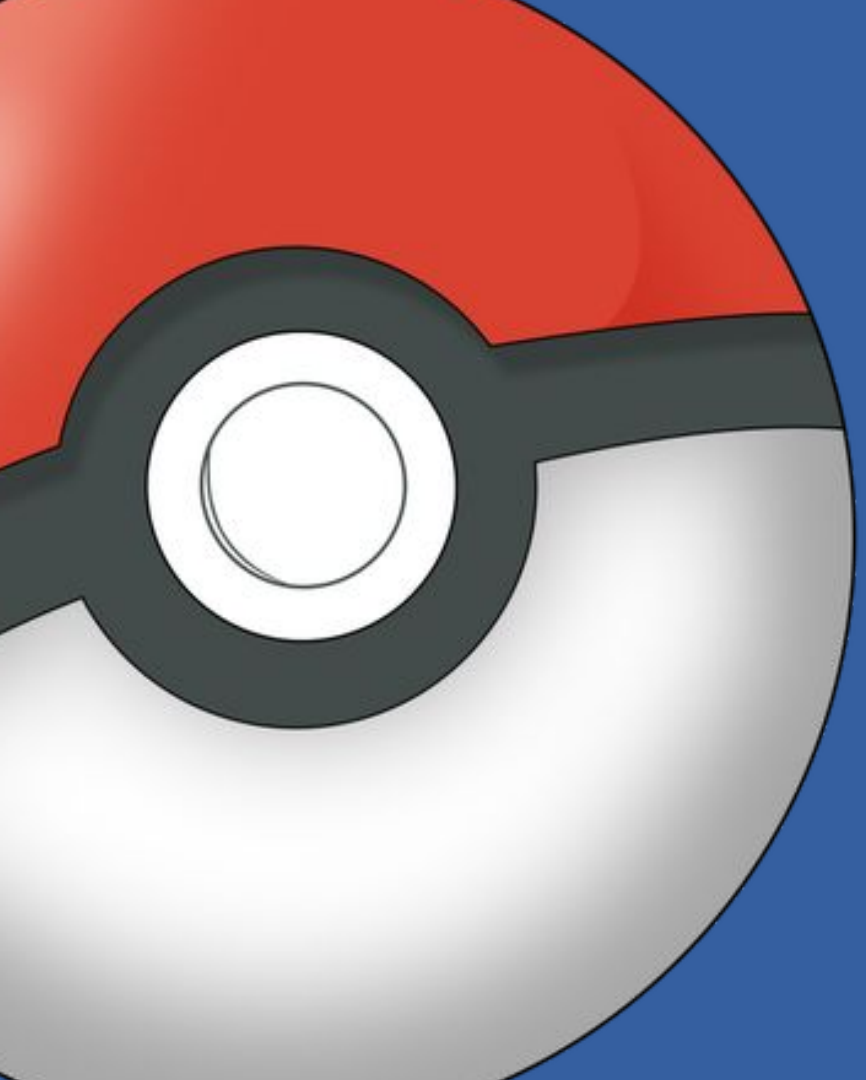
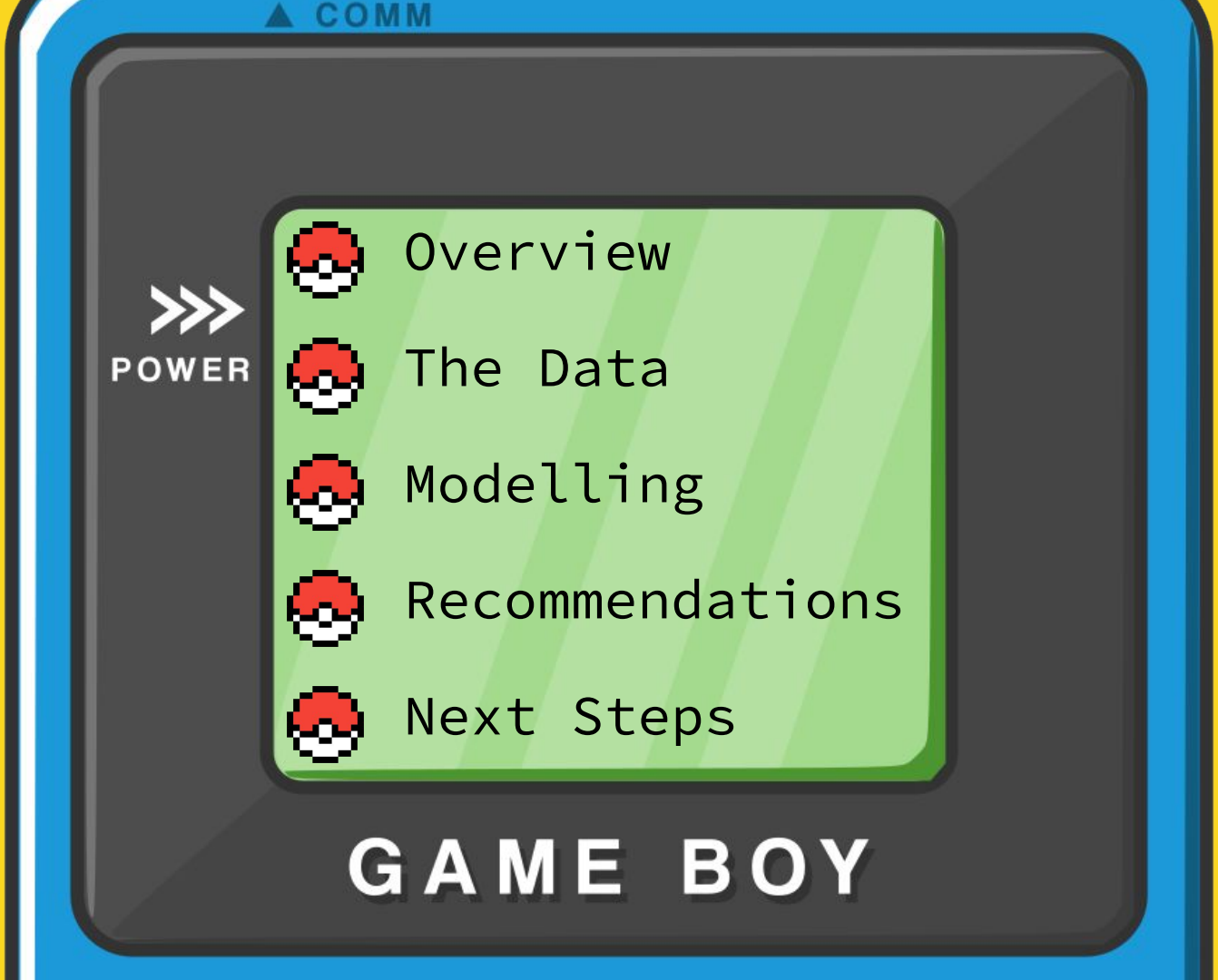
WHO'S THAT POKÉMON?



