DOG BREED CLASSIFICATION

A TRANSFER LEARNING APPROACH TO IMAGE RECOGNITION

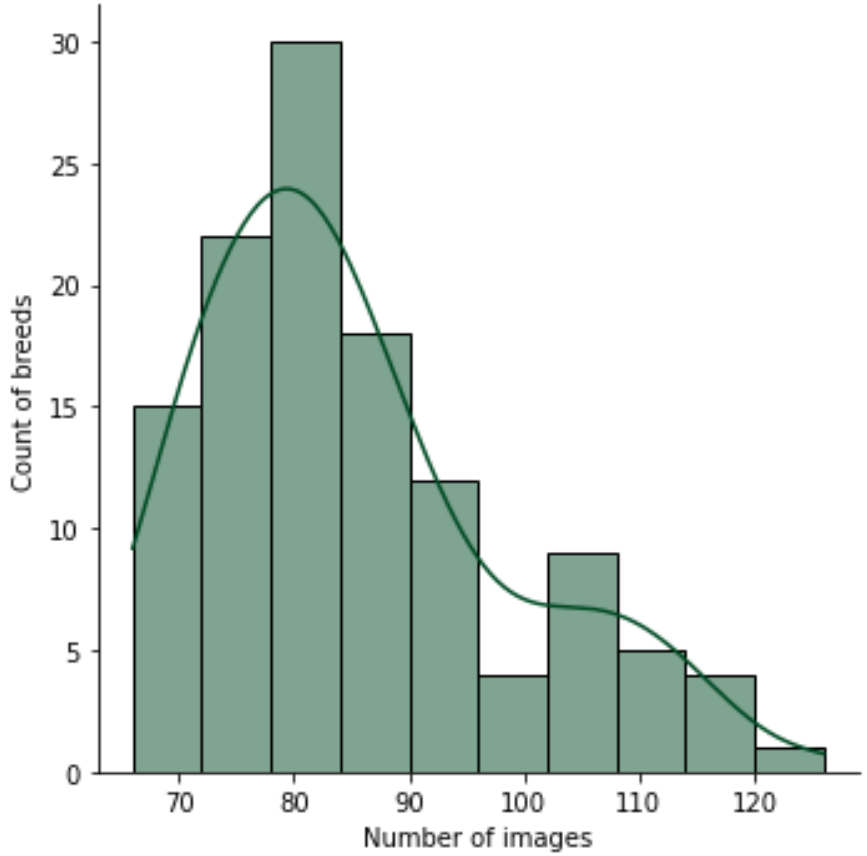
BACKGROUND

- Trending product for pet owners is genetic test kits
  - Identify breed/disease risk factors
  - High cost to consumer (~$150)
  - Useful to shelters/volunteer organizations
- Possible replacement -> Deep Learning
  - Recognize dog breed with high accuracy at low cost

