Dogs vs. Cats

Classification Project

1. Project Introduction

KAGGLE · PLAYGROUND PREDICTION COMPETITION · 10 YEARS AGO

Dogs vs. Cats

Create an algorithm to distinguish dogs from cats

Training data contains 25,000 images of dogs and cats.

Overview | Data | Code | Models | Discussion | Leaderboard

Overview

Start
Sep 25, 2013

Close
Feb 1, 2014

#	△	Team	Members	Score	Entries	Last Solution
1	—	Pierre Sermanet		0.98914	5	10y
2	▲ 4	orchid		0.98308	17	10y
3	—	Owen		0.98171	15	10y
4	—	Paul Covington		0.98171	3	10y
5	▼ 3	Maxim Milakov		0.98137	24	10y
6	▼ 1	we've been in KAIST		0.98102	8	10y
7	▲ 1	Doug Koch		0.98057	6	10y
8	▲ 2	fastml.com/cats-and-dogs		0.98000	6	10y

Project Understanding

Objective

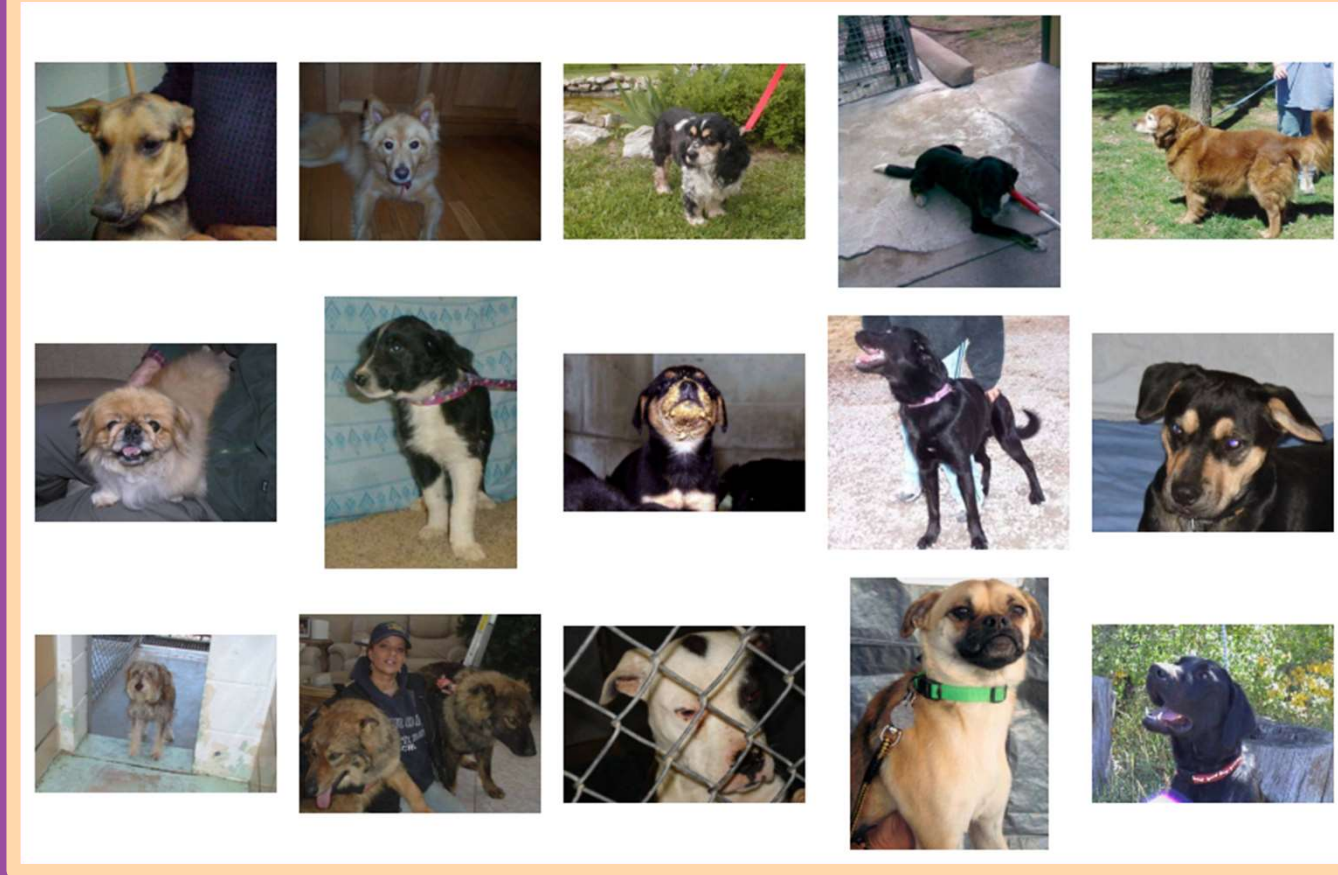
1. Try Different Models
2. Visualize Performance
3. Achieve 99% Accuracy