Who's that Pokémon?

Using Neural Networks for Image Classification

Nadya Agrawal
March 2023


COMM
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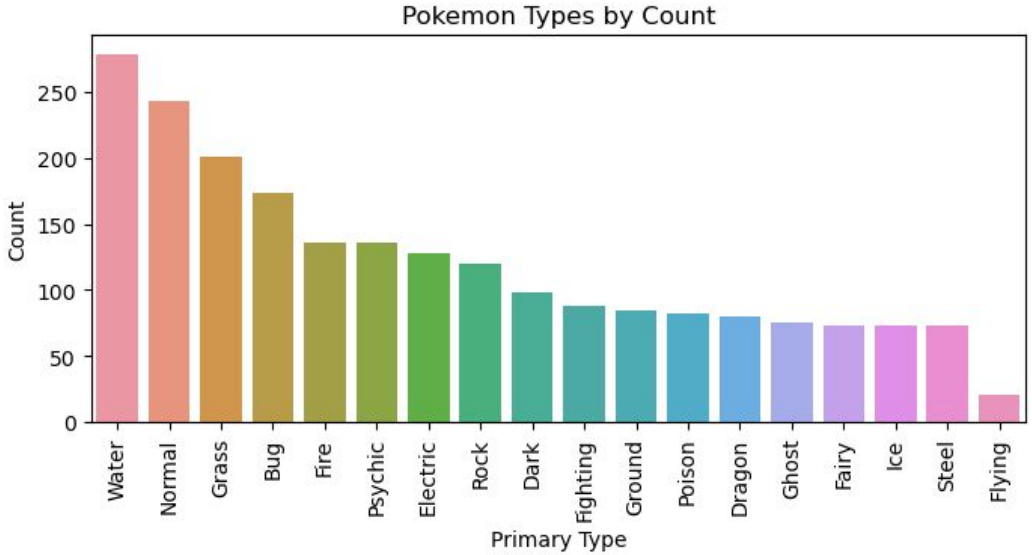
GAME BOY