DATA

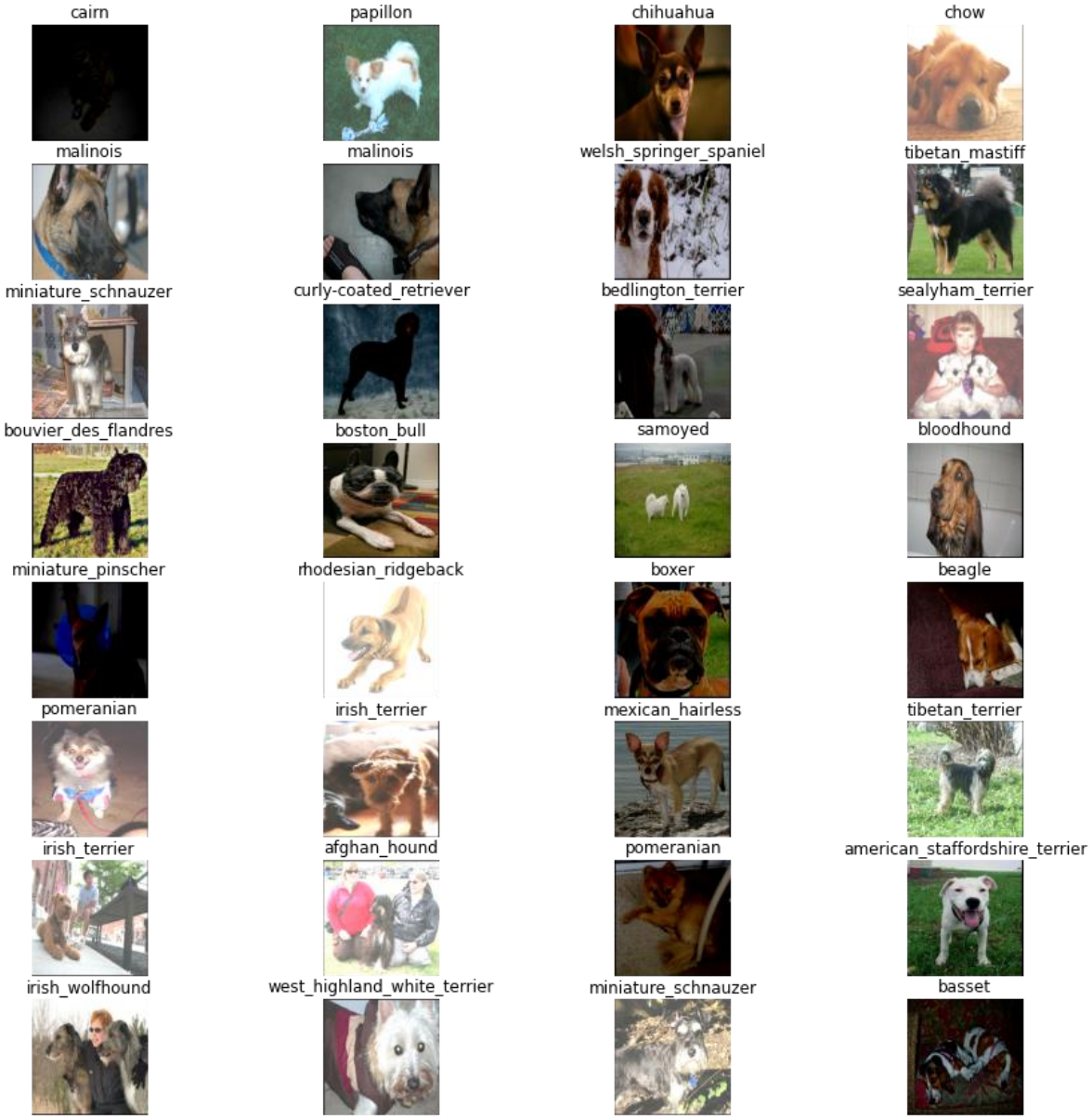
- Dog Breed Classification Competition on Kaggle
- Images of Dogs sourced from ImageNet
  - Train: 10222 .jpg files
  - Test: 10357 .jpg files
- True labels provided as file, label pairs for train
- 120 different dog breeds provided

