Pokemon Type-Set Recommendations

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Background Information

Pokemon is a TV show and video game series the centers around catching fictional monsters and training them to do battle with each other.

Pokemon have various powers base on their types such as the ability to blast fire (Fire) or cause earthquakes (Ground). They can have up to two different types such as Ground & Fire or Ice & Flying.

Every few years a new generation of Pokemon is added.

Problem

1. Are there type-sets that have not been introduced?

2. Can we utilize analysis to identify type-sets that are balanced and thus fair to introduce in future generations.

Approach

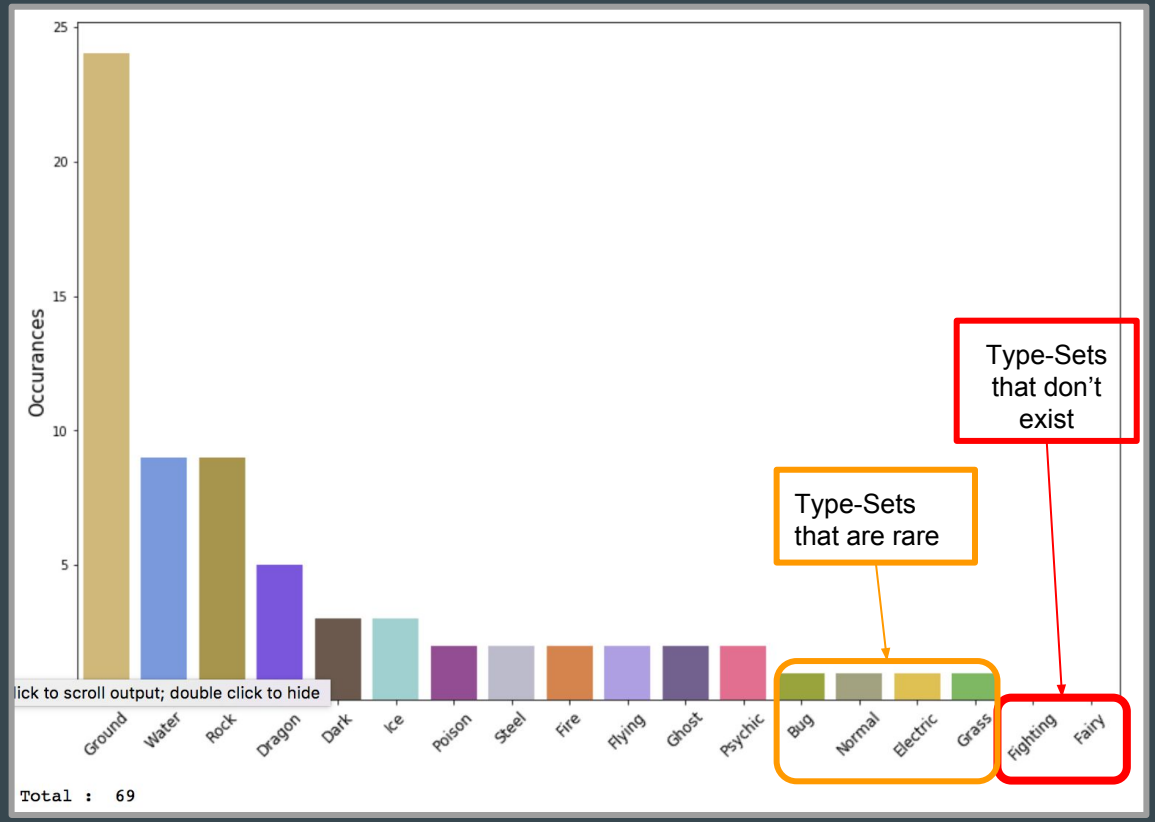
- Look at current distributions of type-sets
- Identify type-sets that do not exist yet or are very limited
  - Limited type-set analysis was set aside give time restrictions
- Identify the strengths and weaknesses associated with each type set
  - Utilize existing type-sets to identify baselines and averages.
  - Compare non-existing type-sets to the identified baselines and averages.
- Make recommendations based on which new type-sets have averages close to the baselines.
  - Type-Sets that are further away from the baselines are either much stronger or weaker than most existing Pokemon which would be considered an unbalanced type-set.

Approach : Data

- PokedexNumber : Unique Pokemon ID (Int : Unique)
- Name : Pokemon's Name (String : Unique)
- Type : List contain Pokemon's type(s) (List)
- Total : Sum of stat values "HP, Attack, Defense, SpecialAttack, SpecialDefense & Speed" (Int)
- HP : Hit Points stat (Amount of Health) (Int)
- Attack : Attacking Stat (Int)
- Defense : Defending Stat (Int)
- SpecialAttack : Attacking Stat (Int)
- SpecialDefense : Defending Stat (Int)
- Speed : Quickness Stat (Int)
- **Type_P : First type listed in "Type" (String) : Used in the Type-Set**
- **Type_S : Second type listed in "Type" (String) : Used in the Type-Set**
- **Mega : Is a Mega Evolution (Boolean) : Mega Pokemon were dropped from analysis**
- **Legendary : Is a Legendary Pokemon (Boolean) : Legendary Poke. were dropped from analysis**

I also utilized a Attack/Defensive by type calculation table similar to the once seen here.

