# PokeData

Process Book

Table of Contents

Overview and Motivation

Data visualization is commonly used for communicating more serious things like scientific findings, historical trends, or current events. We felt as though there's an influx of negative current events so we wanted to do something that was more lighthearted. Therefore we decided to use a Pokemon dataset in order to create interactive, yet still educational, visualizations with Pokemon data. The show has a handheld computer called a Pokedex, which when pointed at a Pokemon, explains everything about it. This always felt so magical to us, so we wanted to bring that item to life, minus the picture taking and talking aspects.

Related Work

The original pokemon colors were too saturated and bright for the aesthetic we were going for. For the overall page we went with the colors of a pokeball(red, white, black) since this was pokemon afterall. As for the type colors, we found another pokemon dashboard with more muted colors for each type and used that. The colors can be seen below. (http://jkunst.com/flexdashboard-highcharter-examples/pokemon/).
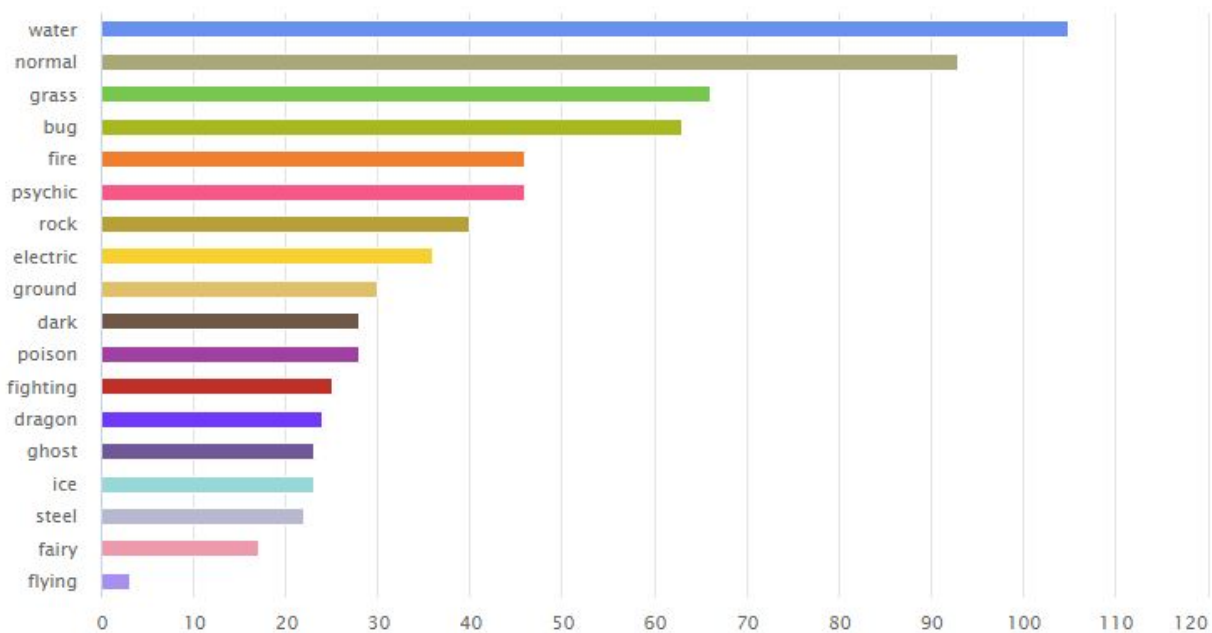
Questions

This project aims to create an interactive and educational data visualization for all 8 generations of Pokemon. We hope that it will help give a better understanding of pokemon statistical distributions in terms of types, generation, and stats. There are so many pokemon and type-relations that we want someone unfamiliar with the topic to be able to gain an understanding of the pokemon ecosystem. Also for people who already know about the pokemon world, this tool can be used to find out more in depth relations, like how strong certain pokemon are in relation to the rest.

Data

The Complete Pokemon Dataset (https://www.kaggle.com/rounakbanik/pokemon) from Kaggle is accessible through a downloaded csv file. In order to get the sprites for each pokemon, we will be using the PokeAPI's github (https://github.com/PokeAPI/sprites/tree/master/sprites/pokemon) which has a folder of all Pokemon images based on that Pokemon's Pokedex ID.

Data Update

One of the features we tweaked was how we should show the evolutions of pokemon. We realized the original Kaggle dataset did not have this information. We were able to find a csv with the evolution data from this public Github repository (https://github.com/jenniNelson/dataviscourse-pr-christennelsenson/tree/master/WhosThatPokemon/data/pokemon_data) and used that.
After loading in the evolutions we noticed that many of the arrays and values were the wrong types, so we wrote a python script to fill the null values and convert the fields to the correct data types. We also converted the csv's to json as that sped up the load time a little bit.

Exploratory Data Analysis

The data for this project was found in csv files which is easy to analyze when opening in Excel. By scrolling through the tabular data, we were able to deduce what kind of visualizations we could create with the data given. Additionally, the data is built on our previous knowledge so we could make assumptions on what we wanted a lot of the information to look like when displayed.

Design Evolution

Initially, we came up with 3 design sketches that each had some unique strengths. We then combined the best ideas from the 3 designs into a 4th final design. We used this final design as a base for starting our project and adjusted it from there.

Upon selection of a Pokemon, we want to be able to show a breakdown of their stats (defense, attack, etc), type(s), height, weight, and any other classifying information. In order to display pokemon stats, we want to utilize a radar chart to display special defense, special attack, defense, attack, and speed.