Challenge

1. Computation Power
2. Overfitting Underfitting
3. Preprocessing Method

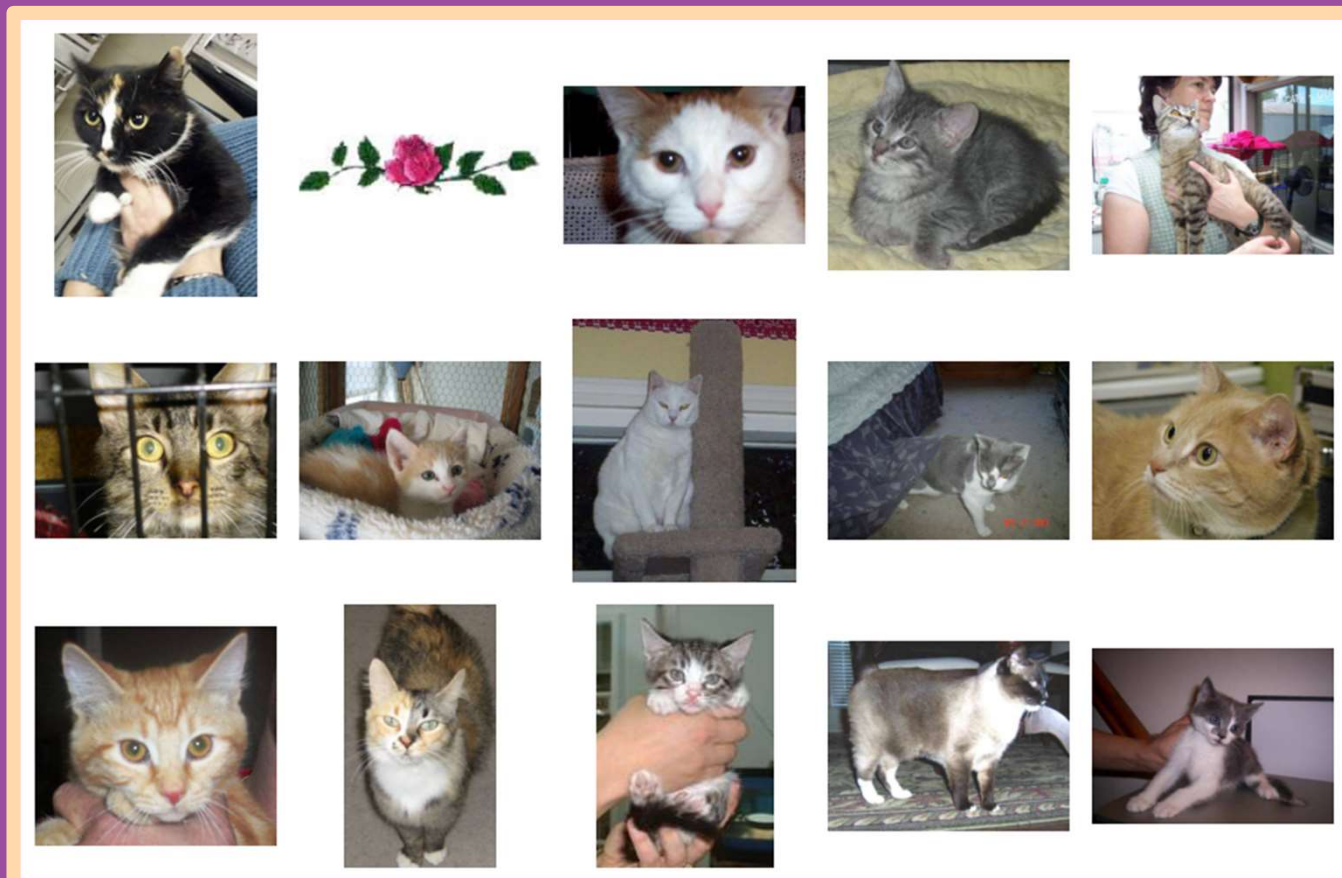
2. Exploratory Analysis

Dogs Sample Preview



Shape

Cats Sample Preview

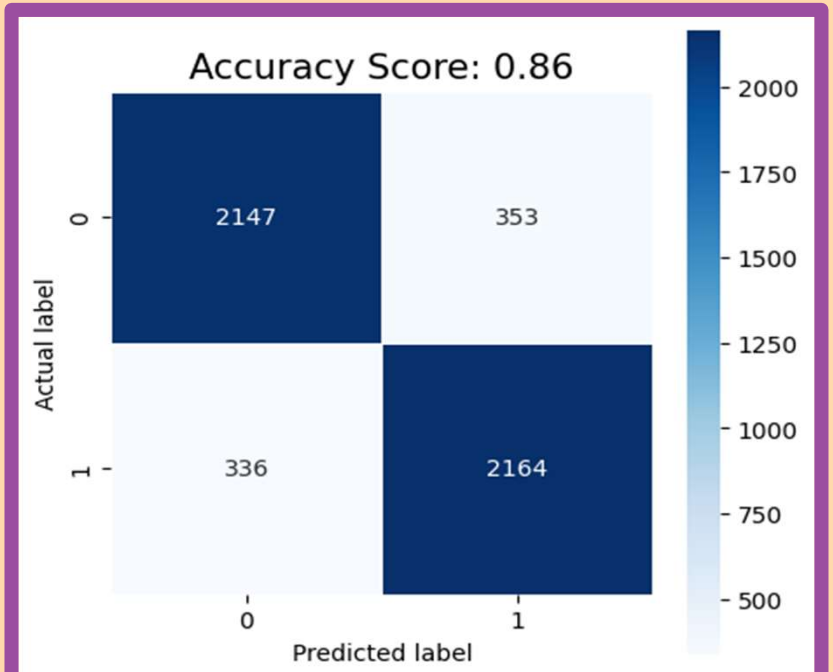


Noise

