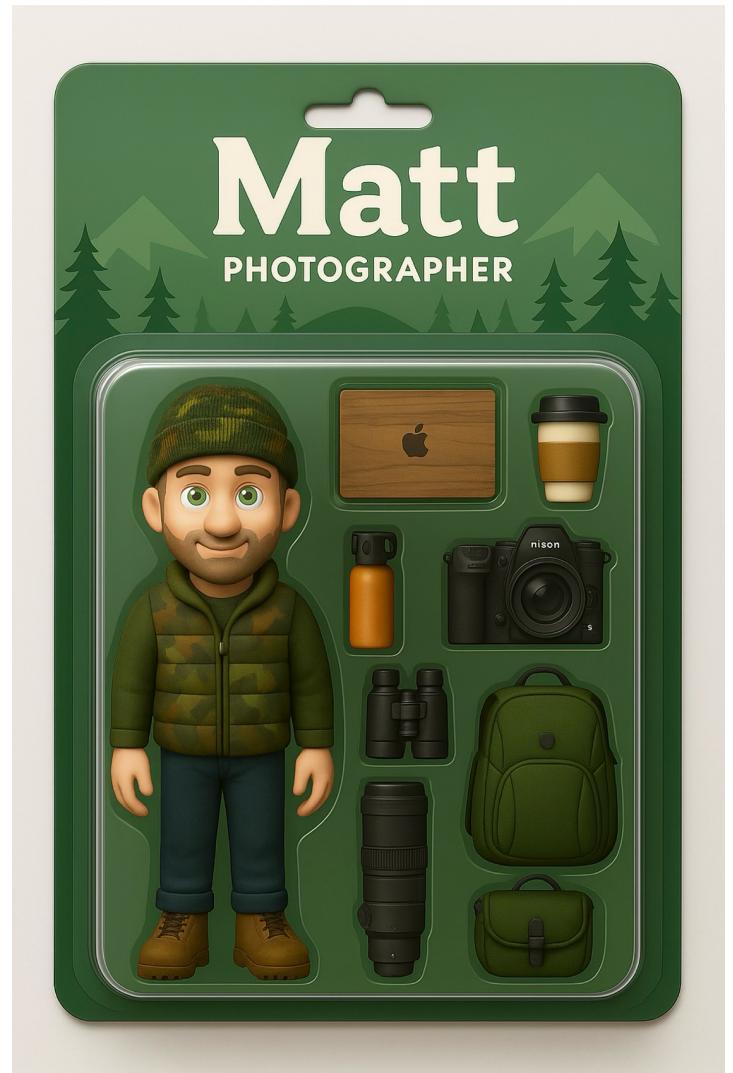


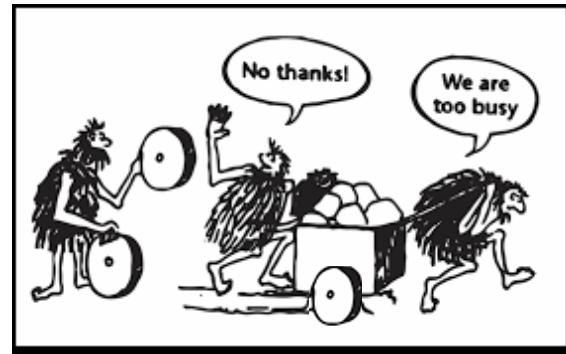
Wildlife Image Processing
& Semantic Search
System V2

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Why Continue?



Deploy ⋮

 Home

 Ingestion Pipeline

 Validation

 Species Detection

Analysis

 Analysis Explorer

 Exploration / Search

Tools

 One-Off Species Scraper

 Database & File Clean-up

 Geocode & Update Image Locati...

 Regenerate Image Embeddings

 Regenerate Text Embeddings

Appendix

 Project Overview

 Complete Wildlife Image Proces...

 References

[View less](#)

 Sections

Home

Wildlife Image Processing & Semantic Search System

This project presents the development of a modular, AI-enhanced system for processing, classifying, and retrieving wildlife images and videos. It integrates traditional computer vision techniques with advanced semantic understanding powered by Large Language Models. The platform supports manual and AI-assisted annotation, stores visual metadata and embeddings, and enables intuitive natural language queries to discover relevant visual content. By enabling contextual insights and advanced search capabilities, the system transforms how wildlife media can be explored and utilized.