Prototype 1
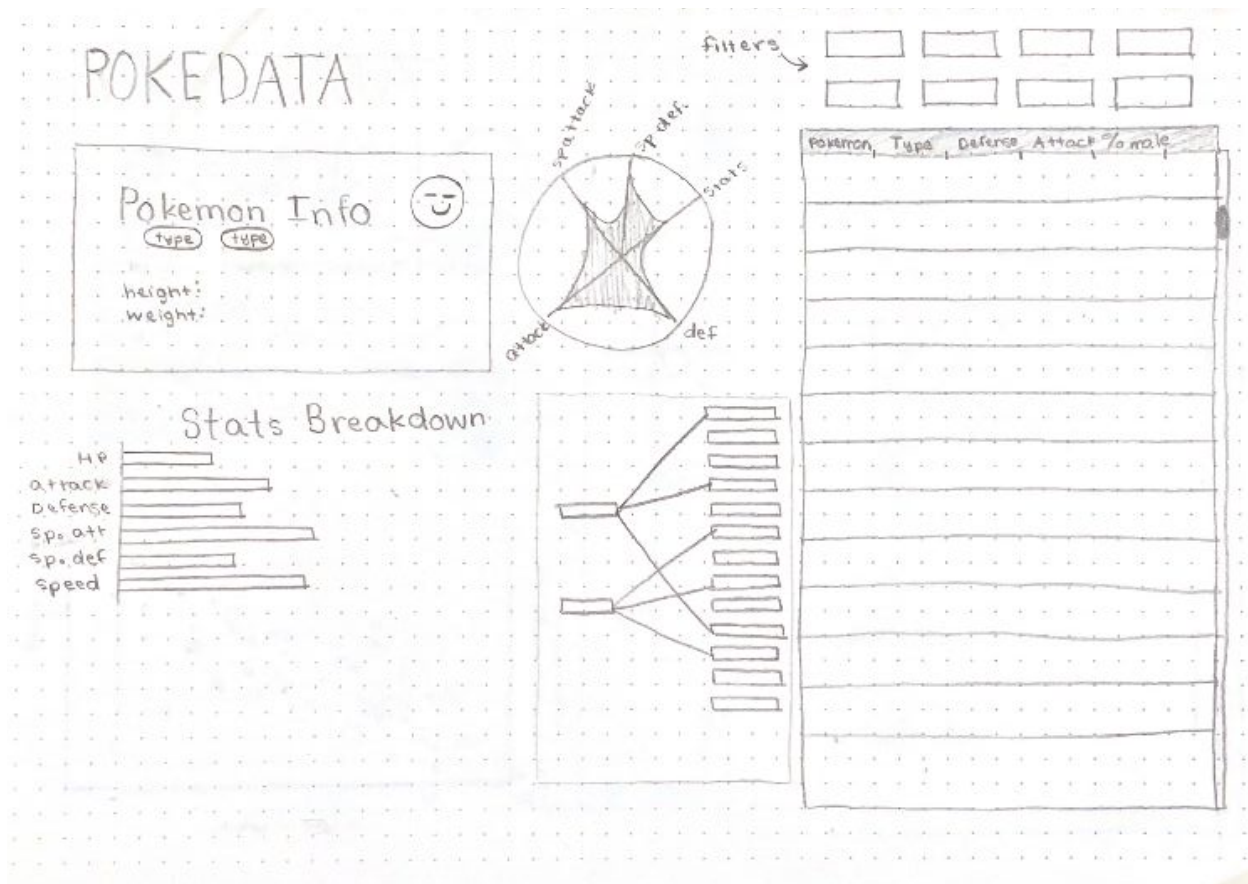
The first prototype design features a table view on the right hand side of the screen which will have every pokemon listed along with all of its stats. We also want a way to filter through all the pokemon in the table, hence the filtering buttons at the top of the table which could filter on type. Then on selection of a pokemon within the table, it would pull up a breakdown of that pokemon's statistics by use of an info card and a few different graphs. The info card contains the name, picture, type(s), height and weight. We wanted to show a visual indicator for specific stats (defense, attack, special defense, special attack, and speed) in a traditional radar chart. This way allows for a quicker understanding of how each stat relates to one another. Then we break down the rest of the statistics a little further in a stats breakdown chart which is a simple horizontal bar chart. To the right of the stats breakdown is information about the selected pokemon's type and what types the pokemon is weak and strong against. We envisioned this would be a visual indicator similar to word-term matching on tests where there are lines to types that are more or less effective given the type of the selected pokemon.