Number of images per breed is sufficient and evenly distributed

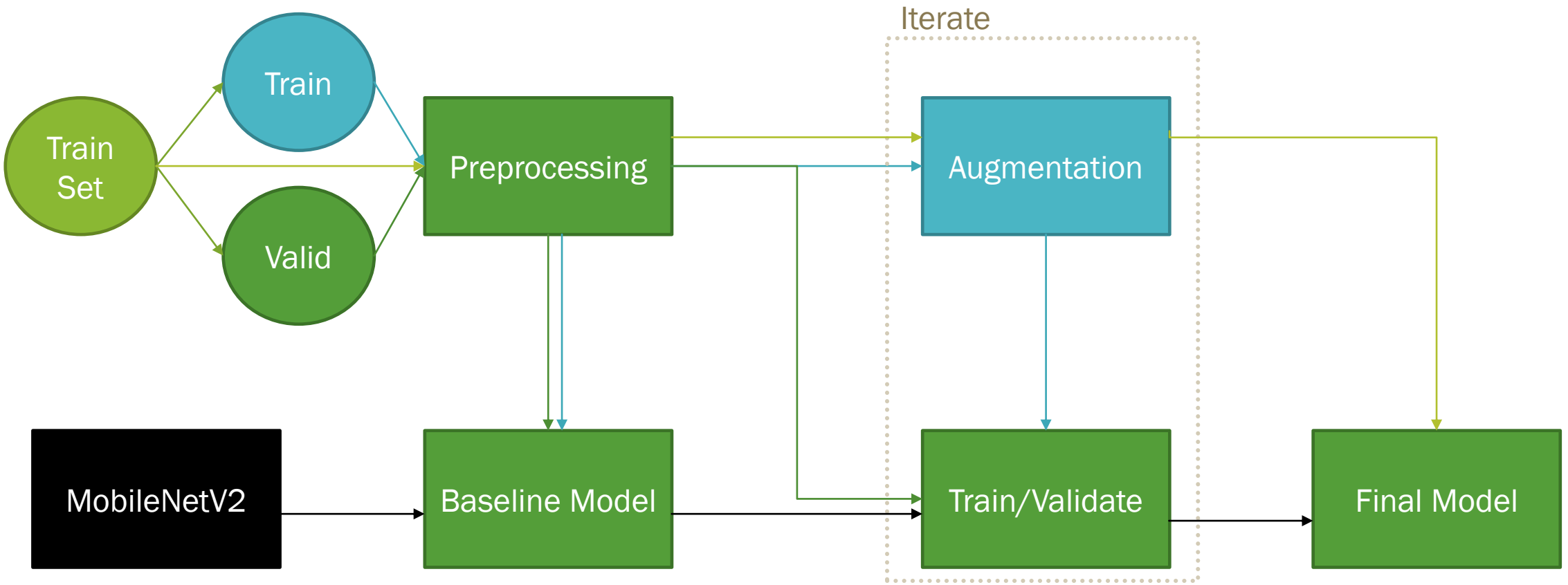


METHODOLOGY

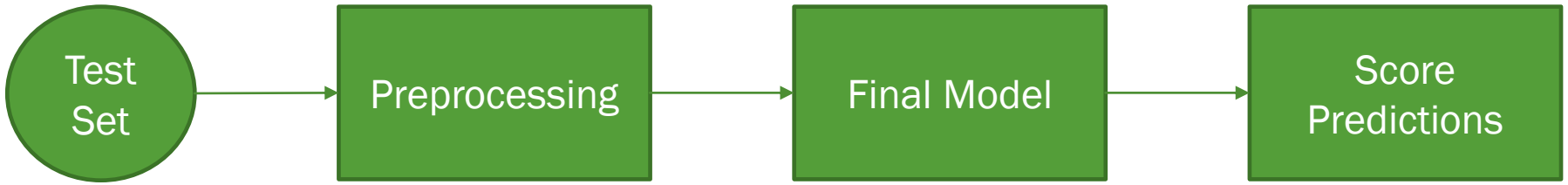
- Transfer Learning
  - MobileNetV2
- Data Batching
- Baseline Model
  - Issues with overfitting
- Data Augmentation
  - Crop
  - Flip
  - Brightness