Brown Bear

Confidence: 0.738

mammalia, carnivora, ursidae, ursus, arctos, brown bear



American Bison

Confidence: 0.9952

mammalia, cetartiodactyla, bovidae, bison, bison, None, american bison



Owl

Confidence: 0.322

aves, strigiformes, owl

Agenda

- Back to the Future
- Project Goals
- Tag Responsibly
- Under the Hood
- AI Species Identification
- 88 MPH Achieved!
- Q&A



Project Goals

- Boost accuracy and improve species identification through multi-model AI (LangGraph, embeddings, SpeciesNet).
- Enhance images using OpenCV to improve quality before analysis.
- Lay the groundwork for training models using my own wildlife images.
- Make services and tools accessible to everyone.
- Protect what matters by addressing privacy concerns for wildlife and locations.



Tag Responsibly

Protecting Wildlife Through Mindful Labeling and Geotagging

- Generalize locations for sensitive areas — e.g., “Yellowstone, Boulder, etc.” instead of exact GPS coordinates.



Tag Responsibly

How it Fits in the New Architecture



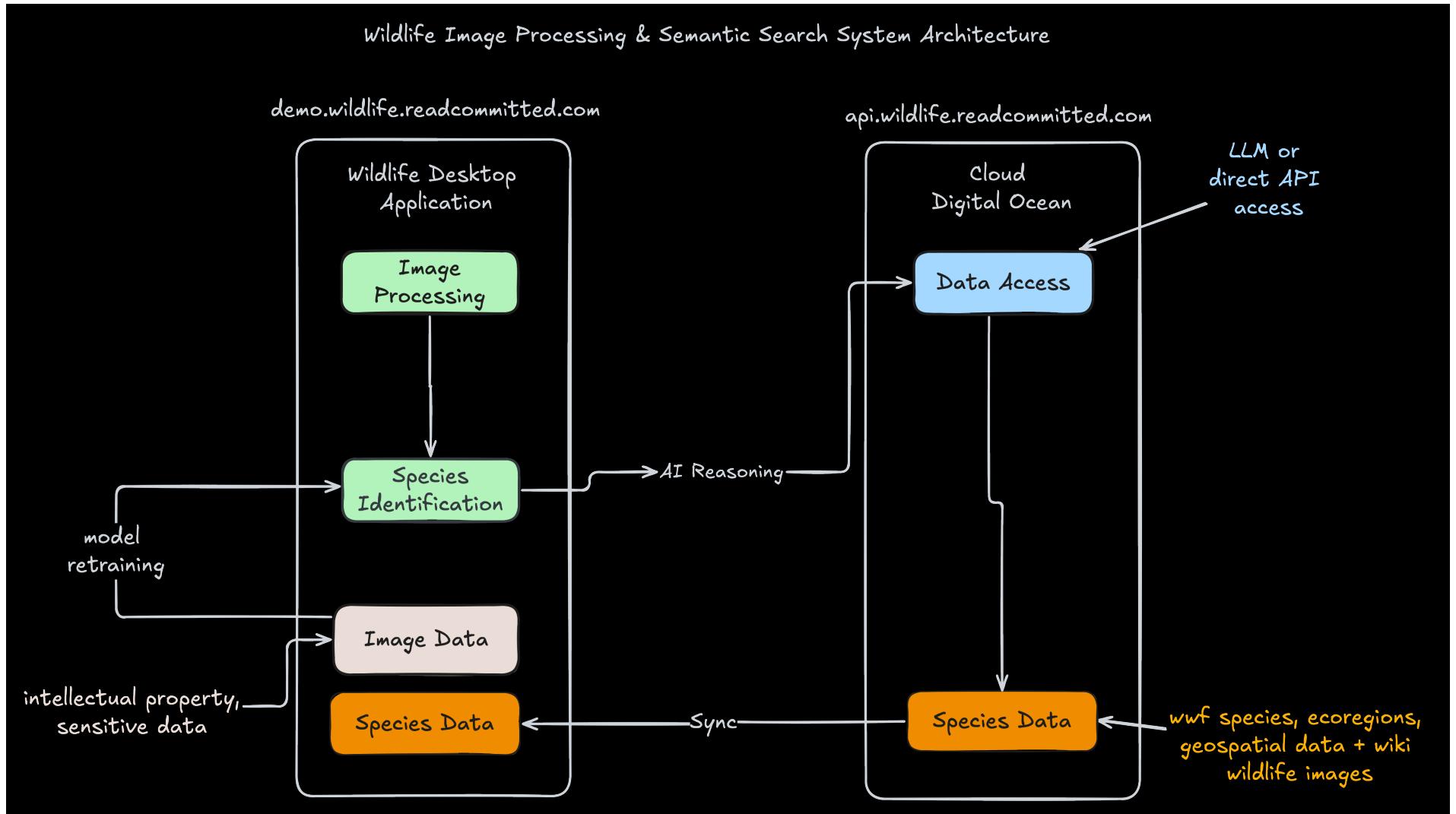
- Desktop Application (Standalone Container for the Application). Protecting IP and wildlife from unnecessary exposure.
- Cloud (AI + Data Access for Species & Geospatial Data Model).