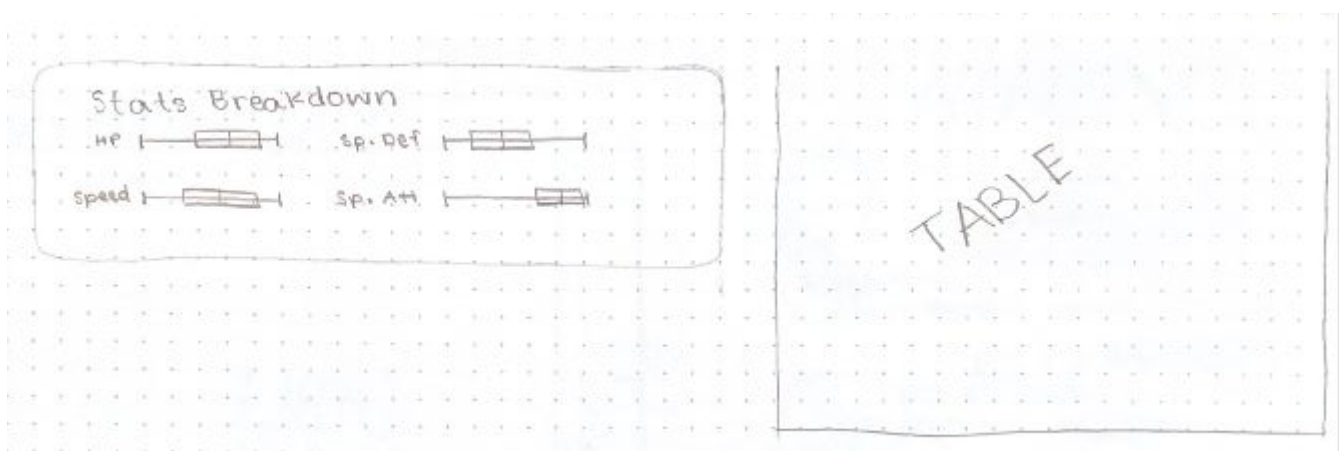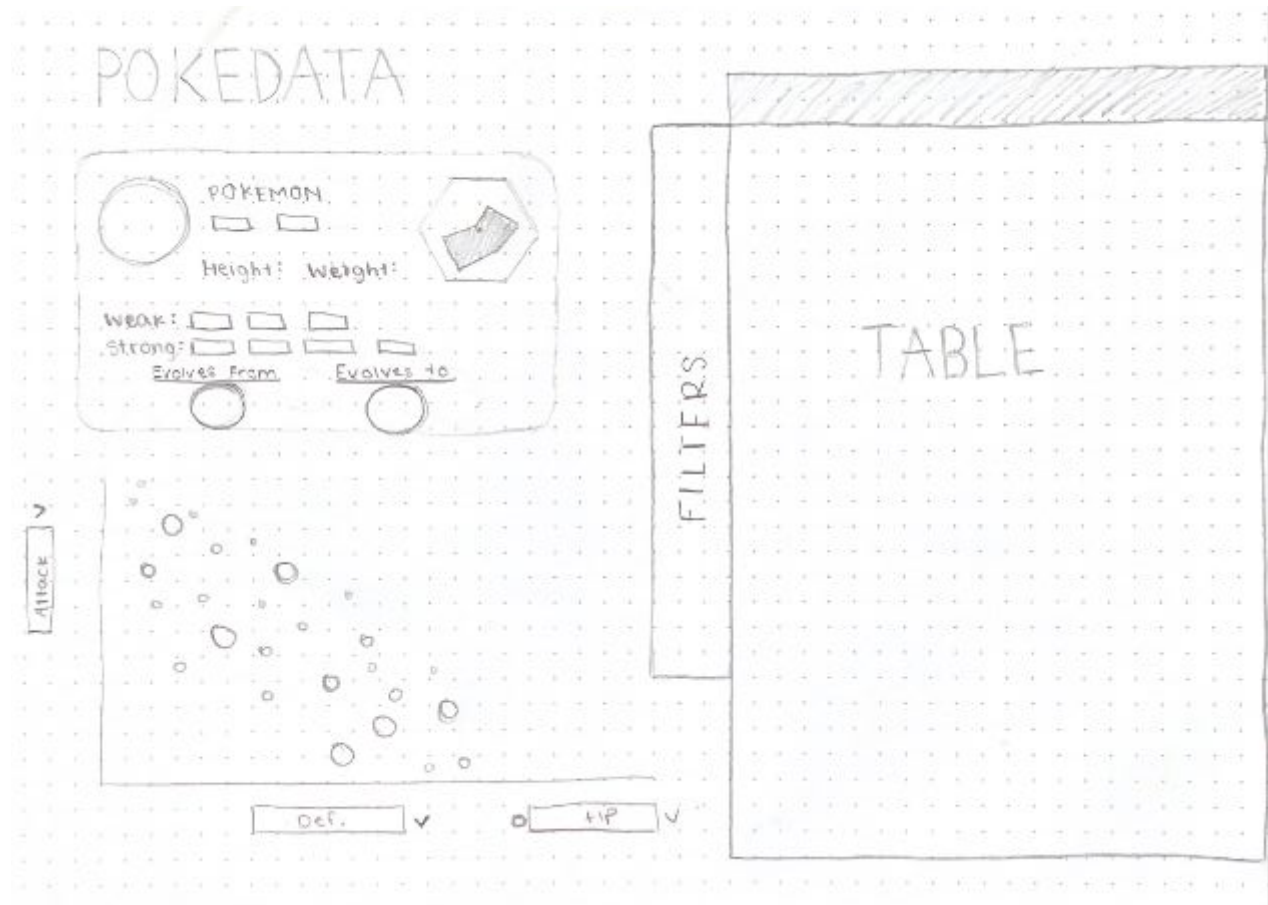
Prototype 2
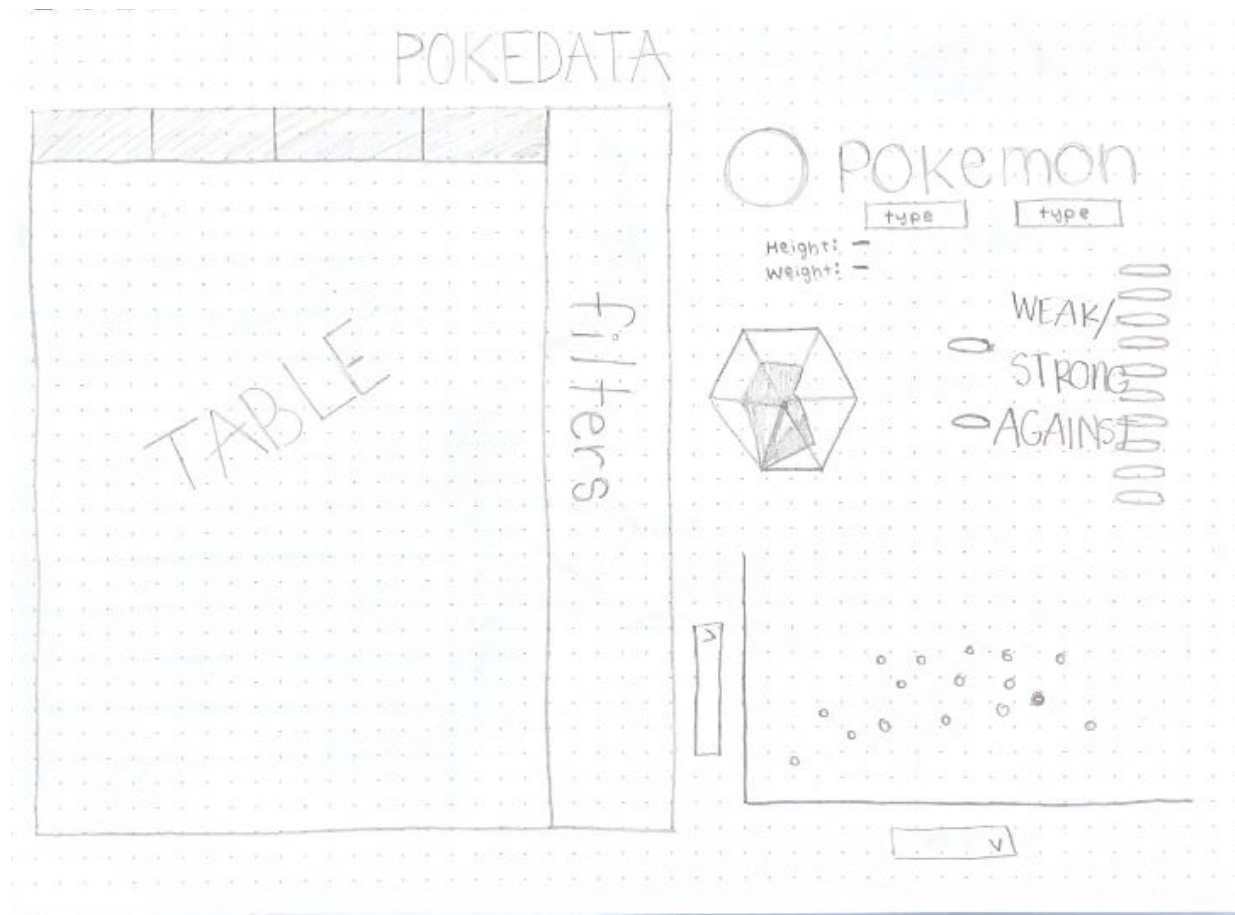
The second design is similar to the first, but the major differences are what is the most highlighted aspect of what is seen first. The table is a big focal point of this design because we have a larger table on the left which has a filter bar on its right hand side. Interactions within the web page would work similarly as selection of a pokemon in the table would pull up it's statistics breakdown on the top right side. The top right side still has the info card, radar chart for stat comparison, and then the weak against and strong against type information for that selected pokemon. Here we wanted to add in a distribution overview of all pokemon in the table on the bottom right of the webpage. The scatter plot has customizable x and y axis statistics which would display every pokemon that is in the table. The plot would filter as the table filters as well. We thought this would be a useful change to not only have an individual pokemon's statistical information but to also compare that pokemon with all the rest of the pokemon as well.