Approach : Current distributions of type-sets



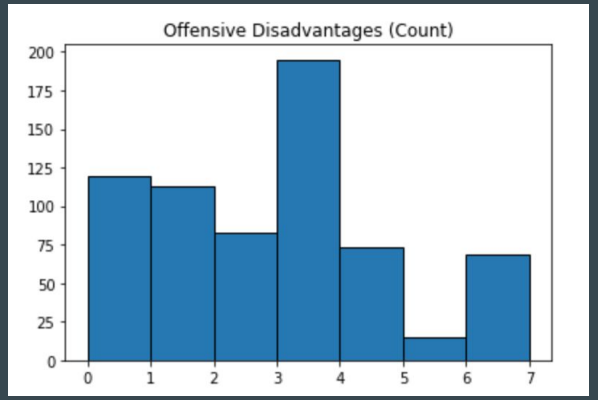
Approach : Feature Engineering

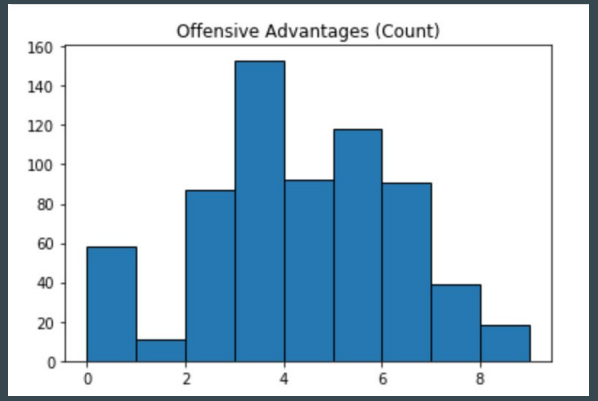
My recommendations would be based of strengths and weaknesses of each type and the aggregate of combining them. To represent this I created 7 new features to be calculated once given a type set

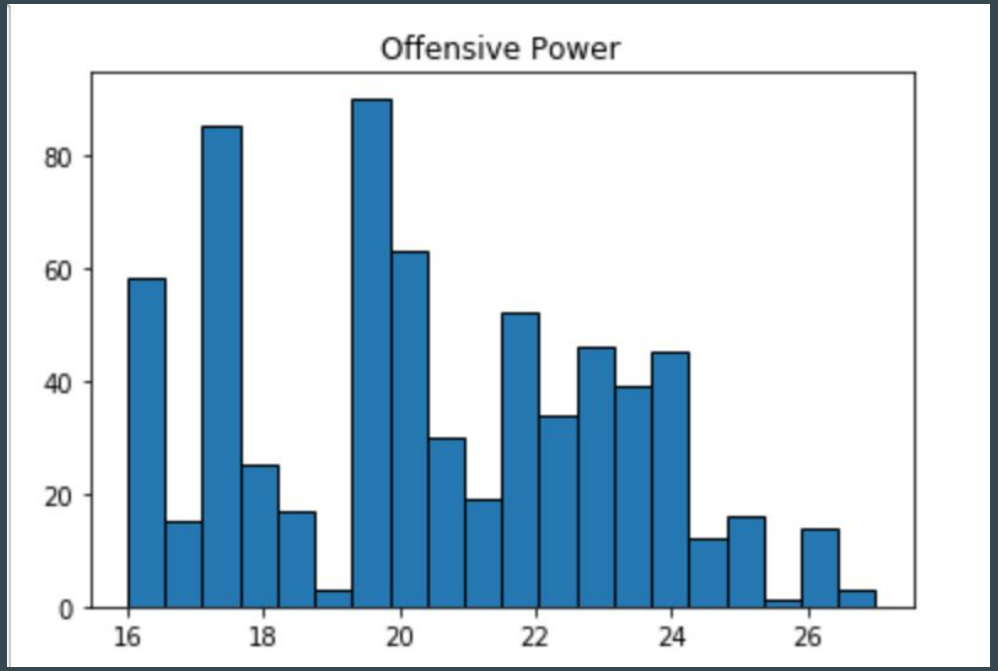
- Offensive Advantages : Lists of types this type-set has an offensive advantage against.
- Offensive Disadvantages : Lists of types this type-set has an offensive disadvantage against.
- Offensive Power : Sum of “Best” attacking multipliers against each individual type.
- Defensive Advantages : Lists of types this type-set has an defensive advantage against.
- Defensive Disadvantages : Lists of types this type-set has an defensive disadvantage against.
- Defensive Power : Sum of defending multipliers against this typeset.
- Immunities : List of Attacking types who have no effect on this type-set.