3. Simple Model

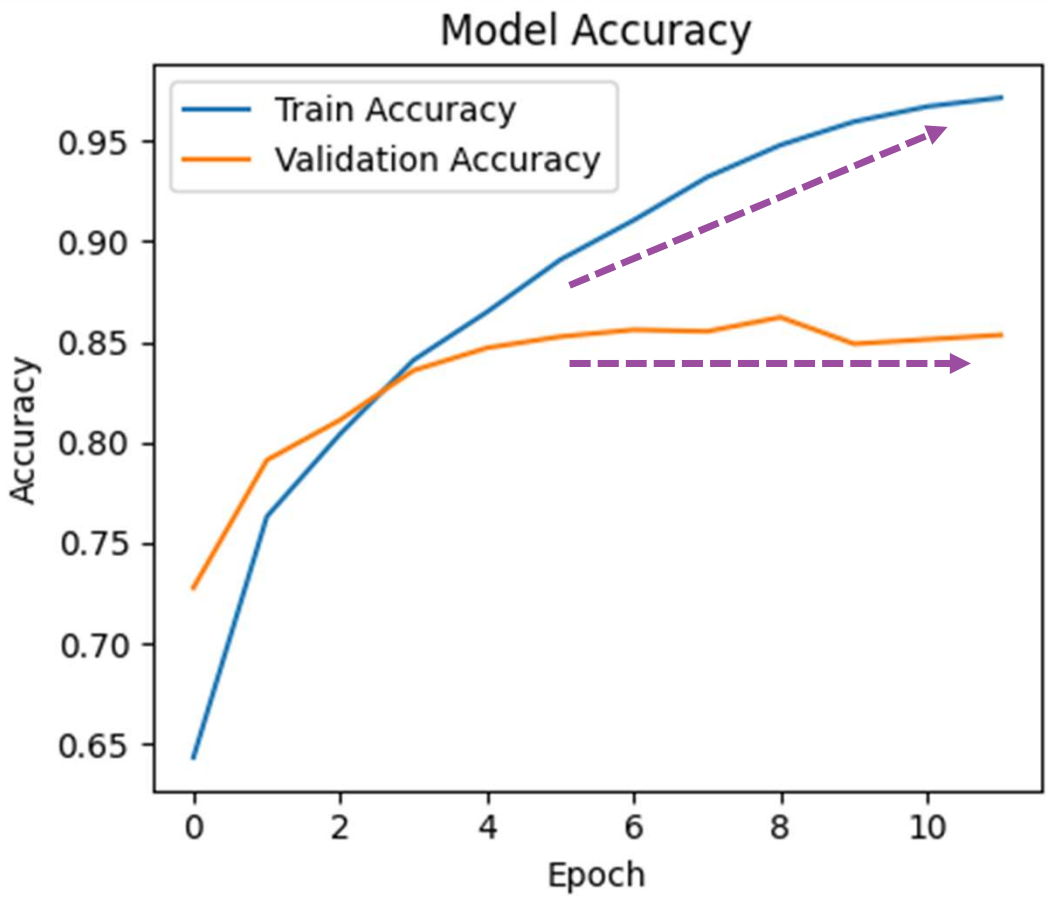
Structure

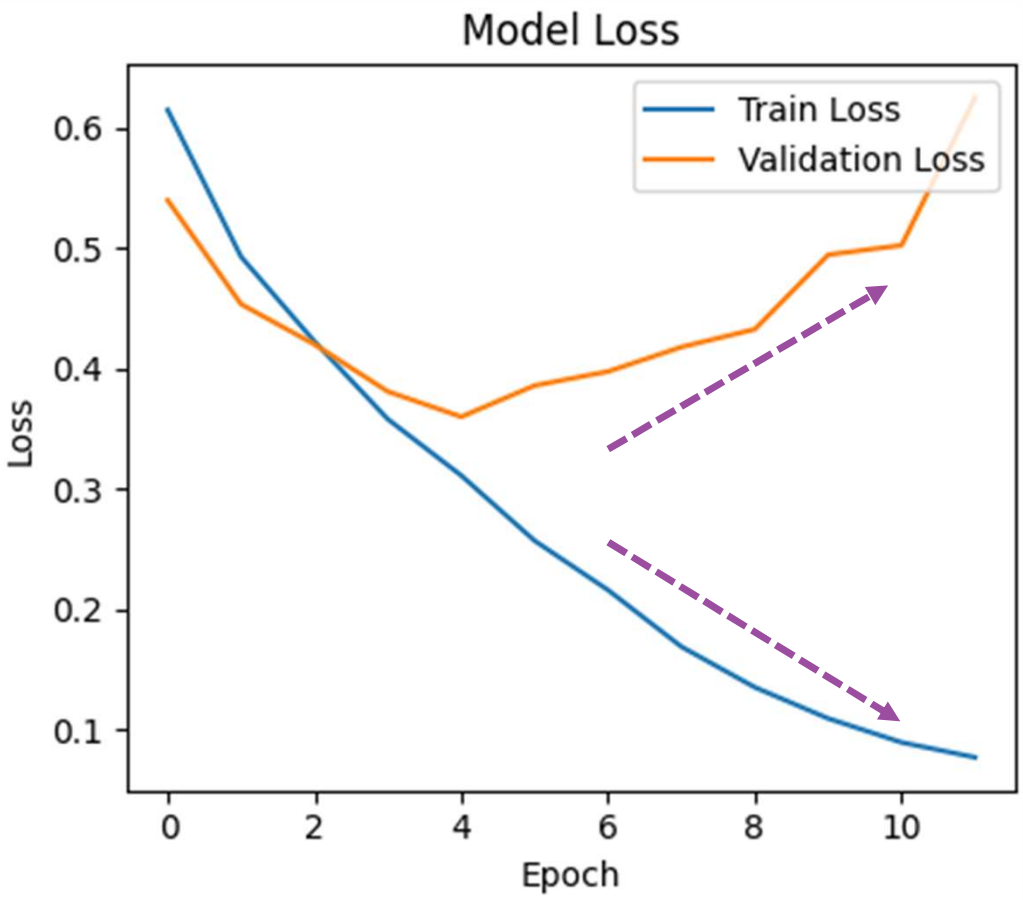
- Input: 96*96*3
- Layer1: Cov 32 + Max Pool
- Layer2: Cov 64 + Max Pool
- Layer3: Cov 128 + Max Pool
- Layer4: Dense 256 + Drop0.5
- Layer5: Dense 1