Prototype 3

Pokedata

Authors

Sprite — Weak Against Water

Name

Strong Against Grass

weight height — Neutral Against Fire

Type 1: Fire

Type 2: Dragon

Stats Breakdown

HP — min, max, 75th percentile

Speed

Atk

Def

Search Name or Id

Type Filter ⌄

Generation ⌄

Name	type	ATk				

This design splits our project into 3 sections: Infocard, stats breakdown, and table. The table gives an overview of all the data, since the data is tabular in nature this felt like the natural thing to do. This allows for easy filtering and ordering of the data as there are too many rows to digest at once. The top half is a zoomed in view for the currently selected pokemon. For easy comparing of the stats we drew a radar chart that will transition on selection. We felt this was the easiest way to compare multiple stats compactly (attack, defense, speed, hp, special attack, special defense) as it encodes each value with their distance from the center. As for the stats breakdown, we wanted to show how the selection compared to the dataset overall. Since there are 6 stats, we wanted a compact way to display what percentile a pokemon's stats fell into.

Final Design

POKEDATA

POKEMON

Height: Weight:

WEAK: ☐ ☐ ☐
Strong: ☐ ☐ ☐ ☐

Evolves From   Evolves to

Attack

Def.   HP

FILTERS

TABLE

Stats Breakdown

HP ├──☐──┤   Sp. Def ├──☐──┤

Speed ├──☐──┤   Sp. Att ├──☐──┤

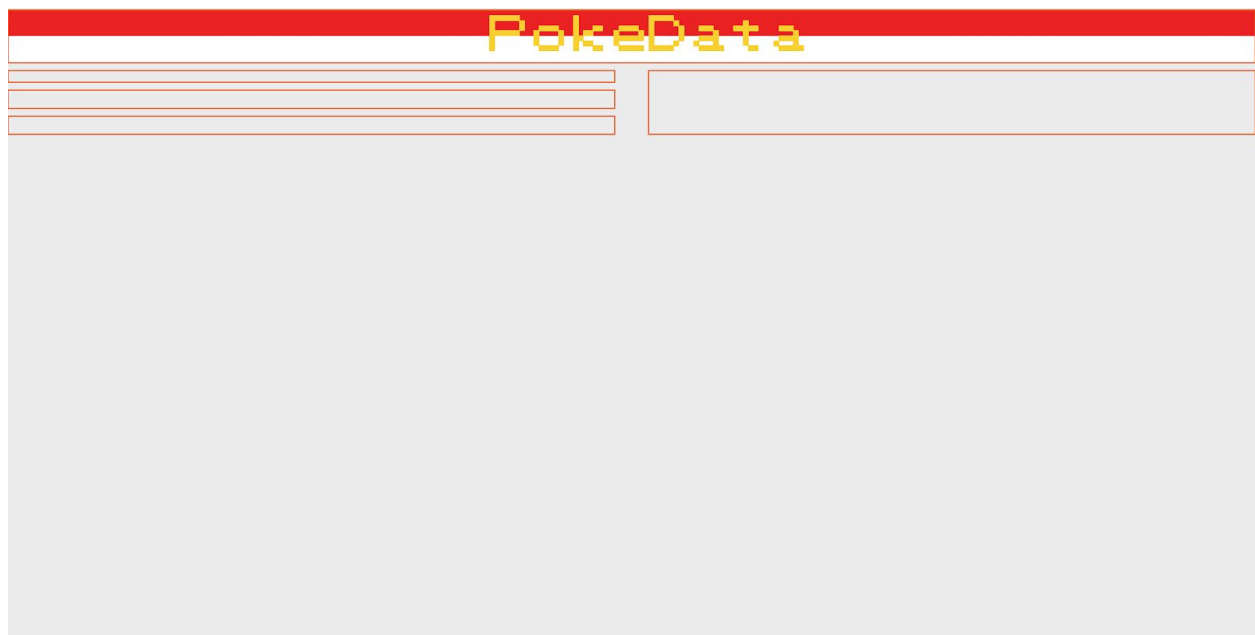TABLE