For all created features except the two power ones, a count of values in those lists were used for analysis.

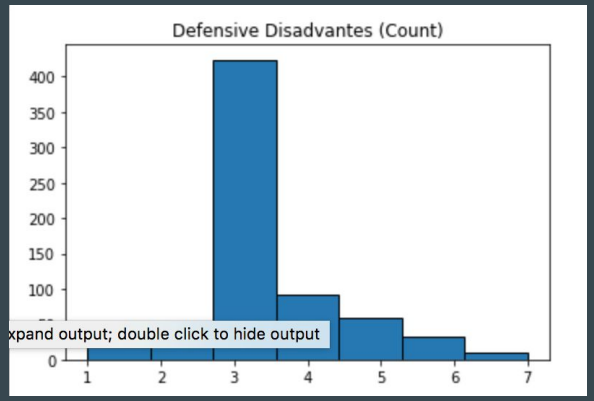
Approach : Identify Baselines and Averages (Offensive)

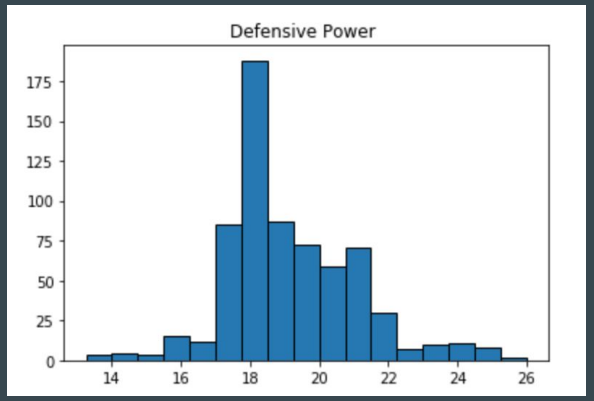


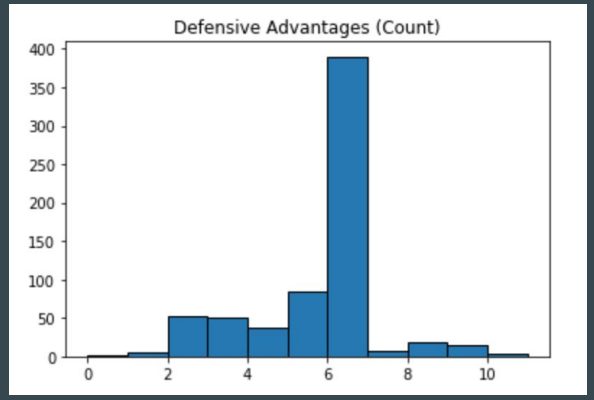


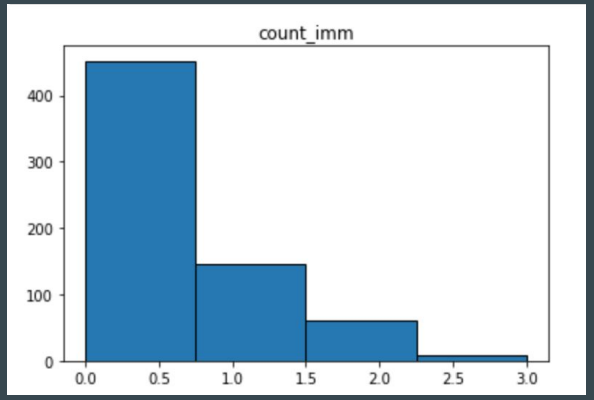


Approach : Identify Baselines and Averages (Defensive)









