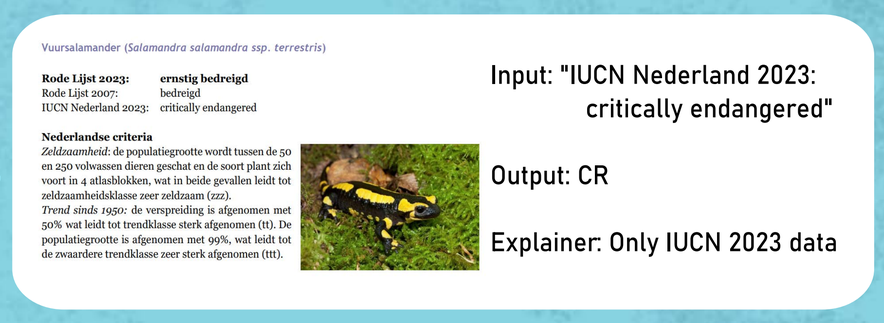
GNFinder Locates potential latin names in text.
GBIF API filtering further focuses extraction on relevant taxons.
Anchoring the extraction process.



Examples

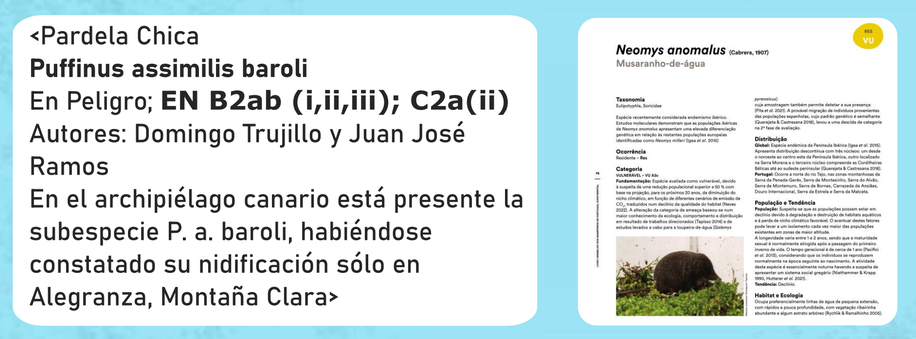
For better results, we guide the LLM by providing examples.

Few-shot prompting technique.



Chunking

For each species, contextual chunks are created.
Text chunks are quicker and cheaper to process.
Image preserves structure at a higher cost (tokens).



LLM parsing

For each species in the filtered list, a separate API call is created.
Including: **base prompt + custom data fields + context chunks + examples.**
EcoParse supports **Ollama** (local) or **Gemini** (cloud, paid tier).
With some experience, data from a 500 page PDF can be extracted in less than 5 minutes. **Manual verification** is still **crucial for perfect results**.

Download the data!

Sample raw output from EcoParse:

Species	Status	Criteria
Gavia immer	VU	D1
Podiceps nigricollis	NT	VU D1
Podiceps cristatus	NF	NF
Bulweria bulwerii	EN	B2ab(ii,iii,iv)
Asio otus	NF	NF
Larus cachinnans	NF	NF
Calonectris diomedea diomedea	EN	A3cde
Bubo bubo	NF	NF
Calonectris diomedea borealis	VU	A3d+4d
Puffinus puffinus	EN	B2ab(ii,iii); C2a(ii)
Puffinus mauretanicus	CR	A3ace+4ace; B2ab(ii,iii,iv,v); E
Balear nidifica	NF	NF
Puffinus assimilis baroli	EN	B2ab(i,ii,iii); C2a(ii)
Pelagodroma marina hypoleuca	VU	NF
Pechialbo nidifica	NF	NF

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