We designed each prototype with a specific strength in mind, but realized we do not have to confine our visualization to a single page because you can scroll down infinitely in a webpage. So we combined all the elements in each prototype into this once. The most important part of a pokedex is finding the pokemon you want and seeing its core information, so we put the table and infocard at the top. The table lets a user quickly sort through the tabular data by any attribute (name, type, stats) as well get an overview of all the data. The infocard will include the stats in a radar chart, which we discussed compactly encodes stat values with distance. We then added a scatter plot below the infocard so that users can compare any 3 stats on the axes. Since position and area are very powerful channels we believe this is the best way to compare a few specific attributes. Unseen here, but the color will also encode the pokemon's type. Clicking a point will bring it up on the infocard as well as in the stats breakdown, which lets the user select a pokemon with specific criteria in mind. The stats breakdown will use boxplots to show how a pokemon's stats compare to the rest. We had a lot of stats so we wanted something compact and easy to read quickly.
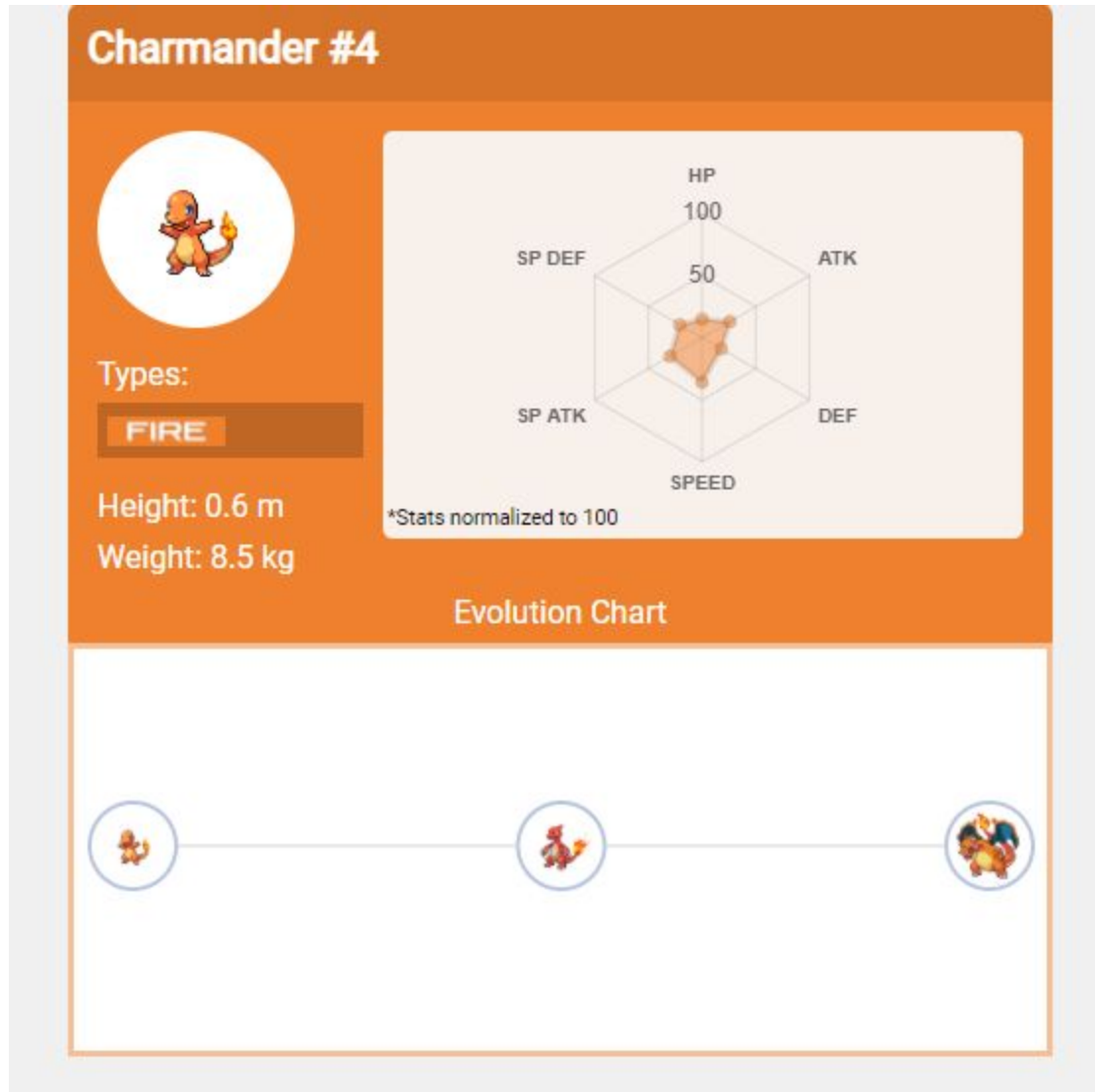
Implementation

Overall Layout

Our base layout includes a title banner, complete with boxes for where we plan to put our components. The left side will have the infocard, scatterplot, and stats breakdown, while the right will have the table. We felt this was a good starting point as it separates all the components of our project and allows us to split the work.