12 Epochs / 6 Mins

Model Evaluation





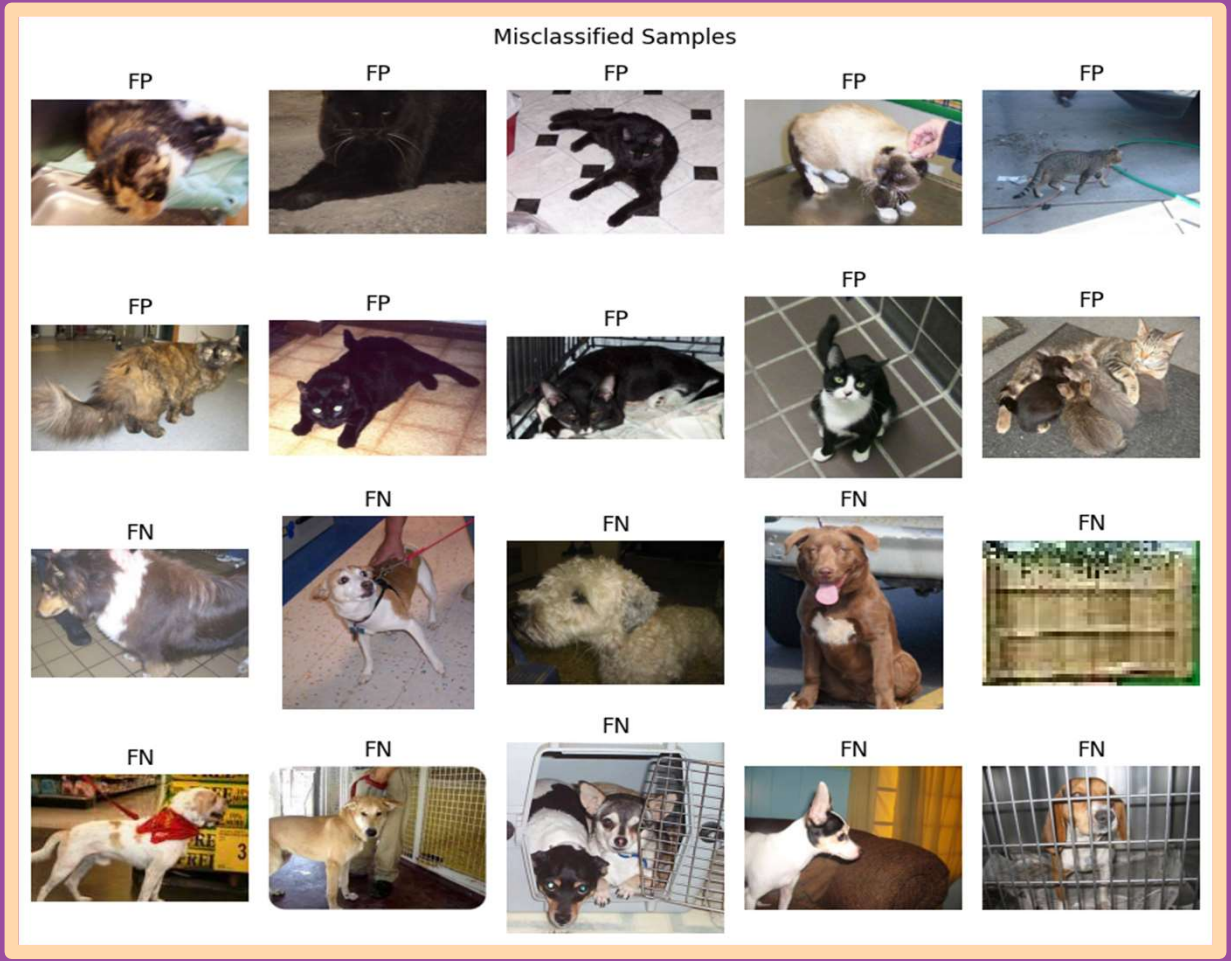
Misclassified Samples

1. Black Cat

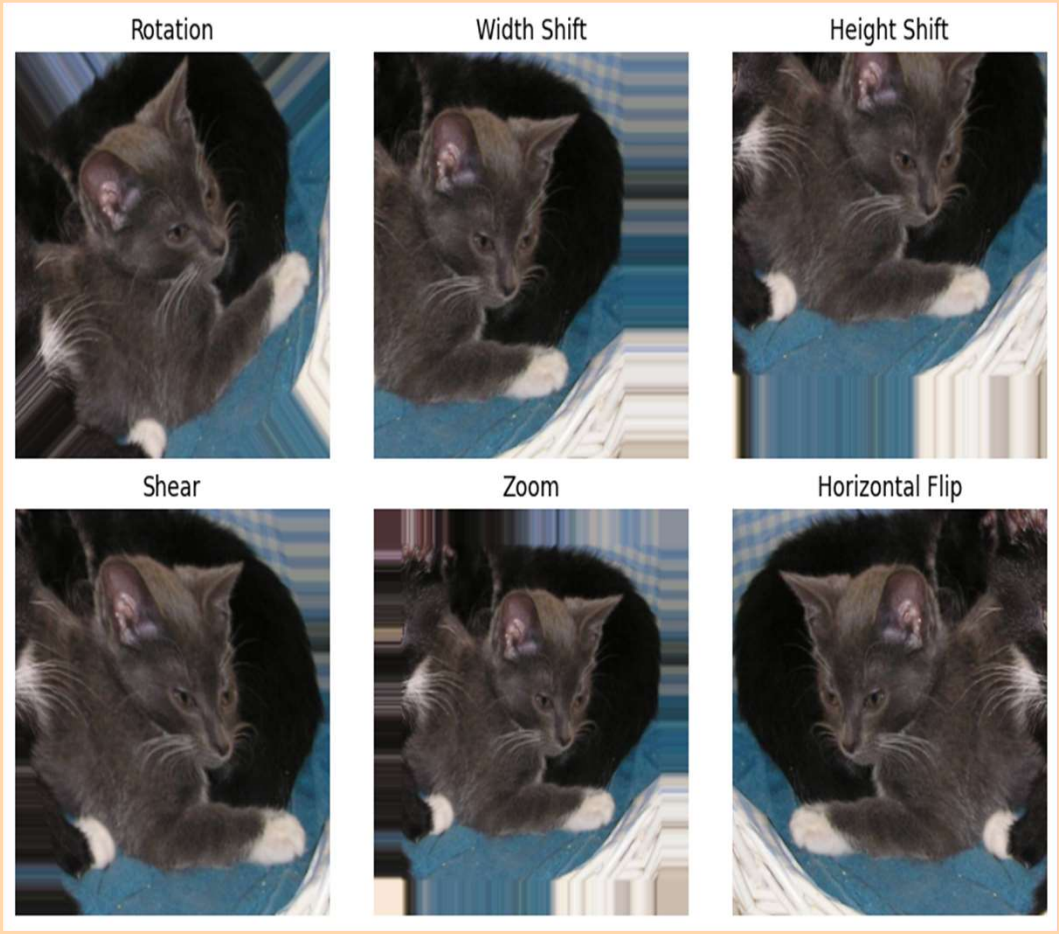
2. Dog Side Face

