

Cat Model

Team: Olivia Tirso & Alexandra Mallqui



Our Team



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01

Introduction

Why we chose this topic...





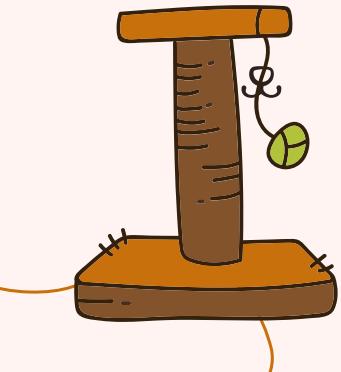
Why?

The Problem

- 1.4M cats lack homes; shelter overcrowding peaks during kitten season (April–October)
- Lost pets and unneutered strays add to shelter challenges

The Solution: AI-Powered Detection

- Automates classification of kittens and cats
- Optimizes space and resources
- Increases adoption visibility
- Reduces manual workload for shelter staff
-



02

Dataset

Cat Distribution...



Cat Breeds



Abyssinian



Bengal



Birman



Bombay



British Shorthair



Egyptian Mau



Maine Coon



Persian



Ragdoll



Russian Blue

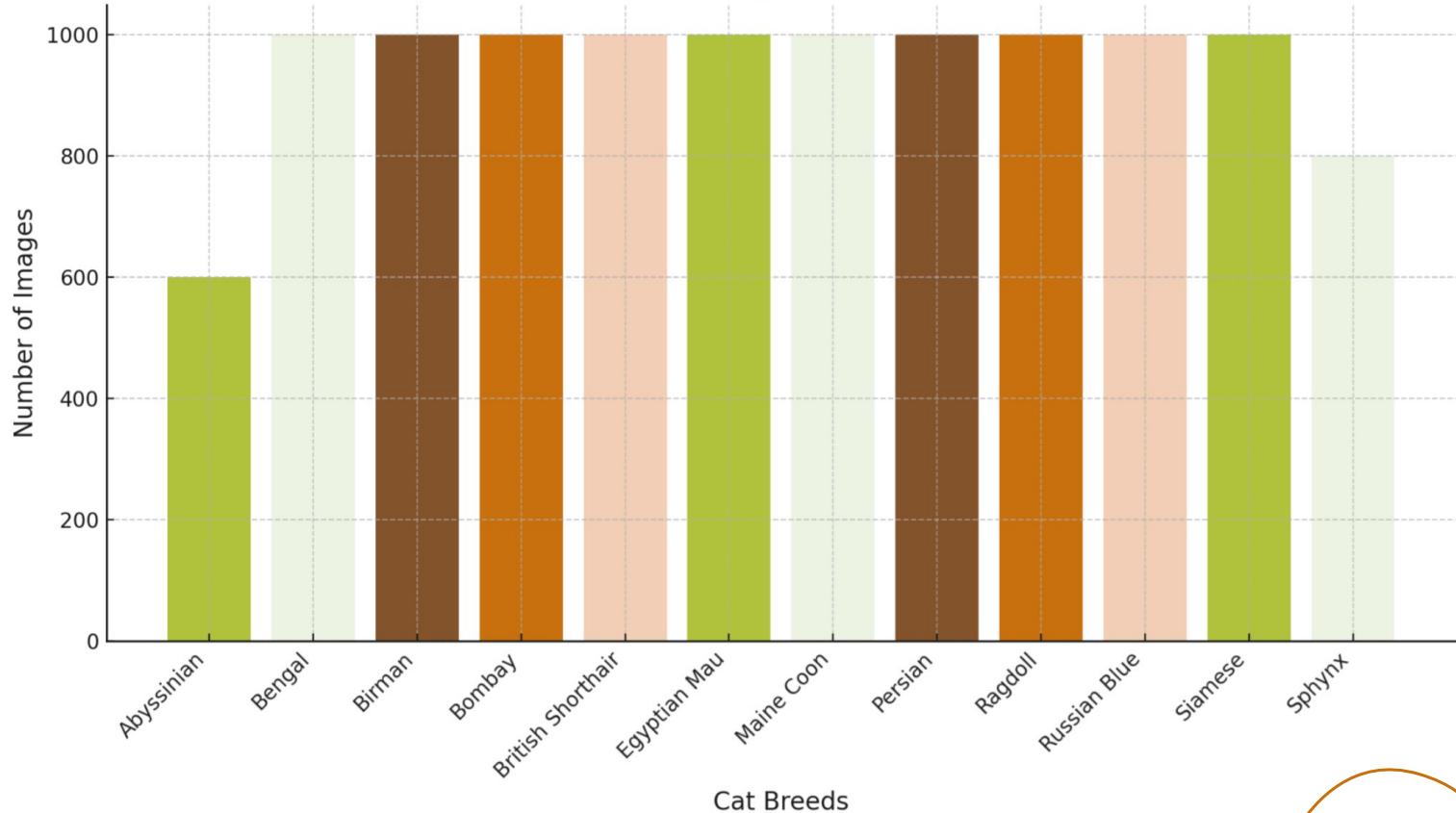


Siamese



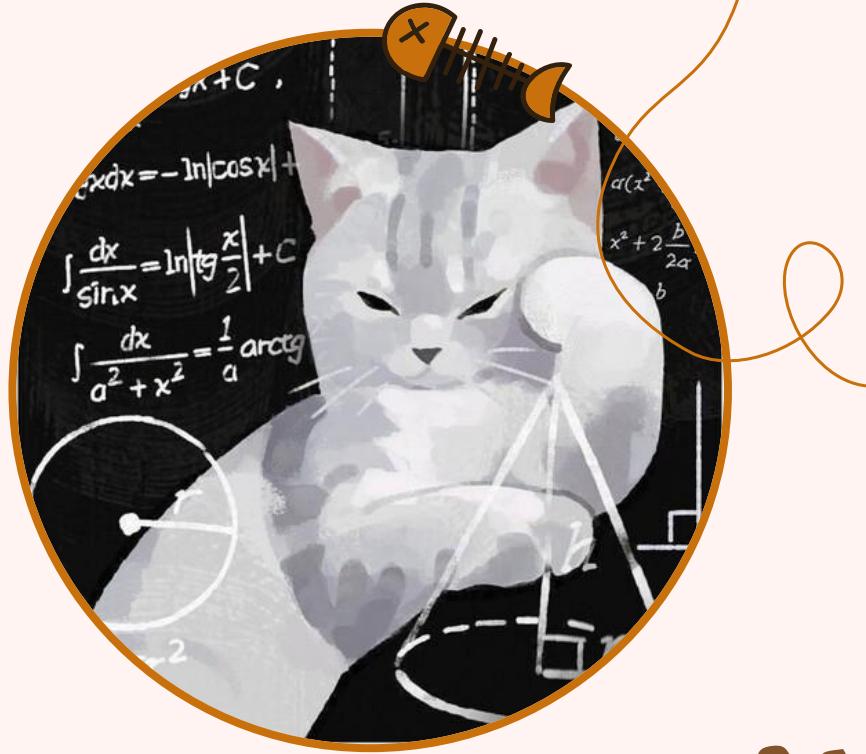
Sphynx

Distribution of Images Across Cat Breeds



03

Evaluation Metrics



Three metrics we chose:



Accuracy

measures the proportion of correctly identified cat breeds out of all predictions made by the model.



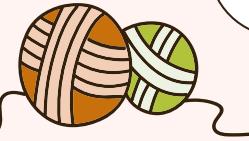
Precision

measures the proportion of correct predictions for a specific breed out of all predictions made for that breed.