Infocard
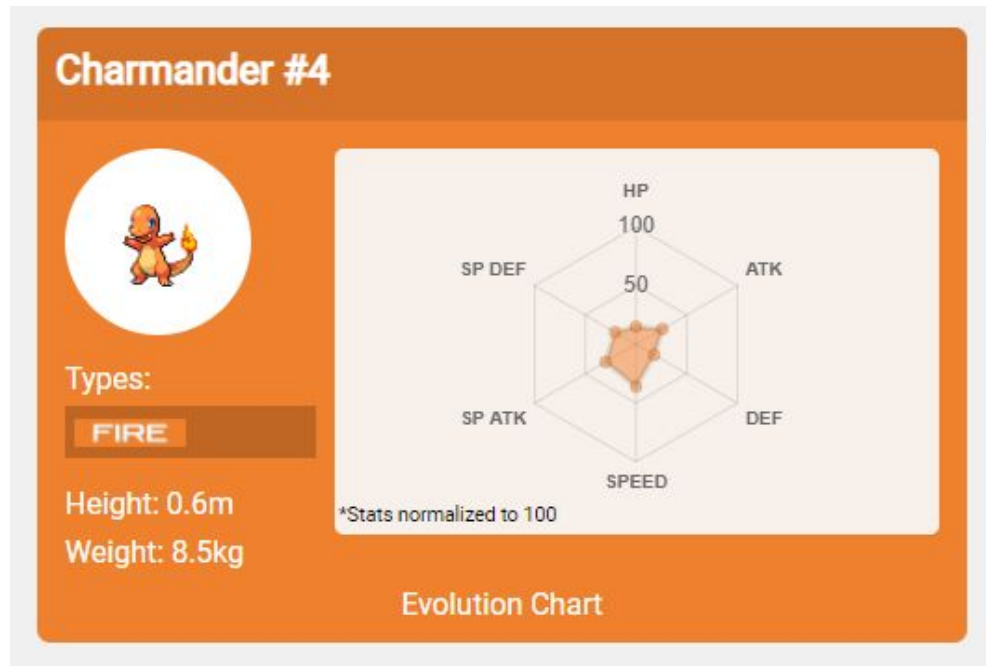
The infocard is meant to give fine control to a user by showing the attributes of a selected pokemon. The sprites are unique and the core of the franchise, but there are over 800 of them so it is important to allow users to map the image to the name. We also wanted a way to convey the type to the user, so we have a double encoding for it (the color of the infocard and the actual logo in the types section). A small dark background was applied to make the type logo discernable from the background itself. As for the stats window, we wanted to give a quick overview at a pokemon's best and worst stats. Because HP has a much bigger domain than the other stats, they were all normalized to 100 to keep every stat visible. The radar transitions to the new size when a new pokemon is selected, as opposed to no transition, which allows users to visually compare the stats.

Charmander #4

Types:

FIRE

Height: 0.6 m
Weight: 8.5 kg

*Stats normalized to 100

HP, SP DEF, ATK, SP ATK, DEF, SPEED

Evolution Chart

Evolutions are another key component to pokemon and creates a relationship between them. Pokemon typically start in a small form and as they get stronger (or a special item is given to them) they will evolve into another pokemon. Since this is a hierarchical process (pokemon always evolve from one to another and cannot go back) we thought a tree would show this best. Each node encodes the pokemon with its sprite, and clicking any of the sprites will select that pokemon and change the infocard accordingly.

Table

#	Name	Type 1	Type 2	HP	Attack	Defense	Special Attack	Special Defense	Speed
1	Bulbasaur	grass	poison	45	49	49	65	65	45
2	Ivysaur	grass	poison	60	62	63	80	80	60
3	Venusaur	grass	poison	80	100	123	122	120	80
4	Charmander	fire		39	52	43	60	50	65
5	Charmeleon	fire		58	64	58	80	65	80
6	Charizard	fire	flying	78	104	78	159	115	100
7	Squirtle	water		44	48	65	50	64	43

The first version of the complete pokemon table was a very simple, scrollable table. The table mimicked the csv file with no particular changes to the display of the data, other than the ability to sort the data by clicking on the headers. By default, the data was already sorted by Pokedex number. At this stage, selection of a row will also update the infocard with that pokemon's picture and stats.

#	Name	Type 1	Type 2	HP	Attack	Defense	Special Attack	Special Defense	Speed
1	Bulbasaur	grass	poison						
2	Ivysaur	grass	poison						
3	Venusaur	grass	poison						
4	Charmander	fire							
5	Charmeleon	fire							
6	Charizard	fire	flying						
7	Squirtle	water							

The next iteration of the table was to visually encode how the individual stats were displayed. We thought that plain numbers were not as intuitive or comparable so we decided to add in the bar visualization of the data. Additionally, each bar is scaled with the minimum and maximum of each individual stat to better display the various ranges. A tooltip will display the actual value of the stat when hovered over as well to still convey the same information as the previous version.

For more consistency throughout the entire webpage, we thought it would be a good idea to also encode the types using the type badges used in the infocard. For this version of this table, filters were added in order to make looking for a specific pokemon a little easier or to compare pokemon of a similar type/stat range. The search bar searches on name and pokedex number while the 'filters' button expands to show type filters and stat sliders.


There are two distinct sections in the filters' expanded view: type filters and range sliders for each stat. Clicking a type filter will filter the table on whether a pokemon has that type for either their first or second type. A visual indication of the filter selection will be represented as

that type button with an 'X' next to it to provide a way to clear the filter. The range sliders for the individual stats will filter based on the numbers selected by each slider.