3. Several Together

--- Humans Can Recognize



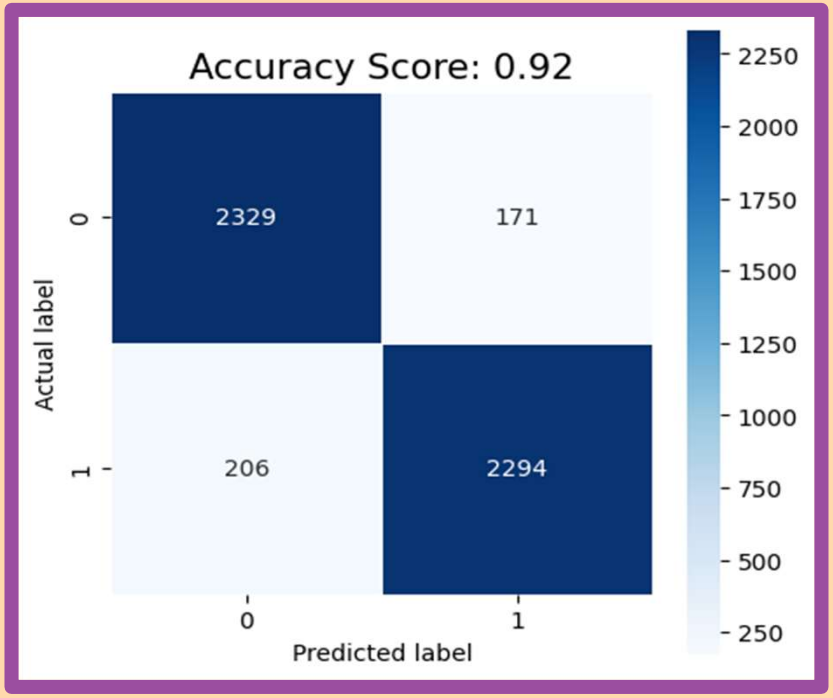
Augmentation



4. Complex Model

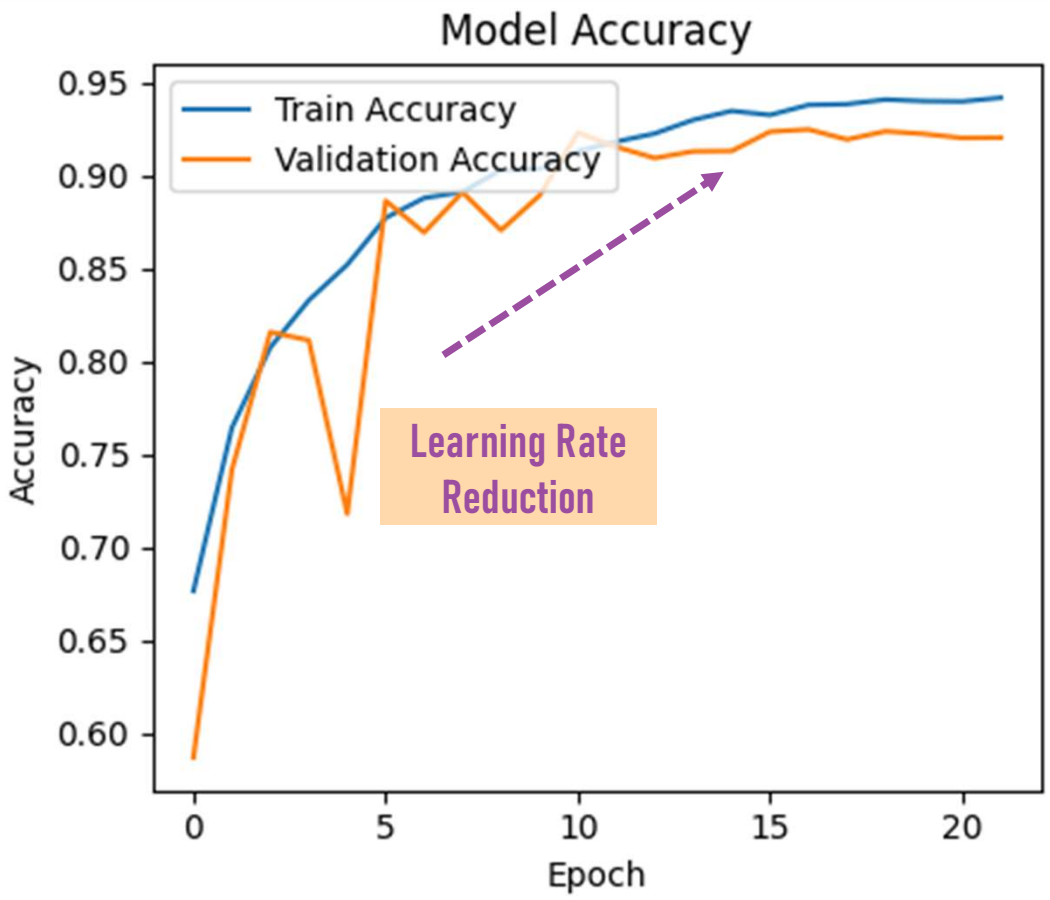
Structure

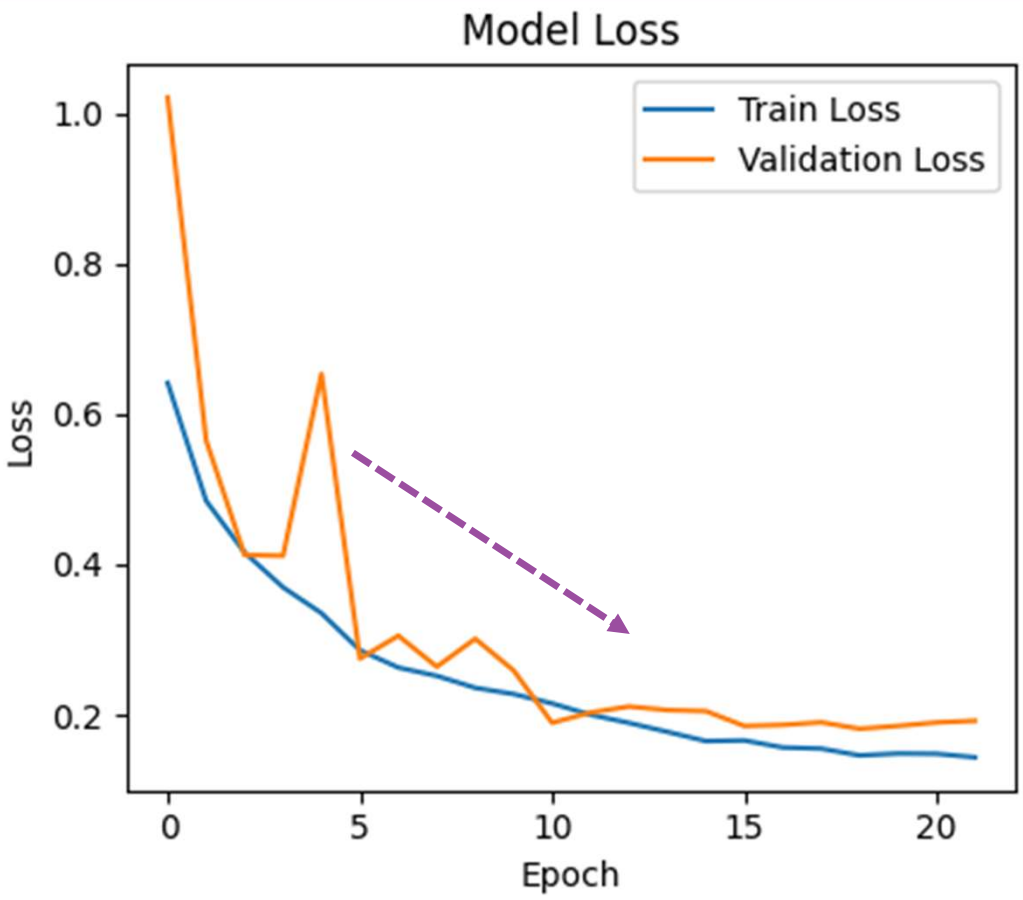
- Input: 96*96*3 + Augmentation
- L1: Cov32+BNorm+Pool+Drop0.2
- L2: Cov64+BNorm+Pool+Drop0.2
- L3: Cov128+BNorm+Pool+Drop0.2
- L4: Dense 512 + Drop0.2
- L5: Dense 1