Approach : Recommendations I - Measure of Centrality

- Offensive Advantages (Count)	:	4	:	Median/Mean
- Offensive Disadvantages (Count)		:	3	: Median/Mode
- Offensive Power	:	20	:	Median/Mean
- Defensive Advantages (Count)	:	6	:	Median/Mode
- Defensive Disadvantages (Count)	:	3	:	Median/Mode
- Defensive Power	:	19	:	Mean
- Immunities (Count)	:	0	:	Mode
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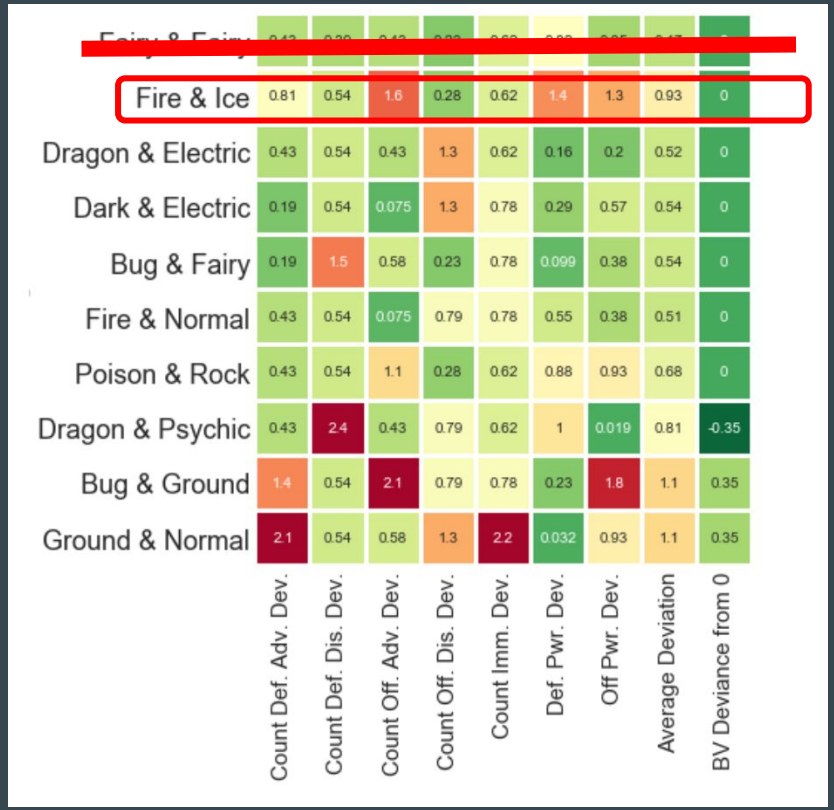
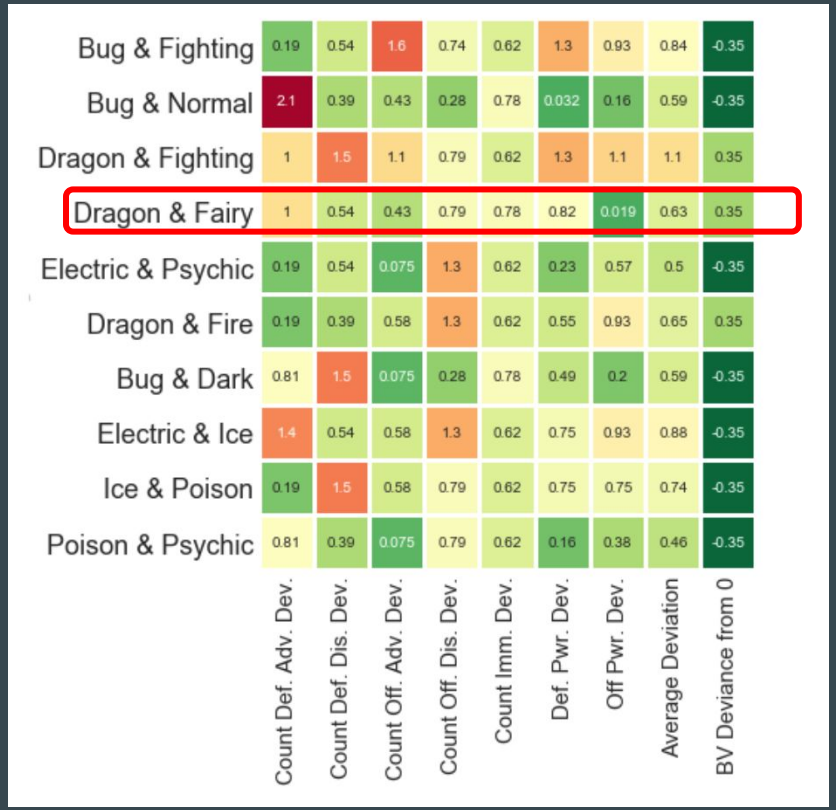
New type-sets with similar calculate values would be considered.

Plus/Minus system to require complementary weakness given a good strength and vise-versa

Approach : Recommendations II - Type-Sets





Conclusion

Excellent

- Dragon & Electric
- Dark & Electric
- Bug & Fairy
- Fire & Normal
- Poison & Rock

Very Good

- Dragon & Psychic
- Bug & Ground
- Ground & Normal
- Bug & Fighting
- Bug & Normal
- Dragon & Fighting
- Electric & Pyschic
- Dragon & Fire
- Bug & Dark

Next Steps

Rare Occurrences	• Remove are occurrences from analysis • Conduct Analysis on only rare occurrences
Consider Legendaries	• Investigate the effect of including legendary pokemon in the analysis. • Make type-set recommendations for new legendary pokemon.
Stat Ranges	• Investigate ranges of stats for existing type-sets • Recommend stat value ranges for proposed type-sets
Remove Normal	• Remove Normal Types as the are pure neutrals