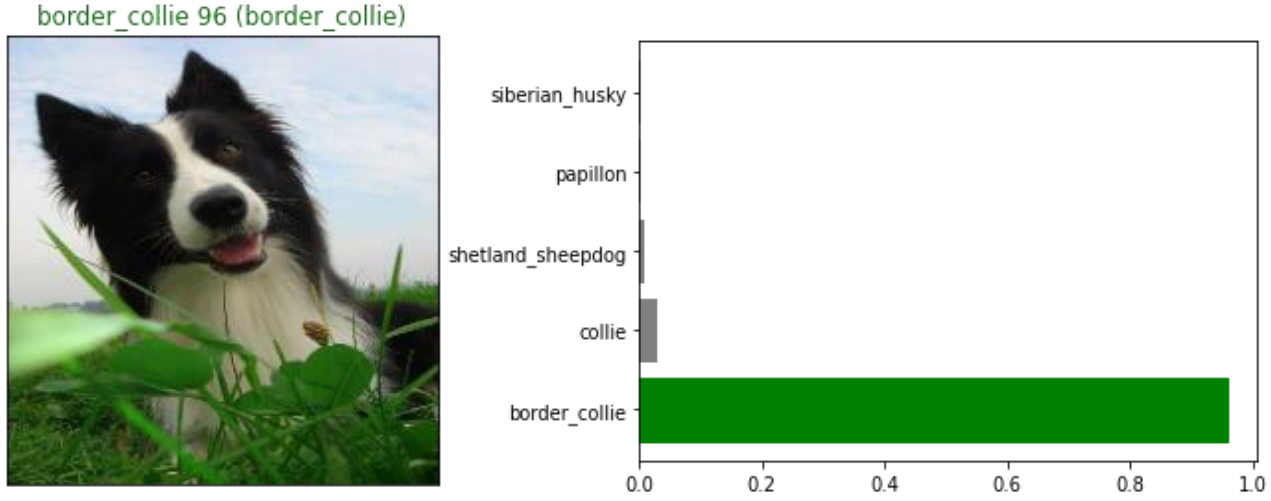
WORKFLOW

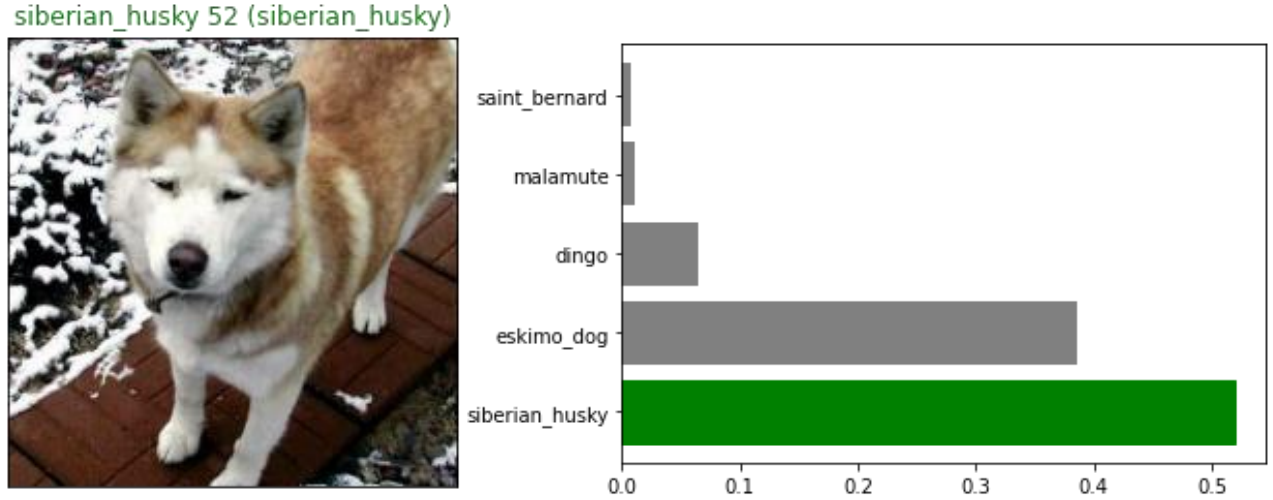

Iterate
Train
Train Set
Valid
Preprocessing
Augmentation
MobileNetV2
Baseline Model
Train/Validate
Final Model

WORKFLOW



RESULTS


border_collie 96 (border_collie)
siberian_husky
papillon
shetland_sheepdog
collie
border_collie
0.0
0.2
0.4
0.6
0.8
1.0


siberian_husky 52 (siberian_husky)
saint_bernard
malamute
dingo
eskimo_dog
siberian_husky
0.0
0.1
0.2
0.3
0.4
0.5

RESULTS

Model	Train Accuracy	Validation Accuracy	Test Accuracy
Baseline	0.99	0.71	-
Partial set, augmentation	0.93	0.77	-
Full set, augmentation	0.94	0.79	-
Final Model	0.91	-	0.90452

USING THE MODEL – PURE BREEDS

Gracie
Guess: Great Pyrenees 4/4
True: Great Pyrenees

Chester
Guess: Cheaspeake Bay Retriever 4/5
True: German Short-haired Pointer

Lucy
Guess: Saint Bernard 1/1
True: Saint Bernard

USING THE MODEL – MIXED BREEDS

Harvey
Guess: Ibizan Hound

?

Actual Ibizan Hound

USING THE MODEL – MIXED BREEDS

Piper
Guess: Whippet

?

Actual Whippet

FUTURE WORK

SOURCE AND ADD MORE BREEDS TO DATASET, IMPROVED HANDLING OF MIXED BREEDS

FURTHER OPTIMIZATION WITH AUGMENTATION/DROPOUT

INTEGRATE INTO WEB APP WHERE USER SUBMITS PICTURE AND RECEIVES RESULTS

QUESTIONS ?