22 Epochs / 30 Mins

Model Evaluation





Misclassified Samples

1. Lying Cat

2. Uncommon Breed

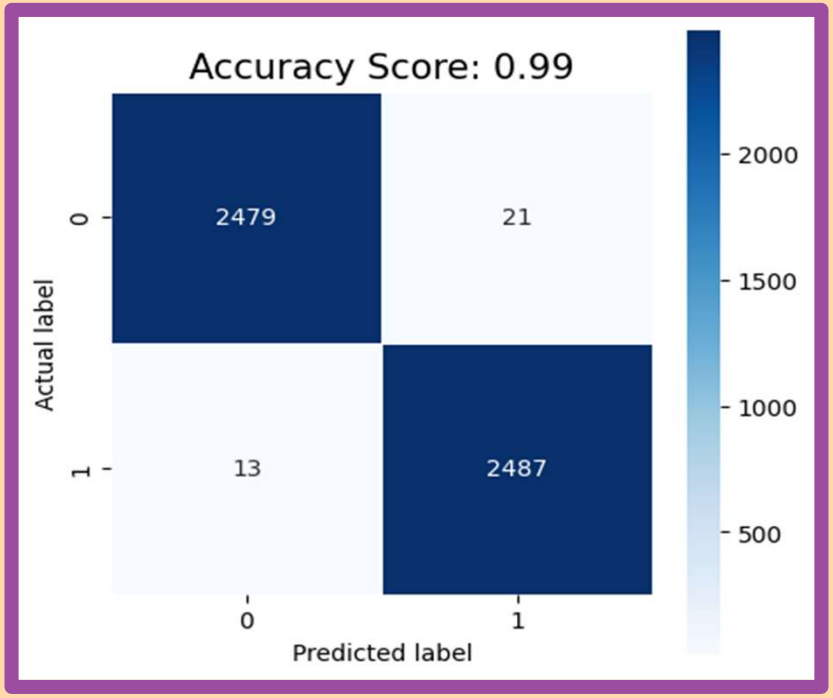
3. Blurred Face

--- Humans Can Recognize

5. Transfer Learning

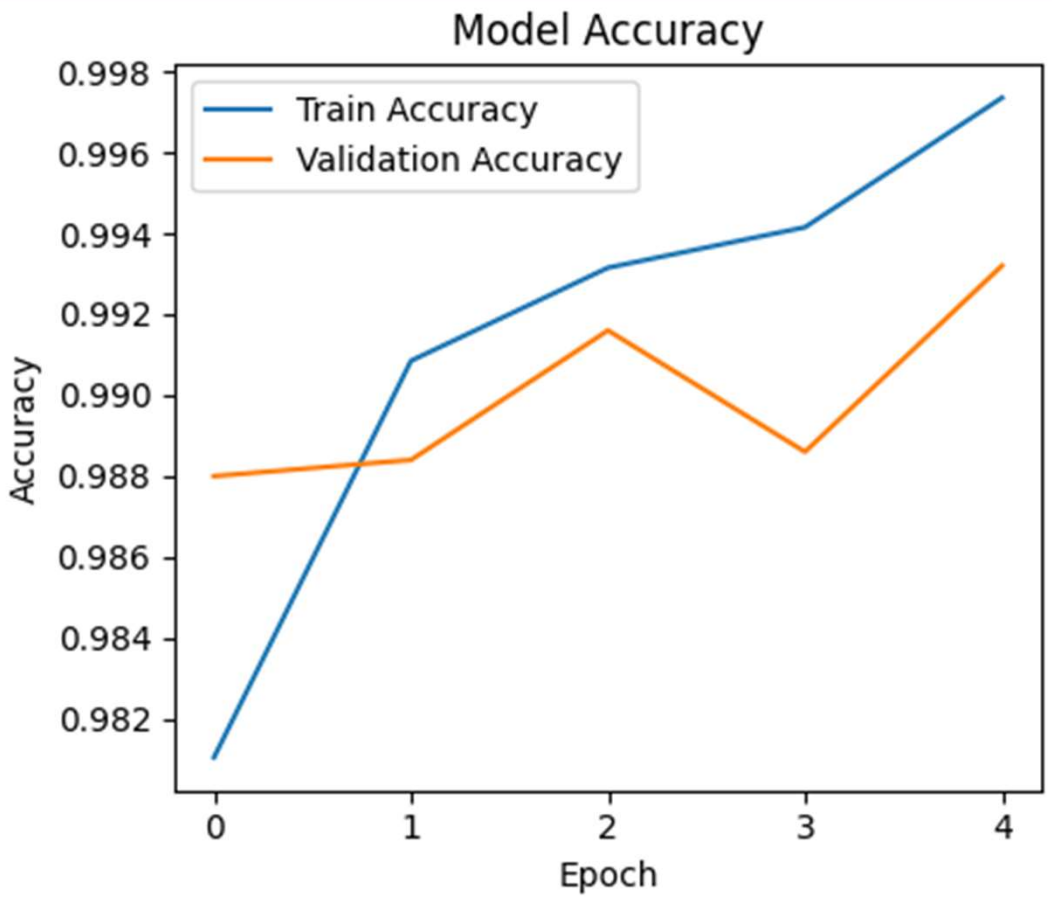
Structure

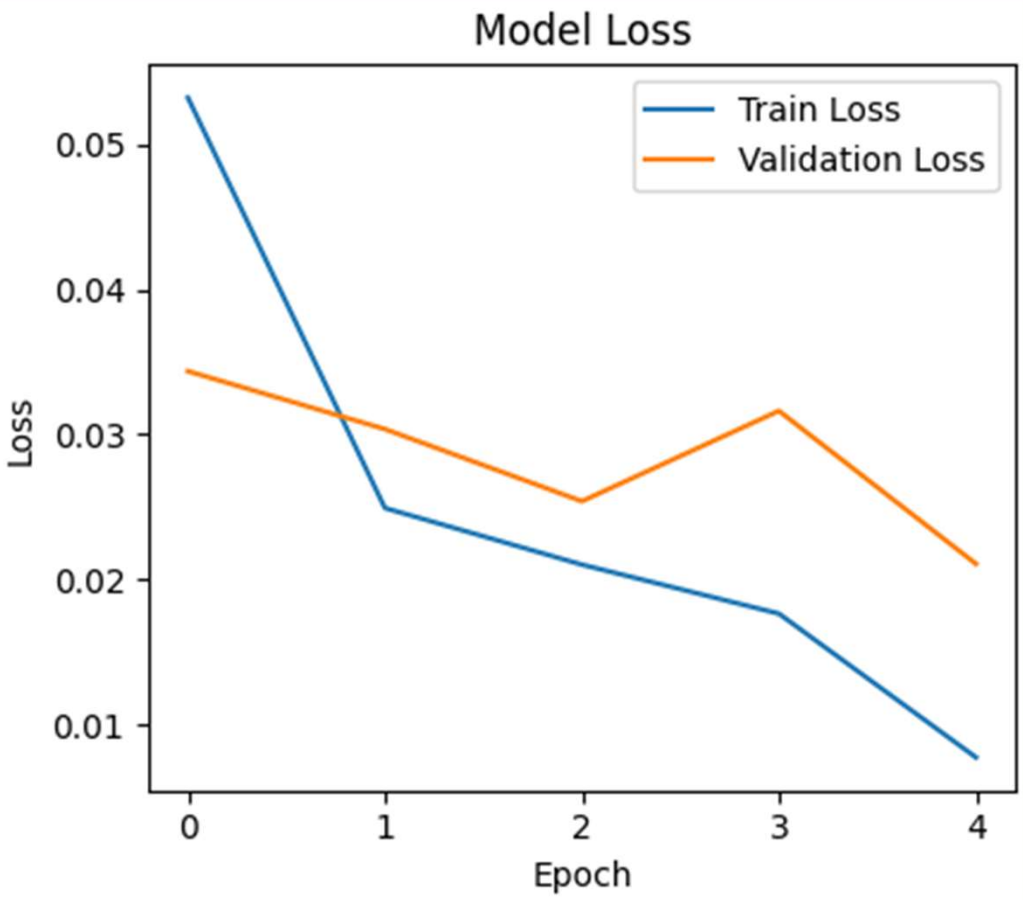
- Input: 299*299*3
- Layer1: InceptionV3
- Layer2: Avg Pool + Dense 1024
- Layer3: Dense 1



