Animal Species Classification Using Deep Learning

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Tier 1

The Problem

- Problem: Identifying animal species from images can be time-consuming and requires expert knowledge.

- Who cares: Wildlife researchers, conservationists, and biodiversity organizations.

- Why it's important: Automating species identification helps speed up wildlife monitoring and supports biodiversity research efforts.

My Solution

- An image classification system that takes an animal image and predicts the species along with a confidence score.

- How it works:

Image → Preprocessing → CNN model → Species prediction + probability

Technical Approach

- Computer Vision Technique: Image Classification
- Model: ResNet or EfficientNet (pre-trained)
- Framework: PyTorch or TensorFlow

Justification:

Pre-trained CNN models are well-suited for image classification and allow effective transfer learning with limited training data.

Data Plan

- Source: Public wildlife datasets such as iNaturalist
- Collection Type: Public, labeled dataset
- Size: Thousands of images
- Labels: Animal species names
- Preparation: Resize images, normalize pixel values, split into training and testing sets

System Diagram

- [Input Image] → [Image Preprocessing] → [CNN Model] → [Predicted Species + Probability]

Success Metrics

Metric Type	Metric	Target
Primary	Classification Accuracy	≥ 80%
Secondary	Inference Time	< 1 second per image

Week-by-Week Plan

Week	Task	Milestone
10	Select dataset, set up environment	Dataset ready
11	Configure model and baseline training	Model working
12	Evaluate and improve performance	Improved accuracy
13	Test model and generate outputs	Demo results ready
14	Documentation and final testing	Project finalized
15	Presentation	🎉 Presentation day

Challenges & Backup Plans

- Challenge: Dataset too large or complex
- Plan B: Limit the number of species/classes
- Challenge: Accuracy lower than expected
- Plan B: Apply data augmentation or adjust model choice

Resources Needed

Resource	Options / Notes
Compute	Google Colab (free GPU)
Frameworks	PyTorch or TensorFlow
Estimated Cost	$0