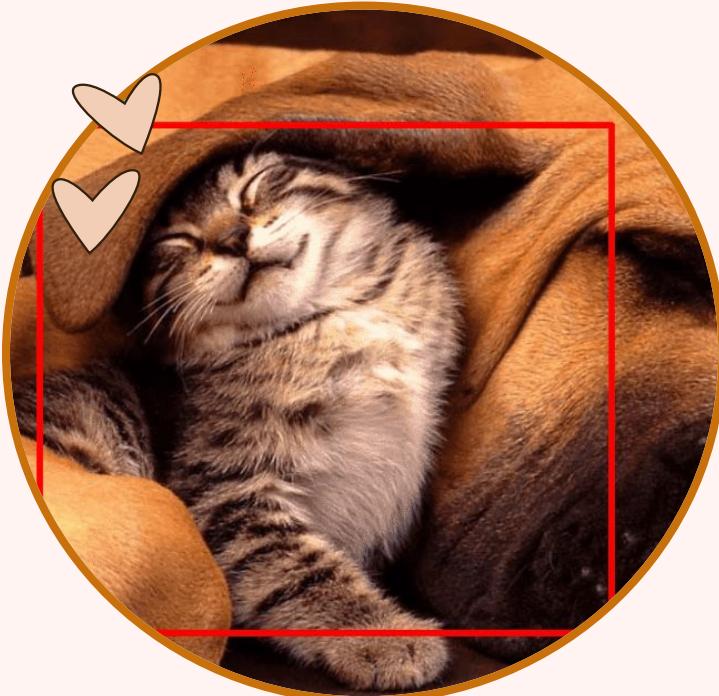


Recall

measures the proportion of actual instances of a breed correctly identified by the AI model.



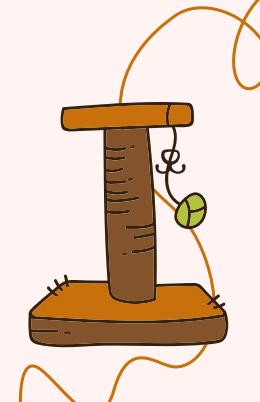
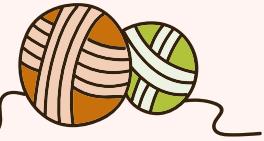
Formulas:



$$\text{Accuracy} = \frac{(TP + TN)}{(TP + FP + TN + FN)}$$

$$Precision = \frac{TP}{TP + FP}$$

$$Recall = \frac{TP}{TP + FN}$$



04

Training Methods





Methods (4):

Model Prediction

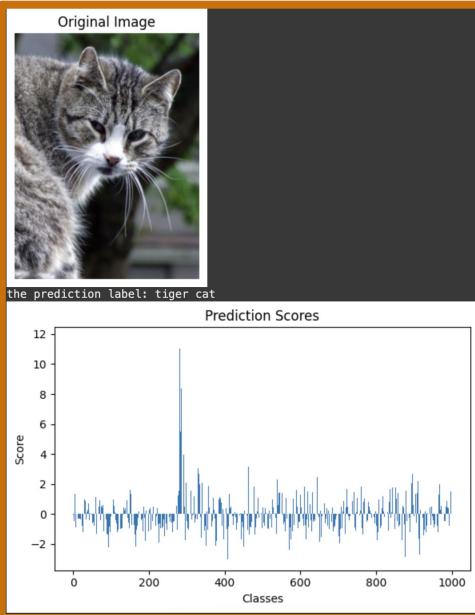
Deep Learning for Image Classification

GitHub Image Classification

Custom Method



1. Model Prediction



The process of using a model to estimate or predict outcomes:

- A. Load
- B. Prep
- C. Classify
- D. Print

2. Deep Learning



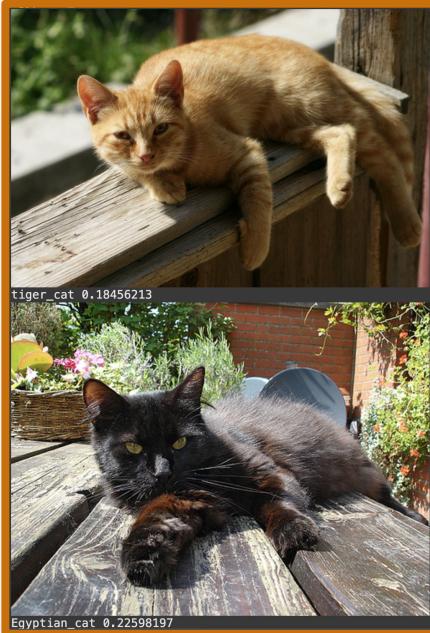
Results

Machine Learning technique that uses neural networks to assign labels to images based on their features.