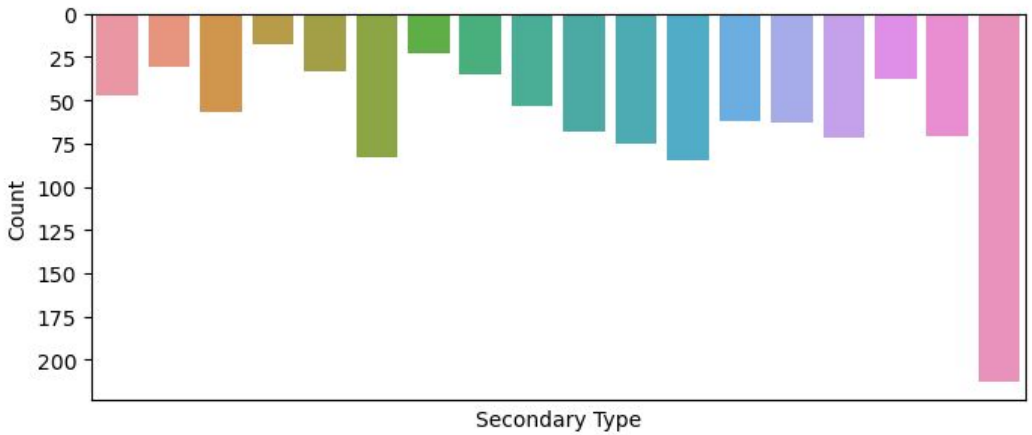
Overview

Stakeholders: Pokémon trainers

Goal: create a working Pokédex which can detect Pokémon type by its image, as trainers often have to do in the games

