

Data Mining

COSC 4610/ MSCS 5610 – Spring 2019

Project Final Report

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Data Mining Project Midway Report

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Team Name: Team Rocket

Team Webpage:

<https://github.com/tparackal/DataMiningProject.git>

Dataset Link:

<https://www.kaggle.com/abcsds/pokemon>

Project Description

Pokemon is a video game where players are able to catch monsters called Pokemon and battle with them against other players. Players are able to make a team of 6 Pokemon. Since there are different kinds of Pokemon, players will have the option to make very diverse teams. Since making a team can be a bit complex due to the many choices, this project will explore what Pokemon one would need based on different attributes.

Project Goals

The goals for this project is to be able to compare a predicted pokemon based on a battle situation or attribute and process the data to find similarities. Another one of our goals for this project is to determine the strongest pokemon and determine a matchup of statistics between them. Essentially we will be able to determine the 20 best pokemon that can best attack it, compare its Attack/Defense and Speed/HP to all other types of pokemon. Finally we will create a base stat comparison table in order to visualize the strongest pokemon statistically.

Data Set

The data set we are using is from the link above. It was found by using the Google datasets tool. The attributes of the dataset are as follows:

Name: the name of the Pokemon

Type 1: the type of Pokemon (one of the types below)

Type 2: the type of Pokemon (some Pokemon have 2 types) (one of the types below)

(Grass, Fire, Water, Bug, Normal, Poison, Electric, Ground, Flying, Fairy, Fighting, Psychic, Rock, Ghost, Ice, Steel, Dark, Dragon)

Total: the sum of all the attributes below (main determinant of how strong a Pokemon is)

Hit Points (HP): the health bar of a Pokemon (different Pokemon have different size health bars)

Attack: the strength of a Pokemon's physical attack

Defense: the strength of a Pokemon's physical defense (how much a Pokemon can endure a physical attack)

Special Attack (Sp. Atk): the strength of a Pokemon's special attack

Special Defense (Sp. Def): the strength of a Pokemon's special defense (how much a Pokemon can endure a special attack)

Speed: how fast a Pokemon moves

The dataset contains entries of the same Pokemon, but in different forms. In order to reduce confusion, these entries will be omitted. There are also a bunch of Pokemon that are considered legendary Pokemon in this dataset. Legendary Pokemon are considered outliers since their stats are beyond the norm. Since these Pokemon will skew the results, these entries will be omitted as well. We would like to focus on regular Pokemon for this project. The data in this dataset has been collected from the 3 websites below.

Important Links

These links were used to create the entire dataset:

- pokemon.com
- pokemondb
- bulbapedia

Tools

We intend to use numpy and pandas in order to read in the dataset and preprocess it. Seaborn and matplotlib would be used to generate graphs and other visuals.

Data Predictions

This is what we believe are the best Pokemon for the following attributes.

Strongest Water Type Pokemon: Gyarados

Strongest Fire Type Pokemon: Charizard

Strongest Grass Type Pokemon: Sceptile

Strongest Bug Type Pokemon: Pinsir

Strongest Normal Type Pokemon: Kangaskhan

Strongest Poison Type Pokemon: Muk

Strongest Electric Type Pokemon: Electivire

Strongest Ground Type Pokemon: Aggron

Strongest Fairy Type Pokemon: Gardevoir

Strongest Fighting Type Pokemon: Heracross

Strongest Psychic Type Pokemon: Alakazam

Strongest Flying Type Pokemon: Charizard

Strongest Rock Type Pokemon: Golem

Strongest Ghost Type Pokemon: Gengar

Strongest Ice Type Pokemon: Weavile

Strongest Dragon Type Pokemon: Dragonite

Strongest Steel Type Pokemon: Aggron

Strongest Dark Type Pokemon: Zoroark

Strongest Flying Type Pokemon: Salamence

Strongest Pokemon: Dragonite

Best Attacking Pokemon: Machop

Best Defensive Pokemon: Snorlax

Best Special Attacking Pokemon: Espeon

Best Special Defensive Pokemon: Tyranitar

Fastest Pokemon: Jolteon

We will see if our predictions match with the results from the dataset.