The Architecture

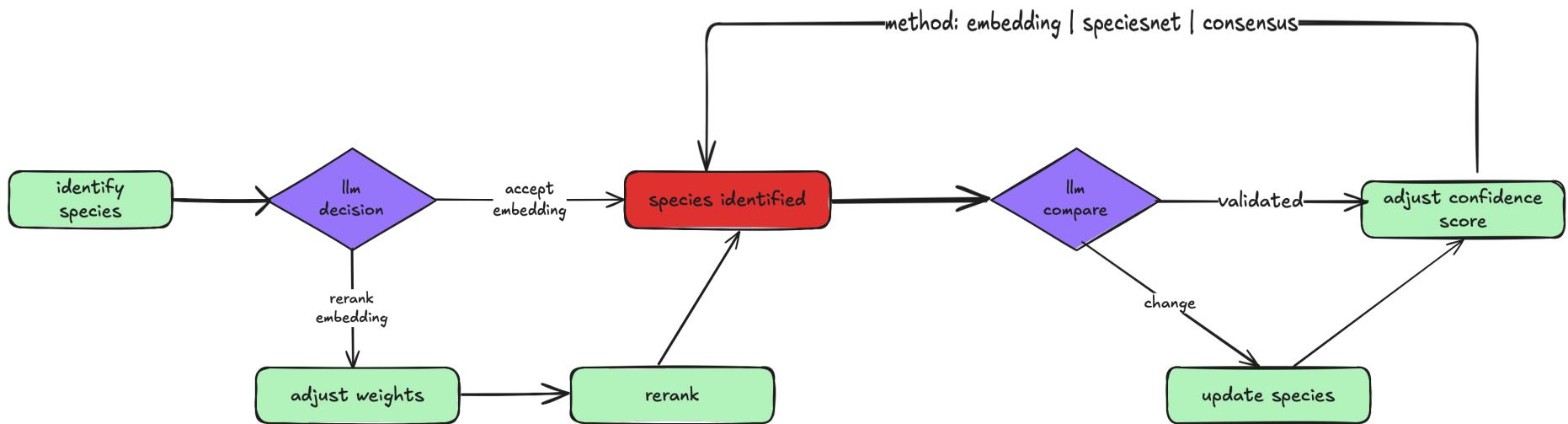
Under the hood

Wildlife Image Processing & Semantic Search System Architecture



AI Species Identification

Multi-Model Species Identification and Arbitration

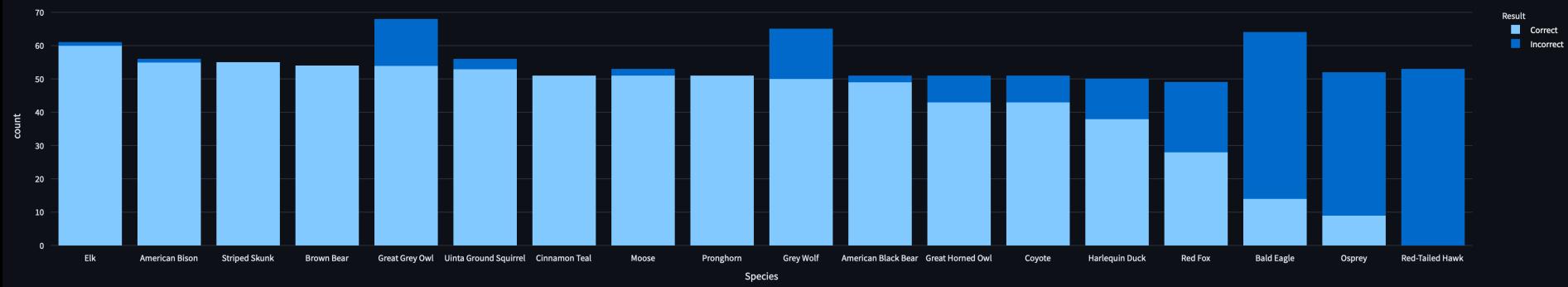


Clip Embedding Analysis



Accuracy: 758 / 991 = 76.49%

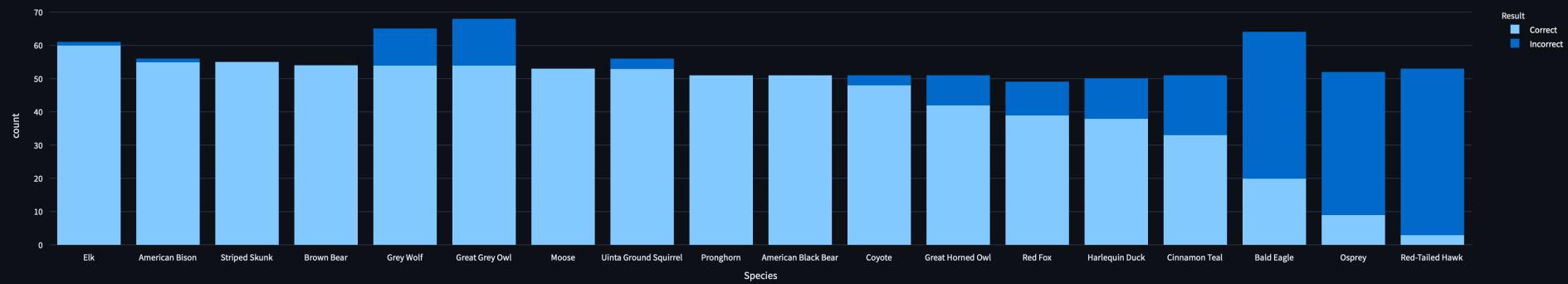
Prediction Outcomes by Species



Multi-Model Analysis

Accuracy: 772 / 991 = 77.90%

Prediction Outcomes by Species





A painting of a silver DeLorean time machine driving down a wet street at night. The car is angled towards the left, leaving a trail of orange fire on the asphalt. In the background, there's a building with a sign that says "SCHOOL" and "RECORDS". To the right, another building has signs for "COFFEE" and "SANDWICHES". The sky is dark with bright, glowing blue and orange streaks of light, suggesting lightning or a time vortex. The overall mood is mysterious and futuristic.

How do we achieve 88 MPH?



Photo: DeLorean Time Machine, 2025: <https://www.deloreantimemachines.com/>



>89% Accuracy

Custom-trained SpeciesNet Model on 450+ images

demo.wildlife.readcommitted.com

From Project Goals to Results

- Deployed to cloud, exposed APIs & LLM, containerized desktop application
- 30% -> 60% -> 80% accuracy (embeddings + SpeciesNet + LangChain)
- Built color palette for each species and Estimated relative size using camera properties
- Fine-tuned SpeciesNet on my photos Delivering > 89% accuracy
- IP stays local in within desktop application, Cloud holds only generalized, shareable insights



Q&A



Appendix



Power of the model

Species	Confidence
Red-Tailed Hawk	99.8%
Bald Eagle	0.002%
Great Horned Owl	0.002%

Species	Confidence
Coyote	97.7%
Grey Wolf	0.7%
Red Fox	0.3%

Species	Confidence
American Bison	97.8%
Moose	0.5%
Brown Bear	0.3%

Species	Confidence
Bald Eagle	99.5%
Red-Tailed Hawk	0.001%
Osprey	0.0004%



CLIP Similarity: 'American Bison' vs. Other Species in South Central Rockies forests