Challenges: coloration, types and subtypes, and lack of images





Primary & Secondary Types

Model may mislabel some Pokémon for primary type but correct for secondary

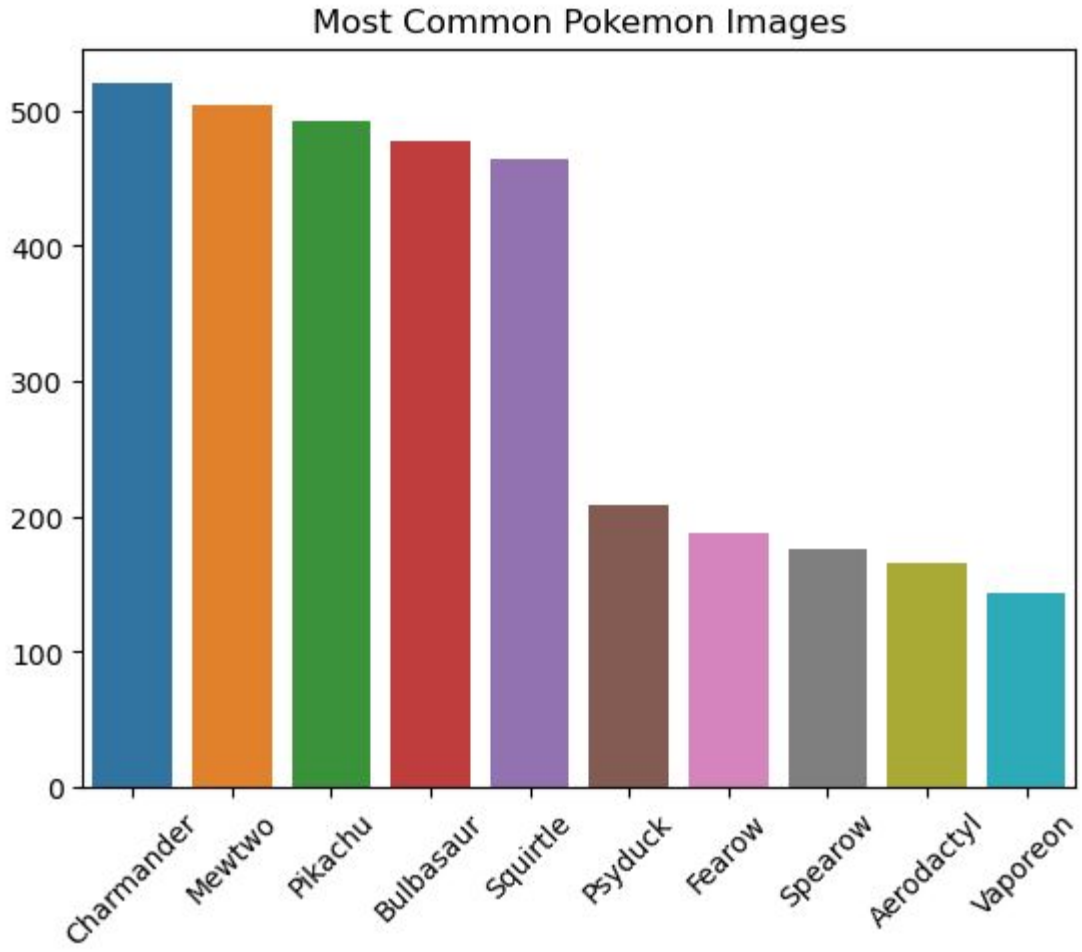
The Data

Scraped from PokemonDB, Bulbapedia, plus two Kaggle datasets - "7,000 Labeled Pokemon" by Lance Zhang and "Pokemon Generation One" by Harshit Dwivedi