5 Epochs / 35 Mins

Model Evaluation





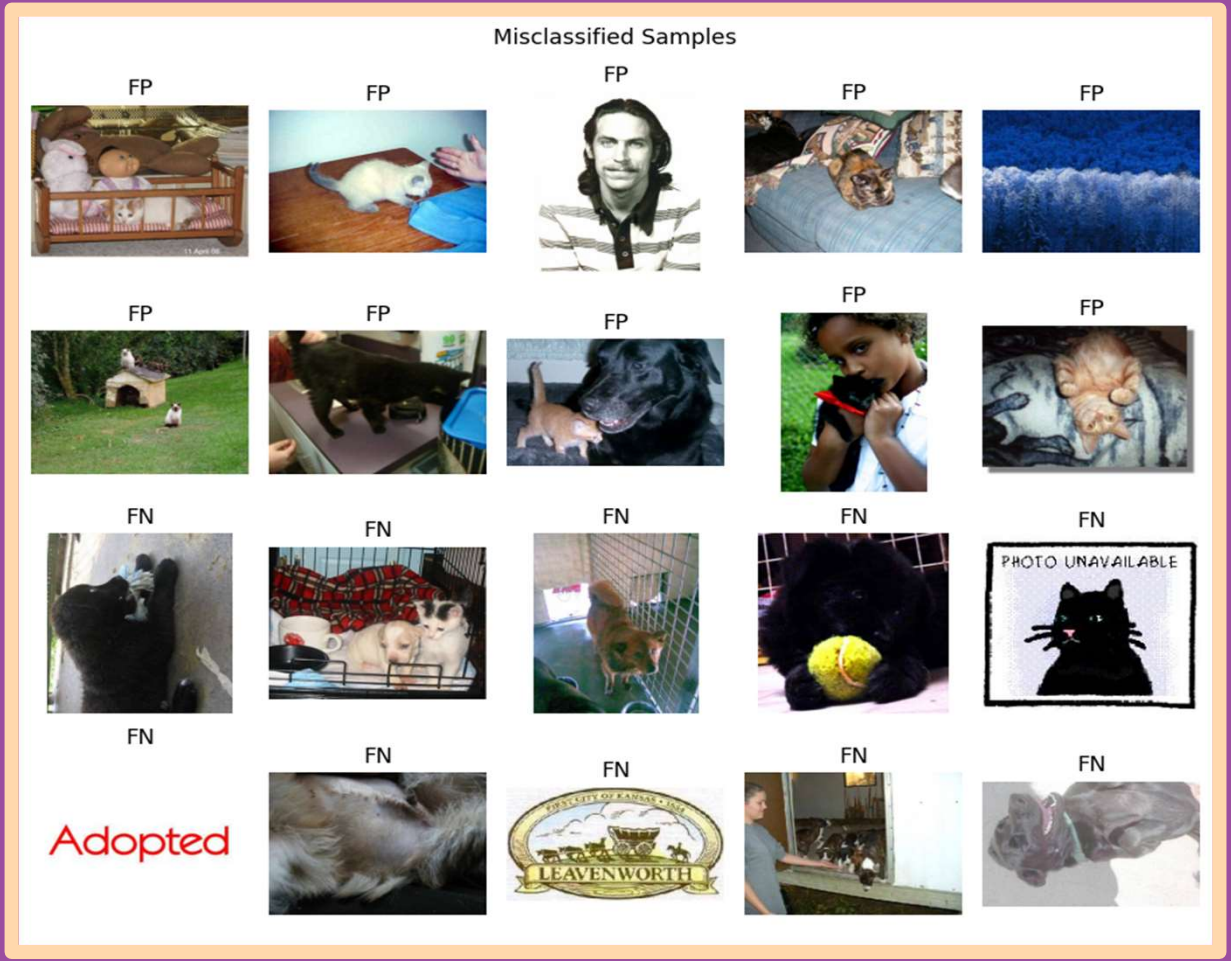
Misclassified Samples

1. Incorrect Image

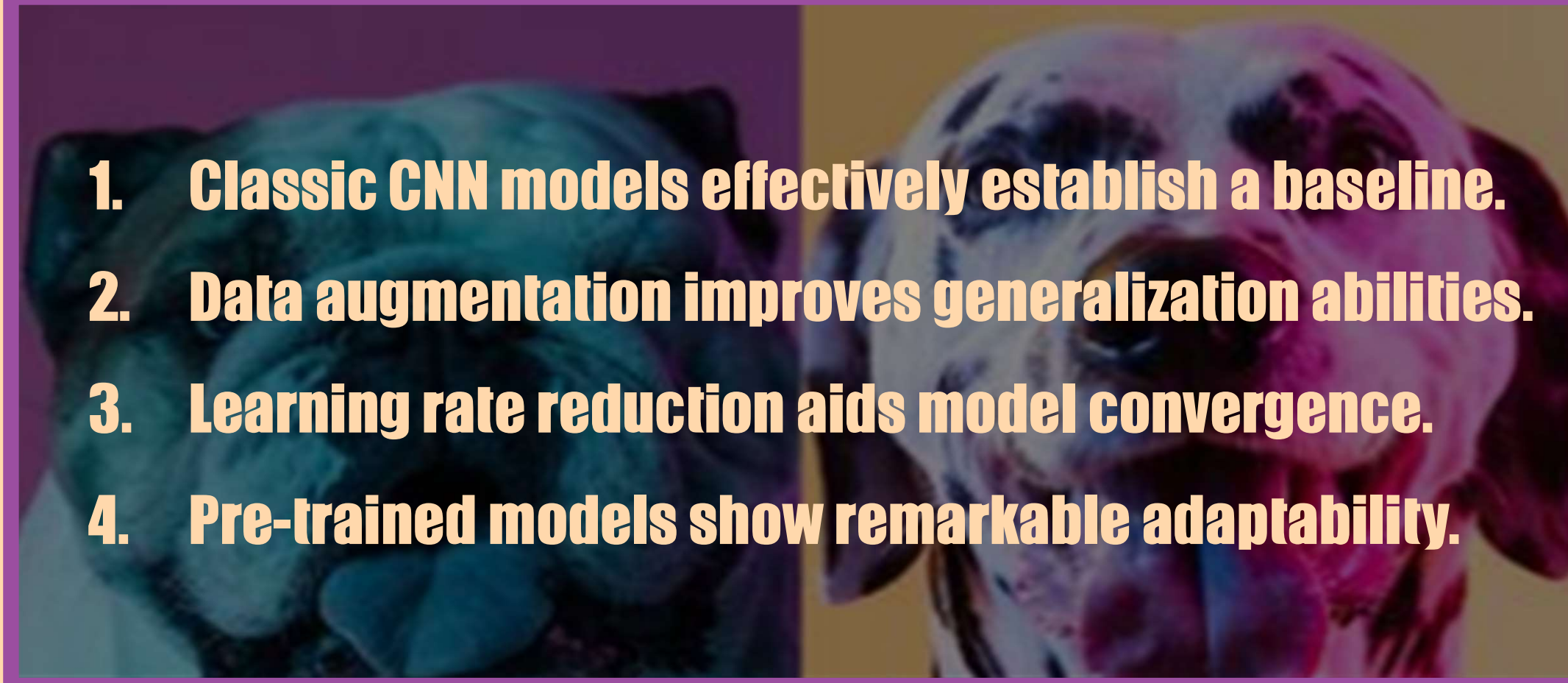
2. Too Small or Too Big

3. Disrupted by Object

--- Hard to Recognize



6. Project Conclusion



1. Classic CNN models effectively establish a baseline.
2. Data augmentation improves generalization abilities.
3. Learning rate reduction aids model convergence.
4. Pre-trained models show remarkable adaptability.

Dogs vs. Cats

Classification Project

Thank You for Watching!