Scatterplot
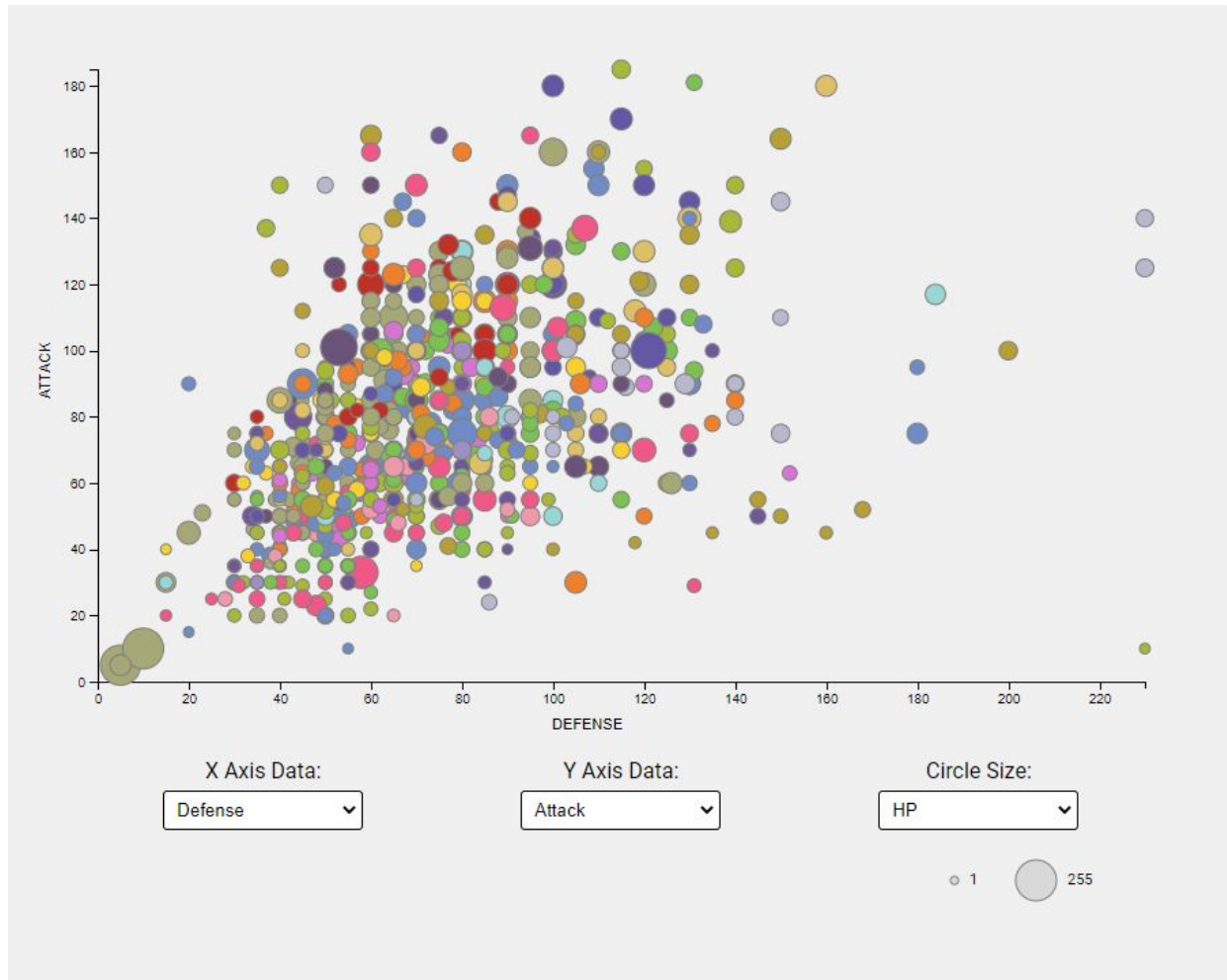
A core mechanic of the pokemon games is the battle system. For this reason, we wanted to compare pokemon by their stats. As seen with the radar, it can be hard to look at all 5 at once, so we allow users to intuitively compare 3 up to stats. Users can select which stats they want on each axis, as well as what they want the circle size to represent. There is also a legend to indicate what values the circle sizes represent as that cannot be seen in the scatterplot. This plot was effective in the Gapminder assignment so it was reused here. Color encodes the type of each pokemon, which is a recurring color encoding that will be seen across all the views.
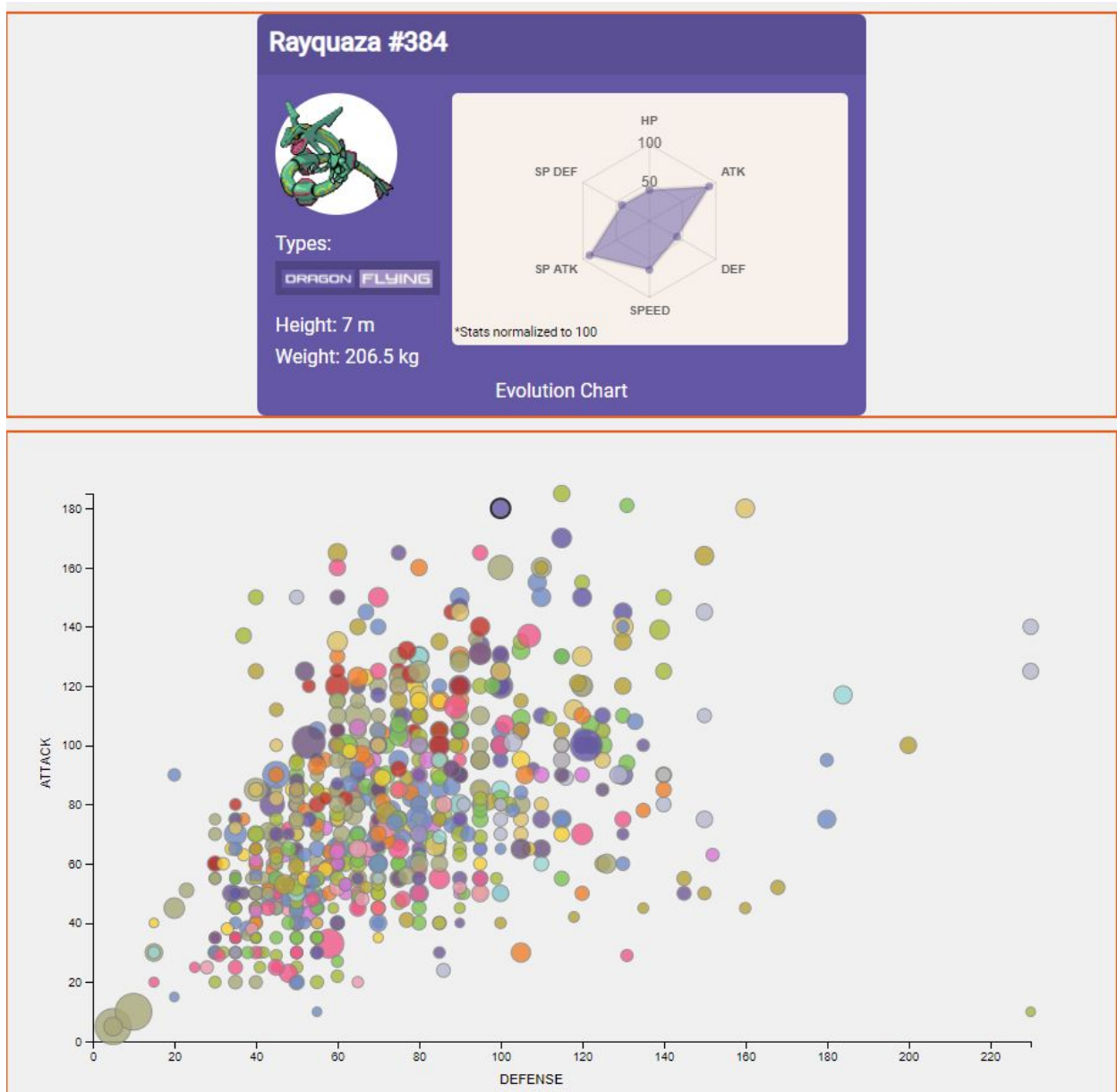