As a result, most of the data is for Gen 1 with fewer being from Gens 2-9

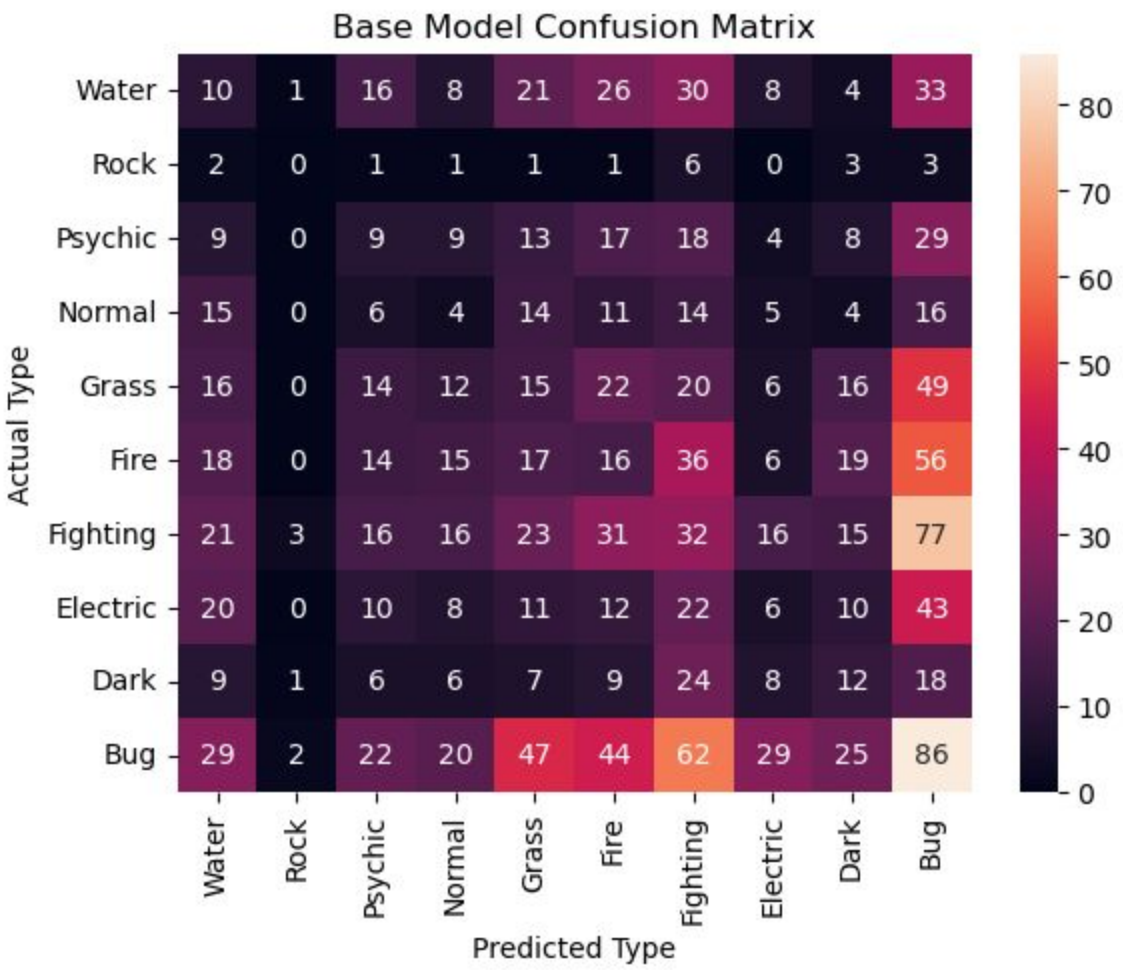
Image Count

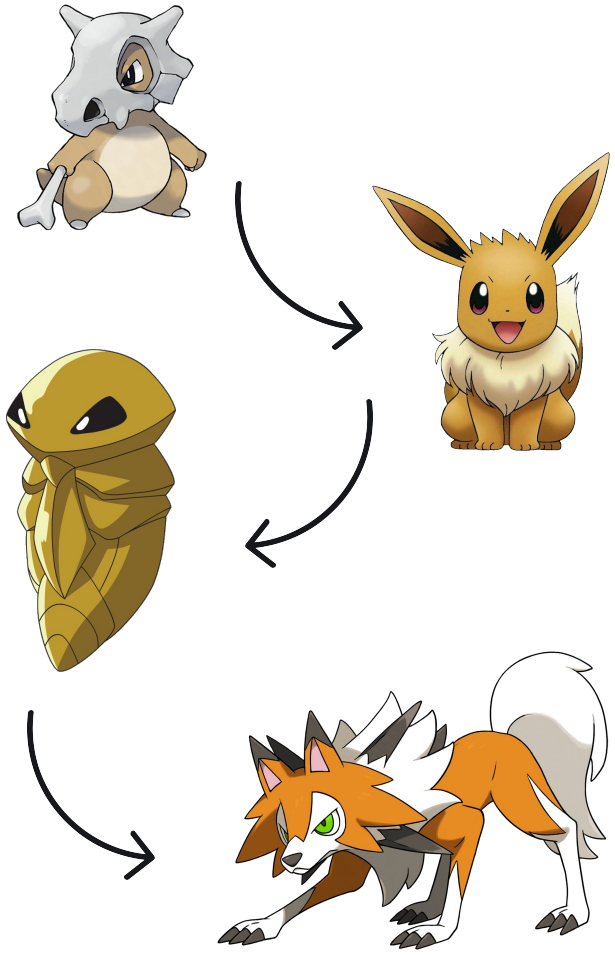
Huge amounts of some Pokémon in image collection and far fewer for others



Modelling

- Convolutional Neural Network
- Iterative process - optimizers, layers, etc.
- Ultimately the simplest model was best with only two convolutional layers and two dense ones
- Achieved nearly 55% accuracy achieved


Base Model Confusion Matrix
Water 10 1 16 8 21 26 30 8 4 33
Rock 2 0 1 1 1 1 6 0 3 3
Psychic 9 0 9 9 13 17 18 4 8 29
Normal 15 0 6 4 14 11 14 5 4 16
Grass 16 0 14 12 15 22 20 6 16 49
Fire 18 0 14 15 17 16 36 6 19 56
Fighting 21 3 16 16 23 31 32 16 15 77
Electric 20 0 10 8 11 12 22 6 10 43
Dark 9 1 6 6 7 9 24 8 12 18
Bug 29 2 22 20 47 44 62 29 25 86
Actual Type
Water
Rock
Psychic
Normal
Grass
Fire
Fighting
Electric
Dark
Bug
Predicted Type
80
70
60
50
40
30
20
10
0



Recommendations

Typing is not best determined by images, design can and should be improved for gameplay

Newer generations of Pokémon need more airtime in the TV show




Next Steps

Increase amount and diversity of images

Model with secondary typings and all primary typings

Thank You

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