Example Links and References

<https://www.kaggle.com/aagundez/pikachu-vs-bulbasaur-matchup>

Schedule

Task	Deliverable	Completed
Adjust Database	Midway Deliverable	YES
Finding best for each attribute	Midway Deliverable	YES
Finding the strongest pokemon and determine the best pokemon to attack it	Final Deliverable	YES
Base stats statistics table	Final Deliverable	YES

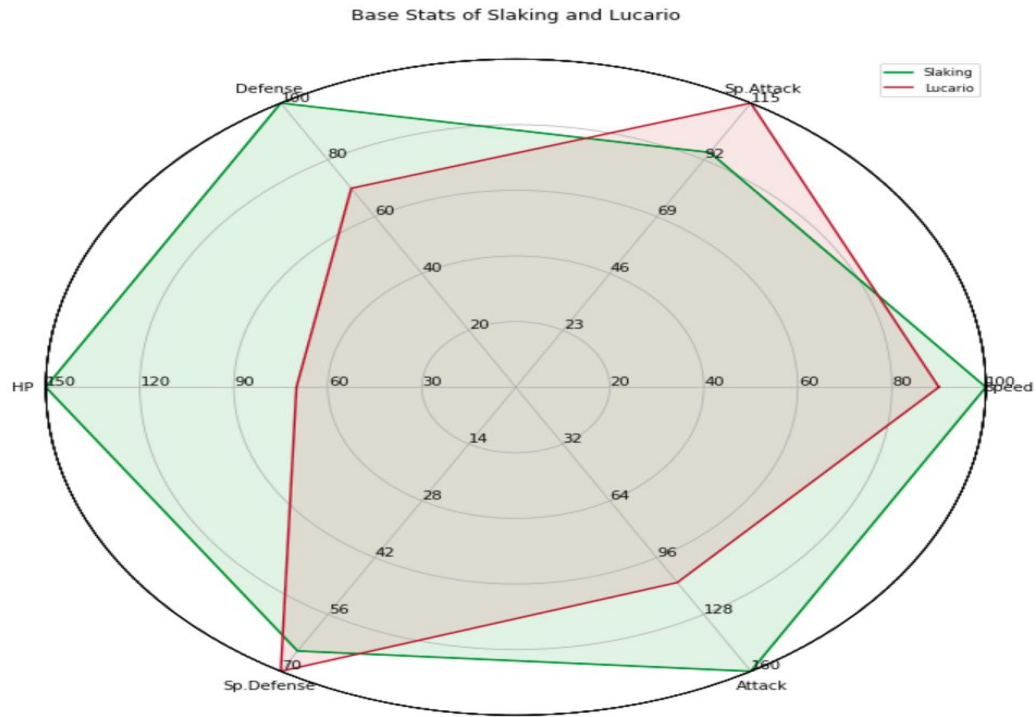
Results

Attribute	Guess	Actual	Correct?
<u>Strongest Water Type Pokemon:</u>	Gyarados	Kingdra	
<u>Strongest Fire Type Pokemon:</u>	Charizard	Arcanine	
<u>Strongest Grass Type Pokemon:</u>	Sceptile	Tangrowth	
<u>Strongest Bug Type Pokemon:</u>	Pinsir	Yanmega	
<u>Strongest Normal Type Pokemon:</u>	Kangaskhan	Staking	
<u>Strongest Poison Type Pokemon:</u>	Muk	Crobat	
<u>Strongest Electric Type Pokemon:</u>	Electivire	Electrivire	
<u>Strongest Ground Type Pokemon:</u>	Aggron	Garchamp	
<u>Strongest Fairy Type Pokemon:</u>	Gardevoir	Flargies	
<u>Strongest Fighting Type Pokemon:</u>	Heracross	Infernape	
<u>Strongest Psychic Type Pokemon:</u>	Alakazam	Metagrass	
<u>Strongest Rock Type Pokemon:</u>	Golem	Tyranitar	
<u>Strongest Ghost Type Pokemon:</u>	Gengar	Dusknair	