Being able to compare stats alone is useless if we do not let users look at the pokemon each dot represents. So if a user hovers over a dot the tooltip will show the pokemon name and pokedex id (which is a unique id that each pokemon has). They can click the dot to select it and the infocard will update accordingly. This gives the user a way to filter pokemon by certain stats before selecting them. Also worth noting, the opacity of the circle was adjusted in this iteration so that overlapping circles could be seen.
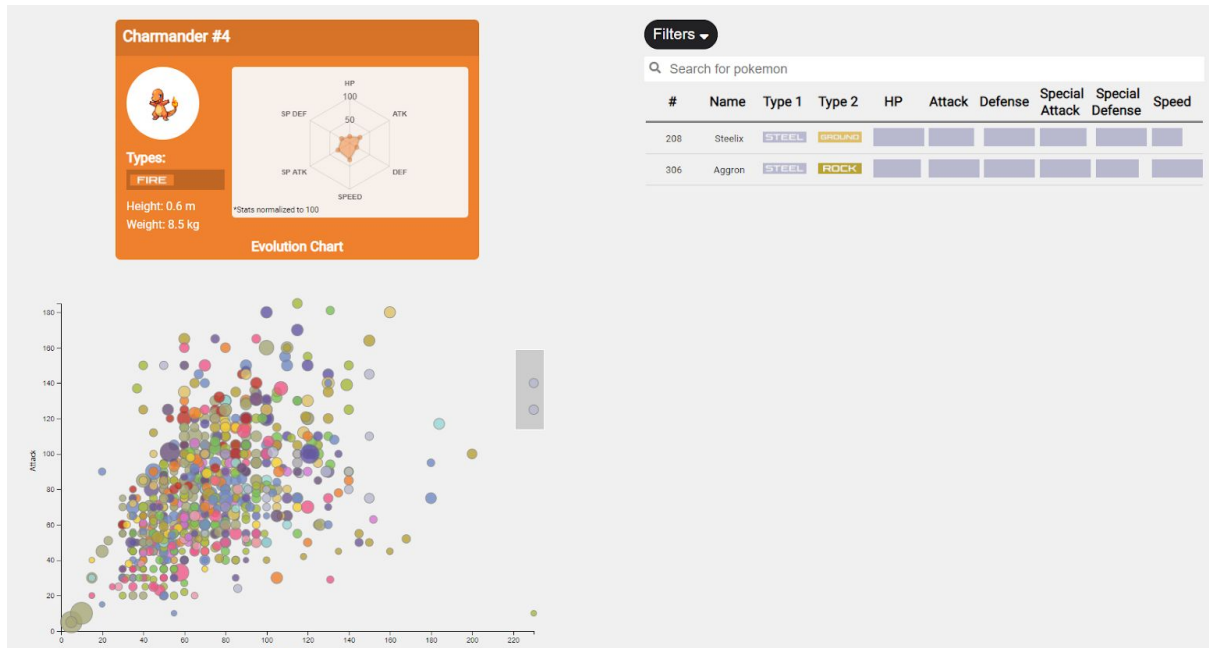
A brush was added to allow users to narrow down specific pokemon they want to look at. Brushed circles will adjust the table accordingly, which gives the user another form of filtering. This was necessary because the infocard can only show 1 pokemon at a time, but the table allows for much more. And because of the bar encodings in the table, it also allows users to compare in the table as well as the scatterplot.