Features:

- Early stopping
- Visual results
- Training Progress

3. Github Image Classification



Results

A process that classifies an image according to its visual content

Features:

- Loads the ResNet50 model pre trained on ImageNet to perform image classification
- Stacks all preprocessed images into a single batch for efficient prediction

4. Custom Method

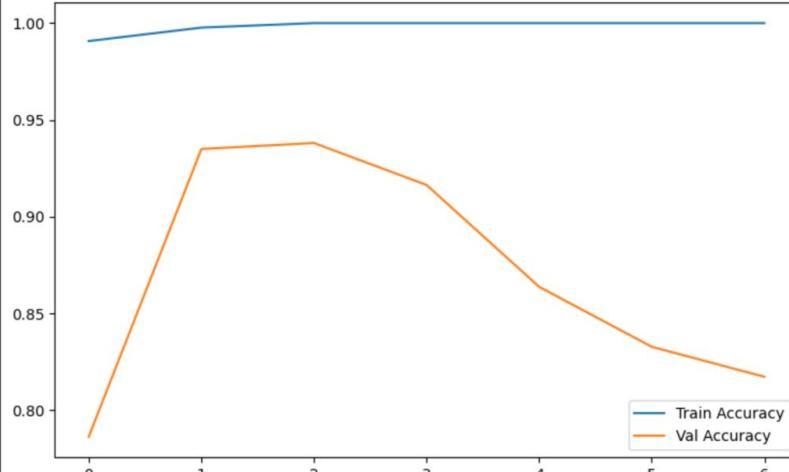
Systematically trains a CNN for each class in the dataset

Features:

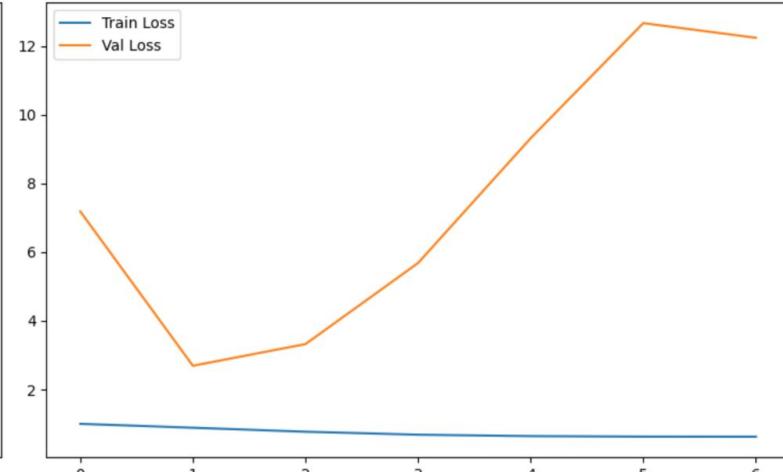
- Leverages data augmentation, class weighting, and training callbacks to ensure robust and efficient training, with detailed visualizations for performance tracking.

True Labels: [0. 0. 0. 0. 0. 0. 0. 0. 0. 0.]
Predictions: [2.0209180e-08 0.0000000e+00 7.7899136e-02 2.7271101e-22 4.5857911e-26
0.0000000e+00 6.1625328e-18 1.2852159e-38 3.3179251e-32 0.0000000e+00]

CAT_01 Accuracy



CAT_01 Loss



Training for class: CAT_02

Found 1406 images belonging to 2 classes.
Found 351 images belonging to 2 classes.

Results

05

Comparative Analysis



Methods	Advantages	Limitations	Applications
1. Model Prediction	Simple and fast	Limited by dataset	Quick predictions
2. Deep Learning	High accuracy, pre trained knowledge	Requires computational resources	Large scale image classification
3. Github Image Classification	Robust training, generalizable models	Time consuming to train for multiple classes	Binary classification tasks
4. Custom Method	Tailored for specific needs, highly configurable	Requires tuning and debugging	Fine grained image classification

06

Future Work





"With innovative solutions and community support, we can create a brighter future for cats and reduce shelter overcrowding."

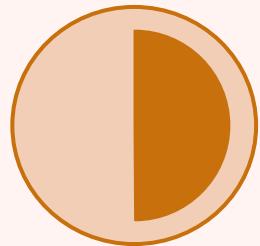
07

Team Contributions



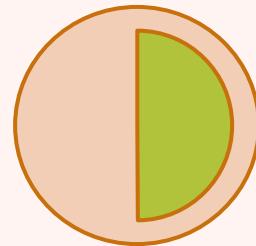
Workload for each member:

50%



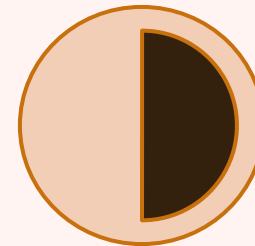
Methods

50%



Debugging

50%



Presentation



THANKS!

Do you have any questions?

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