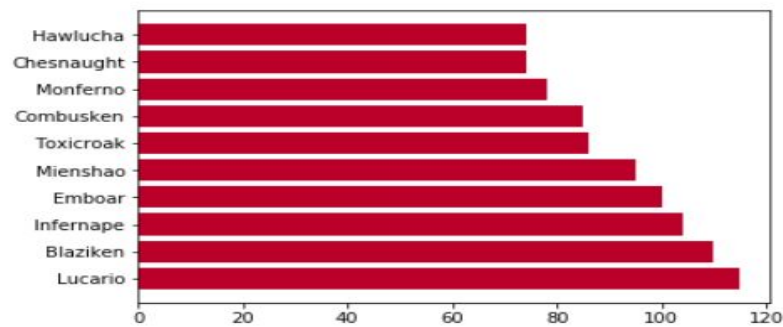
<u>Strongest Ice Type Pokemon:</u>	Weavile	Lapras/Vanilluxe	
<u>Strongest Dragon Type Pokemon:</u>	Dragonite	Godda/Salamence/Dragonite/Hydreigen/Garchamp	
<u>Strongest Steel Type Pokemon:</u>	Aggron	Metagrass	
<u>Strongest Dark Type Pokemon:</u>	Zoroark	Tyranitar/Hydreigen	
<u>Strongest Flying Type Pokemon:</u>	Salamence	Salamence	
<u>Strongest Pokemon:</u>	Dragonite	Slacking	
<u>Best Attacking Pokemon:</u>	Machop	Rampardos	
<u>Best Defensive Pokemon:</u>	Snorlax	Shuckle	
<u>Best Special Attacking Pokemon:</u>	Espeon	Aegislash	
<u>Best Special Defensive Pokemon:</u>	Tyranitar	Shuckle	
<u>Fastest Pokemon:</u>	Jolteon	Ninjask	

Final Results(base stats table)

```
Out[251]: Text(0.5, 1.05, 'Base Stats of Slaking and Lucario')
```



```
Out[247]: <BarContainer object of 10 artists>
```



Legacy of Project (Future Work)

- The Pokemon Company releases new Pokemon over time
 - Redo the work done to take the new Pokemon into account
- Include legendary pokemon into the dataset
 - These Pokemon are outliers and can skew the results, but it is interesting to see the results when they are applied
- Create a function that takes in a legendary

Pokemon and computes what the best regular Pokemon is to fight the legendary Pokemon

- Create a function that takes in a Pokemon and determines the best moveset for that Pokemon

Conclusion Part 1

Our Knowledge of the entire pokemon database was majorly incorrect based of the dataset results in python. We were only able to get % of our predictions correct. For each type and stat, we generated a list of the top 10

Pokemon and displayed the information on bar graphs. This is a reality check and gives us more motivation and incentive to learn more about the vast world of pokemon.

Conclusion Part 2

For our final portion of the project we conducted a test in order to find the strongest pokemon which can best strategically attack the strongest pokemon in the dataset, Slaking. In order to do so we had to view the stats of Slaking. We were then able to determine that it was a normal type pokemon and that it had a low special defense. So the best pokemon that can attack it was a fighting type pokemon that has a high special attack. We then coded it by finding the list of all the potential fighting types. Then we had to code to show their raw stats and organize them based on their special attack score. We selected the top ten and made a bar chart. On the top of the bar chart we then determined that lucario was the best fit for our specific criteria.

References

<https://www.kaggle.com/abcsds/pokemon>

www.pokemon.com

www.pokemondb.net

https://bulbapedia.bulbagarden.net/wiki/Main_Page

www.serebii.net

<https://www.kaggle.com/aagundez/pikachu-vs-bulbasaur-matchup>